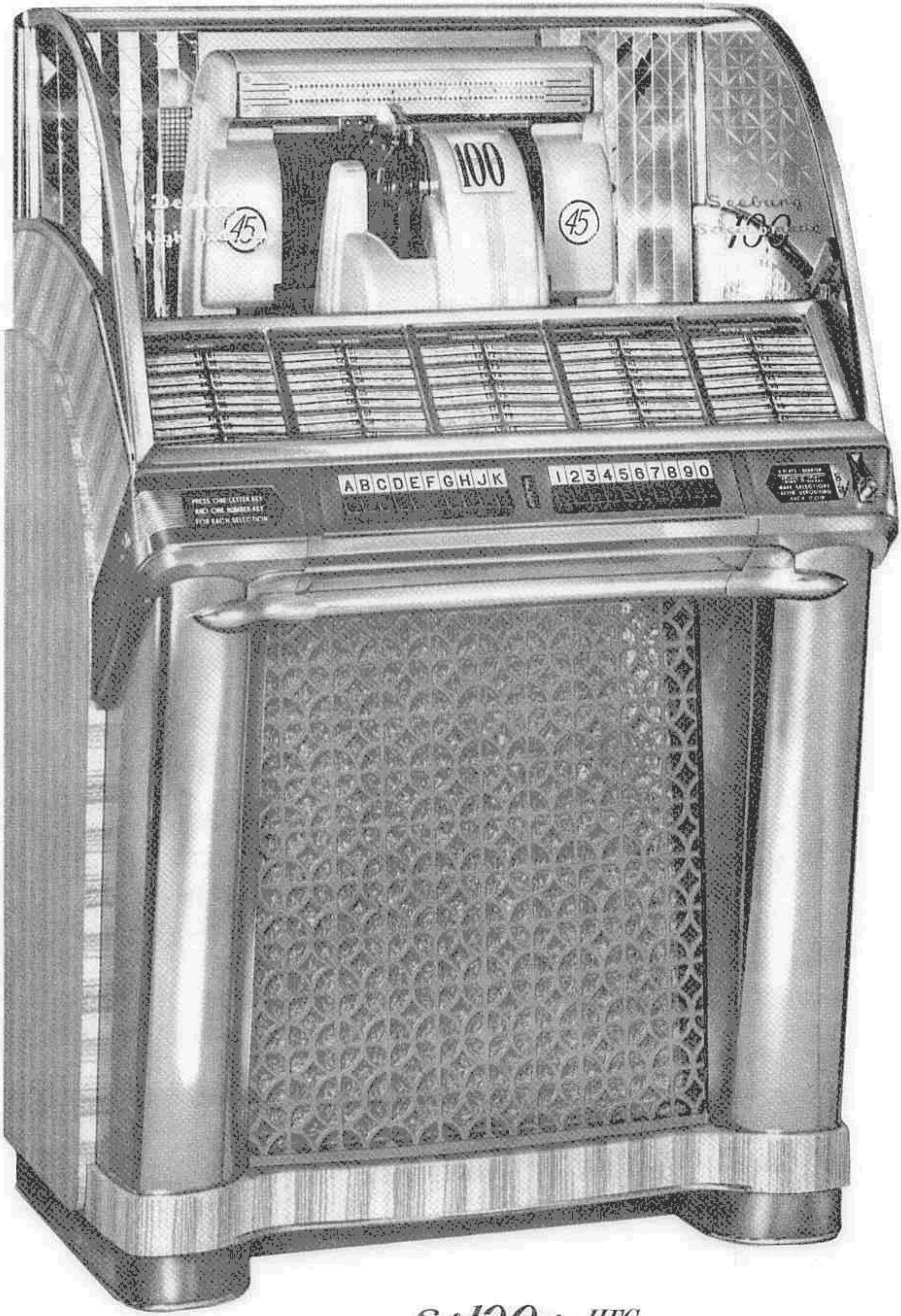


Select-o-matic 100 HFG

ANOTHER GREAT SEEBURG
MUSICAL ADVANCEMENT

HIGH FIDELITY

to coin-operated music

The value of any music system lies in its ability to attract the public by offering a *Broader Music Service.*

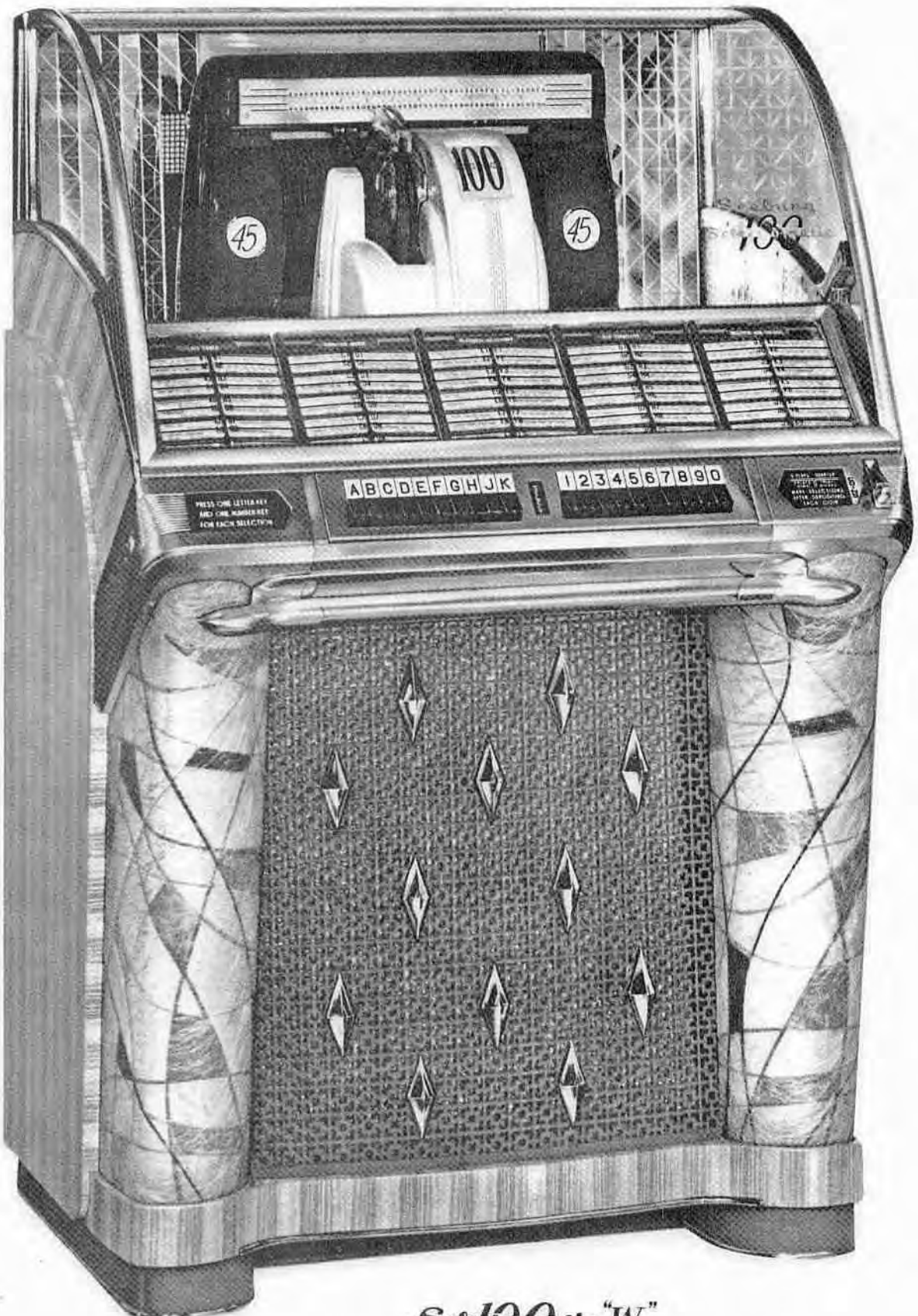
That's why Seeburg spent years to perfect the Select-O-Matic Mechanism, the most revolutionary development in the entire history of our industry. That's why Seeburg has led the way in producing music systems that make proper programming easy.

That's why Seeburg was first to develop a 100-selection remote control system . . . first to adopt scientific sound distribution and automatic volume compensation.

And, now, Seeburg brings another great advancement to the world of coin-operated music . . . HIGH FIDELITY.

In this book Seeburg proudly presents two great new Select-O-Matic "100" Music Systems. Once you see them, you'll agree that Seeburg continues to set the pace for the coin-operated music industry.

J. P. SEEBURG CORPORATION, CHICAGO 22, ILLINOIS



Select-o-matic "W"

THE NEW

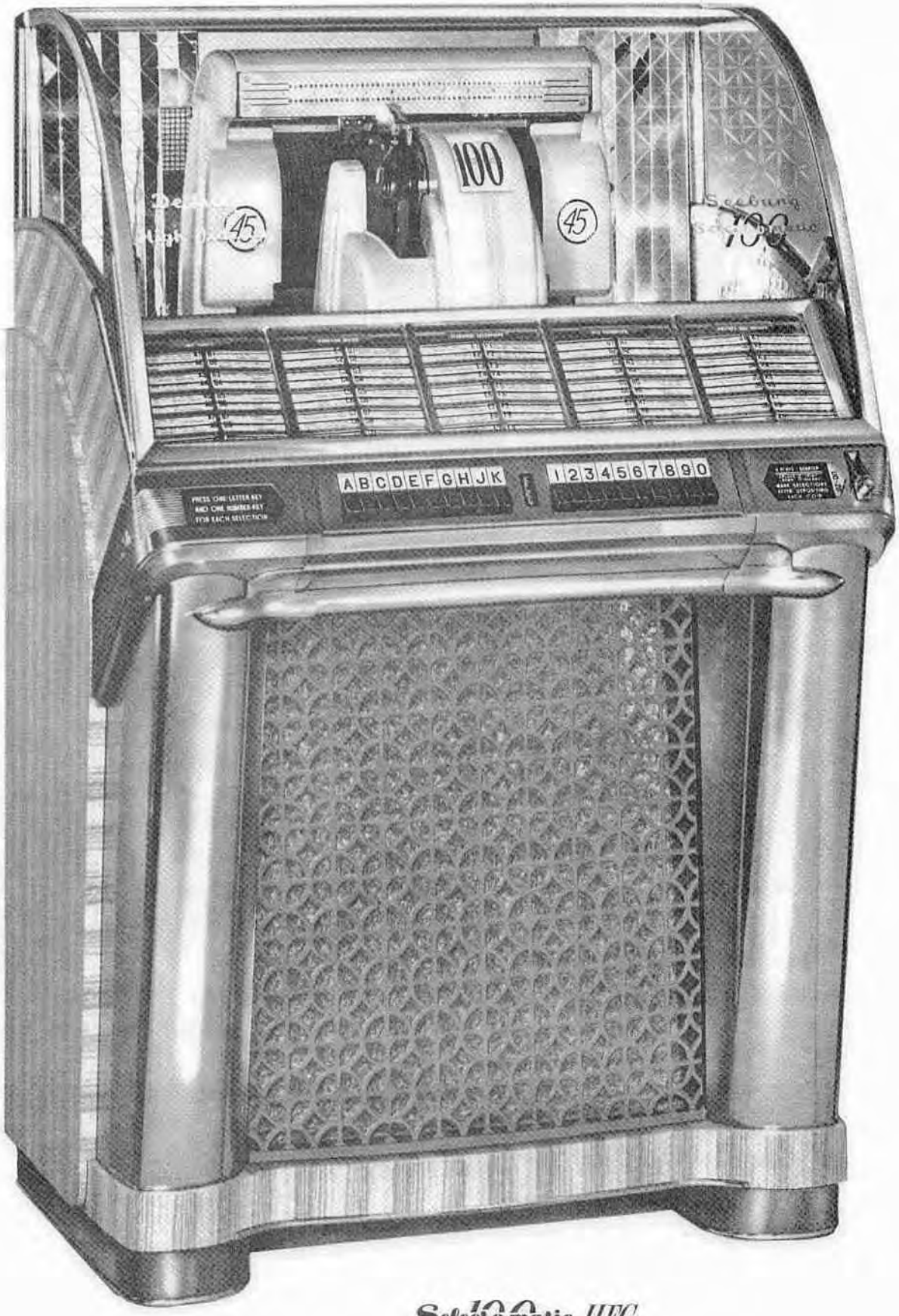
Select-O-Matic 100 "W"

You're looking at the "new look" in Select-O-Matic "100" Music Systems. In this great new music system, beauty of design and functional styling are immediately apparent.

An exciting blend of rich wood veneers, sparkling chromium, glittering mirrors and crystal-clear glass . . . the cabinet of the new Select-O-Matic "100" will attract all who see it, wherever it is installed. The extended sweep of the full-vision, one-piece glass top provides an enlarged showcase for the selection panel and the Select-O-Matic "100" mechanism mounted against a brilliant mirror background. And nestled at the base of the showcase is the newly-designed straight-in-line selection system . . . perfectly positioned to provide "music for everyone."

Below, flanking the chromium diamond-studded grille, are pilasters of modern Fiberglas which send forth a pleasing pattern of cool, refreshing illumination and color.

Beyond its beauty, the Select-O-Matic "100" W offers features that assure outstanding performance . . . features that only Seeburg builds into a coin-operated music system (see pages 8 and 9).



Select-o-matic 100 HFG

THE NEW Select-o-matic 100 HFG

DELUXE HIGH FIDELITY

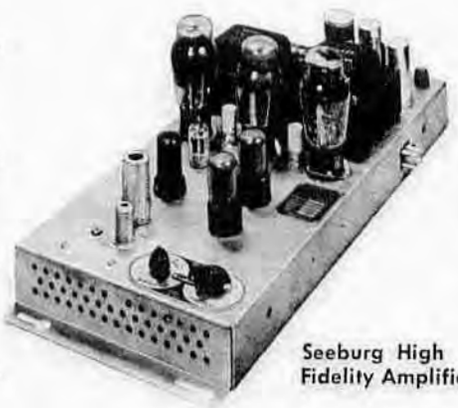
Now, Seeburg introduces another startling innovation! Here, for the first time in the history of coin-operated music is a music system completely equipped for

HIGH FIDELITY REPRODUCTION

The new Select-O-Matic "100" High Fidelity Deluxe brings a new realism to recorded music. Every note of the artist is faithfully reproduced . . . you'll hear music you never knew existed on the records. From the lowest lows to the highest highs, "hash" and distortion of every kind are completely minimized. Think of the advantages this will mean to capture *and hold* the attention of even the most critical listeners.

Matching the tonal perfection of the Deluxe High Fidelity is the exciting beauty of the cabinet with its distinctive, smart-looking chromium pilasters. In all other respects, the Deluxe High Fidelity is identical to the Select-O-Matic "100" W. (See pages 8 and 9 for other features.)

ALL HIGH FIDELITY CHARACTERISTICS ARE "BUILT-IN" FEATURES

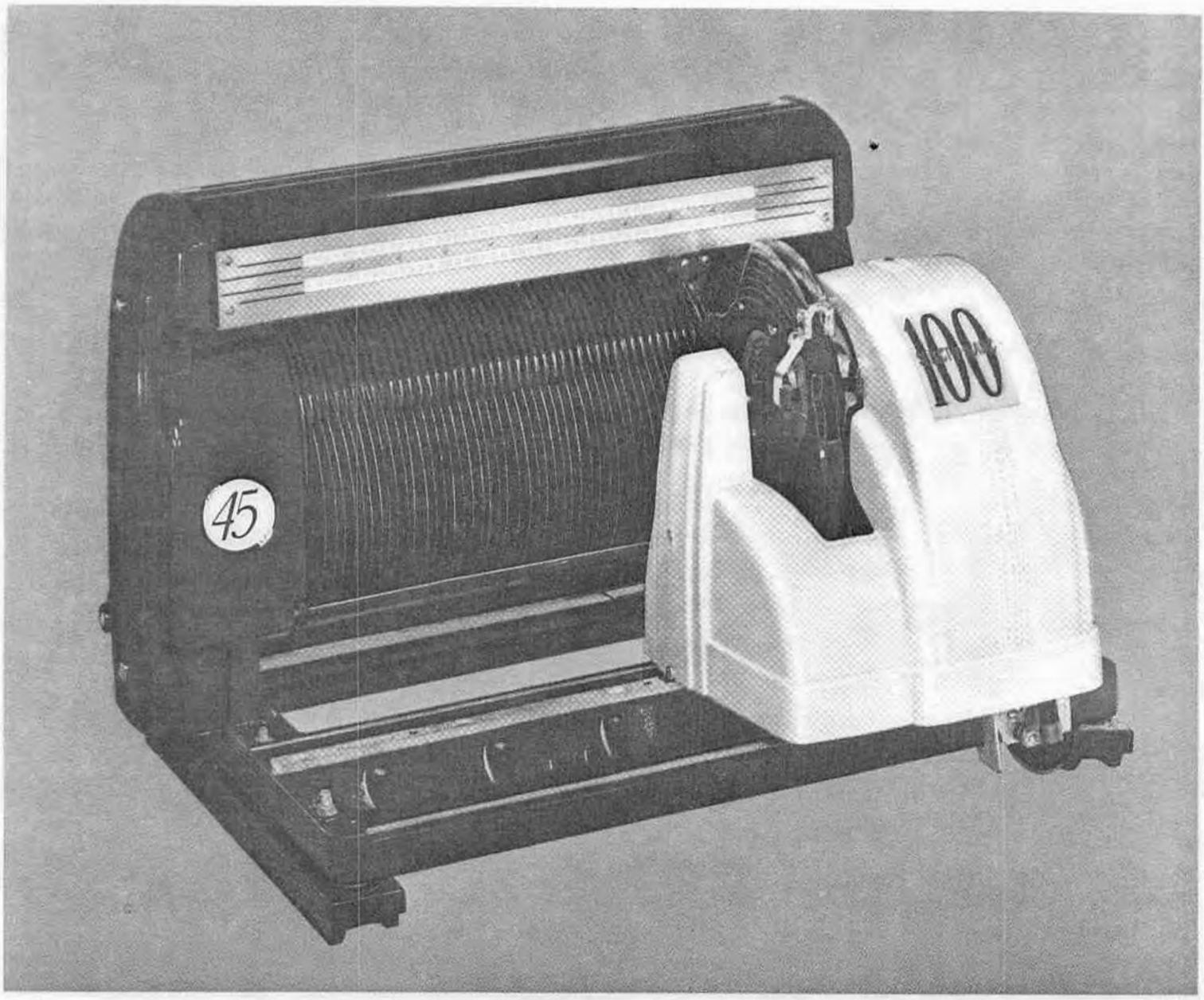


Seeburg High Fidelity Amplifier

This is a complete high fidelity system . . . with nothing to convert, nothing to adapt. The amplifier has low distortion and wide range characteristics to assure tone trueness across the entire range. The Select-O-Matic "100" HFG is equipped with two skillfully baffled speakers: (1) a 15-inch woofer speaker for the low and middle range; (2) a 5-inch tweeter speaker to reproduce the highs. For remote speakers, Seeburg supplies a 12-inch, high fidelity recessed speaker which has two mechanically interlocked cones (one for low and middle range—the other for highs).

15-inch Woofer and 5-inch Tweeter Speakers mounted on same baffle

12-inch High Fidelity Recessed Remote Speaker



ONLY SEEBURG HAS THE Select-o-matic 100 MECHANISM

The Select-O-Matic "100" mechanism . . . the most revolutionary development for the playing of recorded music—since the invention of the phonograph . . . has established new standards of performance for coin-operated music.

Only the Select-O-Matic "100" Mechanism—world's first commercial mechanism designed exclusively for the playing of 45 RPM records—plays records in the vertical position, never drops a record, never turns one over. Vertical play means greater sales appeal through increased public interest. And, when records are stored and played in the vertical position dust, dirt, and abrasives do not settle in the grooves, thereby increasing both record and stylus life.

Beyond this, the performance of the Select-O-Matic "100" has proved it to be the most efficient operating mechanism ever incorporated in a coin-operated music system.

SEEBURG

SELECT-O-MATIC "100"

MODEL 100W

The Select-O-Matic "100", Model 100W, is a coin-operated phonograph using the Seeburg Select-O-Matic Mechanism for selective playing of either or both sides of fifty 45 r.p.m., 7-inch records. Choice of any of the one hundred selections may be made at the instrument with an Electrical Selector or by remote control with 100-selection 3-wire Wall-O-Matics. A program holder using standard size title strips displays the entire hundred selection program and may be removed as a complete unit or in sections of 20 titles.

The program title strips are back-lighted by a 25-watt Daylight fluorescent lamp which also illuminates the mechanism, the speaker grille, and the electrical selector escutcheons. A 20-watt Daylight fluorescent lamp is used in each of the pilasters.

The cover glass through which the mechanism may be seen is hinged and opens for changing records and title strips. The cover is retained at any position of opening by a self-locking support rod. Service Switches, a Popularity Meter and a Selection Counter are accessible with the cover open. The Service Switches are used to operate the mechanism when servicing the instrument. The Popularity Meter which is a part of the mechanism indicates the number of times (up to 50) each record is played. The Selection Counter which is part of the Electrical Selector totals the number of selections made with the Electrical Selector and with remote control Wall-O-Matics.

Coins are deposited in a single entry coin chute and pass through a 5-, 10-, 25-cent slug rejector to the coin switches. The coin switches are connected for one play for a nickel, two plays for a ten-cent piece or six plays for a quarter. The coins are stored in a canvas bag which has a capacity of approximately one-hundred fifty dollars. The bag, is removed through a small door at the lower right side of the cabinet.

A Seeburg Magnetic Pickup with one-quarter ounce stylus pressure assures long record life and high quality reproduction unaffected by temperature or humidity conditions. A 25-watt amplifier connects to a 15" dynamic speaker in the cabinet and to remote speakers. The amplifier incorporates an automatic volume compen-

sator to provide uniform volume level and avoid "blasting" due to "loud" records. A single volume control is used to adjust the volume of sound from the phonograph speaker and the remote speakers. Provision has been made for plug-in connection of a remote volume control that may be up to a hundred feet from the Select-O-Matic without introducing hum or causing distortion.

A Selection Receiver supplies power for remote control Wall-O-Matics and incorporates the switches and relays for operation from remote points as well as from the Electrical Selector. It is equipped with convenient sockets for plug-in connections of the mechanism, cabinet lighting, amplifier, and control circuits.

The Selection Receiver and the Amplifier are mounted in a vertical position on the inside of the cabinet rear door. The door may be opened for access to the tubes and fuses or it may be fully removed. The units are fastened over an opening which is covered by a steel plate. The plate, which is held in place with wing nuts, may be removed to expose the tube socket and plug connections and the interior wiring of the units for test furing normal operation.

A selection cancel switch, effective only when a record is playing, is operated by a small, inconspicuous button on the back near the left side of the cabinet. A remote cancel switch or button may be substituted by plug-in connection to the selection receiver.

SPECIFICATIONS

Power Requirements:
117 volts A.C., 60 cycles
Standby (without Wall-O-Matics) - 140 watts
Operating (without Wall-O-Matics)- 270 watts

Cabinet Lighting:
1 - 25-watt, 33-inch, Daylight Fluorescent (FS25-Starter.)
2 - 20-watt, 24-inch, Daylight Fluorescent (FS2-Starter.)

Cabinet Key Number.....F221

Record Capacity.....50 records (100 selections)

Record Type.....45 rpm
7-inch diameter, 1.5-inch center hole.

Pickup.....Seeburg Magnetic
Speaker.....15" Electro-dynamic
Finish: Silver Zebrano Plastic Veneer.

Coin Equipment:.....5-, 10-, 25-cent Single Entry Slug Rejector.

Amplifier:
8-tube Constant Voltage Type with Automatic Volume Compensation.

Audio Power Output (at full volume):
To Phonograph Speaker (adjustable).....
¼ to 16 watts.....
To Remote Speakers.....24 watts, max.
Maximum total to Phonograph Speaker & Remote Speakers.....25 watts

Major Component Assemblies:
Type 145S10-L6 Select-O-Matic Mechanism with
Type 100SA7-L6 Selector Assembly
Type ES10-L6 Electrical Selector
Type MRA3-L6 Master Remote Amplifier
Type WSR5-L6 Wired Selection Receiver

Remote Control:
Type.....Seeburg, 3-wire "Wall-O-Matic 100"
Nominal operating voltage.....25
Power source for Wall-O-Matics.....Selection Receiver or Aux. Power Supply (Type PS6 1Z)
Maximum Number of Wall-O-Matics powered by
Selection Receiver 6
Maximum Number of Wall-O-Matics powered by each
Aux. Power Supply.....6

Remote Speakers: CV (Constant Voltage) or RS

Tubes:	Fuses:
1-6J7	1-5 amp. 3AG
1-6SN7GT	1-3 amp. 3AG
1-6SK7	2-2 amp. 3AG SLO-BLO
2-6SL7GT	1-3 amp. Fustat
2-6L6G	
1-5U4G	
1-2050	

Dimensions:

Height.....	54 Inches
Width.....	35 Inches
Depth.....	27 Inches
Net Weight.....	326 Pounds
Shipping Weight.....	406 Pounds
Record Weight, 50 Records, approx..	3 Pounds

INSTALLATION and OPERATION

DAMAGE CAUSED BY SHIPPING

Examine the instrument immediately after unboxing. If any damage is found, notify the transportation representative and get his signature on the transportation bill with notation of damage.

UNBLOCKING

Before placing this phonograph into operation it is necessary to remove or loosen certain shipping hardware used to safeguard the mechanism during transit. Carefully follow instructions on the tags found in several places in the instrument and remove blocks and shipping supports accordingly. *CAUTION: Do not attempt mechanism operation by manually turning the flywheel – this may damage the mechanism. Use the service switches!*

DO NOT PUT PACKING BLOCKS, INSTRUCTION CARDS, OR ANY OTHER MATERIAL ON THE AIR INTAKE SCREEN IN THE FLOOR OF THE CABINET, AS THIS WILL OBSTRUCT VENTILATION AND CAUSE OVERHEATING. SUCH OVERHEATING MAY WARP RECORDS AND SHORTEN THE LIFE OF THE EQUIPMENT.

ELECTRONIC EQUIPMENT

The electronic equipment is mounted on the lower rear door. This door is hinged and can be swung out to permit access to coin equipment and to tubes, tone controls, plugs, etc., on the front of the electronic equipment. The cover plate on the rear of the electronic equipment can be removed by unscrewing three thumb nuts and loosening the screw at the lower center of the plate. *(NOTE: It is not necessary to remove this screw.)* The electronic equipment may be completely serviced while the phonograph is operating without removing it from the cabinet. Normally the opening of the lower rear door is limited by a chain. The chain can be unhooked and, if plugs at the upper end of the chassis are removed, the door can be swung open until it rests on the floor. The entire door can also be removed by removing all plugs and unhooking the chain, then lifting the assembly up and out toward the rear.

CABINET LID SUPPORT

The cabinet lid may be lifted to any required opening for access to the mechanism and the service switches. A notched support rod is attached to the lid and lifts with it. One of the notches in the rod hooks into and locks in a latch plate when the weight of the raised lid bears on it. A spring assures positive engagement of the rod by the latch plate and prevents accidental release by bumping or jarring. To lower the lid, it must first be lifted while pressing the support rod toward the back of the cabinet.

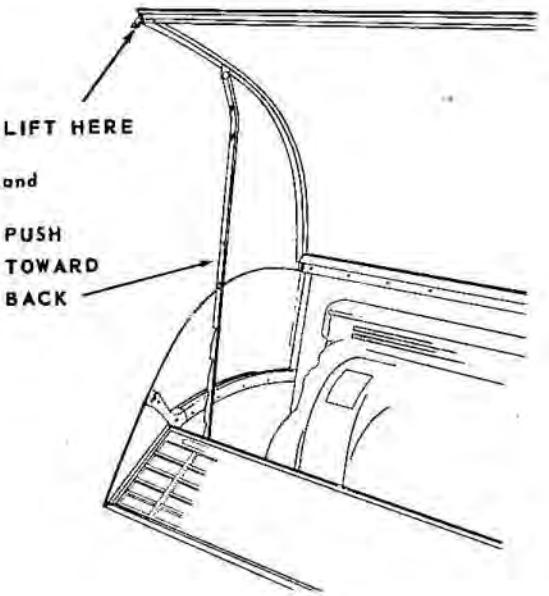


Figure 2.

TUBES AND PLUGS

This instrument is shipped with tubes and plugs installed. In shipment they may loosen; for this reason, it is well to see that they are all firmly seated in the sockets before inserting the line cord.

VOLTAGE RATING

Before connecting the line cord to a light socket or outlet make certain that the voltage and frequency on the meter box at the location agree with the markings of voltage and frequency on the instrument name plate.

PLACING THE SELECT-O-MATIC "100"

To obtain best performance and long service from this equipment, it should be placed on a firm, reasonably level surface away from excessive moisture and heat.

WARNING: To prevent warping records place phonograph where the records will not at any time be exposed to direct sunlight or any other radiant heat. Do not reduce ventilation by obstructing the vent screens.

A space of at least two inches must be allowed between the back of the cabinet and the wall, so as to assure adequate ventilation.

SERVICE SWITCHES

Two service switches are located in the mechanism compartment, on the left side, below the mechanism support bracket. The two-position toggle switch toward the back controls the mechanism motor. The spring return toggle switch toward the front scans the carriage. When the motor switch lever is set toward the front, the mechanism will not operate even though selections are "set up" on the Selector Assembly. The motor switch lever must be toward the back for normal operation. The scan switch lever, when held toward the front, causes the carriage to scan past selections which may be set up on the Selector Assembly. The scan switch can be used to move the carriage when the motor switch is in its "off" position.

LOADING RECORDS

To obtain satisfactory performance use only new or nearly new records on the Select-O-Matic "100" Mechanism. Arrange the records so that the most popular tunes will be divided between odd and even numbered selections. This will result in more nearly equal wear on the two styluses of the pickup. Any standard 7-inch commercial 45 rpm record may be used. Occasionally, records will be found that have an undersize center hole. This is caused, in some cases, by the paper label being pushed into the center hole. If the record center hole is undersize, such a defective record may stick on the record center pin.

Throw the main switch "on" (accessible through hole in rear door). Set the motor switch to the forward position; this keeps the carriage from operating even though credits are established on the Selector Assembly. (See Service Switches.) Hold the scanning switch in the forward position until the carriage is near the right hand end of base. Release the scanning switch.

Starting at the left end of the magazine (A-1, A-2), *insert one record in each record space.* The left side of all records will be the odd number selections. Thus A-1, A-5, B-7, C-3, D-1, etc., all will be left sides, and A-2, A-6, B-8, C-4, D-2, etc., will be right sides of records. *CAUTION: Do not force records into record spaces!* Any normal record will roll very freely into record spaces. A record which is warped badly enough to have any tendency to bind in the magazine space would not be properly played in any automatic mechanism and should not be used.

When the left half of the magazine has been loaded with records, scan the carriage to the left end of the base and load the right half of the magazine. *After the magazine has been loaded, set the lower service switch to the "down" position.*

PROGRAM HOLDERS

The complete Program Holder is removable from the cabinet. Open the cabinet lid, setting the support as shown in Figure 2. Press upward on the catches at each end of the Program Holder and pull the complete assembly toward you. See Figure 4. The individual program holders can be removed separately as desired by hooking a finder under the top of the holder and sliding it out of the guides.

A complete set of title strips is provided with the instrument. These can be found in the cash bag. Title strips are loaded into program holders by sliding the strip into the desired slot. The record titles for both sides of a record are to be put on one individual double strip, with the title for left side on the upper half of the strip and the title for the right side on the lower half of the strip. Thus when a record is inserted in the magazine the selection corresponding to the top title will face left. Spare classification headings are provided and will be found in the cash bag. Classification headings can be changed in the program holder by sliding the retainer springs up onto adjoining ledges and replacing the classification heading.

AUDIO CONTROLS

The Master Remote Amplifier is equipped with a keyed volume control which is accessible through a hole in the rear door. It is inoperative when a remote volume control is used.

Bass and treble controls are located at the top of the amplifier panel and are accessible by opening the rear door. Room size and wall coverings determine the proper setting for each control. With typical records and location, very realistic reproduction is obtained by setting Bass on No. 2 or No. 3 and setting treble on No. 3. Treble boost is obtained on No. 4 and and rather severe treble cut is had on No. 1.

AUTOMATIC VOLUME COMPENSATOR

An automatic volume compensator is incorporated in the amplifier. It compensates for the variations in the average volume levels of different records and makes possible a volume control setting for normal records without danger of blasting or high volume due to exceptionally "loud" records. A 4-position switch on the amplifier provides a choice of degree of volume compensation from zero (off) to maximum.

Operation of the compensator may be checked by removing the muting circuit plug from the amplifier while records are playing. Normal operation is indicated if, when the plug is taken out, the sound from a low volume record will fade almost completely away; that from a record of average volume will decrease in loudness. Little effect will be noted if a "loud" record is being played when the plug is pulled out. The change in volume, if any, will take place slowly, not suddenly when the muting plug is pulled out and replaced. Approximately six to eight seconds will be required to restore the volume to the original level after the plug is replaced.

POPULARITY METER

A popularity meter is provided behind the "Record Now Playing" indicator at the top of the magazine. It is exposed to view by swinging the cover downward past the front of the "Record Now Playing" indicator. The popularity of each of the fifty records is indicated by 50 indicator wheels. Each wheel is calibrated from 0 to 50 and shows approximate total number of plays (both sides) the corresponding record has had.

For a quick check of record popularity, the indicating wheels are part blue and part aluminum finish. Less than 10 plays are shown in the blue area while 11 or more are indicated in the aluminum area.

TO RESET THE POPULARITY METER

The lever at the right hand end of the meter partially resets the wheels each time it is pressed and released. It should be operated until all the wheels indicate zero.

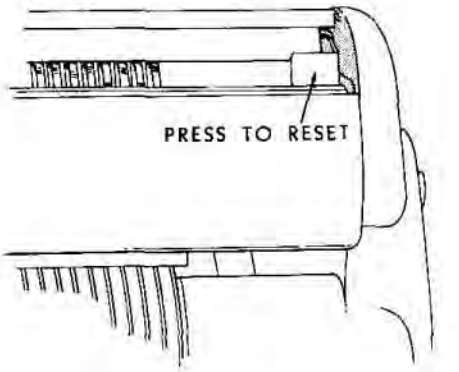


Figure 3.

SELECTION COUNTER

A selection counter is built into the right side of the electrical selector. This counter totals SELECTIONS made from the electrical selector and Wall-O-Matics. The counter may be read by opening the glass top and pulling the program holder forward as shown in Figure 4.

Although this counter is intended primarily as a selection counter, the approximate total value of coins received in the phonograph and Wall-O-Matic cash boxes may be figured as follows (assuming six plays for a quarter):

1. Subtract the present counter reading from the last reading. (The reading taken when the cash boxes were last emptied.)

2. From this figure subtract the total number of quarters in all cash boxes (phonograph plus all connected Wall-O-Matics.)

3. Multiply by .05 to obtain value in dollars.

EXAMPLE:

Present counter reading	11792
Last counter reading	10680
Difference	1112
Number of quarters	78
	1034
	x. 05
Approximate cash	$51.70

NOTE: The counter may register slightly higher or lower than the actual number of selections, because of the multiple count during simultaneous operation of two or more wall boxes.

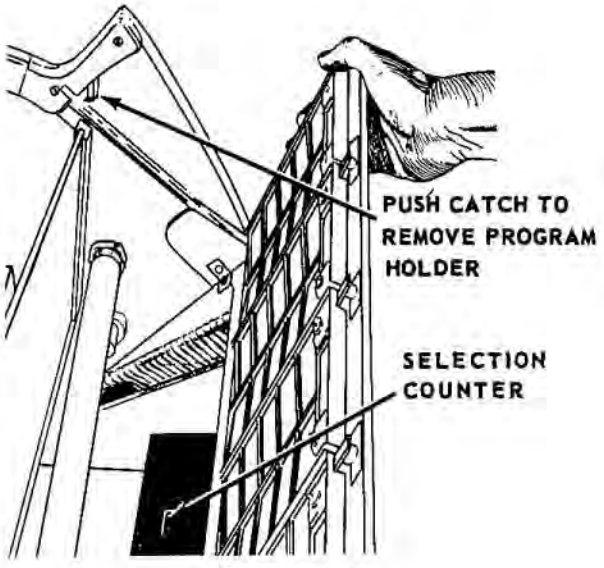


Figure 4.

WALL-O-MATIC "100"

The remote choice of 100 selections is made possible by the Wall-O-Matic "100" which pulses the Selection Receiver to register selections on the Select-O-Matic "100" Mechanism. A sufficient number of these units should be used and placed to provide convenient selection from all parts of the location.

Power to operate up to six Wall-O-Matics is available from the Wired Selection Receiver. When more than six Wall-O-Matics are used, additional power supplies (Type PS6-1Z are required. For each power supply that is added, six additional Wall-O-Matics may be used.

The wiring of the Wall-O-Matics is facilitated by the use of special cable, *Seeburg Part No. 12015*, which is available in continuous lengths as required. Details of wiring and installing the Wall-O-Matic "100" are included in the instruction folder shipped with each Wall-O-Matic "100".

Bar Bracket Assembly, *Seeburg Part No. 500185*, is available for rigidly mounting the Wall-O-Matic on bars, counters and tables.

SPEAKERS

The audio output of the Master-Remote Amplifier operates the large speaker mounted in the Select-O-Matic cabinet, and also terminates on the amplifier terminal board for powering remote speakers.

The audio system is of the "constant voltage" type, in which the amplifier output does not change when the speaker load is varied. This means that the volume from any speaker in the system will not change noticeably when other speakers are added or removed. It also facilitates adjustment of volume at each speaker; connections and speaker runs are simplified and, within certain limits, impedance matching problems are eliminated.

Except in very small locations, adequate distribution of sound at uniform level thruout the service area can be obtained only by careful placement of a sufficient number of speakers, and by adjusting the volume of the speakers individually to suit local conditions. The adjustment of the volume level at each speaker is simplified by the use of Seeburg Constant Voltage (CV) Speakers. While the older Type RS Speakers may be used with the Model 100W, the Type CV Speakers are recommended because the volume level (watts) can be adjusted at each speaker. *WARNING: 8 OHM SPEAKERS SHOULD NEVER BE CONNECTED DIRECTLY TO THE TERMINAL BOARD OF THE AMPLIFIER.*

Recommended Speaker Types are as follows:

Type CVS4-8, Wall Speaker (Teardrop-Ivory).

Type CVS5-12, Wall Speaker (Walnut Wood Cabinet).

Type CVS6-8, Recessed Speaker (Grill Type for wall or ceiling-Ivory).

Type CVS7-12, Recessed Speaker (Grill Type for wall or ceiling-Ivory).

All the preceding speakers can be connected for four different volume steps, from 1/16 watt to 4 watts for Type CVS4-8 and CVS6-8 and CVS6-8 and from 1/8 watt to 8 watt for Types CVS5-12 and CVS7-12.

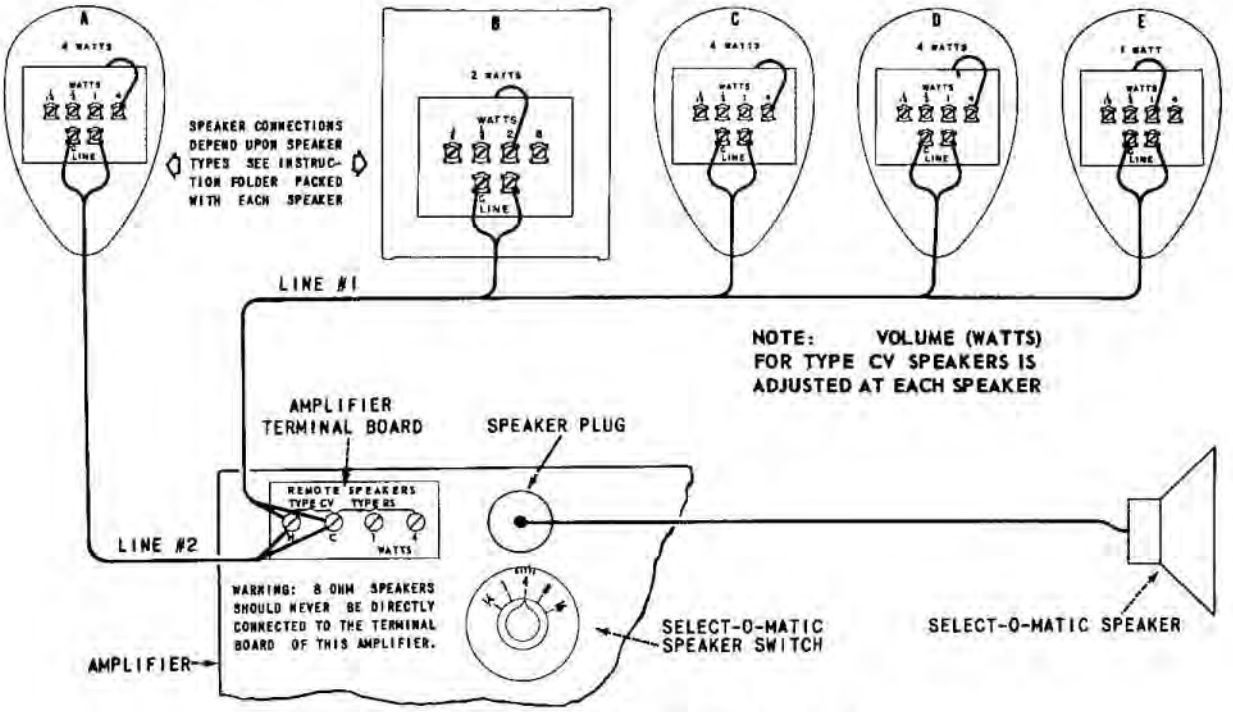


Figure 5. A Typical CV Speaker Installation

TOTAL WATTS OF SPEAKER LOAD

Line #1:	1 (Speaker)	×	2	(watts)	=	2.0 watts
	2 (Speakers)	×	4	(watts)	=	8.0 watts
	1 (Speaker)	×	1	(watts)	=	1.0 watts
Line #2:	1 (Speaker)	×	4	(watts)	=	4.0 watts
Select-O-Matic Speaker:					=	1.0 watts
				Total Load	=	16.0 watts

This is between 6 and 25 watts, and is a satisfactory amplifier load.

When a listening test was conducted on the above installation during typical operating periods, it was found necessary to increase the input to Speaker "B" to 8 watts.

The new speaker load on the amplifier:

Line #1:	1 (Speaker)	×	8	(watts)	=	8.0 watts
	2 (Speakers)	×	4	(watts)	=	8.0 watts
	1 (Speaker)	×	1	(watts)	=	1.0 watts
Line #2:	1 (Speaker)	×	4	(watts)	=	4.0 watts
Select-O-Matic Speaker						1.0 watts
				New Total	=	22.0 watts – Satisfactory Load

After the speakers have been mounted, one or more cables can be run from the phonograph, one cable for each group of speakers. The cable can be run from one speaker to the next, cutting the cable at each speaker and using the speaker terminals as junction points.

NOTE: For installation and wiring of the speakers, see instruction folder packed with each speaker.

Be sure that the phasing of all speakers is the same; this will be accomplished if the same wire of the speaker cable is connected to the common "C" terminal at all speakers. This wire should be connected to the common "C" terminal at the amplifier. The other wire in the cable is connected to the "H" terminal at the amplifier when using Type CV speakers, as shown in Figure 5.

After the installation is finished, a critical listening test should be made and the volume (Watts) readjusted at certain speakers where required to obtain uniform sound covering under normal noise conditions. The power consumed at each speaker will depend on the connections that have been made at the speaker *(See Speaker Installation Folder.)*

SELECT-O-MATIC SPEAKER

Set the Select-O-Matic Speaker Switch to the position which gives the best balance between the Select-O-Matic Speaker and the remote speakers with normal volume control setting. IF NO REMOTE SPEAKERS ARE USED, THE SWITCH MUST BE SET TO 16 WATTS.

The Wattage of all speakers must be added (including the Select-O-Matic Speaker) and the total watts absorbed by all speakers must not exceed 25 watts, which is the power rating of the Master-Remote amplifier. For best operation, the total watts should be not less than 6 watts (25% of rated amplifier load.) If Seeburg Type CV speakers are used, and the speaker load is 25% to 100% rated amplifier load (6 to 25 watts), no external impedance matching transformers are required. Within the limits described above, the problems of impedance matching are eliminated when using Type CV speakers on the MRA3-L6 Power Amplifier.

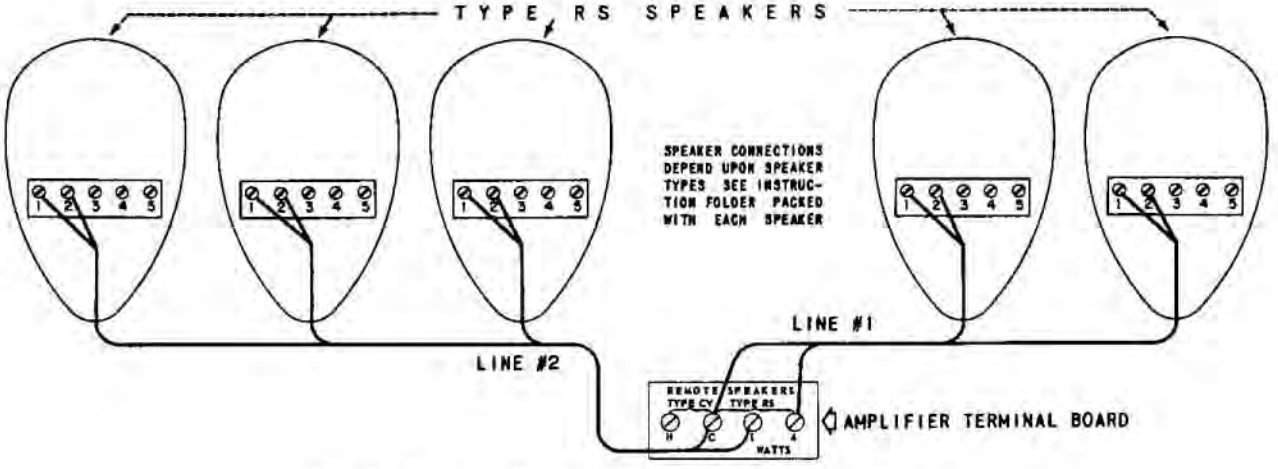


Figure 6. A Typical RS Speaker Installation

SPEAKER LOAD ON THE AMPLIFIER

Line #1:	2 (Speakers)	×	4	(watts)	=	8.0 watts
Line #2:	3 (Speakers)	×	1.5	(watts)	=	4.5 watts
Select-O-Matic Speaker					=	4.0 watts
				Total Load	=	16.5 watts

This is a satisfactory speaker load.

TYPE RS SPEAKER

If Type RS Speakers are used with the Select-O-Matic Model 100W, they may be wired as shown in Figure 6. Any group wired as shown may be connected to amplifier terminals "C" and 4 (watts) for 4 watts per speaker. Set the SELECT-O-MATIC SPEAKER switch to the position which gives the best balance between the Select-O-Matic Speaker and the remote speakers with normal volume control setting. While this arrangement is not as flexible as the Type CV method, it does permit two or more groups of speakers at two different volume levels. When using the Type RS speakers, it is necessary to add the Watts of all speakers, including the Select-O-Matic Speaker, and make sure this total wattage does not exceed 25 watts, and is not less than 6 watts.

NOTE: If the wattage of all speakers (including the Select-O-Matic Speaker) to be connected to the Master-Remote Amplifier exceeds 25 watts, an Auxiliary Remote Amplifier, Seeburg Type ARA1-L6, may be used to supply part of the speaker load, or lower volume (watts) may be used. When using CV type speakers on ARA1-L6, set the speaker matching plug to "2" and make connections to terminals marked "Speakers".

SPEAKER CONTROL TYPE NO. 25 LT-1 (Accessory)

The speaker control is a housed adjustable autoformer that may be installed in any 70 volt CV speaker line for the purpose of separately controlling the volume from any single speaker or group of speakers. In installations involving speakers in several rooms these Speaker Controls are especially useful to obtain flexibility of control.

MASTER REMOTE VOLUME CONTROL, TYPE NO. MRVC-1 (Accessory)

The Master Remote Volume Control, Type MRVC-1 comes completely wired and ready for use. It is only necessary to remove the 7-prong dummy plug from the Master Remote Amplifier and the 2-prong Cancel Plug from the Wired Selection Receiver and replace with the corresponding plugs on the cable of the MRVC-1, and dress the cable to the permanent position selected for the control unit. Screws and cable clamps furnished with this kit make it easy to do a neat, workmanlike installation.

MICROPHONE PREAMPLIFIER AND MIXER, TYPE PAK3-L56 (Accessory)

The Microphone Preamplifier and Mixer Kit, Type PAK3-L56, may be used with the Select-O-Matic Model 100W on any installation requiring the transmission of voice or live music thru the Seeburg Sound Distribution System.

TESTING

After the installation has been completed, all units should be carefully tested to see that they perform properly. Make several selections from the Electrical Selector and from each Wall-O-Matic and see that the selections made have correctly registered on the Selector Assembly. Check the quality of music, and note that music can be heard at a comfortable volume level in all parts of the service area. See that all cables are dressed into inconspicuous places to present a neat appearance and prevent mechanical damage to them.

REMOVING CARRIAGE COVER

The carriage cover must be removed for lubricating the mechanism, for servicing and for replacement of the lamp used to illuminate the escutcheon. It is removed as follows:

1. Select an odd number selection (F-1) to get pickup to the left side.
2. Cover the pickup cartridge with the plastic protective case.
3. Remove the top screw on the right hand brush holder and turn the holder until the brush is at the top.
4. Remove two oval head screws; one is on the top, and the other on the lower left side. Lift the cover straight up.

5. After replacing the lamp, carefully lower the cover over the carriage making sure the three notches at the bottom edge engage the three support studs on the carriage.

6. Fasten cover and brushes with their respective screws.

LUBRICATION

The mechanism and other mechanical parts should be lubricated periodically. Follow the lubrication chart posted on the back of the mechanism.

PICKUP STYLUSES

In order to retain good quality of reproduction it is necessary to keep the pickup and styluses clean and in good condition. *CAUTION: The pickup and styluses must be handled carefully or the delicate armature suspension may be damaged.*

When records are changed, or the equipment is cleaned the styluses and the stylus brushes should be cleaned by using the small brush furnished for this purpose and mounted in a clip on the left diffuser block.

STYLUS REPLACEMENT

The styluses used with the Seeburg magnetic pickup are tipped with natural Swiss sapphire, which is excelled in hardness and wear resistance only by diamond. However, all materials wear in the presence of friction; wear of a stylus starts with the first play and continues until the stylus is replaced. The tone quality is good and distortion remains at a low figure for the first few thousand plays but gradually distortion increases until a disagreeable amount is noticed.

When only pure vinlyite 45 rpm records are used, styluses should be changed every four or five thousand plays to maintain good quality. If, because of the presence of oil on the records, dust or dirt is permitted to accumulate and remain on the surface, the wear will be more rapid; economical operation will require more frequent stylus replacement.

If the Styluses are not replaced before objectionable distortion sets in, the records may be permanently damaged, and replacing the Styluses will not restore the original tone quality.

Because the cost of a pair of styluses is only a small fraction of the cost of a set of records, it is economically sound to replace styluses on a regular schedule rather than on a hit-or-miss basis. A schedule can be most easily determined from instrument income. The styluses should be changed according to the following table if the records are arranged for approximately equal distribution of play between the right and left sides of the pickup:

Approximate Weekly Gross Receipts:	Change Both Styluses Every:
$ 25	4 months
$ 50	2 months
$ 75	6 weeks
$100	4 weeks
$150	3 weeks

The table is based on five cents per selection and four to five thousand plays for each stylus.

TO REPLACE STYLUSES:

1. Remove the slotted-head screw at the top of the arm and remove the pickup by lifting straight up. Thread the screw into the pickup so as not to lose it.

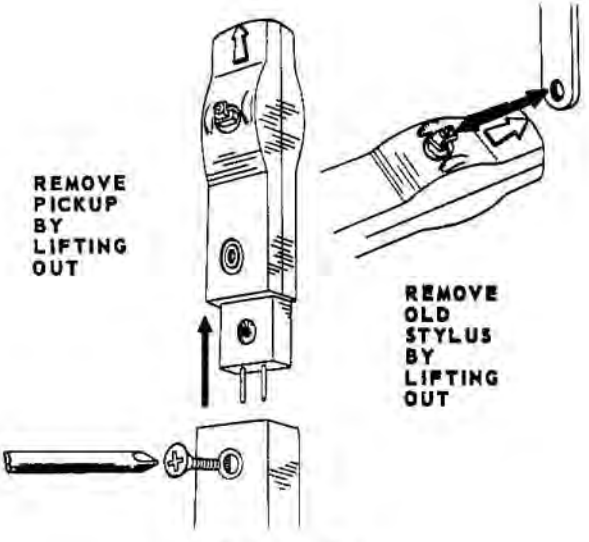


Figure 7.

2. Remove one of the installation tools (with new stylus) from the card and thread the old stylus through the hole in the rounded end of the tool. Lift out the old stylus by gently pulling STRAIGHT OUT. DO NOT USE A TWISTING MOTION OR MOVE THE STYLUS FROM SIDE TO SIDE – PULL STRAIGHT OUT.

3. Gently insert the new stylus - *DO NOT FORCE*. Slide the tool off the stylus.

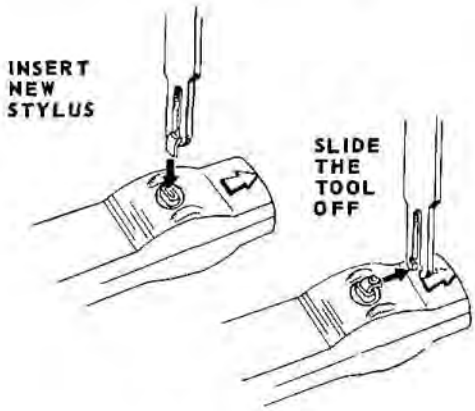


Figure 8.

4. Turn the pickup over and replace the other stylus in the same manner.

Install the pickup on the arm after checking that styluses are installed to point in direction that embossed arrows point. Tighten the holding screw firmly – check landing adjustment. Also, check the stylus brushes to make sure that they wipe the styluses lightly to remove lint and dust.

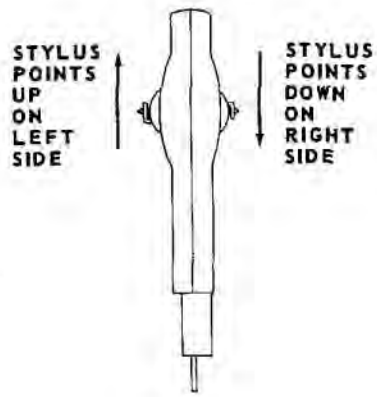


Figure 9.

RECORD CARE

To avoid accumulation of dust and dirt, keep oil off the records. Wipe your hands with a clean cloth before handling records and always handle records by edge and center hole. Records that show signs of surface dust or dirt should be wiped with a slightly dampened cloth, using a circular motion. Use only water to dampen the cloth – solvents will damage the records. Records not in use should be stored on edge in a cool place. Avoid exposing the records to excessive heat. Records become, overheated in a very short time if exposed to direct sunlight or if stored in a closed automobile or truck. Temperature above 120° F. should be avoided. *See instructions on "Placing* the Select-O-Matic "100".

LAMP REPLACEMENT

Access to the 25 watt (33 inch) Daylight fluorescent lamp or lamp starter is gained by removing the program assembly. To remove the fluorescent lamp rotate in either direction and lift out.

To replace the lamp behind the carriage cover escutcheon it is necessary to remove the cover as outlined in "Removing Carriage Cover".

To replace the *"Selection Now Playing" lamp* proceed as follows:

1. Select K-4 and while this record is in play position turn off the phonograph at the main switch. Swing the popularity meter cover down exposing the lamp assembly.

2. Loosen the screw which holds the light bracket to the top of the bakelite block. Slide the socket assembly to the right to clear the block. Lift out the lamp assembly.

3. Replace lamps and lightly fasten assembly in place with pigtail lug under screw head.

4. Turn on the main switch. Adjust the socket assembly by sliding the bracket to the left or right until a clean-cut rectangular window of light is centered on K-4. Tighten the screw and raise the cover to normal position.

The 20-watt, (24-inch) Daylight fluorescent lamps for pilaster lighting are part of assemblies which include the lamp starters and color screen. Each lamp is mounted on a removable strip which is accessible from the back of the cabinet. Electrical connection for the lamp and starter is made with an attachment plug and socket. A cone-shaped cup at the lower end of the assembly rests on a stud which is the upper part of a cabinet caster. The upper end of the assembly is held with a spring clip.

To replace a lamp, pull out the connecting plug and remove, from the cabinet, the entire lamp and color screen assembly. This can be done by pressing down on the spring clip and moving the upper end of the assembly toward the back of the cabinet. When the upper end is out of the pilaster, the entire assembly may be lifted from the cabinet. The upper end of the lamp is accessible for 90° rotation in either direction and withdrawal from the sockets.

When replacing the lamp and color screen, the cone-shaped cup at the bottom serves as a guide for that end as well as assuring correct centering. The spring clip at the top will snap into place for correct positioning of the upper end of the assembly.

APPEARANCE

To maintain good appearance of the phonograph, and thus keep customer appeal at its maximum level, the various pieces of glass (such as the lid, side glass, diffuser glass, and mirrors) should be kept clean. The chrome plated parts also should be cleaned occasionally. These parts include Electrical Selector, program holder, coin slot, and plated parts in the mechanism compartment.

PREPARING INSTRUMENT FOR MOVING

1. Place protective tube over pickup cartridge and install Pickup Arm shipping support.

2. Remove all records from the magazine. Position carriage on base so that the selection indicator light is behind D-1. Put three pads under the carriage wheels; then bolt the carriage to the base by means of two 2-inch long thumb screws.

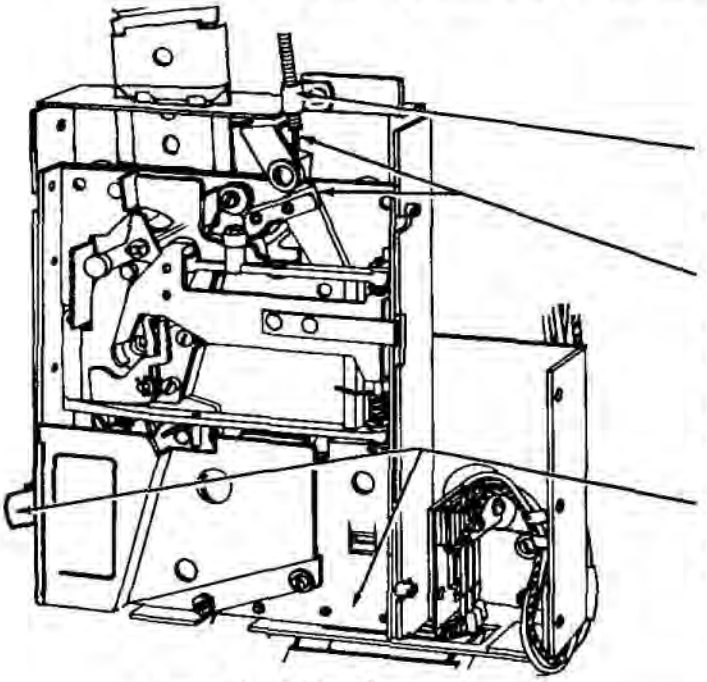
3. Put the two wood ¼" shims under the base at the mechanism hold-down bolts.

4. Tighten three mechanism hold-down nuts.

TO SHIP

If the instrument is to be shipped by way of a transportation company, it should be blocked and crated in the same manner in which it was received from the factory.

SLUG REJECTOR SCAVENGER CABLE



Adjust position of cable in clamp so plunger button at front of cabinet extends ¾"

The clamp should be positioned so the wire does not bind in the flexible cable.

End of wire should not touch surface of bracket on wiper blade.

Rejector should be held by spring clip and in mounting bracket at this corner.

Figure 10. Cable Adjustment

COIN SWITCHES

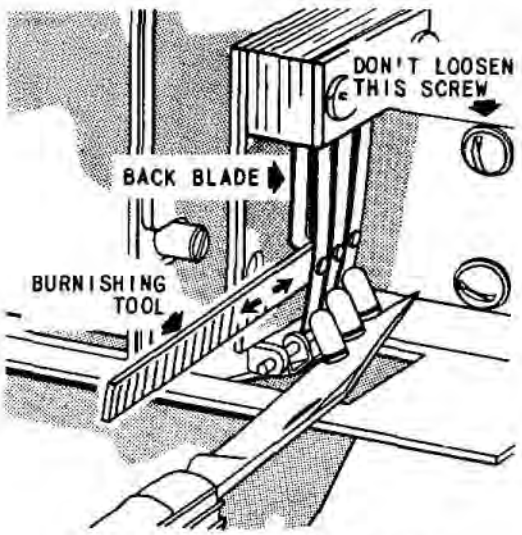


Figure 11. Coin Switch Cleaning

Clean the switch contacts carefully with carbon tetrachloride using a No. 2 camel hair brush.

Burnish by inserting a burnishing tool between the contacts, raising the switch lever with a knife blade as shown in Figure 11. *Never use a file or sandpaper for contact cleaning.*

DO NOT ATTEMPT ANY BENDING ADJUSTMENT IF THE SWITCH MEETS CONDITIONS OUTLINED ON FIGURES 12, 13 and 14.

1. Insert a dime at top of the slug rejector while supporting the switch actuating lever with a knife blade. The coin rests on the lever as shown in Figure 12.

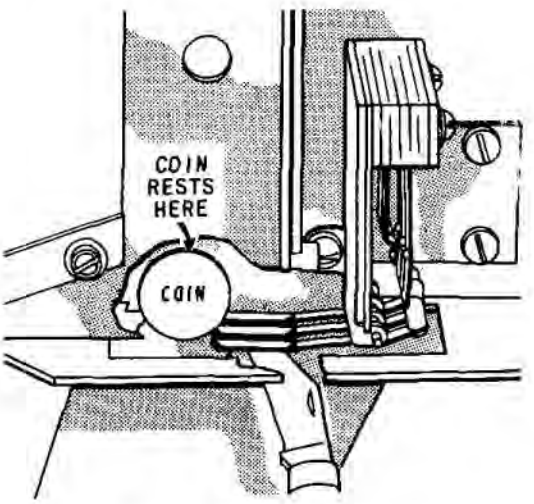


Figure 12. Coin Position

COIN SWITCHES *(Continued)*

2. Move the knife blade slowly to the right to release the coin. The contacts must come *together* and the back blade should move approximately 1/64" just before the coin drops through of its own weight. *(See Figure* 13).

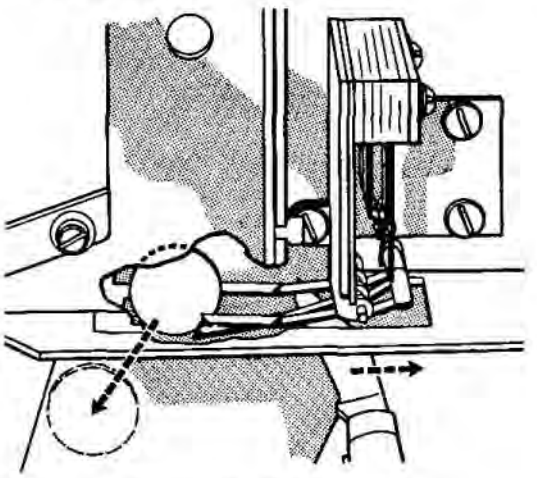


Figure 13. Coin Travel

The coin switch levers should be parallel with the opening in the gage plate and the center lever (10¢) should center on the projection of the gage as shown in Figure 14. Lateral play of the lever should be taken into account when checking the position of the 10¢ switch lever.

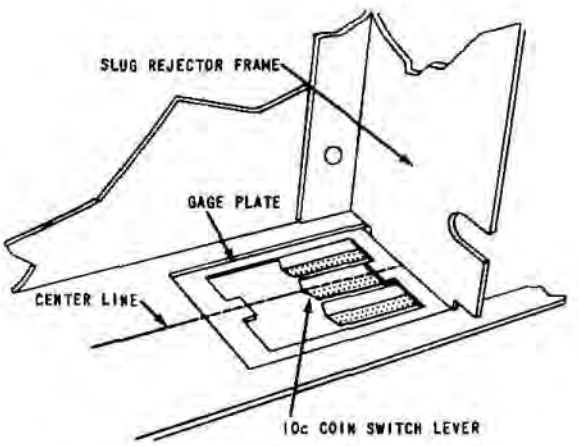


Figure 14. Coin Switch Lever Position

If the proper contact is not made or the coin does not drop through of its own weight adjustment should be made as outlined below.

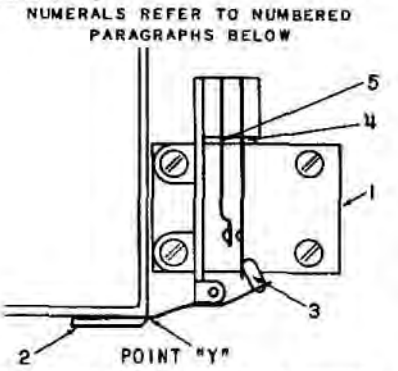


Figure 15. Coin Switch Adjustment

1. Adjust position of coin switch mounting so switch levers bear at point "Y".

2. Adjust levers to be parallel to and against bottom surface of frame.

3. Adjust switch actuating cams to be tilted approximately as shown and overlap the blade approximately 3/32".

4. Bend long blade at this point for 4 to 5 grams tension toward cam as measured at switch contact point.

5. Bend short blade at this point so it moves approximately 1/64" when coin is slowly released as in Figures 12 and 13.

NOTE: It is important that the ENDS of the bracer blades support the short contact blades support the short contact blades as shown in Figure 16.

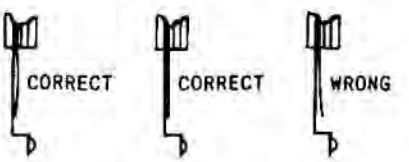


Figure 16. Bracer Blade Adjustment

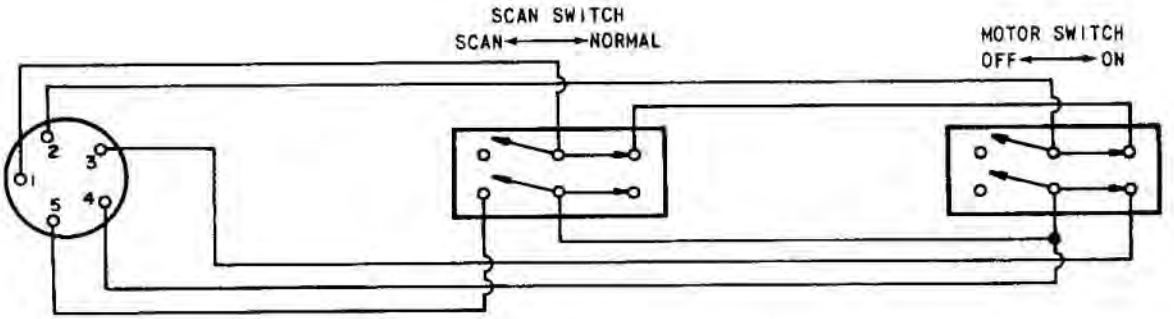


Figure 17. Schematic Diagram - Service Switches.

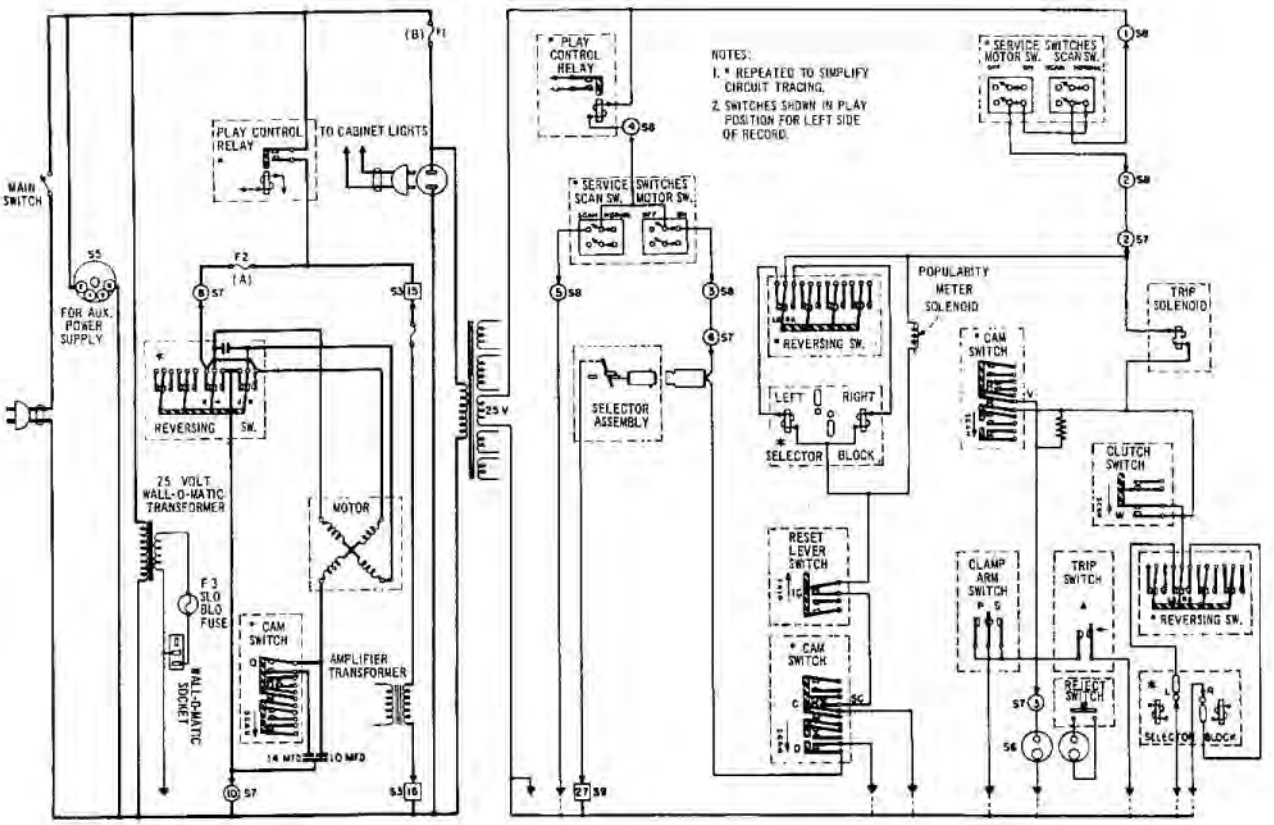


Figure 18. Schematic Diagram - Power & Control Wiring, 145S10-L6 Mechanism & WSR 5-L6 Selection Receiver.

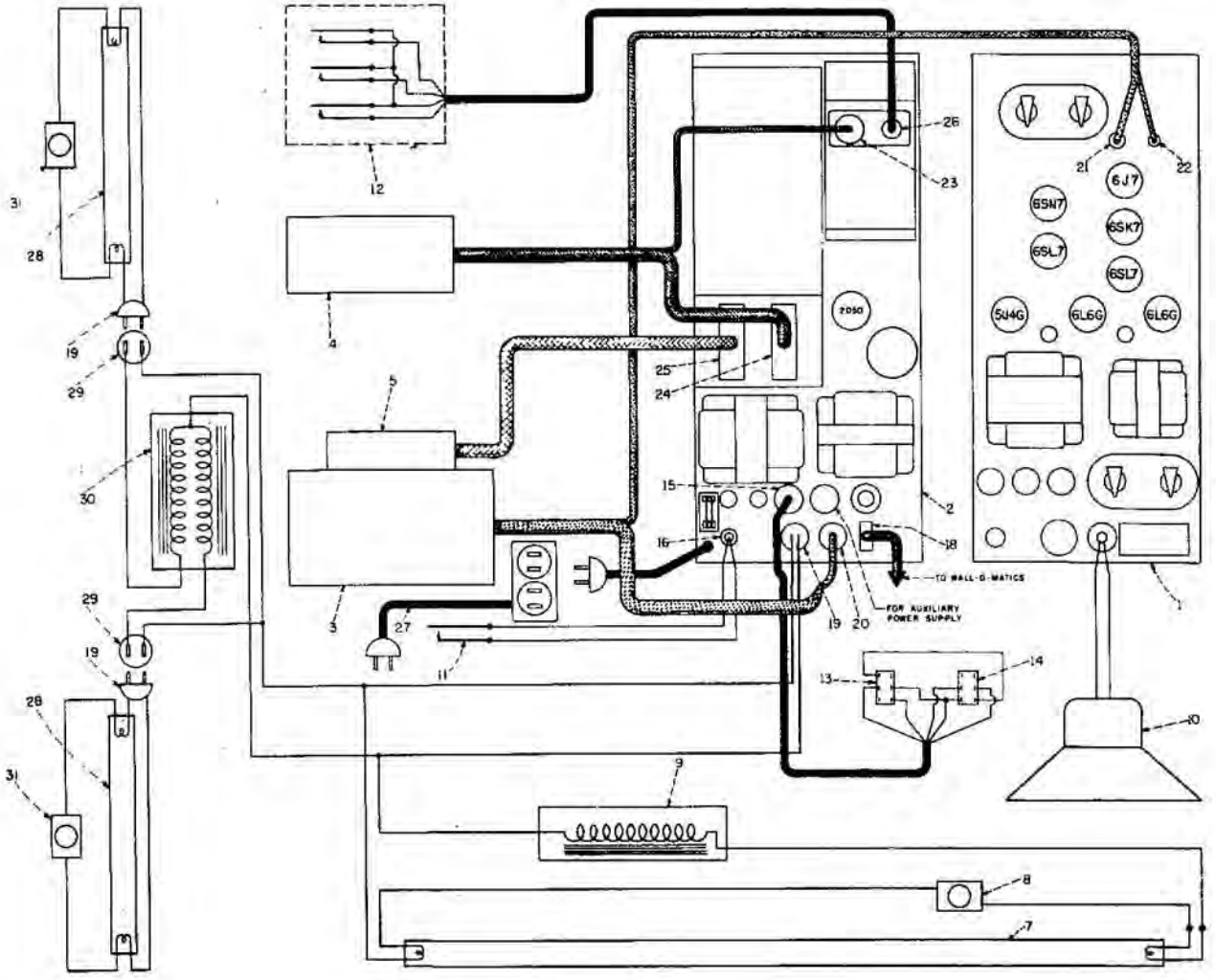


Figure 19. Cabinet Wiring Diagram.

PARTS LIST

Item	Part No.	Part Name
1	305100	Master Remote Amplifier, Type MRA3-L6
2	303230	Wired Selection Receiver, Type WSR-L6
3	246100	Select-O-Matic Mechanism, Type 145S10-L6
4	410200	Electrical Selector, Type ES10-L6
5	304450	Selector Assembly, Type 100SA7-L6
6	405138	Starter
7	405136	25 Watt Fluorescent Daylight Lamp
8	405138	Starter
9	405101	Ballast
10	404550 404553	Speaker
11	402065	Record Reject Switch
12	401506	Coin Switches
13	404671	Scan Switch
14	23261	Motor Switch
15	200241	5-prong Plug
16	402066	2-prong Plug
18	12015	3-prong Plug
19	10895	AC Plug
20	250942	11-prong Plug
21	A250938	3-prong Plug
22	K228440	Single Prong Plug
23	12028	Octal Plug
24	400844	27-prong Connector
25	F9461	27-prong Plug
26	401515	4-prong Plug (Small)
27	402152	Line Cord and Outlet Assembly
28	405547	20 Watt Fluorescent Daylight Lamp
29	F7842	AC Socket
30	405546	2 Lamp Ballast

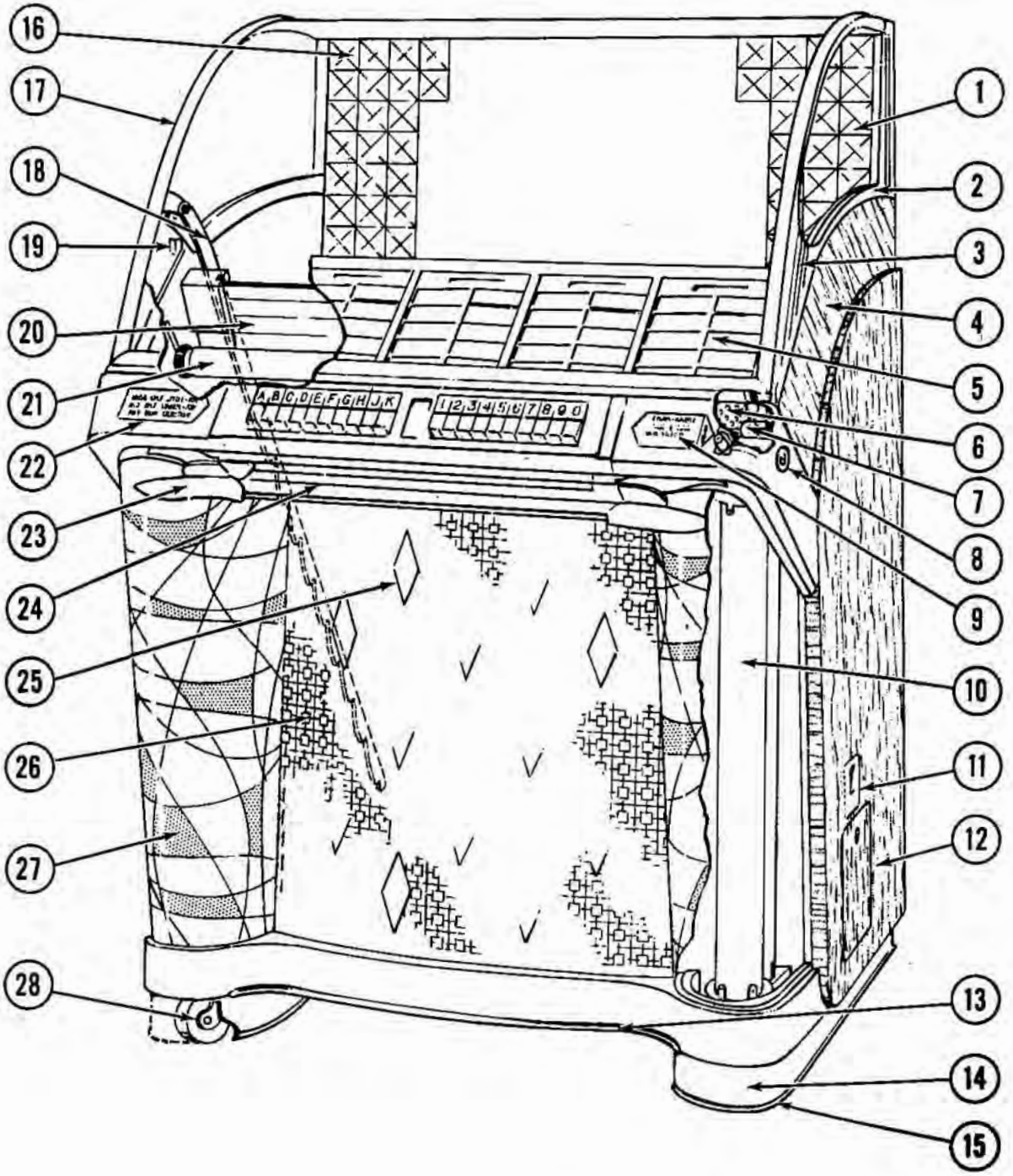


Figure 20. Front View 100W Cabinet Assembly

PARTS LIST on Reverse Side

PARTS LIST

Item	Part No.	Part Name
1 -	406077	Side Glass
2 -	406063	Side Glass Mldg. L.H. (Outside)
	406062	Side Glass Mldg. R.H. (Outside)
	77274	No. 6 x ¾ Phillips F.H.W. Screws
	406242	Side Glass Retainer (Inside)
	77204	No. x 5/8 Phillips Oval (Hd. W. Screw)
3 -	406030	Side Glass Support (Front Brkt.) R.H.
	406031	Side Glass Support (Front Brkt.) L.H.
	406307	Side Glass Clamp (Back)
	70647	6/32 x ¼ Phillips R.H.M. Screw
4 -	406380	Silver Zebrano Decal (Light) (49" x 34 ¼")
	406381	Silver Zebrano Decal (Dark) (Die Cut - R.H.)
	406382	Silver Zebrano Decal (Dark) (Die Cut - L.H.)
	406383	Silver Zebrano Decal (Dark) (Band 2 5/8 x 34")
	406384	Silver Zebrano Decal (Dark) (Special)
5 -	406245	Prog. Holder & Frame Assembly
	406140	Frame Rail
	406142	Frame Rail Sides
	406300	Program Glass - (A1-B10)
	406301	Program Glass - (C1-D10)
	406302	Program Glass - (E1-F10)
	406303	Program Glass - (G1-H10)
	406304	Program Glass - (J1-K10)
	406051	Program Holder Assem. (A-B)
	406014	Program Holder Only
	406050	Program Holder Spring
	404675	Retainer Washer
	72158	(7/16 x .140 x .031) Flatwasher
	406052	Program Holder Assem. (C-D)
	406053	Program Holder Assem. (E-F)
	406054	Program Holder Assem. (G-H)
	406055	Program Holder Assem. (J-K)
	406056- thru 406060	Program Identification Labels
	406320 thru 406335	Classification Heading (Sold in Sets Only)
6 -	406229	Vent Screen Front
7 -	405138	Fluorescent Light Starter
	404631	Starter Socket
8 -	406040	Lid Lock - L.H.
	406041	Lid Lock - R.H.
	406042	Lid Lock Bolt
	406043	Bolt Pivot Bar
9 -	406200	Coin Window (6 Play - Quarter)
	406201	Coin Window (3 Play - Quarter)
10 -	406223	Lamp Assembly
	405793	Lite Cable Assembly
	406367	Fluorescent Tube (20 Watt Daylite)
	406346	Tube Sleeve Assembly
11 -	406110	Slug Receptacle Assembly
	406085	Slug Receptacle Only
	406109	Slug Receptacle Side Wall
12 -	406338	Cash Door Assembly
	406086	Cash Door Only
	406340	Cash Door Lock
	406095	Lock Reinforcing Channel
13 -	406164	Cabinet Base Trim Strip
14 -	406167	Base Plate Covering
15 -	406165	Base Trim Strip - R.H.
	406166	Base Trim Strip - L.H.
16 -	406238	Mirror Assembly - R.H.
	406239	Mirror Assembly - L.H.
	406177	Flex-Glass Mirror Only - R.H.
	406178	Flex-Glass Mirror Only - L.H.
17 -	406248	Cabinet Lid Assembly
	406016	Cabinet Lid Glass
	406064	Lid Hinge
	406017	Cabinet Lid Frame - R.H.
	406018	Cabinet Lid Frame - L.H.
	406083	Cabinet Lid Frame - (Top)
	406084	Cabinet Lid Frame - (Bottom)
18 -	406251	Lid Support
19 -	406090	Side Glass Clamp - R.H.
	406091	Side Glass Clamp - L.H.
	406368	Spring
	406065	Program Frame Latch - R.H.
	406066	Program Frame Latch - L.H.
	406067	Program Frame Latch - Spring
20 -	406253	Diffuser Glass 30" Long
	406424	Diffuser Glass 31 ¾" Long
21 -	405136	Fluorescent Tube (25 Watt Daylite)
	406645	Light Socket (2)
	406228	Cable Assembly
22 -	406180	Instruction Window (Press one Letter)
23 -	406025	Ornaments - L.H.
	406026	Ornaments - R.H.
24 -	406104	Cabinet Corner Casting - R.H.
	406106	Corner Channel Casting - R.H.
	406105	Cabinet Corner Casting - L.H.
	406107	Corner Channel Casting - L.H.
	70775	10-32 x 3/8 Phillips Flat H.M. Screw Steel Chrome Plated
	70776	10-32 x 3/8 Phillips Oval H.M. Screw Steel Chrome Plated
	406021	Selector Frame Center
25 -	406029	Grille Ornament
	406370	Rubber Bumper
	70207	Speed Nut
26 -	406179	Grille Cloth
	406345	Grille Assembly
27 -	406100	Pilaster - R.H.
	406101	Pilaster - L.H.
28 -	405774	Caster Socket
	402588	Caster (Metal Wheel)
	405773	Caster (Composition Wheel)

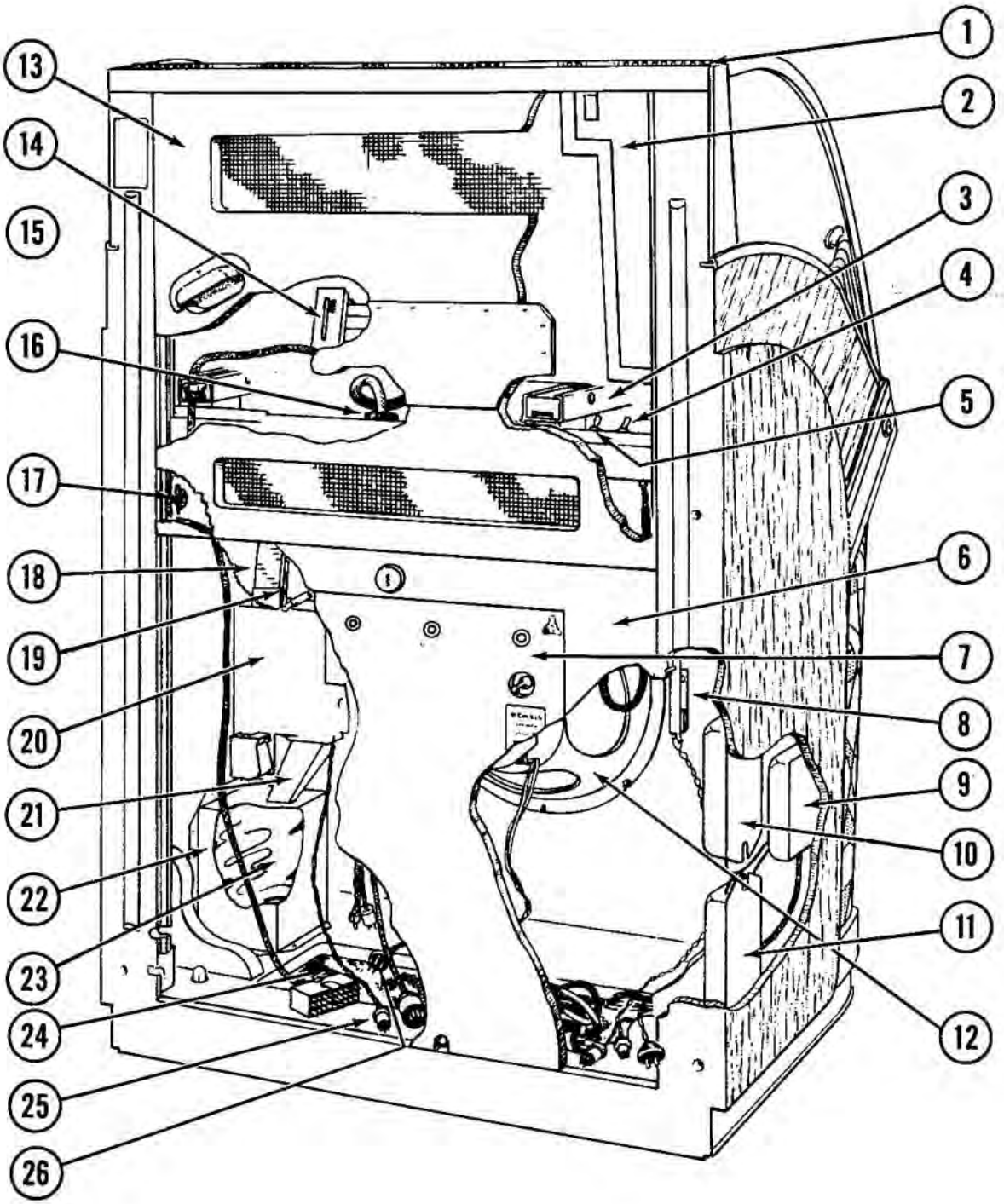


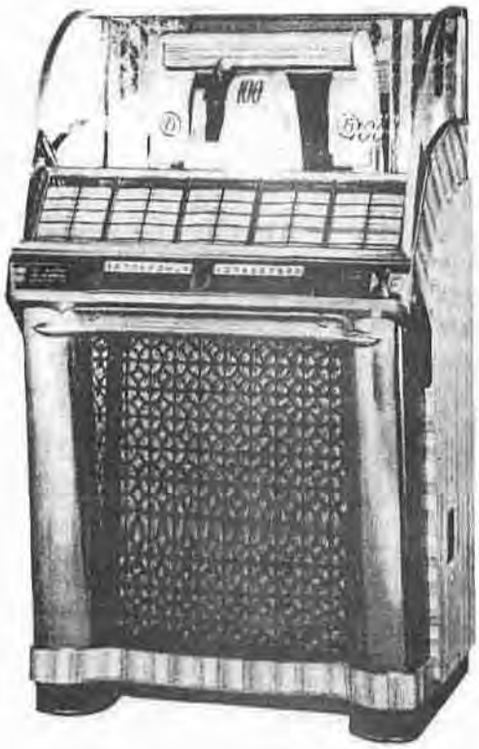
Figure 21. Back View 100W Cabinet Assembly

PARTS LIST on Reverse Side

PARTS LIST

Item	Part No.	Part Name
1 -	406046	Cabinet Hinge Rail
2 -	406238	Mirror Assembly, R. H.
	406239	Mirror Assembly, L. H.
	70659	6-32 x 3/8 Phillip R.H.M.S. (Finish Hd.) (Red)
	70660	6-32 x 1 1/8 Phillip R.H.M.S. (Finish Hd.) (Red)
3 -	406233	Channel Support Post, R. H.
	406234	Channel Support Post, L. H.
	406235	Channel Block Rear
	406236	Channel & Pin Assembly
	405196	Chassis Lock Pin
	405203	Retaining Ring
	406237	Channel Support Bracket, Upper
4 -	404671	Scan Switch
5 -	23261	Motor Switch
6 -	406119	Back Door Assembly (Lower)
	406123	Rear Door Lock
	404320	Tee Nut
	404321	Eye Bolt
7 -	406445	Lower Rear Door Cover Plate Assem.
8 -	405654	Record Reject Switch Assem.(Complete)
	402065	Switch
	405742	Cable and Plug Assembly
	402064	Pin (Reject)
	77242	No. 5 x ¾ Phillip R.H.W.S. (2)
	15037	Cable Clamp (Switch Stop)
	77243	No. 6 x 3/8 Phillip R.H.W.S. (2)
	402066	2-Prong Plug
9 -	402152	Line Cord & Outlet Assembly
10 -	405546	Fluorescent Lite Ballast (Dual 20 Watt)
11 -	405101	Fluorescent Lite Ballast (25 Watt)
12 -	404550	Speaker (Jensen)
	405242	Speaker (Utah)
	404553	Speaker (Magnavox)
	402430	Speaker Plug
13 -	406120	Upper Rear Door Assembly
	406122	Upper Rear Door Only
	404619	Rear Door Clamp, R.H.
	404620	Rear Door Clamp, L.H.
	406443	Upper Rear Door Cover Plate
	406441	Upper Rear Vent Screen (Lower)
	406442	Upper Rear Vent Screen (Top)
	406169	Rear Door Trim (Small)
	406170	Rear Door Trim (Large)
	406444	Handle
14 -	405219	Pickup Brush
	405220	Brush Holder
15 -	15037	Cable Clamp
16 -	405204	Rubber Grommet
17 -	404619	Upper Rear Door Clamp, R.H.
	404620	Upper Rear Door Clamp, L.H.
18 -	401625	Coin Chute
19 -	401740	Scavenger Wire & Plunger Assembly
	401741	Scavenger Wire & Housing
	401223	Plunger Return Spring
20 -	401731	Slug Rejecter Mounting Frame Assembly
	404731	Slug Rejector
	401255	Slug Rejector Mounting Stud
	401506	Coin Switch & Cable Assembly
	401314	Coin Switch Only
21 -	401298	Lower Coin Chute Welded Assem.
22 -	406096	Cash Box Welded Assembly
	405745	Cash Box Lock Plate
23 -	404659	Cash Bag
24 -	406440	Floor Vent Screen
25 -	401515	4-Prong Plug (Coin Switch)
26 -	402430	6-Prong Speaker Plug

SEEBURG
SELECT-O-MATIC "100"
DELUXE HIGH FIDELITY
MODEL HF100G



The Select-O-Matic "100", Model HF100G, is a coin-operated phonograph using the Seeburg Select-O-Matic Mechanism for selective playing of either or both sides of fifty 45 r.p.m., 7-inch records. Choice of any of the one hundred selections may be made at the instrument with an Electrical Selector or by remote control with 100-selection 3-wire Wall-O-Matics. A program holder using standard size title strips displays the entire hundred selection program and may be removed as a complete unit or in sections of 20 titles.

The program title strips are back-lighted by a 25-watt fluorescent lamp which also illuminates the mechanism, the speaker grille, and the electrical selector escutcheons. The pilasters are of chrome metal.

The cover glass through which the mechanism may be seen is hinged and opens for changing records and title strips. The cover is retained at any position of opening by a self-locking support rod. Service Switches, a Popularity Meter and a Selection Counter are accessible with the cover open. The Service Switches are used to operate the mechanism when servicing the instrument. The Popularity Meter which is a part of the mechanism indicates the number of times (up to 50) each record is played. The Selection Counter which is part of the Electrical Selector totals the number of selections made with the Electrical Selector and with remote control Wall-O-Matics.

Coins are deposited in a single entry coin chute and pass through a 5-, 10-, 25-cent slug rejector to the coin switches. The coin switches are connected for one play for a nickel, two plays for a ten-cent piece or six plays for a quarter. The coins are stored in a canvas bag which has a capacity of approximately one-hundred fifty dollars. The bag is removed through a small door at the lower right side of the cabinet.

A Seeburg Magnetic Pickup with one-quarter ounce stylus pressure assures long record life and high quality reproduction unaffected by temperature or humidity conditions. A 25-watt High Fidelity Amplifier connects to a 15" dynamic low frequency speaker and a 5" permanent magnetic high frequency speaker in the cabinet. A terminal strip is provided for connection of High Fidelity Type Remote Speakers.

The amplifier incorporates an automatic volume compensator to provide uniform volume level and avoid "blasting" due to "loud" records. A single volume control is used to adjust the volume of sound from the phonograph speaker and the remote speakers. Provision has been made for plug-in connection of a remote volume control that may be up to a hundred feet from the Select-O-Matic without introducing hum or causing distortion.

A Selection Receiver supplies power for remote control Wall-O-Matics and incorporates the switches and relays for operation from remote points as well as from the Electrical Selector. It is equipped with convenient sockets for plug-in connections of the mechanism, cabinet lighting, amplifier, and control circuits.

The Selection Receiver and the Amplifier are mounted in a vertical position on the inside of the cabinet rear door. The door may be opened for access to the tubes and fuses or it may be fully removed. The units are fastened over an opening which is covered by a steel plate. The plate, which is held in place with wing nuts, may be removed to expose the tube socket and plug connections and the interior wiring of the units for test during normal operation.

A selection cancel switch, effective only when a record is playing, is operated by a small, inconspicuous button on the back near the left side of the cabinet. A remote cancel switch or button may be substituted by plug-in connection to the selection receiver.

SPECIFICATIONS

Power Requirements:

117 volts A.C., 60 cycles
Standby (without Wall-O-Matics) - 85 watts
Operating (without Wall-O-Matics)- 230 watts

Cabinet Lighting:

1 - 25-watt, 33-inch, Daylight Fluorescent (FS25 Starter.)

Cabinet Key Number.....F221

Record Capacity.....50 records (100 selections)
Record Type.....45 rpm
7-inch diameter, 1.5-inch center hole.

Pickup.....Seeburg Magnetic
Speakers: 15" Electro-dynamic(Low Frequency)
5" Permanent magnetic (High – Frequency)

Finish: Silver Zebrano PlasticVeneer.

Coin Equipment:.....5-, 10-, 25-cent Single Entry Slug Rejector.

Amplifier:
8-tube High Fidelity Constant Voltage Type with Automatic Volume Compensation.

Audio Power Output (at full volume):
To Phonograph Speakers (adjustable).....
.....¼ to 16 watts

To Remote Speakers.....24 watts, max.
Maximum total to Phonograph Speakers & Remote Speakers.....25 watts

Major Component Assemblies:
Type 145S11-L6 Select-O-Matic Mechanism with
Type 100SA7-L6 Selector Assembly
Type ES10-L6 Electrical Selector
Type MRA4-L6 High Fidelity Master Remote Amplifier
Type WSR5-L6 Wired Selection Receiver

Remote Control:

Type.....Seeburg, 3-wire "Wall-O-Matic 100"
Nominal operating voltage.....25
Power source for Wall-O-Matics.....Selection Receiver or Aux. Power Supply (Type PS6-1Z)

Maximum Number of Wall-O-Matics powered by Selection Receiver.....6
Maximum Number of Wall-O-Matics powered by each Aux. Power Supply.....6

Remote Speakers: High Fidelity Type

Tubes:
1 - 5879
1 - 6SN7
1 - 6SK7
1 - 6SL7
1 - 12AX7
2 - 6L6GT
1 - 5U4G
1 - 2050

Fuses:
1 - 5 amp. 3AG
1 - 3 amp. 3AG
2 - 2 amp. 3AG SLO-BLO
1 - 3 amp. Fustat

Dimensions:

Height..... 54 Inches
Width..... 35 Inches
Depth..... 27 Inches
Net Weight.....325 Pounds
Shipping Weight.....405 Pounds
Record Weight, 50 Records, approx. 3 Pounds

INSTALLATION AND OPERATION

DAMAGE CAUSED BY SHIPPING

Examine the instrument immediately after unboxing. If any damage is found, notify the transportation representative and get his signature on the transportation bill with notation of damage.

ELECTRONIC EQUIPMENT

The electronic equipment is mounted on the lower rear door. This door is hinged and can be swung out to permit access to coin equipment and to tubes, tone controls, plugs, etc., on the front of the electronic equipment. The cover plate on the rear of the electronic equipment can be removed by unscrewing three thumb nuts and loosening the screw at the lower center of the plate. *(NOTE: It is not necessary to remove this screw.)* The electronic equipment may be completely serviced while the phonograph is operating without removing it from the cabinet. Normally the opening of the lower rear door is limited by a chain. The chain can be unhooked and, if plugs at the upper end of the chassis are removed, the door can be swung open until it rests on the floor. The entire door can also be removed by removing all plugs and unhooking the chain, then lifting the assembly up and out toward the rear.

CABINET LID SUPPORT

The cabinet lid may be lifted to any required opening for access to the mechanism and the service switches. A notched support rod is attached to the lid and lifts with it. One of the notches in the rod hooks into and locks in a latch plate when the weight of the raised lid bears on it. A spring assures positive engagement of the rod by the latch plate and prevents accidental release by bumping or jarring. To lower the lid, it must first be lifted while pressing the support rod toward the back of the cabinet.

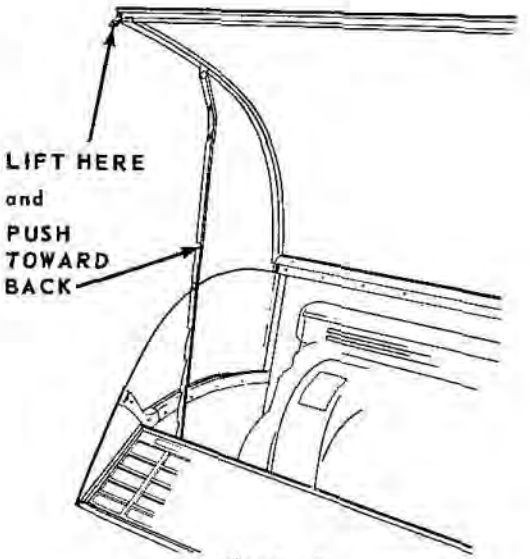


Figure 2.

UNBLOCKING

Before placing this phonograph into operation it is necessary to remove or loosen certain shipping hardware used to safeguard the mechanism during transit. Carefully follow instructions on the tags found in several places in the instrument and remove blocks and shipping supports accordingly. *CAUTION: Do not attempt mechanism operation by manually turning the flywheel-this may damage the mechanism. Use the service switches!*

DO NOT PUT PACKING BLOCKS, INSTRUCTION CARDS, OR ANY OTHER MATERIAL ON THE AIR INTAKE SCREEN IN THE FLOOR OF THE CABINET, AS THIS WILL OBSTRUCT VENTILATION AND CAUSE OVERHEATING. SUCH OVERHEATING MAY WARP RECORDS AND SHORTEN THE LIFE OF THE EQUIPMENT.

TUBES AND PLUGS

This instrument is shipped with tubes and plugs installed. In shipment they may loosen; for this reason, it is well to see that they are all firmly seated in the sockets before inserting the line cord.

VOLTAGE RATING

Before connecting the line cord to a light socket or outlet make certain that the voltage and frequency on the meter box at the location agree with the markings of voltage and frequency on the instrument name plate.

PLACING THE SELECT-O-MATIC "100"

To obtain best performance and long service from this equipment, it should be placed on a firm, reasonably level surface away from excessive moisture and heat.

WARNING: To prevent warping records place phonograph where the records will not at any time be exposed to direct sunlight or any other radiant heat. Do not reduce ventilation by obstructing the vent screens.

A space of at least two inches must be allowed between the back of the cabinet and the wall, so as to assure adequate ventilation.

SERVICE SWITCHES

Two service switches are located in the mechanism compartment, on the left side, below the mechanism support bracket. The two-position toggle switch toward the back controls the mechanism motor. The spring return toggle switch toward the front scans the carriage. When the motor switch lever is set toward the front, the mechanism will not operate even though selections are "set up" on the Selector Assembly. The motor switch lever must be toward the back for normal operation. The scan switch lever, when held toward the front, causes the carriage to scan past selections which may be set up on the Selector Assembly. The scan switch can be used to move the carriage when the motor switch is in its "off" position.

LOADING RECORDS

To obtain optimum performance and supply your customer with the best in recorded music it is necessary that only new or nearly new records be used on the HIGH FIDELITY Model HF100G Select-O-Matic. Only standard 7-inch commercial 45 rpm record may be used. Occasionally, records will be found that have an undersize center hole. This is caused, in some cases, by the paper label being pushed into the center hole. If the record center hole is undersize, such a defective record may stick on the record center pin.

Throw the main switch "on" (accessible through hole in rear door). Set the motor switch to the forward position; this keeps the carriage from operating even though credits are established on the Selector Assembly. (See Service Switches.) Hold the scanning switch in the forward position until the carriage is near the right hand end of base. Release the scanning switch.

Starting at the left end of the magazine (A-1, A-2), *insert one record in each record space.* The left side of all records will be the odd number selections. Thus A-1, A-5, B-7, C-3, D-1, etc., all will be left sides, and A-2, A-6, B-8, C-4, D-2, etc., will be right sides of records. *CAUTION: Do not force records into record spaces!* Any normal record will roll very freely into record spaces. A record which is warped badly enough to have any tendency to bind in the magazine space would not be properly played in any automatic mechanism and should not be used.

When the left half of the magazine has been loaded with records, scan the carriage to the left end of the base and load the right half of the magazine. *After the magazine has been loaded, set the lower service switch to the "down" position.*

PROGRAM HOLDERS

The complete Program Holder is removable from the cabinet. Open the cabinet lid, setting the support as shown in Figure 2. Press upward on the catches at each end of the Program Holder and pull the complete assembly toward you. See Figure 4. The individual program holders can be removed separately as desired by hooking a finger under the top of the holder and sliding it out of the guides.

A complete set of title strips is provided with the instrument. These can be found in the cash bag. Title strips are loaded into program holders by sliding the strip into the desired

slot. The record titles for both sides of a record record are to be put on one individual double strip, with the title for left side on the upper half of the strip and the title for the right side on the lower half of the strip. Thus when a record is inserted in the magazine the selection corresponding to the top title will face left. Spare classification headings are provided and will be found in the cash bag. Classification headings can be changed in the program holder by sliding the retainer springs up onto adjoining ledges and replacing the classification heading.

AUDIO CONTROLS

The Master Remote High Fidelity Amplifier is equipped with a keyed volume control which is accessible through a hole in the rear door. It is inoperative when a remote volume control is used.

Bass and treble controls are located at the top of the amplifier panel and are accessible by opening the rear door. Room size and wall coverings determine the proper setting for each control. With typical records and location, very realistic reproduction is obtained by setting Bass on No. 3 and setting Treble on No. 3. Treble boost is obtained on No. 4 and rather severe Treble cut is had on No. 1.

AUTOMATIC VOLUME COMPENSATOR

An automatic volume compensator is incorporated in the amplifier. It compensates for the variations in the average volume levels of different records and makes possible a volume control setting for normal records without danger of blasting or high volume due to exceptionally "loud" records. A 4-position switch on the amplifier provides a choice of degree of volume compensation from zero (off) to maximum.

Operation of the compensator may be checked by removing the muting circuit plug from the amplifier while records are playing. Normal operation is indicated if, when the plug is taken out, the sound from a low volume record will fade almost completely away; that from a record of average volume will decrease in loudness. Little effect will be noted if a "loud" record is being played when the plug is pulled out. The change in volume, if any, will take place slowly, not suddenly when the muting plug is pulled out and replaced. Approximately six to eight seconds will be required to restore the volume to the original level after the plug is replaced.

POPULARITY METER

A popularity meter is provided behind the "Record Now Playing" indicator at the top of the magazine. It is exposed to view by swinging the cover downward past the front of the "Record Now Playing" indicator. The popularity of each of the fifty records is indicated by 50 indicator wheels. Each wheel is calibrated from 0 to 50 and shows approximate total number of plays (both sides) the corresponding record has had.

For a quick check of record popularity, the indicating wheels are part blue and part aluminum finish. Less than 10 plays are shown in the blue area while 11 or more are indicated in the aluminum area.

TO RESET THE POPULARITY METER

The lever at the right hand end of the meter partially resets the wheels each time it is pressed and released. It should be operated until all the wheels indicate zero.

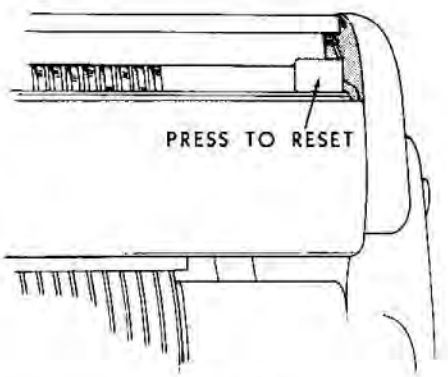


Figure 3.

SELECTION COUNTER

A selection counter is built into the right side of the electrical selector. This counter totals SELECTIONS made from the electrical selector and Wall-O-Matics. The counter may be read by opening the glass lid and pulling the program holder forward as shown in Figure 4.

Although this counter is intended primarily as a selection counter, the approximate total value of coins received in the phonograph and Wall-O-Matic cash boxes may be figured as follows (assuming six plays for a quarter):

1. Subtract the present counter reading from the last reading. (The reading taken when the cash boxes were last emptied.)

2. From this figure subtract the total number of quarters in all cash boxes (phonograph plus all connected Wall-O-Matics.)

3. Multiply by .05 to obtain value in dollars.

EXAMPLE:

Present counter reading	11792
Last counter reading	10680
Difference	1112
Number of quarters	78
	1034
	x.05
Approximate cash	$51.70

NOTE: The counter may register slightly higher or lower than the actual number of selections, because of the multiple count during simultaneous operation of two or more wall boxes.

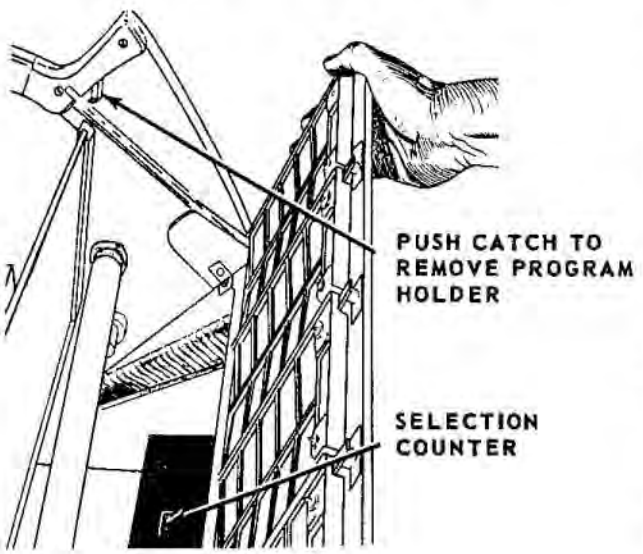


Figure 4.

WALL-O-MATIC "100"

The remote choice of 100 selections is made possible by the Wall-O-Matic "100" which pulses the Selection Receiver to register selections on the Select-O-Matic "100" Mechanism. A sufficient number of these units should be used and placed to provide convenient selection from all parts of the location.

Power to operate up to six Wall-O-Matics is available from the Wired Selection Receiver. When more than six Wall-O-Matics are used, additional power supplies (Type PS6-1Z are required. For each power supply that is added, six additional Wall-O-Matics may be used.

The wiring of the Wall-O-Matics is facilitated by the use of special cable, *Seeburg Part No. 12015*, which is available in continuous lengths as required. Details of wiring and installing the Wall-O-Matic "100" are included in the instruction folder shipped with each Wall-O-Matic "100".

Bar Bracket Assembly, *Seeburg Part No. 500185*, is available for rigidly mounting the Wall-O-Matic on bars, counters and tables.

SPEAKERS

The audio output of the Master Remote High Fidelity Amplifier operates the dual speakers mounted in the Select-O-Matic cabinet. A 15 inch (low frequency) and a 5 inch (high frequency) speaker provides wide frequency range. The audio output is also terminated in an amplifier terminal board for powering High Fidelity type remote speakers.

The audio system is of the "constant voltage" type, in which the amplifier output does not change when the speaker load is varied. This means that the volume from any speaker in the system will not change noticeably when other speakers are added or removed. It also facilitates adjustment of volume at each speaker; connections and speaker runs are simplified and, within certain limits, impedance matching problems are eliminated.

Except in very small locations, adequate distribution of sound at uniform level thru-out the service area can be obtained only by careful placement of a sufficient number of High Fidelity remote speakers.

A total of 25 watts of audio power is available from the MRA4-L6 amplifier which is used in the Model HF100G. This power can be divided in various proportions between the cabinet speakers and High Fidelity Type Remote Speakers.

In order to preserve the high quality obtainable from the MRA4-L6 High Fidelity Amplifier when remote speakers are to be used, the following types must be used:

A. Type HFAS2-12 Recessed Speaker (Grill type for wall or ceiling mounting-16 ohm, 8 watts).

B. Type HFAS3-8 Corner Speaker (Wood Cabinet - ceiling corner or floor mounting-16 ohm, 8 watts).

C. Type HFCV1-8 Corner Speaker (Wood Cabinet - ceiling corner or floor mounting-70-Volt Constant Voltage Type).

CONNECTION OF HIGH FIDELITY REMOTE SPEAKER

1. If 16 ohm, 8 watt type High Fidelity Speakers are to be used, only a maximum of 2 may be connected to this amplifier. They are connected in parallel directly to terminals L and G on the amplifier. See Figure 5. With this connection 8 watts will be available at each speaker. Wire Size and line lengths are given below:

WIRE SIZE A.W.G.	SEEBURG PART NO.	MAXIMUM LINE LENGTH (FOR 10% POWER LOSS)	
		1 Speaker 8 Watts	2 Speakers 16 Watts
24	502090	32 feet	16 feet
22	–	50 feet	25 feet
20	*502294	80 feet	40 feet
18	51941	140 feet	65 feet
16	*502229	200 feet	100 feet
14	–	320 feet	160 feet
12	–	500 feet	250 feet

* SHIELDED

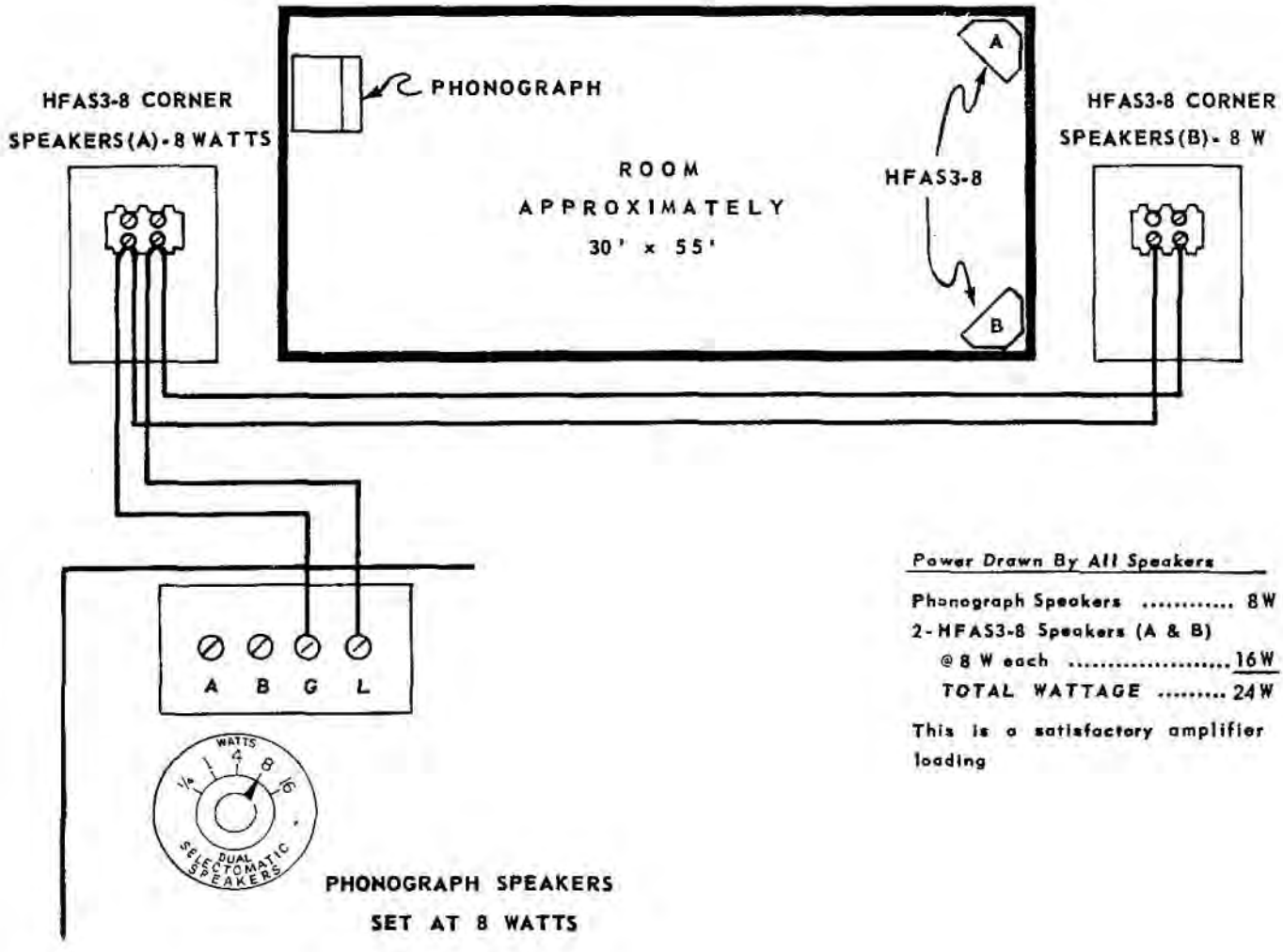
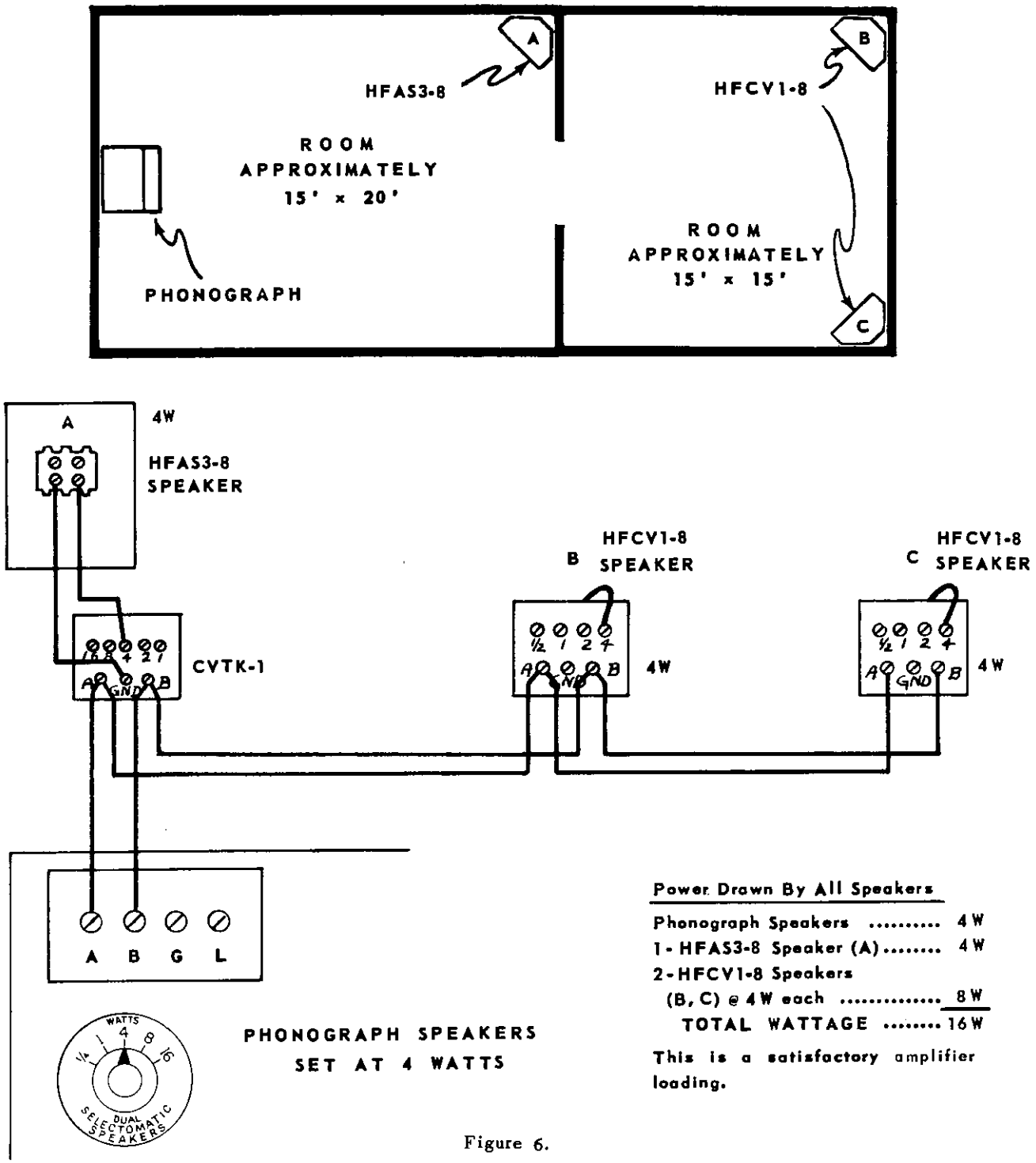


Figure 5.

2. If the proposed speaker line is too long for practical wire size, or if more than 2 speakers are needed, convert the speakers to CV operation by installing one or more transformer kits; Type CVTK-1. See Figure 6. Connect the CVTK-1 line to terminals A and B on the Amplifier. See CVTK-1 instruction folder packed with each kit.

3. Constant Voltage Type High Fidelity Speakers are connected to terminals A and B of the Amplifier. See Figure 6. A load of 16 watts can be carried by No. 24 wire (Part No. 502090) for line lengths up to 600 feet.

   For wiring of Speakers, See instruction folder packed with each speaker and kit.



Power Drawn By All Speakers

Phonograph Speakers	4 W
1 - HFAS3-8 Speaker (A)	4 W
2 - HFCV1-8 Speakers (B, C) @ 4 W each	8 W
TOTAL WATTAGE	16 W

This is a satisfactory amplifier loading.

Figure 6.

SELECT-O-MATIC SPEAKERS

Set the Dual Select-O-Matic Speakers Switch to the position which gives the best balance between the Select-O-Matic Speakers and the remote speakers with normal volume control setting. IF NO REMOTE SPEAKERS ARE USED, THE SWITCH MUST BE SET TO 16 WATTS.

The Wattage of all speakers must be added (including the Select-O-Matic Speakers) and the total watts absorbed by all speakers must not exceed 25 watts, which is the power rating of the MRA4-L6 Amplifier. For best operation, the total watts should be not less than 6 watts (25% of rated amplifier load.)

NOTE: If the wattage of all speakers (including the Select-O-Matic Speakers) to be connected to the Master Remote High Fidelity Amplifier, Type MRA4-L6, exceeds 25 watts, a power amplifier, Seeburg Type HFA1-L6, may be used to supply part of the load. Follow the instructions supplied with the amplifier for connecting speakers.

MASTER REMOTE VOLUME CONTROL, TYPE NO. MRVC-1 (Accessory)

The Master Remote Volume Control, Type MRVC-1 comes completely wired and ready for use. It is only necessary to remove the 7-prong dummy plug from the Master Remote Amplifier and the 2-prong Cancel Plug from the Wired Selection Receiver and replace with the corresponding plugs on the cable of the MRVC-1, and dress the cable to the permanent position selected for the control unit. Screws and cable clamps furnished with this kit make it easy to do a neat, workmanlike installation.

MICROPHONE PREAMPLIFIER AND MIXER, TYPE PAK3-L56 (Accessory)

The Microphone Preamplifier and Mixer Kit, Type PAK3-L56, may be used with the Select-O-Matic Model HF100G on any installation requiring the transmission of voice or live music thru the Seeburg Sound Distribution System.

HIGH FIDELITY CONSTANT VOLTAGE SPEAKER CONTROL, TYPE HF25LT-2 (Accessory)

This is a control designed for use with 70-volt Constant Voltage Speaker lines. It can be used to control the power (in 3 db steps) to one or more High Fidelity Constant Voltage type speakers, or it can be used with 16 ohm High Fidelity Speakers that are operating with a Type CVTK-1 Transformer Kit.

TESTING

After the installation has been completed, all units should be carefully tested to see that they perform properly. Make several selections from the Electrical Selector and from each Wall-O-Matic and see that the selections made have correctly registered on the Selector Assembly. Check the quality of music, and note that music can be heard at a comfortable volume level in all parts of the service area. See that all cables are dressed into inconspicuous places to present a neat appearance and prevent mechanical damage to them.

REMOVING CARRIAGE COVER

The carriage cover must be removed for lubricating the mechanism, for servicing and for replacement of the lamp used to illuminate the escutcheon. It is removed as follows:

1. Select an odd number selection (F-1) to get pickup to the left side.
2. Cover the pickup cartridge with the plastic protective case.
3. Remove the top screw on the right hand brush holder and turn the holder until the brush is at the top.
4. Remove two oval head screws; one is on the top, and the other on the lower left side.
5. After replacing the lamp, carefully lower the cover over the carriage making sure the three notches at the bottom edge engage the three support studs on the carriage.
6. Fasten cover and brushes with their respective screws.

LUBRICATION

The mechanism and other mechanical parts should be lubricated periodically. Follow the lubrication chart posted on the back of the mechanism.

PICKUP STYLUSES

In order to retain good quality of reproduction it is necessary to keep the pickup and styluses clean and in good condition.

CAUTION: The pickup and styluses must be handled carefully or the delicate armature suspension may be damaged.

When records are changed, or the equipment is cleaned the styluses and the stylus brushes should be cleaned by using the small brush furnished for this purpose and mounted in a clip on the left diffuser block.

STYLUS REPLACEMENT

The styluses used with the Seeburg magnetic pickup are tipped with natural Swiss sapphire, which is excelled in hardness and wear resistance only by diamond. However, all materials wear in the presence of friction; wear of a stylus starts with the first play and continues until the stylus is replaced. The tone quality is good and distortion remains at a low figure for the first few thousand plays but gradually distortion increases until a disagreeable amount is noticed.

When only pure vinylite 45 rpm records are used, styluses should be changed every four or five thousand plays to maintain good quality. If, because of the presence of oil on the records, dust or dirt is permitted to accumulate and remain on the surface, the wear will be more rapid; economical operation will require more frequent stylus replacement.

If the Styluses are not replaced before objectionable distortion sets in, the records may be permanently damaged, and replacing the Styluses will not restore the original tone quality.

Because the cost of a pair of styluses is only a small fraction of the cost of a set of records, it is economically sound to replace styluses on a regular schedule rather than on a hit-or-miss basis. A schedule can be most easily determined from instrument income. The styluses should be changed according to the following table if the records are arranged for approximately equal distribution of play between the right and left sides of the pickup:

Approximate Weekly Gross Receipts:	Change Both Styluses Every:
$ 25	4 months
$ 50	2 months
$ 75	6 weeks
$100	4 weeks
$150	3 weeks

The table is based on five cents per selection and four to five thousand plays for each stylus.

TO REPLACE STYLUSES:

1. Remove the slotted-head screw at the top of the arm and remove the pickup by lifting straight up. Thread the screw into the pickup so as not to lose it.

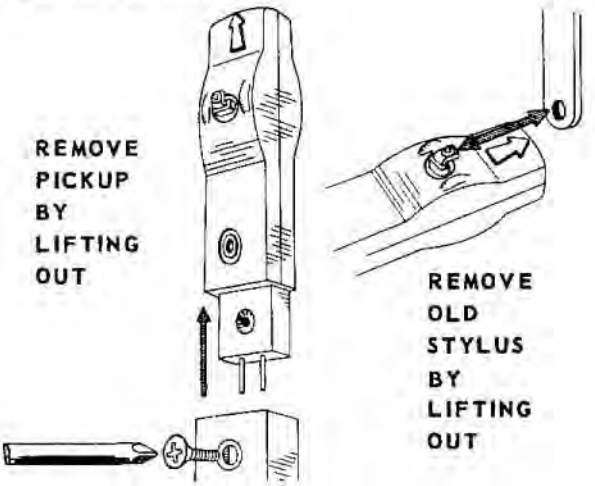


Figure 7.

2. Remove one of the installation tools (with new stylus) from the card and thread the old stylus through the hole in the rounded end of the tool. Lift out the old stylus by gently pulling STRAIGHT OUT. DO NOT USE A TWISTING MOTION OR MOVE THE STYLUS FROM SIDE TO SIDE – PULL STRAIGHT OUT.

3. Gently insert the new stylus – DO NOT FORCE. Slide the tool off the stylus.

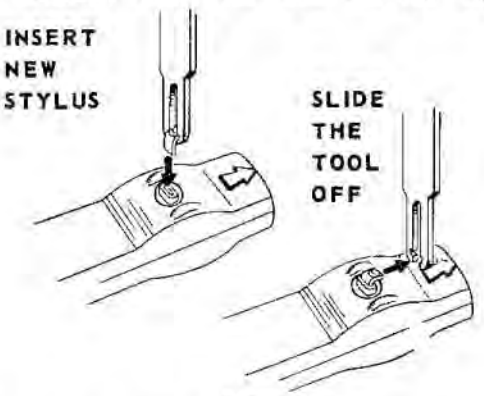


Figure 8.

4. Turn the pickup over and replace the other stylus in the same manner.

Install the pickup on the arm after checking that styluses are installed to point in direction that embossed arrows point. Tighten the holding screw firmly – check landing adjustment. Also, check the stylus brushes to make sure that they wipe the styluses lightly to remove lint and dust.

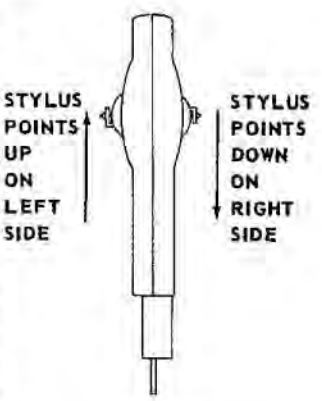


Figure 9.

RECORD CARE

To avoid accumulation of dust and dirt, keep oil off the records. Wipe your hands with a clean cloth before handling records and always handle records by edge and center hole. Records that show signs of surface dust or dirt should be wiped with a slightly dampened cloth, using a circular motion. Use only water to dampen the cloth-solvents will damage the records. Records not in use should be stored on edge in a cool place. Avoid exposing the records to excessive heat. Records become, overheated in a very short time if exposed to direct sunlight or if stored in a closed automobile or truck. Temperature above 120° F. should be avoided.

See instructions on "Placing the Select-O-Matic "100".

LAMP REPLACEMENT

Access to the 25 watt (33 inch) Daylight fluorescent lamp or lamp starter is gained by first removing the program assembly. To remove the fluorescent lamp rotate the lamp 90° in either direction and lift out of sockets.

To replace the lamp behind the carriage cover escutcheon it is necessary to remove the cover as outlined in "Removing Carriage Cover".

To replace the *"Selection Now Playing" lamp* proceed as follows:

1. Select K-4 and while this record is in play position turn off the phonograph at the main switch. Swing the popularity meter cover down exposing the lamp assembly.
2. Loosen the screw which holds the light bracket to the top of the bakelite block. Slide the socket assembly to the right to clear the block. Lift out the lamp assembly.
3. Replace lamps and lightly fasten assembly in place with pigtail lug under screw head.
4. Turn on the main switch. Adjust the socket assembly by sliding the bracket to the left or right until a clean-cut rectangular window of light is centered on K-4. Tighten the screw and raise the cover to normal position.

APPEARANCE

To maintain good appearance of the phonograph, and thus keep customer appeal at its maximum level, the various pieces of glass (such as the lid, side glass, diffuser glass, and mirrors) should be kept clean. The chrome plated parts also should be cleaned occasionally. These parts include Electrical Selector, program holder, coin slot, and plated parts in the mechanism compartment.

PREPARING INSTRUMENT FOR MOVING

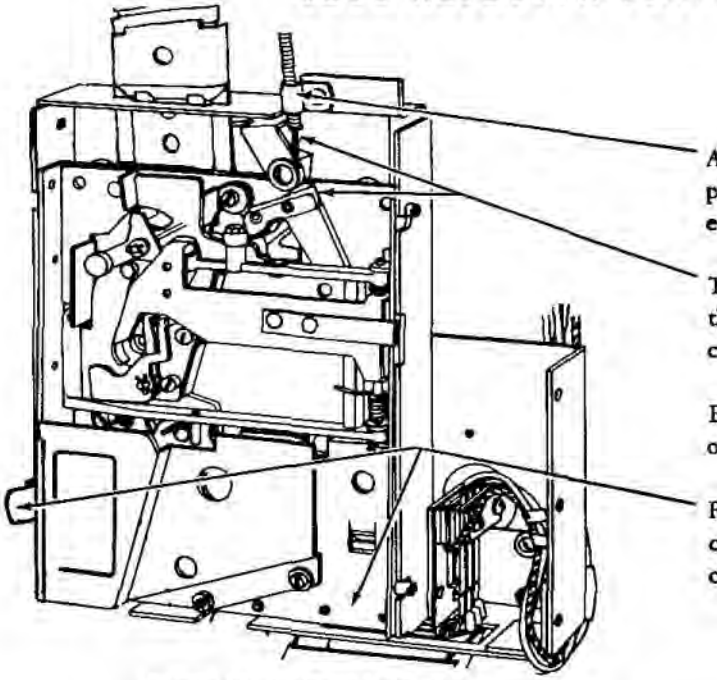
1. Place protective tube over pickup cartridge and install Pickup Arm shipping support.
2. Remove all records from the magazine. Position carriage on base so that the selection indicator light is behind D-1. Put three pads under the carriage wheels; then bolt the carriage to the base by means of two 2-inch long thumb screws.
3. Put the two wood ¼" shims under the base at the mechanism hold-down bolts.
4. Tighten three mechanism hold-down nuts.

TO SHIP

If the instrument is to be shipped by way of a transportation company, it should be blocked and crated in the same manner in which it was received from the factory.

SEEBURG

SLUG REJECTOR SCAVENGER CABLE



Adjust position of cable in clamp so plunger button at front of cabinet extends ¾".

The clamp should be positioned so the wire does not bind in the flexible cable.

End of wire should not touch surface of bracket on wiper blade.

Rejector should be held by spring clip and in mounting bracket at this corner.

Figure 10. Cable Adjustment

COIN SWITCHES

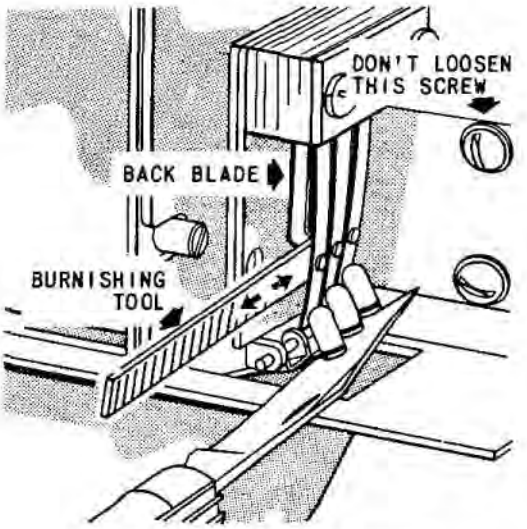


Figure 11. Coin Switch Cleaning

Clean the switch contacts carefully with carbon tetrachloride using a #2 camel hair brush.

Burnish by inserting a burnishing tool between the contacts, raising the switch lever with a knife blade as shown in Figure 11. *Never use a file or sandpaper for contact cleaning.*

DO NOT ATTEMPT ANY BENDING ADJUSTMENT IF THE SWITCH MEETS CONDITIONS OUTLINED ON FIGURES 12, 13 and 14.

1. Insert a dime at top of the slug rejector while supporting the switch actuating lever with a knife blade. The coin rests on the lever as shown in Figure 12.

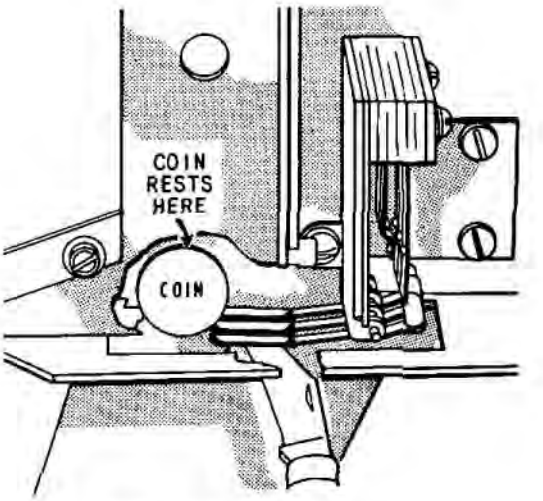


Figure 12. Coin Position

COIN SWITCHES *(Continued)*

2. Move the knife blade *slowly* to the right to release the coin. The contacts must come together and the back blade should move approximately 1/64" just before the coin drops through of its own weight. (See Figure 13).

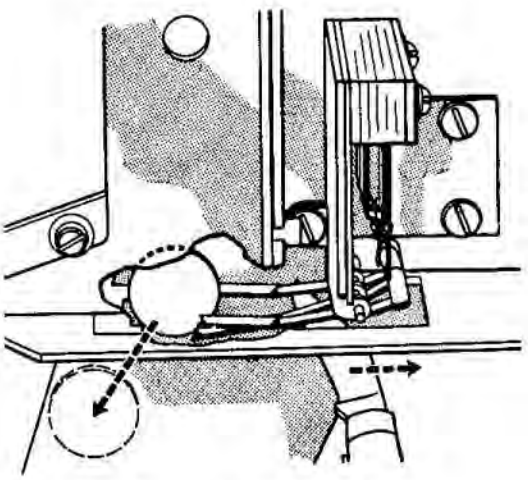


Figure 13. Coin Travel

The coin switch levers should be parallel with the opening in the gage plate and the center lever (10¢) should center on the projection of the gage as shown in Figure 14. Lateral play of the lever should be taken into account when checking the position of the 10¢ switch lever.

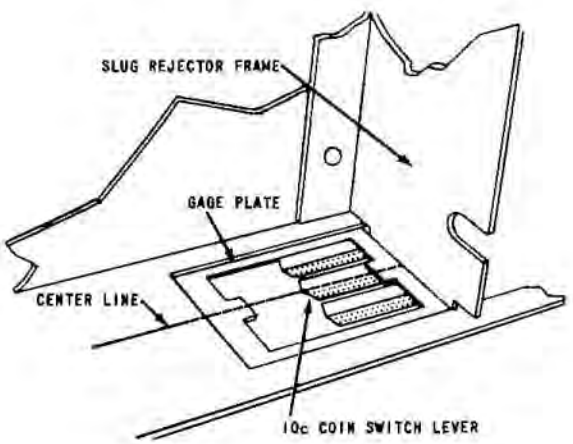


Figure 14. Coin Switch Lever Position

If the proper contact is not made or the coin does not drop through of its own weight adjustment should be made as oudined below.

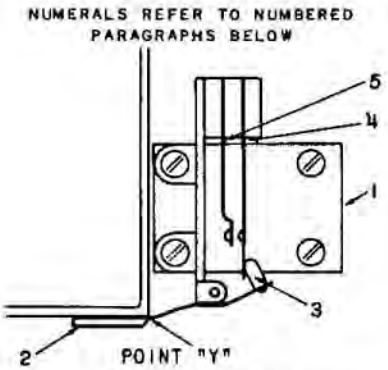


Figure 15. Coin Switch Adjustment

1. Adjust position of coin switch mounting so switch levers bear at point "Y".

2. Adjust levers to be parallel to and against bottom surface of frame.

3. Adjust switch actuating cams to be tilted approximately as shown and overlap the blade approximately 3/32".

4. Bend long blade at this point for 4 to 5 grams tension toward cam as measured at switch contact point.

5. Bend short blade at this point so it moves approximately 1/64" when coin is slowly released as in Figures 12 and 13.

NOTE: It is important that the ENDS of the bracer blades support the short contact blades support the short contact blades as shown in Figure 16.

Figure 16. Bracer Blade Adjustment

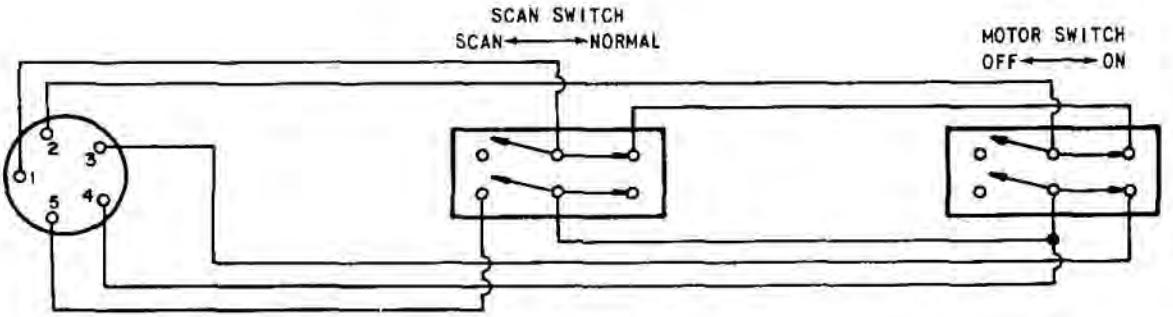


Figure 17. Schematic Diagram - Service Switches.

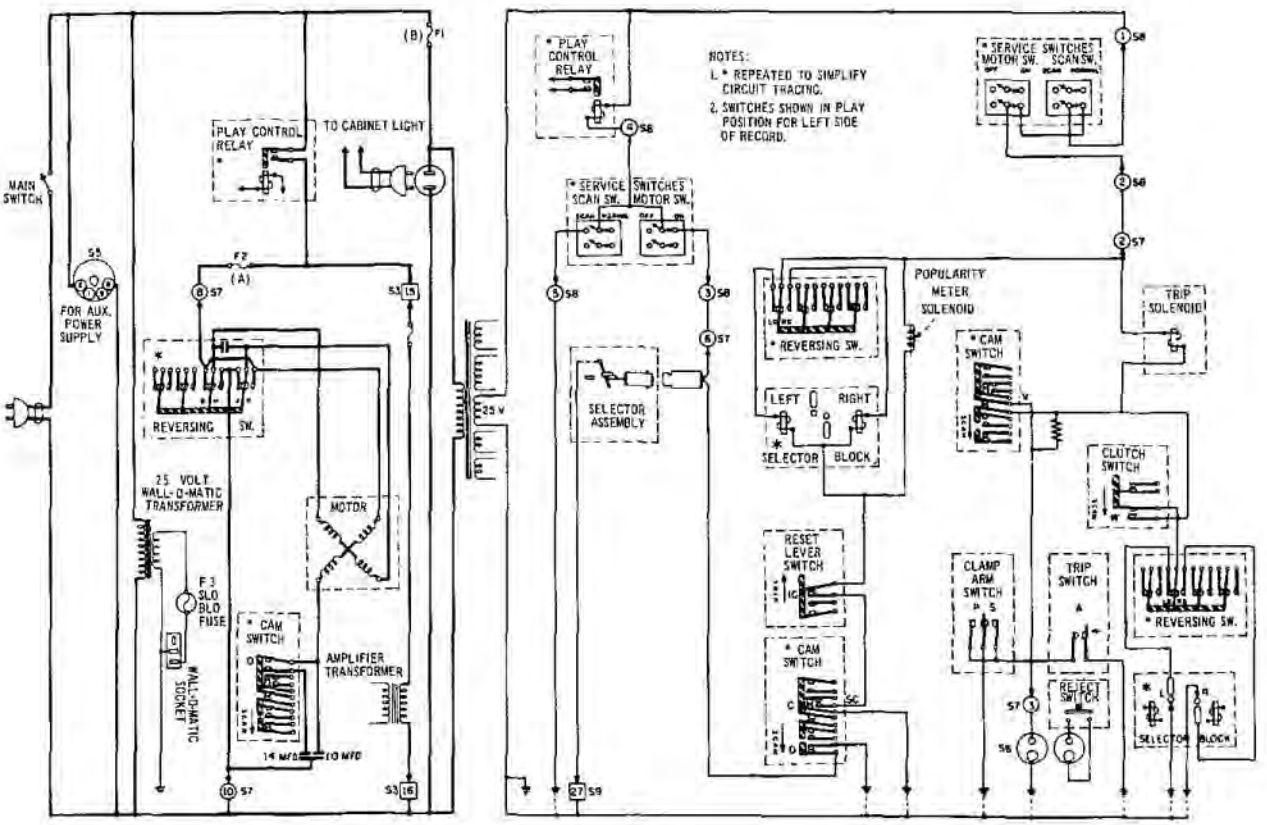


Figure 18. Schematic Diagram - Power & Control Wiring,
145S11-L6 Mechanism & WSR 5-L6 Selection Receiver.

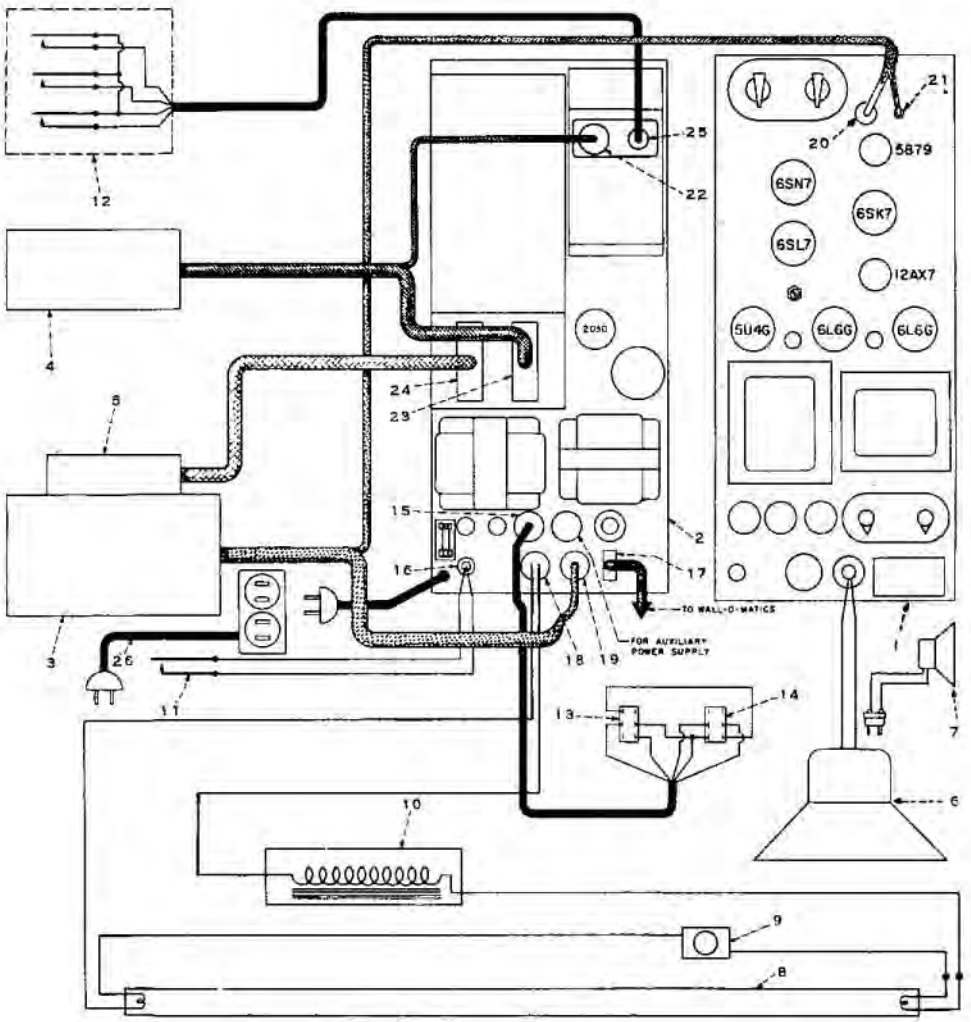


Figure 19. Cabinet Wiring Diagram.

PARTS LIST

Item	Part No.	Part Name
1	305150	High Fidelity Master Remote Amplifier, Type MRA4-L6
2	303230	Wired Selection Receiver, Type WSR-L6
3	246101	Select-O-Matic Mechanism, Type 145S11-L6
4	410200	Electrical Selector, Type ES10-L6
5	304450	Selector Assembly, Type 100SA7-L6
6	406350	Speaker (Low Frequency)
7	406260	Speaker (High Frequency)
8	405136	25 Watt Fluorescent Daylight Lamp
9	405138	Starter
10	405101	Ballast
11	402065	Record Reject Switch
12	401506	Coin Switches
13	404671	Scan Switch
14	23261	Motor Switch
15	200241	5-prong Plug
16	402066	2-prong Plug
17	12015	3-prong Plug
18	10895	A C Plug
19	250942	11-prong Plug
20	A250938	3-prong Plug
21	K228440	Single Prong Plug
22	12028	Octal Plug
23	400844	27-prong Connector
24	F9461	27-prong Plug
25	401515	4-prong Plug (Small)
26	402152	Line Cord and Outlet Assembly

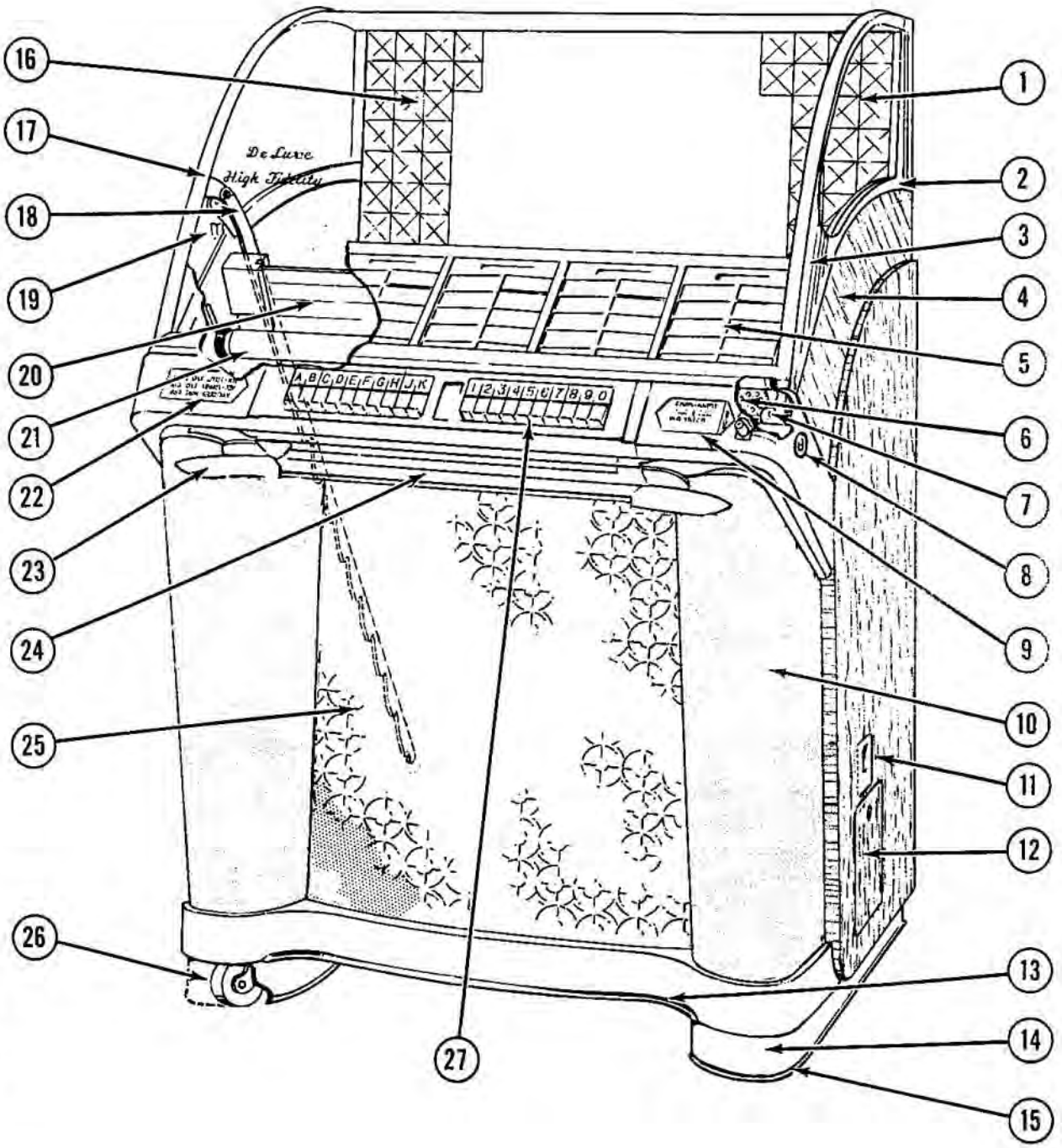


Figure 20. Front View HF100G Cabinet Assembly

PARTS LIST on Reverse Side

PARTS LIST

Item	Part No.	Part Name
1 -	406077	Side Glass
2 -	406063	Side Glass Mldg. L.H. (Outside)
	406062	Side Glass Mldg. R.H. (Outside)
	77274	No. 6 x ⅜ Phillips F.H.W. Screws
	406242	Side Glass Retainer (Inside)
	77204	No. x 5/8 Phillips Oval (Hd. W. Screw)
3 -	406030	Side Glass Support (Front Brkt.) R.H.
	406031	Side Glass Support (Front Brkt.) L.H.
	406307	Side Glass Clamp (Back)
	70647	6/32 x ¼ Phillips R.H.M. Screw
4 -	406380	Silver Zebrano Decal (Light) (49" x 34¼")
	406381	Silver Zebrano Decal (Dark) (Die Cut - R.H.)
	406382	Silver Zebrano Decal (Dark) (Die Cut - L.H.)
	406383	Silver Zebrano Decal (Dark) (Band 2 5/8 x 34")
	406384	Silver Zebrano Decal (Dark) (Special)
5 -	406245	Prog. Holder & Frame Assembly
	406140	Frame Rail
	406142	Frame Rail Sides
	406300	Program Glass - (A1-B10)
	406301	Program Glass - (C1-D10)
	406302	Program Glass - (E1-F10)
	406303	Program Glass - (G1-H10)
	406304	Program Glass - (J1-K10)
	406051	Program Holder Assem. (A-B)
	406014	Program Holder Only
	406050	Program Holder Spring
	404675	Retainer Washer
	72158	(7/16 x .140 x .031) Flatwasher
	406052	Program Holder Assem. (C-D)
	406053	Program Holder Assem. (E-F)
	406054	Program Holder Assem. (G-H)
	406055	Program Holder Assem. (J-K)
	406056 thru 406060	Program Identification Labels
	406320 thru 406335	Classification Heading (Sold In Sets Only)
6 -	406229	Vent Screen Front
7 -	405138	Fluorescent Light Starter
	404631	Starter Socket
8 -	406040	Lid Lock - L.H.
	406041	Lid Lock - R.H.
	406042	Lid Lock Bolt
	406043	Bolt Pivot Bar
9 -	406200	Coin Window (6 Play - Quarter)
	406201	Coin Window (3 Play - Quarter)
10 -	406401	Pilaster - R.H.
	406400	Pilaster - L.H.
11 -	406110	Slug Receptacle Assembly
	406085	Slug Receptacle Only
	406109	Slug Receptacle Side Wall
12 -	406338	Cash Door Assembly
	406086	Cash Door Only
	406340	Cash Door Lock
	406095	Lock Reinforcing Channel
13 -	406164	Cabinet Base Trim Strip
14 -	406426	Base Plate Cover - L.H.
	406427	Base Plate Cover - R.H.
15 -	406165	Base Trim Strip - R.H.
	406166	Base Trim Strip - L.H.
16 -	406238	Mirror Assembly - R.H.
	406239	Mirror Assembly - L.H.
	406177	Flex-Glass Mirror Only - R.H.
	406178	Flex-Glass Mirror Only - L.H.
17 -	406412	Cabinet Lid Assembly
	406413	Cabinet Lid Glass
	406077	Lid Hinge
	406017	Cabinet Lid Frame - R.H.
	406018	Cabinet Lid Frame - L.H.
	406083	Cabinet Lid Frame - (Top)
	406084	Cabinet Lid Frame - (Bottom)
18 -	406251	Lid Support
19 -	406090	Side Glass Clamp - R.H.
	406091	Side Glass Clamp - L.H.
	406368	Spring
	406065	Program Frame Latch - R.H.
	406066	Program Frame Latch - L.H.
	406067	Program Frame Latch - Spring
20 -	406414	Diffuser Glass 30" Long
	406425	Diffuser Glass 31¾" Long
21 -	405136	Fluorescent Tube (25 Watt Daylite)
	406645	Light Socket (2)
	406228	Cable Assembly
22 -	406180	Instruction Window (Press One Letter)
23 -	406025	Ornaments - L.H.
	406026	Ornaments - R.H.
24 -	406104	Cabinet Corner Casting - R.H.
	406106	Corner Channel Casting - R.H.
	406105	Cabinet Corner Casting - L.H.
	406107	Corner Channel Casting - L.H.
	70775	10-32 x 3/8 Phillips Flat H.M. Screw Steel Chrome Plated
	70776	10-32 x 3/8 Phillips Oval H.M. Screw Steel Chrome Plated
	406021	Selector Frame Center
25 -	406179	Grille Cloth
	406420	Grille Assembly
26 -	405774	Caster Socket
	402588	Caster (Metal Wheel)
	405773	Caster (Composition Wheel)
27 -	410210	Selector Key Panel, complete

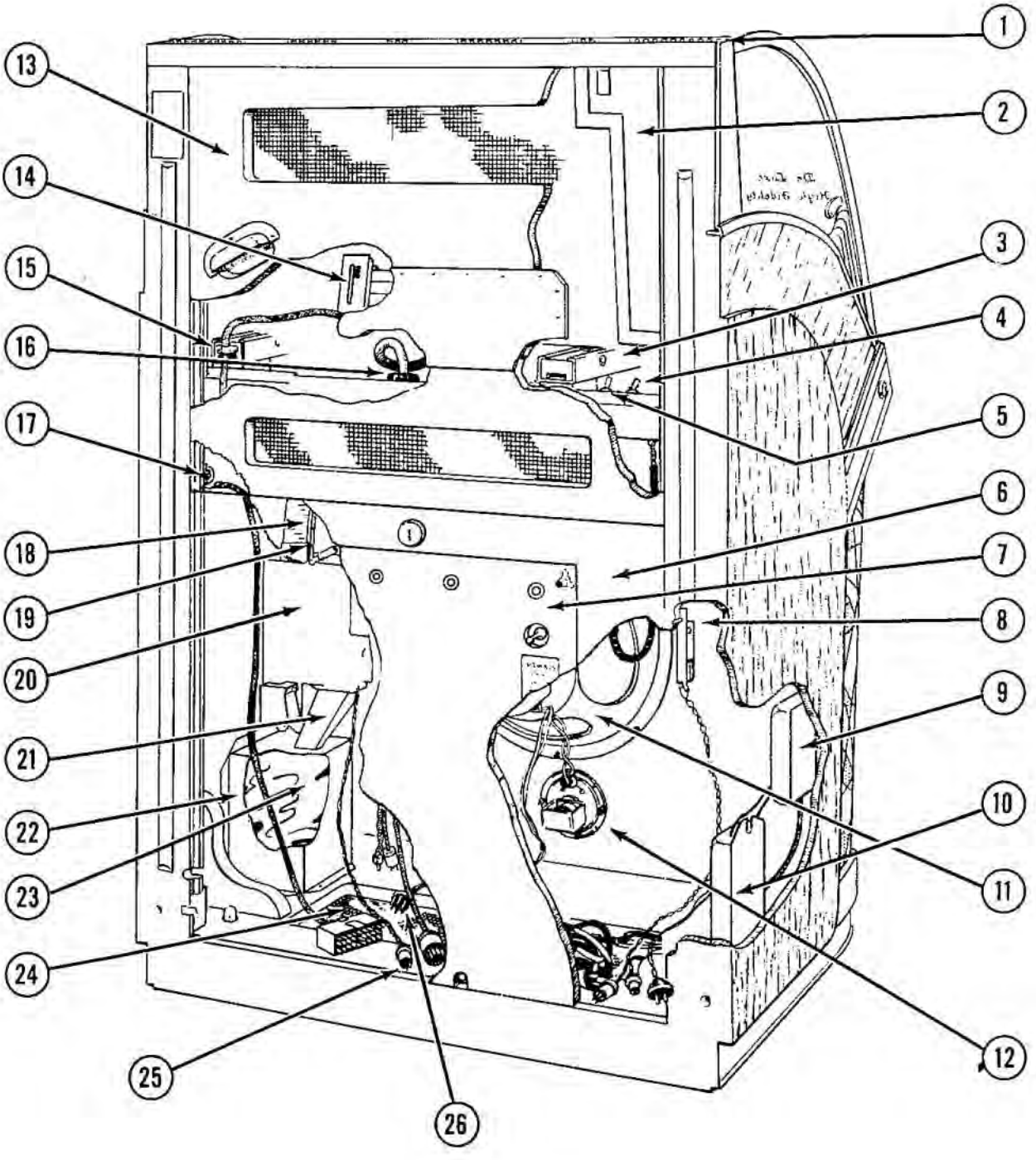


Figure 21. Back View HF100G Cabinet Assembly

PARTS LIST on Reverse Side

PARTS LIST

Item	Part No.	Part Name
1 -	406046	Cabinet Hinge Rail
2 -	406238	Mirror Assembly, R.H.
	406239	Mirror Assembly, L.H.
	70659	6-32 x 3/8 Phillip R.H.M.S. (Finish Hd.) (Red)
	70660	6-32 x 1 1/8 Phillip R.H.M.S. (Finish Hd.) (Red)
	406233	Channel Support Post, R.H.
	406234	Channel Support Post, L.H.
	406235	Channel Block Rear
	406236	Channel & Pin Assembly
	405196	Chassis Lock Pin
	405203	Retaining Ring
	406237	Channel Support Bracket, Upper
4 -	404671	Scan Switch
5 -	23261	Motor Switch
6 -	406119	Back Door Assembly (Lower)
	406123	Rear Door Lock
	404320	Tee Nut
	404321	Eye Bolt
7 -	406445	Lower Rear Door Cover Plate Assem.
8 -	405654	Record Reject Switch Assem. (Complete)
	402065	Switch
	405742	Cable and Plug Assembly
	402064	Pin (Reject)
	77242	No. 5 x ¾ Phillip R.H.W.S. (2)
	15037	Cable Clamp (Switch Stop)
	77243	No. 6 x 3/8 Phillip R.H.W.S. (2)
	402066	2 - Prong Plug
9 -	402152	Line Cord & Outlet Assembly
10 -	405101	Fluorescent Lite Ballast (25 Watt)
11 -	402430	Speaker Plug
	406350	Speaker (Utah) (Low Freq.)
12 -	406260	Speaker (Utah) (Hi Freq.)
	406349	Speaker Receptacle (Hi Freq.)
	406261	Speaker Plug (Hi Freq.)
13 -	406120	Upper Rear Door Assembly
	406122	Upper Rear Door Only
	404619	Rear Door Clamp, R.H.
	404620	Rear Door Clamp, L.H.
	406443	Upper Rear Door Cover Plate
	406441	Upper Rear Vent Screen (Lower)
	406442	Upper Rear Vent Screen (Top)
	406169	Rear Door Trim (Small)
	406170	Rear Door Trim (Large)
	406444	Handle
14 -	405219	Pickup Brush
	405220	Brush Holder
15 -	15037	Cable Clamp
16 -	405204	Rubber Grommet
17 -	404619	Upper Rear Door Clamp, R.H.
	404620	Upper Rear Door Clamp, L.H.
18 -	401625	Coin Chute
19 -	401740	Scavenger Wire & Plunger Assembly
	401741	Scavenger Wire & Housing
	401223	Plunger Return Spring
20 -	401731	Slug Rejector Mounting Frame Assembly
	404731	Slug Rejector
	401255	Slug Rejector Mounting Stud
	401506	Coin Switch & Cable Assembly
	401314	Coin Switch Only
21 -	401298	Lower Coin Chute Welded Assem.
22 -	406096	Cash Box Welded Assembly
	405745	Cash Box Lock Plate
23 -	404659	Cash Bag
24 -	406440	Floor Vent Screen
25 -	401515	4 - Prong Plug (Coin Switch)
26 -	402430	6 - Prong Speaker Plug

PICTURE DIAGRAMS

SEEBURG SELECT-O-MATIC "100"

MODELS 100W & HF100G

45 R.P.M.

The picture diagrams on the next six pages show the control and operational "circuits" of the Seeburg 45 R.P.M. Select-O-Matic "100" Model 100W & HF100G. Each diagram concerns one or two major elements which, if not operating normally, will result in abnormal equipment performance that is very apparent and can be readily observed. These major elements are identified and are at the end of lines which, if followed, "connect" all switches, fuses, or relays associated with the "circuit". The lines are marked with arrowheads to assist in tracing. The broken red lines indicate the location of switches, relays and fuses.

To use the diagrams, start with the element which is not operating correctly, i.e., Motor, Amplifier, Trip Relay, etc. Follow the line to its *starting point* working *against* the arrows - never *with* them. By working *against* the arrows, the lines will lead through each item where trouble may occur. If there are lights or fuses in the circuits being traced, observe and check them first.

EXAMPLE:

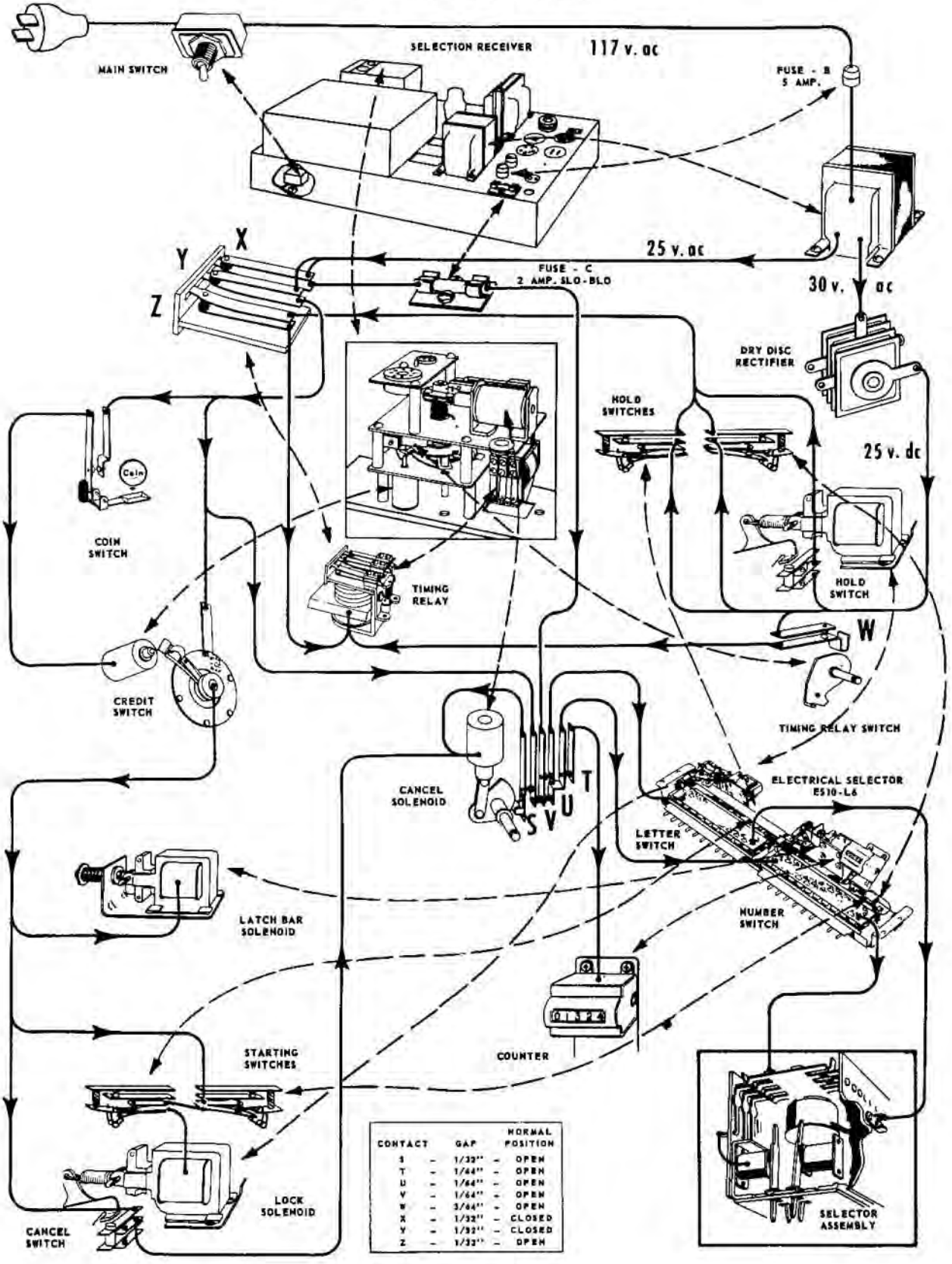
TROUBLE	CHECK
Motor does not run. Use diagram "Motor & Amplifier Control".	Check from Mechanism MOTOR *against* arrows to: A. Reversing Switch B. 3 amp. Fuse – A C. Contact "C" on Play Control Relay. D. Main Switch. E. Line cord and plug. If the fluorescent cabinet lights operate normally, items D and E can be eliminated as possible causes of mechanism motor failure because *both motor and light* operate through them. If the Amplifier operates when the mechanism is in playing position, items C, D, and E can be eliminated as possible causes of motor failure because *both motor and amplifier* operate through them. If manual operation of the Play Control Relay and Contact "C" causes the motor to run and the amplifier to turn on, check the Relay to see if it is being energized. If the relay is not being energized, check the 25 V. line *against* the arrows from the Play Control Relay through: A. Service Switches. B. Selector Assembly. C. 3 amp. Fuse B.

SEEBURG

ELECTRICAL SELECTOR OPERATION - Picture Diagram

Select-o-matic "100" – HF100G & 100W

(NOT A SCHEMATIC OR WIRING DIAGRAM)

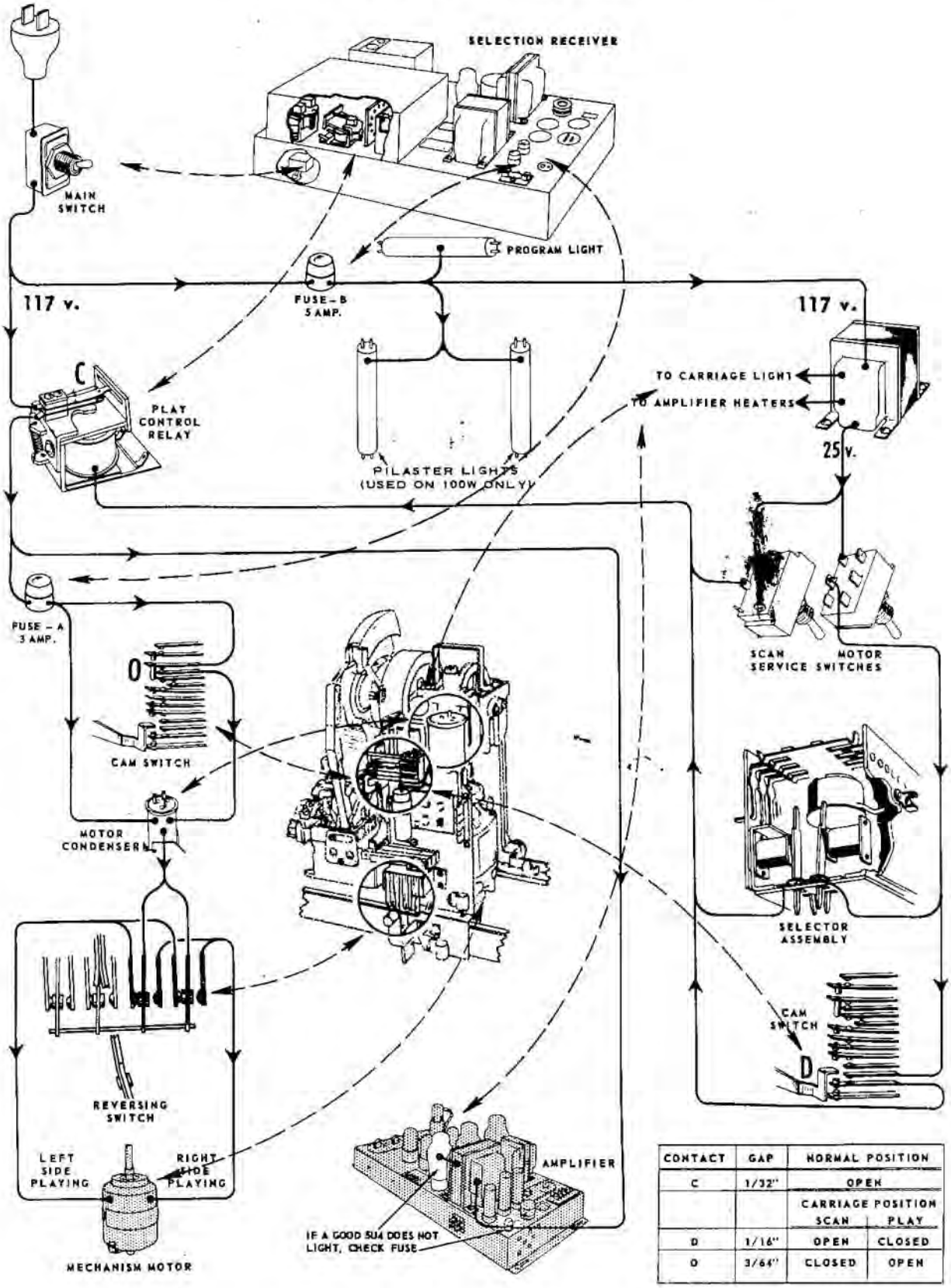


CONTACT	GAP	NORMAL POSITION
S	1/32"	OPEN
T	1/64"	OPEN
U	1/64"	OPEN
V	1/64"	OPEN
W	3/64"	OPEN
X	1/32"	CLOSED
Y	1/32"	CLOSED
Z	1/32"	OPEN

MOTOR & AMPLIFIER CONTROL - Picture Diagram

Select-o-matic "100" – 100W & HF100G

(NOT A SCHEMATIC OR WIRING DIAGRAM)

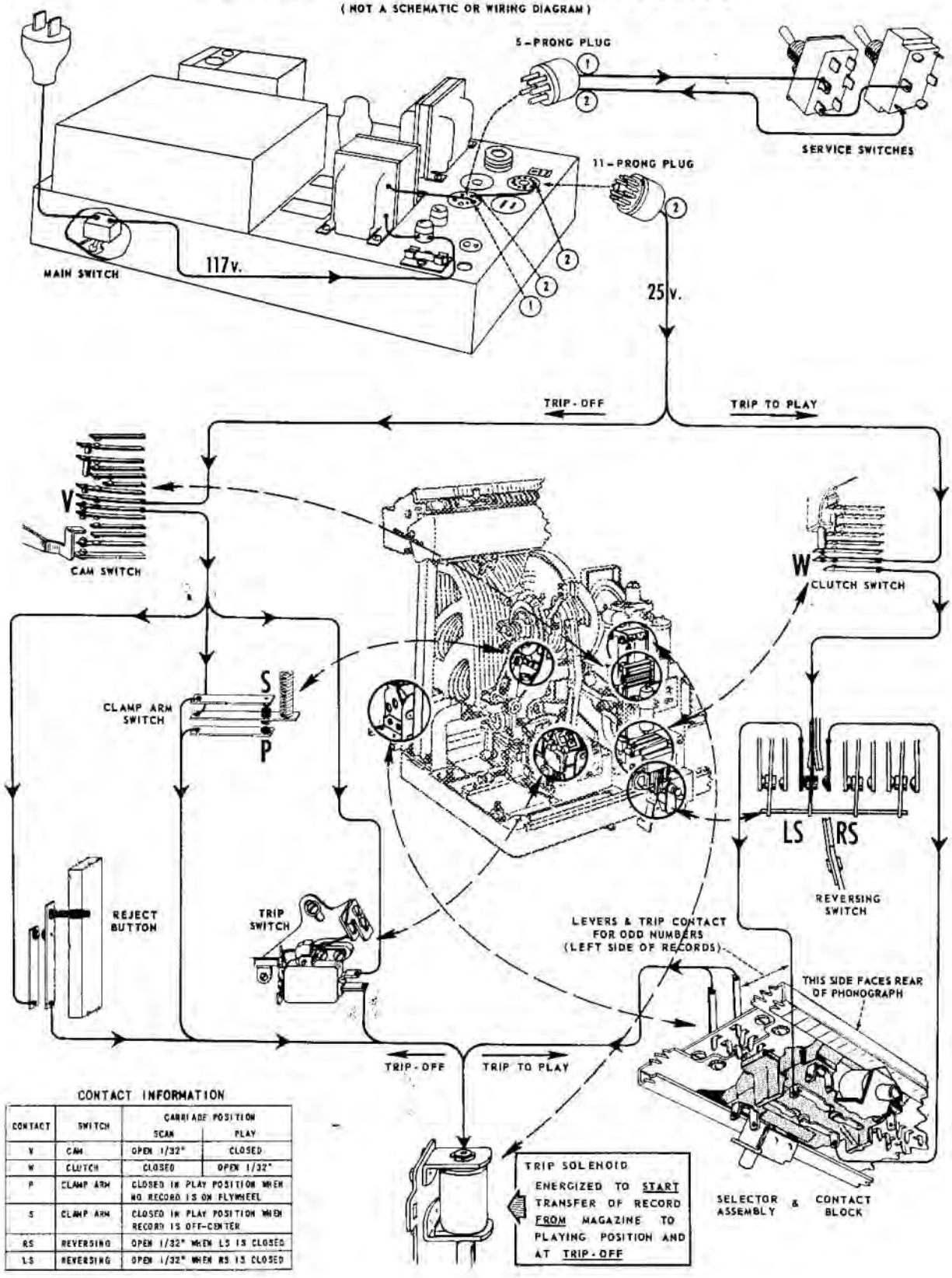


CONTACT	GAP	NORMAL POSITION	
C	1/32"	OPEN	
		CARRIAGE POSITION SCAN	PLAY
D	1/16"	OPEN	CLOSED
D	3/64"	CLOSED	OPEN

TRIP SOLENOID - Picture Diagram

Select-o-matic "100" – 100W & HF100G

(NOT A SCHEMATIC OR WIRING DIAGRAM)



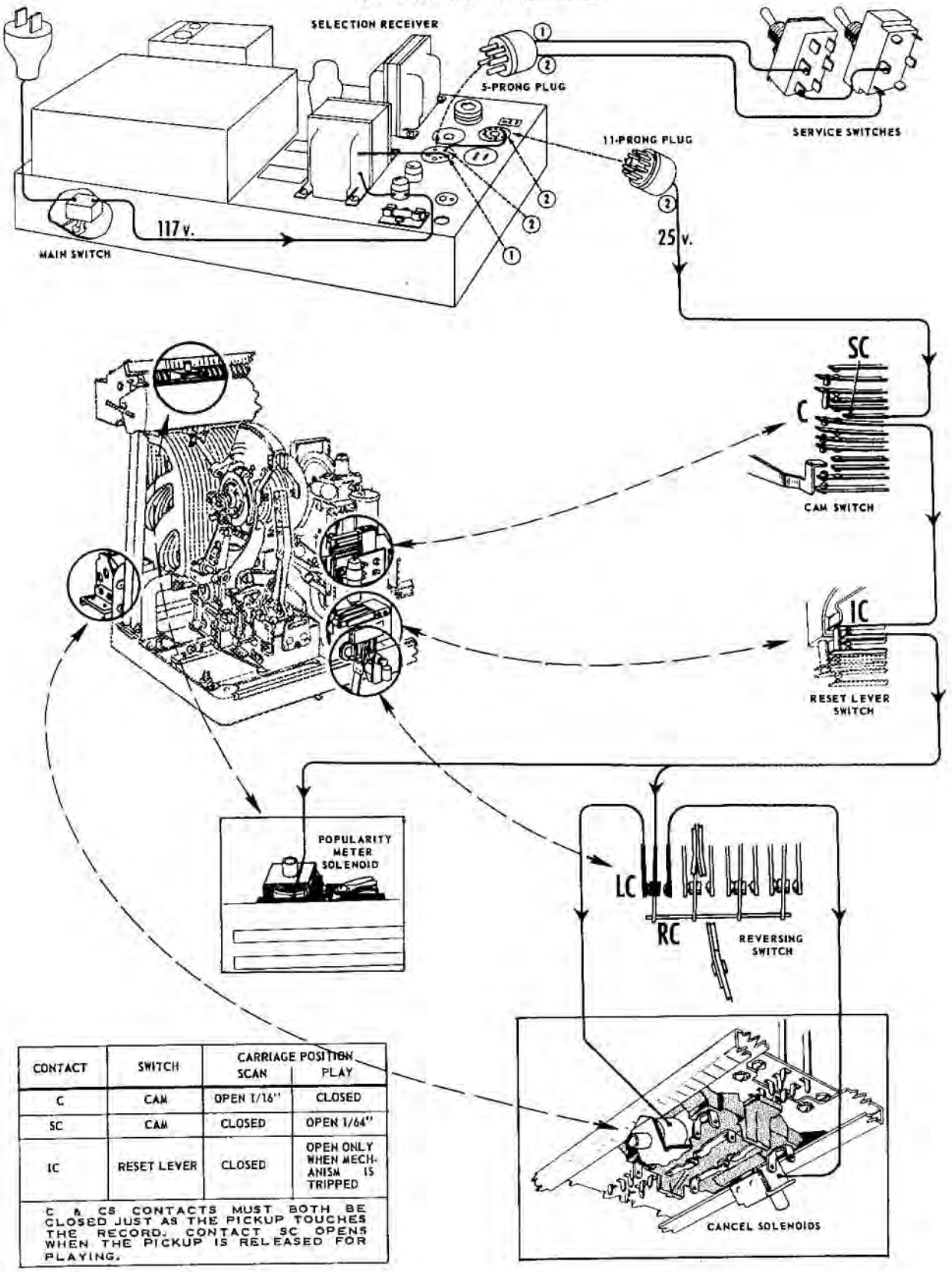
CONTACT INFORMATION

CONTACT	SWITCH	CARRIAGE POSITION	
		SCAN	PLAY
V	CAM	OPEN 1/32"	CLOSED
W	CLUTCH	CLOSED	OPEN 1/32"
P	CLAMP ARM	CLOSED IN PLAY POSITION WHEN NO RECORD IS ON FLYWHEEL	
S	CLAMP ARM	CLOSED IN PLAY POSITION WHEN RECORD IS OFF-CENTER	
RS	REVERSING	OPEN 1/32" WHEN LS IS CLOSED	
LS	REVERSING	OPEN 1/32" WHEN RS IS CLOSED	

SELECTION CANCEL - Picture Diagram

Select-o-matic "100" – 100W & HF100G

(NOT A SCHEMATIC OR WIRING DIAGRAM)

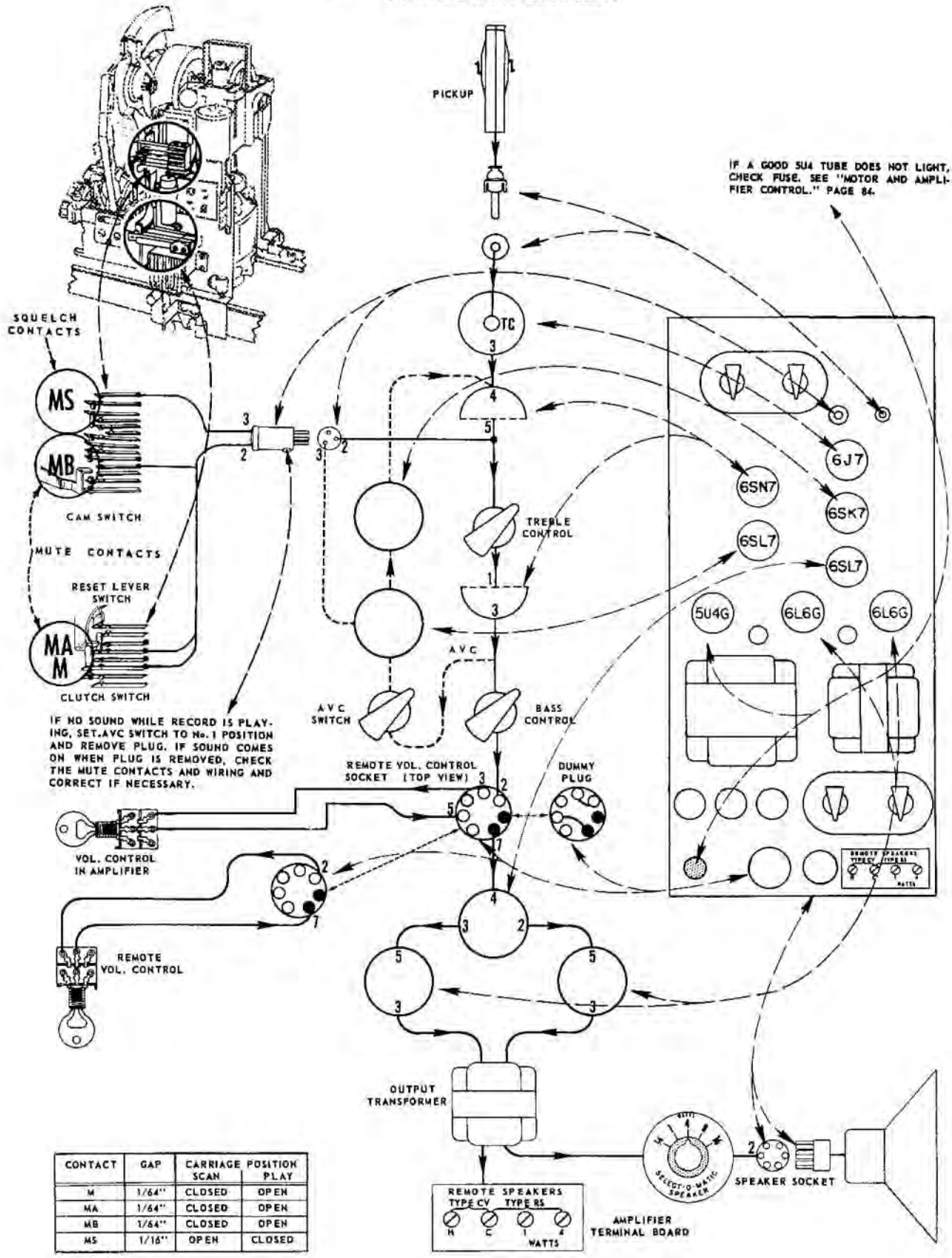


CONTACT	SWITCH	CARRIAGE POSITION SCAN	CARRIAGE POSITION PLAY
C	CAM	OPEN 1/16"	CLOSED
SC	CAM	CLOSED	OPEN 1/64"
IC	RESET LEVER	CLOSED	OPEN ONLY WHEN MECHANISM IS TRIPPED

C & CS CONTACTS MUST BOTH BE CLOSED JUST AS THE PICKUP TOUCHES THE RECORD. CONTACT SC OPENS WHEN THE PICKUP IS RELEASED FOR PLAYING.

AMPLIFIER & SOUND - Picture Diagram
Select-o-matic "100" – 100W

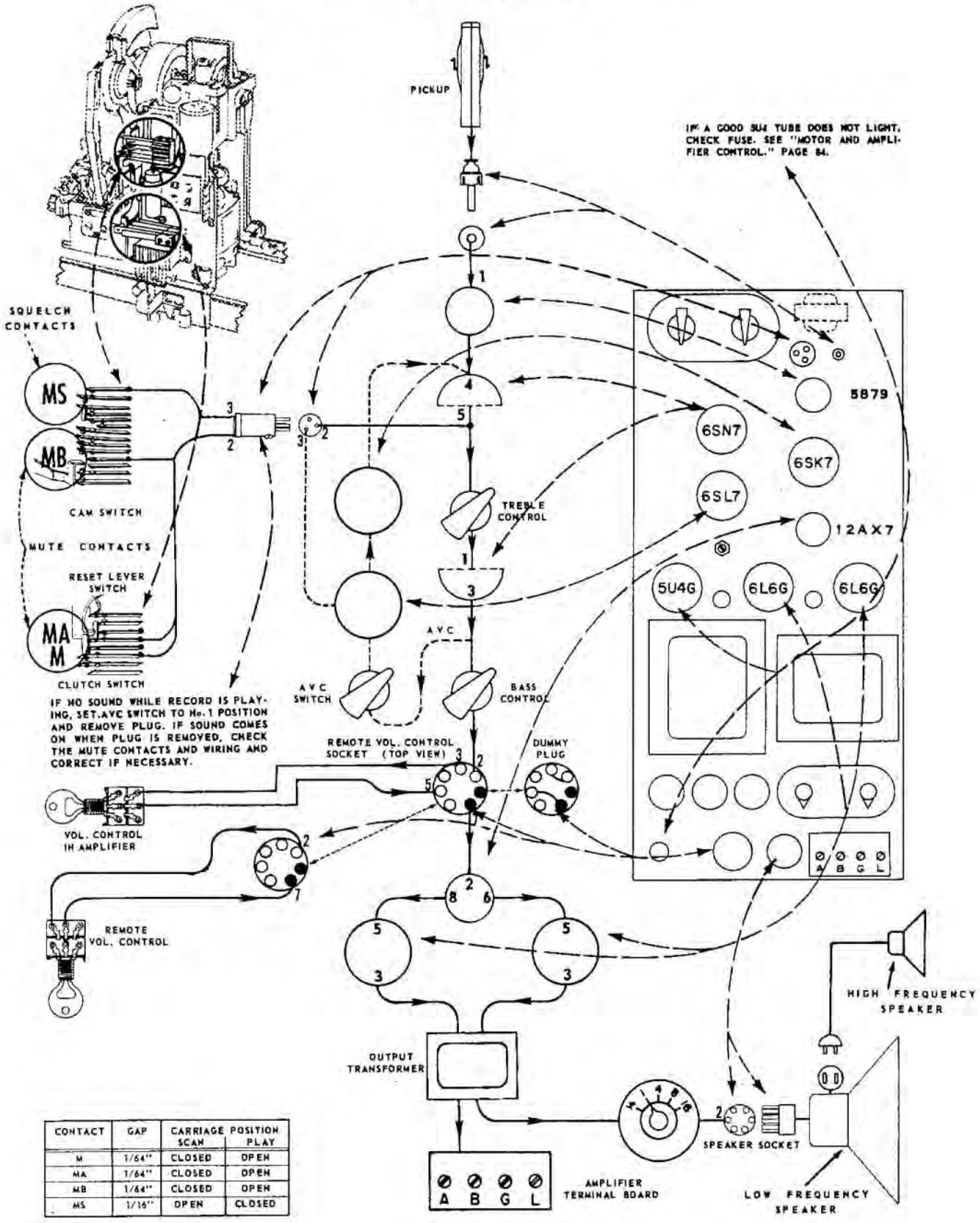
(NOT A SCHEMATIC OR WIRING DIAGRAM)



CONTACT	GAP	CARRIAGE POSITION SCAN	PLAY
M	1/64"	CLOSED	OPEN
MA	1/64"	CLOSED	OPEN
MB	1/64"	CLOSED	OPEN
MS	1/16"	OPEN	CLOSED

AMPLIFIER & SOUND - Picture Diagram
Select-o-matic "100" – HF100G

(NOT A SCHEMATIC OR WIRING DIAGRAM)



CONTACT	GAP	CARRIAGE POSITION SCAN	PLAY
M	1/64"	CLOSED	OPEN
MA	1/64"	CLOSED	OPEN
MB	1/64"	CLOSED	OPEN
MS	1/16"	OPEN	CLOSED

TROUBLE SHOOTING CHARTS

45 RPM
SELECT-O-MATIC "100"

Models 100W – HF100G – HF100R

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Coin Switches, Credit Coils

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Amplifier, Speaker,
Pickup, Mute Switches

Remote Control..... ....129 – 137
Wall-O-Matics, Wiring,
Selection Receiver

TROUBLE SHOOTING

Coins do not work right –

"Credit" lamps do not light when money is deposited.

No Sound –

Poor Sound –

Incorrect record cycling.

Phonograph is dead. (Lights are out – nothing operates)

Trouble Shooting Chart–Cabinet Power and Light **100W – HF100G – HF100R**

SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. No power to phonograph	All lamps fail to light. Motor fails to run.	(a) Line cord plug not making contact in outlet.	Repair or replace plug or outlet.
		(b) Line cord broken.	Repair or replace cord.
		(c) 5 amp. fuse blown in selection receiver.	Replace 5 amp. fuse. See Page 83 or 90.
		(d) "House" fuse blown.	Replace fuse.
		(e) Selection receiver AC plug not making contact in cabinet socket.	Repair or replace plug or socket.
		(f) Main switch broken.	Replace switch.
		(g) Open circuit in selection receiver.	Trace and repair. See schematic on Page 5087 or 5103.
2. Fluorescent lamp fails to light.	Phonograph operates normally but no light available for program and cabinet.	(a) Lamp loose in socket.	Seat lamp firmly in socket.
		(b) Defective lamp.	Replace lamp.
		(c) Defective starter.	Replace starter.
		(d) Faulty ballast	Replace ballast.
		(e) Open circuit in lamp or ballast wiring.	Trace and repair. See diagram Page 1178, 1198 or 1226.
3. Selection playing indicator lamps fail to light.	No indication of number of record being played.	(a) Lamps burned out.	Replace with No. 44 Mazda lamps.
		(b) Contact springs fail to touch lamp sockets.	Adjust contact springs for proper contact with lamp sockets. Items 3, 5 and 17. See Page 2267 or 2293.
		(c) Lamp switch contact sleeve fails to touch slide contacts.	Adjust slide contacts for proper contact with sleeve. Items 4, 7 and 48 – Page 2193 or 2241.
		(d) Open circuit in indicator lamp wiring.	Trace and repair. See schematic on Page 2180 or 2228.

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. Rejects coins.	Coins sometimes fail to go through to cash box.	(a) Dirt or foreign matter in rejector	Clean rejector as shown on Pages 9013 to 9015.
		(b) Incorrect adjustments in rejector.	Adjust rejector as shown on Pages 9003 to 9011.
		(c) Bind in scavenger cable keeping rejector gates open.	Remove, straighten, and lubricate scavenger wire. Adjust as shown on Page 1175, 1195 or 1221.
2. Coins drop through to cash box. No credits. "Select" light fails to come on.	Coins occasionally drop through to cash box without establishing credits.	(a) Bind in credit solenoid plunger or gummed plunger.	Remove, clean and polish credit solenoid plungers. Clean solenoid coil sleeve.
		(b) Incorrect alignment of rejector and coin switch levers. Coins drop between levers.	Seat rejector fully into mounting frame. Align switch levers as shown on Page 1176, 1196 or 1222.
		(c) Dirty or incorrectly adjusted coin switches.	Clean and/or adjust coin switches as shown on Page 1175, 1195 or 1222.
		(d) Excessive spring pressure or poor contact on one of six credit switches.	Replace U-shaped spring or entire credit switch assembly. Item 31 & 32, Page 5092 or Item 10, Page 5108.
	All coins fail to establish credits.	(e) Coin switch plug not seated in socket.	Replace plug and seat firmly in socket.
		(f) Credit switch assembly binds and stops with switches out of line with credit plungers.	Check mechanical adjustments of credit and cancel unit as shown on Page 3063 or 3081. Check for binds and worn parts.
		(g) "Y" contacts of timing relay not closing.	Clean and adjust contacts as shown on Page 83 or 90.
		(h) Timing relay continuously energized by partially depressed button or mechanical binds in Electrical Selector keeping Hold Switch closed.	Release button and/or correct cause of bind. See Page 83 or 90.
		(i) Timing relay continuously energized by incorrectly adjusted Hold Switch in Electrical Selector.	Adjust switch for 1/32" gap (when buttons are released.) See "Hold Switches", Page 83 or 90.
		(j) Timing relay continuously energized by "W" contact in credit and cancel unit.	Clear bind in cancel plunger linkage and/or adjust "W" contacts as shown on Page 3063 or 3081.
(Continued)	*(Continued)*		

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 2. Coins drop through to cash box. No credits. "Select" light fails to come on.	All coins fail to establish credits.	(k) Open circuit at wiper contact and collector ring of credit switch assembly.	Clean and adjust contact and collector ring.
		(l) Open circuit at ground connection (bearing) of credit switch assembly.	Clean, lubricate bearing with graphite.
		(m) Open circuit wiring or bad solder connection in credit circuit.	Check wiring and connections. See diagram - Page 5087 or 5103.
	Only one type of coin fails to establish credits - others work every time.	*See 2 (a), (b), (c) and (m) Above.....*	
		(n) Open credit solenoid.	Replace solenoid.
		(o) Shorted condenser across credit solenoid.	Replace condenser C13, C14 or C15 shown in diagram Page 5087 or 5103.
3. Select light stays lit. Free credits.	Continuous free credits.	(a) Coin hangs on coin switch.	Adjust and check coin switch as shown on Pages 1175 or 1222.
		(b) Coin hangs at bottom of rejector, keeps coin switch closed.	Check coin exits of rejector with new coins. Remove burrs or obstruction causing coins to hang.
		(c) Coin switch incorrectly adjusted,- contacts stay closed.	Adjust and check contact gaps and pressures as shown on Page 1175 or 1222.
		(d) Credit switch fails to reset.	Adjust reset bracket in credit and cancel unit so it resets all credit switches.
4. Occasional extra credits.	More than normal number of credits for coin deposited.	(a) Reset pawl occasionally fails to engage next ratchet tooth of credit switch assembly.	Adjust cancel solenoid position and pawl arm stop for correct pawl stroke as shown on Page 3063 or 3081.
		(b) Credit switches jump to ON position when cancel coil operates,- credit switch pressure toolight.	Replace U - shaped spring in switch or entire credit switch assembly. Item 31& 32. Page 5092 or Item 10, Page 5108.
		(c) Credit switch occasionally fails to reset.	Adjust reset bracket in credit and cancel unit so it resets all credit switches.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
5. Occasionally loses some credits.	Not enough credits for coin deposited.	(a) "Machine gun" action, "S" contact blade vibrates when selection is made taking off additional credits.	Tighten screws holding switch stack. Adjust "S" contact roller blade for pressure against cam and adjust S, U, and V contact gaps as shown on Page 3064 or 3082.
		(b) Credit switch jumps to OFF position when cancel coil operates. Credit switch pressure too light.	Replace U - shaped spring in switch - or entire credit switch assembly. Item 31 & 32, Page 5092 or Item 10, Page 5108.
6. "Machine gun" action. Takes off all credits.	Takes off all credits when a letter and a number are held down at the same time.	(a) "Z" contacts in timing relay fail to make.	Clean and adjust "Z" contacts as shown on Page 83 or 90.
		(b) Defective wiring or solder connection in hold switch circuit.	Check complete hold switch circuit. See schematic on Pages 3056 and 5087 or Pages 3083 and 5103.

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SEEBURG

SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. Selection levers fail to move when selected. SEE NOTE.	NOTE: - In checking for failure of levers to move when selected it is advisable to carefully select all 100 selections in a normal manner from the Electrical Selector. Don't take the word of others about what is happening. Try all 100 selections yourself. (Warning: - Make selections carefully at a normal rate. Making a long series of selections too rapidly may cause 1 amp. Slo-Blo fuse to blow.)		
	One lever always fails to move when selected. Other 99 levers work properly.	(a) Excessive friction. (Burrs or foreign matter on contact washer, contact bars, or on sides of guide plate opening preventing selection lever from moving.)	Burnish working surfaces by pulling down on lever and working back and forth. If necessary, remove selector coil assembly from magazine, clean contact washer, then place a small amount of powdered graphite in the guide plate opening and work lever back and forth until friction is reduced. BLOW OUT THE EXCESS GRAPHITE.
		(b) Ground contact fails to make.	Remove top cover from selector coil assembly. Clean and/or adjust ground contacts.
		(c) Bad solder connection or broken wire at selector coil terminals.	Repair and solder as required.
		(d) Open selector coil.	Replace coil. Item 23, Page 2271 or 2297, Part No. 304333.
	One or more random levers sometime fail to move when selected.	(e) Excessive friction.	See (a) above.
		(f) Ground contacts dirty or not making properly.	Remove top cover from selector coil assembly. Clean and/or adjust ground contacts and check solder connections at grounding wires.
		(g) Short selection pulse from credit and cancel unit.	Clean and adjust W, S, U, V and T contacts as shown on Pages 3063 and 3064 or Pages 3081 and 3082. Increase pulse length by adjusting Z contacts so upper blade presses heavily upward against fiber lift. See Page 83 or 90.
(Continued)	*(Continued)*		

Trouble Shooting Chart—Selection System 1

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 1. Selection levers fail to move when selected. SEE NOTE. Page 101.	*(Continued)* One or more random levers sometime fail to move when selected.	(h) Electrical Selector starting switches close too soon. (Credit and Cancel Unit operates before push button is in far enough to close circuit to selector coil.)	ES-10: Adjust starting switches as shown on Page 3060 and adjust cancel switch as shown on Page 3061. ES-11: Adjust lock pawls and starting switches as shown on Pages 3077, 3078 and 3079.
		(i) Poor latching of selector switches in Electrical Selector. (Selector switch releases too soon breaking pulse circuit to selector coil before selection lever moves.)	ES-10: Check latch bar adjustments as shown on Pages 3057 and 3058 and adjust as required. Also check latch bar spring tensions and increase tension if required, - See Item 7 Page 3062. ES-11: Check latch bar adjustments as shown on Pages 3075 and 3076 and adjust as required. Also check latch bar spring tensions and increase tension if required, - See Item 6 Page 3080.
		(j) Selection switches in Electrical Selector sometimes fail to make due to foreign matter or spread contacts.	Locate, clean and adjust faulty contacts or replace switch assembly.
	One lever in each group fails to move when selected. (Example:-A3, C3, E3, G3, and J3 fail to operate.)	(k) Bad solder or plug connection open or grounded circuit or faulty switch in Electrical Selector.	Check complete circuit associated with series of selector coils which fail to operate. (Example:-If A3, C3, E3, G3 and J3 fail to operate check No. 3 circuit from selector coil assembly , No. 3 pin connections in plugs and sockets back to No. 3 switch in Electrical Selector. Correct as required.)
	One entire group of levers fail to operate. (Example: All levers in C-D group fail to operate.)	(l) Open circuit to group coil.	Check complete circuit associated with group coil failing to operate from group coil through plugs and sockets back to termination at Electrical Selector switches. Correct as required.
(Continued)		(m) Open group coil.	Repair or replace coil. Item 9, Page 2271 or 2297.

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 1. Selection levers fail to move when selected. SEE NOTE. Page 101.	One letter section fails to operate. (Example:- All ten levers in C section fail to operate.)	(n) Faulty switch or bad solder connection in Electrical Selector.	Check switch and solder connection in Electrical Selector associated with letter section failing to operate. Correct as required.
	All 100 levers fail to operate, but takes off credits when selections are made.	(o) 1 amp. Slo-Blo fuse blown.	Replace fuse. See Page 83 or 90.
		(p) U, V or X contacts in Credit and Cancel Unit fail to make.	Clean and adjust U, V and X contacts. See Page 83 or 90.
		(q) Electrical Selector or Selector Assembly 27-prong plugs not fully seated.	Seat plugs fully into sockets.
		(r) Bad solder connection or broken wire in selection pulse circuit.	Check circuit from 25 v. source in WSR through CCU and ES. See Pages 5087 and 3056 or Pages 5103 and 3083 for schematics.
	Entire large section of Selector Assembly fails to operate. (Example:- All A, B, C, D and E levers fail to operate.)	(s) Open ladder circuit in Electrical Selector letter switch assembly.	Clean, repair, or replace letter switch assembly. See Pages 3056 or 3083 for diagrams.
	Series of levers in each group fail to operate. (Example:- All No. 1, 2, 3 levers in A, C, E, G and J sections fail to operate.)	(t) Electrical Selector or Selector Assembly 27-prong plug not fully seated.	Seat plugs fully into sockets.
		(u) Open ladder circuit in Electrical Selector number switch assembly.	Clean, repair, or replace number switch assembly. See Pages 3056 or 3083 for diagrams.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
2. Select light is on but Electrical Selector fails to operate properly.	Buttons fail to latch. Cannot make selections. Does not take off credits.	(a) Y contacts of timing relay fail to make.	Clean and adjust Y contacts as shown on Page 83 or 90.
		(b) Timing relay continuously energized keeping Y contacts open.	See Coins and Credits 2 (h), (i), and (j),- Page 97.
	Buttons fail to latch but selections can be made if both a letter and a number are pushed simultaneously.	(c) Latch bar solenoid fails to energize.	Check for open solenoid, bad solder connection or broken wire in latch bar solenoid circuit. See diagram on Page 3056 or 3083
		(d) Latch bars incorrectly adjusted.	ES10: Adjust latch bars and Latch Bar Solenoid as shown on Pages 3057, 3058 and 3059. ES11: Adjust latch bars as shown on Pages 3075 and 3076.
	Both letter and number buttons latch but selector works only if buttons are pushed down hard to limit of their travel.	(e) Starting switches in Electrical Selector close too late.	ES10: Adjust starting switches as shown on Page 3060. ES11: Adjust lock pawls and starting switches as shown on Pages 3077, 3078 and 3079.
	Both letter and number buttons latch and stay latched. Cannot make selections even if buttons are pushed down hard. Does not take off credits.	(f) Starting switches in Electrical Selector fail to close.	ES10: Adjust starting switches as shown on Page 3060 and cancel switch as shown on Page 3061. ES11: Adjust lock pawls and starting switches as shown on Pages 3077, 3078 and 3079.
		(g) Bad solder connection or broken wire in Cancel Solenoid circuit.	Check Cancel Solenoid circuit connections See Pages 3056 and 5087 or 3083 and 5103 for diagrams.
		(h) Open cancel solenoid.	Repair or replace solenoid. Item 12, Page 5092 or Item 20, Page 5108.

(Continued)

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 2. Select light is on but Electrical Selector fails to operate properly.	All selector buttons locked out. Cannot push buttons in to make selections.	(i) Incorrect latch bar adjustments.	ES10: Adjust latch bars as shown on Pages 3057 and 3058. ES11: Adjust latch bars as shown on Pages 3075 and 3076.
	Selection established properly but last button pushed stays in "latched -in" position.	(j) Hold switch in electrical selector or Z contacts of timing relay fail to make.	Clean and adjust hold switches and Z contacts as shown on Pages 83 or 90.
	Selected buttons both stay locked in and others stay locked out after first selection is made. Cannot make any more selections.	(k) In ES10, - lock solenoid sticks in energized position due to bind or residual magnetism. In ES11, - latch solenoid sticks in energized position due to bind in plunger or residual magnetism.	Clean bind or replace solenoid as required. Lubricate plunger as shown on Page 3074. If due to residual magnetism,- increase plunger spring tension or replace solenoid as required.
3. Select light fails to light.	Select light fails to light but Electrical Selector operates normally.	(a) Burned out lamp.	Replace lamp. (No. 47 Mazda)
		(b) Open series resistor.	Replace resistor. Item 20, Page 3065 or Item 26, Page 3085.
		(c) Bad solder connection or broken wire in light circuit.	Check select light circuit. For schematic See Page 3056 or 3083.
(Continued)	Coins drop through to cash box but fail to establish credits.	See "Coins and Credits 2" Page 97 & 98.	

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
4. Selection levers move out normally when selected but motor fails to run.		See "Motor Fails to Run" in Mechanism 1, Page 109.	
5. 1 amp. Slo-Blo fuse blows when selection is made. WARNING:- If 1 amp. Slo-Blo fuse blows, find and correct cause of trouble. Oversized fuse may result in burned out Selector Assembly coils.	All 100 selection levers fail to move when selected.	(a) One group coil shorted to ground. Fuse blows every time selection made in that group.	Check group coils and circuits for short to ground.
		(b) Timing Relay fails to energize.	See Selection System 6 (a) to (d) below.
		(c) Short to ground in "25 volt fused" (pulse) circuit.	Check "25 v. fused" circuit for short to ground. See Page 5087 or 5103 for diagram.
		(d) Short to ground in counter circuit.	Check counter solenoid and circuit for short to ground. See Page 5087 or 5103 for diagram.
		(e) Timing Relay operates too slowly due to low line voltage.	Correct by connecting to different circuit with normal line voltage.
6. Loud continuous buzzing sound from Credit and Cancel Unit. Cannot make selections. 1 amp. Slo-Blo fuse blown. *(Continued)*	Cancel Solenoid in Credit and Cancel Unit remains energized because Timing Relay fails to operate.	(a) W contacts in Credit and Cancel Unit fail to make.	Check wiring to contacts. Clean and adjust as shown on Page 83 or 90.
		(b) Timing Relay fails to operate because selenium rectifier in WSR is weak or faulty. (Check rectifier output voltage. With Timing Relay energized - 22 to - 26 volts is correct.)	Replace rectifier.
		(c) Timing Relay coil open or shorted.	Replace relay. Item 21, Page 5092 or Item 8, Page 5108.
		(d) Bad solder connection or broken wire in timing relay circuit.	Check circuit and repair. See Page 5087 or 5103 for diagram.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
7. Electrical Selector buttons do not latch properly.	Buttons pop out too easily.	(a) Weak latch bar springs.	Increase tension of latch bar springs. See Item 7 Page 3062 or Item 6 Page 3080.
		(b) Incorrect latch bar adjustments.	ES10: Adjust as shown on Pages 3057 and 3058. ES11: Adjust as shown on Pages 3075 and 3076.
8. Plays extra records that were not selected.	Two or more selection levers move out when one selection is made.	(a) Ground contacts in Selector Assembly fail to open.	Remove top cover from Selector Assembly and adjust contacts.
		(b) Selector coil shorted to ground or to adjacent coil.	Locate and remove short.
		(c) Short between two or more circuits in Selector Assembly, Electrical Selector or in cables, plugs or sockets.	Locate and remove short.
		(d) Vibration from grounding contacts moves extra levers.	Replace paper washers. Item 4 Page 2271 or 2297.
9. "Wrong Selections"	Carriage stops at correct space but selection doesn't match title strip.	(a) Record reversed or placed in wrong space.	Match records and title strips correctly.
	Carriage "skips" to next space. Plays adjacent record then returns to attempt to play correct selection.	See Mechanism 16, Page 119.	
	Plays last selection made instead of correct selection.	Motor carry-over contacts fail to make. See Mechanism 2, Page 110.	Clean and adjust "D" contacts as shown on Page 84 or 91.
10. Selection counter fails to operate properly.	Counter fails to work when selections are made at Electrical Selector.	(a) T contacts in Credit and Cancel Unit fail to make.	Clean and adjust T contacts. See Page 83 or 90.
		(b) Mechanical defect or bind in counter.	Remove bind or replace counter

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 10. Selection counter fails to operate properly.	*(Continued)* Counter fails to work when selections are made at Electrical Selector.	(c) Bad connection or broken wire in counter circuit.	Locate and correct. See diagrams on Pages 3056 and 5087 or Pages 3083 and 5103.
	Counter works properly when selections are made at Electrical Selector but fails to operate when selections are made at Wall-O-Matic.	(d) L contacts in Step Switch Assembly of Selection Receiver fail to make or L contact circuit open.	Clean and adjust L contacts and check circuit. See Pages 5087 or 5103.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. Motor fails to run	Play control relay is energized. See Play Control Relay, Page 84 or 91.	(a) Blown motor fuse	Replace 3 amp. fuse. See Page 84 or 91.
		(b) Reversing switch contacts not making.	Clean and adjust G, H, J and K contacts as shown on Page 2170.
		(c) Faulty reversing switch.	Repair or replace. Adjust switch and brackets as shown on Pages 2169 and 2170.
		(d) Play control relay contacts not making.	Clean and adjust contacts. See Page 84 or 91.
		(e) "O" contacts not making. (Motor runs if started by hand.)	Clean and adjust contacts as shown on Page 2172.
		(f) Defective motor condenser.	Replace condenser. (Item 23, Page 2270 or 2296.)
		(g) Broken motor coupling or loose set screws. (Motor runs but does not drive mechanism.)	Replace coupling or tighten set screws as required.
		(h) Bind in motor.	Lubricate or replace as required.
		(i) Bind in mechanism. Check by carefully turning motor shaft. DO NOT USE FORCE AND DO NOT TURN FLYWHEEL BY HAND.	Check for foreign matter that may have fallen into mechanism. Check for normal clearances and lubrication on gears, cams, shafts, etc.
		(j) Open motor winding.	Repair or replace motor.
		(k) Open wiring or solder connection in motor circuit.	Check motor circuit. See diagrams, Pages 2280, 5087 and 5103.
	Play control relay is not energized when selection levers are moved out (to ON position) *(Continued)*	(l) Motor service switch in OFF position.	Turn to ON.
		(m) Selector lever contact washers fail to make contact.	Clean washers and contact bars.
		(n) Open coil in play control relay.	Replace relay coil. (Item 5, Page 5090 or 5106.)

(Continued)

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Trouble Shooting Chart – Mechanism 1-4

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 1. Motor fails to run.	*(Continued)* Play control relay is not energized when selection levers are moved out (to ON position)	(o) Open circuit wiring or solder connection in play control relay circuit.	Trace and correct. See diagrams, Pages 1225, 1177 or 1197.
2. Motor stops in play position.	Motor stops just as record starts to play. Starts again if another selection is made.	(a) Motor carry - over contacts on cam switch open in play position.	Clean and adjust "D" contacts as shown on Page 84, 91 or 2172.
		(b) Open circuit in carriage wiring or loose solder connection.	Trace circuit from pin No. 6 of carriage cable plug to "D" contact of cam switch. See diagram, Page 2280.
3. Motor fuse blows.	Fuse blows immediately upon being placed in holder.	(a) Short in "arc suppression" condenser.	Replace condenser. Item 5, Page 2270 or 2296.
		(b) Shorted motor winding.	Replace motor.
		(c) Shorted motor circuit.	Trace circuit. See diagrams Pages 2280 and 5103 or 5087.
	Fuse blows occasionally	(d) Reversing switch contacts incorrectly adjusted or dirty.	Clean and adjust G, H, J and K contacts as shown on Page 2170.
		(e) Excessive arcing at reversing switch contacts due to open "arc suppression" condenser.	Replace condenser. Item 5, Page 2270 or 2296.
4. Motor runs slow.	Motor sluggish, slow while scanning and while playing resulting in "poor tone."	(a) Lack of lubrication.	Lubricate motor bearings, and mechanism as shown on chart, Page 2279.
		(b) Bind in motor bearings.	Clean and lubricate or replace motor.
		(c) Bind in mechanism.	Lubricate bearings, gears, and clutch assembly. Check end play on flywheel shaft drive worm and on clutch shaft.
		(d) Shorted motor winding.	Replace motor.
	Motor slow while playing but normal while scanning.	(e) "O" contacts in cam switch closed in play position.	Clean and adjust contacts as shown on Page 2172.

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
5. Motor sluggish or late in reversing.	Motor speed appears normal but sluggish in reversing. Carriage hits rubber bumpers at end of magazine.	(a) "O" contacts in cam switch not closing in scan and transfer.	Clean and adjust as shown on Page 2172.
		(b) Reversing switch operates too late.	Adjust reversing switch brackets as shown on Page 2169.
		(c) Motor starting condenser defective.	Replace condenser. Item 23, Page 2270 or 2296.
6. Noisy mechanism.	Whirring noises from general area of motor.	(a) Motor coupling set screws loose and hitting carriage casting.	Tighten set screws.
		(b) Oil cups of motor touching carriage cover or casting.	Turn motor so oil cups do not touch.
	Rattle or chattering noise while carriage scans.	(c) Excessive end play in flywheel shaft or in drive worm.	Adjust thrust screw for .002" end play. Avoid binding.
		(d) Selection playing indicator slide chattering in guide channel.	Lubricate guide channel with Aero Lubriplate.
	Ticking noise while scanning or playing.	(e) Clutch 1, 2, 3 or 4 adjustments incorrect.	Adjust Clutch 1, 2, 3 and 4 as shown on Pages 2139 to 2142.
		(f) Bind in cam shaft bearings.	Clean and lubricate bearings.
	Scraping noise. Records rub magazine or transfer arm.	(g) Badly warped record.	Replace record.
		(h) Magazine misaligned.	Adjust magazine and transfer arm as shown on Pages 2148 and 2149. (If magazine or transfer arm is moved, be sure to adjust contact block as shown on Page 2151.)
(Continued)	*(Continued)*		

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 6. Noisy mechanism.	(Continued) Scraping noise. Records rub magazine or transfer arm.	(i) Transfer arm too high.	Adjust Transfer Arm 2 as shown on Page 2150.
7. Carriage scans back and forth. Motor runs continuously.	No selection levers out but carriage continuously scans.	(a) Metal particles or graphite across contact bars in selector coil assembly.	Disconnect selector coil assembly connector (Item 33, Page 2271 or 2297). If carriage stops scanning remove coil assembly and clean out metal or graphite.
		(b) "D" contacts in cam switch fail to open.	Clean and adjust contacts as shown on Pages 84 or 91 and 2172.
		(c) Play control relay remains in energized position due to gummy material on pole face.	Clean armature and pole face. (For relay location See Page 84 or 91.)
		(d) Play control relay remains in energized position due to residual magnetism.	Increase upward pressure of upper contact blade, or replace relay. Item 5, Page 5090 or 5106.
		(e) Play control relay contacts welded or fail to open.	Clean and adjust contacts as shown on Pages 5083 or 5099.
		(f) Play control relay circuit grounded.	Trace circuit. See diagrams, Pages 2280 and 5087 or 5103.
	Selection levers are out (to ON position) but carriage does not stop to play selected records.	(g) Sticking L or R contact pins in contact block. Contact pins stick in down position and fail to touch selected levers.	Remove contact block; remove and clean pins, ream pin holes with No. 11 drill and wash with carbon-tet'. Reassemble and adjust spring pressures and contact block as shown on Page 2151.
		(h) "W" contacts in clutch switch not making in scan.	Clean and adjust contacts as shown on Pages 85 or 92 and 2174.
		(i) "LS" or "RS" contacts in reversing switch not making.	Clean and adjust contacts as shown on Page 2170.
		(j) Open trip solenoid.	Replace solenoid and adjust as shown on Page 2144.
		(k) Open circuit wiring or connection in trip solenoid circuit.	Trace and correct. See diagrams, Pages 2280 and 5087 or 5103.

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
8. *Carriage continuously scans and tries to play selected records.* Motor runs continuously.	Carriage stops to bring up selected records but does not play them. Returns records to magazine and scans again.	(a) Small record center hole prevents full clamping.	Remove rough edges from hole.
		(b) Clamp arm switch contacts incorrectly adjusted.	Adjust P and S contacts as shown on Pages 2171 and 85 or 92.
		(c) Trip switch fails to reset.	Adjust reset plate as shown on Page 2162.
		(d) Incorrect clamp arm adjustments prevent full clamping of record.	Check and adjust clamp arm 1 and 2 as shown on Page 2146.
		(e) Burrs or foreign matter on clamp arm disc or in centering hole of flywheel shaft preventing full clamping of record.	Clean clamp arm disc and flywheel shaft hole and /or remove burrs.
		(f) Reject button sticking.	Remove reject button and enlarge hole in cabinet.
		(g) *Bent transfer arm fails to bring record up to* clamping position.	*Straighten transfer arm* as shown at bottom of *page* 2149.
		(h) Bent magazine separator prevents transfer arm from bringing record up to clamping position.	Straighten magazine separator.
		(i) Incorrect alignment of magazine and transfer arm preventing transfer of record to clamping *position.*	Adjust magazine and transfer arm as shown on Pages 2148 and 2149.
		(j) No record in selected space.	Place record in empty space.
		(k) Trip solenoid circuit shorted to ground.	Remove short to ground in trip solenoid "trip-off" circuits. See schematic on Page 1197, 1225 or 2280.
		(l) Safety lever plunger obstructs transfer of record due to bind in lever or plunger.	Remove bind. Clean, lubricate and adjust safety lever as shown on Page 2145. (Use Seeburg Special Purpose Oil.)

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
9. Plays same record over and over. Motor runs continuously.	Plays record, scans, then returns to play record again. Does not cancel selection levers.	(a) Cancel coil plunger binding or sticking.	Remove cancel coil and plunger, - clean plunger and coil tube or remove bind as required.
		(b) Open cancel coil.	Replace cancel coil. (Item 52, Page 2271 or 2297, Part No. 304370.)
		(c) Dirty or misadjusted switch contacts in cancel circuit.	Check SC, C, IC, LC, and RC contacts shown on Page 86 or 93, Clean and adjust as shown on Pages 2170 to 2174.
		(d) Open circuit wiring or bad solder connections in selection cancel circuit.	Check complete selection cancel circuit. See schematic on Page 2280.
	Plays same record repeatedly without scanning.	(e) Badly warped record fails to return fully to magazine.	Replace with good record.
		(f) Contact block out of adjustment.	Adjust contact block as shown on Page 2151.
		(g) Contact block drive bracket bent open.	Straighten bracket and adjust contact block as shown on Page 2151.
		(h) Bind or incorrect adjustment in safety lefer.	Clean, lubricate safety lever assembly. Adjust as shown on Page 2145.
		(i) Short to ground in "trip to play" circuits of trip solenoid.	Check "trip to play" circuits of trip solenoid. (From W contact to L and R contacts.) See Page 2280.
		(j) Contact block binding in rails.	Clean block and rails. Lubricate rails with graphite.
10. Record on flywheel fails to trip off. Motor runs continuously. *(Continued)*	Trip Solenoid fails to trip at end of record. *(Continued)*	(a) Worn, chipped, or wrong type needle, - fails to follow record cut-off groove.	Replace with correct SEEBURG needle.
		(b) Bad record - Cut-off groove defective.	Replace with good record.
		(c) Trip switch pressure adjustment "too heavy."	Adjust trip switch pressure as shown on Page 2160.
		(d) Trip switch "cut-off" adjustment incorrect.	Adjust trip switch actuator as shown on Page 2161. (NOTE:- If actuator is moved be sure to adjust reset plate as shown on Page 2162.)

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 10. Record on flywheel fails to trip off. Motor runs continuously.	*(Continued)* Trip Solenoid fails to trip at end of record.	(e) Nylon trip lever pivots binding.	Clean nylon pivots and align supporting lug to eliminate bind. (Items 38 and 39, Page 2263 or 2289.)
		(f) Faulty trip switch.	Repair or replace switch. (Item 41, Page 2263 or 2289 - Part No. 245816.)
		(g) Pickup cradle pivots tight.	Adjust pivot to eliminate binds. See page 2163, - NOTE 1.
		(h) Pickup out of balance.	Adjust pickup balance as shown on Page 2163.
		(i) Pickup needle pressure too light.	Adjust needle pressure as shown on Page 2164.
		(j) "V" contacts not making.	Clean and adjust "V" contacts as shown on Page 85, 92, or 2172.
		(k) Open trip solenoid.	Replace trip solenoid and adjust as shown on Page 2144.
		(l) Open circuit wiring or bad solder connection in trip solenoid "Trip-off" circuit.	Check "Trip-off" circuit of trip solenoid. See schematic on Page 2280 and 5087 or 5103.
	Trip solenoid operates but mechanism fails to unclamp or return record to magazine.	(m) Bind in clutch.	*Clean and lubricate clutch (Seeburg Special Purpose* Oil) or remove bind as required.
		(n) Bind in trip mechanism or dash pot.	Locate and eliminate bind.
		(o) Clutch 1 adjustment screw down too far.	Adjust Clutch 1 as shown on Page 2139.
11. Flywheel turns but no action. Motor runs continuously. *(Continued)*	*Carriage stops at* selected record but does not bring it up. "Sits and Spins" *(Continued)*	(a) Contact block binds in guide rail.	Clean guide rail tracks and lubricate with powdered graphite. Check contact block for binds along entire rail.
		(b) Selection playing indicator binding.	Clean playing indicator track, and lubricate with Aero Lubriplate.
		(c) Guide rollers bind on gear rack.	Check and adjust guide rollers as shown on Page 2152

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 11. Flywheel turns but no action. Motor runs continuously.	*(Continued)* Carriage stops at selected record but does not bring it up. "Sits and Spins"	(d) Bind in clutch, trip mechanism or carriage rollers.	Eliminate bind and lubricate as shown on Page 2279.
		(e) Clutch 1 adjustment screw down too far.	Adjust Clutch 1 as shown on Page 2139.
	Carriage fails to scan after returning record to magazine. Clutch does not drop into scan.	(f) Bind in clutch or trip mechanism.	Eliminate bind and lubricate as shown on Page 2279.
		(g) Safety plunger fails to move out of way of clutch link because of bind.	Clean and lubricate plunger. Check for bind as shown on Page 2145, Item C. (Use Seeburg Special Purpose Oil.)
12. Record comes up but goes back without playing.	Motor runs continuously. Same record constantly transfers up and back,- Fails to play – Fails to scan.	(a) Trip solenoid plunger binding or magnetized.	Remove bind. Adjust as shown on Page 2144. If magnetized, replace plunger stop - Item 4, Page 2299.
		(b) Trip mechanism binding.	Eliminate bind and lubricate trip mechanism.
		(c) "V" contacts fail to open.	Clean and adjust "V" contacts as shown on Page 85, 92 or 2172.
		(d) Ground in trip solenoid circuit. (Trip solenoid continuously energized.)	Check for ground in wires connected to Terminal No. 5 of TS2. See Page 2280.
	Record comes up once but immediately goes back without playing. Motor stops.	(e) Clutch or clutch worm binding on shaft.	Eliminate bind. Wash with carbon tet. Lubricate with Seeburg Special Purpose Oil.
		(f) Clutch 4 adjustment screw in too far. (No clearance between clutch and worm pin.)	Adjust Clutch 4 as shown on Page 2142.
	Record comes up but immediately goes back.	(g) Small record hole prevents full clamping.	Remove rough edges from record hole.
(Continued)	*(Continued)*	(h) Clamp arm switch contacts incorrectly adjusted.	Adjust P and S contacts as shown on Pages 2171, 85 or 92.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
	(Continued)		
12. Record comes up but goes back without playing.	without playing. Carriage continues scanning and attempting to play same record.	(i) Trip switch fails to reset.	Adjust reset plate as shown on Page 2162.
		(j) Incorrect clamp arm adjustments prevent full clamping of record.	Check and adjust clamp arm 1 and 2 as shown on Page 2146.
		(k) Burrs or foreign matter on clamp arm disc or in centering hole of flywheel shaft preventing full clamping of record.	Clean clamp arm disc and flywheel shaft hole and/or remove burrs.
		(l) Reject button sticking.	Remove reject button and enlarge hole in cabinet.
		(m) Bent transfer arm fails to bring record up to clamping position.	Straighten transfer arm as shown at *bottom of* Page 2149.
		(n) Bent magazine separator prevents transfer arm from bringing record up to clamping position.	Straighten magazine separator.
		(o) Incorrect alignment of magazine and transfer arm preventing transfer of record to clamping position.	Adjust magazine and transfer arm as shown on *Pages 2148 and 2149.*
		(p) No record in selected space.	Place record in empty space.
		(q) Trip solenoid circuit shorted to ground.	Remove short to ground in trip solenoid "Trip-off" circuits. See schematic on Page 2280.
		(r) Safety lever plunger obstructs transfer of record due to bind in lever or plunger.	Remove, bind. Clean, lubricate and adjust safety lever as shown on Page 2145. (Use Seeburg Special Purpose Oil.)
13. Fails to cancel selection levers.	Repeatedly plays record,- scans,- then returns to play same record again.	(a) Cancel coil plunger binding or sticking.	Remove cancel coil and plunger, - clean plunger and coil tube or remove bind as required.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 13. Fails to cancel selection levers.	*(Continued)* Repeatedly plays record, scans, - then returns to play same record again.	(b) Open cancel coil.	Replace cancel coil. (Item 52, Page 2271 or 2297. Part No. 304370.)
		(c) Dirty or misadjusted switch contacts in cancel circuit.	Check SC, C, IC, LC, and RC contacts shown on Page 86 or 93, and adjust as shown on Page 2170 to 2174.
		(d) Open circuit wiring or bad solder connections in selection cancel circuit.	Check complete selection cancel circuit. See schematic on Page 2280 and 1197 or 1225.
14. Burned out cancel coil in contact block.	Fails to cancel Selection levers.	(a) Incorrect adjustment of "SC" and "C" contacts keeps coil continuously energized.	Adjust "SC" and "C" contacts for proper "Make and Break" as shown on Page 86, 93 or 2172.
		(b) Short to ground in cancel coil circuit keeps coil continuously energized.	Check complete cancel coil circuit and remove short. See schematic on Page 2280 and 1197 or 1225.
		(c) Short to ground in popularity meter solenoid.	Check popularity meter solenoid circuit and remove short. See schematic on Page 2280 and 1197 or 1225.
15. Cancel pin jams alongside selection lever.	Carriage fails to transfer. May bend cancel pin, selection lever or contact block drive bracket.	(a) Contact block out of adjustment.	Adjust contact block as shown on Page 2151.
		(b) Excessive carriage side play in playing position due to incorrect adjustments of clutch.	Adjust Clutch 2, 3 and 4 as shown on Page 2140, 2141 and 2142.
		(c) Incorrect adjustment of SC or C contacts occasionally keeping cancel coil energized while scanning.	Adjust SC and C contacts for proper "Make and Break" as shown on Page 86, 93 or 2172.
		(d) Contact block binds in guide rail.	Clean guide rail tracks and lubricate with small amount of powdered graphite. Check contact block for binds along entire rail.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
16. Carriage "skips" one position past correct selection.	Plays wrong selection then returns and attempts to play correct selection.	(a) Contact block out of adjustment.	Adjust contact block as shown on Page 2151.
		(b) Bind in clutch.	Clean and lubricate clutch -- Seeburg Special Purpose Oil.
		(c) Bind in trip mechanism.	Eliminate bind and lubricate trip mechanism.
		(d) Clutch 1 adjustment down too far.	Adjust Clutch 1 as shown on Page 2139.
		(e) Clutch 2 adjustment out too far.	Adjust Clutch 2 as shown on Page 2140. (Then check Clutch 3 and 4.
17. Record doesn't come up high enough to clamp.	Record goes back and carriage continuously scans and attempts to bring record up to play.	(a) Bent transfer arm.	Check and straighten transfer arm as shown at bottom of Page 2149.
		(b) Bent magazine separator.	Straighten magazine separator.
		(c) Incorrect alignment of magazine and transfer arm.	Adjust magazine and transfer arm as shown on Pages 2148 and 2149. (If magazine or transfer arm is moved be sure to check contact block adjustment, Page 2151.)
		(d) Bind in transfer arm shaft or gear segment.	Lubricate or remove bind as required. For assembly instructions see Pages 2177 and 2178.
		(e) Transfer Arm 2 adjustment incorrect.	Adjust Transfer Arm 2 as shown on Page 2150.

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
18. Pickup fails to land properly at beginning of record.	Needle falls off edge of record or lands in too far.	(a) Undersized or off-standard record.	Replace with good record.
		(b) Needle landing adjustment incorrect.	Adjust as shown on Page 2153.
	Needle lands at random positions anywhere from beginning to end of record.	(c) Pickup lock adjustment incorrect. Fails to lock pickup cradle in scan position.	Adjust as shown on Page 2157.
19. Pickup skids in at beginning of record.	Pickup skids across first few grooves or across record to trip off.	(a) Worn, chipped, or wrong type needle.	Replace with correct SEEBURG needle.
		(b) Trip switch reset plate down too far resulting in "booster action."	Adjust reset plate as shown on Page 2162.
		(c) Pickup badly out of balance.	Adjust pickup balance as shown on Page 2163.
20. Record starts over after playing part way.	Needle skids back toward start of record after playing part way.	(a) Worn, chipped or wrong type needle.	Replace with correct SEEBURG needle.
		(b) Pickup badly out of balance.	Adjust pickup balance as shown on Page 2163.
		(c) Needle pressure adjustment incorrect.	Adjust needle pressure as shown on Page 2164.
21. Early trip-off.	Trips before end of record.	(a) Cut-off adjustment incorrect.	Adjust record cut-off and reset plate position as shown on Page 2161 and 2162.
		(b) Trip switch pressure too light. Switch operates itself due to vibration.	Adjust trip switch pressure as shown on Page 2160.
		(c) Light needle pressure.	Adjust pressure as shown On Page 2164.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
22. Pickup gets "hung up" along playing surface of record.	Small section of record playing surface wears out, or, - Needle plays same record groove over and over.	(a) Record groove broken.	Replace record.
		(b) Pickup does not clear brush while playing.	Adjust brush clearance as shown on Page 2160.
		(c) Pickup cradle pivots too tight.	Adjust pivots to eliminate bind. See Page 2163, note 1.
		(d) Pickup fails to unlock for playing records.	Adjust for pickup release as shown on Page 2155.
		(e) Pickup out of balance.	Adjust pickup balance as shown on Page 2163.
23. Excessive record wear.	Records wear faster than normal.	(a) Worn, chipped, or wrong type needles.	Replace with correct SEEBURG needles.
		(b) Incorrect needle pressure.	Adjust needle pressure as shown on Page 2164.
		(c) Pickup out of balance.	Adjust pickup balance as shown on Page 2163.
		(d) Pickup cradle pivots too tight.	Adjust pivot to eliminate binds. See Page 2163, note 1.
		(e) Excessive dust and dirt on records. Bad records - poor record material.	Wipe records with clean damp cloth. Replace bad records.
24. Pickup "chatters" while shifting.	Pickup does not shift smoothly from side to side.	(a) Pickup cradle shaft dirty or gummy.	Clean and lubricate pickup cradle shaft. See Page 2279.
		(b) Pickup return adjustment too tight.	Adjust as shown on Page 2154.
		(c) Pickup locking screw in too far. Screw tip drags along crank while shifting.	Adjust as shown on Page 2157.
25. Pickup arm is not reset properly after playing record.	Pickup hangs up on brush when resetting.	(a) Pickup return adjustment incorrect.	Adjust as shown on Page 2154.
		(b) Pickup lifts too far off record after playing.	Adjust for correct pickup lift as shown on Page 2159.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
26. Needle scrapes across record when pickup resets.	Records scratched.	(a) Pickup fails to lift from record before resetting.	Adjust for pickup lift as shown on Page 2159.
		(b) Pickup out of balance.	Adjust pickup balance. As shown on Page 2163.
		(c) Pickup arm roller binding.	Clean and lubricate roller at base of pickup arm.
27. Needle hits flywheel or stripper plate when lifting off of record.	Possible damage to needle or pickup cartridge.	(a) Pickup lifts too far off of record after playing.	Adjust for correct pickup lift as shown on Page 2159.
28. Excessive lint accumulation on needles.	Distorted sound.	(a) Brushes incorrectly adjusted and fail to clean needles.	Adjust brush positions as shown on Page 2160.
		(b) Excessive lint or dust from records.	Remove lint from needles. Wipe records with clean damp cloth.

(FC)

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. No sound from Select-O-Matic speaker.	Mechanism operation normal.	Test: With the mechanism playing a record, volume control turned full on, and with all other conditions established for record playing, remove and quickly replace the 5879 tube (6J7 tube in MRA3-L6 amplifier in Model 100W). If a loud pop or noise is heard from the speaker, the trouble may be in the pickup circuit. If there is no noise from the speaker, the trouble probably is in plug connections, tubes, amplifier or speaker.	
		(a) Muting switch not opening.	Check by removing mute plug while record is playing. If sound comes on when plug is removed, check and adjust contacts M, MA and MB as shown on Page 2172 and 2174.
		(b) Grid clip on 6J7 tube not making contact or grounding.	Bend clips to make firm contact with grid cap. Check for ground.
		(c) Pickup connecting wire (on mechanism) broken or shorted.	Replace wire.
		(d) Pickup plug loose.	Seat plug firmly.
		(e) Pickup coil open.	Replace pickup.
		(f) Loose remote volume control plug or volume control dummy plug.	Seat plug firmly in socket. Check soldered connections in plugs.
		(g) Speaker plug loose.	Seat plug firmly.
		(h) Amplifier fuse blown.	Replace with 2 amp. Slo-Blo fuse.
		(i) Dead amplifier tube.	Replace.
		(j) Volume control faulty.	Adjust or replace control.
		(k) Speaker damaged or speaker wiring open or shorted.	Trace circuit and correct. Check connecting lugs at terminal strip on amplifier.
		(l) Loose connection or faulty part in amplifier.	Check and repair or replace amplifier. See diagram Page 4047, 4051, 4055 or 4059.

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
2. No sound from remote speakers.	Phonograph speaker normal or low volume with distortion.	(a) Short or open circuit in remote speaker or remote speaker wiring.	Trace and correct. Check connecting lugs on amplifier terminal strip.
3. Distorted sound or no sound from one side of pickup - other side normal.	Mechanism operation normal.	(a) Needle broken or missing.	Replace with a new SEEBURG stylus.
		(b) Excessive lint accumulation on needle.	Clean carefully. Check brush adjustment as shown on Page 2160.
		(c) Pickup connecting wire (on mechanism) broken or shorted.	Replace wire.
4. Intermittent sound.	Volume drops and returns suddenly.	(a) See Sound System 1 (a) to (l).	
		(b) Open or high resistance pickup coil.	Replace if necessary. Test d.c. resistance: 245789 pickup - approx. 450 ohms; 246796 pickup - approx. 1800 ohms.
	Volume drops and returns slowly.	(a) Tube loose in socket.	Seat firmly.
		(b) Defective tube.	Replace.
		(c) Loose connection in amplifier.	Repair or replace amplifier. See diagram Page 4047, 4051, 4055 or 4059.
		(d) Squelch switch for automatic volume compensator not closing when record play.	Clean and adjust MS contacts in Cam Switch as shown on Page 2172.
		(e) Open circuit in plug or wiring to squelch switch for automatic volume compensator.	Check mute plug and plug connections. Trace circuit. See diagram Page 2280.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
5. Low volume.	Volume low at all times.	(a) Defective tube.	Replace.
		(b) Volume control not turned up or shorted.	Check.
		(c) See Sound System 4 (d) and (e) above.	
		(d) Remote volume control plug or dummy plug loose, or plug connection loose.	Seat plug firmly. Check connections in volume control plug or dummy plug.
		(e) Broken wire or short in remote volume control wiring.	Trace and correct. See diagram Page 8006.
		(f) Speaker volume switch set too low.	Set switch as required. See instruction - Page 4046, 4050, 4054 or 4058.
		(g) Lugs for remote speaker connections to amplifier touching together.	Separate lugs and tighten terminal screws.
		(h) Short circuit in remote speaker or remote speaker wiring.	Trace and correct.
		(i) 8 ohm remote speaker connected to amplifier.	Replace with SEEBURG CV type speaker.
		(j) Loose connection or faulty part in amplifier.	Check and repair or replace amplifier. See diagram Page 4047, 4051, 4055 or 4059.
		(k) See Sound 4 (b) above.	
6. Sound fades.	Volume dies down as record plays.	See Sound System 4 above.	
7. Howl or squeal.	High pitched squeal.	(a) Defective tube.	Replace tube.
		(b) Loose connection or faulty part in amplifier.	Check and repair. See diagram Page 4047, 4051, 4055 or 4059.
	Low pitched howl.	(c) Defective tube.	Replace tube.
(Continued)	*(Continued)*		

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued)	*(Continued)*		
7. Howl or squeal.	Low pitched howl.	(d) Shipping bolts and blocks of mechanism not loosened or removed.	Loosen bolts. Remove blocks and pads.
		(e) Chassis tie-down bolts touching edges of holes in chassis base.	Center the bolts in holes.
8. Hum.	Steady hum from speaker. Sound otherwise normal.	(a) Defective tube.	Replace tube.
		(b) Defective filter condenser in amplifier.	Replace condenser. See diagram, Page 4047, 4051 4055 or 4059.
		(c) Remote volume control or remote speaker wiring near neon tube transformer or wiring.	Re-route or shield wiring.
		(d) One side of pickup wire grounded to carriage.	Repair as required.
		(e) See Sound 4 (b), above.	
9. Poor tone.	Music slow.	See Mechanism 4 (a) to (e).	
	Music distorted.	(a) Dirty, worn or chipped needles.	Clean or replace with new SEEBURG needles.
		(b) Worn or dirty record.	Replace record.
		(c) Defective tube.	Replace tube.
		(d) Damaged pickup.	Replace pickup.
		(e) Volume control shorted or open.	Replace control.
		(f) Remote volume control plug or dummy plug loose, or loose connections in plugs.	Seat plugs firmly. Check connections in plugs.
		(g) Broken wire or short in remote volume control wiring.	Trace and correct. See diagram. Page 8006.
		(h) Lugs for remote speaker connections to amplifier touching together.	Separate lugs and tighten terminal screws.
(Continued)	*(Continued)*	(i) See Sound 4 (b), above.	

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued)	*(Continued)*	(j) Short circuit in remote speaker or remote speaker wiring.	Trace and correct.
9. Poor tone.	Music distorted.	(k) 8 ohm remote speaker connected to amplifier.	Replace with SEEBURG CV type speaker.
		(l) Speaker voice coil not centered.	Adjust and center voice coil or replace speaker.
		(m) Speaker cone damaged.	Replace cone or speaker.
		(n) Pickup arm and/or cradle pivots binding.	Adjust pivots.
	Waver or tremolo in music.	(o) Warped record.	Replace record.
		(p) Eccentric hole in record.	Replace record.
		(q) Loose motor coupling.	Tighten set screws.
		(r) Loose motor mounting.	Tighten clamps.
		(s) Flywheel shaft bearings dry or gummed.	Clean and lubricate.
		(t) Loose or broken rubber drive grommets in flywheel.	Replace grommets. See Page 2176.
		(u) End play in flywheel shaft drive worm.	Adjust thrust screw for .002" end play of shaft.
10. Clicks, hum or other noises from speaker while changing record.	Noise from speaker while carriage is transferring records or scanning.	(a) Mute switch plug loose or mute circuit open.	Seat mute plug firmly in socket in amplifier. Check solder connections in mute plug. Trace circuit and repair. See diagram, Page 2280.
		(b) Mute switches not closing.	Check mute switches.

SEEBURG

SERVICE CALL	EFFECT	CAUSE	CORRECTION
1. No power to Wall-O-Matics.	No lights, - Wall-O-Matics fail to operate.	(a) 3 amp. fusetat blown.	Replace 3 amp. fusetat.
		(b) Open circuit in cable or at terminal connections.	Repair or replace faulty cable or terminal connections.
		(c) Loose connection in selection receiver.	Trace circuit and correct. See diagram, Page 5087 or 5103.
2. Coins fail to establish credits.	Program lights on but coins fail to establish credits.	(a) Coins rejected.	Clean and adjust rejector as shown on Pages 9001-9015.
		(b) Coin switch dirty or incorrectly adjusted.	Clean and adjust coin switches as shown on Page 12046.
		(c) Open credit solenoid or solenoid circuit.	Trace and repair or replace solenoid. See schematic on Page 12050.
		(d) Faulty credit switch.	Repair or replace credit switch assembly.
		(e) Slug rejector not correctly aligned with coin switch levers.	Adjust flat washer on slug rejector so rejector is held firmly in place by program holder. Adjust coin switch levers for proper alignment to slug rejector.
3. Credit lamp lights but buttons fail to latch. Customer must hold letter and number buttons in together to get selection.	Coins establish credits but motor fails to turn cam to credit position.	(a) Latch bar setting switch dirty or incorrectly adjusted.	Adjust latch bar setting switch as shown on Page 12046 or 12047.
	Motor turns cam to credit position when coin deposited but buttons fail to latch properly.	(b) Incorrect adjustment of latch bar adjusting screws.	Adjust latch bar screws as shown on Pages 12047 and 12048.

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
4. Buttons lock out in credit position.	Customer cannot push buttons in to make selections.	(a) Incorrect adjustment of latch bar adjusting screws.	Adjust latch bar screws as shown on Pages 12047 and 12048.
5. Buttons latch but motor fails to run.	Motor turns cam to credit position but fails to run again when buttons are latched.	(a) Motor starting switch fails to close.	Clean motor starting switches, located behind letter and number switch banks, and adjust so they close just before the buttons latch.
6. Buttons latch without credit.	After last selection is made, motor drives cam to credit position instead of stopping in rest position.	(a) Bind in clutch or gears. Clutch drops out too slow and drives cam too far.	Eliminate bind. Lubricate both ends of motor with - Seeburg Special Purpose Oil.
		(b) Contact arm set too far back.	Adjust contact arm position as shown in Figure 11, Page 12047.
		(c) Wrong adjustment of latch bar adjusting screws.	Adjust latch bar screws as shown on Pages 12047 and 12048.
7. Motor fails to complete full cycle of last credit. Contact arm stops about two-thirds of way around on contact plate.	Motor stops when credit switch is reset and buttons stay latched.	(a) Front latch bar setting contacts fail to make in pulsing position.	Clean and adjust latch bar setting contacts as shown in Figure 8, Page 12047. (For units below Serial No. 16645 adjust as shown in Figure 7, Page 12046.)
		(b) Operating lever for latch bar setting contacts binds in credit position. (Item 3, Page 12055.)	Eliminate bind.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
8. Motor runs through full cycle as soon as coin is deposited.	K 10 selection is played unless buttons are held in when coin is deposited.	(a) Contacts on latch bar setting switch not opening in credit position.	Adjust both contacts to be open in credit position as shown on Page 12047.
		(b) Bind in clutch or motor shaft. Clutch fails to disengage in credit position so runs through to pulsing position.	Eliminate bind. Lubricate both ends of motor & clutch with Seeburg Special Purpose Oil.
		(c) Contact arm set too far forward.	Adjust contact arm as shown on Figure 11, Page 12047.
9. Motor continues to run after selection is made.	Motor runs continuously or until all credits are used. Selects K 10.	(a) Bind in clutch or gears. Clutch fails to disengage rapidly and motor coasts into pulsing position.	Eliminate bind. Lubricate both ends of shaft with Seeburg Special Purpose Oil.
		(b) Contact arm set too far forward.	Adjust contact arm as shown in Figure 11, Page 12047.
		(c) Contacts of latch bar setting switch fail to open in credit position.	Adjust latch bar setting switch as shown in Figure 8, Page 12047. (For units below Serial No. 16645 adjust switches as shown on Figure 7, Page 12046.)
10. Wall-O-Matic lamps fail to light but Wall-O-Matic operates and makes selections normally.	Program lamps fail to light. Others light normally.	(a) Burned out lamps.	Replace lamps.
		(b) Bad connection between contact on back plate and contact on program holder.	Adjust contact brush. Item 23, Page 12054.
	All lamps in Wall-O-Matic fail to light (except credit lamp.)	(c) Open or short in lamp circuit.	Trace and correct. See schematic on Page 12050.
		(d) Open lighting transformer.	Repair or replace transformer. Item 3, Page 12054.
	Credit lamp fails to light.	(e) Burned out lamp.	Replace lamp No. 51 Mazda.
		(f) Open series resistor.	Replace resistor. Item 8, Page 12054.
		(g) Open credit lamp circuit.	Trace and repair. See schematic on Page 12050.

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SERVICE CALL	EFFECT	CAUSE	CORRECTION
11. Wrong selections from only one Wall-O-Matic. Others operate correctly. (See Remote Control 12.)	Customer sometimes gets wrong selection-one letter higher than selected. (Example:- customer selects *G1* but gets *H1.*)	(a) 3 - circuit switch contacts dirty or incorrectly adjusted.	Clean and adjust 3 - circuit as shown on Page 12048. Clean switch operating lever to eliminate binds.
	Erratic operation - – Wrong selections – Extra selections.	(b) Motor starting switches close too soon. Motor starts before customer has pushed button in far enough to lock.	Adjust motor starting switches, located behind letter and number switch banks, so the switches close just before the buttons latch.
		(c) Dirty Contacts on selector disc or incorrect contact pressure.	Clean selector disc contacts as discussed on Page 12045 and adjust as shown on Page 12047.
		(d) Dirty contacts in letter or number selector switch banks.	Clean and adjust slide contacts or replace switch assembly as required. Items S7 and S8, Page 12050.
		(e) Slow motor. Check motor speed as discussed on Page 12046.	Clean and lubricate motor and gears - eliminate binds. If necessary replace motor.
12. Wrong selections from all Wall-O-Matics due to incorrect operation of step switch assembly. (Also see Remote Control 11.) *(Continued)*	Customer gets J 1 instead of correct selection. (Example:- Customer selects A 8 but gets J 1.)	(a) "E" or "F" contacts of step switch assembly fail to make or too far apart.	Clean and adjust "E" and "F" contacts as shown on Page 5083.
		(b) Low voltage from selenium rectifier. *(Normal rectifier voltage output is minimum 22 volts D. C. when reset magnet is energized. Hold down unit or group step relay to energize reset magnet.)*	Replace selenium rectifier. Item X1, Page 5087 or CR-1, Page 5103.
		(c) Open coil in transfer relay.	Replace transfer relay. Item 7, Page 5090, or 5106.
		(d) Short in condenser C5.	Replace C5. See diagram on Page 5087 or 5103.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 12. Wrong selections from all Wall-O-Matics due to incorrect operation of step switch assembly. (Also see Remote Control 11.)	Customer makes one selection but gets two entirely different selections. (Example:- Customer selects A 2 but gets C 1 and E 1.)	(e) Same as a, b, c and d above.	
	Customer gets correct selection but also gets adjacent selection. (Example:- Customer selects B 5 but gets B 4 and B 5.)	(f) Unit contact plate misaligned - contact plate switch blades touch two contacts in some positions.	Loosen unit contact plate mounting screws and align plate so switch blades touch only one contact at each ratchet position. Item 6, Page 5091.
		(g) Short between two circuits in cable, plugs or sockets, or in selector coil assembly.	Trace and correct.
	Customer gets two or more selections when he selects from one of the letters in the middle section. (Example:- Customer selects E 5 but gets C 3, C 4, E 4 and E 5.)	(h) "J" contacts on group step relay fail to make. Reset magnet releases while pulse is coming through contacts.	Clean and adjust "J" contacts as shown on Page 5083.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 12. Wrong selections from all Wall-O-Matics due to incorrect operation of step switch assembly. (Also see Remote Control 11.)	Erratic operation - customer occasionally gets higher number than selected.	(i) Unit contactor occasionally fails to drop back to rest position.	Check for: Bind in shaft. Burrs or gummy material on contactor plate. Bind in transfer switch roller. Excessive pressure on transfer switch blades. Lack of tension on ratchet return spring. Clean, lubricate and adjust as shown on Pages 5084 to 5086, or 5100 to 5102.
	Erratic operation - customer occasionally gets lower number than the one selected.	(j) "A" and "B" contacts of transfer switch arc excessively during operation of unit step relay.	Clean contacts. Adjust blade pressures and switch position as shown on Page 5086 or 5102.
		(k) Mechanical bind in unit or group step relay pawl.	Clean pawl pivots and sliding surfaces. Lubricate with Seeburg Special Purpose Oil. See Page 5102.
		(l) Incorrect adjustment of unit or group step relay magnet position.	Adjust step relay magnet position as shown on Page 5084 or 5100.
		(m) Incorrect adjustment of pawl guides.	Adjust pawl guides as shown on 5085 or 5101.
		(n) Low voltage from selenium rectifier. *(Normal rectifier output is minimum 22 volts D.C. when reset magnet is energized. Hold down unit or group step relay to energize reset magnet.*	Replace selenium rectifier, Item X1, Page 5087 or CR-1, Page 5103.
13. No selections from all Wall-O-Matics. Wall-O-Matics operate normally but step switch assembly fails to operate correctly. *(Continued)*	2050 tube fails to fire when selections are made at Wall-O-Matics.	(a) Open circuit between Wall-O-Matics and wired Selection Receiver.	Check cable and terminal connections and repair as required.
		(b) "A" contacts on transfer switch fail to make.	Clean and adjust "A" contacts as shown on Page 5086 or 5102.
		(c) Bad 2050 tube.	Replace tube.
		(d) Open coil in unit step relay.	Replace relay and adjust as shown on Page 5084 or 5100.
		(e) Open plate supply to 2050 tube.	Trace and repair. See schematic on Page 5087 or 5103.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 13. No selections from all Wall-O-Matics. Wall-O-Matics operate normally but step switch assembly fails to operate correctly.	2050 tube fires continuously.	(f) Short circuit or ground in cable or at terminal connections. (No. 1 circuit (blue) grounded)	Trace and eliminate.
		(g) Motor in one of Wall-O-Matics failed to complete last cycle. Contact arm stopped on "live" contact of contact plate.	See Remote Control 7, Page 130.
		(h) No bias voltage at 2050 grid due to short or open circuit or bad rectifier.	Check selenium rectifier output voltage. Should be -25 to -28 volts d.c. with no load. Check circuit from selenium rectifier to 2050 grid. Correct as required. See diagram on Page 5087. or 5103.
	Unit step relay operates but reset magnet fails to energize. Unit ratchet dog fails to engage ratchet.	(i) "G" contacts fail to make.	Clean and adjust "G" contacts on unit step relay as shown on Page 5083 or 5099.
		(j) Open reset magnet coil.	Replace reset magnet and adjust as shown on Page 5085 or 5101.
		(k) Open circuit to reset magnet.	Trace and repair open circuit. See Schematic on Page 5087 or 5103.
	Unit step relay steps only two positions and drops back to rest position. Group step relay fails to operate	(l) "B" contacts on transfer switch fail to make.	Clean and adjust "B" contacts as shown on Page 5086 or 5102.
	Unit step relay operates normally but group step relay fails to operate.	(m) "D" contacts of transfer relay fail to make.	Clean and adjust "D" contacts as shown on Page 5083 or 5099.
(Continued)		(n) Open group step relay coil.	Replace group step relay and adjust as shown on Page 5084 or 5100.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
(Continued) 13. No selections from all Wall-O-Matics. Wall-O-Matics operate normally but step switch assembly fails to operate correctly.	Transfer relay stays down for both series of pulses. All pulses go to unit step relay.	(o) Transfer Relay "sticks" due to foreign matter on pole face or to residual magnetism.	Clean armature and pole face surfaces and adjust contact pressures. Item 7, Page 5090 or 5106.
	Reset magnet energizes but release dogs fail to engage ratchets.	(p) Incorrect adjustment of reset magnet.	Adjust reset magnet and dog operating links as described on Page 5085 and 5086.
		(q) Mechanical bind in release dog.	Remove bind in release dog and adjust spring pressure as described on Page 5086 or 5101 and 5102.
	Unit and group relays work normally but timing relays 1 and 2 fail to operate.	(r) "H" contacts on group step relay fail to make.	Clean and adjust "H" contacts as shown on Page 5083 or 5099.
		(s) Short in condenser C8.	Replace C8 - See diagram on Page 5087 or 5103.
		(t) Open coil in timing relay No. 1.	Replace relay. Item 6, Page 5090 or 5106.
	Timing relay No. 2 fails to operate.	(u) "P" contact in timing relay No. 1 fail to make.	Clean and adjust "P" contacts as shown on Page 5083 or 5099.
		(v) Short in condenser C7.	Replace C7 - See diagram on Page 5087 or 5103.
		(w) Open coil in timing relay No. 2.	Replace relay. Item 10, Page 5090 or Item 8, Page 5106.
	All relays operate normally but none of the selection levers move to their ON position when selected.	(x) Slo-Blo fuse blown.	Replace Slo-Blo fuse in Selection Receiver. See Page 83 or 90.
		(y) "M" or "N" contacts on timing relays fail to make.	Clean and adjust "M" and "N" contacts as shown on Page 5083 or 5099.
		(z) 27 pin plug not fully seated into socket.	Seat plug firmly into socket.
		(zz) Open selection pulse circuit in step switch assembly.	Trace and repair. See schematic on Page 5087 or 5103.

SERVICE CALL	EFFECT	CAUSE	CORRECTION
14. No selection of higher letters of all Wall-O-Matics. (Example: G, H, J or K fail to select.)	All relays operate but reset magnet releases too soon on higher letters.	(a) "J" contacts on group step relay fail to make.	Clean and adjust "J" contacts as shown on Page 5083 or 5099.
15. No selection from only one Wall-O-Matic. Others operate and select correctly. (See Remote Control 13.)	See Remote Control 1b, 2, 4 and 5.		
16. One selection lever in each group fails to move when selected at Wall-O-Matic. (Example: A3, C3, E3, G3 and J3 fail to operate.)	Five levers fail to operate from Wall-O-Matic – other 95 work normally.	(a) Open connection or short to ground in circuits between unit step contact plate and selector coil assembly. Check 27-prong plugs, plug connections and connections at Selector Coil Assembly.	Trace and repair. See diagram on Page 5087 or 5103.
17. One entire group of selection levers fail to move when selected at Wall-O-Matic. (Example: All levers of the C-D group fail to operate.)	Twenty levers of one group fail to operate from Wall-O-Matic - other 80 work normally.	(a) Open circuit from group step contact plate to selector coil assembly. Check 27-prong plugs, plug connections and connections at Selector Coil Assembly.	Trace and repair. See diagram on Page 5087 or 5103.
18. Random selection levers occasionally fail to move to ON position when selected.	Phonograph fails to start when selection is made.	See Selection System 1(e), (f) Page 101.	
		Short selection pulse from Step Switch Assembly.	To increase pulse time adjust M and N contact gaps and relay tail spring pressures so N closes sooner and M opens later. (See Timing Relay No. 1 and No. 2, Page 5083 or 5099.)

J. P. Seeburg Corporation, Chicago 22, U.S.A. Issue 1 (FC)

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SELECT-O-MATIC "100" MECHANISM

The Select-O-Matic "100" Mechanism, is designed for automatic selective playing of any of the selections in a program of 50, 45 r.p.m., 7" diameter records with 1½" center hole. The mechanism will play either side or both sides of the records.

There are two fundamental parts of the Mechanism – a magazine, and a carriage assembly. The magazine holds the records. The carriage assembly plays the desired program selections by progressively withdrawing the records, playing them, and restoring them to their original position in the magazine.

The record magazine holds the records in a vertical position in openings or spaces that are ¼" wide (center to center). It is filled from the front of the instrument by merely placing the records in the spaces. The spaces are numbered A1 to K10 for convenience in indexing the selections. There are 10 groups with 10 selections in each lettered group. To avoid confusion with the figure "1", the letter "I" is not used.

The carriage assembly moves, or scans from side to side of the instrument on a track parallel to, and in front of, the records. The scanning operation of the carriage commences as soon as a selection is made and will continue until the carriage has moved to a position in front of a record that is to be played. The carriage stops scanning when it comes to the position for playing the selected record and transfers the record from the magazine to the playing position on the carriage. The carriage transfers the record (when it has finished playing) to its original position in the magazine and scans to the next selected record, or, if no other record has been selected, will come to a stop.

SEQUENCE OF PLAYING

The carriage assembly changes direction of scanning only at the ends of the magazine, and the scanning operation is interrupted for playing only when the carriage is scanning toward the selected side of the record. The sequence of

SELECT-O-MATIC "100" MECHANISM

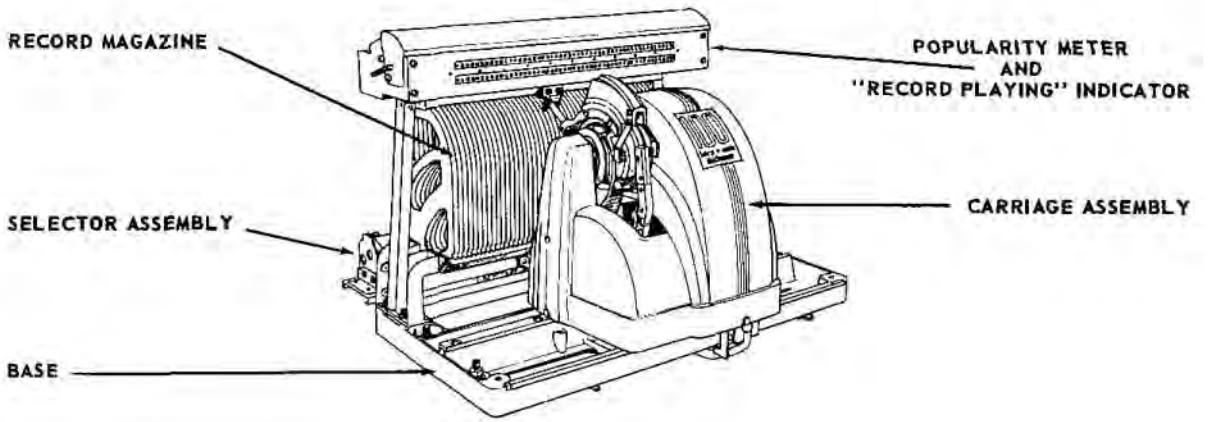


Figure 2.

playing selections will, then, be established by their position in the magazine and the starting position and direction of scanning of the carriage. Selections of the left sides of records will be played as the carriage progresses from the left side of the magazine – right sides as the carriage scans from the right side. If both sides of a record are selected, one side will be played then the carriage will scan to the end of the magazine, reverse direction, and return to the record for playing the remaining side.

SELECTION OF RECORDS

The mechanism is controlled for playing selected records with the Selector Assembly and a movable Contact Block on the back of the mechanism. There are 100 selector levers in the Selector Assembly – two for each record – arranged in two rows of 50 levers each. When a

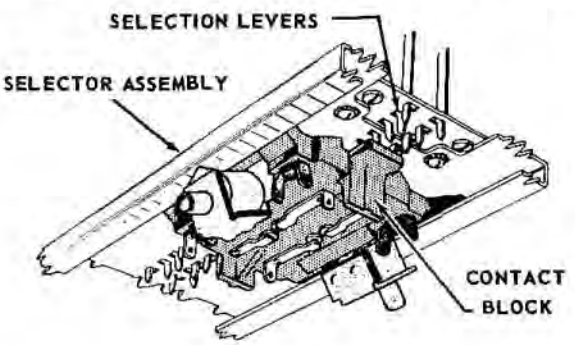


Figure 3.

selection is made with the Electrical Selector, or by remote control, an electromagnet in the selector assembly is momentarily energized and the lever corresponding to the selection number is moved from its normal position to the "play" position. Movement to the play position of any lever closes a circuit which starts the scanning operation of the carriage assembly and positions the lever for electrical contact with a trip contact in the contact block.

The contact block is attached to the carriage assembly with an arm and moves with it on guide rails that are part of the selector assembly. There are two contacts on the block that are for electrical contact with the selector levers that have been moved by selection to the play position. They pass, without touching, the levers in the normal (not selected) position. When one of the contacts touches a selector lever, it is grounded and completes a circuit to a trip solenoid. Operation of the trip solenoid while the carriage is scanning causes the carriage to stop and be accurately detented at the selected record.

When the carriage is detented, the transfer arm rolls the selected record from the magazine, up a ramp to the turntable. After the record has been brought to the turntable, the clamp arm lifts it from the ramp and clamps it, properly centered, in the playing position. Because the turntable is rotating, the record will start to turn as soon as it is clamped. When the clamping operation is completed, the pickup stylus is set on the record and is released so the stylus will follow the record grooves. The mechanism is then in the record-playing position.

When the record has finished playing the pickup will have moved the arm to a position which causes it to operate a trip switch. The

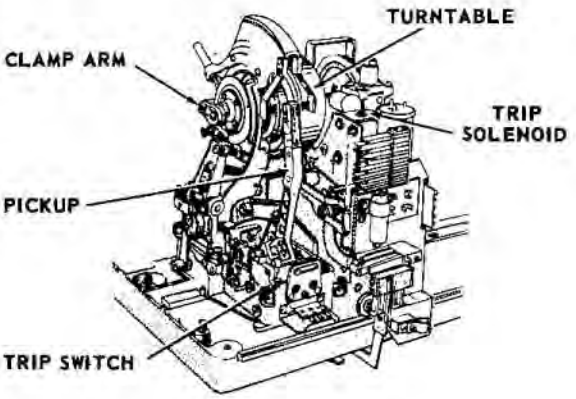


Figure 4.

switch, in turn, closes a circuit to the trip solenoid. This is the same trip solenoid which operated to detent the carriage and initiate the transfer of the record to the playing position. This second operation of the solenoid, occurring at the moment of record trip-off, starts the operation in which the record is transferred from the playing position back to the magazine. In this operation the above cycle is reversed – the pickup is lifted from the record; the clamp arm is withdrawn so the record is released; the transfer arm lowers the record to the magazine. When the record has been fully returned, the carriage again scans or, if no other record has been selected, it comes to a stop.

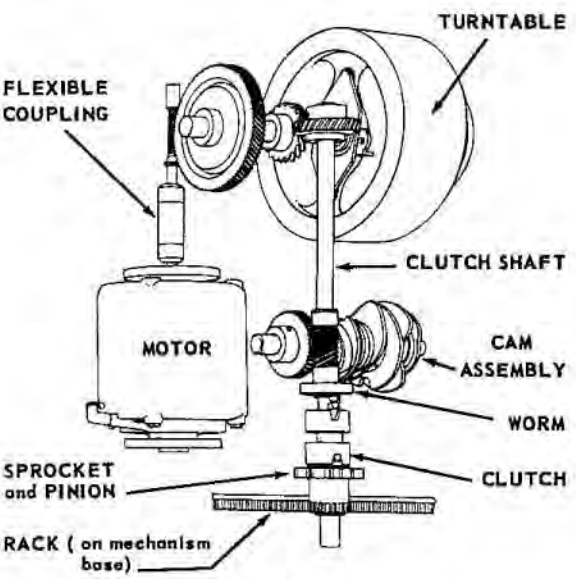


Figure 5.

SCAN – TRANSFER

All the operations of the mechanism – scan, transfer and playing – are powered by a motor through gears to the record turntable and, through a clutch, to a cam assembly or a sprocket assembly. These parts are shown in their relative positions in Figure 5. It can be seen that the turntable and the clutch shaft will turn whenever the motor is running. The clutch member is loosely fitted on the clutch shaft and can be moved vertically. One or both the drive pins shown in the enlarged view of the clutch, Figure 6, will be engaged in the notches of the

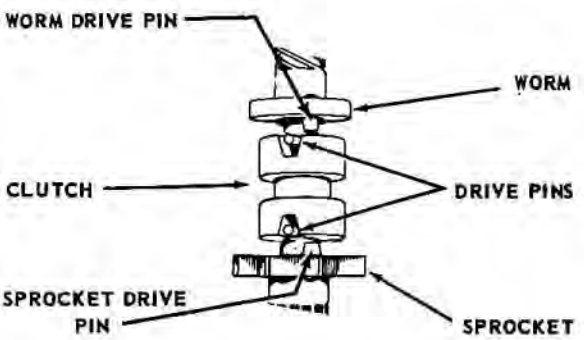


Figure 6.

clutch at all times so the clutch, although free to move up and down, will be turning with the shaft whenever the motor is in operation. In the scan operation of the mechanism, the clutch is lowered and is engaged with the pin on the upper end of the sprocket. In the transfer operation, the clutch is raised and is engaged with the pin on the lower end of the clutch worm. In the play position, the clutch is held between the sprocket and worm pins so that only the turntable is being driven by the motor.

When the rotating clutch is lowered so it is engaged with the sprocket, the pinion (which is part of the sprocket) is also turning. The pinion is meshed with a gear rack which is fastened to the mechanism base and extends the length of the magazine. As the pinion turns, it drives the carriage in the movement referred to as "scanning". The direction of scanning is determined by the direction of rotation of the pinion and is changed by reversing the motor. The motor rotation is changed by a reversing switch that is mounted on the carriage and actuated by "stops" at each end of the base.

When the clutch is raised and engaged with the clutch worm, the cam assembly rotates and, in turning, operates the parts of the carriage that are associated with the record transferring operation. During the transition of the carriage from the scan to the play position, the cam assembly turns one-half revolution. It makes another one-half turn during the change back to the scan position. Its direction of rotation is determined by the direction of rotation of the motor and is the same during both transfer operations so it makes one complete revolution for each record playing cycle.

The cam assembly, although a single unit, has eight individual cam faces each of which has a definite function in the transfer operations. The contour of each of the cams is symmetrical about an axis through its scan and play positions so the sequence and timing of the carriage operations are the same for either rotation direction of the motor.

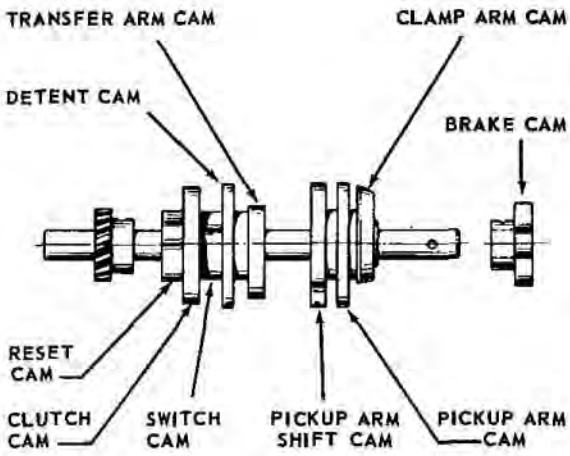


Figure 7.

Figure 7 shows the cam assembly and identifies the different cams. The reset and clutch cams operate in conjunction with a trip mechanism as a part of the clutch control. It is the trip mechanism and the levers associated with it which move the clutch to the scan, transfer and play positions. The third cam – the switch cam – operates a cam switch which, in turn, operates mechanism control circuits. The detent cam operates through a series of levers to hold the carriage at a selected record position (magazine record space) and maintains alignment of the turntable with the magazine while the record is played and also while it is being transferred. The pickup shift cam moves the pickup for left or right side playing of a record. The movement of the pickup arm to and away from the record and to the normal starting position is performed through levers by the pickup arm cam. The clamp arm cam, operating the clamp arm, holds the record in playing position on the turntable. The cam at the right – the brake cam – is not a part of the cam assembly although it is attached to the cam shaft. It stretches and releases a "brake spring" and has a profile designed so the spring equalizes the forces required from the motor at different positions of the cam assembly thereby assuring smooth operation of the mechanism during transfer of the record.

CLUTCH OPERATION

The clutch is shifted by two springs and a series of levers that are parts of the trip mechanism assembly shown in Figure 8. It is linked

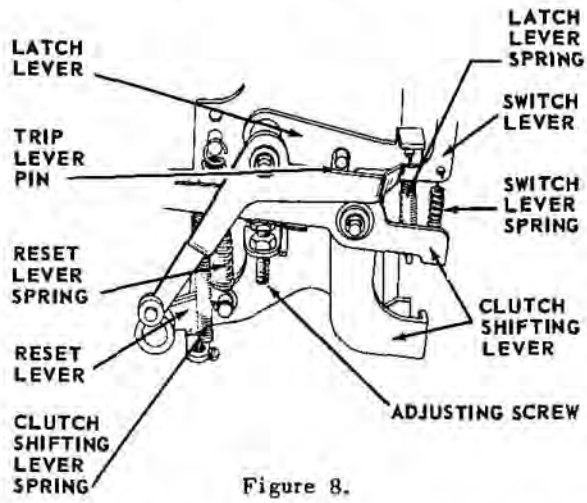


Figure 8.

to the clutch shifting lever and is lifted to the transfer position by the reset lever spring. The force of this spring is applied, upward, to the clutch shifting lever, through the reset lever and the adjusting screw that is in the reset lever.

When the mechanism is scanning or playing a record, the reset lever is held down by the latch lever and the spring is in its charged condition. When the trip solenoid is momentarily energized, it pulls the trip lever pin upward against the latch lever. When the pin hits the latch lever, the reset lever is released and the spring pulls the clutch upward so it engages the pin in the clutch worm.

During the ensuing record transfer operation and cam rotation, the reset cam moves the reset lever to its original latched position and the spring is again charged. This resetting of the trip mechanism begins as soon as the cam assembly starts to turn and is fully completed when approximately one-half the transfer operation is completed.

When the reset lever is returning to the reset position it can no longer hold the clutch shifting lever in the raised position. The clutch would then be lowered until it is no longer engaged with the clutch worm and the transfer operation would cease soon after it is begun. This is prevented by the clutch cam and the roller that is a part of the clutch shifting lever.

The clutch cam is the second from the left in Figure 7. The roller is between the two side frame members of the clutch shifting lever and is above the cam assembly. The roller must be in the "scan notch" of the cam, as in Figure 9a, to permit the clutch to engage the sprocket. The roller, in this position, holds the cam assembly so it cannot turn from the scan position.

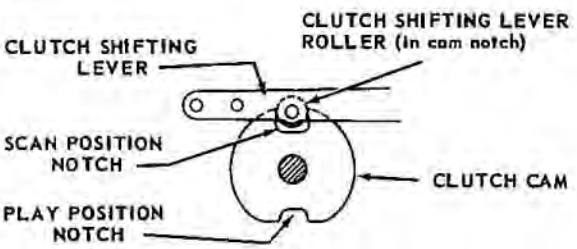


Figure 9a.

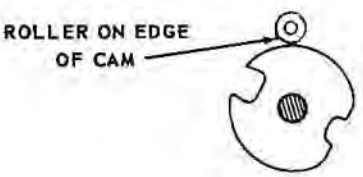


Figure 9b.

When the clutch rises to the transfer position, the clutch shifting lever roller lifts out of the notch. The transfer operation commences as soon as the clutch engages the pin on the clutch worm and, as the cam turns, the roller rides it as in Figure 9b. As long as the roller is on the outer edge of the cam it will hold the lever (and the clutch) in the transfer position.

As the transfer operation progresses, the reset cam, pushing on the reset lever, recharges the reset lever spring and, at the same time, charges the clutch shifting lever spring. This spring pulls downward on the clutch shifting lever so its roller is held firmly against the clutch cam.

In the continuing transfer operation, "play position notch" of the clutch cam is brought under the roller and the roller is pulled down, by the clutch shifting lever spring, into the notch. As the roller enters the notch the clutch also moves down and disengages from the clutch worm so the cam assembly stops turning. The downward movement of the clutch is limited by a mechanism adjustment so it cannot engage the sprocket.

When the clutch shifting lever roller has entered the cam notch, the cam assembly will have rotated one-half turn from its scan position and will be in its "play position", the carriage will be firmly detented at the selected record position, the record will have been transferred to the turntable and been clamped there, the pickup will be on the record and released so it can follow the record grooves and only the turntable is being driven by the motor. This is the "play position" of the mechanism.

CARRIAGE DETENTING

It is necessary to firmly detent and hold the carriage assembly at the selected record position while the record is being transferred to the turntable, played, then returned to the magazine. This is done by engaging a detent roller between two teeth of the sprocket that is at the lower end of the clutch shaft. The roller is supported on the detent arm and is engaged with the sprocket by the lower end of the clutch yoke lever. These parts are shown in Figure 10. *(Page 2124)*

Initial detenting occurs when the trip solenoid is energized and the clutch moves from the scan position to the transfer position. The upward movement of the clutch shifting lever lifts the clutch link and clutch spring, Figure 11, and the clutch yoke lever. The yoke lever pivots, bringing the detent adjusting screw against the detent arm so the detent roller engages the sprocket.

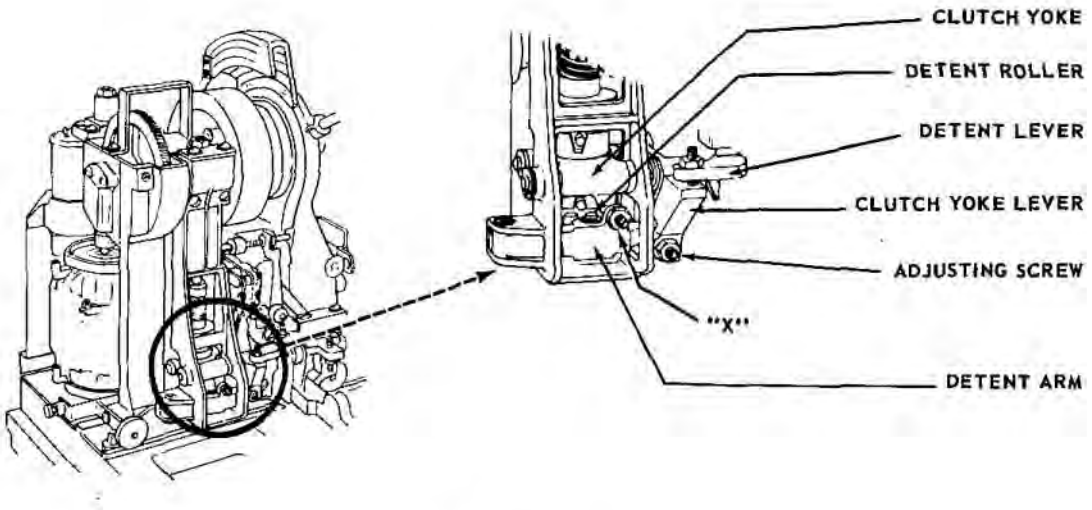


Figure 10.

When the play position of the carriage is attained, the clutch shifting lever drops to disengage the clutch from the clutch worm. Its downward movement relieves the detenting force it applies to the clutch yoke lever but, before the release occurs, the yoke lever will be locked in the detenting position by the detent lever shown in Figure 12.

The detent lever is operated by the detent cam. These are shown in their scan position in Figure 12. As the cam turns from the scan position to the play position, the detent lever is driven downward so the adjusting screw at its end is against the flat horizontal part of the clutch yoke lever effectively locking the detent roller in position.

At the conclusion of playing a record, the trip solenoid again is operated so the clutch moves upward to the transfer position and again the clutch shifting lever supplies detenting force to the clutch yoke lever. In the ensuing rotation of the cam assembly to the scan position the detent lever is raised from the yoke lever so the detenting force is again supplied only from the clutch shifting lever. When the scan position is attained, the clutch drops and the detent roller is retracted from the sprocket so the carriage is free to scan.

Another function of the detent arm and the operations associated with it is retention of the clutch in its correct playing position while a record is playing. The adjusting screw in the detent arm, indicated at "X" in Figure 10, will move toward the clutch when the sprocket is detented and will be held firmly in position by

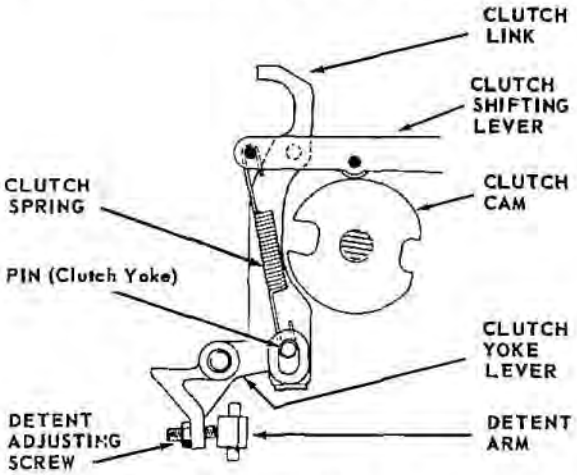


Figure 11.

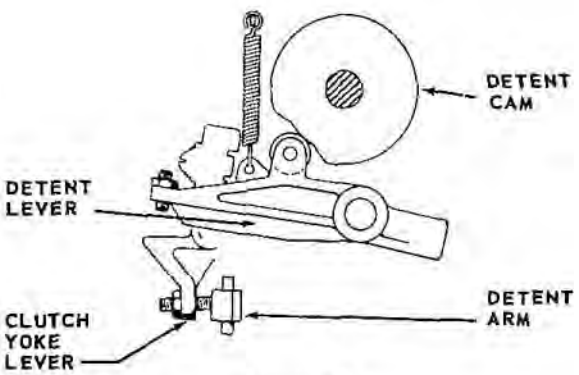


Figure 12.

the locking action of the detent cam and lever at the time the carriage cycles into the play position. When the play position is attained, the clutch disengages but its downward travel is limited by the clutch yoke bearing against the adjusting screw. The length of clutch travel from the transfer position to play position is held to a minimum so the remaining available movement (from play to scan position) will afford the greatest possible displacement of the clutch shifting lever. By maintaining maximum movement of the clutch shifting lever between the scan and play positions, a control switch it operates will be less critical in adjustment and positive contact functioning will be assured.

The transfer arm is controlled by the gear segment and cam shown in Figure 13. The segment pivots on the shaft at A; the arm pivots at B. The gear segment spring biases the roller against the cam and lifts the head of the arm in an arc toward the turntable as the cam rotates from the scan to the play position. In the scan position the arm is below the record magazine. As it starts moving into the magazine, the roller in the head engages the lower projections of adjacent separators so the arm centers in the record space.

As the arm moves upward, the record is rolled onto and up the ramp until the upward

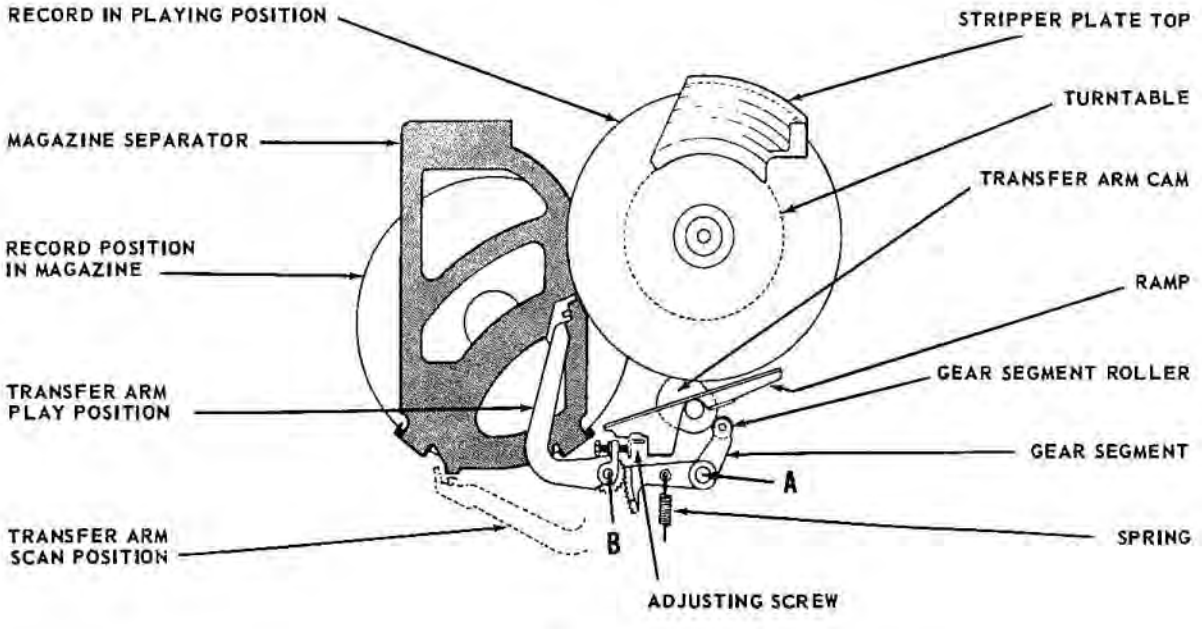


Figure 13.

RECORD HANDLING

Record handling from the magazine to the playing position on the turntable and return to the magazine is performed by the transfer arm and the clamp arm. The record is rolled by the transfer arm from the magazine, upward on the ramp, to a position beside the turntable. After the record has been brought up to the turntable, the clamp arm centers it and clamps it in the playing position. At trip-off, when playing is concluded, the cam assembly rotation retracts the clamp arm to release the record and the transfer arm then lowers it to its original position in the magazine.

movement is arrested by the adjustment screw coming in contact with the stop plate. In this position, the record is cradled in the forked head of the transfer arm and the ramp and is slightly below its centered clamped position.

As soon as the transfer arm and record are in the raised position, the clamp arm, Figure 14, moves toward the turntable and the cone and centering pin on the clamp disc pass through the record center hole. As the centering pin enters the hole in the turntable, the disc is aligned parallel with the turntable and the cone lifts the record so it no longer is touching either the ramp or the transfer arm.

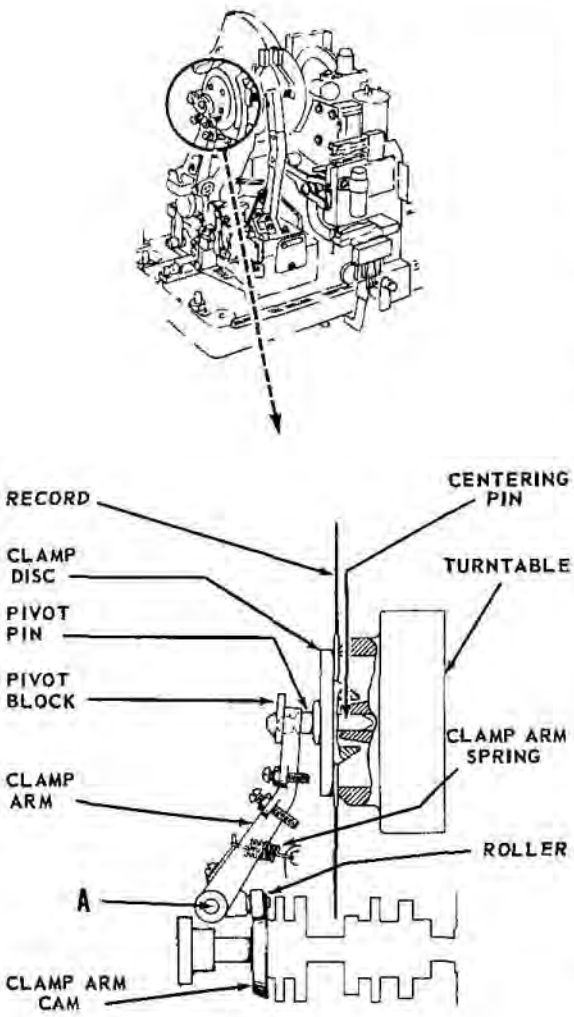


Figure 14.

The clamp arm movement is controlled by the clamp arm cam. The arm pivots at A and is pulled toward the turntable by the clamp arm spring as the roller follows the cam during rotation from the scan to the play position. In the clamping position, the disc rotates with the record and turntable, with the ball on the pivot pin and the pivot block as a bearing.

It will be noted that both the transfer arm and the clamp arm move to their play positions by spring force. If either is obstructed by any abnormal conditions, there are no damaging strains set up. It will be noted, too, that the record is "captive" in that it does not fully leave its magazine space for playing and cannot move past possible clamping position due to the stripper plate top. Lateral random movement of the record, before and after clamping, is prevented by the turntable and the stripper plate.

At trip-off, when the record is to be returned to the magazine, the cam assembly turns to the scan position. The clamp arm is first retracted from the turntable and the stripper plate "strips" the record from the disc cone so it drops to its former cradled position on the ramp and the transfer arm head. The transfer arm then lowers it to its stored position in the magazine space.

SAFETY PLUNGER

If a record is badly warped so it rubs on the magazine separators or for any other reason fails to return fully to its stored position in the magazine, the carriage will not scan to cause possible damage to the records or mechanism. The safety plunger, Figure 15, must move

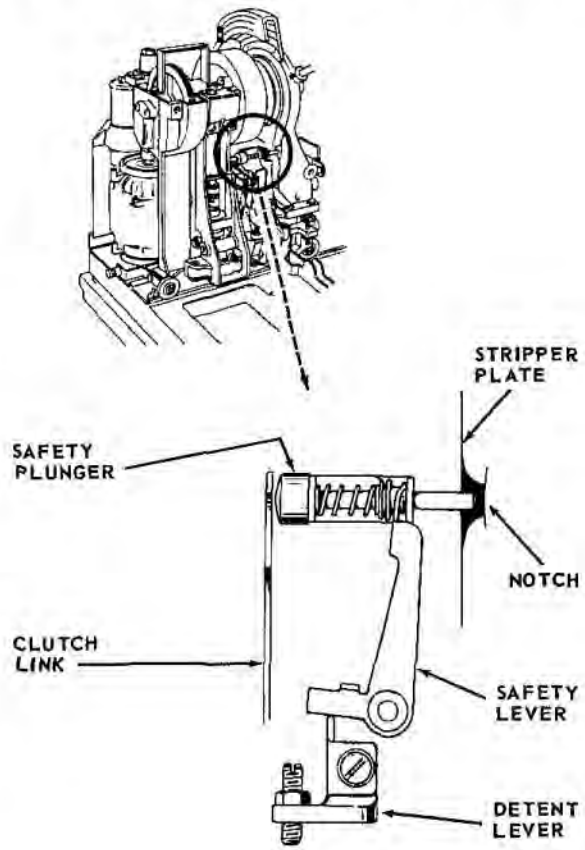
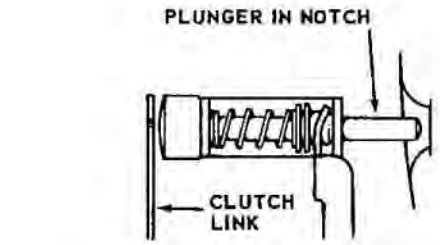
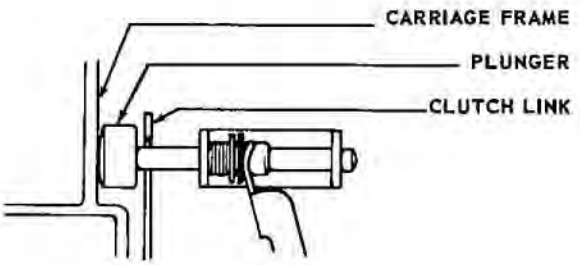


Figure 15.

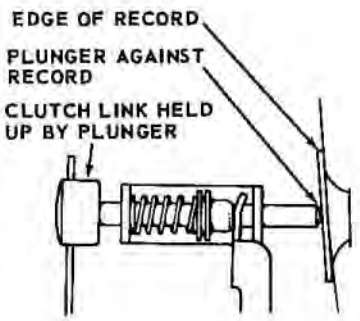
to its normal scan position, Figure 16A, before the carriage can start the scanning operation by engaging the sprocket. In this position the small diameter end of the plunger is in a notch in the stripper plate and the hook at the top of the clutch link (see Figure 11) has moved down past the large end of the plunger to permit the clutch to drop into its scan position.



(A) Normal Scan Position



(B) Play Position



(C) Record Not Returned To Magazine

Figure 16.

In the play position the plunger has been moved by the detent lever and the safety lever so its large end is against the clutch frame as shown in Figure 16B. In this plunger position the hook on the clutch link can move downward far enough to permit the clutch to move to the play position.

If a record is not returned to the magazine, it will block the path of the safety plunger from its scan position as shown in Figure 16C and the hook on the clutch link will rest on the large end of the plunger. With the link held up by the plunger, it cannot drop far enough for release of sprocket detenting or engagement of the clutch and sprocket for carriage scanning.

PICKUP

A pickup with two armature and stylus assemblies plays both sides of the records and is part of a pickup arm system that is moved to the record side that is to be played. The pickup, a magnetic type with replaceable styluses, operates with stylus pressure on the record of seven to eight grams.

The armatures in which the styluses are inserted are hollow tubes, formed at the end to a flat oval. The stylus shank has a slight taper and curvature so it wedges in the armature and is held firmly without clamps or screws. Both armatures are independently supported to provide varying flux density through a single coil that terminates at the two connecting pins in a bakelite block or base. The coil has a d.c. resistance of approximately 450 ohms. The nominal pickup output for 1000 c.p.s. at amplitude of 6 cm/sec is 30 m.v. when connected to a 10,000 ohm load.

PICKUP ARM SYSTEM

The pickup arm position and operation are controlled by two cams. One of these, the pickup cam, places the stylus on the record, releases the arm so the stylus can follow the playing grooves, lifts the pickup from the record at conclusion of playing, returns the arm to the at-rest position and locks it there, ready for the next playing cycle. The other, the shift cam, positions the arm to the left or right of the record to be played for, respectively, left or right side playing.

The movement of the arm as the pickup moves to and from the record and as it follows the irregularities of a warped record has at its axis, at the lower end of the arm, a damping system shown in Figure 17A. The arm pivots on a thin film of viscous oil that is between the bore of the arm and the stator. The stator, as its name implies, does not turn – it is held rigidly between two centering screws in the cradle shown in Figure 18.

The stylus pressure against the record and the arm movement toward the record is obtained from the pressure springs, Figure 17B. When the right side of a record is played, the arm is positioned at the right as shown and the spring at the left provides the stylus pressure. When the left side is played, the arm is positioned to the left of the record so the spring at the right provides the pressure.

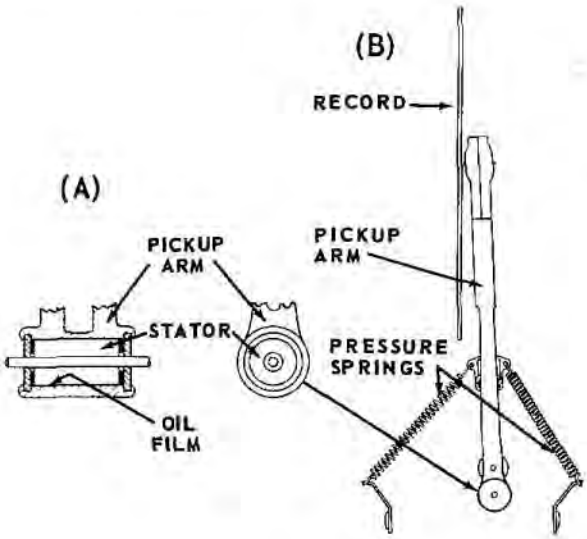


Figure 17.

The axis of lateral movement of the pickup arm (movement parallel to the record surface) is through the pickup cradle & the pivot sockets, Figure 18. The pivots are hardened steel points in the cradle frame, Figure 19. The pivot at the right is fixed; the one at the left is moveable so it can be adjusted for free movement of the cradle with neither binding nor undue looseness.

The lateral movement is limited in both directions. The limit of pickup travel toward the edge of the records is controlled by the adjusting screw A, Figure 20, and is established at the point at which the stylus lands on the record at the start of play. The screw is in a projection of the pickup cradle and moves downward in an arc until it stops against the cradle frame. The movement of the pickup toward the record center is controlled by the screw, B. It projects through the frame casting at a point below the axis of movement so it acts as a stop for the swing of the cradle.

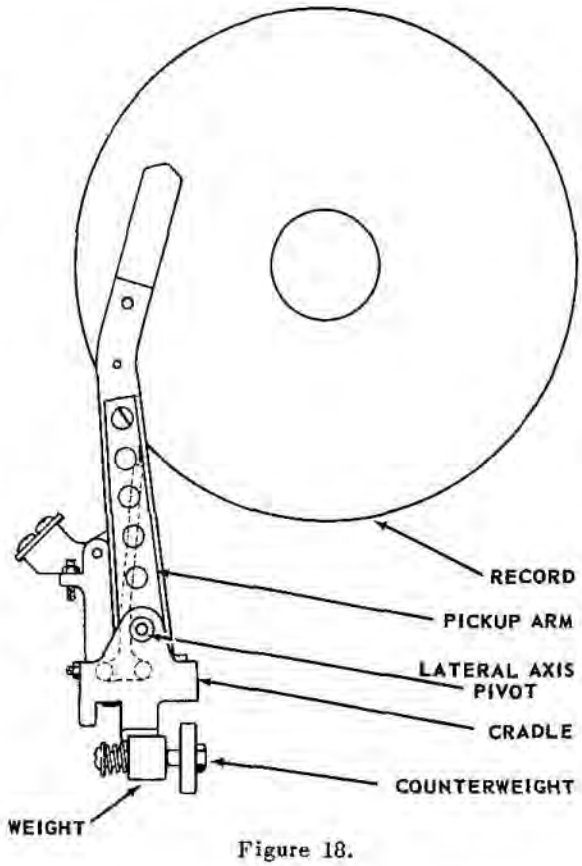


Figure 18.

The arm and cradle, as a unit, are statically balanced by a weight and counterweight that are attached to the bottom of the cradle, Figure 18. The weight is fixed in its position but the counterweight is moveable and is adjusted for correct lateral balance.

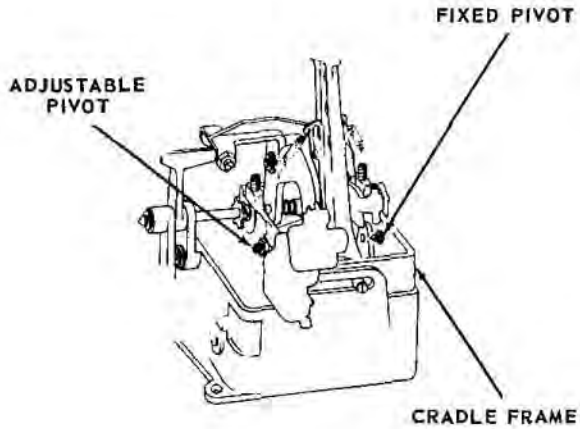


Figure 19.

In addition to balancing for static conditions, provision is made to counteract the lateral forces developed dynamically by friction between the stylus tip and the record. This is done by anchoring the lower ends of the stylus pressure springs at a point that is off-set from the lateral axis of the arm so the spring that is in tension opposes the dynamic force as well as holds the stylus in the record groove.

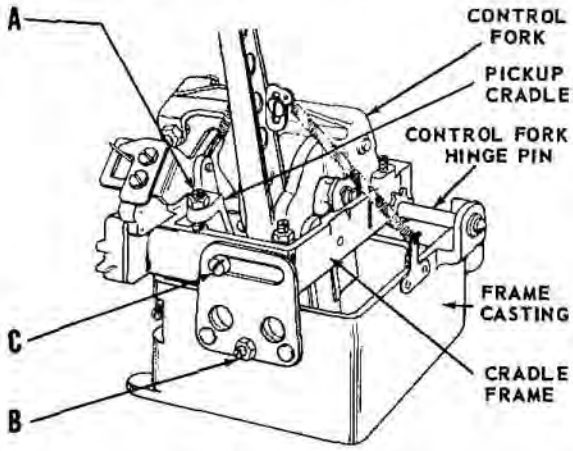


Figure 20.

PICKUP ARM SHIFT

The cradle frame in which the pickup arm and cradle are held is mounted in the frame casting, Figure 20. It is supported on the control fork hinge pin and the screw, C, the head of which rests in the slotted plate at the front of the casting. The assembly is moved, as a whole, to the left or right, by the pickup shift cam operating through the drive crank, cradle actuator lever, and shift collar, Figure 21.

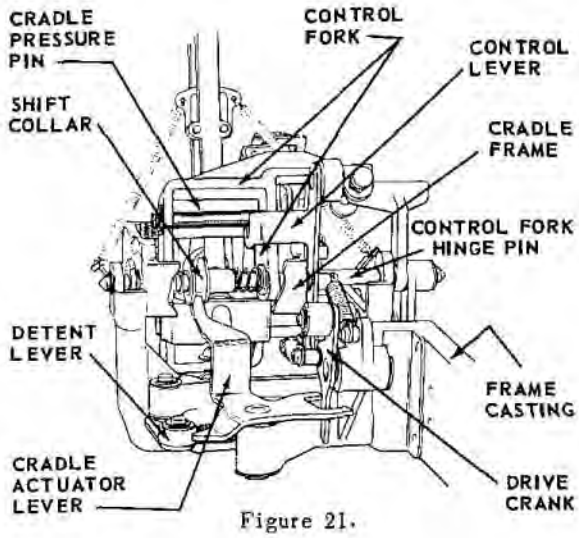


Figure 21.

In the assembly shifting operation, the shift cam rotation direction determines the position of the drive crank. The crank, if it changes position, operates the cradle actuator lever which, in turn, slides the shift collar on the control fork hinge pin. The collar is between two compression springs and the control fork so, when it moves, the control fork and the cradle frame, together, slide with it along the pin until the frame comes to a stop against projections that are at the back of the frame casting.

The movement imparted to the cradle actuator lever by the drive crank is supplemented by the detent lever, Figure 21. In conjunction with the actuator lever, it performs an over-center action that moves the shift collar farther than the stops on the frame casting will permit the cradle frame to move. This over-travel of the collar is absorbed by the compression springs and assures full positioning of the pickup arm to the left or right side playing position. It also holds continuous but controlled force against the control fork and the cradle frame to eliminate possibility of vibration of the assembly.

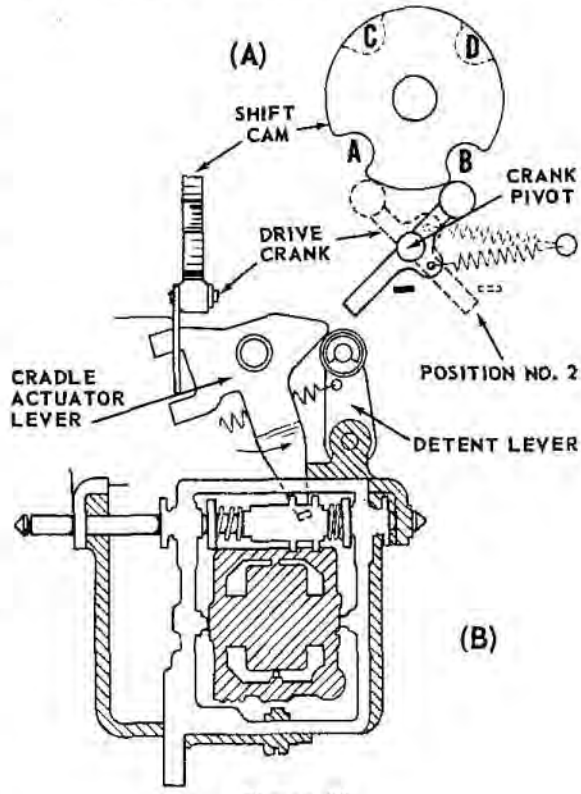


Figure 22.

The drive crank changes position and moves the pickup arm only if the record side next to be

played is opposite that of the record side last played. Figure 22A explains this operation and shows the shift cam and the drive crank in their relative scan positions after the left side of a record has been played. In this view, the cam and crank are shown in their relative positions as though viewed from the clamp arm side of the carriage assembly.

If, on the next play, the right side of a record is to be played, the cam will turn clockwise in the record transfer operation. After a few degrees of cam rotation the roller on the drive crank will fall into the notch, B. As the cam continues to turn, the notch, B, will move to its play position at C with the roller following it until the crank is at position 2. When the crank is in this position, the pickup arm and the levers are positioned as shown in Figure 22B.

If, on the next play, the left side of a record is to be played, the cam will turn counterclockwise from the position shown in Figure 22A and the notch, A, will pass the roller of the drive crank. The roller is momentarily in the notch but there will be no change of position of the crank relative to the cam and the pickup arm position remains unchanged.

PICKUP ARM OPERATION

The pickup arm operations at the beginning and end of record play are performed by the control fork. The fork is actuated by the pickup cam and the control lever and is shown in its play position in Figure 23. In this position, the control lever spring holds the control lever roller in the cam notch and the control fork,

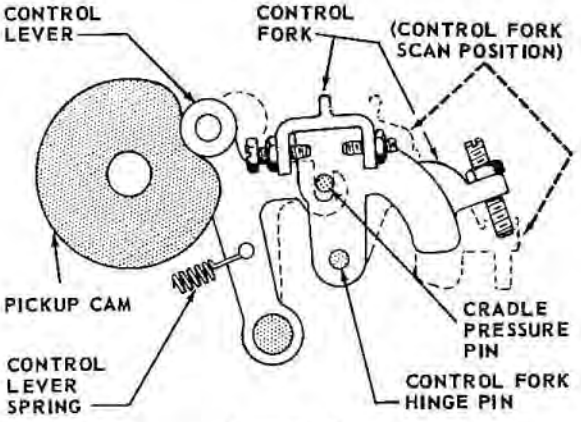


Figure 23.

through coupling with the lever at the cradle pressure pin, is in its play position. As the cam rotates from its play position, the roller on the control lever moves to the longer cam radius and the control fork pivots on the hinge pin to its scan position. While moving from play to scan position, the pickup is lifted from the record, the arm and cradle are then moved to and locked in their scan position. While moving to the play position, the fork lowers the pickup to the record, then releases the arm and cradle so the stylus can follow the record grooves.

The pickup is moved to and from the record surface by the forked downward extension that gives the control fork its name. In the scan position, one or the other of these extensions bears against a roller, that is in the pickup arm above its pivot axis in the cradle, and holds the pickup away from the record. Figure 24 shows the fork and pickup arm with the fork in a position approximately half way between scan and play and with the pickup arm at the right side of a record. In this illustration the

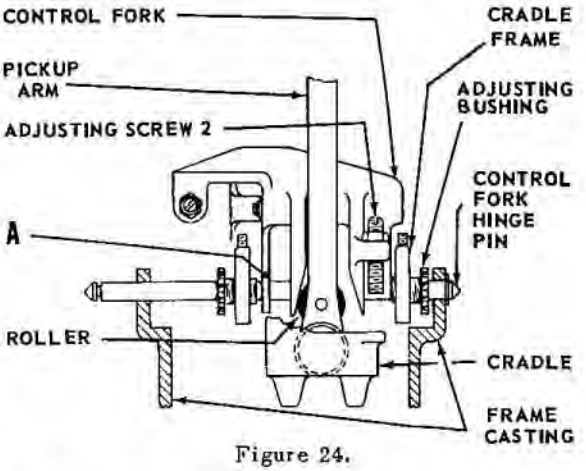


Figure 24.

fork extension at the left is against the roller in the arm and, if it is moved downward to the scan position, it will press against the roller and move the pickup away from the record. If the fork is moved upward to the play position from the position shown, it will fully clear the roller and the pickup arm will be released so the stylus will rest on the record.

Negligible force for lateral movement is imparted to the pickup arm by the lifting operation because the point of contact of the roller and the control fork is on the lateral axis of the system.

If the pickup arm is in position for right side playing and the left side of a record is to be played, it will be shifted as discussed in Pickup Shift. The shift collar and compression spring (Figure 21) will push against the control fork at A, Figure 24, and the fork will move to the left on the hinge pin, until bearing against the left adjusting bushing, it shifts the arm, cradle and cradle frame to the left in the frame casting. As the fork moves from the right to the left side of the cradle frame, the fork extension at the left moves away from the pickup arm roller and the one at the right moves against it. The arm then tilts to the left for pickup clearance with the left side of the record.

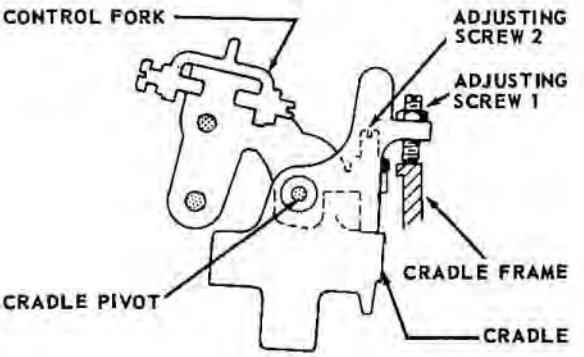


Figure 25.

Return of the pickup and cradle from the released, record playing position to the scan position occurs when the adjusting screw 2 in the control fork, Figures 24 and 25, presses downward on the forward edge of the cradle. The pickup moves with the arm to a position that places the stylus where, without lateral movement, it can move to its starting point on a record at the start of the next play. This position is established by the adjusting screw 1, Figure 25, and adjustment for movement to that position is made with screw 2.

The pickup arm is locked in the scan position and released for playing by the lock lever, Figure 26. The lever pivots at A when the upper end of the control crank is moved by the No. 3 or No. 5 adjusting screws. In the play position, shown in Figure 26, the horizontal part of the lock lever is raised and is held in position by contact with the detent lever at B. The lock lever pin which extends from the cradle can move freely beneath the pointed projection on the lock lever so the pickup arm and cradle are free to swing on the cradle pivots.

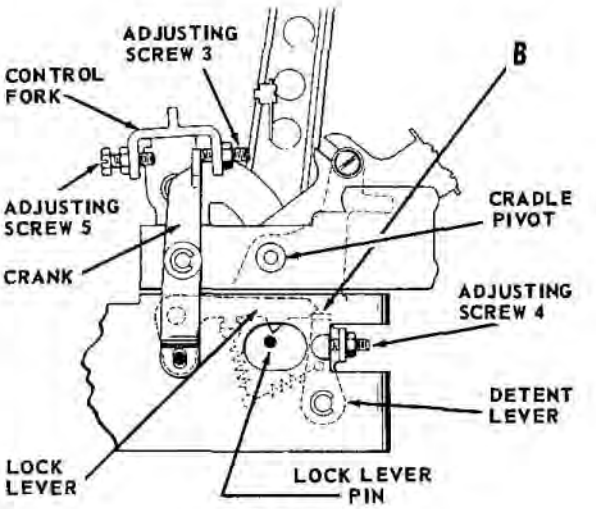


Figure 26.

When the control fork moves to the scan position, the cradle and pickup arm are first moved to their scan position and the lock lever pin is positioned back of the point on the lock lever. When the fork has moved almost fully to its scan position, the No. 5 adjusting screw, presses against the control crank and drives the lock lever downward, past the detent lever, to the scan position shown in Figure 27. The lock lever, in the lowered position, securely holds the lock lever pin (and the pickup arm) in the scan position and is again detented by the detent lever. The force or pressure of detenting is controlled by the tension of the spring that holds the lever toward the lock lever but the No. 4 adjusting screw, in contact with the frame casting, limits the detent lever movement and determines the point of contact of the two levers.

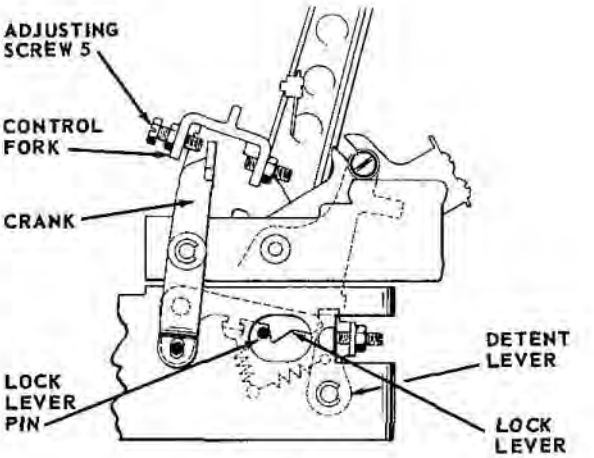


Figure 27.

The pickup arm remains locked in the scan position until, in the next record playing cycle, the control fork has moved almost fully to its play position and the pickup stylus has been placed on the record. The No. 3 adjusting screw then presses against the control crank and lifts the lock lever past the detent lever, to the position shown in Figure 26, so the pickup is released for playing.

MOTOR

All phases of operation of the carriage assembly – scanning, transfer of the record to and from the turntable, and playing – are accomplished with a single motor that is mounted on the carriage assembly. It is a 117-volt A.C., split phase capacitor type of approximately 1/100 h.p. The normal motor speed for record playing at 45 r.p.m. is 1745 r.p.m. During scanning and when a record is being transferred, more torque is required of the motor and is provided for in these operations by connecting additional capacitance across the permanently connected capacitor. This is done with the "O" contacts of the cam switch that are closed except when the carriage is in the play position.

The change in direction of scanning and of the turntable for playing the left or right sides of the records requires a change in direction of rotation of the motor. This change is made with the reversing switch that is on the carriage and operated by "stops" at each end of the base.

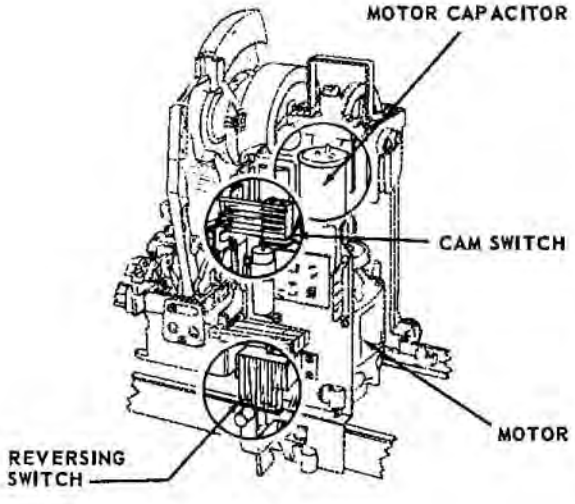


Figure 28.

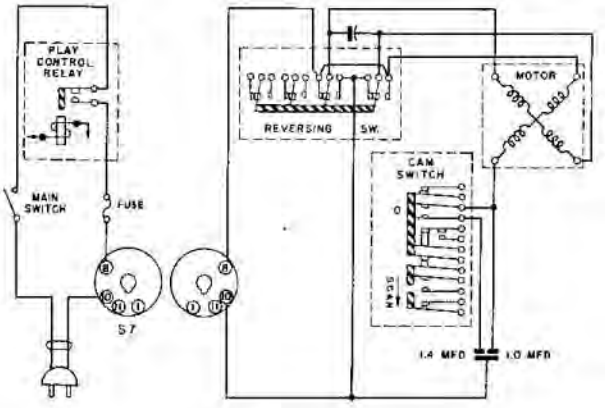


Figure 29.

The direction of rotation is determined by the motor connections and must be such that the carriage will scan to the right when the operating lever of the reversing switch is deflected to the right.

Power for the motor is supplied from the selection receiver in the complete phonograph through the cable to the mechanism and is controlled by the play control relay that is in the receiver.

SELECTOR ASSEMBLY

The selector assembly controls the mechanism so it plays the selections made with the electrical selector or by remote control. This function is performed with selection levers and contact washers that are arranged so the mechanism motor starts when a selection is made and so the trip solenoid will be operated when the carriage approaches the selected record. Power for operation of the selector assembly is supplied at 25 volts, A. C., from the selection receiver.

The selection levers, Figure 30, are extended armatures of selector coils (electro-magnets) and are moved, individually, from their normal position to the play position by passing current through an associated coil. They are spaced on ¼" centers and arranged in two rows of fifty each parallel to the line of travel of the carriage so there is a lever for each record side in line with each record space of the magazine. The fifty levers in the row nearest the magazine are for the right sides of the records; the levers in the row farthest from the magazine are for the left sides.

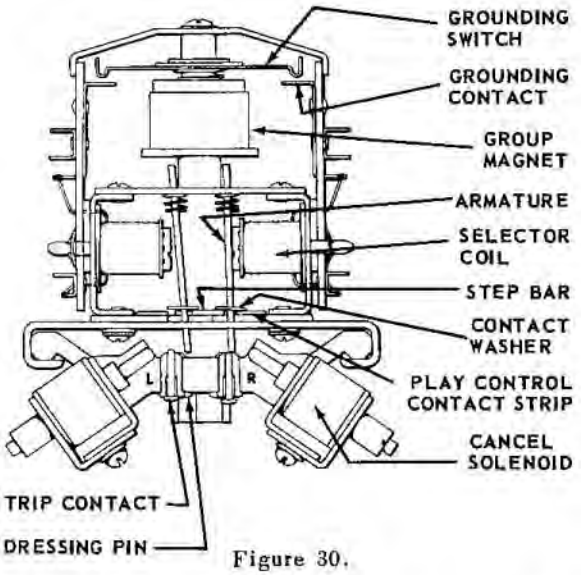


Figure 30.

The contact washers shown in Figure 30 are associated with each selection lever and move with the lever. When the lever is in the play position, the washer connects the play control contact strip to the grounded step bar and completes a circuit that energizes the coil of the play control relay at 25 volts, A. C. The relay, when energized, turns on the power to the mechanism motor (and the phonograph amplifier). The carriage, then, starts scanning as soon as selection lever is moved to the play position. The play control circuit is shown in Figure 31.

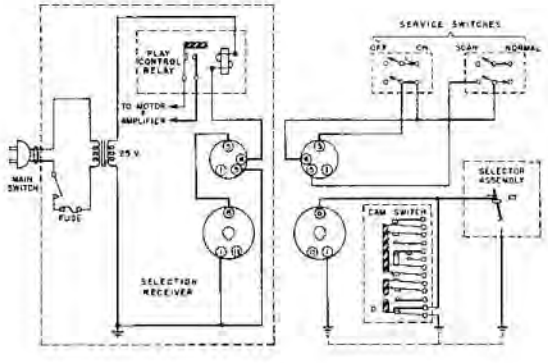


Figure 31.

The selector contact block, supporting two trip contacts, two dressing pins and two cancel solenoids, is attached to the carriage and moves the length of the selector assembly when the carriage scans. The trip contacts are in the trip solenoid circuit and, when grounded, they initiate the playing cycle of the carriage at the time of contact. They are arranged on the block so they contact, during the scanning operation, the selection levers that are moved by selection to the play position. One contact, the L contact, touches and grounds through the levers associated with the left sides of the records; the R contact touches and grounds through the levers for the right sides.

The dressing pins on the block serve merely to assure full position of the selector levers. They move in a path midway between the play and normal position of the selector levers and, by brushing lightly against them, "dress" them fully to either position.

The cancel solenoids reset the selection levers from the play position to the normal position. They center at the lever position that stopped the carriage for playing and, as the record is about to start playing, the appropriate solenoid, right or left side, is energized so its plunger restores the lever to its normal position.

If the lever that will be reset by the cancel solenoid is the only one in the play position, the play control relay circuit through the contact strip will be opened when the record is transferred to the turntable. The relay circuit, then will be maintained by the carry-over switch (D contacts) in the cam switch on the carriage until the record playing cycle has been completed. These contacts parallel, electrically, the contact strip. They close during transfer of a record to the playing position and remain closed until the record is played and no longer on the turntable.

The selector assembly is made up of five sub-assemblies each of which has twenty selector coils and levers, a group magnet and a grounding switch. The grounding switch is operated by the group magnet and, when closed, connects to ground one terminal of each of the twenty selector coils in the sub-assembly. The selector coils are numbered one to ten in ten groups and each group is designated by a letter beginning with the letter A at the left of the mechanism and ending with the letter K at the right. (The letter I is omitted to avoid confusion with the numeral 1.) The equivalent numbered coils in alternately lettered groups are connected together, as shown in the diagram Figure 32, so there are a total of twenty selector coil circuits.

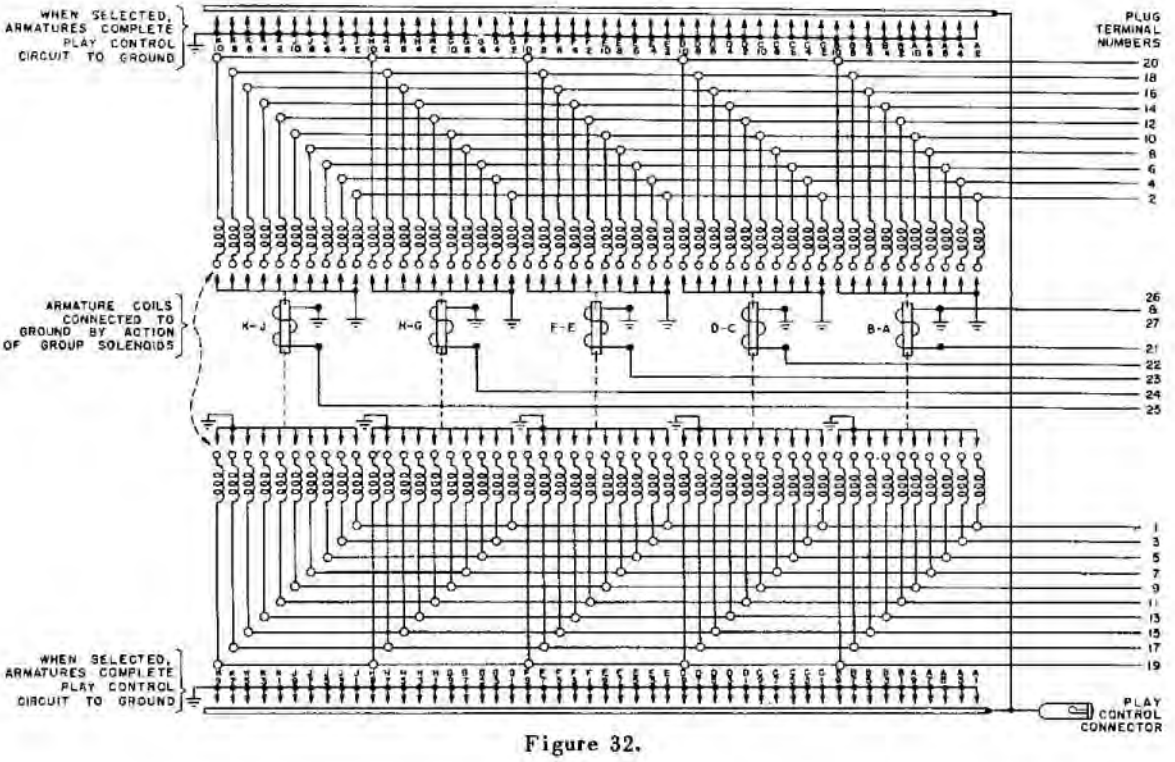


Figure 32.

The five group magnets are identified by the letters used to designate the groups of the sub-assembly with which they are associated. For example: the group magnet that operates the grounding switch for the selector coils of the A and B groups in the sub-assembly at the left is the A-B group magnet.

Power for operation of the selector coils and the group solenoids is supplied at 25-volts from the selection receiver and is distributed through the electrical selector system or through the step switches in the selection receiver. When a selection is made, a group solenoid is energized and one of the twenty selector coil circuits of five coils is connected to the ungrounded side of the 25-volt line. The group solenoid operates the group grounding switches so, of the five coils, only the selector coil associated with the energized group solenoid will have a complete circuit to ground and only that selector coil will be energized.

TRIP SOLENOID CIRCUIT (Figure 34)

The trip solenoid operates at 25 volts, A. C. that is supplied from the selection receiver. It is energized when a record transfer operation is to be initiated. The circuit to the solenoid is closed only when the service switches in the phonograph cabinet are in normal position and the mechanism carriage is either (a) scanning and the clutch switch contact W closed or (b) in, or approaching, the play position so the cam switch contact V is closed.

Contact W is actuated by an extension of the clutch shifting lever and is closed when the lever is in the scan position. It completes the circuit, through the contacts in the reversing switch, to a trip contact so the circuit will be closed when a trip contact engages a selection lever during the scanning operation and opens the circuit when the clutch moves from the scan position in response to the solenoid operation.

The position of the reversing switch determines which trip contact will be in the circuit and, therefore, coordinates the direction of scanning and the turntable rotation with the record side to be played.

The trip contacts are arranged on the contact block so the trip solenoid will be energized before the carriage, moving at its normal scanning rate, is fully at the selected record position. This makes allowance for the brief time interval required for movement of the solenoid plunger and for the clutch to disengage the

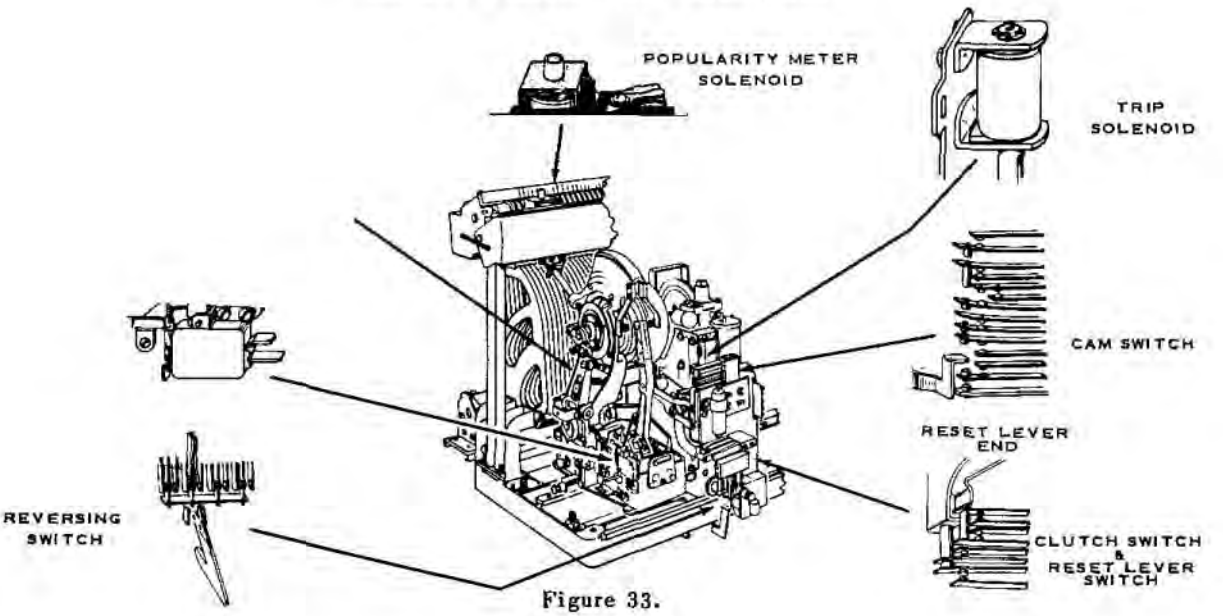


Figure 33.

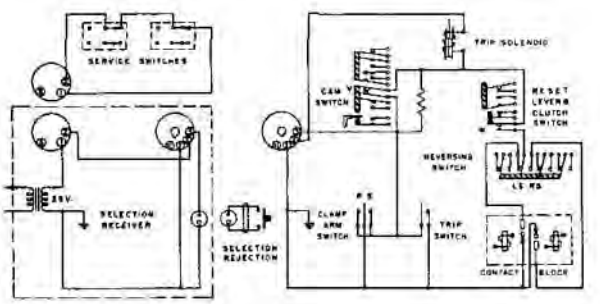


Figure 34.

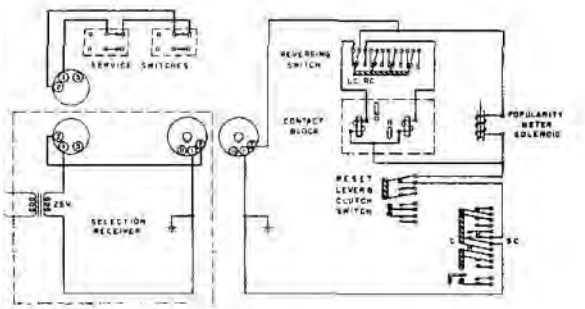


Figure 35.

sprocket. It also provides for a slight separation of the trip contact and the selection lever when the carriage is detented and locked at the record position. The separation of contact and lever insures that the lever will move freely to the off position when the cancel solenoid operates and can move freely to the play position if the same record is again selected before the carriage has moved from that position. The separation also prevents immediate repetition of a selection if some other selection has also been made because the carriage must scan through all selections before the trip contact will again be able to contact the same lever.

Contact V completes the trip circuit to the clamp arm switch, the trip switch and a reject switch. It isolates these switches until, in normal mechanism operation, they are open or, in event of abnormal conditions, they are required to restore the carriage to the scan position. The contact closes when a record is transferred to the playing position at about the time the pickup is placed on the record and reopens immediately after the start of transfer of the record to the magazine.

When the pickup moves to the cut-off point on the record, the trip switch closes the trip solenoid circuit. The switch stays in the closed condition until the pickup arm is reset to its scan position but the trip circuit is opened by contact V.

The S and P contacts of the clamp arm switch are adjusted to be open when a normal record is clamped to the turntable. If the clamping is incomplete or if no record is on the turntable, the S or P contact, respectively, will remain closed so the trip solenoid is energized when contact V closes.

The reject switch is normally in a position where it can be manually operated if, for any

reason, a record in the playing position (or transferring to the playing position) is to be returned to the magazine before completion of playing and normal trip-off. There is no control over the time the reject switch is closed but the V contact opens the circuit to the trip solenoid.

PIN CANCEL SOLENOID CIRCUIT (Figure 35)

The pin cancel solenoids operate at 25 volts, A. C., that is supplied from the selection receiver. They operate, individually, to restore the selection levers to the normal off position after the function of the lever in credit and selection has been performed. The circuit is closed when the service switches in the phonograph cabinet are in normal position if the reset lever switch contacts IC are closed when the cam switch contacts C and SC are closed.

The position of reversing switch determines which cancel solenoid will be in the circuit. The LC (left cancel) and RC (right cancel) connect the solenoid that resets, respectively, the left side and right side selection levers. The C and SC contacts are make-and-break and are closed momentarily at about the time the pickup is placed on the record in the transfer-to-play operation and again immediately after the start of transfer of the record to the magazine. They are operated by force that is applied to them through the blades of the V contacts so they do not close until after the V contacts have closed. The IC contacts are operated by the reset lever and are closed when the trip mechanism is in the reset condition.

The trip mechanism is released at the beginning of a record transfer operation and reset when the operation is approximately half completed. The circuit, then, is completed at the IC contacts at the time the C and SC contacts close during the transfer-to-play operation but it is open at the IC contacts at the time the C and SC contacts close during the transfer of the record to the magazine. There is then only one cancel solenoid operation and it occurs at the time the record is brought to the playing position.

The cancel solenoid does not operate if there is no record in the magazine space at which the record transfer operation takes place or if a record fails to center correctly on the turntable. If either of these conditions prevail, the trip solenoid circuit will be completed through the clamp arm switch at the time the V contact of the cam switch closes. Because the V contact closes before the cancel solenoid circuit can be completed at the C and SC contacts, the reset lever will be released and open the IC contacts. In this sequence the record is returned to the magazine but the selection lever remains in the play position.

If the reject switch is held closed during transfer of a record for playing, the same conditions will prevail – the record will be returned to the magazine and the selection lever will not be reset to the off position.

POPULARITY METER

The popularity meter indicates the approximate number of times each record has been played. It is operated by the solenoid shown in parallel with the pin cancel solenoid in Figure 35. Like the cancel solenoid it is energized once only in each record playing cycle and the meter does not register if no record is in the selected position in the magazine or if a record does not properly center or play.

MUTING CIRCUIT

There is the possibility of objectionable noise output from the phonograph sound system arising from mechanism operation when a record is not being played. This is overcome by grounding the amplifier signal circuit except when the carriage is in the play position. In order to be assured of positive grounding during all phases of mechanism operation, three pairs of contacts on different switches are in parallel. These are the MB contacts in the cam switch, the MA contacts in the reset lever switch and the M contacts in the clutch switch. Because this circuit is in the signal path of the sound system, it is shielded and has its grounded side isolated from the mechanism to avoid hum from ground currents between units. Connection of the muting switches to the amplifier is made through a three-pin plug and socket.

SQUELCH CIRCUIT
(Automatic Volume Compensation)

The amplifier associated with this mechanism has an automatic volume compensation circuit that maintains nearly constant the average

volume of sound from the phonograph regardless of the difference in "loudness" of the records played. This circuit employs a "squelch circuit" that is connected to the amplifier through the same plug and socket used for the muting circuit connections. The switch, contact MS in the cam switch, is closed only in the carriage play position. When the switch is open, the amplifier gain is reduced (squelched). When the switch closes, it grounds a point of the volume controlling circuit so the gain of the amplifier is restored to normal. These changes in amplifier gain and resultant volume changes are not abrupt; they require four to eight seconds to reach their final values.

SUMMARY—OPERATION SEQUENCE

A complete control and record playing cycle of the Select-O-Matic mechanism begins when, with the carriage at stand-by, ready to start scanning, a selection lever is moved to the play position. It ends when the record has played and is no longer on the turntable. Between these there is a fixed pattern of operation that is given below. If this pattern or sequence is known and coupled with the operating information in the preceding pages, it will be helpful in mechanism study and a valuable aid in determining cause for possible abnormal operation.

1. Selector lever moved to play position.
2. Play control relay energized.
3. Motor and amplifier turn on.
4. Carriage scans.
5. Trip contact grounded by selector lever.
6. Trip solenoid energized.
7. (a) Clutch shifted from engagement with sprocket.
   (b) Sprocket engaged by derent roller.
   (c) W contact opens trip circuit.
   (d) Carriage scanning ceases.
8. Clutch engages clurch worm.
9. Cam assembly rotates from scan position.
10. Safety trip plunger moves to play position.
11. Clutch is locked in transfer position by clutch cam and clutch shifting lever roller.
12. Sprocket detent is locked by detent lever.
13. Transfer arm starts upward movement.
14. Reset of trip mechanism commences.
15. Pickup arm shifts (if it is to be shifted).
16. Carry-over (D) contact closes.
17. IC contacts close.
18. Reset of trip mechanism completed.
19. Transfer arm completes travel to play position.
20. Clamp arm centers and clamps record.
21. Pickup stylus placed on record.
22. V contact closes.
23. C contact closes.
24. Pin cancel solenoid resets selection lever.
25. SC contact opens.
26. O contact opens.
27. Pickup arm is released.
28. (a) Clutch disengages from clutch worm and moves to play position.
    (b) Sprocket detent force from clutch shifting lever is released.
    (c) Cam rotation ceases.

RECORD IS NOW PLAYING.

29. Pickup follows record grooves to trip-off.
30. Trip switch closes.
31. Trip solenoid energized.
32. (a) Clutch shifts from play position.
    (b) Sprocket detent force applied by clutch shifting lever.
    (c) IC contact opens.
33. Clutch engages clutch worm.
34. Cam assembly rotates from play position.
35. O contact closes.
36. V contact opens.
37. Clutch is locked in transfer position by clutch cam and clutch shifting lever roller.
38. Pickup is lifted from record.
39. Reset of trip mechanism commences.
40. Pickup arm resets to scan position.
41. Clamp arm releases record.
42. Carry-over (D) contact opens. *(See Note)*
43. Reset of trip mechanism completed.
44. Transfer arm starts downward travel.
45. Detent lock by detent lever relieved.
46. Safety trip plunger moves to scan position.
47. Transfer arm completes travel to scan position.
48. Clutch moves down from transfer position.
49. (a) Clutch engages sprocket.
    (b) Sprocket detent released.
    (c) Cam rotation ceases.
    (d) W contact closes.
50. Carriage scans to the next selection. *(See Note)*

Following opening of the carry-over contact the play control relay will turn off the mechanism motor and the amplifier if another selection is not to be played. When the motor turns off, its momentum will coast the mechanism through some of steps 43 to 50. With normal adjustment of the switch, the mechanism should stop any time after the record is released (Step 41) but before the clutch moves from the transfer position (Step 48).

SEEBURG

ADJUSTMENT INDEX

45 r.p.m.
Select-O-Matic "100" Mechanism

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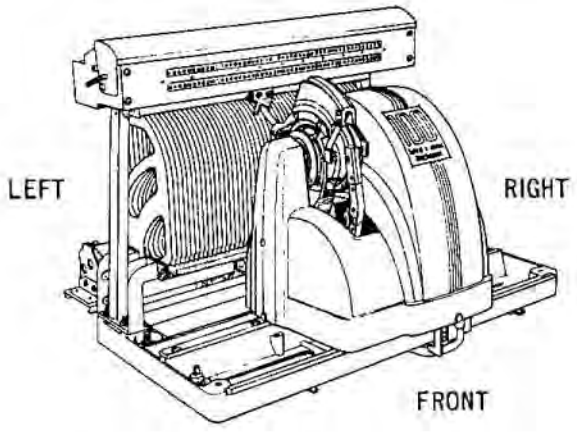
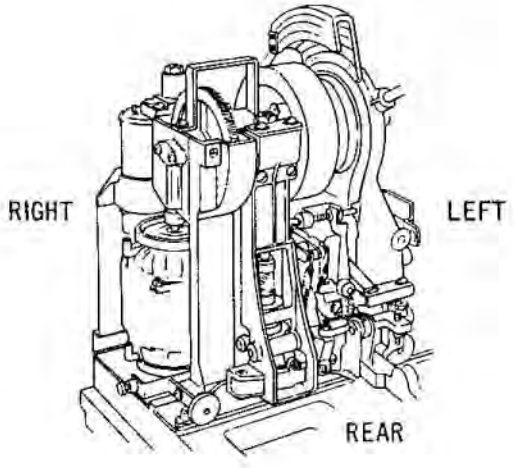
ADJUSTMENT PREFACE

The adjustments for the 45 r.p.m. Select-O-Matic "100" Mechanism, Type 145S2-L6. are given on the following pages. Each adjustment is associated with a step-by-step procedure which, if followed, will result in correct adjustment and normal operation. These individual adjustments may be made in any sequence but they are, in some instances, dependent on or affected by others. Because of this, they are arranged in a sequence which may be followed from page to page if a completely misadjusted mechanism is to be placed in operating condition. If an individual adjustment is to be checked or made, careful attention should be given to notes indicating dependent adjustments.

Reference is made in these adjustment outlines to the FRONT, REAR, LEFT and RIGHT of the mechanism in order to locate adjusting screws and various mechanical parts. Unless otherwise specified, these are defined as viewed from the front of the cabinet. Reference is also made to right side and left side playing of a record. Right side of a record is defined as viewed from the front of the complete instrument and is played with counter-clockwise rotation of the mechanism flywheel. Left side of a record is defined as viewed from the front of the instrument and is played with clockwise rotation of the flywheel. Counter-clockwise and clockwise rotation of the flywheel are defined as viewed from the left side of the mechanism. These references are used whether the mechanism is in or out of the cabinet.





The operation cycle of the mechanism follows a definite sequence in playing a record. This sequence includes the following:

SCAN - - in which the carriage assembly travels from side to side on the mechanism base.

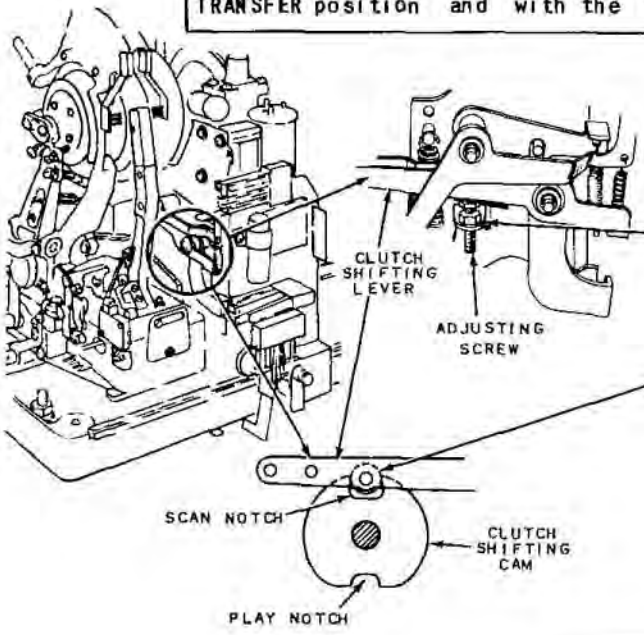
TRANSFER - - in which the record is transferred from the magazine to the playing position or from the playing position to the magazine.

PLAYING - - in which the record is clamped to the turntable and is played.

These terms SCAN - TRANSFER - PLAYING are also used to describe the position of the clutch, cams and levers of the carriage assembly whether or not the motor is in operation.

"CLUTCH I" - - CLUTCH LIFTING ADJUSTMENT

This adjustment controls the amount of vertical clutch travel and results in full engagement of the Clutch with the Worm Pin in TRANSFER position and with the Sprocket Pin in SCAN position

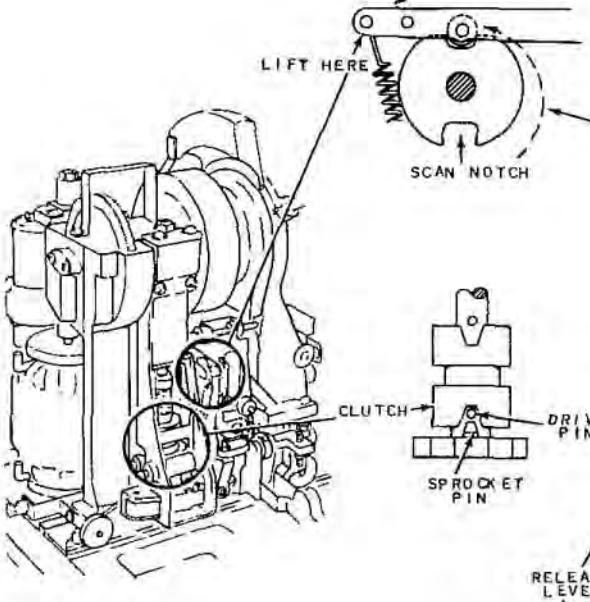


(A) Scan Carriage to front of K9-K10 record space. Leave it in SCAN position.

(B) Loosen lock nut and turn Adjusting Screw down to limit.

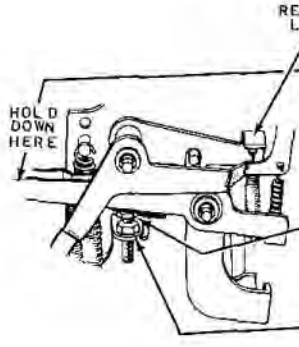
(C) Check Clutch Shifting Lever Roller position. The Roller should be in the SCAN Notch.

If the Roller is not in the SCAN Notch, turn the motor shaft until the Roller enters fully into the notch. If the Roller enters the PLAY Notch, it may be necessary to manually lift the Clutch Shifting Lever and - -
turn the motor shaft until the Roller is on the high part of its cam. When the Roller is on the high part of the cam, release the Lever but continue turning the motor shaft until the Roller fully enters the SCAN Notch.



(D) Check Trip Mechanism position. The Trip Mechanism should be latched with Release Lever down to limit.

(E) Check Clutch position. Clutch should be all the way down against Drive Pin and engaged with Sprocket Pin.



(F) While manually holding Clutch Shifting Lever down - -

turn Adjusting Screw UP until screw head just touches Clutch Shifting Lever.

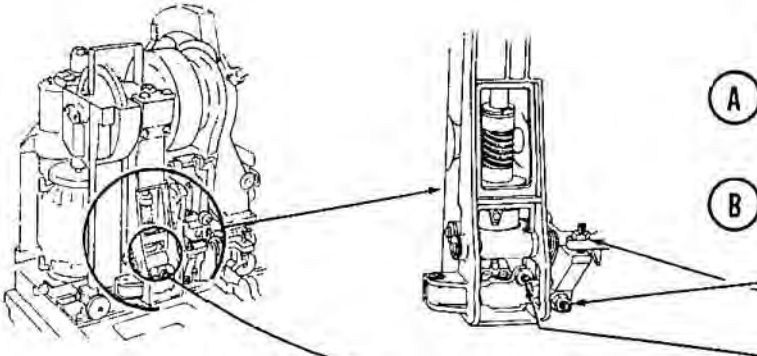
(G) Tighten Lock Nut.

"CLUTCH 2" - - SPROCKET CLEARANCE AND DETENTING ADJUSTMENT

This adjustment establishes correct clearance between the Detent Roller and the Sprocket Teeth when the mechanism is Scanning. It results in clearance between roller and Sprocket Teeth which allows 1/16" movement at end of the Detent Arm.

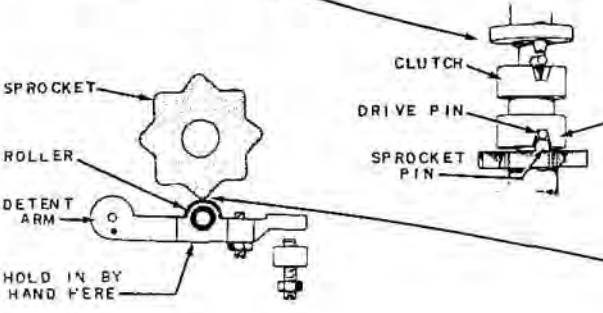
NOTE 1: - "Clutch 1" adjustment should be correct before making this adjustment.

NOTE 2: - If "Clutch 2" adjustment is changed in any way, "Clutch 3 and 4" should be re-adjusted. "Clutch 2, 3 and 4" are related to an extent that a change of "Clutch 2" can cause damaging strains at adjusting screws for "Clutch 3 and 4".



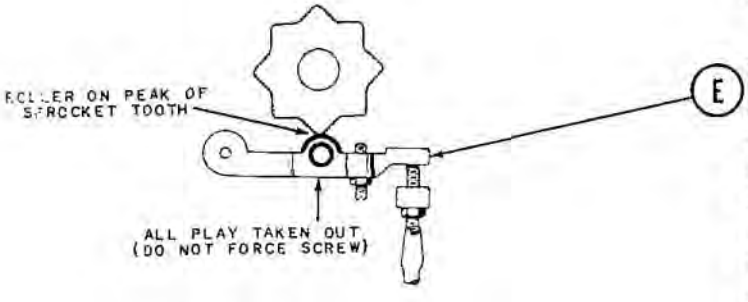
(A) Scan Carriage to right end beyond K10 position.

(B) Loosen lock nuts and turn these adjusting screws out to the limit;

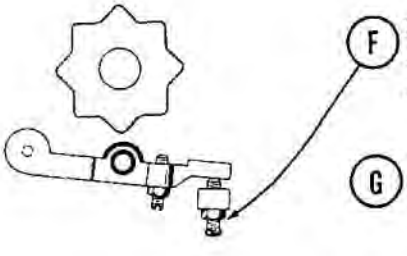


(C) Mechanism should still be in SCAN position, beyond K10, with Clutch all the way down (against lower Drive Pin) and engaged with Sprocket Pin.

(D) Hold Detent Arm in lightly by hand and turn motor shaft until Detent Arm Roller reaches peak of a Sprocket Tooth.



(E) With Detent Roller lined up with peak of Sprocket Tooth, turn adjusting screw in carefully, a little at a time, until there is no "in and out" play between Detent Arm Roller and peak of Sprocket Tooth. (This is the starting point for correct adjustment.)

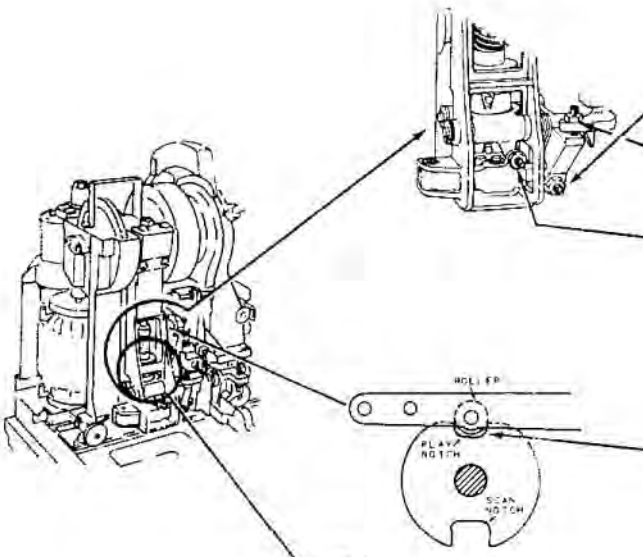


(F) Now, back out, the screw 2 turns and tighten the lock nut. This establishes correct clearance.

(G) After this adjustment has been made, adjust "Clutch 3 and 4" as shown on following pages.

"CLUTCH 3" - - DETENT LOCKING ADJUSTMENT

This adjustment insures proper locking of the carriage while a record is playing. The adjustment takes out all rotational motion of the sprocket resulting in a minimum of lateral play in the carriage.



NOTE: - "Clutch 2" adjustment should be correct before making this adjustment.

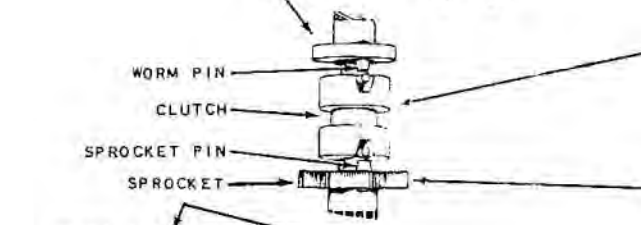
(A) Loosen Lock Nuts and turn these adjusting screws out to the limit:

"Clutch 3"

"Clutch 4"

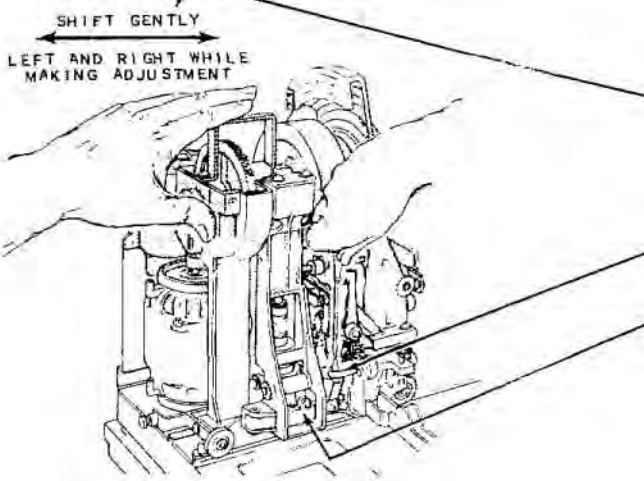
(B) Place mechanism in K10 PLAY position. Be sure mechanism is fully in PLAY position.

Clutch Shifting Lever Roller should be down in PLAY Notch, - - - and - - -



Clutch should be somewhere below the Worm Pin and above the Sprocket Pin.

Note side play in Carriage and rotational motion in Sprocket when Carriage is shifted to left and right by hand. This is due to "Clutch 3" screw being out too far.

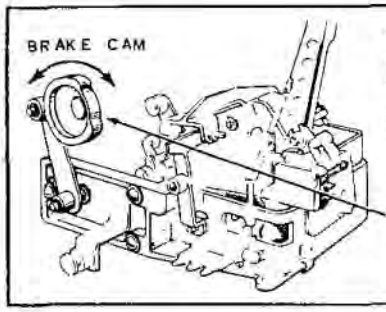


(C) While gently shifting Carriage to Left and Right by hand, - - -

turn "Clutch 3" adjusting screw carefully downward - - -

until all rotational motion is just taken out of Sprocket. Tighten "Clutch 3" Lock Nut.

(D) After this adjustment has been made, adjust "Clutch 4" as shown on the following page.



CAUTION: - Note that when adjustment is completed there is no more rotational motion in Sprocket but Carriage still has a slight amount of side play. This is a normal condition due to required gear clearances.

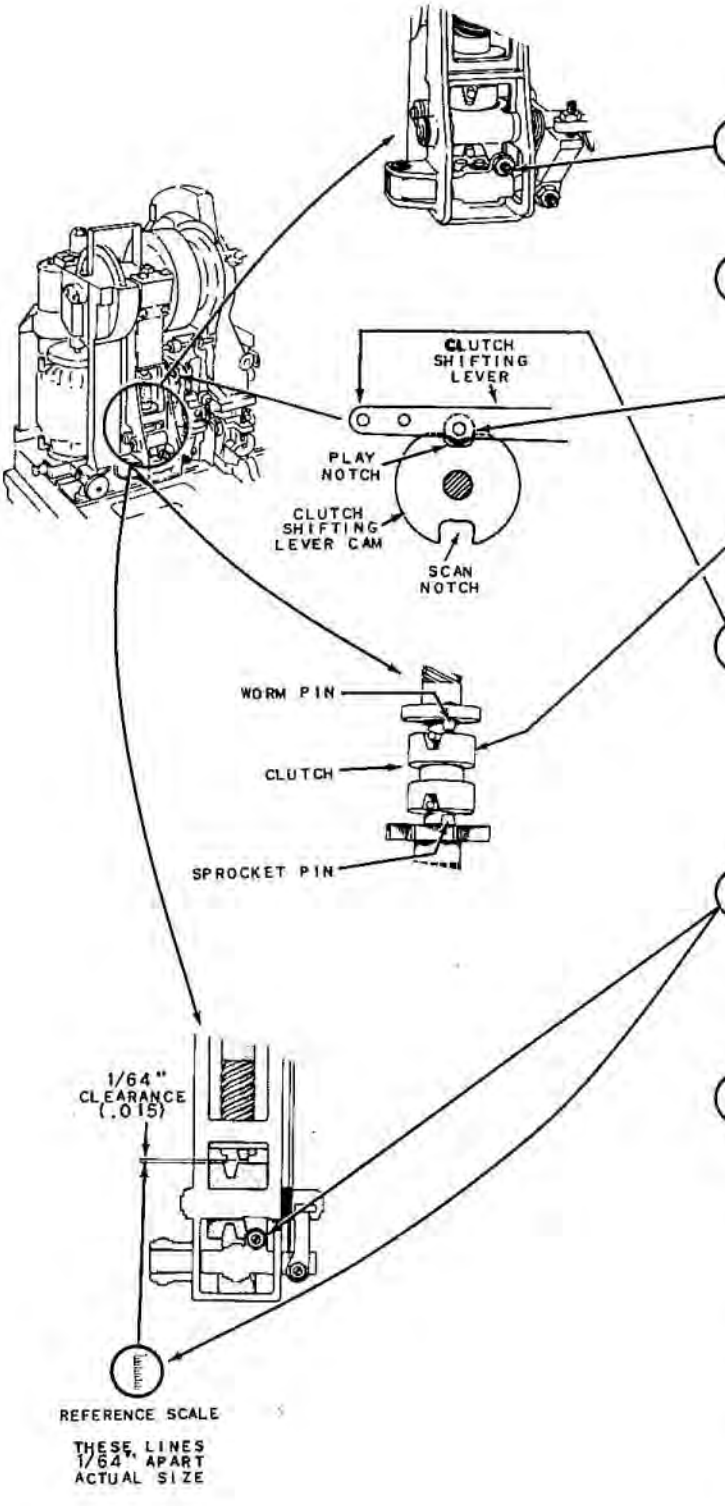
Do not force adjusting screw.

Turning the screw down too far will set up severe strains in the levers and will cause the Cam Assembly to bind when entering PLAY position. When adjustment is completed, check for freedom of action of Cam Assembly by turning Brake Cam by hand in both directions. Cam should have a slight amount of rotational play.

"CLUTCH 4" - - CLUTCH PLAY POSITION ADJUSTMENT

This adjustment establishes the playing position of the Clutch. This results in 1/64" clearance between the Clutch and the Worm Pin in PLAY position.

NOTE: - Before making this adjustment "Clutch 2 and 3" should be correct.



(A) "Clutch 4" adjusting screw should be turned out to the limit.

(B) Place mechanism in K10 PLAY position. Be sure mechanism is fully in PLAY position.

Clutch Shifting Lever Roller should be down in PLAY notch, - - - and - - -

Clutch should be below the Worm Pin and above the Sprocket Pin.

(C) Press downward on end of Clutch Shifting Lever. (This insures that the Clutch has moved to its farthest downward travel before making the adjustment.)

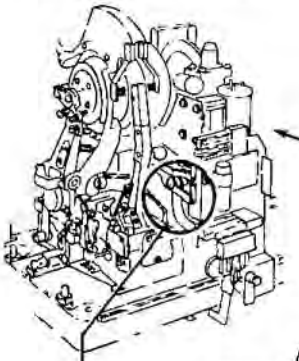
(D) Turn adjusting screw inward until there is 1/64" (.015) clearance between the bottom of the Worm Pin and the top of the Clutch.

(E) Tighten Lock Nut.

NOTE: - Clutch should drop freely, (to 1/64" clearance) every time mechanism enters PLAY position. If Clutch does not drop freely into full PLAY position it may hit Worm Pin as it rotates. This can be caused by "Clutch 3" being too tight or by binds in the Clutch and the Clutch Shifting Lever.

RESET LEVER STOP ADJUSTMENT*

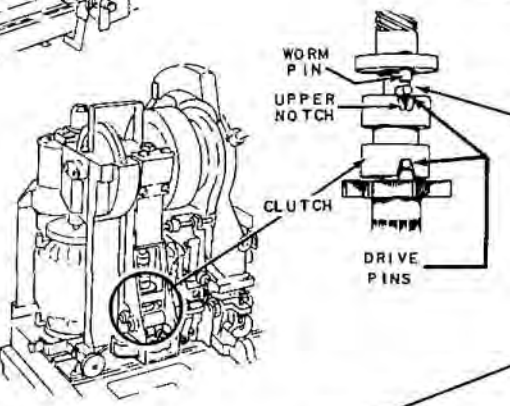
This adjustment positions the Rubber Stop so it minimizes and absorbs mechanical shock at the Reset Lever when the mechanism is tripped. It results in 1/32" clearance between the Limit Pin and the Reset Lever in the tripped position of the mechanism.



NOTE 1: - This adjustment not used if adjustable Trip Solenoid is used. See "Trip Solenoid 1" adjustment.

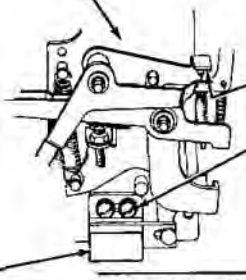
NOTE 2: - "Clutch 1" adjustment should be correct before making this adjustment.

(A) Place mechanism in SCAN position in front of K9-K10 record space.

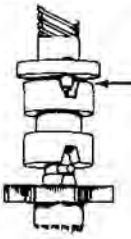


(B) Turn motor shaft manually until upper notch in Clutch is lined up with Worm Pin.

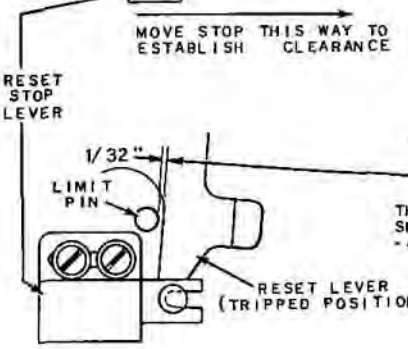
(C) Trip the mechanism by manually lifting the Release Lever.



(D) Loosen screws holding Reset Lever Stop.

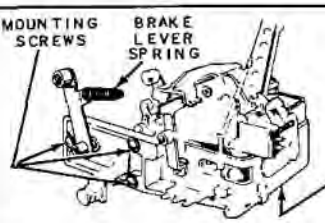


(E) Check Clutch position. Clutch should now be up to limit and engaged with Worm Pin.



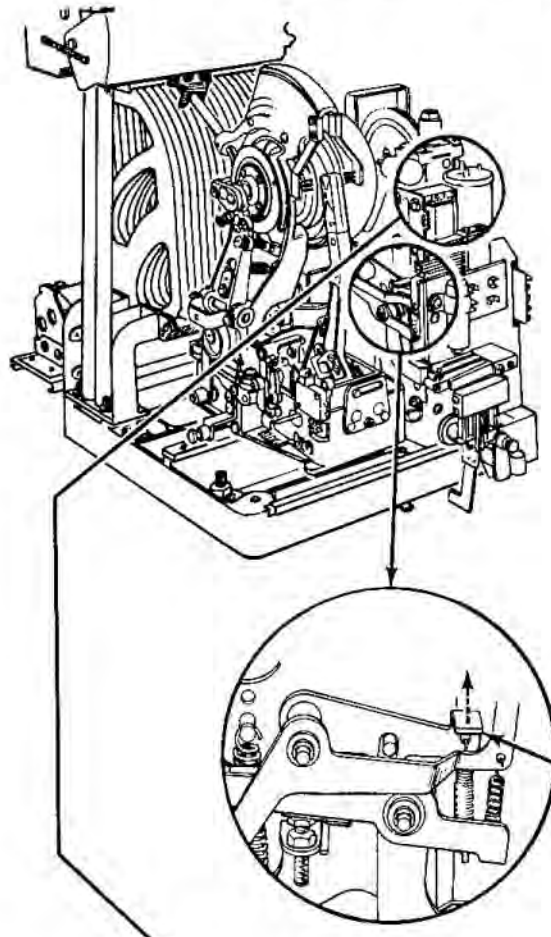
(F) With Clutch engaged with Worm Pin, as shown above, move Reset Lever Stop toward front until Reset Lever clears Limit Pin by 1/32 inch. Tighten screws.

(G) Check Clutch position. Clutch should still be up to limit and engaged with Worm Pin. If it is not against the Drive Pin check "Clutch 1" adjustment.



*It is necessary to remove Pickup Assembly to change above adjustment. This can be done by removing Brake Lever Spring and three mounting screws. When replacing Pickup Assembly on Carriage Casting pull front end of Pickup Base Casting UP before tightening mounting screws, taking out all play in upward direction. This insures that Pickup Casting does not rest against Reset Lever Stop. Check Pickup adjustments after mounting on carriage.

"TRIP SOLENOID I" - - TRIP SOLENOID POSITION



This adjustment positions the Trip Solenoid so the Trip Lever is raised enough to cause the mechanism to "trip".

NOTE: This adjustment applies only if mechanism has adjustable Trip Solenoid with slotted mounting screw holes.

(A) Trip the mechanism by manually lifting the Release Lever.

(B) Loosen four screws holding Trip Solenoid Brackets and - - -

adjust the vertical position of the Solenoid so the Trip Lever Pin clears the upper edge of the Mounting Plate Hole not less than 1/64" when the Solenoid Plunger is in the fully raised position.

(C) Adjust the horizontal position of the Solenoid so the forked end of the Trip Lever, when vertical, is centered in the plunger slot.

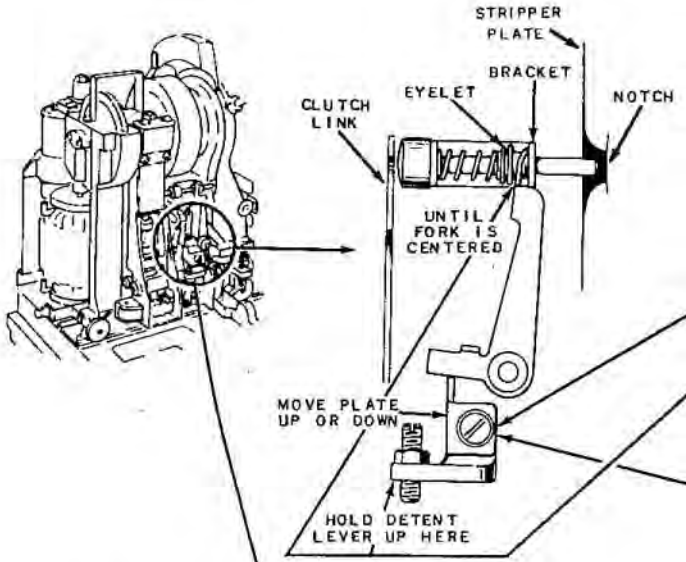
(D) To avoid binds the Plunger must have horizontal play when the Trip Lever is in either extreme up or down position.

(E) The upper and lower brackets holding the Solenoid should be square with the coil.

"SAFETY LEVER I" - - SAFETY LEVER POSITION

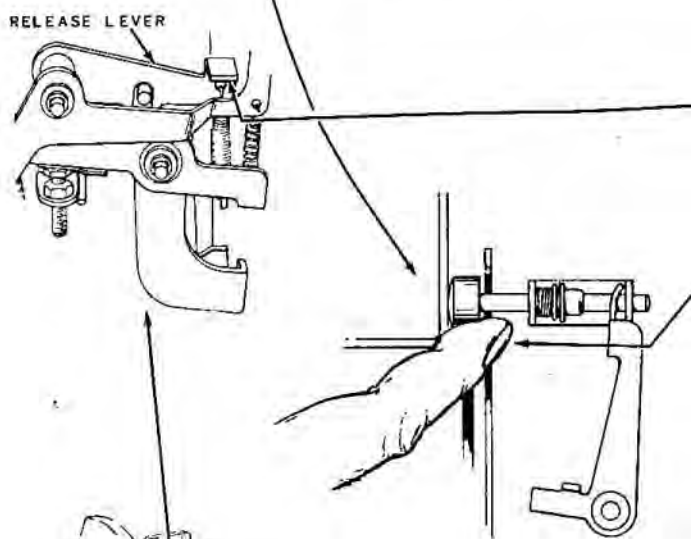
This adjustment establishes the correct position of the Safety Lever and results in proper travel of the Safety Plunger when the mechanism is entering PLAY or SCAN position.

(A) Scan Carriage to right end beyond K10 and turn off power.



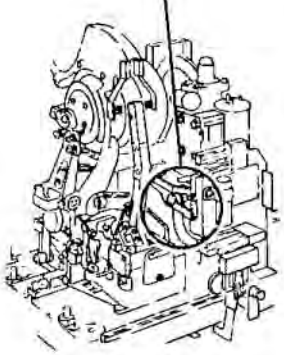
(B) To adjust Safety Lever, - - -

1. Mechanism should still be in SCAN position.
2. Loosen screw.
3. While holding Detent Arm Lever up by hand, move Adjustment Plate up or down until top forked end of Safety Lever is approximately centered between eyelet and bracket.
4. Tighten screw.



(C) To check Safety Assembly for binds,

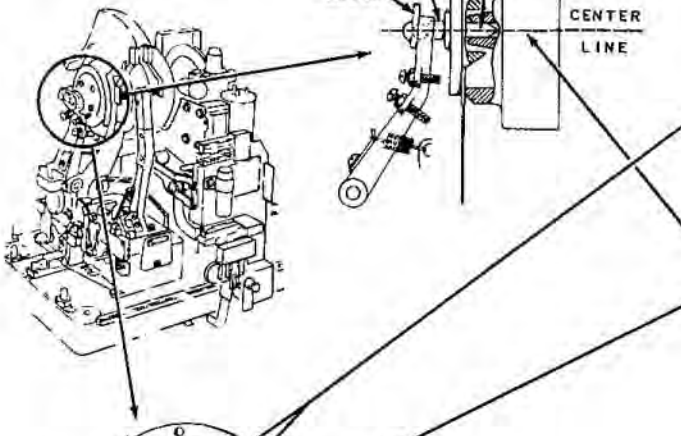
1. Trip the mechanism by manually lifting the Release Lever.
2. Pull Plunger all the way over to the left (as shown) and release slowly to right. Plunger should return freely without binds.



(D) To test for correct safety operation, - - hold the edge of a thin record across the Stripper Plate Notch and run mechanism slowly through SCAN. Hook on Clutch link should catch on large end of Plunger and record should be returned to PLAY position.

"CLAMP ARM 1" - - PIVOT PIN ALIGNMENT

This adjustment establishes proper alignment of the Pivot Pin with the Centering Pin and the hole in the Flywheel Shaft.



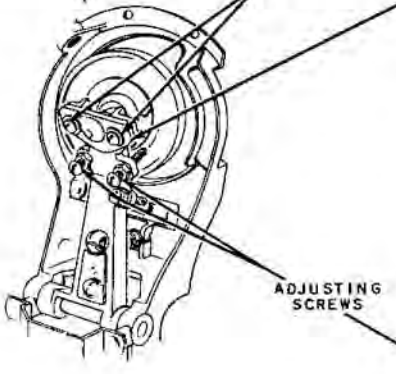
(A) Place mechanism in PLAY position with a record clamped on the Flywheel.

(B) Loosen Pivot Block Screws.

(C) Move Pivot Block, up or down, until center line of Pivot Pin is in line with or 1/32" above the center line of the Flywheel Shaft, and tighten screws.

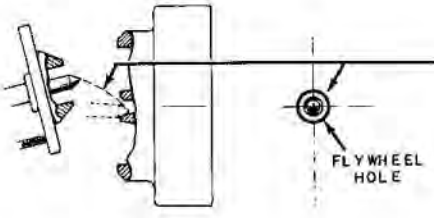
"CLAMP ARM 2" - - CENTERING PIN POSITION

This adjustment establishes the Centering Pin position allowing it to enter freely into the hole of the Flywheel Shaft when a record is being clamped.



NOTE: - "Clamp Arm 1" adjustment should be correct before making this adjustment.

(A) Loosen lock nuts and adjust both screws as required so - - -

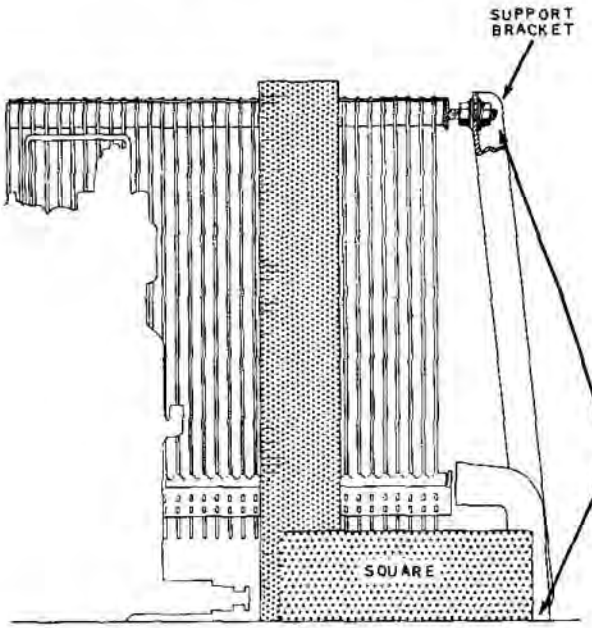


(B) Tip of Centering Pin enters Flywheel hole as shown.

(C) Tighten Lock Nuts.

"MAGAZINE I" - - VERTICAL ALIGNMENT

This adjustment moves the upper end of all the Magazine Separators so the Separators are at right angles with respect to the base. This results in the Separators being parallel to a flat record when the record is in Play position.



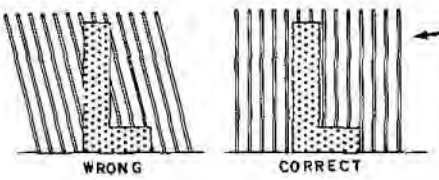
(A) To check Magazine for squareness -

1. Lay the edge of a 12" square along the back rail of the base and line up the vertical edge with one of the Separators as shown.

2. The Magazine Separators should line up with the edge of the square as shown.

(B) To Adjust - - -

1. Loosen Adjusting Nuts at <u>both sides</u> of the magazine and move them to their limit away from their Support Brackets.



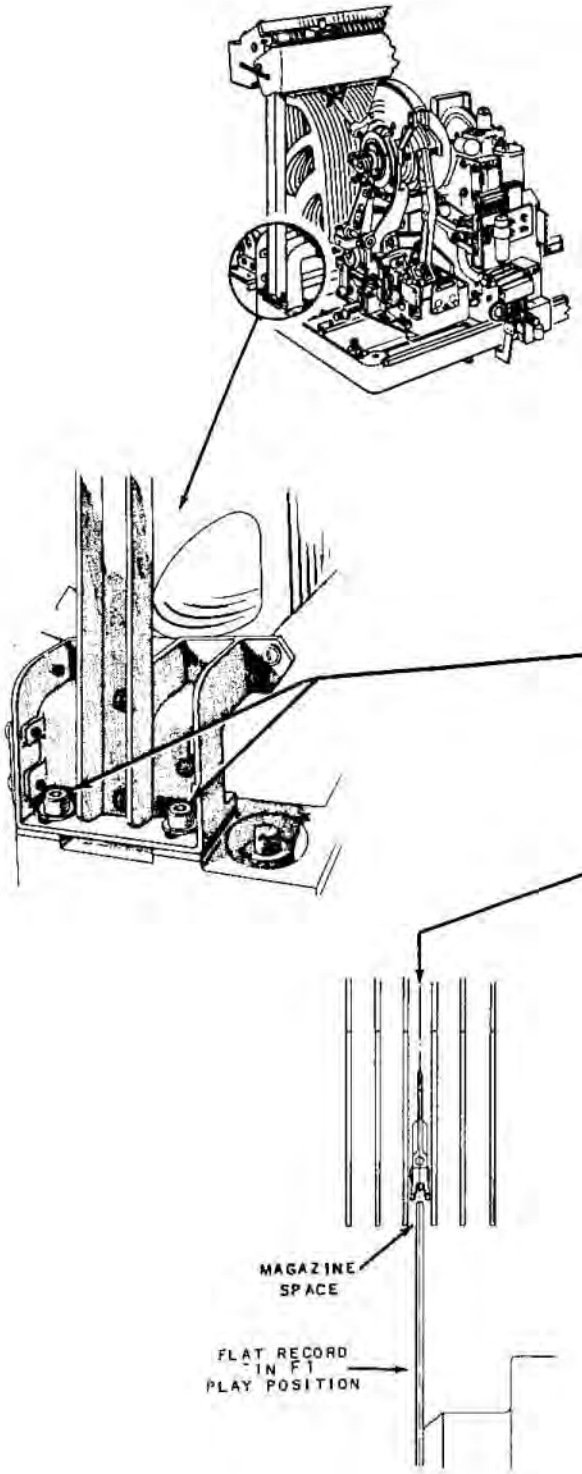
2. Adjust proper nut, on either side, which will align the Separators with the edge of the square.

3. Bring other nuts up to their Support Brackets and tighten.

NOTE: - Check the spacing of the Magazine Separators. All the Separators should be straight and equally spaced.

"MAGAZINE 2" - - HORIZONTAL POSITION

This adjustment establishes the horizontal Magazine position so that when a record is in Play position it is approximately centered with its magazine space.



NOTE: - Before making this adjustment the Magazine should be square, as noted in "Magazine 1" adjustment.

(A) Place a FLAT record in F1 PLAY position. (Be sure the record is FLAT - not warped, not dished.)

(B) Loosen the cap screws holding both ends of the Magazine to the Base.

(C) Shift the entire Magazine to Left or Right until the record is in the center of the Magazine Space.

(D) Tighten cap screws. (Be sure the screws are tight.)

NOTE: - If the Magazine position is changed be sure to check and re-adjust.

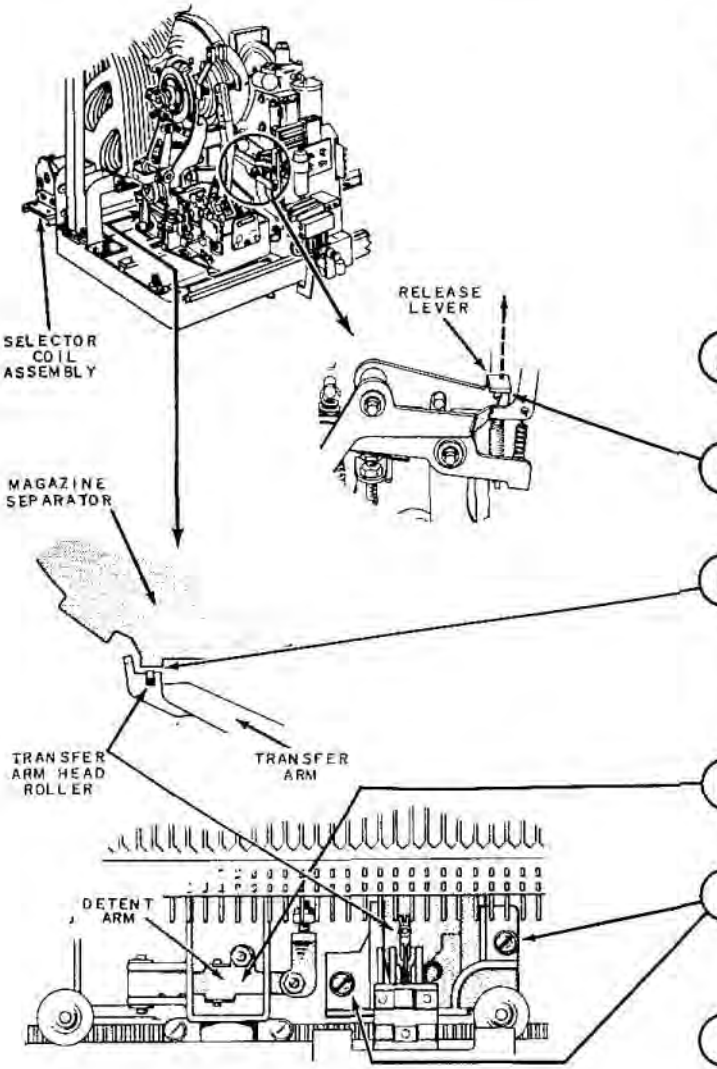
"Transfer Arm 1"

"Contact Block 1"

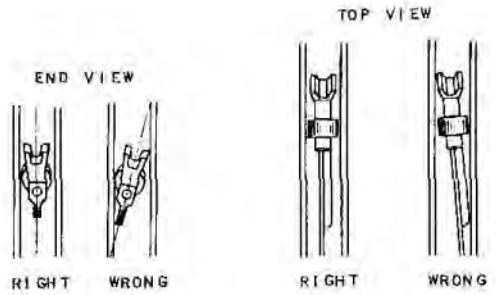
"Selection Playing Indicator 2"

"TRANSFER ARM 1" - - ALIGNMENT TO MAGAZINE

This adjustment establishes the lateral position of the Transfer Arm so the Transfer Arm Head will be centered in the magazine space when a record is transferred.



REAR VIEW WITH SELECTOR COIL ASSEMBLY REMOVED



NOTE: - The Magazine position (Magazine 2 Adjustment) should be correct before making this adjustment.

The Selector Coil Assembly should be removed for convenience in making this adjustment. This can be done by removing its four mounting screws and sliding Selector Coil Assembly off the Contact Block.

(A) Scan the mechanism to F1 position and turn off power.

(B) Trip the mechanism by manually lifting the Release Lever.

(C) Turn motor shaft until Roller in Transfer Arm Head is approximately 1/32" below the projections on the lower edges of the Magazine Separators.

(D) Push in on Detent Arm to take out Carriage Side Play.

(E) Loosen two screws holding Contact Arm Casting to Carriage Casting and - - -

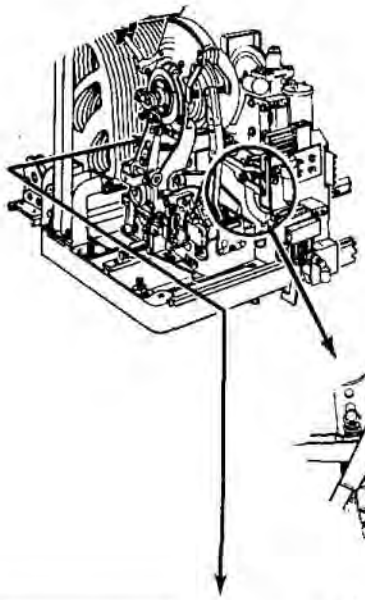
(F) Shift Contact Arm Casting to left or right until Transfer Arm Head is centered in the space. Tighten screws.

(G) When the Transfer Arm enters the space, the Transfer Arm Head should be parallel to the Magazine Separators as shown. Straighten Arm if necessary to correct Transfer Arm Head alignment.

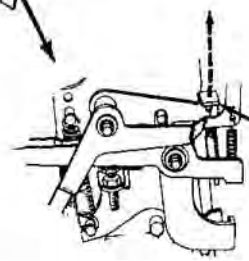
NOTE: - After making this adjustment be sure to check and adjust - "Contact Block 1".

"TRANSFER ARM 2" - - PLAY POSITION CLEARANCE

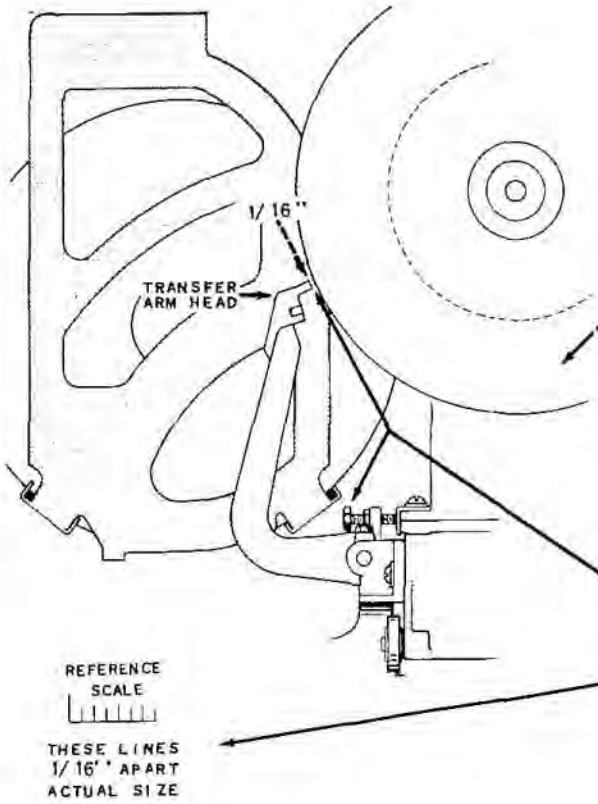
This adjustment establishes the upper limit of travel of the Transfer Arm so that records will be brought up high enough to be properly clamped to the Flywheel by the Clamp Arm.



(A) Scan the carriage to the Left, stopping it one position to the LEFT of A1 so the Transfer Arm will come up outside the magazine.



(B) Trip the mechanism by manually lifting the Release Lever.



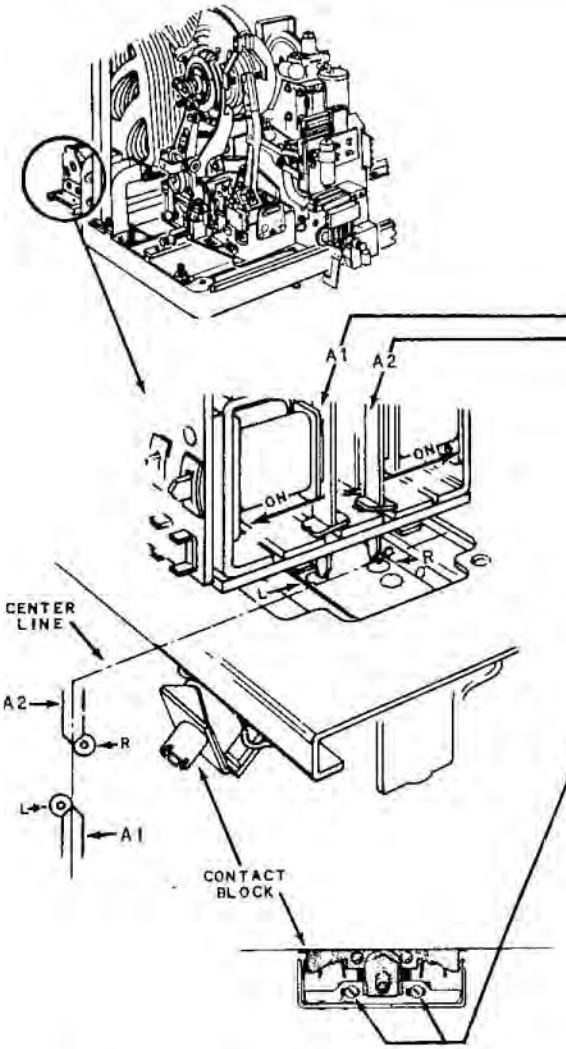
(C) Place a normal size *record in position on the Transfer Arm Head. Turn motor shaft until record is brought up and clamped in PLAY position. (Transfer Arm and record should come up just outside of the Magazine one position to the left of A1.)

(D) Adjust screw for 1/16" clearance between edge of record and tips of the Transfer Arm Head.

*DIAMETER OF A NORMAL SIZE 45 R.P.M. RECORD IS 6-7/8" ± 1/32"

"CONTACT BLOCK I" - - CONTACT BLOCK ALIGNMENT

This adjustment positions the Contact Block and determines proper timing for tripping the mechanism at the selected record and proper alignment at the Cancel Solenoid for cancellation at the Selected Lever.



NOTE: - Check "Clutch 3" for minimum Carriage side play, and check "Magazine 2" and "Transfer Arm 1" adjustment before making this adjustment.

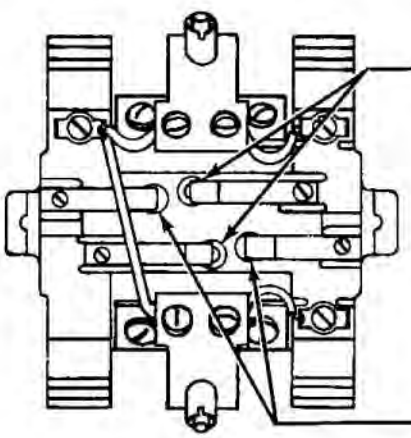
(A) Place mechanism in A1 PLAY position and turn off power.

(B) Move Selection Levers A1 and A2 out to their ON position.

(C) Loosen Contact Block Adjusting Screws.

(D) Position Contact Block so A1 and A2 levers are approximately centered between L and R contacts, as shown, and tighten screws.

(E) Place mechanism in K9 PLAY position and check for equivalent L and R contact alignment with K9-K10 Selection Levers out to their ON position. Exact centering at all points is not necessary -- if the Selection Levers are not equally centered with the L and R contacts at the K9-K10 position, shift the Contact Block, as required, so variation in centering is equally divided between the A1-A2 and the K9-K10 positions.



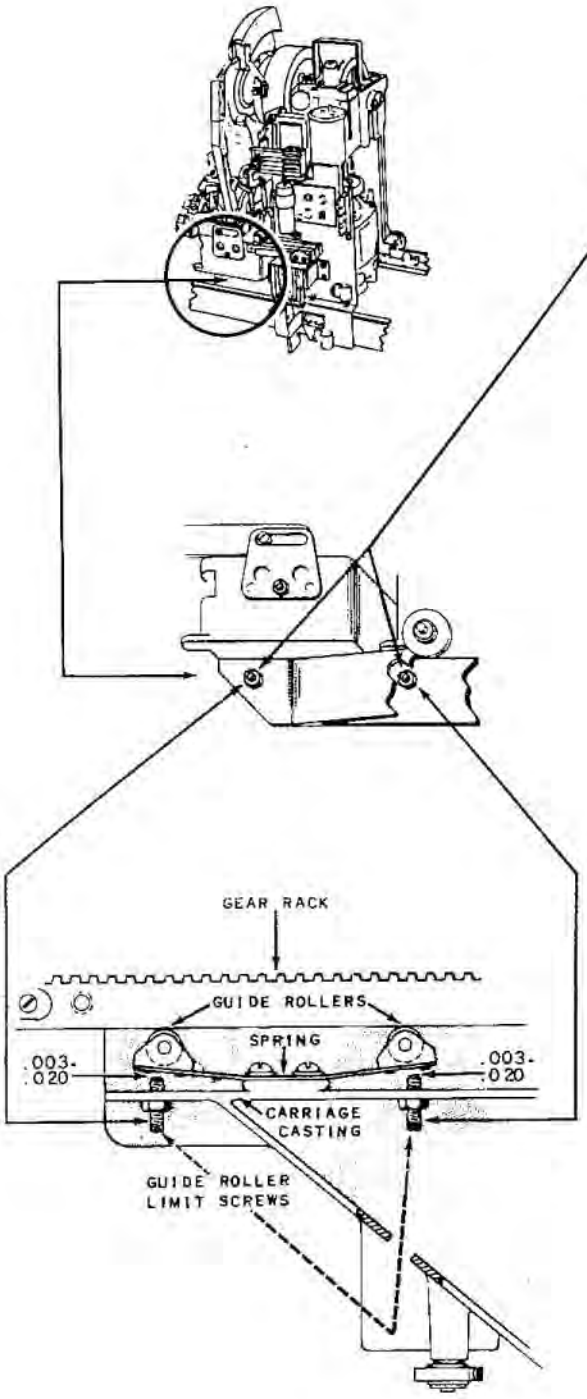
Adjust spring pressure so a 1/2 to 3/4 oz. force is required to move selector contacts.

Adjust spring pressure so a 2 to 2-1/2 oz. force is required to move dressing contacts.

Dressing contacts and selector contacts should move of their own weight (with no spring pressure).

"GUIDE ROLLERS I" - - CARRIAGE GUIDE ROLLER ADJUSTMENTS

This adjustment limits the front to back play of the Carriage.



(A) Front and back play of Carriage on rack should be limited to .003 to .020 by position of Guide Roller Limit Screws.

(B) To adjust Guide Roller Limit Screws - - -

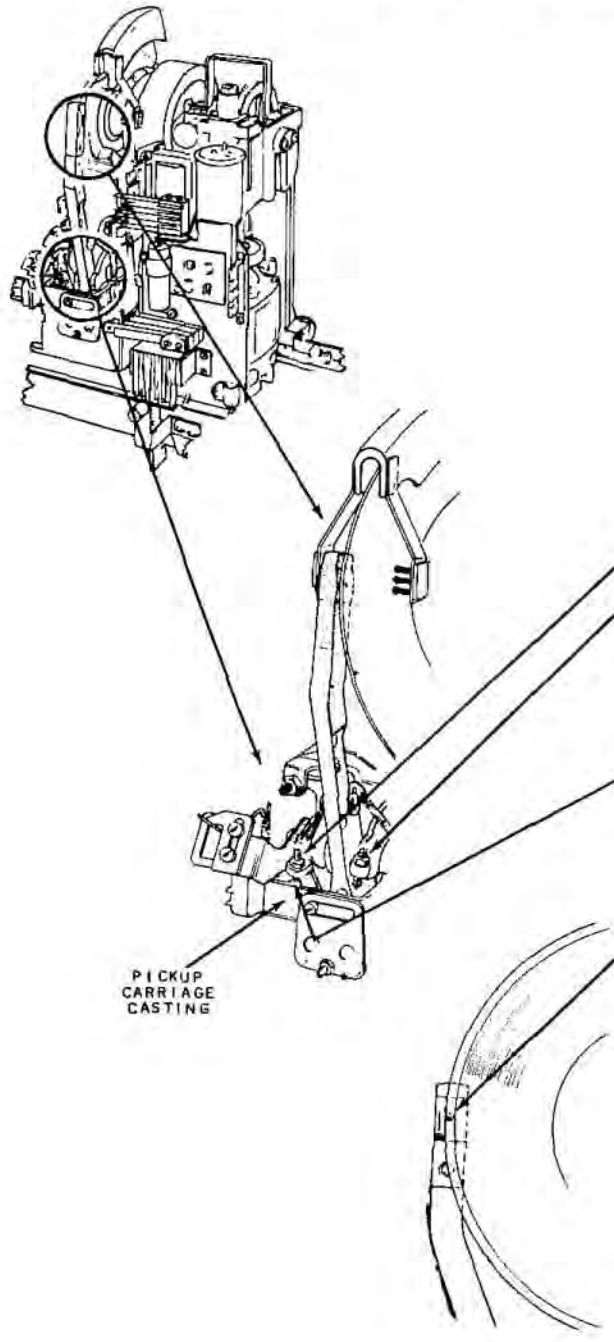
1. Loosen Lock Nuts.
2. Carefully turn screws in, all the way, until all front and back play of Carriage is taken out. (DO NOT FORCE SCREWS)
3. When all front and back play is taken out, back out each screw 1/2 turn. (This will result in approximately .015 clearance.)
4. Tighten Lock Nuts.

(C) Check for play along the entire Gear Rack. Back out each screw an additional 1/4 turn if necessary to avoid binding.

(D) To check Guide Roller Spring pressure, - push left side of Carriage toward the rear and release slowly. Repeat with right side of Carriage. Spring pressure on each side should be great enough to fully reset the Carriage to its normal forward positions.

"PICKUP 1" - - NEEDLE LANDING ADJUSTMENT

This adjustment establishes the point of landing of the needle on the record at the beginning of Play. It should be made so the needle lands half way between the edge of the record and the first playing groove.



(A) Select the Left side of a normal* record (preferably a transparent type) and place the record and the mechanism in Left Side PLAY position.

(B) Loosen Lock Nuts on - - - "Pickup 1" and - - - "Pickup 2". Turn Adjusting Screw out to limit. (" Pickup 2" Adjusting Screw is loosened to avoid possibility of binds in the levers when the mechanism is later returned to SCAN.)

(C) Hold Adjusting Screw down against casting and adjust so - - -

(D) - - needle is half way between outer edge of record and the playing grooves. (If transparent type record is used, point where needle touches can be seen through the record.)

(E) Tighten "Pickup 1" Lock Nut.

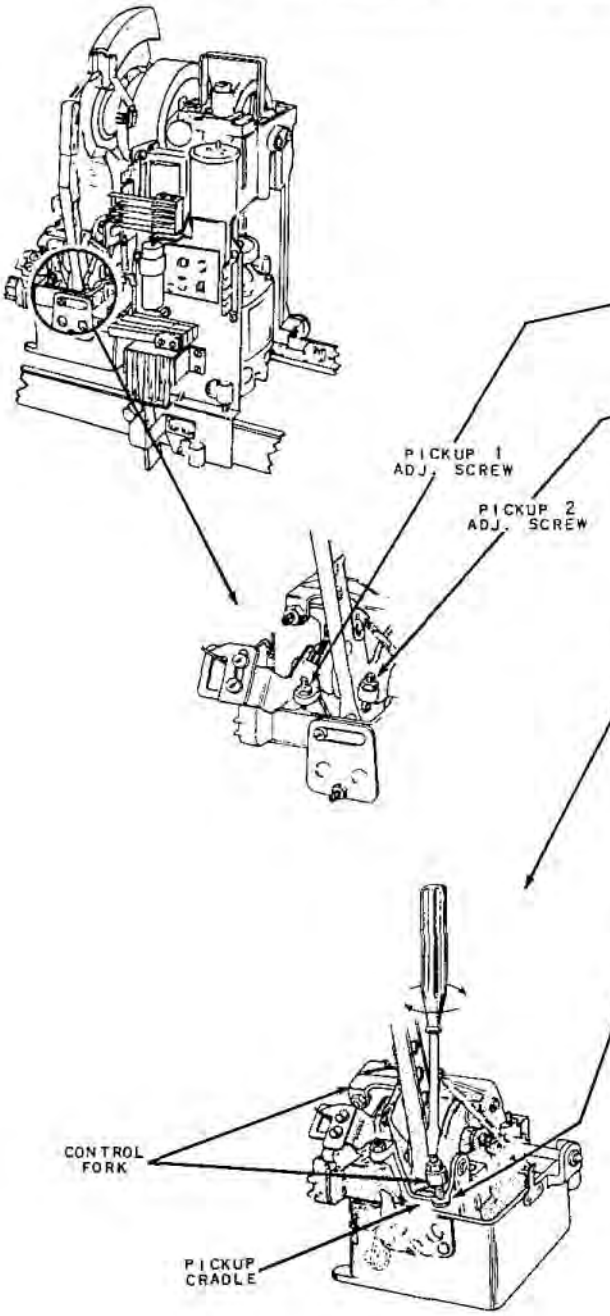
(F) Select the Right side of the same record and check for proper needle landing at the beginning of Right Side PLAY.

(G) After this adjustment had been made, adjust "Pickup 2" as shown on the following page.

*Normal diameter for 45 R.P.M. records is 6-7/8 ± 1/32.

PICKUP 2 - - PICKUP RETURN ADJUSTMENT

This adjustment results in proper return of the Pickup Arm to SCAN position and allows enough play between the Cradle and the Adjusting Screw to avoid binds.



NOTE: - "Pickup 1" adjustment should be correct before making this adjustment.

(A) Place mechanism in SCAN position with Pickup Arm on Left Side. "Pickup 1" Adjusting Screw should be against the casting.

(B) Loosen Lock Nut and turn "Pickup 2" Adjusting Screw out to limit.

(C) Insert screw driver in screw slot. Push straight down on screw with screw driver, then release. Note clearance between screw and cradle and note the up and down play in the Control Fork.

(D) While gently pushing down and releasing the screw with screw driver, turn screw down carefully, a little at a time, until all the up and down play is just taken out.

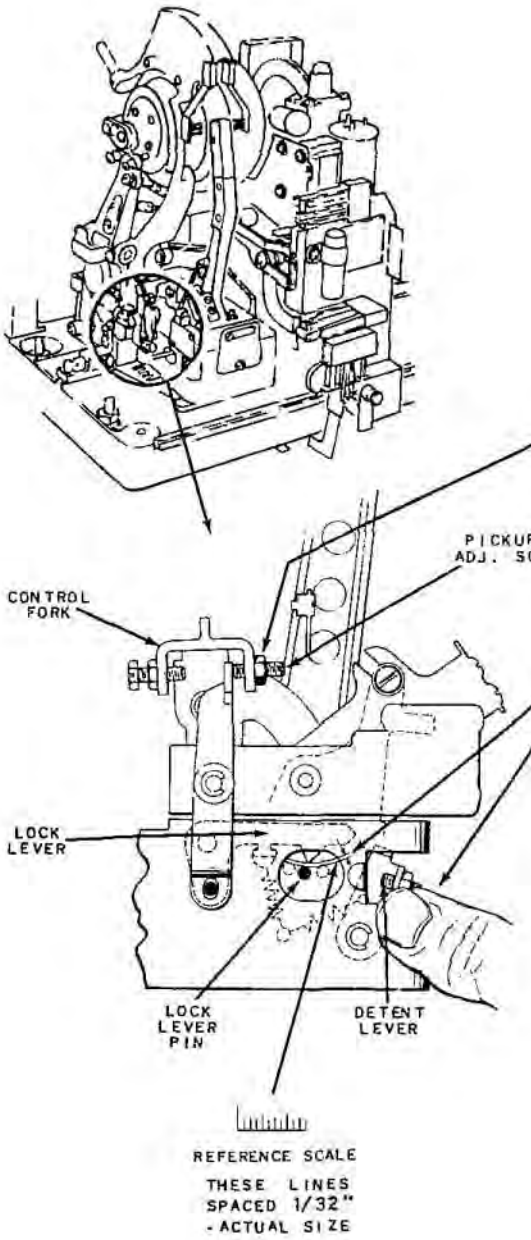
(E) Back out screw 1/4 turn from the above position and tighten Lock Nut. (This allows a small amount of clearance under the screw and a slight amount of up and down play in the Control Fork.)

(F) Place mechanism in Right side PLAY position then return it to SCAN with Pickup Arm on Right Side. Check for equivalent up and down play of Control Fork with Pickup Arm on Right side.

CAUTION: If "Pickup 2" Adjusting Screw is down too far (no up and down play in Control Fork) it may place a bind on the Levers and interfere with proper Pickup shifting action. A check for proper shifting of Pickup can be made by alternately selecting and playing several Right and Left sides of records. Each time Pickup shifts it should move smoothly all the way over to its Right or Left position.

"PICKUP 3" - - PICKUP RELEASE ADJUSTMENT

This adjustment establishes 1/32" clearance between the path of the Lock Lever Pin and the lower projection of the Lock Lever when the mechanism is in PLAY position.



(A) Place mechanism in Left Side PLAY position.

(B) Loosen Lock Nut - - and while holding Detent Lever away from the Lock Lever, - - -

(C) adjust screw so that the lower projection of the Lock Lever and the Lock Lever Pin clear by 1/32" when the Pin is moved past the Lever.

(D) Tighten Lock Nut.

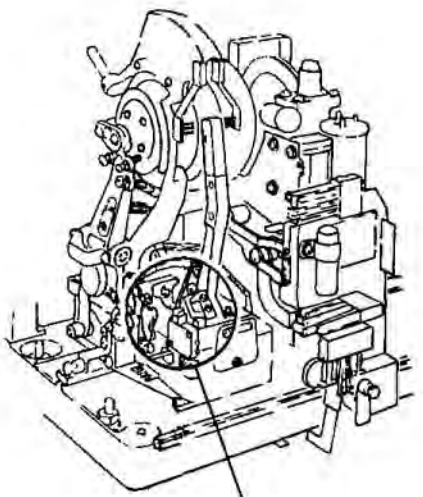
(E) Place mechanism in Right side PLAY position. While holding Detent Lever away from Lock Lever, move Pickup Arm in along record and again check for required 1/32" clearance.

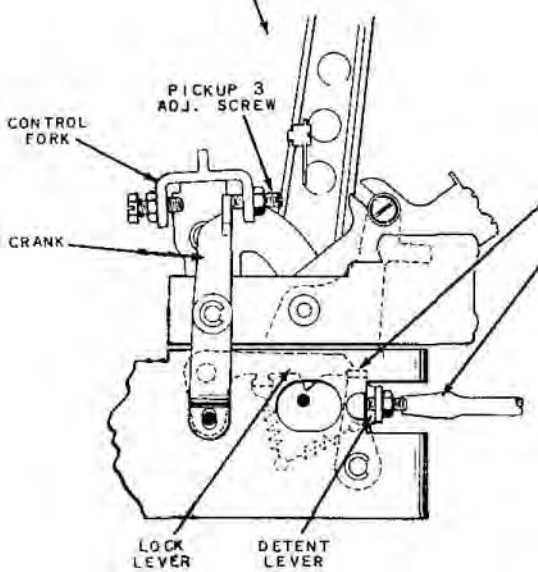
If clearance is not approximately the same in both Right and Left side PLAY positions, check Lock Lever Pin alignment. Straighten Pin, if necessary.

NOTE: - This adjustment should be followed by "Pickup 4" adjustment.

"PICKUP 4" - - DETENT LEVER ADJUSTMENT

This adjustment establishes the Detent Lever position so that it just touches the lower slope of the end of the Lock Lever when the mechanism is in PLAY position.





NOTE: - "Pickup 3" adjustment should be correct before making this adjustment.

(A) Place mechanism in Right side PLAY position.

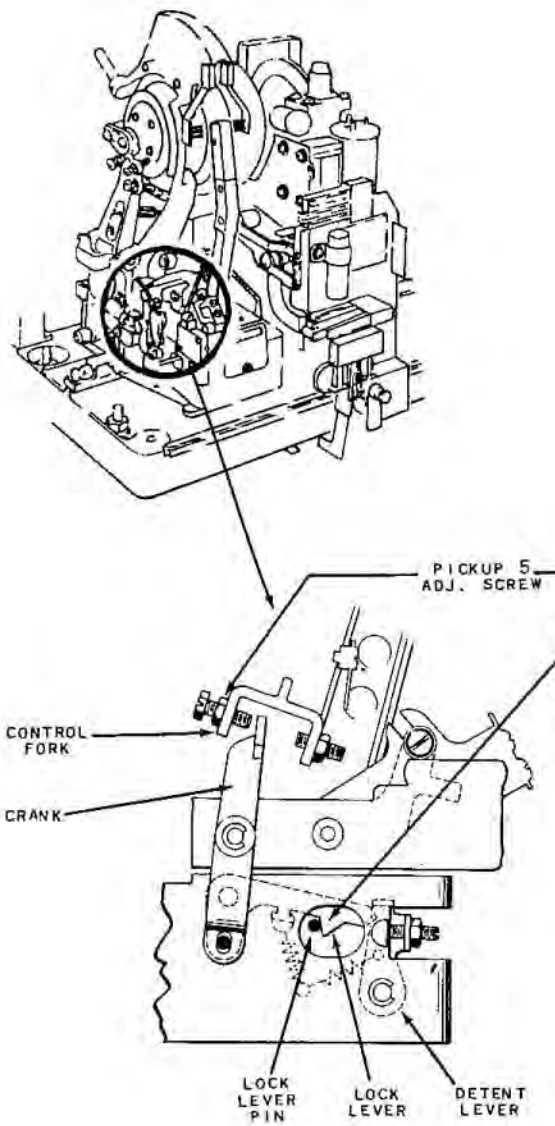
(B) Loosen Lock Nut and adjust the screw until Detent Lever just touches lower slope of Lock Lever, as shown. *The Detent Lever should meet the Lock Lever approximately half way along the lower slope. If the edge of the Detent Lever is above or below the lower slope of the Lock Lever, check "Pickup 3" adjustment.*

(C) Tighten Lock Nut.

(D) To check - - manually pull top of Control Fork away from Crank. The Detent Lever should hold the Lock Lever and the Crank from moving.

"PICKUP 5" - - PICKUP LOCKING ADJUSTMENT

This adjustment establishes 1/32" clearance between the tip of "Pickup 5" adjusting screw and the upper end of the Crank to insure correct locking of the Pickup Assembly in SCAN position.



REFERENCE SCALE THESE LINES SPACED 1/32" ACTUAL SIZE

NOTE: - "Pickup 4" adjustment should be correct before making this adjustment.

(A) Place mechanism in SCAN position with Pickup Arm and Cradle fully reset on Left side.

(B) Lock Lever should be engaged with Lock Lever Pin. Pull Detent Lever out of way, if necessary, to allow Lock Lever to drop against pin.

(C) Loosen Lock Nut and adjust screw so that clearance between the Crank and the tip of the screw is 1/32'' to 1/16''. Note reference scale.

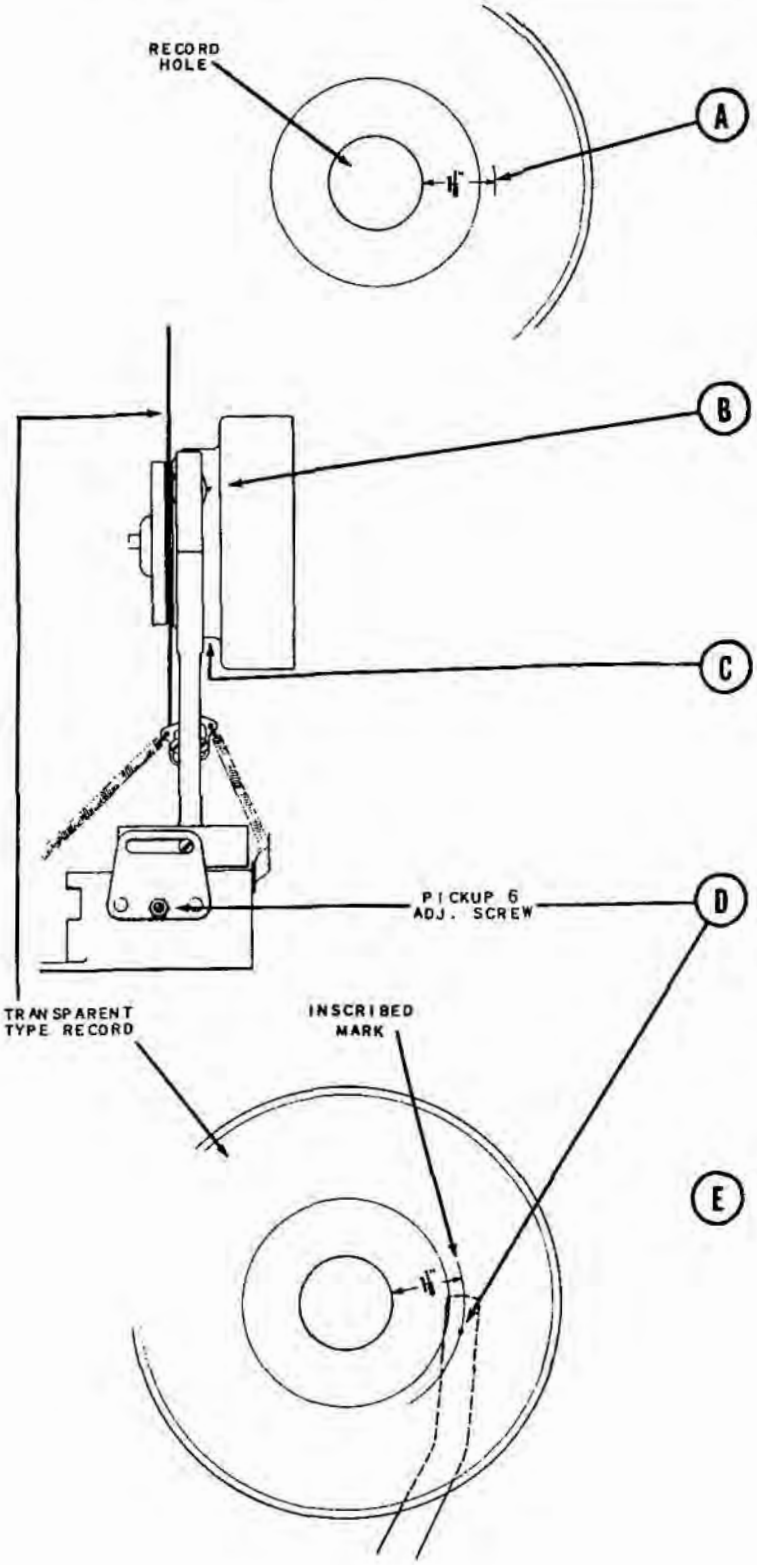
(D) Tighten Lock Nut.

(E) Check adjusting screw clearance by selecting Right side of a record. Screw tip should not touch Crank while shifting.

(F) Check resetting action - - by returning mechanism to Right side SCAN position. Lock Lever should be returned to Lock position against Pin and clearance between screw tip and Crank should be 1/32".

"PICKUP 6" - - PICKUP ARM STOP

This adjustment limits the inward travel of the Pickup Arm so the Pickup Cartridge cannot move in far enough to hit the Flywheel.



(A) Inscribe a mark on a record 1-1/8" away from the edge of hole. Use a transparent type record if available.

(B) Place mechanism in Right side PLAY position with inscribed record on Flywheel. Turn off power.

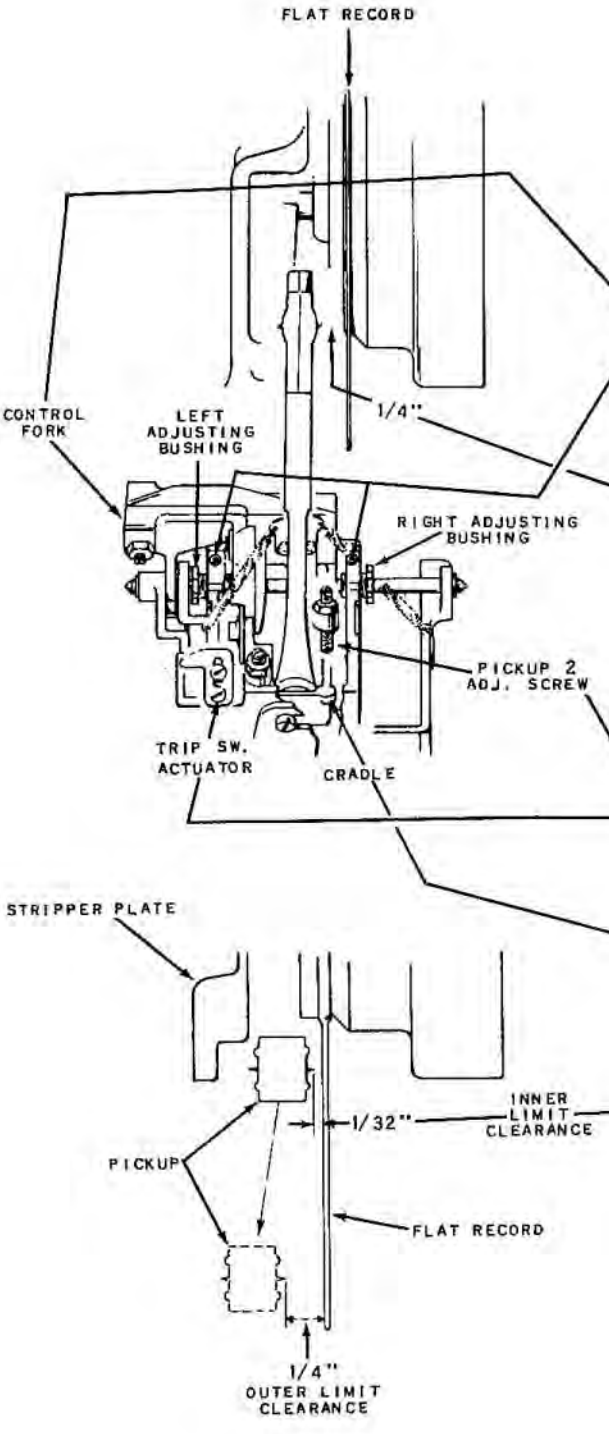
(C) Move Pickup Arm in as far as possible toward Flywheel.

(D) Loosen Lock Nut and adjust screw so that needle cannot move in toward Flywheel any farther than the inscribed mark, as shown.

(E) Tighten Lock Nut.

"PICKUP 7" - - PICKUP LIFTING ADJUSTMENTS

This adjustment establishes correct Pickup lifting action and clearance between the needle and record when the Pickup is lifted and returned to its rest position.



NOTE: - "Pickup 6" adjustment should be correct before making this adjustment.

(A) Place mechanism in Left side PLAY position with a flat record clamped on Flywheel. Turn off power and loosen both socket head set screws holding Adjusting Bushings.

(B) Pull Control Fork forward to the limit of its travel and - - -

(C) adjust Left Adjusting Bushing for 1/4" clearance between record and needle.

(D) Release Control Fork and move Pick-up toward center of Flywheel to limit of its travel.

(E) Hold Pickup in this position by pressing inward lightly on Trip Switch Actuator.

(F) Pull Control Fork down lightly until "Pickup 2" adjusting screw just touches Cradle.

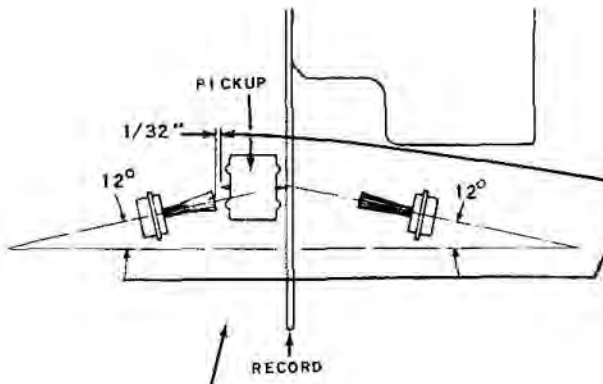
(G) In this position of the Pickup Arm and Control Fork the needle should be a minimum of 1/32" from the record.

(H) Repeat above for Right side PLAY position using Right Adjusting Bushing to make adjustment.

(J) Tighten both set screws.

"PICKUP 8" - - BRUSH POSITION ADJUSTMENTS

This adjustment establishes 1/32" clearance between the outer needle and the Brush while a record is being played.



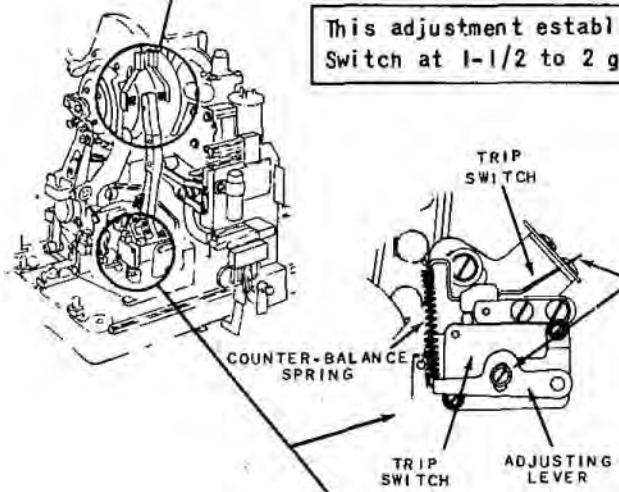
(A) The Brush Mounting Brackets are set so the bristles "point" approximately 12 degrees toward record center.

(B) The Brackets should be formed so the outer needle clears the brush by 1/32" while a record is played.

(C) Check for correct clearance on both Right and Left sides.

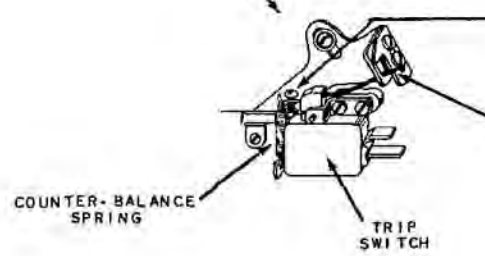
"PICKUP 9" - - TRIP SWITCH PRESSURE ADJUSTMENT

This adjustment establishes the pressure required to operate the Trip Switch at 1-1/2 to 2 grams as measured at the end of the Trip Lever.



(A) Loosen screw and adjust Counter-balance Spring by moving Adjusting Lever up or down.

Pressure required to trip the Switch should be 1-1/2 to 2 grams as measured with a gram scale at this point.

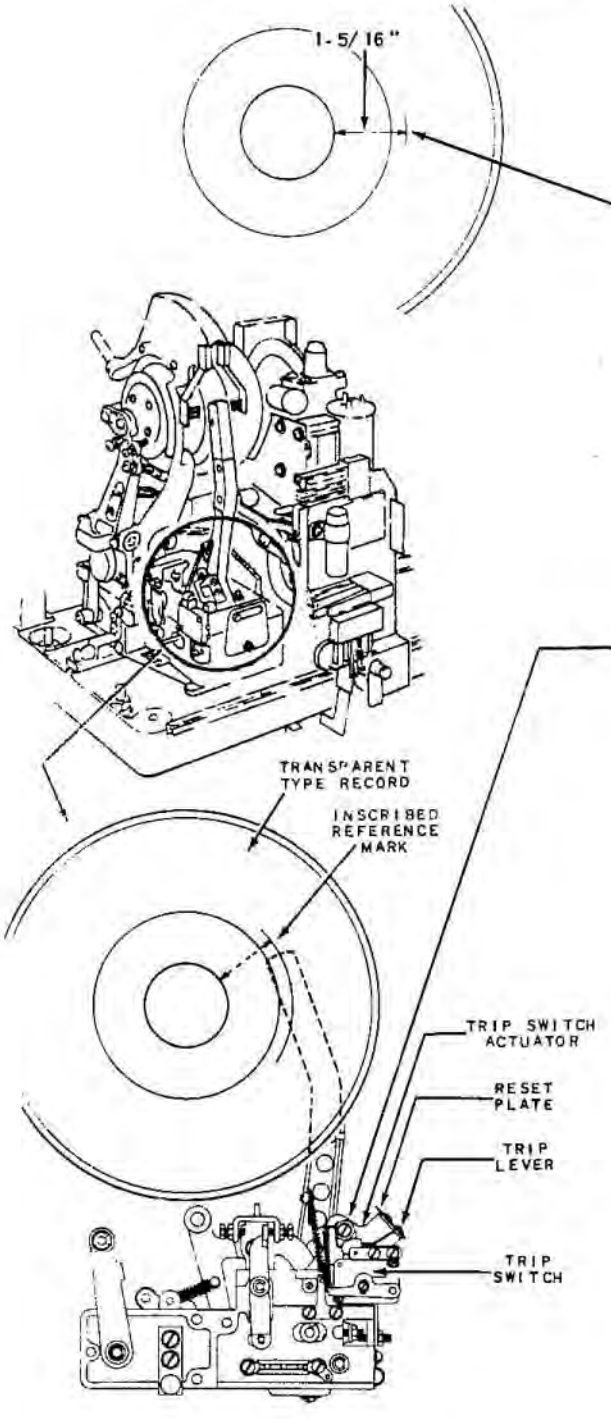


NOTE: - On 145-S2 mechanisms below Serial #2952 the Counter-balance Spring adjustment is made by means of an Adjusting Screw.

Pressure required to trip the Switch should be 1-1/2 to 2 grams as measured with a gram scale at this point.

"PICKUP 10" - - "RECORD CUT-OFF" (TRIP SWITCH ACTUATOR ADJUSTMENT)

This adjustment establishes the "Record Cut-off" position and results in tripping of the mechanism when the needle has reached a point 1-5/16" from the edge of the hole in the record.



NOTE: - "Pickup 9" adjustment should be correct before making this adjustment.

(A) Inscribe a line on a record 1-5/16" away from edge of hole as shown. (Use a transparent type record if available.)

(B) Place mechanism in Right side PLAY position with inscribed record clamped on Flywheel. Turn off power.

(C) Loosen screw and position Trip Switch Actuator so that Trip Switch will operate when needle reaches inscribed mark.

(DO NOT BEND TRIP LEVER TO MAKE ADJUSTMENT.)

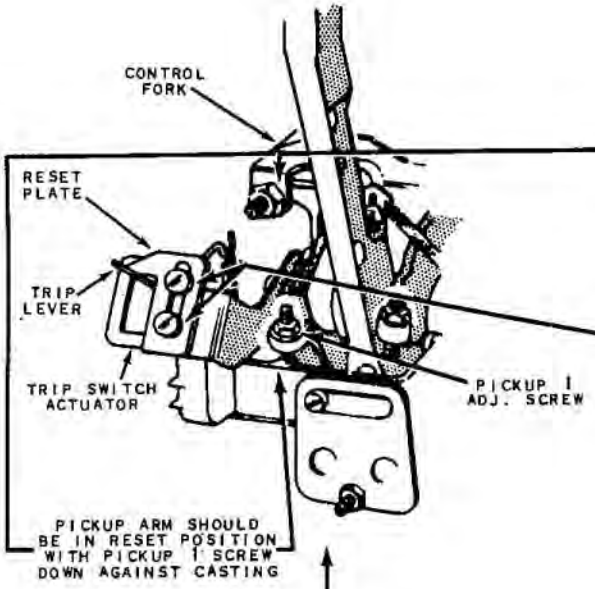
(D) Tighten screw and check for normal operation by playing several Left and Right sides of records.

NOTE: - If the position of the Trip Switch actuator is changed be sure to readjust and check "Pickup 11".

"PICKUP 11" - - TRIP SWITCH RESET ADJUSTMENT

This adjustment results in proper resetting of the Trip Switch when the Pickup Arm returns to its rest position.

NOTE: - "Pickup 9 and 10" adjustments should be correct before making this adjustment.

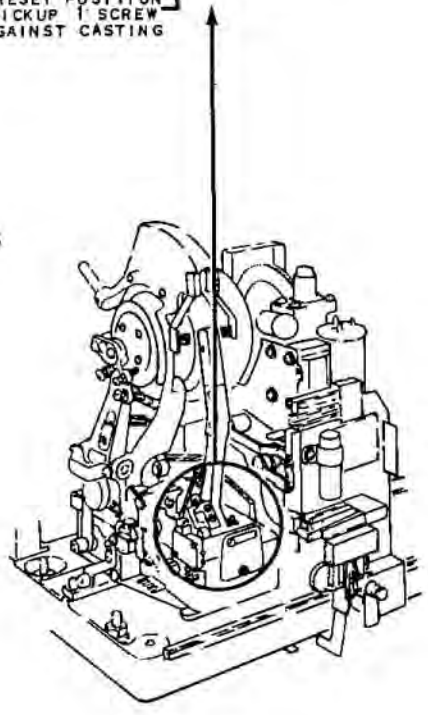


(A) Place mechanism in PLAY position and pull Control Fork down until Pickup Arm is in its reset position.

(B) In this position loosen screws and adjust Reset Plate so Trip Switch is fully reset.

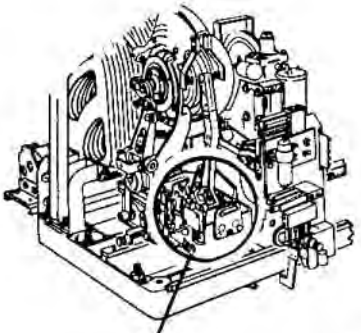
When adjusted correctly the Trip Switch should be reset but the Trip Lever should not apply any upward pressure against the reset plate.

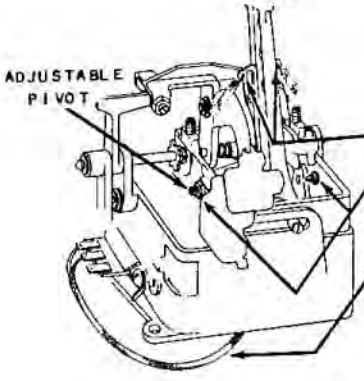
(C) Check by releasing Control Fork. Needle should land properly on record without "Booster" action from Trip Lever.

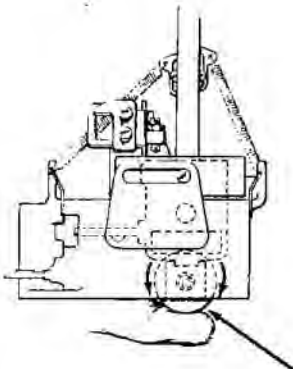


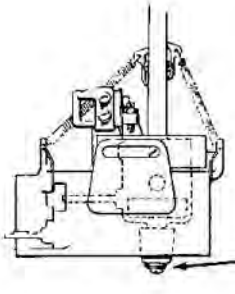
"PICKUP 12" - - PICKUP BALANCE ADJUSTMENT

This Adjustment results in proper balancing of the Pickup Arm and Cradle Assembly and assures maximum record and needle life.









NOTE: Before making this adjustment:

1. Check Cradle Pivots for binds. There should be no play but the Arm and Cradle should move freely on the Pivots.
2. Check Pickup lead to be sure it hangs freely below Cradle and does not touch the carriage or at any place along the base casting.

(A) Place mechanism in PLAY position with a record clamped on Flywheel and turn off power.

(B) Remove both Needle Pressure Springs.

(C) Adjust the position of the pickup arm counter-weight* so the arm is "in balance" at the record cut-off groove and at a point 1" in from the outer edge of the record.

Check the balance by holding the pickup 1/8" to 1/4" from the record, releasing carefully, and observing the DIRECTION in which it moves. Ignore the slow movement toward or away from the record surface. There should be no <u>in or out</u> movement (toward or away from the record center). In or out movement indicates that the pickup arm is not "in balance" at the point of check and requires adjustment of the counter-weight position.

(D) Replace needle pressure springs and check "Pickup 13" Adjustment.

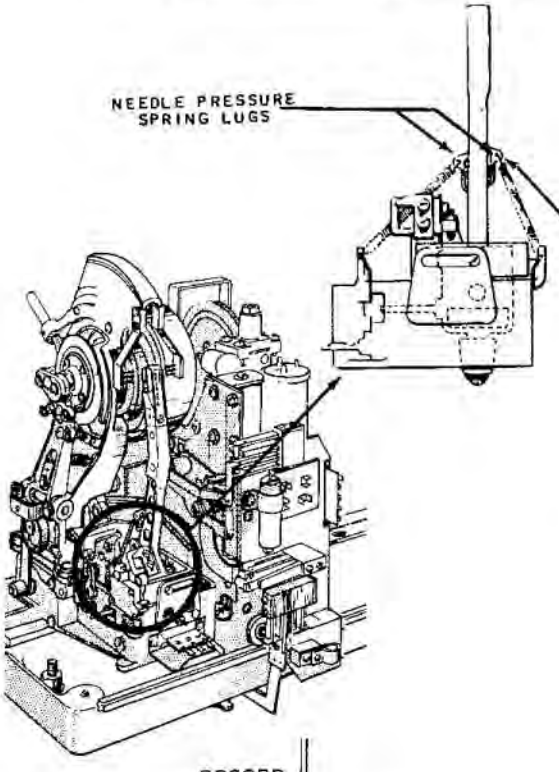
*There are two types of Counter-weights.

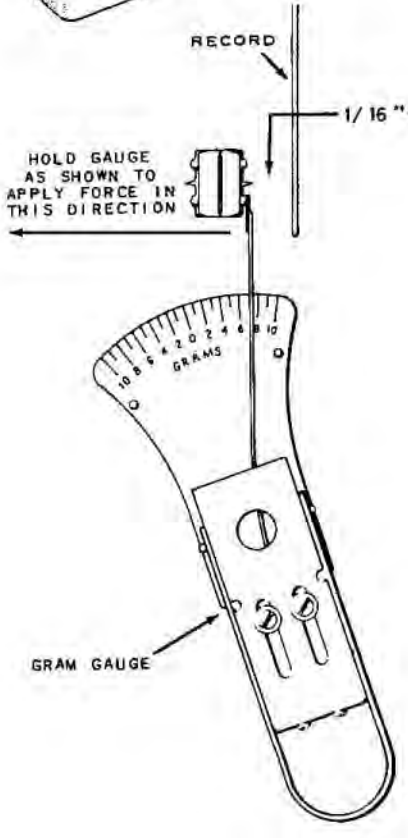
The ROLLER TYPE is adjusted by turning the Roller as shown.

The SLIDING WEIGHT TYPE is adjusted by loosening the screw and sliding the weight forward or back as required.

"PICKUP 13" - - NEEDLE PRESSURE ADJUSTMENTS

This adjustment establishes the needle pressure for both Right or Left sides. Correct pressures result in proper tracking and in a minimum of needle and record wear.





(A) Place mechanism in Left Side PLAY position with a flat record clamped on the Flywheel.

(B) Turn off power so record is not turning.

(C) Adjust position of Pressure Spring Lug on right side of Pickup Arm so that needle pressure is 7 to 8 grams with Part No. 245789 pickup or 4½ to 5½ grams with Part No. 246796 pickup. *

(D) Repeat same procedure on Right Side PLAY position by adjusting the Pressure Spring Lug on left side of the Pickup Arm for 7 to 8 or 4½ to 5½ grams needle pressure. The pressure must be equal on the right and left sides.

NOTE: - For accurate adjustment needle pressure should be measured with a gram gauge as follows:

(1) Place the tip of the gauge spring against the Pickup case at the "Bump" next to the needle tip and lift the Pickup so the needle is about 1/4" from the record.

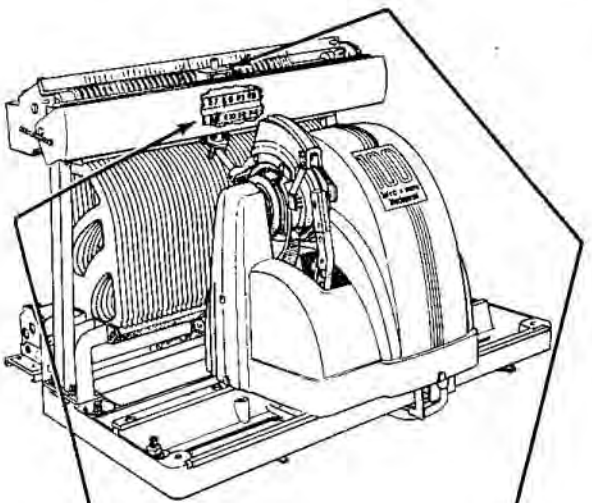
(2) Slowly relax the force of the gauge against the Pickup so the needle moves toward the record.

(3) Stop the inward movement when the needle is about 1/16" from the record and read indicated pressure on gauge.

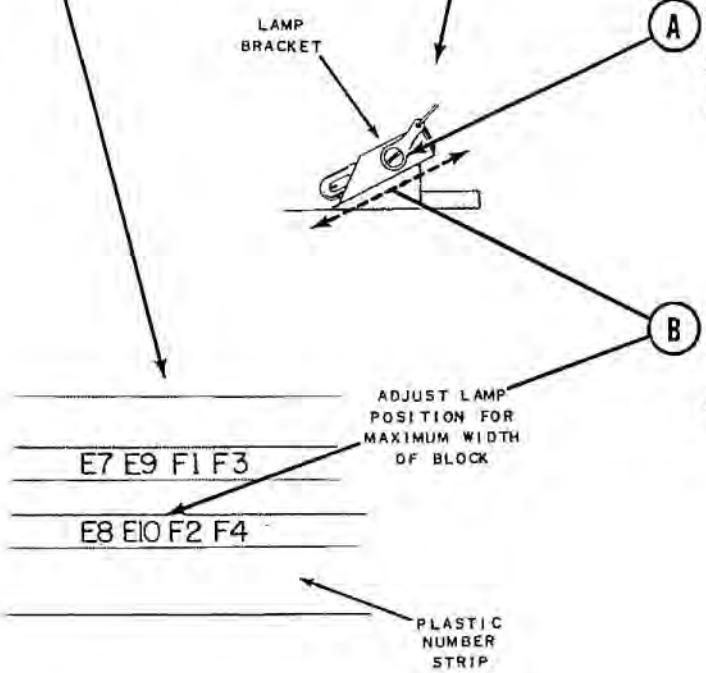
* Part number of pickup is stamped on the side of the cartridge.

"SELECTION PLAYING INDICATOR I" LAMP REPLACEMENT AND ALIGNMENT

This adjustment aligns the Selection Playing Indicator Lamps with the openings in the Slide for maximum width of the Block of light cast on the Plastic Number Strip.



The Selection Playing Indicator illuminates the number of the selection being played. It contains two #47 lamps which are operated alternately through a sliding bar type switch. The lamps shine through windowlike openings in a Slide, projecting a block of light on a Numbered Plastic Strip.

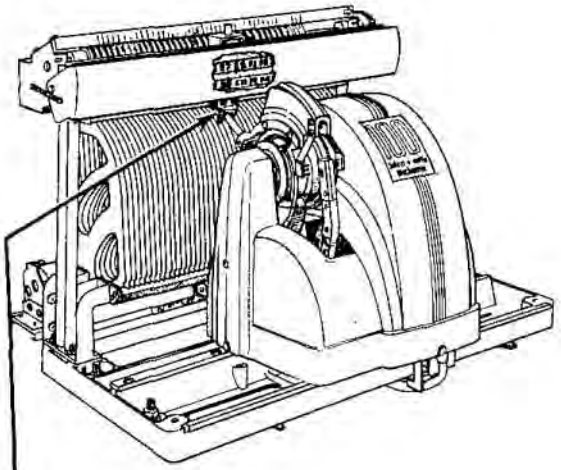


A To replace defective lamps, remove screw and lift out Lamp Bracket. This makes lamps accessible for replacement.

B To adjust lamp position, loosen screw and move Lamp Bracket, as shown, until block of light on Number Strip has maximum width.

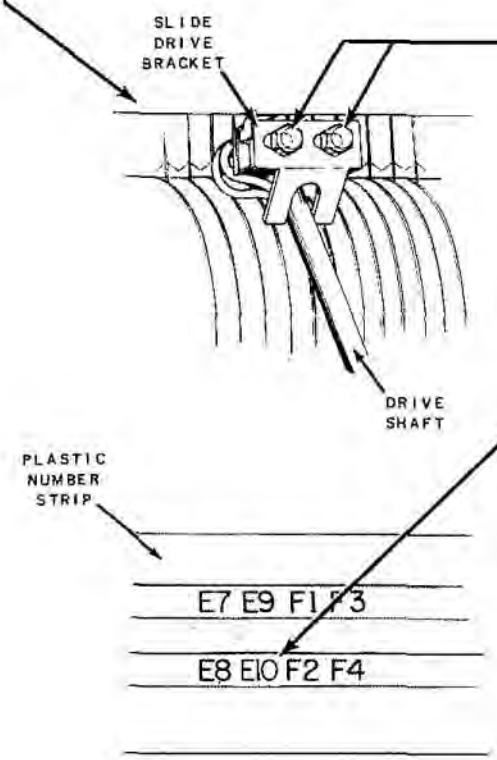
"SELECTION PLAYING INDICATOR 2" - - SLIDE POSITION

This adjustment aligns the Selection Playing Indicator Slide with the numbers on the Plastic Number Strip.



NOTE: "Selection Playing Indicator 1" should be correct before making this adjustment.

(A) Place mechanism in E10 PLAY position.



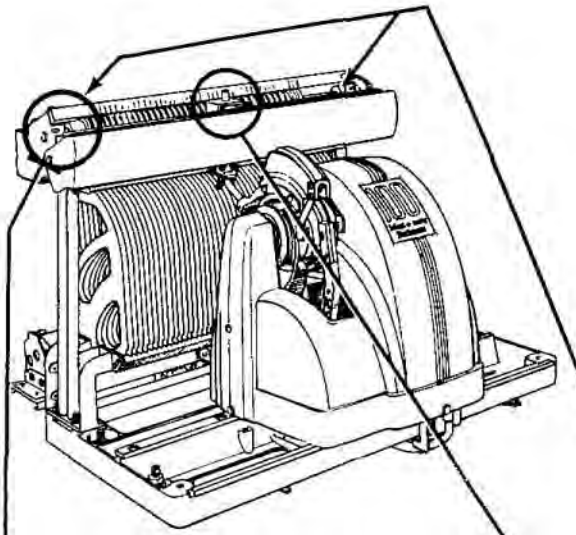
(B) Loosen Cap Nuts.

(C) Position Slide Drive Bracket so that block of light from Indicator Lamp is centered with E10 on the Number Strip. Tighten Cap Nuts.

Note that moving the Slide position for this adjustment also changes the position of the rubber Drive Shoe which operates the Popularity Meter Dials. If above adjustment is changed, check "Popularity Meter 1" adjustment.

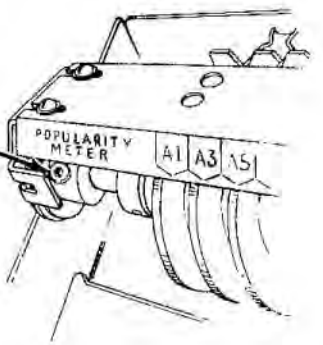
"POPULARITY METER 1" - - DIAL ASSEMBLY POSITION

This adjustment centers the knurled edges of the Popularity Meter Dials with the Rubber Drive Shoe of the Dial Drive Assembly.



NOTE: "Selection Playing Indicator 2" should be correct before making this adjustment.

The Popularity Meter Dials are driven by a Rubber Drive Shoe which is operated by the Popularity Meter Solenoid. For normal operation of the Popularity Meter, the Rubber Drive Shoe should be approximately centered with the knurled edge of each Dial when the mechanism is locked in its PLAY position. To adjust for correct alignment of the Dials with the Drive Shoe proceed as follows.

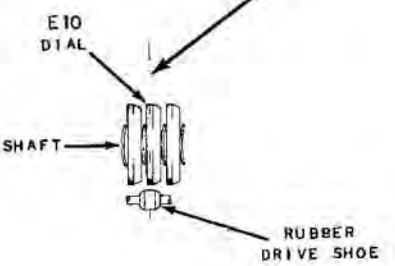


(A) Place mechanism in E10 PLAY position.

(B) Loosen set screws on the collars at both ends of the Dial Shaft.

(C) Move Shaft and Dial Assembly to left or right until knurled driving surface of Dial E10 is centered with the Rubber Drive Shoe.

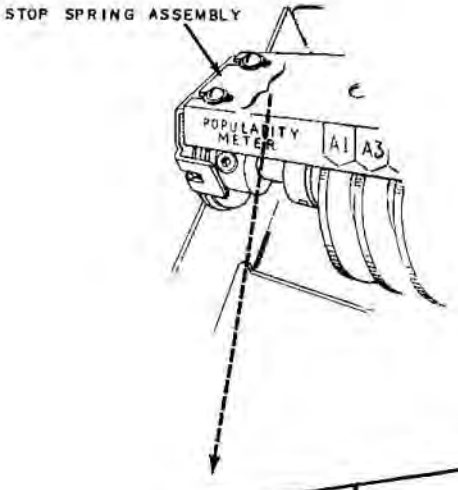
(D) Lock collars in place with set screws allowing about 1/64" end play in shaft to prevent binding.

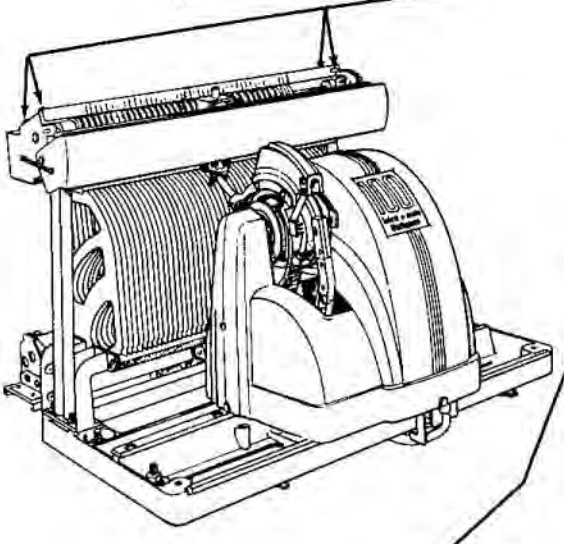


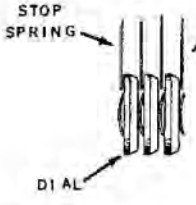
NOTE: If the Dial Assembly position is changed be sure to check "Popularity Meter 2" adjustment.

"POPULARITY METER 2" - - STOP SPRING ASSEMBLY POSITION

The Stop Springs stop the Dials when they reach maximum position and when they are returned to zero position. This adjustment centers the Stop Springs so they do not rub excessively against the Dials or hinder normal operation.







(A) Loosen screws at both ends of Stop Spring Assembly.

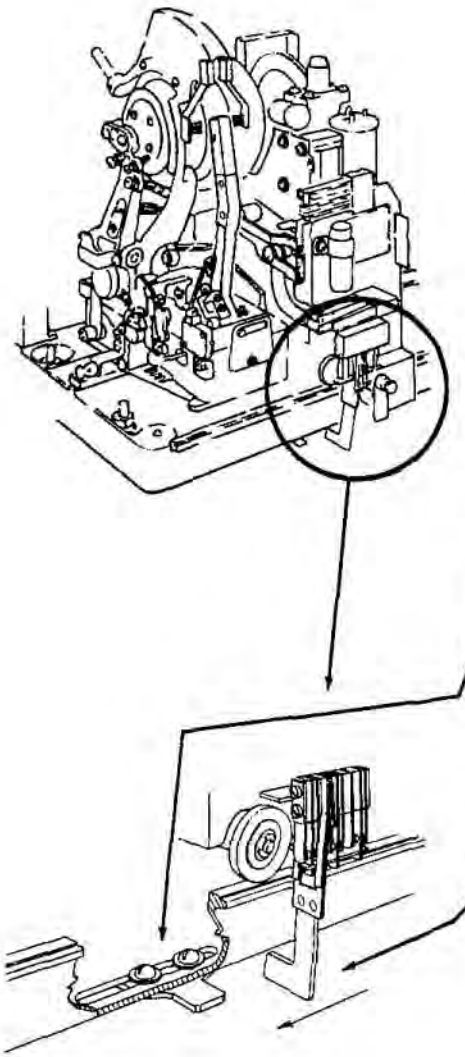
(B) Move Stop Spring Assembly to left or right until all springs are approximately centered between Dials.

(C) Tighten Screws.

NOTE: Dials should not drag against any of the Stop Springs. Check for binds by turning all Dials up to their maximum position by hand then rotating Dial Shaft. All dials should return freely to their zero position without binds.

"REVERSING SWITCH 1" - - SWITCH BRACKETS

This adjustment positions the Reversing Switch Brackets so the Switch operates when the carriage is 1/2" past the end record positions.



(A) Loosen screws holding left Reversing Switch Bracket and move Bracket all the way to the left.

(B) Select A2 and turn off power when selection is playing.

(C) Make a reference mark on the base casting to indicate the A1-A2 record position of the carriage.

(D) Return mechanism to SCAN and turn the motor shaft manually until the mechanism has moved 1/2" to the LEFT of the reference mark made on the base

Reversing Switch Lever should still be to the left.

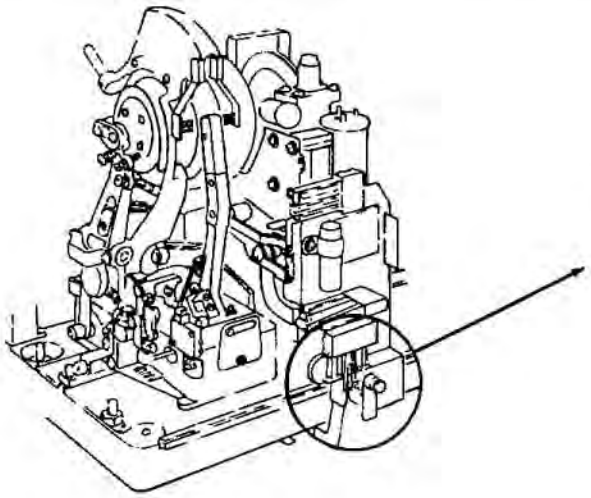
(E) Move the Bracket slowly and carefully to the right until it is at the point where the reversing switch operates.

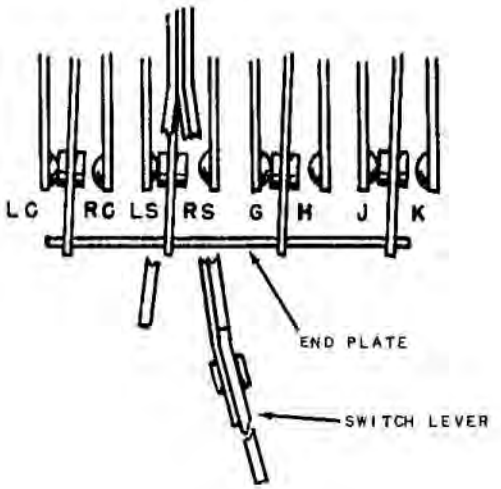
(F) Scan the carriage out of the way to the right, being careful not to move the Bracket, and tighten the bracket holding screws.

(G) Adjust the RIGHT Reversing Switch Bracket so the Switch operates when the carriage is 1/2" to the RIGHT of the K9-K10 record position.

See "Reversing Switch 2" for contact gap adjustment.

"REVERSING SWITCH 2" - - CONTACT GAP AND PRESSURE ADJUSTMENTS





CONTACTS	CONTACT GAPS	CONTACT FUNCTIONS*
L C	1/64" clearance when Switch Lever is to Left.	Connects Left Pin Cancel Solenoid to Cancel Circuit.
R C	1/64" clearance when Switch Lever is to Right.	Connects Right Pin Cancel Solenoid to Cancel Circuit.
L S	1/64" clearance when Switch Lever is to Left.	Connects Trip Solenoid to "L" Trip Contact for Left Side Selections.
R S	1/64" clearance when Switch Lever is to Right.	Connects Trip Solenoid to "R" Trip Contact for Right Side Selections.
G & J	.020" gaps at instant H and K Just open	These contacts closed so motor turns for SCANNING to RIGHT and for PLAYING LEFT SIDES.
H & K	.020" gaps at instant G and J Just open	These contacts closed so motor turns for SCANNING to LEFT and for PLAYING RIGHT SIDES.

*See Schematic Diagrams for Circuit.

ADJUSTMENT PROCEDURE

Caution: - Turn Off Power!! 117 volts on G-H and J-K contacts

A Move Switch Lever to Left

B Adjust LC and LS for 1/64" gaps.

C Push bakelite End Plate slowly to Left. At instant H and K just break, G and J must have .020" gaps.

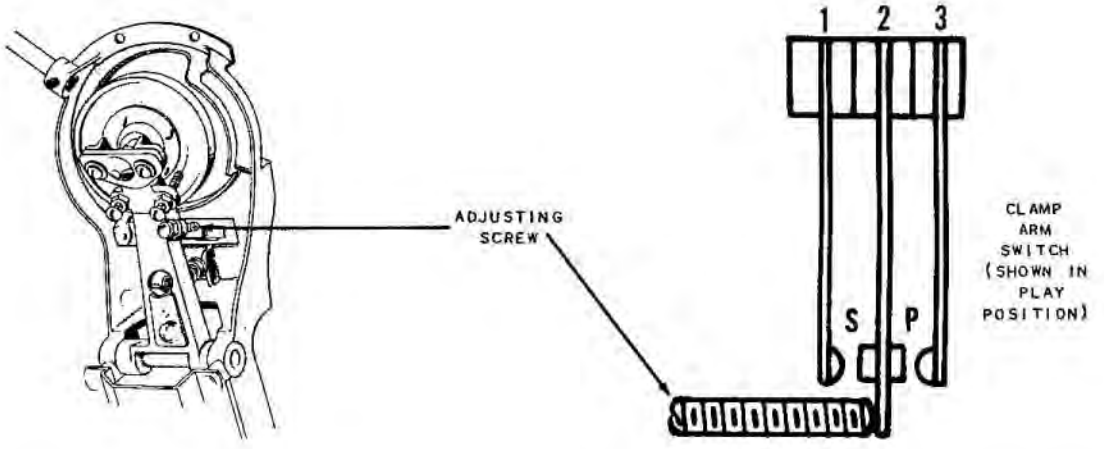
D Move Switch Lever to Right.

E Adjust RC and RS for 1/64" gaps.

F Push bakelite End Plate slowly to Right. At instant G and J just break, H and K must have .020" gaps.

All contacts must have 35 grams (1-1/4 oz.) minimum pressure when closed.

"CLAMP ARM SWITCH" - - CONTACT GAP AND BLADE PRESSURE ADJUSTMENT



CONTACTS	CONTACT GAP	CONTACT FUNCTIONS*
P	1/32" gap in PLAY position with normal record clamped on turntable. Closed in PLAY position if there is no record clamped to turntable.	"No-record" reject. Closes circuit to trip solenoid if there is no record on the turntable when mechanism is in play-position.
S	1/32" gap in PLAY position with normal record clamped on turntable. Closed in SCAN position and stays closed in PLAY if record fails to clamp properly.	Closes circuit to trip solenoid if record fails to clamp properly due to undersize hole, off-center position of record, etc.

*See Schematic Diagrams for Circuit.

ADJUSTMENT PROCEDURE

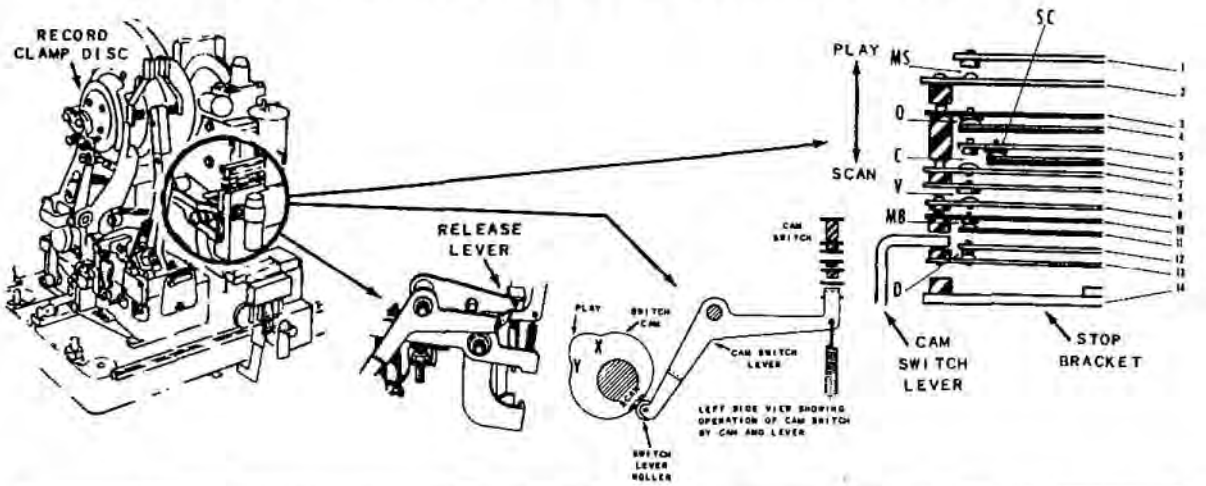
A With mechanism in SCAN, bias center blade (#2) tightly against "S" contact.

B With mechanism in PLAY and a normal record clamped on turntable - -

1. Turn adjusting screw until "P" contact just closes lightly, then back it out one turn. Tighten Lock Nut.
2. Adjust blade #1 for 1/32" gap in "S" contacts.

Contacts should have 1 oz. minimum pressure when closed.

CAM SWITCH – CONTACT GAP AND PRESSURE ADJUSTMENTS



CONTACTS	CONTACT GAP	CONTACT FUNCTIONS *
MS	1/16" gap in SCAN position. Starts to close when pickup approaches record. Closed in PLAY position.	Squelch circuit for use with Automatic Volume Compensator. *See Note.*
O	3/64" gap in PLAY position. Closed in TRANSFER and SCAN.	Adds 1.4 mfd condenser to motor circuit during TRANSFER and SCAN.
SC	1/64" gap in PLAY position. Closed in SCAN position.	Pin Cancel Solenoid Circuits. Just before the mechanism enters PLAY position the C and SC contacts "Make and Break" controlling the Cancel Pulse which operates either the Left or Right Pin Cancel Solenoid.
C	1/32" gap in SCAN and during most of TRANSFER. Starts to close when record Clamp Disc first engages the turntable.	
V	1/32" gap in SCAN and during most of TRANSFER. Starts to close when record Clamp Disc first engages the turntable.	Trip Solenoid Circuit. Completes all circuits which can operate Trip Solenoid in PLAY position.
MB	1/64" gap in PLAY position. Closed in SCAN position.	Mute Circuit. Maintains muting action during SCAN.
D	1/64" to 1/16" gap in SCAN	Motor Carry-over Switch. Keeps motor running (after last Selection Lever has been cancelled) until last selection is played and record is partially returned to the Magazine.

* See Schematic Diagrams for complete circuit.

ADJUSTMENT PROCEDURE

1 Place mechanism in Scan Position and TURN OFF POWER.

2 Trip mechanism by lifting Release Lever and manually turn motor shaft until record Clamp Disc first engages the Turntable. (This places cam so Switch Lever Roller is at position X.)

- **A** Bias blades 9 and 10 down tight against Switch Lever with MB closed. (1½ oz. pressure).
- **B** Bias blade 7 against blade 8 and adjust for 1/32" gap in V Contacts.
- **C** Bias blade 3 down so fiber lift touches blade 7 with O Contacts closed. (1½ oz. pressure). V Contacts should still have 1/32" gap.

D With SC Contacts closed (1½ oz. pressure) adjust for 1/32" gap in C Contacts.

3 Turn motor shaft until mechanism is fully in PLAY position. (This places cam so Switch Lever Roller is on Play position "Peak").

A Adjust blade 4 for 3/64" gap in O Contacts.

B Adjust blade 6 for 1/64" gap in SC Contacts.

C Adjust blade 11 for 1/64" gap in MB Contacts.

4 Trip mechanism by lifting Release Lever and manually turn motor shaft until Clamp Disc begins movement away from Turntable. (This places cam so Switch Lever Roller is at position Y).

A Check for 1/32" gap in C Contacts with SC closed. (1½ oz. pressure).

B Check to see that blades 9 and 10 bear against Switch Lever.

C Check for 1/32" gap in V Contacts.

D Bias blade 13 against Switch Lever with D Contacts closed (1½ to 3 oz. pressure). Fiber stop on the Stop Bracket (14) must clear blade 13 by 3/64".

E Adjust blade 12 by "cut-and try" until mechanism will not coast into Scan Position. (Mechanism can stop any time after record is unclamped and partially returned to the Magazine but it should not coast into SCAN.)

F With mechanism in Scan Position, Adjust position of Stop Bracket (blade 14) for 1/64" to 1/16" gap between D Contacts.

G Adjust blade 1 so fibre lift is touching lightly on blade 3.

5 Trip and operate mechanism until it is in SCAN position. *See Note.*

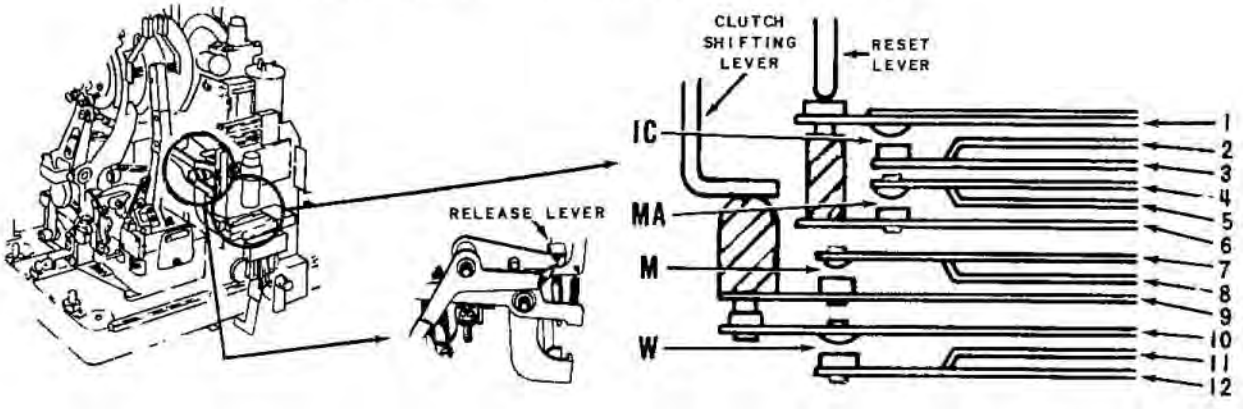
A Adjust blade 2 so fibre lift bears lightly against blade 3.

B Adjust blade 1 for 1/16" gap between MS contacts.

NOTE: Step 5 is for adjustment of the MS contacts. These contacts are not included in the cam switch of mechanisms associated with amplifiers not having automatic volume compensation feature.

Select-O-Matic "100" Mechanism

CLUTCH & RESET LEVER SWITCHES
CONTACT GAP & PRESSURE ADJUSTMENT



NOTE: "Clutch 1" to "4" Mechanical Adjustments must be correct before adjusting these switches.

CONTACTS	CONTACT GAPS	CONTACT FUNCTIONS*
IC	1/16" gap when mechanism trips. Closed in SCAN and PLAY positions.	Part of Pin Cancel Solenoid Circuits. Allows cancellation of Selection Lever when mechanism is transferring into PLAY position but prevents "Extra" cancellation when mechanism is transferring out of PLAY position.
MA	1/64" gap in PLAY position. Closed in Tripped position.	Part of Mute Circuit. Mutes Amplifier at end of record at instant Trip Solenoid is operated.
M	1/64" gap in PLAY position. Closed during Transfer cycles.	Part of Mute Circuit. Maintains Muting action during entire Transfer cycle.
W	1/32" gap in PLAY position. Closed in SCAN position.	Part of Trip Solenoid circuit for both Left and Right side selections.

*See Schematic Diagrams for Circuit.

ADJUSTMENT PROCEDURE

1 Place mechanism in Scan Position and TURN OFF POWER.

2 Trip by manually lifting Release Lever. While mechanism is in this position:

- A Bias blade 1 to within 1/16" of Reset Lever.
- B Bias blade 6 so its fibre lift is against blade 1.
- C Bias blade 9 so its fibre lift is against Clutch Shifting Lever.
- D Bias blade 10 so its fibre lift is against blade 9.
- E Bias blade 3 against bracer blade 2 and adjust blade 2 for 1/16" gap between IC Contacts.

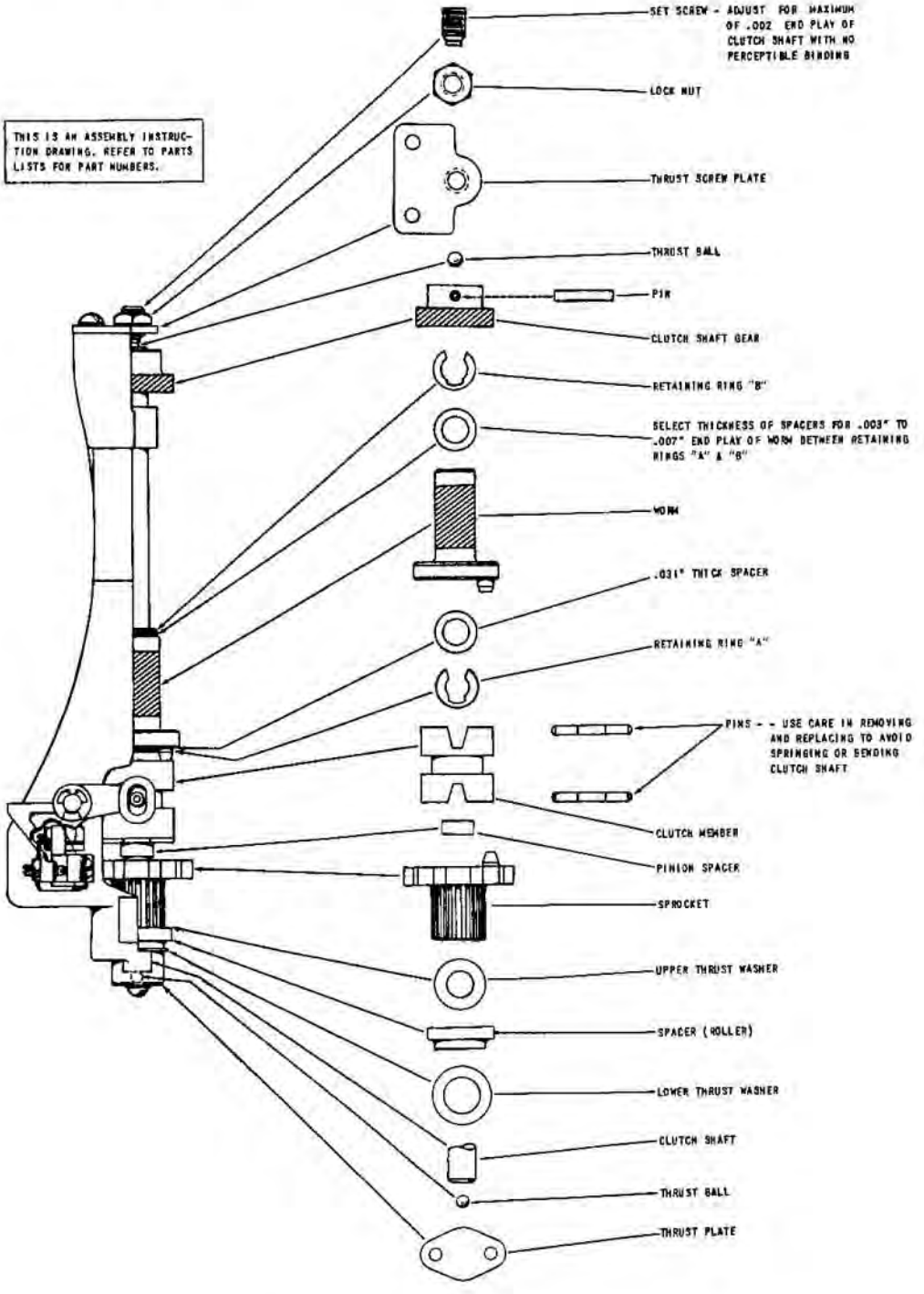
3 Reset mechanism by pressing down on Release Lever.

- A Bias blade 4 against bracer blade 5 and adjust blade 5 for 1/64" gap between MA Contacts.

4 Trip mechanism by lifting Release Lever and turn motor shaft manually until mechanism is in Play Position.

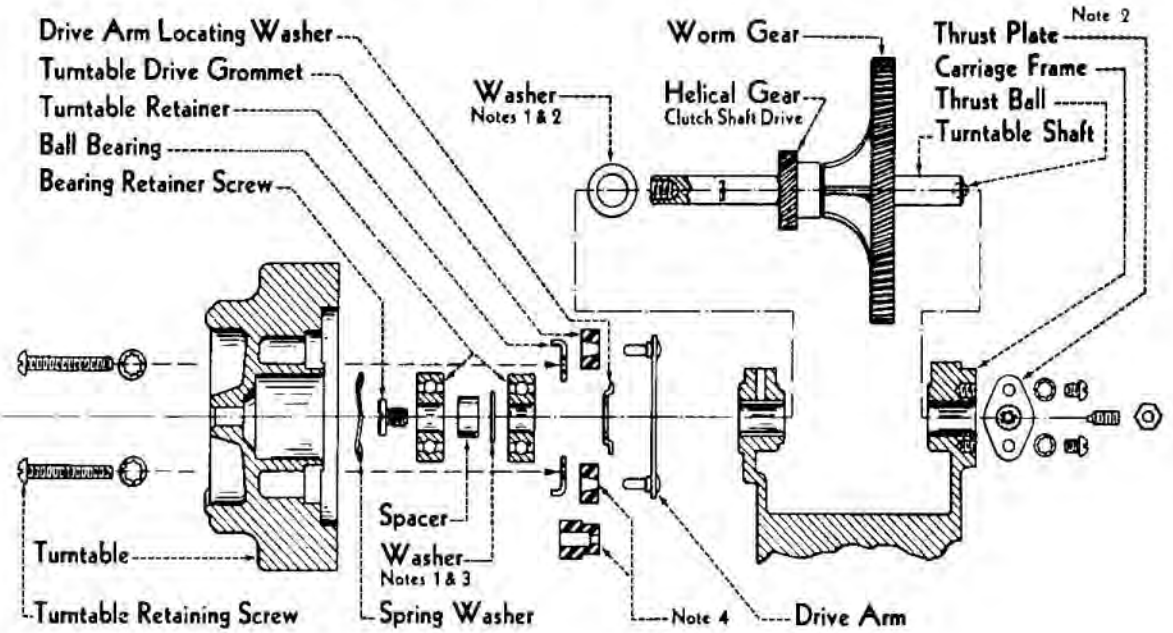
- A Bias blade 7 against bracer blade 8 and adjust blade 8 for 1/64" gap between M Contacts
- B Bias blade 12 against bracer blade 11 and adjust blade 11 for 1/32" gap between W Contacts.

CLUTCH & HOUSING ASSEMBLY, PART #245400, INSTRUCTION



BE SURE CLUTCH WORM AND CAM SHAFT DRIVE GEAR ARE CORRECTLY MESHED BEFORE TIGHTENING CLUTCH ASSEMBLY MOUNTING SCREWS.

TURNTABLE, SHAFT, and GEAR INSTALLATION



Note 1: ..... Washer Part No. 72277 - .005" thick
" " " 72278 - .010" "
" " " 72279 - .015" "

Note 2: ..... Select Washers and install between Clutch Shaft Drive Gear and left Turntable Shaft Bearing so end play of Turntable Shaft is .003" to .007". When thrust plate has screw for adjusting end play of shaft, use one No. 72279 washer and adjust for .003" to .007" end play with screw.

Note 3: ..... Select Washers and install between Spacer and Ball Bearing so end play of Turntable on the Shaft is a maximum of .015". To check this, hold Turntable Shaft firmly against the Thrust Plate, by pressing against the Worm Gear, and move the Turntable to the right in a direction parallel to the Turntable Shaft. The Spring Washer must always take out the end play by returning the Turntable to the left when released.

Note 4: ..... Turntable Drive Grommet with tapered center hole is to be installed with small end of tapered hole toward the Drive Arm. When assembled correctly, the part number, which is molded on the end with the large end of the center hole, will not be visible.

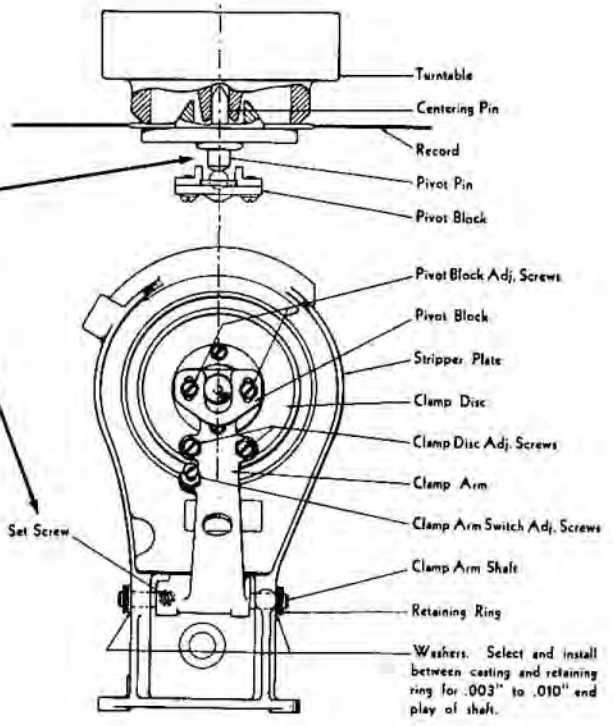
Drive Grommets with "step" should be installed with the small diameter end toward the Drive Arm.

Lubrication: The Gears should have a light coating of Stanodrip #29 (Standard Oil Co) oil. Do not use more oil than will adhere to the Gears. The felt wick in the Thrust Screw for the Turntable Worm (which meshes with the Worm Gear) must be placed in the hole in the screw so it is in contact with the Thrust Ball. The wick should be saturated with Stanodrip #29 oil.

INSTALLATION of CLAMP & TRANSFER ARMS

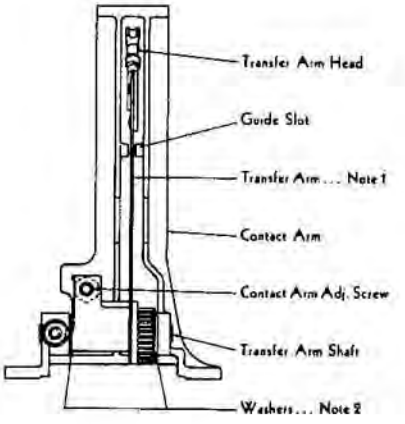
With the Set Screw loose and a Record clamped on the Turntable, adjust the horizontal position of the Clamp Arm so the Center Line through the Pivot Pin forms a right angle with the Clamp Disc and Record.

When installation is complete, readjust Clamp Arm. Refer to Page 2146.



Note 1: Transfer Arm should be straight and should form a right angle with the Transfer Arm Shaft.

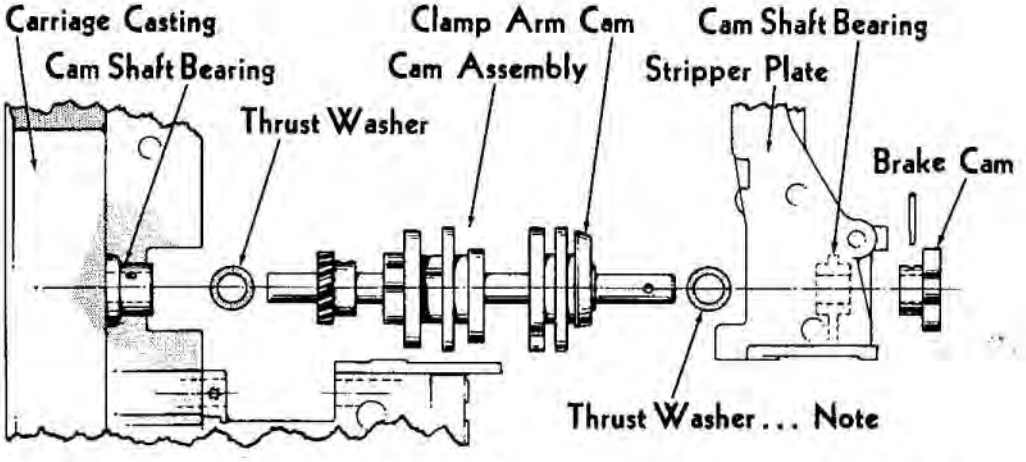
Note 2: Washers, Part No. 72174 (.015"), 72280 (.010"), 72281 (.020"), 72282 (.031") should be selected and placed at both ends of the Transfer Arm hub so the Arm falls in the center of the Guide Slot in the Contact Arm and so the end play of the Arm is .003" to .007". There must be at least one washer at each end of the hub.



Note 3: When installing assembly on carriage, mechanism and Transfer Arm should be in SCAN position with reference marks aligned as shown.

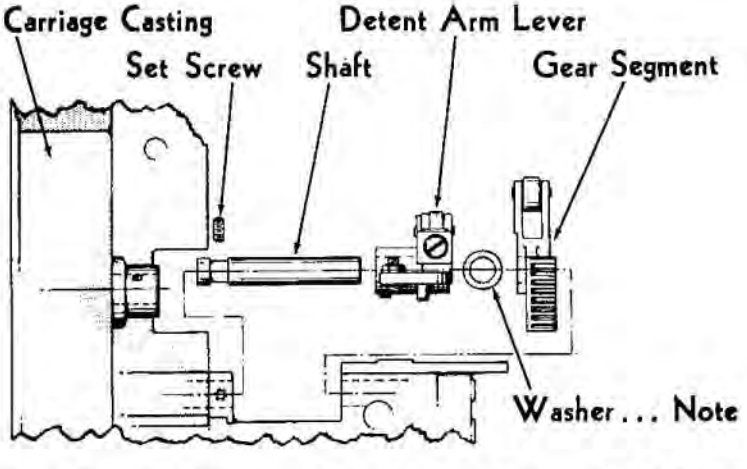
When installation is complete, readjust Transfer Arm. Refer to Pages 2149 and 2150.

INSTALLATION of CAM ASSEMBLY, DETENT ARM & GEAR SEGMENT



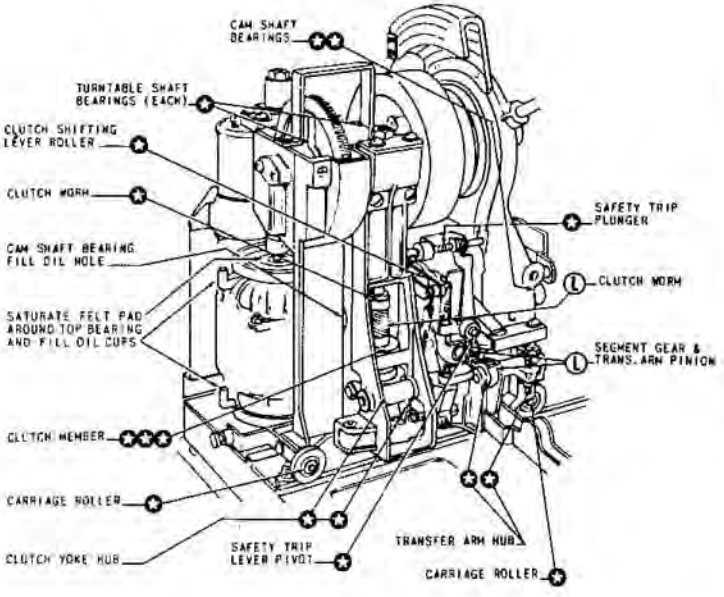
Note: Washers, Part No. 72245 (.020"), 72227 (.005"), 72228 (.010"), 72229 (.015") should be selected and installed between the Clamp Arm Cam and the Thrust Washer so the end play of the Cam Assembly is .003" to .010".

After the proper washers have been installed, the cam assembly should be checked by manual rotation, a full turn in either direction without evidence of binds.



Note: Washers, Part No. 72216 (.015"), 72217 (.010"), 72254 (.005") should be selected and installed between the Detent Arm Lever and the Gear Segment so the end play is .003" to .010".

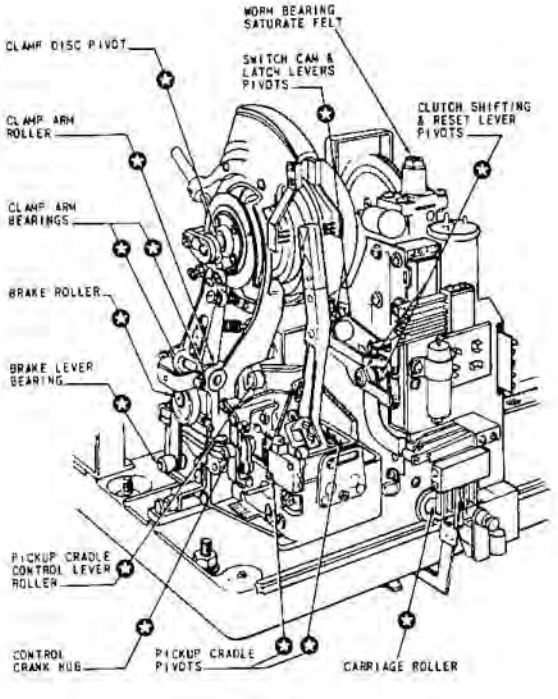
LUBRICATION

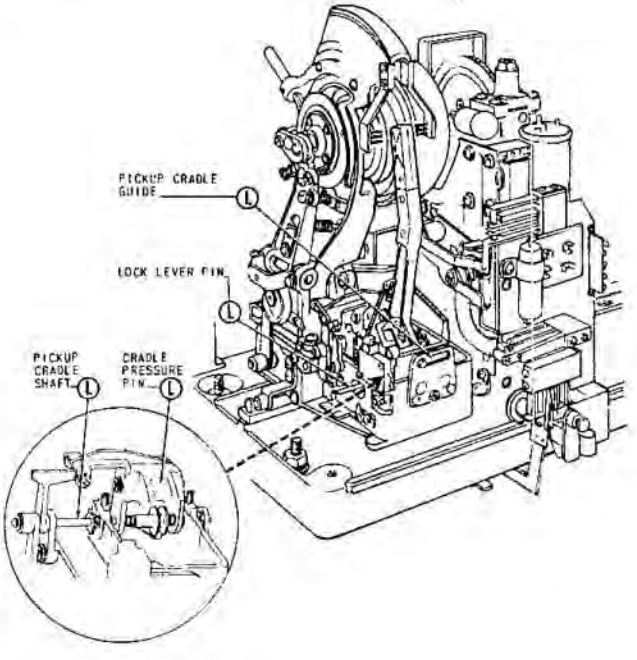


OIL ALL ROLLER PIVOT BEARINGS
1 or 2 DROPS. USE SAE 20 OIL.

USE SAE 20 OIL EVERY SIX MONTHS IN THE AMOUNT SHOWN - - - - -
1 DROP FOR EACH ✪

USE AERO LUBRIPLATE* SPARINGLY EVERY SIX MONTHS AT (L)

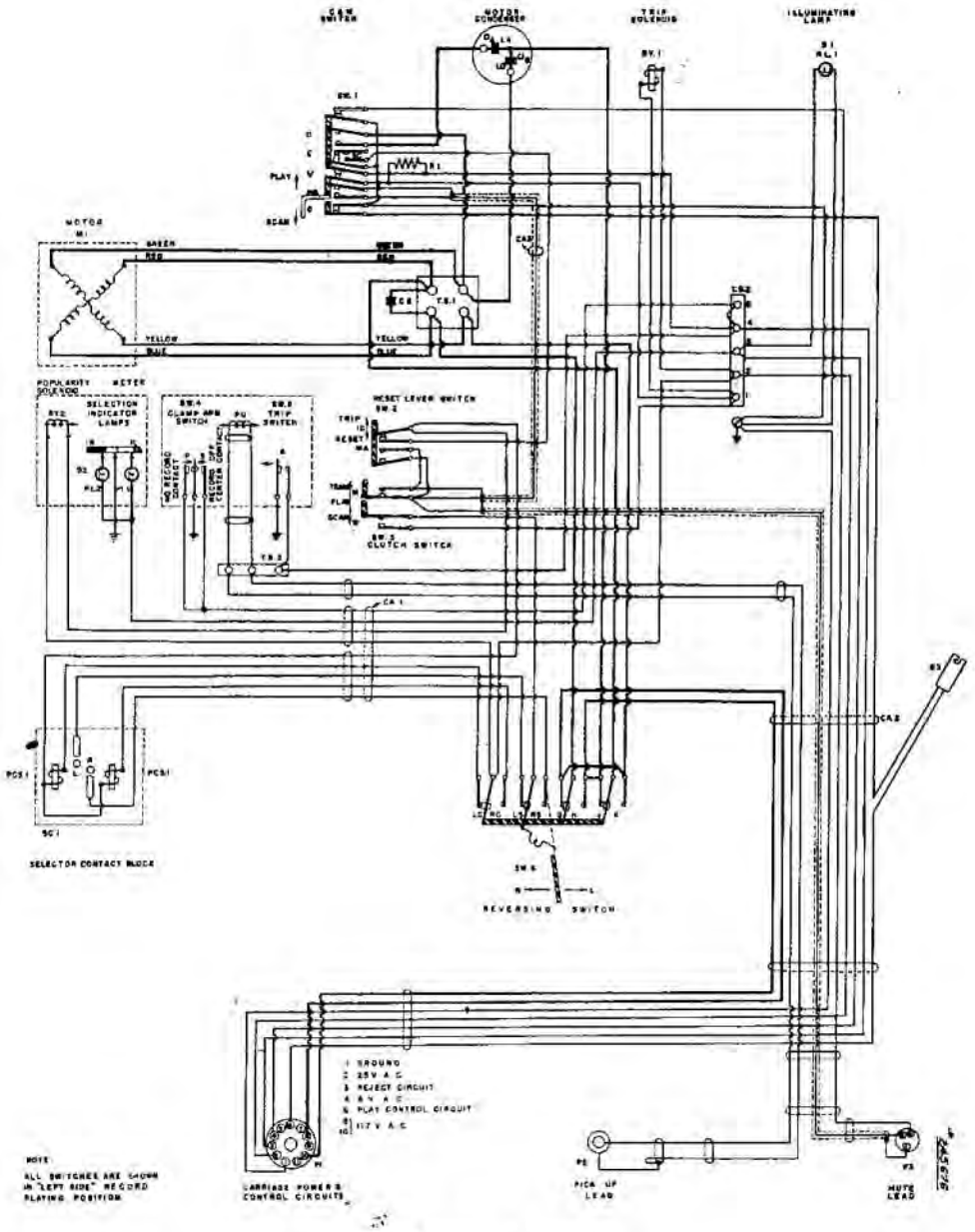




*AERO LUBRIPLATE MAY BE OBTAINED FROM THE SERVICE PARTS DEPARTMENT AT YOUR DISTRIBUTOR

SEEBURG

SCHEMATIC DIAGRAM



PARTS LIST

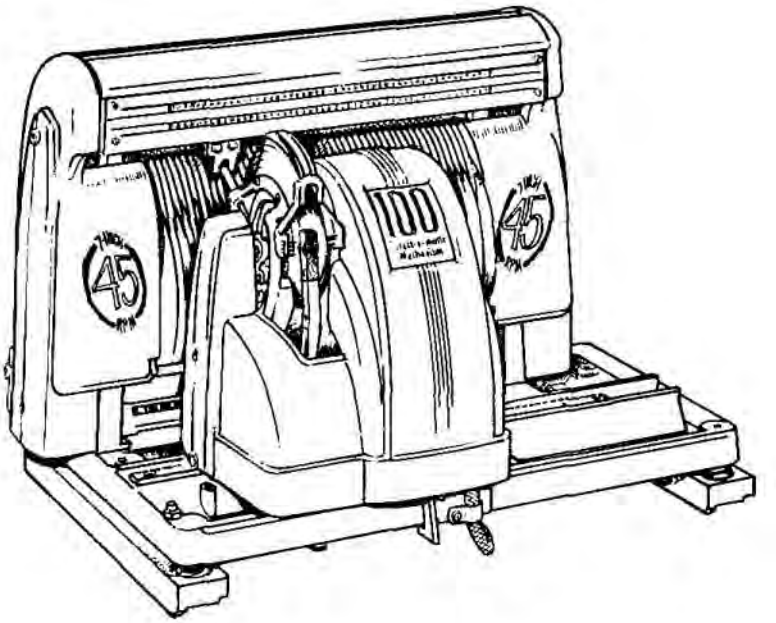
ITEM	PART NO.	DESCRIPTION
C1a	86172	1.4 mfd. Motor Condenser
C1b		1.0 mfd.
C2	86155	0.1 mfd. 600 v. Condenser
CA1	245915	Cable
CA2	245971	Cable Assembly
CA3	245916	Mute Cable
M1	A250251	Motor Assembly
P1	A250942	11-prong Plug
P2	K228440	Single-prong Plug
P3	A250938	3-prong Plug
PU	245789	Pickup Cartridge
	245795	Sapphire Stylus (card of 2)
PL1	7817	No. 81 Lamp
PL2	10192	No. 44 Lamp
PSC1	304370	Pin Cancel Solenoid
R1	82704	1500 ohm 1 watt Resistor

ITEM	PART NO.	DESCRIPTION
RY1	245578	Trip Solenoid
RY2	245159	Popularity Meter Solenoid
S1	245250	Lamp Socket
S2	245142	Lamp Socket
S3	250707	Connector
SC1	304363	Selector Contact Block, complete
SW1	245968	Cam Switch
SW2	245912	Clutch Switch
SW3		Reset Lever Switch
SW4	245065	Clamp Arm Switch
SW5	245816	Record Trip Switch
SW6	245907	Reversing Switch
TS1	245909	Motor Terminal Strip
TS2	245910	5-lug Terminal Strip
TS3	245755	3-lug Terminal Strip

SEEBURG

SELECT-O-MATIC "100" MECHANISM

Type 145S10-L6



The Select-O-Matic "100" Mechanism, Type 145S10-L6, is designed for use with 45 r.p.m., 7" records, in the Select-O-Matic "100", Model 100W. The operation and service data for this mechanism are similar to that of the 145S2-L6 Mechanism and the same as that of the 145S7-L6 Mechanism. The differences between the 145S10-L6 and the 145S2-L6 Mechanisms are in the color of some of the exposed parts, the decorative trim, the Popularity Meter reset and the inclusion of the squelch switch contacts that are incorporated in the Cam Switch of the 145S10-L6 Mechanism. The difference between the 145S10-L6 Mechanism and the 145S7-L6 Mechanism is only in the color of some of the exposed parts.

An index for the service data is given on the following page. A complete listing of the parts for the 145S10-L6 Mechanism begins on page 2255.

- INDEX -

ADJUSTMENTS:

Clutch ..... 2139 to 2142
Trip Solenoid Position 2144
Safety Lever Position 2145
Clamp Arm 2146
Magazine ..... 2147 - 2148
Transfer Arm ..... 2149 - 2150
Contact Block 2151
Guide Rollers 2152
Pickup ..... 2153 to 2164
Selection-Playing Indicator ..... 2165 - 2166
Popularity Meter ..... 2167 - 2168
Reversing Switch ..... 2169 - 2170
Clamp Arm Switch 2171
Cam Switch ..... 2226 - 2227
Clutch and Reset Lever Switches 2174

INSTALLATION INFORMATION:

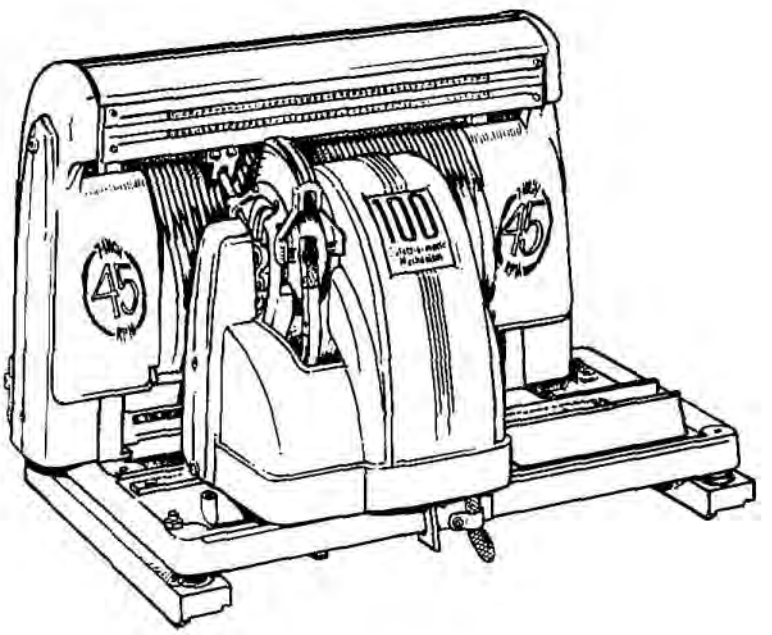
Clutch and Housing 2175
Turntable Shaft and Gear 2176
Clamp and Transfer Arms 2177
Cam Assembly, Detent Arm and Gear Segment 2178

LUBRICATION CHART 2179
PARTS LIST ..... 2255 to 2273
SCHEMATIC DIAGRAM 2228

SEEBURG

SELECT-O-MATIC "100" MECHANISM

Type 145S11-L6



The Select-O-Matic "100" Mechanism, Type 145S11-L6 is designed for use with 45 r.p.m., 7" records, in the Select-O-Matic "100", Model HF100G. The operation and service data for this mechanism are similar to that of the 145S2-L6 Mechanism and the same as that of the 145S7-L6 Mechanism. The differences between the 145S11-L6 and the 145S2-L6 Mechanisms are in the color of some of the exposed parts, the decorative trim, the Popularity Meter reset and the inclusion of the squelch switch contacts that are incorporated in the Cam Switch of the 145S11-L6 Mechanism. The difference between the 145S11-L6 Mechanism and the 145S7-L6 Mechanism is only in the color of some of the exposed parts.

An index for the service data is given on the following page. A complete listing of the parts for the 145S11-L6 Mechanism begins on page 2255.

- INDEX -

ADJUSTMENTS:

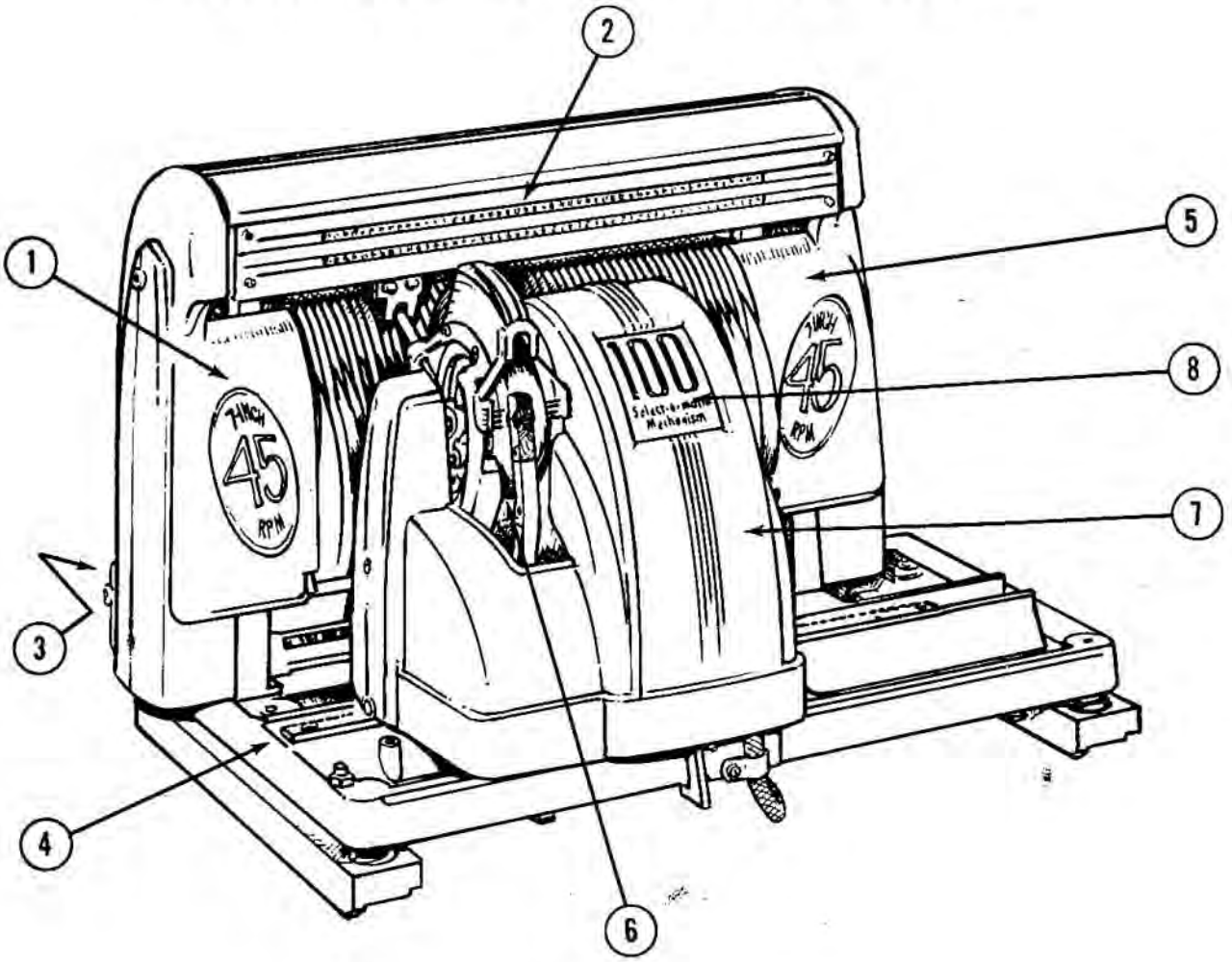
Clutch ..... 2139 to 2142
Trip Solenoid Position 2144
Safety Lever Position 2145
Clamp Arm 2146
Magazine ..... 2147 - 2148
Transfer Arm ..... 2149 - 2150
Contact Block 2151
Guide Rollers 2152
Pickup ..... 2153 to 2164
Selection-Playing Indicator ..... 2165 - 2166
Popularity Meter ..... 2167 - 2168
Reversing Switch ..... 2169 - 2170
Clamp Arm Switch 2171
Cam Switch ..... 2226 - 2227
Clutch and Reset Lever Switches 2174

INSTALLATION INFORMATION:

Clutch and Housing 2175
Turntable Shaft and Gear 2176
Clamp and Transfer Arms 2177
Cam Assembly, Detent Arm and Gear Segment 2178

LUBRICATION CHART 2179
PARTS LIST ..... 2255 to 2273
SCHEMATIC DIAGRAM 2228

MECHANISM ASSEMBLY - PARTS INDEX & PARTS LIST

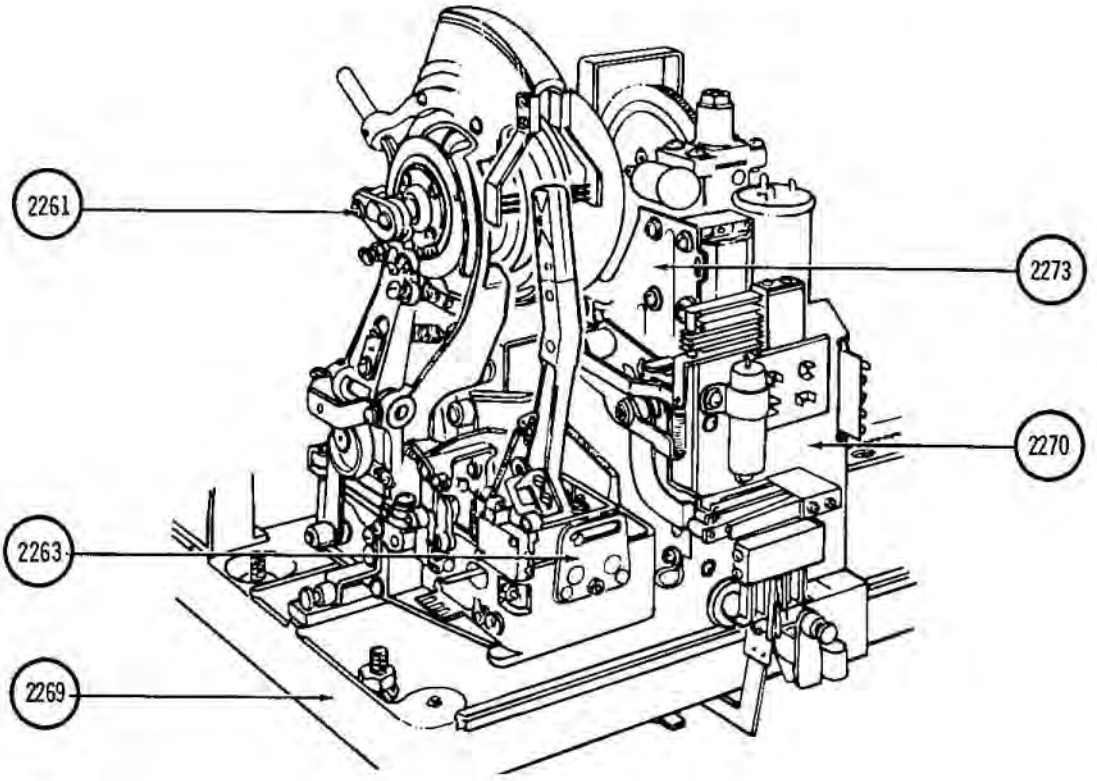


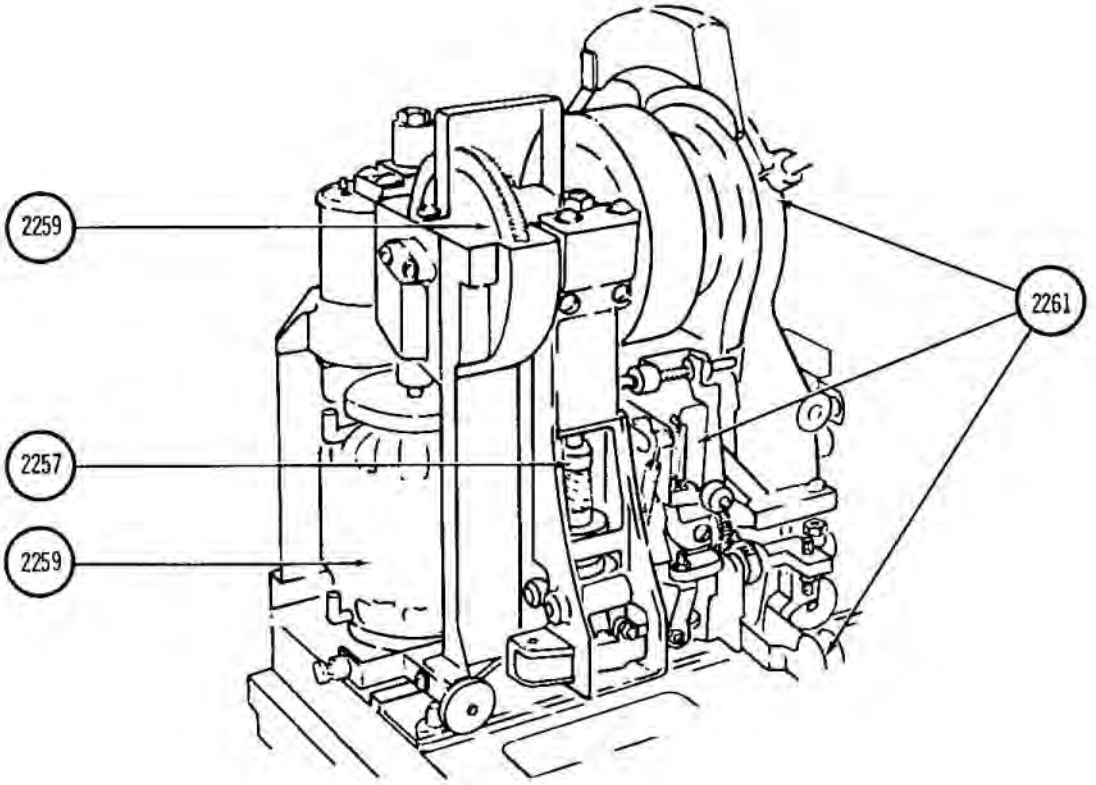
NOTE: Unless otherwise marked, parts are same for 145S10-L6 and 145S11-L6 mechanisms. Parts marked (*) are red and for 145S10-L6. Parts marked (†) are blue and for 145S11-L6.

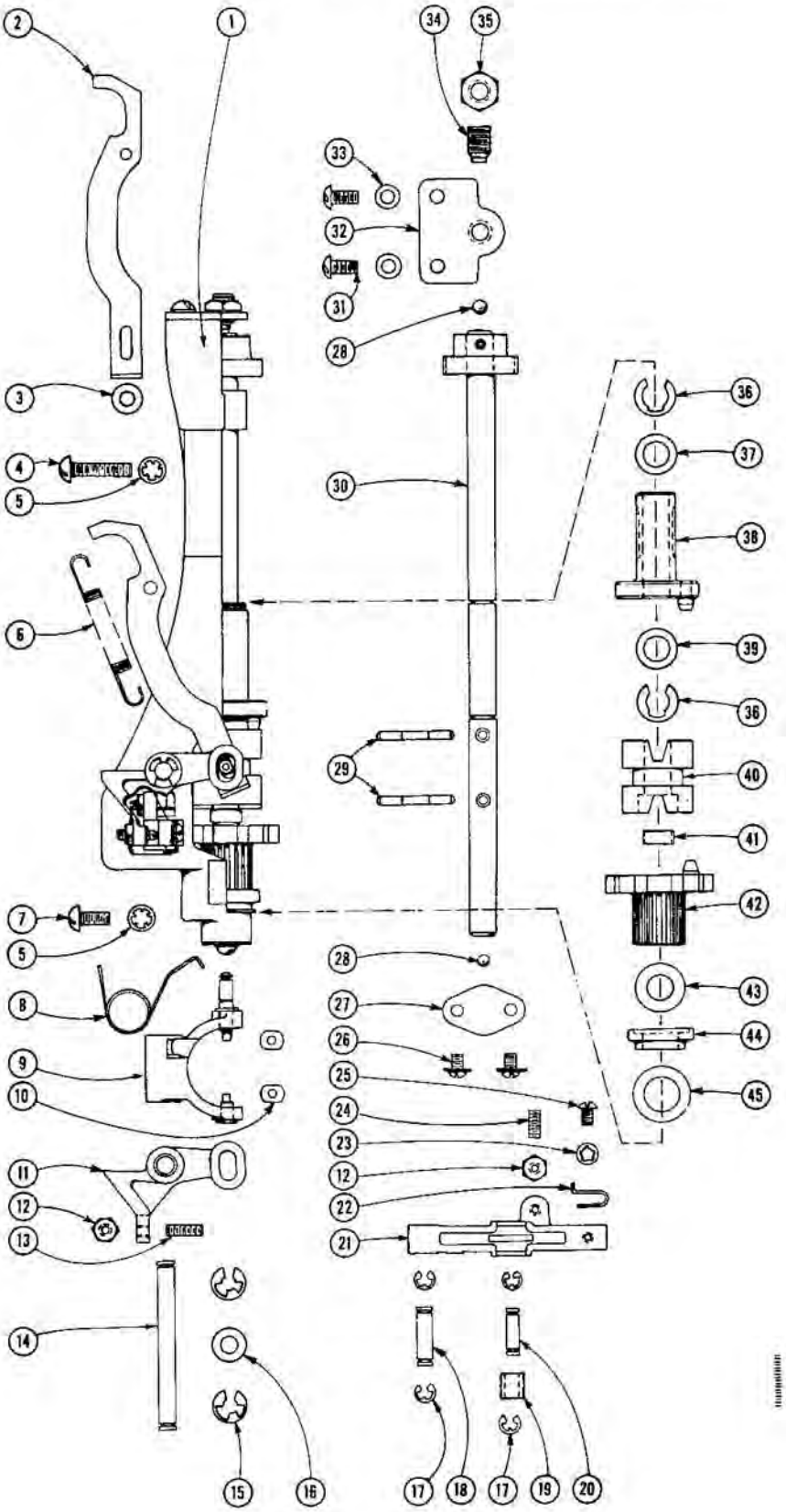
ITEM	PART NO.	PART NAME
1	246140 * 246176 †	Magazine End Housing, L.H.
	70635	1¼" Housing Mounting Screw
	71957	1½" Housing Mounting Screw
	71942	2¼" Housing Mounting Screw
2		Magazine and Popularity Meter, Page 2265 Popularity Meter Slide Assembly, Page 2267
3	304428	Selector Assembly, Type 100SA7-L6, Page 2271
4	246111	Base Assembly, Page 2269
5	246141 * 246177 †	Magazine End Housing, R.H.
	70635	1¼" Housing Mounting Screw
	71957	1½" Housing Mounting Screw
	71947	2¼" Housing Mounting Screw
6		Carriage Assembly, Page 2256
7	246136 * 246173 †	Carriage Cover Assembly
	71943	½" Cover Mounting Screw
	71127	5/16" Cover Mounting Screw
8	246138	Escutcheon Window
	246139 * 246175 †	Magazine Rear Cover

CARRIAGE ASSEMBLY PARTS INDEX

Circled numerals indicate page numbers







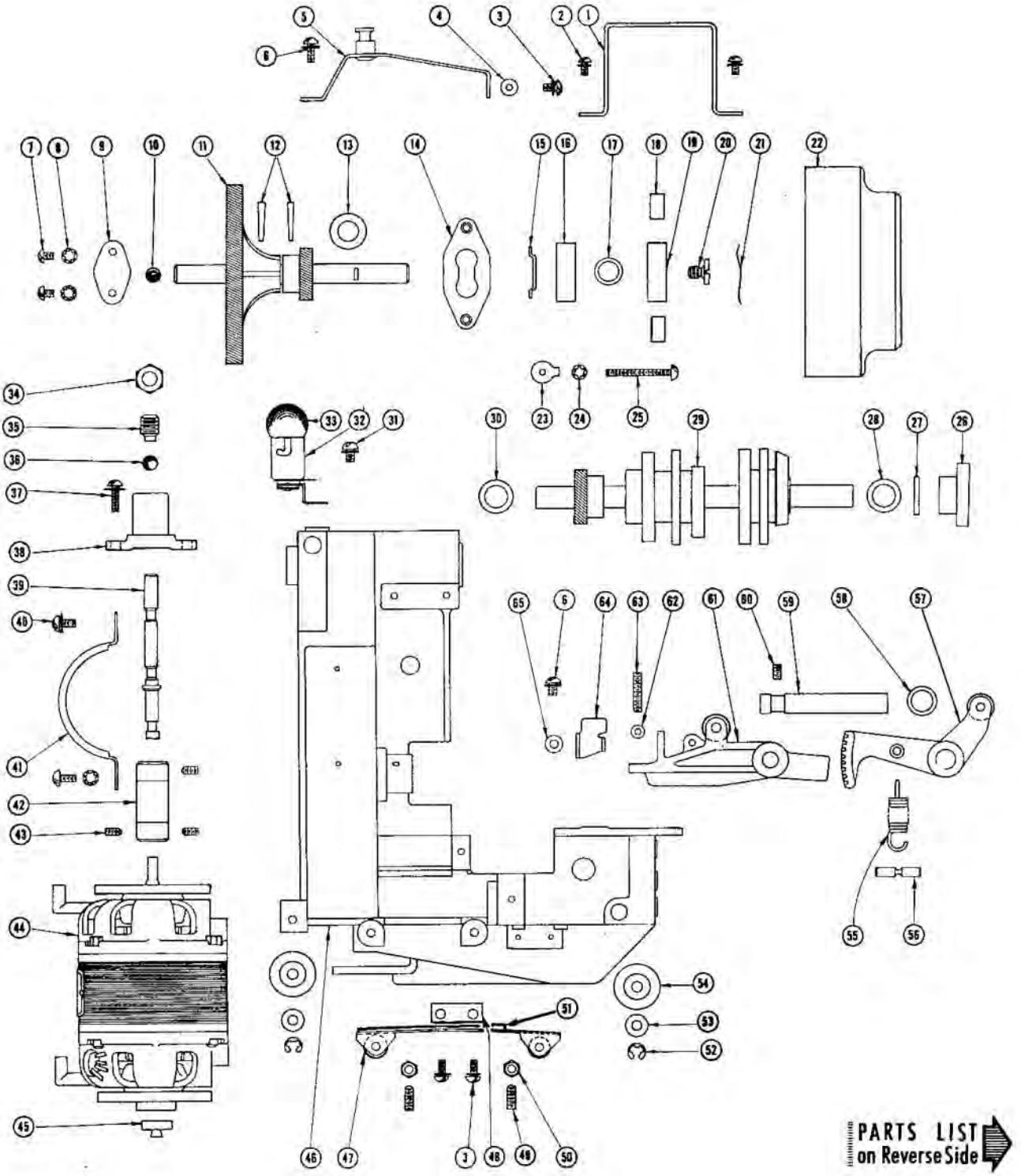
PARTS LIST on Reverse Side

CLUTCH ASSEMBLY

PARTS LIST for CLUTCH ASSEMBLY

(Preceding Page)

Item	Part No.	Description
1	245400	Complete Assembly
	245406	Clutch Housing Casting
2	245426	Connecting Link
3	72292	Flat Washer, Steel
4	71488	10 x 7/8 R.H. Machine Screw
5	73138	Lock Washer
6	245248	Clutch Spring
7	71474	10 x ½ R.H. Machine Screw
8	A250141	Detent Arm Retarding Spring
9	245408	Clutch Yoke Assembly
10	A250529	Bearing Block
11	245427	Clutch Yoke Lever
12	70153	8-32 Hexagon Nut
13	75071	8-32 x ½ Set Screw
14	A250516	Clutch Yoke Shaft
15	S229220	Snap Washer
16	72174	Spring Steel Flat Washer
17	R231163	Snap Washer
18	A250520	Detent Arm Pivot Pin
19	A250518	Detent Arm Roller
20	A250519	Detent Arm Roller Pin
21	A250506	Clutch Detent Arm
22	A250508	Clutch Detent Arm Spring
23	73082	Lock Washer
24	75094	8-32 x 5/8 Set Screw
25	71041	8-32 x 3/16 R.H. Machine Screw
26	71794	8-32 x ¼ Sems Fastener
27	245424	Thrust Plate
28	A250125	Steel Ball
29	A250523	Pin
30	245410	Shaft & Gear Assembly
	245411	Shaft, only
	245412	Gear, only
	80108	Pin
31	71061	10-32 x ½ R.H. Machine Screw
32	245425	Thrust Screw Plate
33	73119	Lock Washer
34	75070	Socket Head Set Screw
35	70105	5/16-24 Hexagon Nut
36	A250507	Snap Washer
37	72175	Spring Steel Flat Washer .031 Thick
	72216	Spring Steel Flat Washer .015 Thick
	72217	Spring Steel Flat Washer .010 Thick
38	245415	Clutch Worm
39	72175	Spring Steel Flat Washer .031 Thick
40	245417	Clutch Member
41	245418	Pinion Spacer
42	245438	Pinion Assembly
43	245421	Upper Thrust Washer
44	245422	Clutch Shaft Spacer
45	245423	Lower Thrust Washer



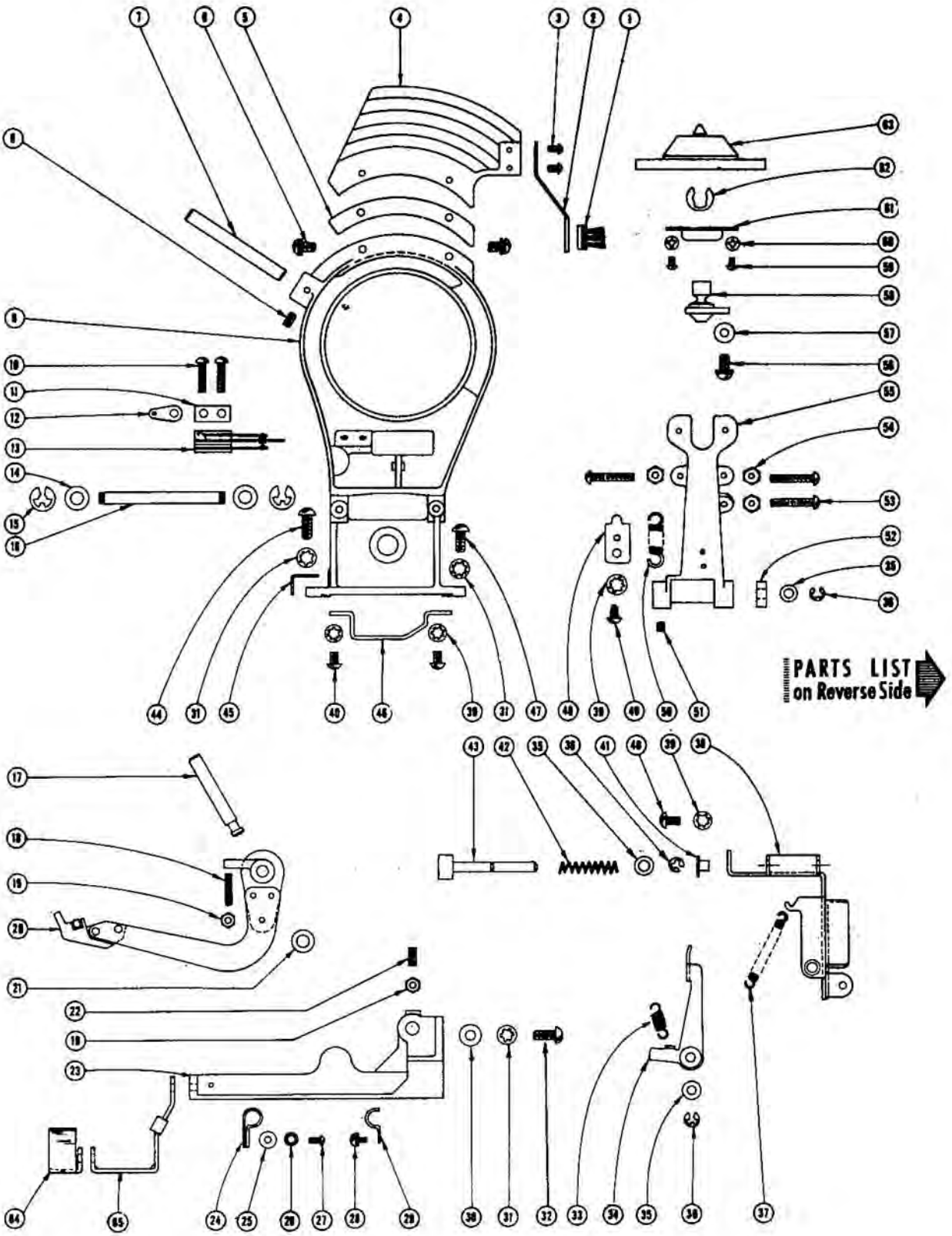
FRAME ASSEMBLY

PARTS LIST for FRAME ASSEMBLY

(Preceding Page)

Item	Part No.	Part Name
1	245120	Carriage Cover Bracket
2	71757	8-32 x ¼ Sems Fastener
3	71755	8-32 x 3/8 Sems Fastener
4	72113	Flat Washer
5	245349	Guide Stud & Bracket
6	71757	8-32 x ¼ Sems Fastener
7	71041	8-32 x 3/16 R.H. Machine Screw
8	73137	Lock Washer
9	245424	Thrust Plate
10	250125	Steel Ball
11	245257	Turntable Shaft & Gear Assembly
12	80036	Taper Pin, 3/0 x 3/4
13	72277	Spring Steel Flat Washer .010 Thick
	72278	Spring Steel Flat Washer .015 Thick
	72287	Spring Steel Flat Washer .005 Thick
14	245467	Drive Arm Assembly
15	245055	Drive Arm Locating Washer
16	245056	Ball Bearing
17	[illegible]	Ball Bearing Spacer
18	[illegible]	Turntable Drive Grommet
19	245056	Ball Bearing
20	245058	Bearing Retainer Screw
21	72288	Spring Washer, Steel
22	245060	Turntable
23	245479	Turntable Retainer
24	73088	Lock Washer
25	71631	6-32 x 1-3/8 R.H. Machine Screw
26	245016	Brake Cam
27	80108	Roll Pin, 1/8 Dia. x 3/4
28	72227	Spring Steel Flat Washer .005 Thick
	72228	Spring Steel Flat Washer .010 Thick
	72229	Spring Steel Flat Washer .015 Thick
	72245	Spring Steel Flat Washer .020 Thick
29	245062	Cam & Gear Assembly
30	250064	Thrust Washer - Cam Shaft
31	71757	8-32 x 1/4 Sems Fastener
32	245250	Lamp Socket
33	402180	No. 81 Mazda Lamp
34	70105	5/16-24 Hexagon Nut
35	75097	Set Screw
36	245180	Steel Ball
37	71791	8-32 x 1/2 Sems Fastener
38	245026	Bearing Bracket Assembly
39	245044	Turntable Shaft Worm
40	71810	8-32 x 5/16 Sems Fastener
41	250111	Clamp Bracket
42	245083	Motor Coupling Assembly
43	75009	8-32 x 3/16 Socket Head Set Screw
44	250251	Motor
45	245086	Motor Support Plug
46	245021	Carriage Frame Assembly
47	245031	Guide Roller & Spring Assembly
48	245299	Spacer Guide Roller Spring
49	75064	8-32 x 1/2 Set Screw
50	70153	8-32 Hexagon Nut
51	245986	Leaf Spring
52	R231163	Snap Washer
53	72177	Spring Steel Flat Washer .015 Thick
54	245082	Carriage Roller
55	245080	Gear Segment Spring
56	245081	Spring Pin
57	245041	Gear Segment Assembly
58	72216	Spring Steel Flat Washer .015 Thick
	72217	Spring Head Flat Washer .010 Thick
	72254	Steel-Blue Flat Washer .005 Thick
59	245043	Shaft
60	75055	10-32 x 1/4 Allen Head Set Screw
61	245037	Detent Arm Lever Assembly
62	70003	10-32 Hexagon Nut
63	75107	10-32 x 3/4 Set Screw
64	245040	Adjustment Plate
65	72113	Flat Washer .031 Thick Stl.

CAROLE ECKLAND
GROVE OKLAHOMA
[illegible] 4137 MOTHER



CARRIAGE FRAME

PARTS LIST for CARRIAGE FRAME ASSEMBLY

(Preceding Page)

STRIPPER PLATE ASSEMBLY

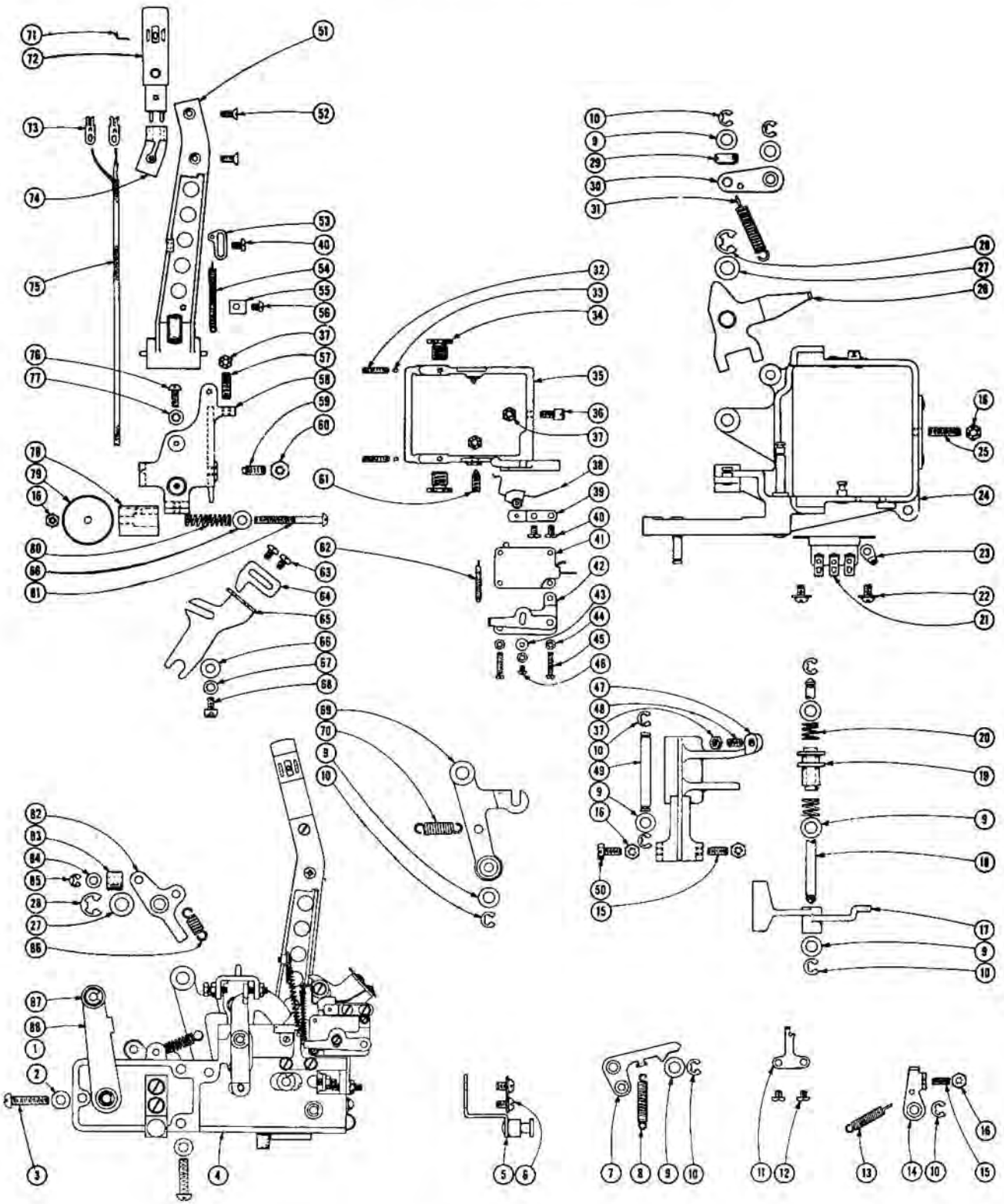
Item	Part No.	Description
1	251684	Brush
2	245295	Brush Holder, R.H.
	245296	Brush Holder, L.H.
3	70541	No. 4 x 3/16 B.H. Machine Screw
4	245110	Stripper Plate Top
5	245135	Stripper Plate Top Shim
6	71810	Sem 8-32 x 5/16 No. 1208 Lock Washer
7	245183	Sel. Indicator Drive Tube
8	75093	8-32 x 1/4 Set Screw
9	246161	Stripper Plate
10	71233	5-40 x 5/8 Fil. H. Machine Screw
11	400597	Tension Plate
12	74006	Solder Lug
13	245065	Clamp Arm Switch
14	72280	Flat Washer
15	S229220	Retaining Ring
16	245354	Shaft
44	71061	10-32 x 1/2 R.H. Machine Screw
45	245134	Transfer Arm Stop
46	245121	Carriage Cover Bracket
47	71474	10-32 x 7-16 R.H. Machine Screw
48	245070	Clamp Arm Spring Plate
49	76130	8-32 x 3/8 R.H. Thread Cutting Screw
50	245079	Clamp Arm Spring
51	75009	8-32 x 3/16 Set Screw
52	245038	Roller
53	70500	8-32 x 7/8 R.H. Machine Screw
54	70153	8-32 Hexagon Nut
55	246163	Clamp Arm & Pin Assembly
56	71751	Sems 8-32 x 3/8 R.H. Machine Screw
57	72240	Flat Washer
58	246166	Pivot Pin & Block Assembly
59	71271	4-40 x 3/16 R.H. Machine Screw
60	73136	1204 Lock Washer
61	250235	Clamp Disc. Cover
62	250507	Snap Washer
63	245072	Record Clamp Disc. Assembly

CONTACT AND TRANSFER ARM ASSEMBLIES

Item	Part No.	Description
17	245109	Transfer Arm Shaft
18	245557	Adjustment Screw
19	70001	8-32 Hexagon Nut
20	245239	Transfer Arm
21	72282	.031" Thick Steel Washer
	72281	.020" Thick Steel Washer
	72174	.015" Thick Steel Washer
	72280	.010" Thick Steel Washer
22	75052	8-32 x 7/16 Set Screw
23	245108	Contact Arm
24	602190	Clamp
25	72230	Flat Washer
26	73088	Lock Washer
27	71479	6-32 x 1/4 R.H. Machine Screw
28	71757	Sems 8-32 x 1/4
29	402098	Cable Clamp
30	72135	Flat Washer
31	73138	1210 Lock Washer
32	71090	10-32 x 7/16 R.H. Machine Screw
64	245230	Drive Bracket
65	245136	Drive Bracket Support

SAFETY TRIP ASSEMBLY

Item	Part No.	Description
33	245103	Safety Trip Lever Spring
34	245094	Lever & Hub Assembly
35	72177	Flat Washer Spring Steel
36	R231163	Snap Washer
37	245102	Detent Arm Spring
38	245088	Safety Trip Bracket Assembly
39	73137	1208 Lock Washer
40	71963	8-32 x 1/4 R.H. Machine Screw
41	245101	Eyelet
42	245100	Plunger Spring
43	245098	Plunger



PICKUP ARM FRAME ASSEMBLY

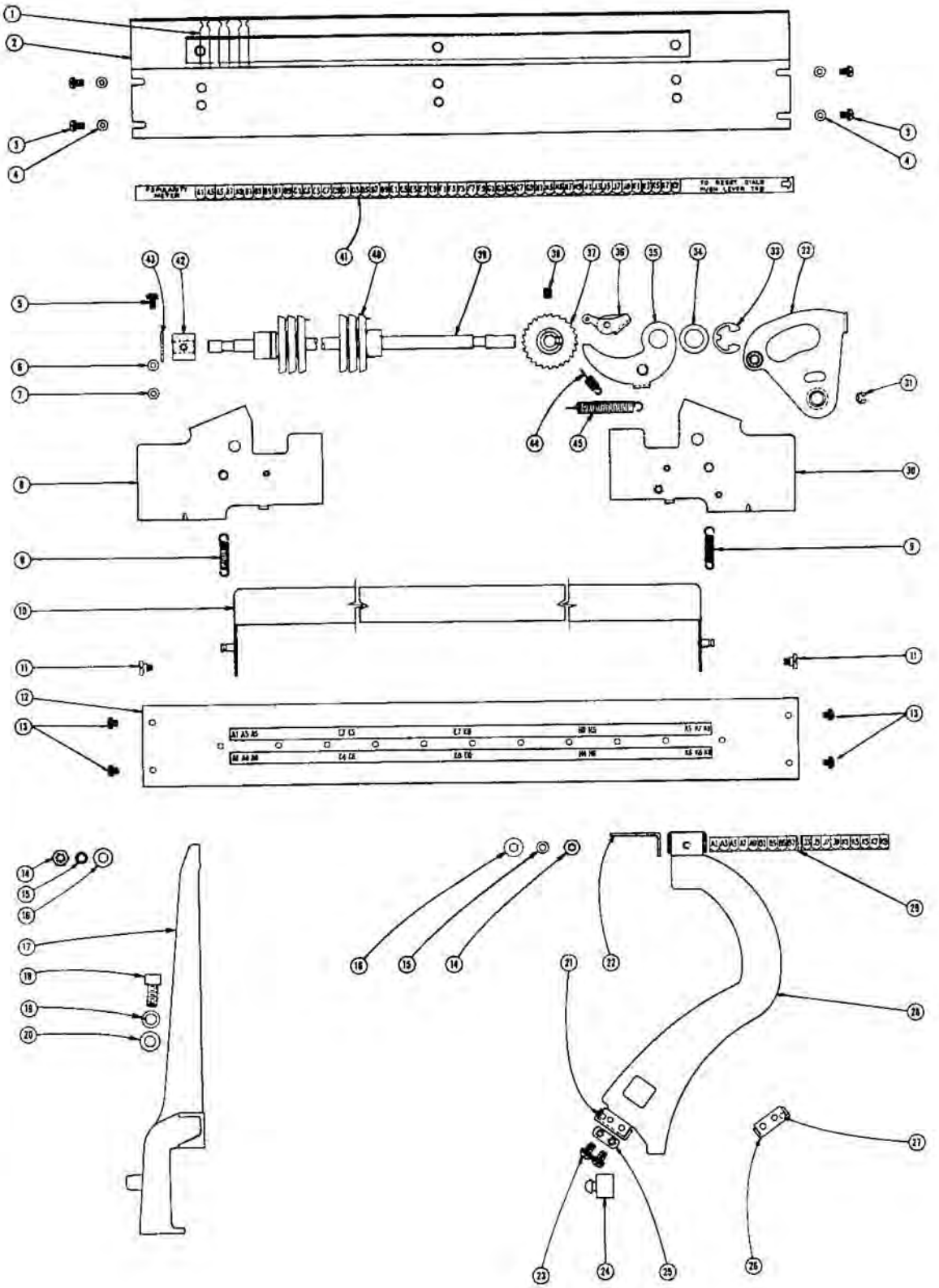
PARTS LIST on Reverse Side

PARTS LIST for PICKUP ARM FRAME ASSEMBLY

(Preceding Page)

PARTS LIST

Item	Part No.	Part Name
1	245243	Brake Lever Spring
2	73138	Lock Washer
3	71047	10-32 x 3/4 R.H. Machine Screw
4	246700	Pickup Arm & Frame Assembly
5	245127	Guide Stud
6	71757	8-32 x 1/4 Sems Fastener
7	245765	Pickup Arm Lock Lever
8	245792	Lock Lever Spring
9	72177	Flat Washer
10	R231163	Retaining Ring
11	245825	Pickup Arm Spring Lug
12	70509	5-40 x 1/8 B.H. Machine Screw
13	245773	Lock Lever Detent Spring
14	245800	Lock Lever Detent
15	75091	6-32 x 3/8 Slotted Head Set Screw
16	70152	6-32 Hexagon Nut
17	245711	Lock Lever Control Crank
18	245728	Control Fork Hinge Pin
19	245729	Shifting Collar
20	245791	Spring
21	245755	3 Lug Terminal Strip
22	71754	6-32 x 1/4 Sems Fastener
23	74007	Solder Lug
24	245753	Pickup Arm Frame Assembly
25	75095	6-32 x 5/8 Set Screw
26	245758	Cradle Actuator Lever
27	72174	Flat Washer
28	S229220	Retaining Ring
29	245740	Detent Roller
30	245762	Detent Lever
31	245764	Detent Lever Spring
32	75088	5-40 x 3/8 Socket Head Set Screw
33	245772	Lock Plug
34	245737	Adjusting Bushing
35	245771	Cradle & Pin Assembly
36	245726	Support Pin
37	70008	8-32 Hexagon Nut
38	245714	Trip Switch Lever
39	245724	Support Lug
40	71917	4-40 x 3/16 B.H. Machine Screw
41	245816	Trip Switch
42	245818	Adjusting Lever & Plate
43	72005	Flat Washer
44	73141	Lock Washer
45	71040	2-56 x 1/2 R.H. Machine Screw
46	70549	2-56 x 1/8 R.H. Machine Screw
47	245709	Control Fork
48	75092	8-32 x 3/4 Slotted Head Set Screw
49	245732	Cradle Pressure Pin
50	70504	Slotted Hexagon Head Machine Screw
51	246712	Pickup Arm & Roller Assembly
52	70502	4-36 x 5/16 Phil. Flat Head Mach. Screw
(a)	70503	4-36 x 5/16 F.H. Machine Screw
53	245715	Pickup Arm Spring Clip
54	245793	Pickup Arm Spring
55	245823	Wire Retainer
56	71272	4-40 x 1/8 R.H. Machine Screw
57	75064	8-32 x 1/2 Slotted Head Set Screw
58	245779	Pickup Arm Cradle & Pin Assembly
59	245805	P.U. Arm Shaft Set Screw
60	70003	10-32 Hexagon Nut
61	245777	Pivot Screw
62	245817	Trip Switch Balance Spring
63	71996	4-40 x 1/8 B.H. Machine Screw
64	245783	Trip Switch Actuator Plate
65	245723	Trip Switch Actuator
66	72064	Flat Washer
67	73088	Lock Washer
68	70547	6-32 x 1/4 Socket Head Cap Screw
69	245766	Control Lever & Roller
70	245769	Control Lever Spring
71	245795	Stylí, Sapphire
72	245789	Pickup Cartridge Assembly
73	74108	Solder Lugs
74	245713	Pickup Cartridge Socket
75	246734	Pickup Lead
76	71016	6-32 x 3/8 R.H. Machine Screw
77	73088	Lock Washer
78	245819	Pickup Arm Weight
79	245820	Pickup Arm Counterweight (.215" thick)
	246733	Pickup Arm Counterweight (.273" thick)
80	245821	Lock Spring
81	71631	6-32 x 1-3/8 R.H. Machine Screw
82	245760	Drive Crank
83	245745	Drive Crank Roller
84	72272	Flat Washer
85	125448	Retaining Ring
86	245782	Drive Crank Spring
87	245157	Brake Cam Roller
88	245242	Brake Cam Lever

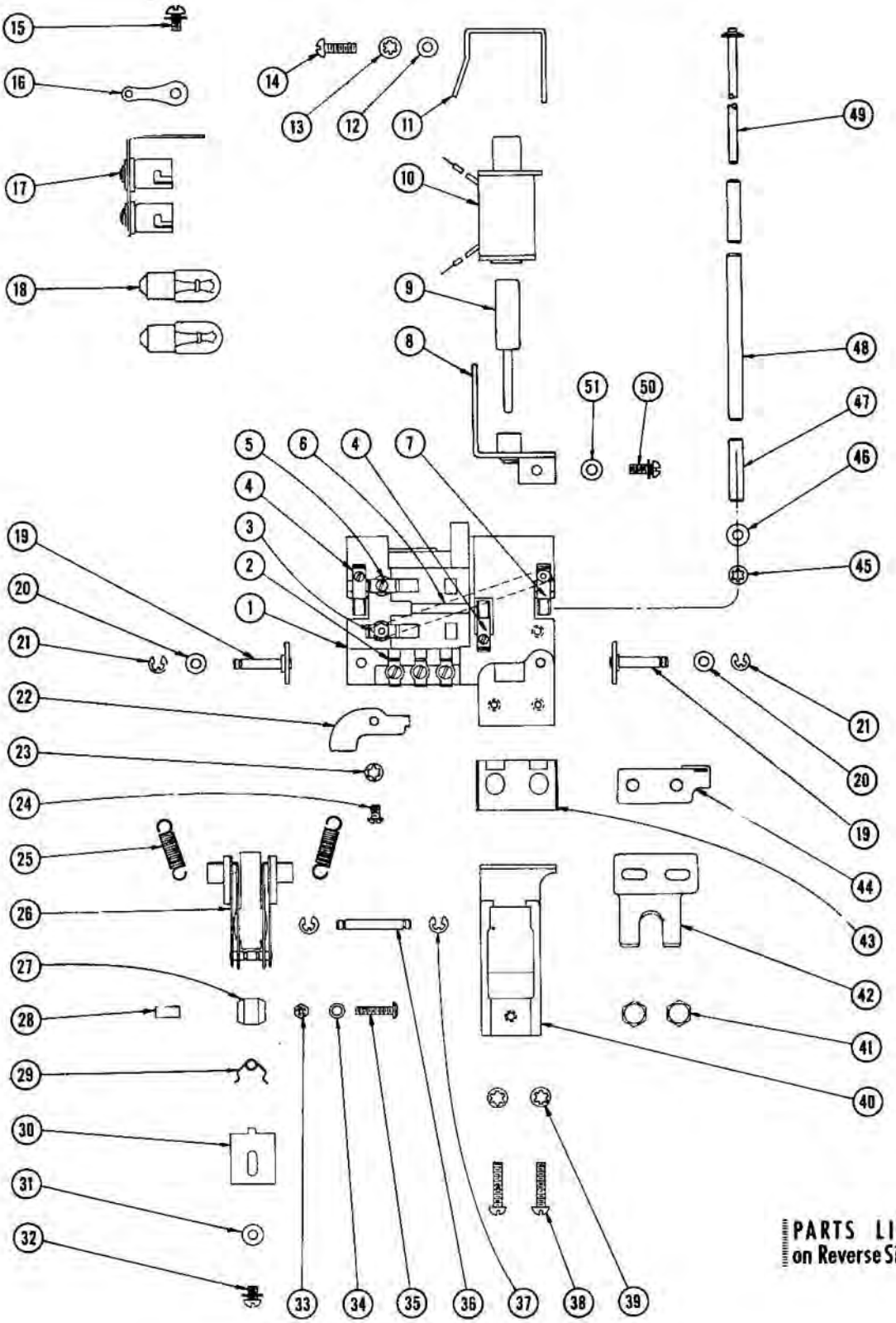


PARTS LIST for
POPULARITY METER & MAGAZINE ASSEMBLY

(Preceding Page)

Item	Part No.	Description
1	245185	Dial Stop Spring
2	246129	Tie Plate & Angle Assembly
3	71754	Sems Fastener
4	72230	Flat Washer
5	71758	Sems Fastener
6	72064	Flat Washer
7	245182	Spacer
8	246121	Indicator Bracket & Stud Assem., L.H.
9	245229	Popularity Meter Cover Spring
10	246135(*)	Cover & Stud Assembly (S10)
	246172(†)	Cover & Stud Assembly (S11)
11	245228	Meter Cover Pivot
12	245614	Selector Indicator Channel Assem.
13	71809	Sems Fastener
14	70003	10-32 Hexagon Nut
15	73119	No. 10 Kantlink Lock Washer
16	73135	Flat Washer
17	246414	Brace, R. H.
	246415	Brace, L.H.
18	71596	¼ - 20 x 9/16 Socket Hd. Cap Screw
19	73087	¼" Kantlink Lock Washer
20	72171	Flat Washer
21	245334	Record Cushion
22	245612	Support Bracket, R.H.
	245613	Support Bracket, L.H.
23	71796	Sems Fastener
24	245291	Rubber Bumper
25	245313	Plate
26	246411	Magazine Channel Assembly
27	245468	Record Cushion
28	245491	Separator & Channel Assembly
29	246413	Number Strip
30	246120	Indicator Bracket & Stud Assem., R.H.
31	R231163	Retaining Ring
32	245645	Meter Reset Lever
33	245648	Retaining Ring
34	72176	Flat Washer
35	245642	Cam Lever
36	245644	Meter Reset Pawl
37	245636	Ratchet
38	75055	10-32 x ¼ Socket
39	245625	Popularity Meter Dial & Shaft Assem.
40	245352	Popularity Dial
41	246130	Number Strip
42	245222	Thrust Collar
43	73181	Thrust Washer (Spring)
44	245673	Pawl Spring
45	245672	Cam Lever Spring

* NOTE: Unless otherwise marked, parts are same for 145S10-L6 and 145S11-L6 mechanisms. Part marked (*) is red and for 145S10-L6. Part marked (†) is blue and for 145S11-L6.



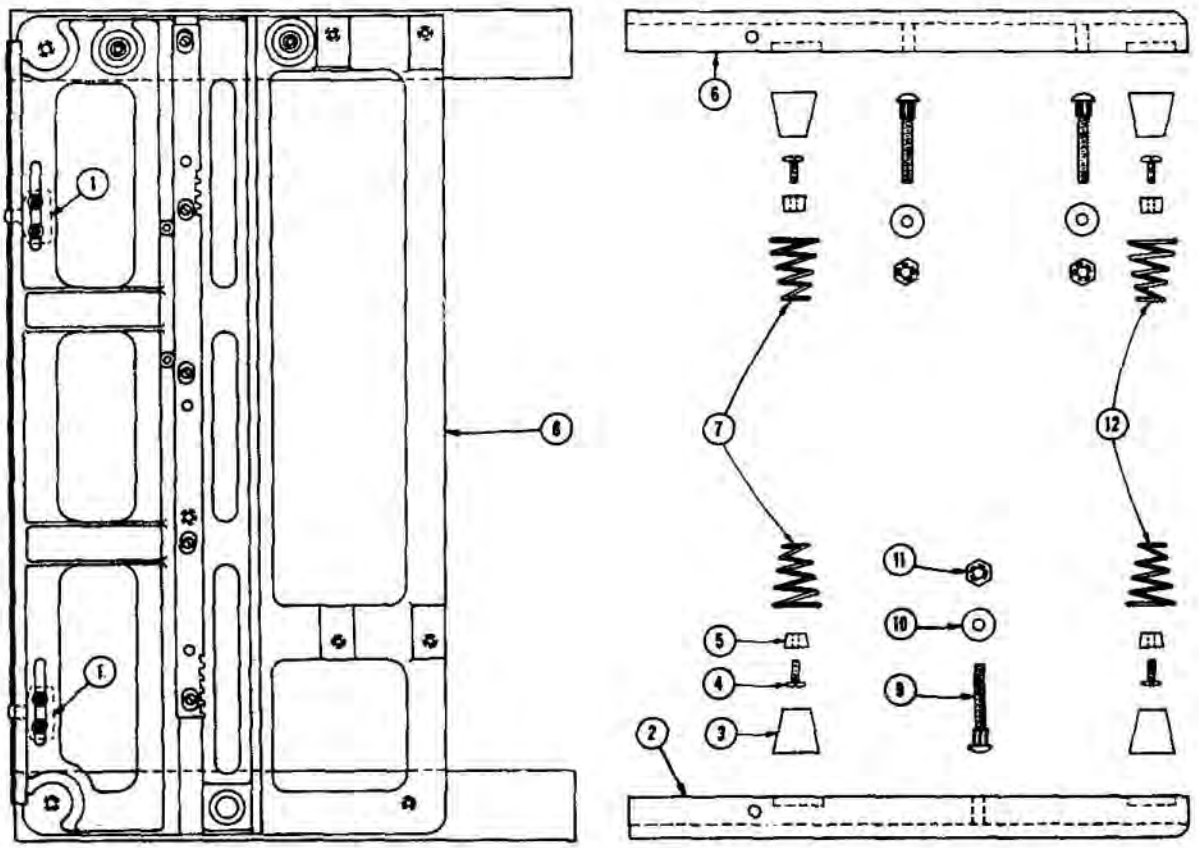
PARTS LIST on Reverse Side

POPULARITY METER SLIDE ASSEMBLY

PARTS LIST for SLIDE ASSEMBLY

(Preceding Page)

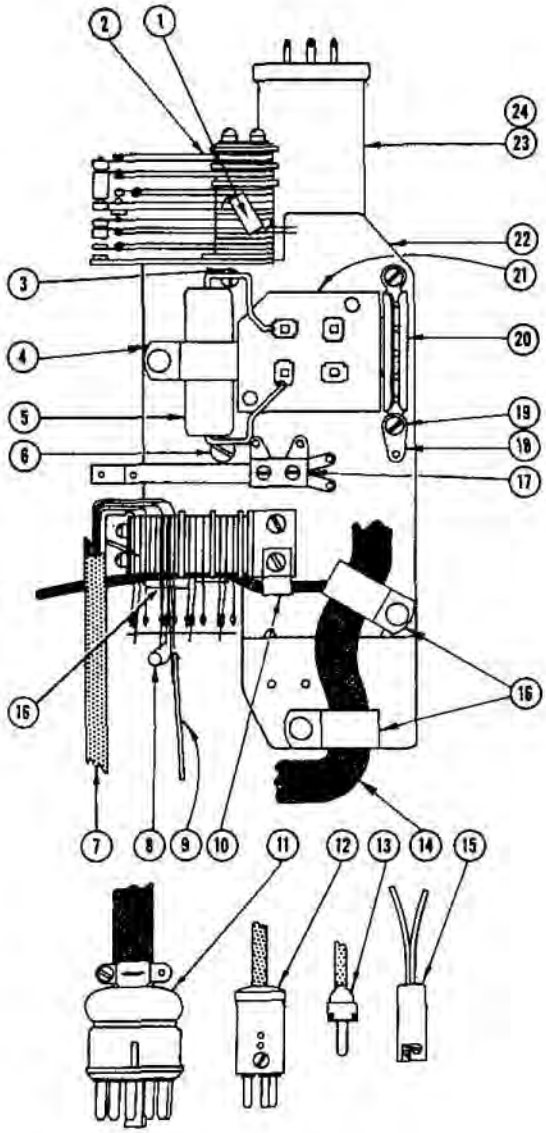
Item	Part No.	Description
1	245128	Selection Indicator Slide
2	74104	Solder Lug
	76055	No. 4 x 1/4 R.H. Self Tapping Screw
3	245156	Lamp Socket Contact Spring
	71040	2-56 x 1/2 R.H. Machine Screw
	73141	1202 Lock Washer
	70011	2-56 Hexagon Nut
4	245143	Indicator Slide Contact Spring
	76003	2-56 x 3/16 R.H. Self Tap Screw
5	245156	Lamp Socket Contact Spring
	76003	2-56 x 3/16 R.H. Self Tap Screw
6	245155	Conductor Strip
7	245143	Indicator Slide Contact Spring
	71040	2-56 x 1/2 R.H. Machine Screw
	73141	1202 Lock Washer
	70011	2-56 Hexagon Nut
8	245198	Solenoid Bracket & Stop Assembly
9	245200	Plunger Assembly
10	245159	Solenoid
11	245151	Solenoid Bracket, Upper
12	72230	Flat Washer
13	73088	1206 Lock Washer
14	71103	6-32 x 7/16 R.H. Machine Screw
15	71754	Sems Fastener
16	74003	Solder Lug
17	245142	Dual Lamp Socket Assembly
18	10192	No.44 Mazda Lamp
19	245191	Roller & Shaft Assembly
20	72272	Flat Washer
21	125448	Retaining Ring
22	245346	Right End Guide
23	73136	1204 Lock Washer
24	70541	No. 4-40 x 3/16 B.H. Machine Screw
25	245212	Rocker Arm Spring
26	245204	Rocker Arm Assembly
27	245209	Drive Shoe
28	245210	Drive Shoe Spacer
29	245154	Toggle Spring
30	245146	Spring Fulcrum Plate
31	72230	Flat Washer
32	71750	Sems Fastener
33	70119	4-40 Hexagon Nut
34	73026	No.4Kantlink Lock Washer
35	70505	No. 4-40 x 1/2 B.H. Machine Screw
36	245211	Rocker Arm Shaft
37	125448	Retaining Ring
38	71262	No. 6-32 x 5/8 R.H. Machine Screw
39	73088	1206 Lock Washer
40	245153	Rocker Arm Bracket
41	70019	No. 6-32 Hexagon Cap Nut
42	246127	Drive Bracket
43	245350	Adjuster Wedge
44	245347	Left End Guide
45	404675	Retaining Ring
46	72001	Flat Washer
47	245196	Selection Indicator Insulator
48	245195	Selection Indicator Contact Sleeve
49	245194	Indicator Slide Pin Assembly
50	71796	Sems Fastener
51	72230	Flat Washer



BASE ASSEMBLY

PARTS LIST

Item	Part No.	Description
1	245609	Rev. Switch Stop
	70185	Twin Speed Nut
2	246168	Chassis Mtg. Cleat Assembly R.H.
3	245268	Chassis Mtg. Spring Plug
4	71637	8-32 x 9/16 B.H. Machine Screw
5	245117	Spring Retainer
6	246169	Chassis Mtg. Cleat Assembly L.H.
7	245116	Chassis Mtg. Spring
8	246181	Base
9	245184	Shipping Bolt
10	72034	Flat Washer 7/8 x 3/8 x 5/64
11	70126	5/16-18 Hex. Nut, 9/16 A.F.
12	245267	Chassis Mtg. Spring, Rear

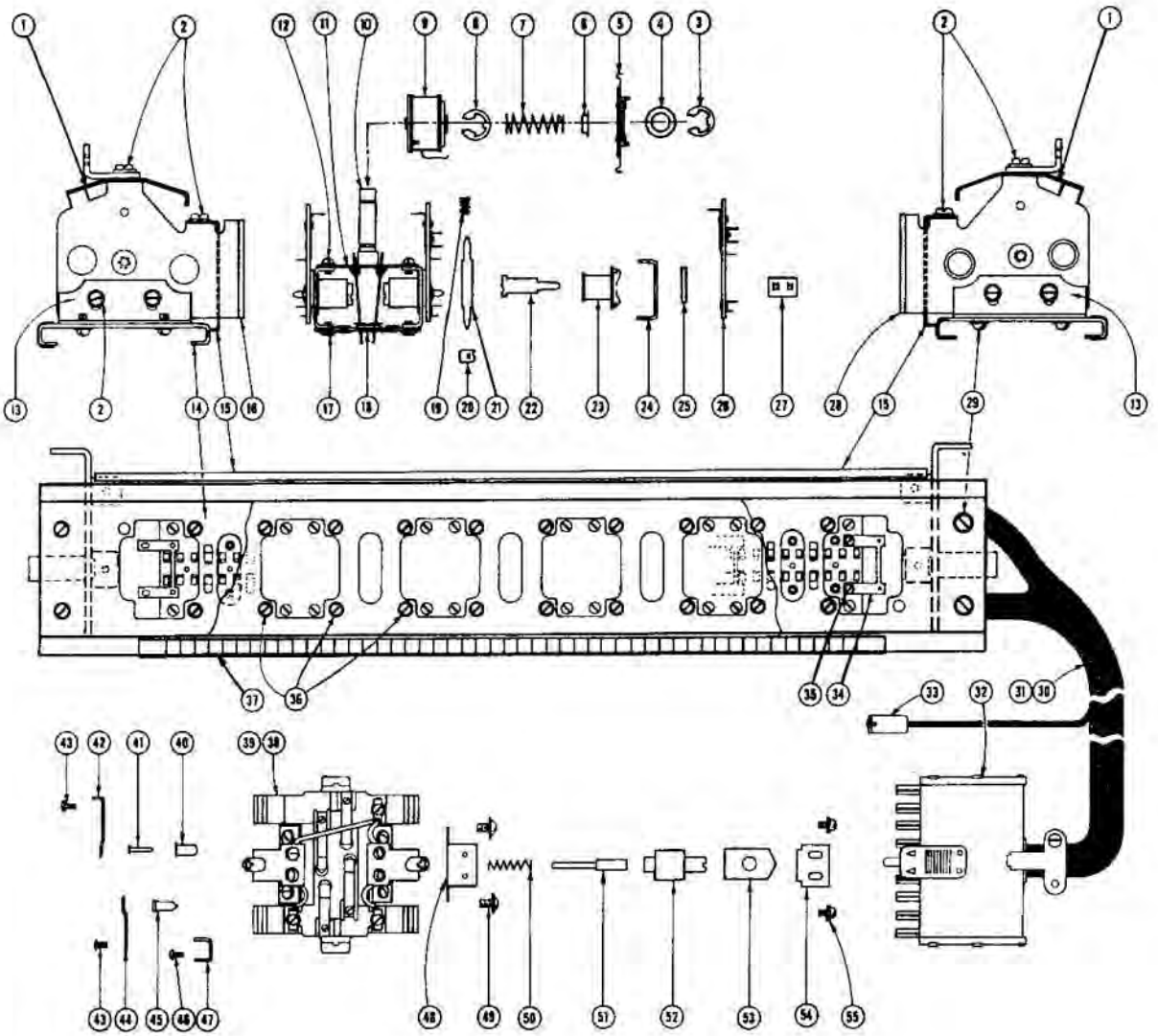


No. 245905

SWITCH PLATE ASSEMBLY

PARTS LIST

Item	Part No.	Description
1	82704	1500 ohm 10% 1 w. Resistor
2	245968	Cam Switch
	245944	Switch Stop Plate & Lifter Assem.
	400597	Tension Plate
	70644	5-40 x 1 7/8 Fil. H. Mach. Screw, Steel-Cad
3	71479	6-32 x ¼ R.H. Machine Screw
	73088	No. 1206 Lock Washer
4	245960	Plastic Clamp
5	86174	.1 mfd. 600 v. Tub. Condenser
6		Switch Plate Mounting Hardware
	71248	8-32 x ¼ Allen Soc. Hd. Cap Screw
	70546	8-32 x ½ Allen Socket Head Cap Screw
	73137	No. 1208 Lock Washer
	72113	Flat Washer 3/8 O.D. x 11/64 I.D. x 1/32 Thk.
7	245915	Internal Cable
8	245948	Spring
9	245907	Reversing Switch Assembly, Complete
	245908	Reversing Switch Bracket
	71750	6-32 x 3/16 Sems Fastener
	245946	Actuator Assembly
	245947	Tie Plate
10	602435	Plastic Clamp
	71758	6-32 x 3/8 Sems Fastener
11	250942	11-prong Plug Assembly
12	250938	3-prong Plug Assembly
13	K228440	Single Prong Plug
14	245971	Cable Assembly, complete with Plugs
	245967	Control Cable, cable only
15	250707	Connector
16	602377	Plastic Clamp
17	245912	Clutch & Reset Lever Sw.
	71733	5-40 x 1-3/8 Fil. H. Mach. Screw
	400597	Tension Plate
18	74023	Solder Lug
19	71501	6-32 x 3/16 R.H. Machine Screw
20	245910	Terminal Strip
21	245909	Terminal Board
22	245906	Switch Plate
	245918	Riveted Assembly consisting of items 21 & 22
23	86172	Motor Condenser
24	245917	Condenser Strap



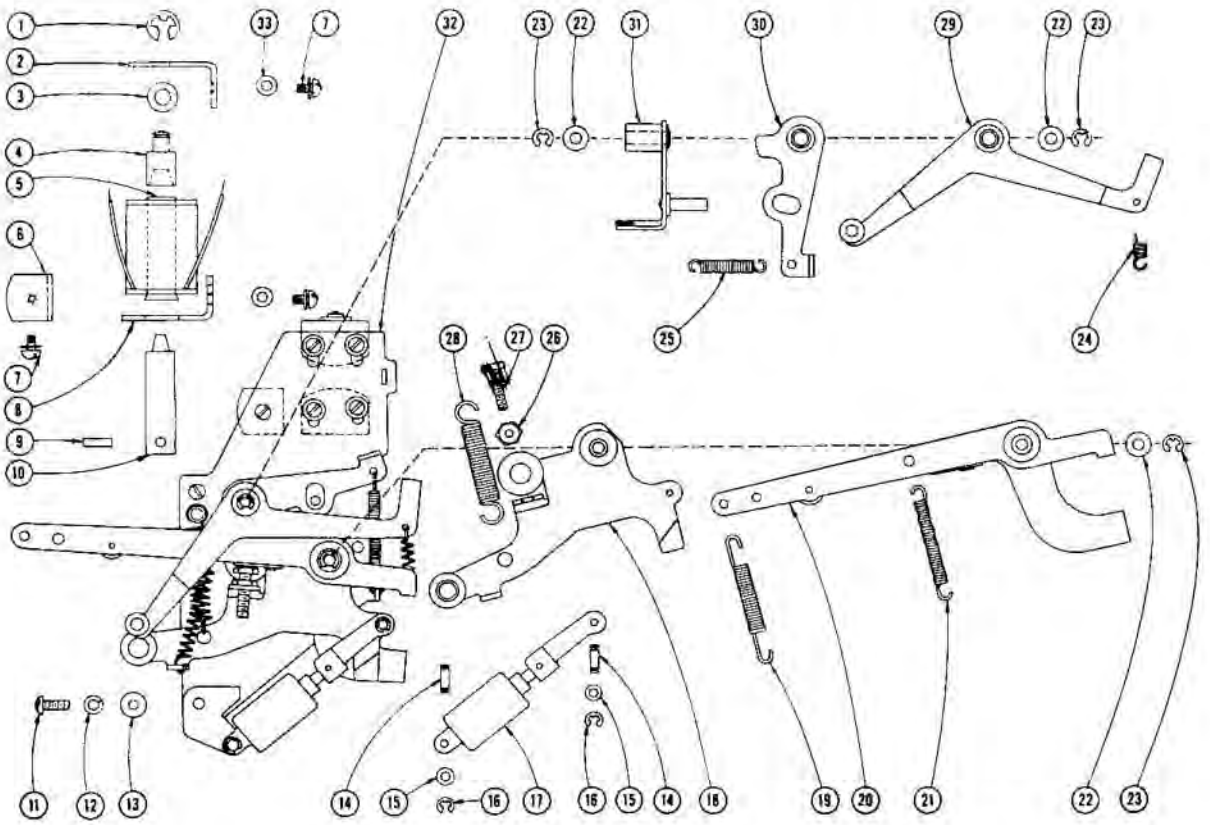
TYPE 100SA7 SELECTOR ASSEMBLY

PARTS LIST on Reverse Side

PARTS LIST for SELECTOR COIL & ARMATURE ASSEMBLY

(Preceding Page)

Item	Part No.	Part Name
1	304357	Cover Plate
2	71760	Sems Fastener
3	304390	Retaining Ring, Bronze
4	304405	Paper Washer
5	304352	Group Magnet Arm. Assembly
6	79539	Eyelet
7	304351	Compression Spring
8	304391	Retaining Ring
9	304346	Group Magnet Assembly
10	304327	Selector Coil & Arm. Assembly
11	304336	Armature Hinge Plate Assembly
12	71793	Sems Fastener
13	304358	Rail End Bracket
14	304326	Selector Block Guide Rail
15	304428	Shield Panel
16	304423	Selector Support Bracket Assembly, L.H.
17	72035	Flat Washer
	71917	4-40 x 3/16 B.H. Machine Screw
	73026	No. 4 Kantlink Lock Washer
18	304342	Armature Guide Plate Assembly
19	304339	Armature Spring
20	304341	Contact Washer
21	304340	Armature
22	304335	Core
23	304333	Selector Coil
24	304332	Selector Channel
25	304331	Terminal Board Spacer
26	304329	Coil Terminal Board Assembly
27	70160	Twin Hole Speed Nut
28	304422	Sel. Support & Bracket Assembly, R.H.
29	71750	Sems Fastener
30	304398	Cable & Plug Assembly (Items 32, 31, & 33)
31	304399	Cable
32	F9461	27 - prong Plug
33	250706	Connector
34	304377	Terminal Lug
35	70548	2 - 56 x ¼ B.H. Machine Screw
	73095	Lock Washer
36	71807	Sems Fastener
37	304397	Selector Lever Number Strip
38	304363	Contact Block Assembly, complete
39	304364	Contact Block
40 41	304411	Selection Contact Assembly
42	251268	Contact Spring
43	76003	2 - 56 x 3/16 R.H. S.T.Screw
44	304369	Dressing Spring
45	304365	Dressing Contact
46	76055	4 x ¼ R.H. S.T.Screw
47	74104	Solder Lug
48	304371	Cancel Coil Mtg. Bracket
49	71754	Sems Fastener
50	304413	Plunger Return Spring
51	304415	Spring & Plunger Assembly
52	304370	Cancel Coil Assembly
53	304396	Pointer
54	304372	Cancel Coil End Bracket
55	71793	Sems Fastener
	72000	Flat Washer



No. 245502 TRIP MECHANISM ASSEMBLY

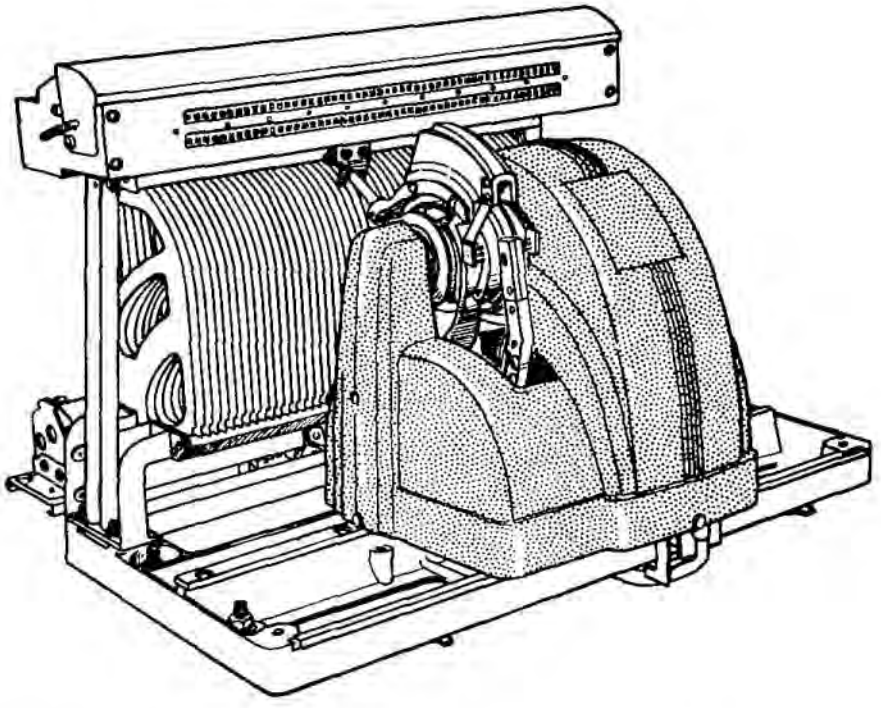
PARTS LIST

Item	Part No.	Description
1	S229220	Retaining Ring
2	245575	Solenoid Bracket - Top
3	400602	Rubber Washer
4	245576	Plug Assembly
5	245578	Solenoid
6	245582	Trip Plate Support Bracket
7	71794	8-32 x 1/4 Sems Fastener
8	245579	Solenoid Bracket - Bottom
9	80116	5/32 x 7/16 Roll Pin
10	245581	Plunger
11	71014	8-32 x 3/8 R.H. Machine Screw
12	73108	No. 8 Lock Washer
13	72279	Flat Washer
14	245523	Dash Pot Pivot Pin
15	72272	Flat Washer
16	125448	Retaining Ring
17	245595	Dash Pot Assembly
18	245588	Reset Lever & Roller Assembly
19	245248	Clutch Spring
20	245525	Clutch Shifting Lever Assembly
21	245573	Clutch Shifting Lever Spring
22	72177	Flat Washer
23	R231163	Snap Washer
24	A250091	Switch Lever Spring
25	245552	Latch Lever Spring
26	70153	8-32 Hexagon Nut
27	245557	Adjustment Screw
28	245550	Reset Lever Spring
29	245539	Switch Lever Assembly
30	245593	Latch Lever Assembly
31	245545	Trip Lever Assembly
32	245583	Mounting Plate
33	72297	Flat Washer

SEEBURG

SEEBURG SELECT-O-MATIC "100" MECHANISM

Type 145S12-L6



The Select-O-Matic "100" Mechanism, Type 145S12-L6, is designed for use with the Select-O-Matic "100" R.C. Special, Type H100W. All information and adjustments of this mechanism are the same as given for the Type 145S10-L6 Mechanism and are indexed on page 2252.

Parts lists for the 145S10-L6 Mechanism, pages 2255 to 2273 apply to the 145S12-L6 Mechanism except the cable assembly shown as item 14 on page 2270 and the dust shield at the back of the record magazine. The cable assembly and the dust shield for the 145S12-L6 are listed below.

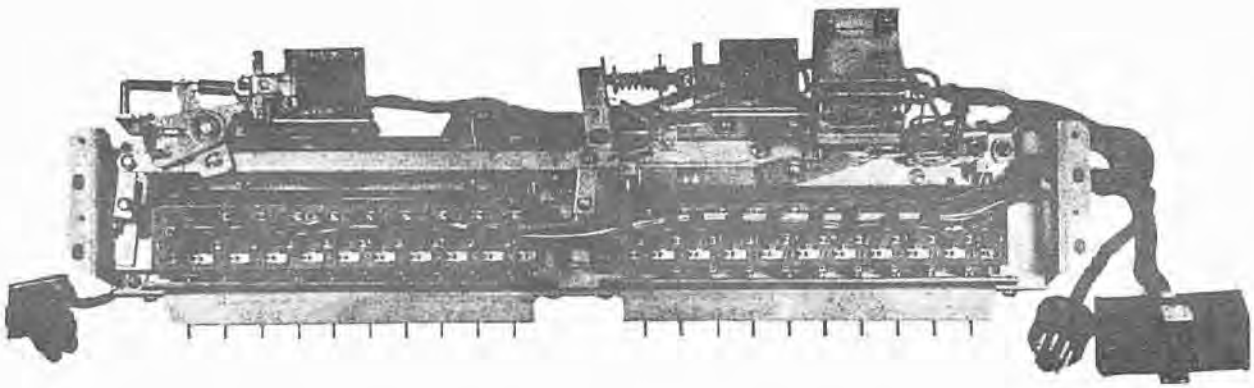
The cables for the 145S10-L6 and 145S12-L6 mechanism are not interchangeable. The lengths of the cables as well as the locations are different. The cable for the 145S12-L6 also includes a 2-wire tap and socket for a pilot light. The pilot light is a part of the H100W Cabinet Assembly used to indicate when the main switch is turned on.

PARTS LIST

Item	Part No.	Part Name
14 (page 2270)	245981	Cable Assembly, complete with plugs
	245982	Control Cable, only
(not shown)	251751	2-prong Socket, (for pilot light circuit)
"	245450	Magazine Dust Shield
"	246189	Dust Shield Support Bracket, R.H.
"	246190	Dust Shield Support Bracket, L.H.

SEEBURG

ELECTRICAL SELECTOR
TYPE ES10-L6



The Electrical Selector, Type ES10-L6, is an assembly with two in-line selector switch assemblies of ten switches each. It is designed for use with the Select-O-Matic "100" Models 100W and HF100G and is operated from a selector key panel that has a row of ten lettered keys and a row of ten numbered keys. The Selector key panel is not a part of the Electrical Selector assembly but is part of the phonograph cabinet.

The Electrical Selector is part of an electrical system which includes the Type CCU-2 Credit and Cancel Unit in the Selection Receiver and the Selector (Coil) Assembly on the Select-O-Matic Mechanism. Its principle functions are to connect a selector coil circuit and a group magnet of the Selector Assembly to current supply circuits in the Selection Receiver and to complete a circuit that initiates the operational sequence of the system. These functions are performed when two selection switches – one in each of the two selector switch assemblies – are operated by pressing a lettered selector key and a numbered key. The keys may be operated in either sequence – first a numbered key, then a lettered key or a lettered key followed by a numbered key.

The component parts of the Selector are assembled on a steel frame and are protected by a steel cover. The complete Selector is easily removed and installed in the cabinet back of the selector key panel and all switch contacts and adjustments are readily accessible without removing it from the cabinet. All electrical connections to the associated Credit and Cancel Unit and to the Selector (Coil) Assembly are made with an octal plug and a 27-prong plug.

The principle component parts of the Selector include, in addition to the two selector switch assemblies, a latch bar operating solenoid, a lock solenoid, a credit indicating light and three switch groups each of which has two pairs of contacts. There is also a counter that totals the number of selections made with the Selector and with Wall-O-Matics that may be used for remote selection. These parts are identified in Figure 1.

The selector switch assemblies are identical and interchangeable. They each incorporate ten selection switches and are associated with a treadle bar and a switch group that includes a snap-action switch and a spring-leaf switch. The shafts of the selector switches extend through the switch frame to operate the treadle bar when a selector key is pressed. The treadle bar, in turn, operates the associated switch group so the contacts will be closed when any one of the ten selector keys is pressed.

The Latch Bars of the selector switch assemblies are spring biased to a position that permits free in-and-out movement of the selector keys (and the selector switches). The Latch Bar Solenoid is linked to the latch bars so the selector keys will remain in the pressed position when the Solenoid is energized. It is energized when a credit switch in the Credit

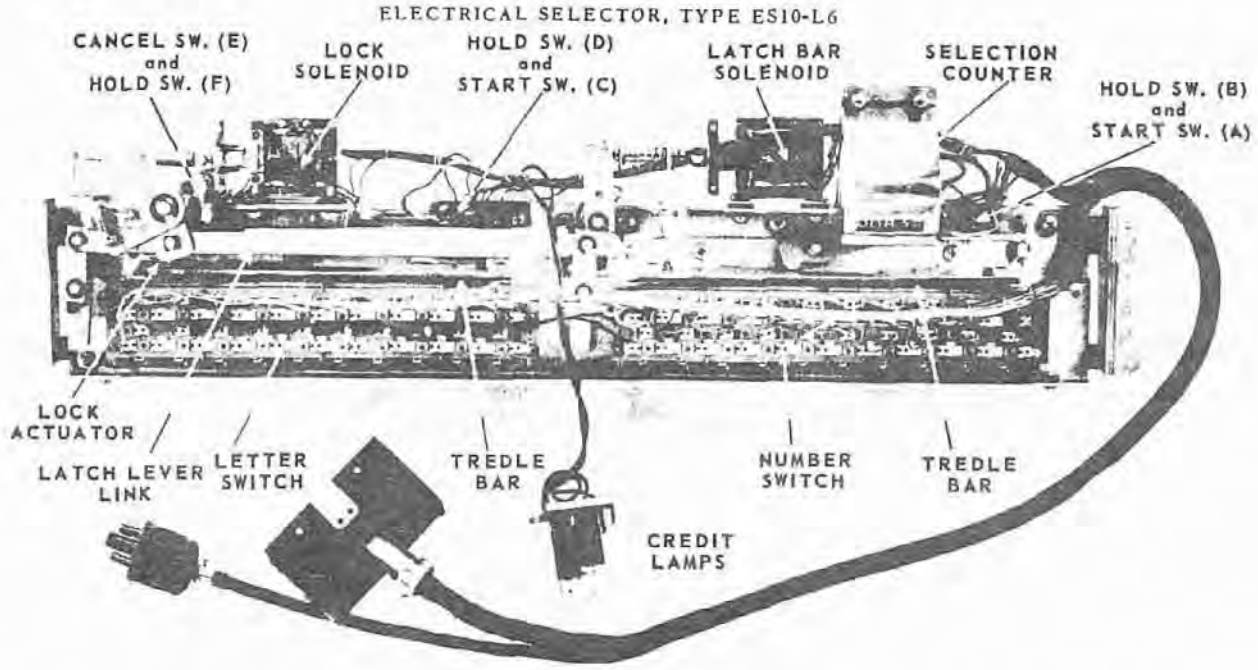


Figure 1.

and Cancel Unit is closed. In normal operation, the selector switches will remain in the latched position until the selection sequence has been completed at which time they will be released.

The two snap-action switches associated with the treadle bar and the selector switch assemblies are connected in series and, together, are part of a Lock Solenoid circuit of the system. Completion of the circuit requires that both switches be closed by pressing two selector keys – one in the letter switch group and one in the number switch group. These snap-action switches are indicated as the Starting Switches in the simplified schematic diagram of the system, Figure 2. Closing them starts the operation sequence that results in selection of a record and cancel of a credit.

The two spring-leaf switches that are associated with the snap-action switches are parallel connected and are part of a timing relay holding circuit that is completed (as far as the Electrical Selector is concerned) if any of the twenty selector keys are pressed. These switches are identified as the Hold Switches in the simplified diagram, Figure 2, and have in parallel with them a third spring-leaf switch that is part of the switch group operated by the lock solenoid. This switch group is the Cancel Switch Assembly, the principle function of which is to complete a circuit to the Cancel Solenoid in the Credit and Cancel unit when the Lock Solenoid is energized. The Cancel Switch, and its association with the Cancel Solenoid may be traced in the simplified diagram.

The principle elements of the Credit and Cancel Unit which is an integral part of the electrical selector system are a credit switch and three credit solenoids, a cancel solenoid, two cam operated switch groups and a timing relay. These may be identified in Figure 3.

The credit switch is a rotating element supporting six equally spaced snap-action switches which are parallel connected and terminate at a collector ring and the grounded frame of the unit. The snap-action switches are operated by the plungers of the credit solenoids. One solenoid is operated by the nickel operated coin switch, one by the dime coin switch, one by the quarter switch. Closing any one of the snap-action switches establishes "credit" so selections can be made. Each time a selection is made, the cancel solenoid in the Unit advances the snap-action switches one sixth turn. They are advanced, therefore, one position – the distance between them – for each selection made.

A reset bracket is mounted on the assembly so a snap-action switch moves past it each time a selection is made. When a snap-action switch that has been turned "on" (by a credit solenoid plunger) passes the bracket, it is engaged by the bracket and reset to the "off" position.

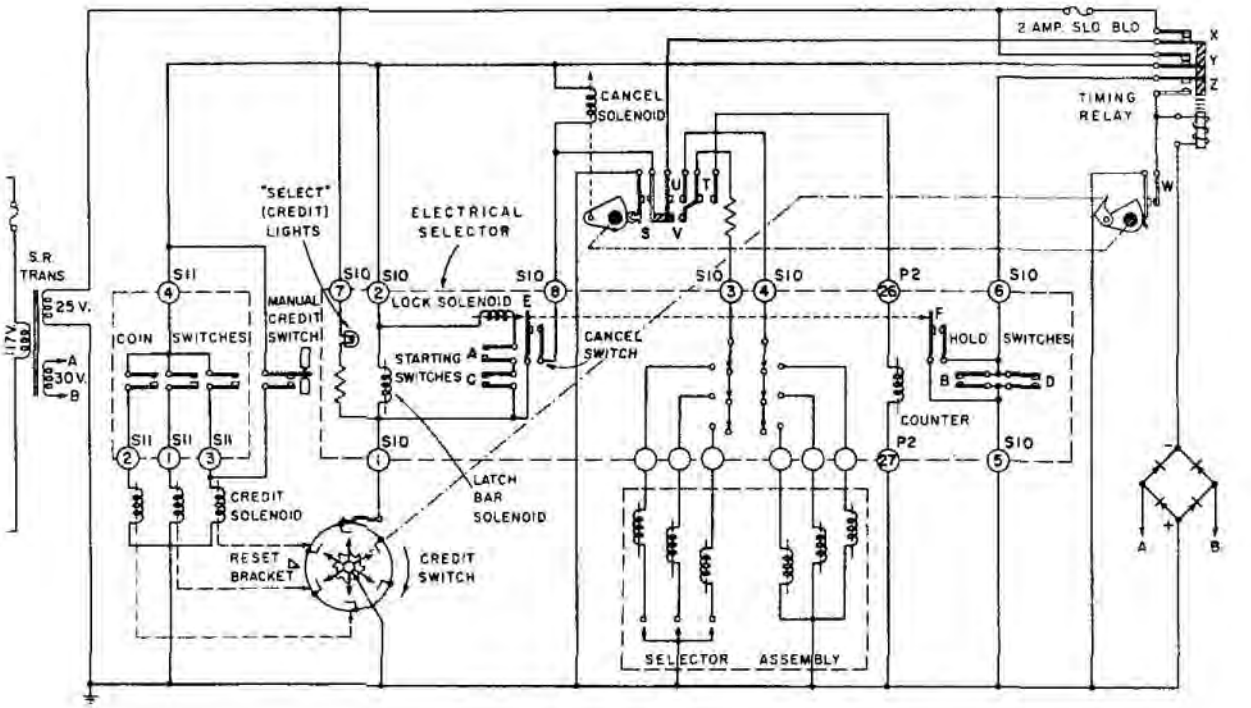


Figure 2.

The "5¢ solenoid" is mounted so its plunger turns on the snap-action switch which is one position from the reset bracket. Because the switch will be opened with one operation of the cancel solenoid, one credit is set up when a 5¢ coin is deposited.

The "10¢ solenoid" turns on the snap-action switch which is two positions from the reset bracket allowing two selections to be made before the switch is reset.

The "25¢ solenoid" is six positions from the reset bracket and will turn on a snap-action switch permitting six selections to be made.

The cancel solenoid plunger is linked to one of the switch cams so the cam is rotated approximately 60 degrees when the solenoid is energized. This cam is pinned to a shaft which drives the other of the two switch cams. A pawl on the second cam engages a ratchet on the credit switch and moves it one position each time the solenoid plunger operates.

The Timing Relay operates with approximately 25-volts d.c. which is supplied through a selenium rectifier in the Selection Receiver. The relay is loaded with copper slugs to cause slow starting of the armature and introduce a time delay for positive control of the current pulse to the selector coils and group magnet in the selector assembly on the Select-O-Matic mechanism.

The sequence of operation of the Electrical Selector system begins when a coin passes through the slug rejector and momentarily closes a coin switch. When the coin switch is closed, a credit solenoid is energized and the solenoid plunger closes a snap-action credit switch. With the credit switch closed, the credit indicating light is turned on and the latch bar solenoid is energized so selection buttons will latch in place when pressed.

As selection is made by pressing a lettered button and a numbered button (simultaneously or in either sequence), the hold circuit switches are closed, a selector coil circuit and a group magnet are connected to their respective current supply circuits, and the Lock Solenoid is energized through the starting switches and the credit switch.

The Lock Solenoid moves the selector switch

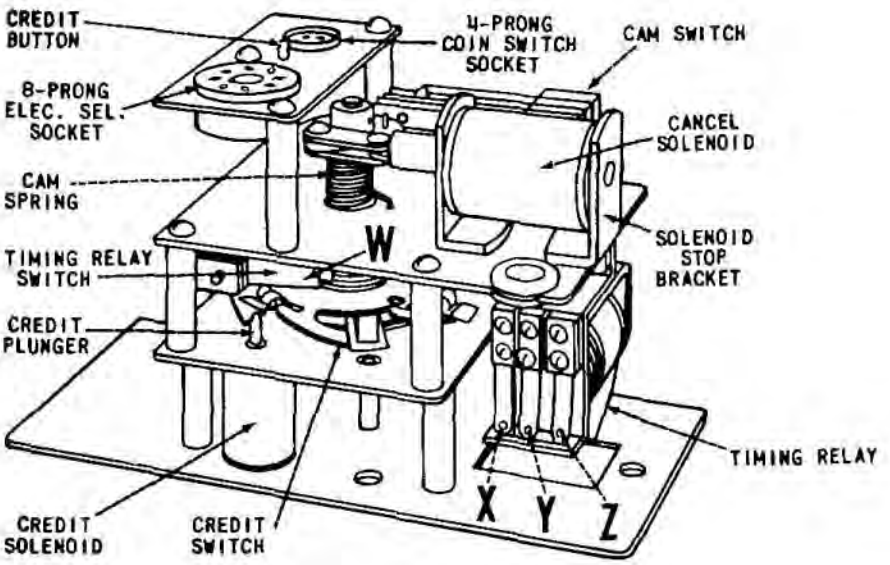


Figure 3.

latch bars to a position that locks the switches and the selector keys until the entire selection sequence has been completed. When the selector keys are locked, the Cancel Switch is closed to complete a circuit to the Cancel Solenoid. If movement of the latch bars to the locking position is obstructed for any reason, the Cancel Switch will not close and the operation sequence is interrupted.

The "S", "T", "U", "V", and "W" contacts of the two switches groups in the Credit and Cancel Unit are closed when the plunger of the Cancel Solenoid rotates the switch cams. Contact "S" parallels the starting switches in a carry-over circuit to insure a full stroke of the cancel solenoid plunger. Contacts "U" and "V" complete the selector coil and group magnet circuits so the coil and magnet are energized and a selector lever is moved to the playing position. Contact "T" completes the circuit for operation of the selection counter solenoid which is part of the Electrical Selector. Contact "W" completes the timing relay circuit so the relay is energized.

The timing relay, after an interval of delay due to the copper slugs, opens the "X" and "Y" contacts and closes the "Z" contacts. Contact "X", when opened, breaks the selector coil and group magnet circuit cutting off the current to those coils. Contact "Y" opens the circuit to the cancel solenoid, the lock solenoid, and the latch bar solenoid. Contact "Z", in series with the three hold switches in the Electrical Selector, will hold the timing relay energized as long as any button of the Selector is held in the operated position and until the lock solenoid is released to normal position. The time during which the selector coil is energized is effected by the gap of contact "W", the delay in starting of the timing relay and the gaps of contacts "U" and "V".

When the circuit of the cancel solenoid is interrupted at contact "Y" of the timing relay, its plunger is returned to normal position by a spring. On the return stroke, the credit switch operating pawl engages in the switch ratchet and advances the switch. When the latch bar solenoid is no longer energized, the selector keys are released for return to their normal position.

REMOVAL OF ELECTRICAL SELECTOR

All adjustments of the mechanical linkage, all switch adjustments and all circuits of the

Selector are accessible for inspection and service without removing it from the cabinet. The entire unit may, however, be removed by pulling out the two connecting plugs at the end of the cable and taking out two screws that are readily accessible, back of the selector key panel, at each end of the Selector frame.

REPLACING CREDIT LIGHTS

Access to the credit (SELECT) lights may be had by pulling the socket assembly from the back of the selector key panel. The light assembly is replaced with the lamps one above the other and the edge with the two spring clips at the top.

LUBRICATION

Oil all pivots with one (1) drop SAE 20 oil. Use Aero Lubriplate * sparingly at place shown in Figure 4.

* *Aero Lubriplate is available at your distributor.*

The selector key panel, complete with the keys, can be removed by pulling up on the sliding catches that are behind the panel and at each end of it.

The individual selector keys pivot, at the upper end, on a projection in the key frame. They may be removed by swinging inward at the bottom. The upper end of the keys are prevented from rattling by spring clips that extend under adjacent keys. The clips will be loose and can fall from place if two adjacent keys are removed from the frame.

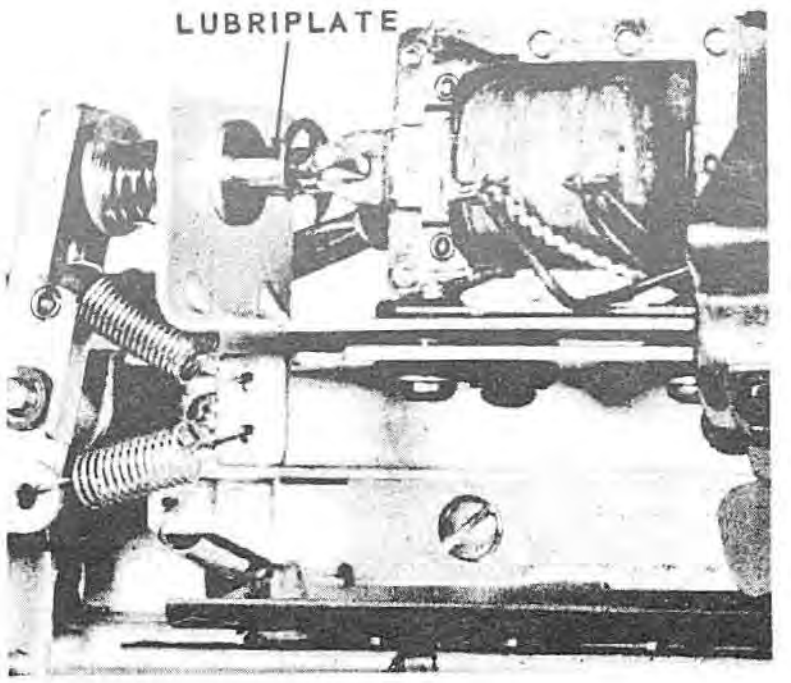
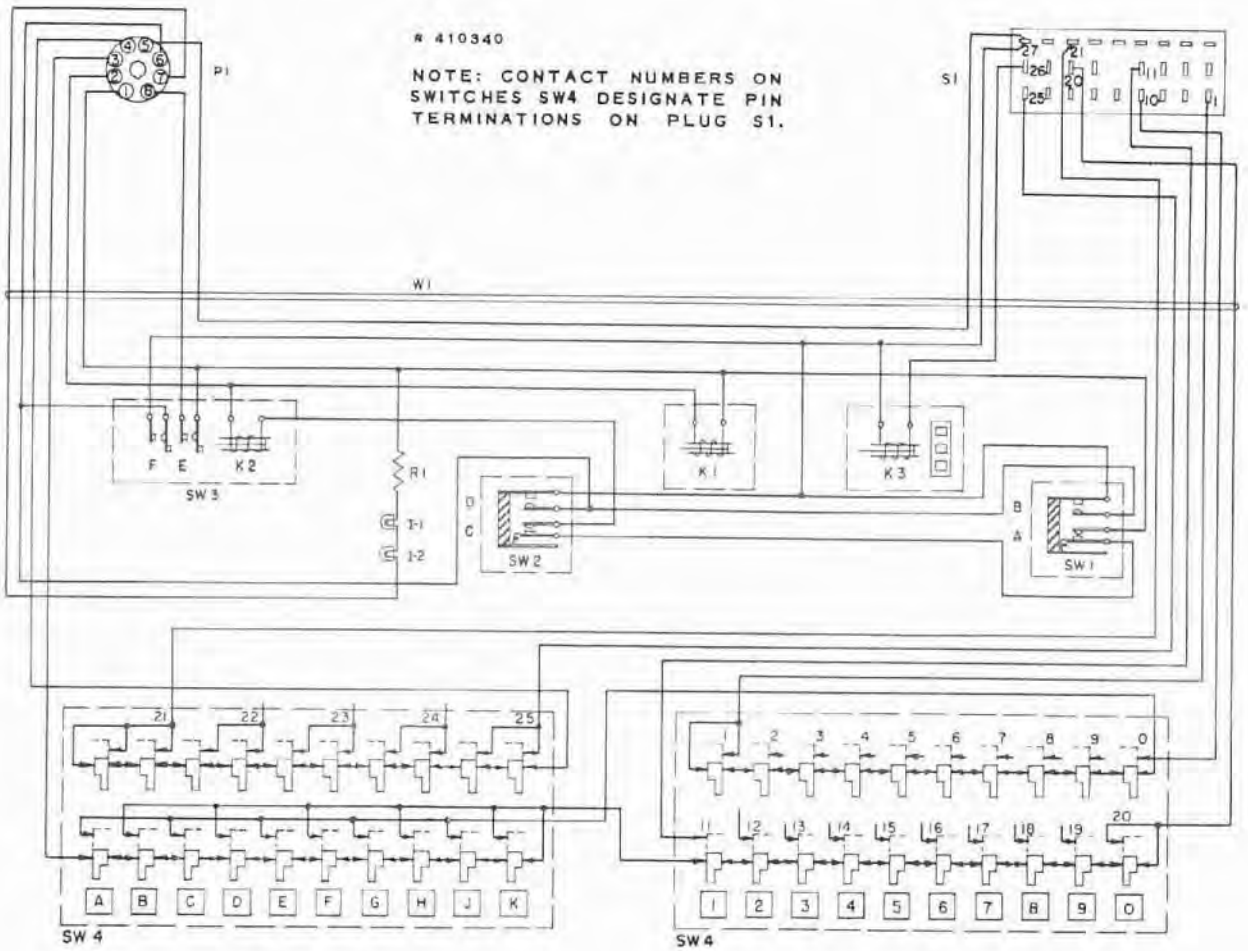


Figure 4.

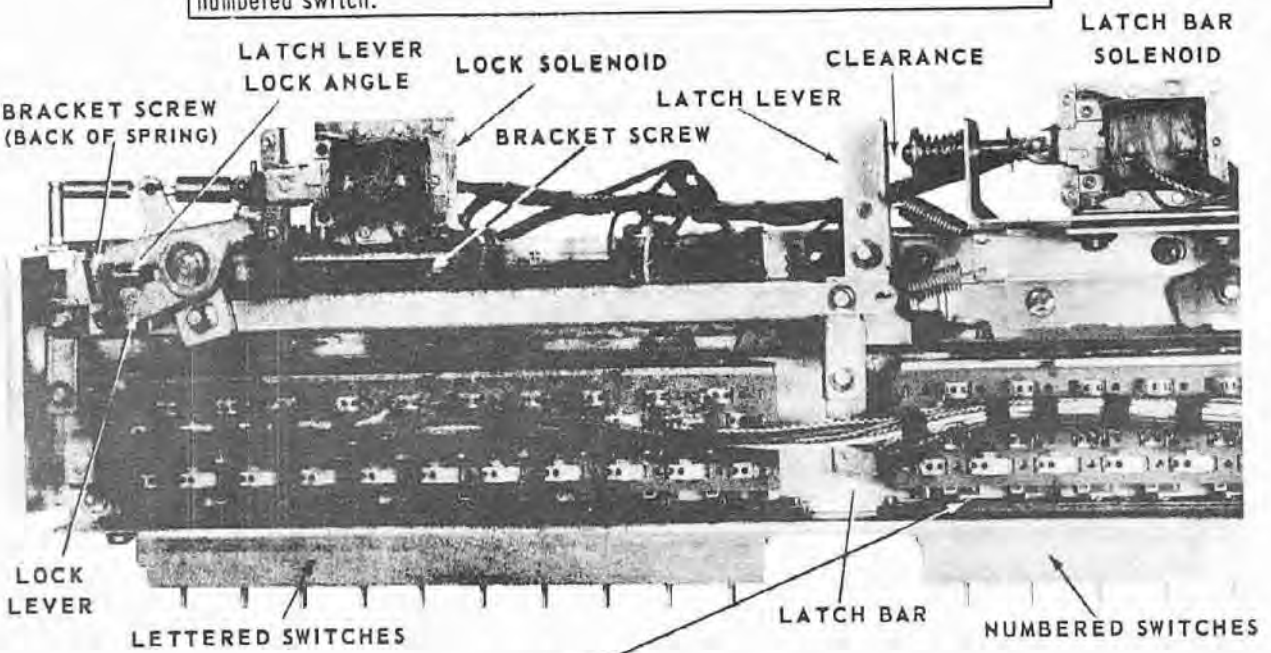


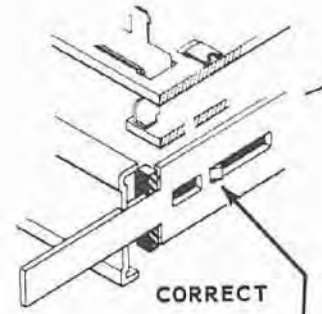
PARTS LIST

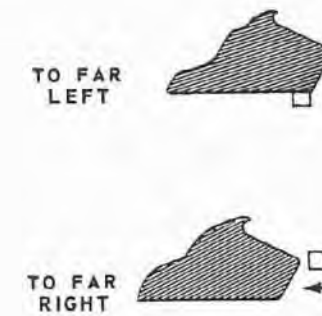
Item	Part No.	Part Name
I1 I2	302141	Credit Lamp No. 47
K1 K2	410081	Solenoid
K3	410308	Counter Assembly
P1	12028	8 Prong Octal Plug
R1	81125	Resistor, 100 Ohm, 5 Watt W.W.
S1	400844	27 Prong Plug
SW1 SW2	410289	Snap Switch and Bracket Assembly
SW3	410283	Cancel Switch Assembly
SW4	410255	Selector Switch
W1	410321	Cable Only

ADJUSTMENT NO. 1 – NUMBER SWITCH ADJUSTMENT

This adjustment positions the latch bar in the NUMBER selector switch so that when credits are established, the numbered selector switches will latch in the pressed-in position but permit change of selection by operating another numbered switch.







NOTE: When making this adjustment the selector key panel should be removed for observing the latch bar position. The latch bar solenoid should be in the energized position, the lock angle on the latch lever link should be against the lock lever, all linkage and levers must be free to move without binding, there should be clearance between the tip of the latch bar solenoid and the latch lever.

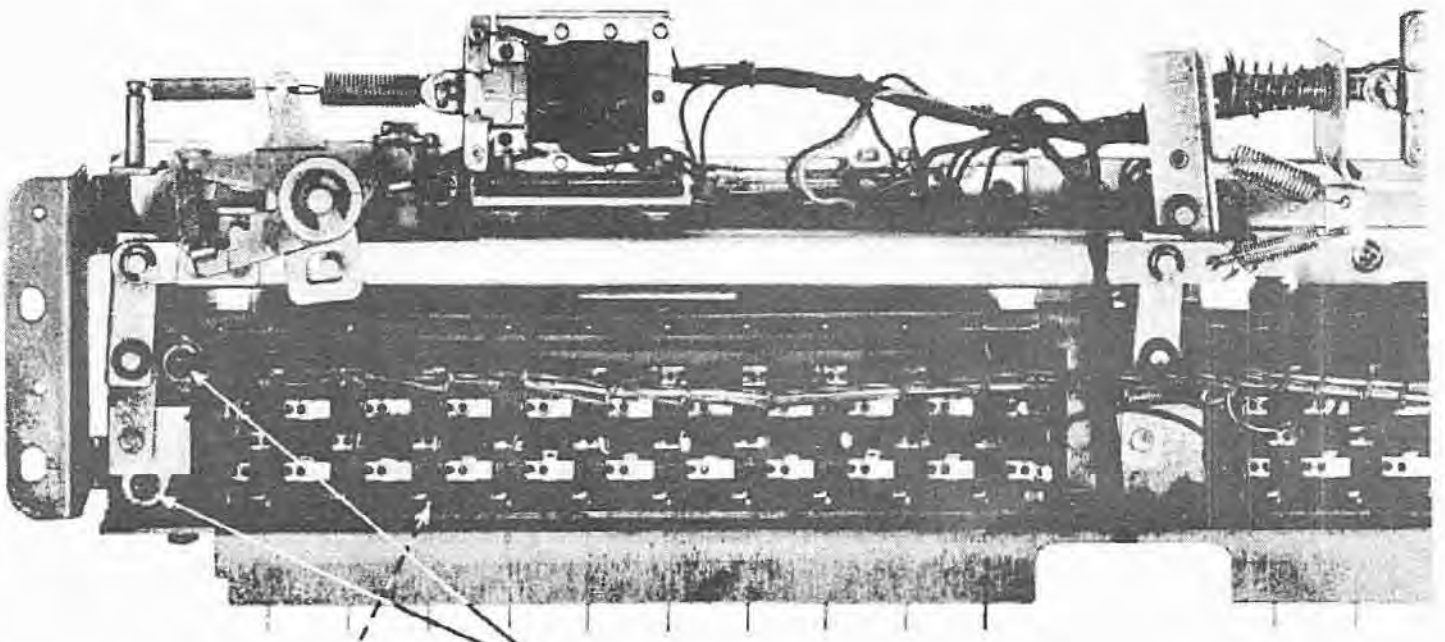
(A) Loosen the screws holding the Lock Solenoid Bracket and adjust the position of the bracket so the shaft of a numbered selector switch, when pressed in, will engage the latch bar at the midway point of the sloping edge of the latch bar hook as shown.

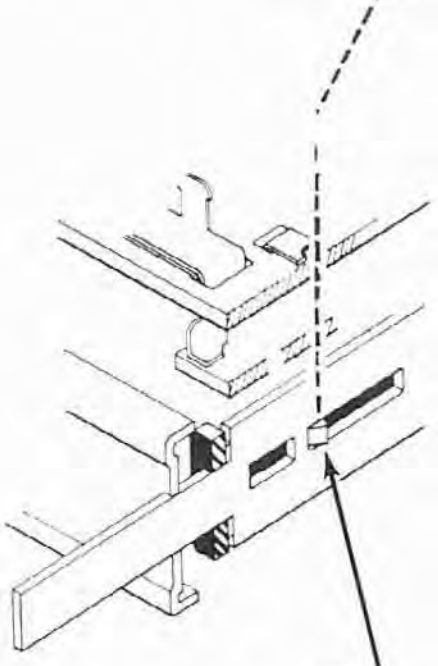
(B) If the Lock Solenoid is too far to the left, the selector keys will be locked. If the Solenoid is too far to the right, the selector keys will not latch or the latching will be erratic.

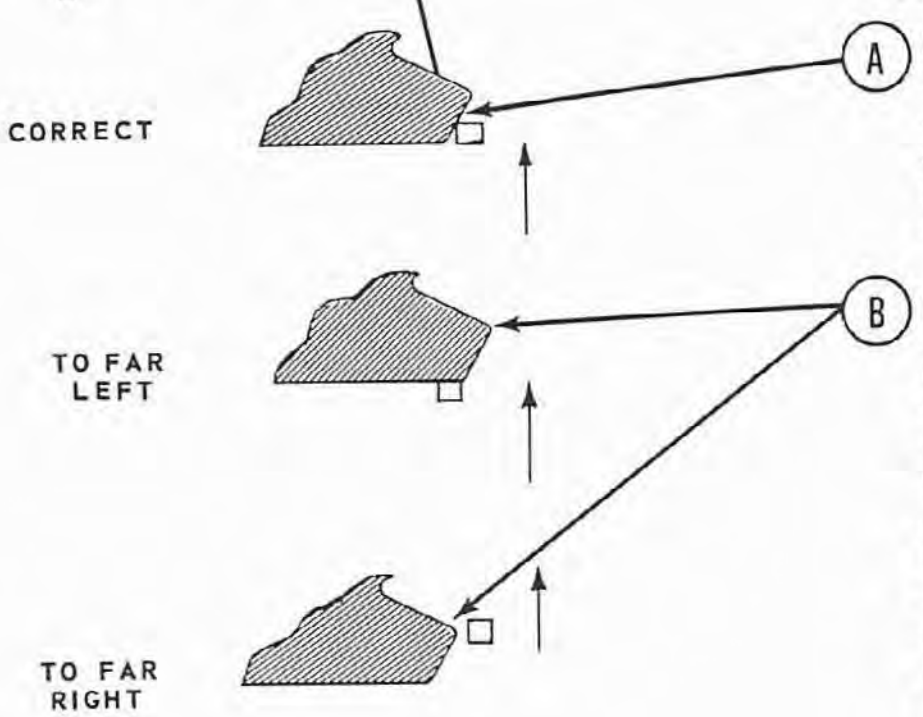
(C) After the correct position of the Lock solenoid has been made, the bracket holding screws must be securely tightened.

ADJUSTMENT NO. 2 – LETTER SWITCH ADJUSTMENT

This adjustment positions the latch bar of the LETTER selector switch so the lettered selector switches will operate in the same manner provided for the numbered switches in adjustment No. 1.







NOTE: Before making this adjustment, Adjustment No. 1 should be correct, the selector key panel should be removed to observe the latch bar position, the latch bar solenoid should be in the energized position, the lock angle on the latch lever link should be against the lock lever actuator, all linkage and levers should be free of binds and there should be clearance between the tip of the latch bar solenoid plunger and the latch lever.

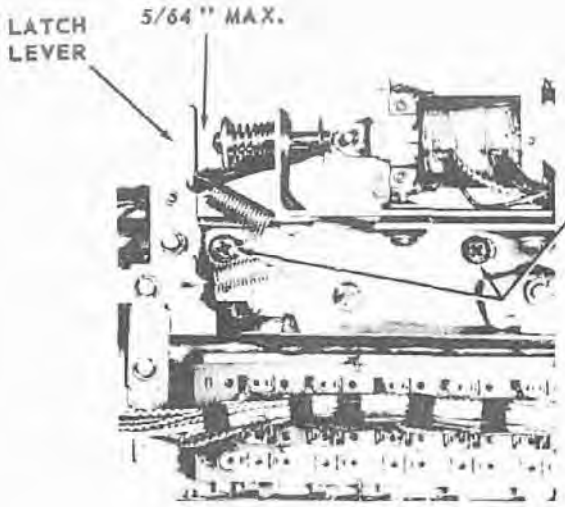
A) Loosen the screws holding the latch lever pivot plate and shift the plate so the shaft of a lettered selector switch, when pressed in, will engage the latch bar at the midway point of the sloping edge of the latch bar hook

B) Check this adjustment by pressing a numbered and a lettered selector key while manually holding the Latch Bar Solenoid in the energized position then slowly releasing the solenoid. The lettered and the numbered keys should release at the same time. If the pivot plate is too far to the left, the lettered switch key will release before the numbered key; if the plate is too far to the right, the lettered key will release after the numbered key.

ADJUSTMENT NO. 3 – LATCH BAR SOLENOID

This adjustment provides sufficient movement of the latch bars to release the selector switches.

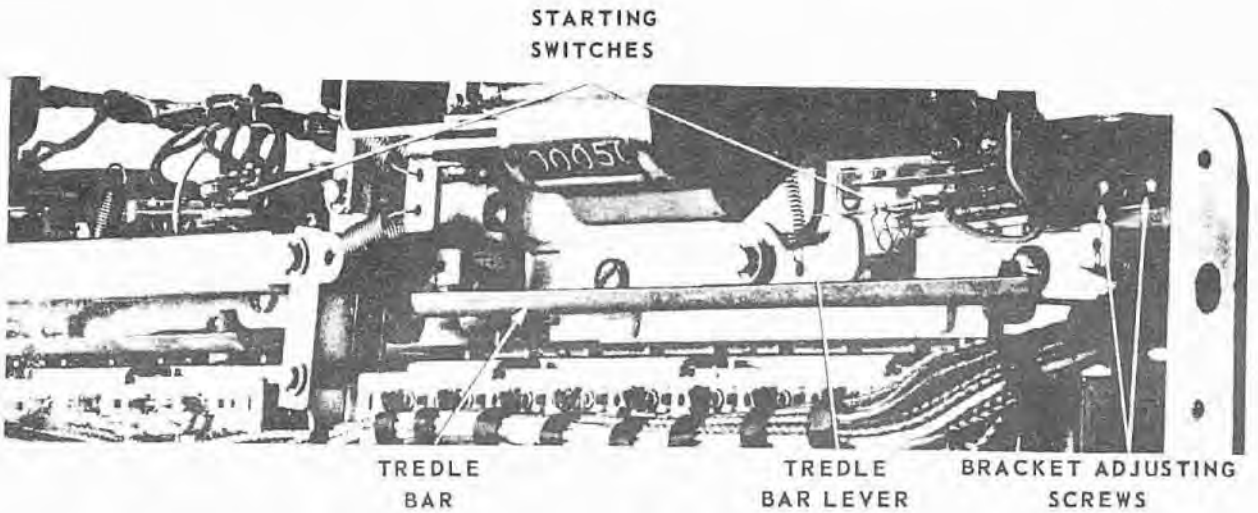
NOTE: Adjustment No. 1 and No. 2 must be correct before making this adjustment. Place the Latch Bar Solenoid in the energized position.



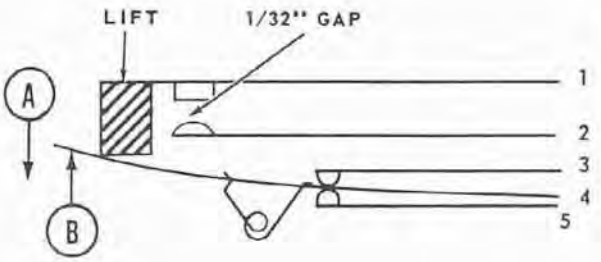
(A) Loosen the screws holding the latch bar solenoid bracket and shift the bracket to a position that will give a clearance of 5/64'' max. between the latch lever and the tip of the latch bar solenoid plunger

(B) Check adjustment by pressing a numbered and a lettered selector key shaft while manually holding the Latch Bar Solenoid in the energized position then slowly releasing the solenoid. The selector keys should be released and can be moved freely in and out when the solenoid has been moved fully to the normal de-energized position. If this cannot be done, check Adjustments No. 1 and No. 2 for correct adjustment.

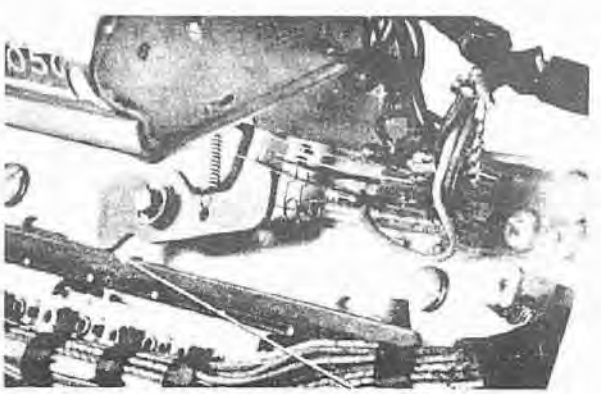
ADJUSTMENT NO. 4 – STARTING SWITCH ADJUSTMENT



(1) The Snap-action Switches on the Starting Switch Assemblies of both the lettered and numbered selector switches must close at the point of latch-in of the selector keys. DO NOT ADJUST BY BENDING THE SNAP ACTION SWITCH BLADES. Adjust by positioning the Starting Switch Assembly brackets.



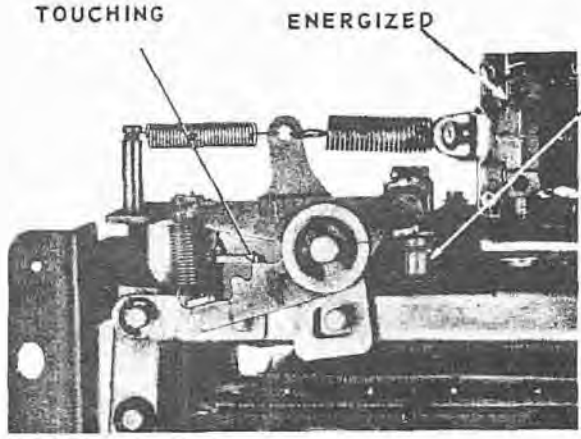
(2) With the snap-action switches correctly adjusted and with no selector keys pressed in, the lift on blade No. 1 of the Spring Leaf switch should bear against blade No. 4 with approximately 1¼ oz. (40 grams) pressure and there should be a 1/32'' contact gap (between blade No. 1 and No. 2). The pressure of blade No. 1 must not cause the treadle bar lever to lift away from the treadle bar. Adjust for pressure and gap by bending the blades as required.



(3) Check operation for approximately 1/32'' travel of blade No. 2 when the selector keys are pressed in fully and for no gap between the treadle bar and treadle bar lever, when the selector keys are fully released.

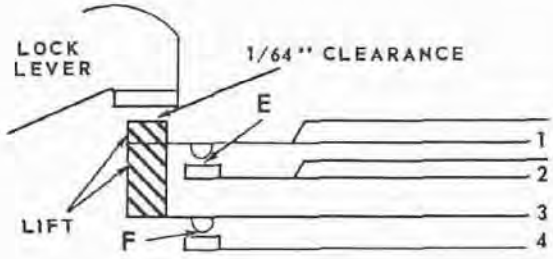
Blade No. 4 of the snap action switch closes its contacts by exerting a force in the direction of arrow (A). At the time the contacts close, blade No. 4 must be exerting enough force to overcome 15 grams minimum in the direction of arrow (B). This force of 15 grams is measured at the tip of the blade.

ADJUSTMENT NO. 5 – CANCEL SWITCH ADJUSTMENT



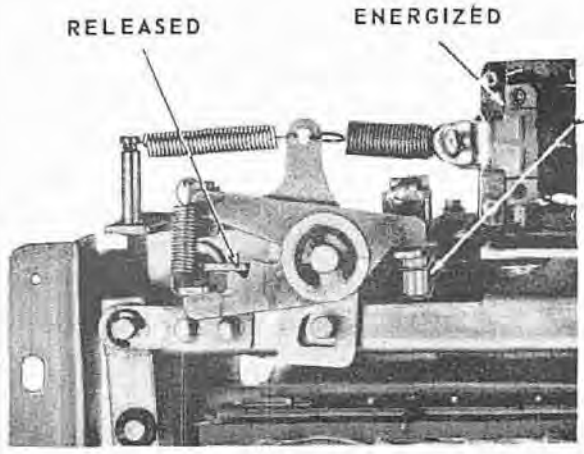
1. Adjust blade No. 1 so its lift clears, by 1/64'', the lock lever switch operating tab when the lock lever is bearing against the angle on the latch lever link. This position of the lever can be had by manually moving the Lock Solenoid plunger toward the energized position.

2. Adjust blade No. 3 so its lift bears lightly against blade No. 1. When blade No. 3 has been adjusted, re-check the clearance of blade No. 1 lift as in 1, above.



3. Adjust blade No. 2 for 1/32'' (.035'') contact E gap.

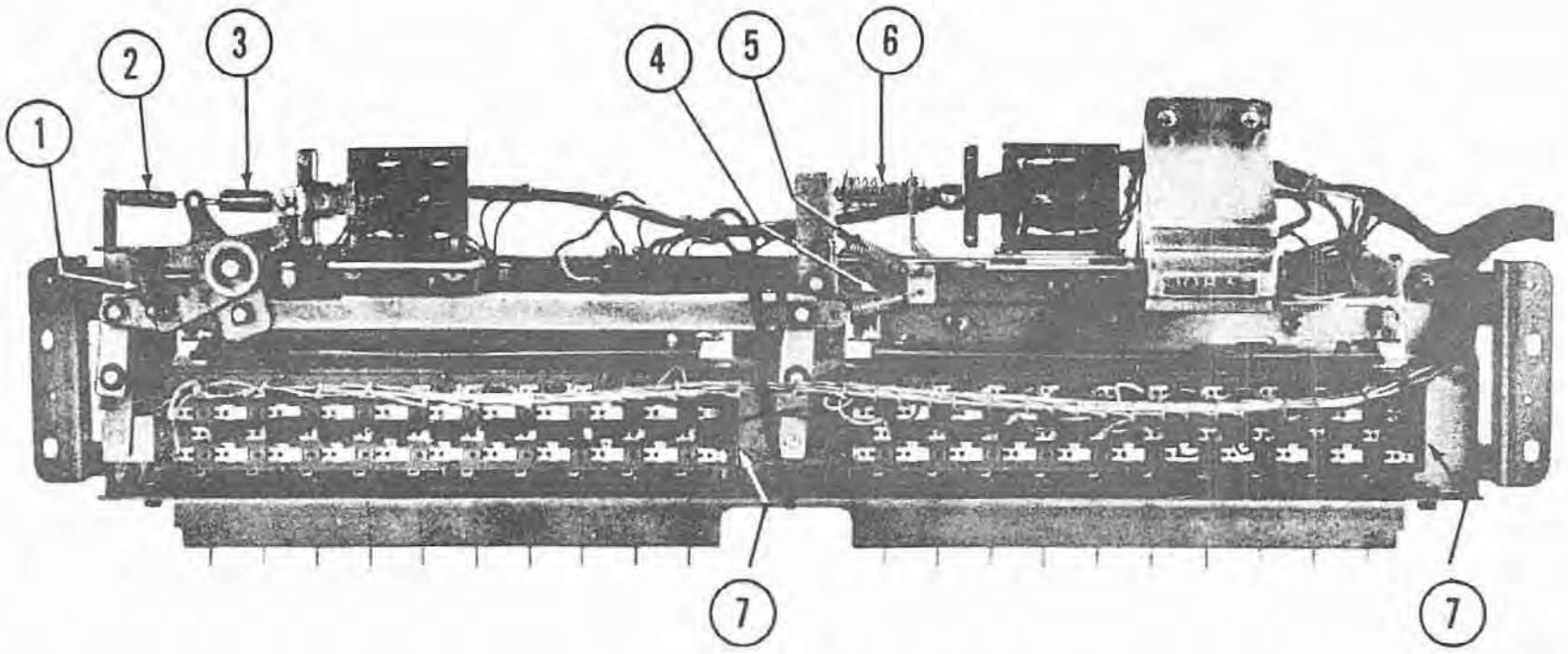
4. Adjust blade No. 4 for slightly less than 1/32'' (.025'') contact F gap. Contact F should close before contact E.



5. Both contact pairs, E and F, should close with approximately 1¾ oz. (50 grams) pressure when the Lock Solenoid is fully in the energized position and the lock lever released as shown.

ELECTRICAL SELECTOR, TYPE ES10-L6

SPRING PRESSURES

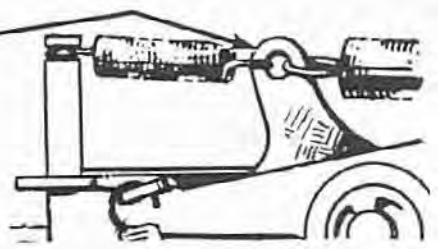


(1) LOCK LEVER SPRING

5 TO 6 OUNCES HERE TO MOVE LEVER FROM REST POSITION.

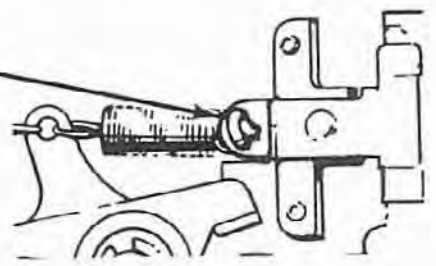
(2) RETURN SPRING

5 OUNCES HERE TO MOVE LEVER FROM REST POSITION.



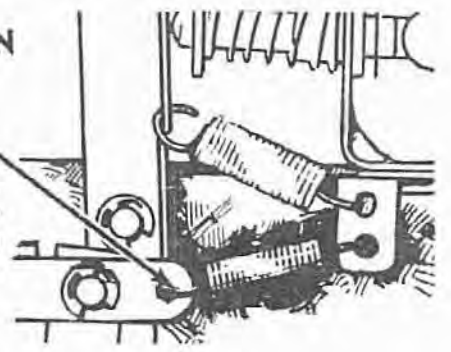
(3) SOLENOID LINK SPRING

REMOVE SPRING TO MEASURE FORCE. 1-7/8 TO 2 LBS. TO START STRETCHING OF SPRING.

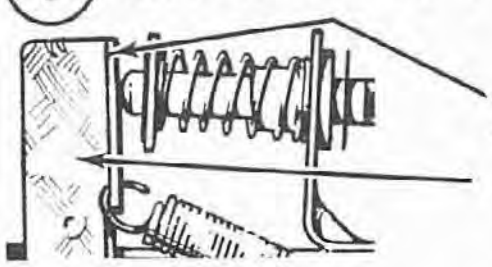


(4) LINK RETURN SPRING

REMOVE SPRING TO MEASURE FORCE. 1¼ TO 1-3/8 LBS. TO STRETCH SPRING TO NORMAL POSITION BEFORE REMOVAL.



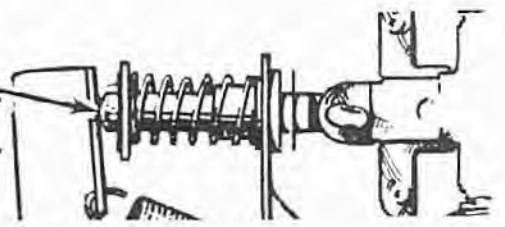
(5) LATCH LEVER SPRING



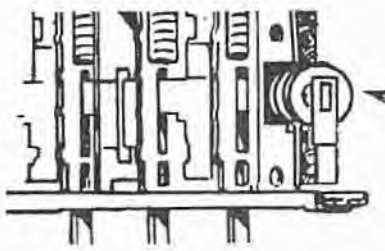
7 TO 8 OUNCES HERE TO MOVE LATCH SOLENOID LEVER.

(6) COMPRESSION SPRING

1 LB. HERE TO START MOVEMENT OF SOLENOID ARMATURE.



(7) LATCH BAR SPRING



5 TO 6 OUNCES HERE TO START MOVEMENT.

SEEBURG

CREDIT AND CANCEL UNIT

MECHANICAL ADJUSTMENTS

1. The Pawl Arm Stop limits the rotation of the credit switch when the Cancel Solenoid plunger returns to normal rest position. It should be adjusted so the credit switch rotates far enough to allow the Lock Pawl to fall into the ratchet and have approximately 1/64" overtravel. The adjustment must be checked at all six positions of the credit wheel and the ratchet. After adjustment, set the locknut tight. See Figure 1.

2. Adjust the position of the Cancel Solenoid Stop Bracket so the Cancel Pawl over-travels the ratchet teeth approximately 1/32" when the solenoid plunger bottoms against the Stop. Set the Stop mounting screws firmly after adjustment. See Figure 2.

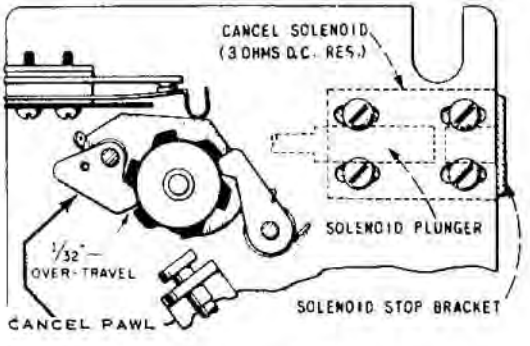


Figure 2.

3. Set the end of the Cam Spring in the first hole in the panel. The Cam Spring may be identified in Figure 3. Check operation by closing all snap-action credit switches and allow the Cam Spring to rotate the switches past the reset bracket. This should be checked slowly to determine if the Spring pressure is adequate to reset the switches without benefit of inertia. If more spring pressure is required, move to the second hole and repeat the test. Use the lowest possible spring pressure (consistent with positive operation) to insure minimum wear and optimum low voltage operation.

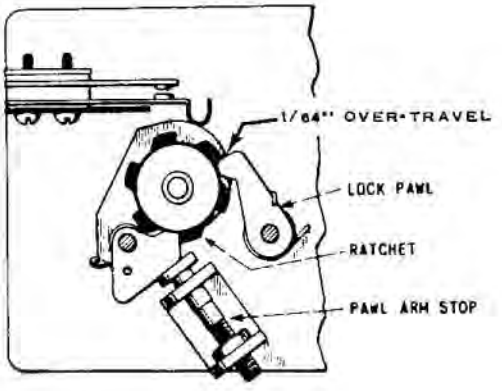


Figure 1.

4. The pressure of the collector ring contact against the ring on the credit switch should be approximately 2½ oz. Excessive pressure will result in excessive wear and sluggish rotary action of the credit switch.

5. Credit Solenoid Plungers should move freely in the pin guides through a full stroke and should be checked in several positions by turning them to different positions.

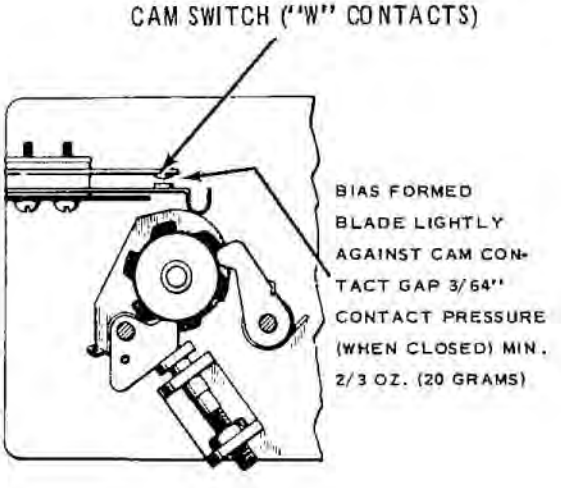


Figure 3.

CREDIT AND CANCEL UNIT

CAM SWITCH (S, U, V & T CONTACTS)

1. All mechanical adjustments must have been made before proceeding with switch adjustments.
2. Adjust roller blade so that roller rests against cam in normal position with 1 oz. pressure.
3. Adjust contact "S" for 1/32" gap after setting center blade against fiber lift.
4. Adjust contacts "T", "U" and "V" for 1/64" gap.
5. Bracer blades should properly support their associated contact blades.
6. Move solenoid plunger to end of power stroke and check pressure of contacts by lifting top contacts away from bottom contacts.

Adjustment check:

T = 1¼ oz. min.
V = 1 oz. min.
U = 1¼ oz. min.
S = more than 3½ oz.

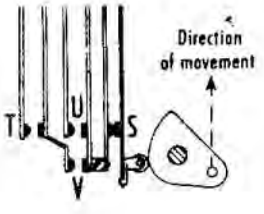


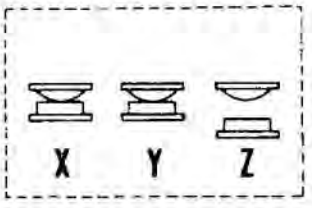
Figure 4.

TIMING RELAY

1. Contacts "X" and "Y" normally closed.
2. Contact "Z" normally open.
3. Contact gaps 1/32" max.
4. Contact pressure 1 to 1½ oz.
5. Armature gap 3/64".
6. Pressure to start relay, see Figure 5. D.C. Coil Resistance 400 ohms.

Contact Functions:

"X" – Selection Circuit.
"Y" – Cancel and coin switch circuits.
"Z" – Timing Relay hold circuit.



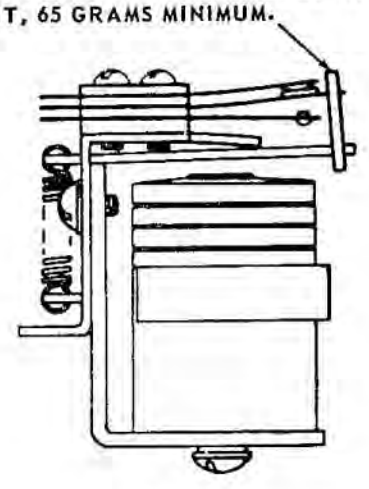
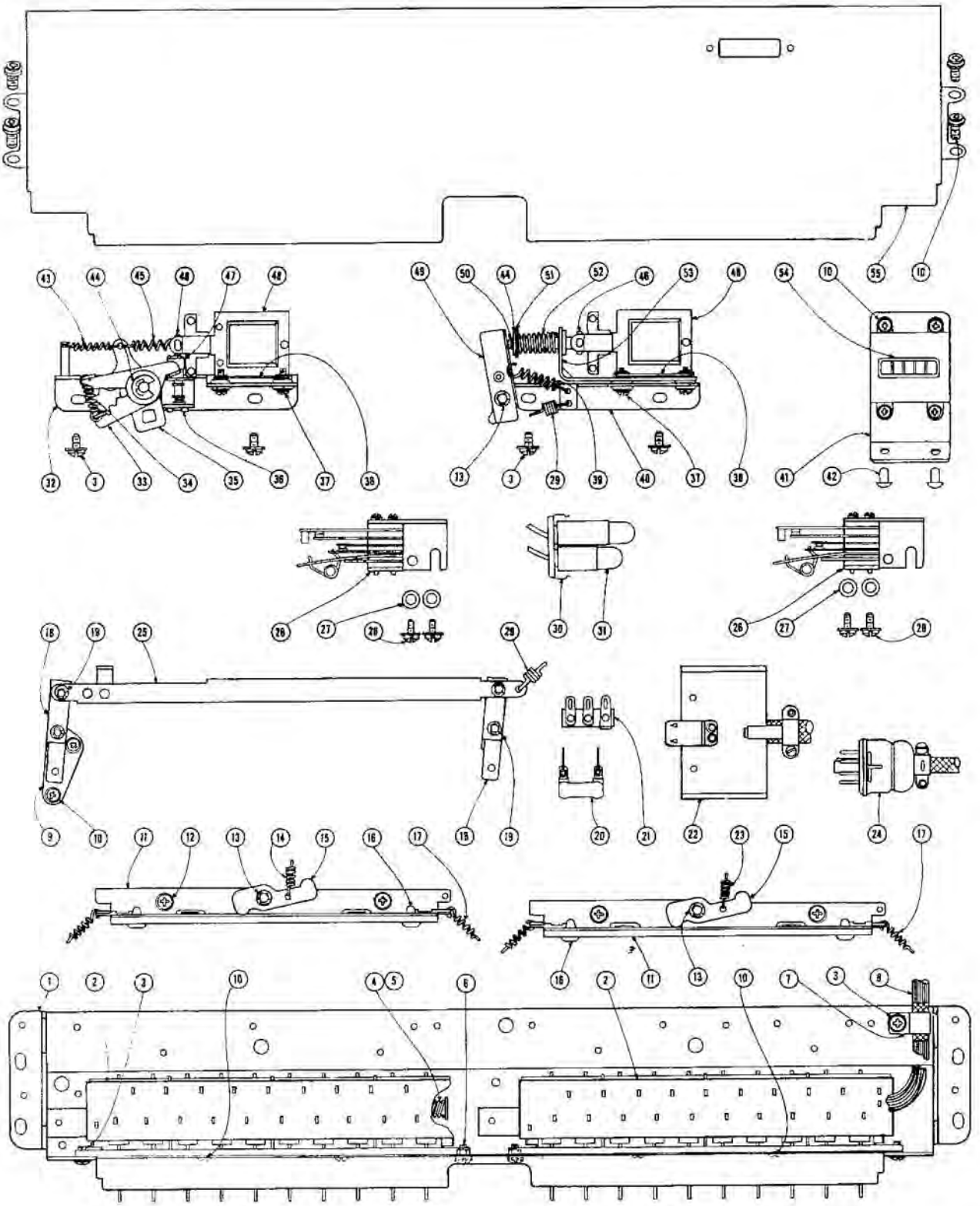


Figure 5.

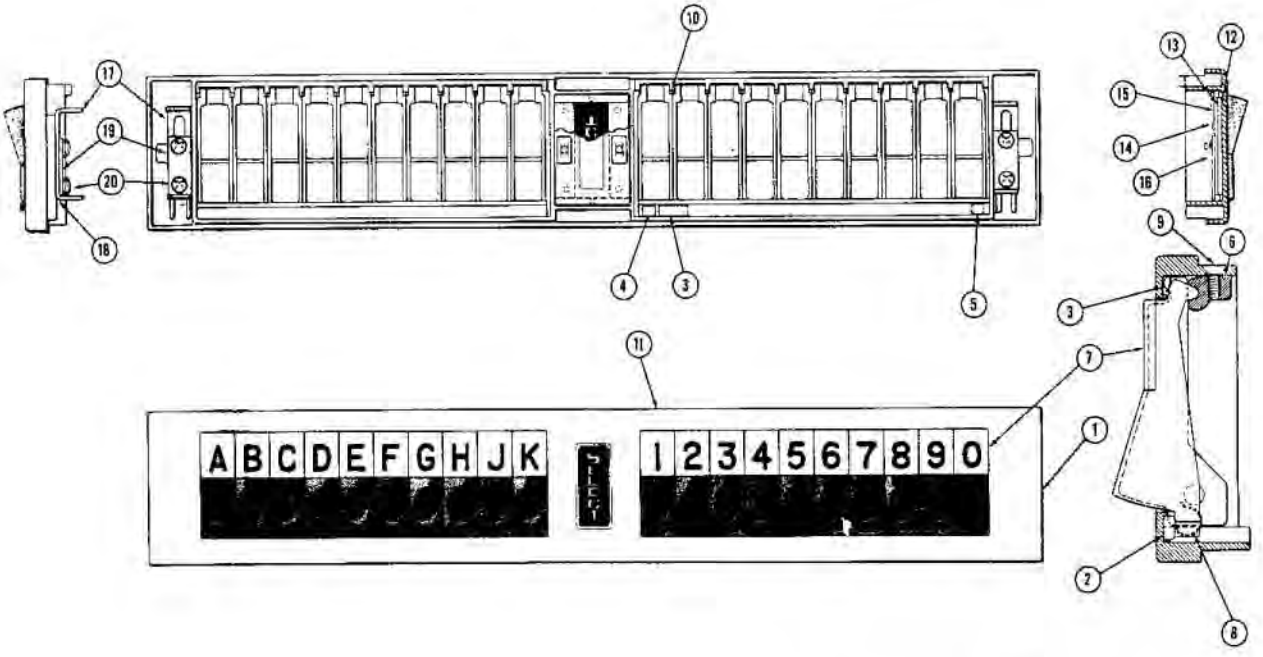


PARTS LIST on Reverse Side

PARTS LIST

Item	Part No.	Part Name
1	410250	Selector Frame Assembly
2	410255	Selector Switch
3	71818	Sems Fastener 8-32 x 5/16
4	410349	Latch Bar Spring
5	400864	Spring Retainer
6	70008	8-32 Hex Nut
7	251287	Clamp
8	410311	Cable & Plug Assembly
	410312	Cable Only
9	410256	Pivot Plate Assembly
10	71817	Sems Fastener 6-32 x ¼"
	72064	Flat Washer
11	410263	Treadle Bar Hinge
	410266	Treadle Bar
12	71820	Sems Fastener 8-32 x ¼"
13	125402	Retaining Ring
14	410344	Spring (letter switch)
15	410270	Treadle Bar Lever
16	410267	Treadle Bar Bumper
17	410268	Treadle Bar Spring
18	410259	Latch Lever
19	72039	Flat Washer
	125402	Retaining Ring
20	81125	Resistor, 100 ohm, 5 watt W.W.
21	410342	Terminal Strip
22	400844	27-Prong Socket
23	410273	Spring (Number Switch)
24	12028	8-Prong Octal Plug
25	410274	Latch Lever Link
26	410289	Snap Switch & Bracket Assembly
	410290	Switch Only
	410292	Snap Switch Bracket
	70524	5-40 x 13/16" R.H.M. Screw
	73116	Lock Washer
	F-200028	Switch Lock Plate
27	72000	Flat Washer
28	71819	Sems Fastener 6-32 x 5/16"
29	410306	Link Bar Return Spring
30	410309	Credit Lamp Assembly
31	302141	Credit Lamp No. 47
32	410279	Lock Solenoid Bracket
33	410285	Lock Lever
34	410286	Lock Lever Spring
35	410284	Lock Actuator
36	410283	Cancel Switch Assembly (E & F)
	70783	5-40 x 13/16" Fil. H. M. Screw
	F-200028	Switch Lock Plate
	73116	Lock Washer
37	78031	Grommets
	400854	Spacer
	72064	Flat Washer
	70784	6-32 x ½" Phillips B.H.M. Screw
38	70206	Speed Nut
39	410305	Latch Lever Spring
40	410294	Latch Solenoid Bkt & Pin Assembly
41	410307	Counter Bracket
42	79024	1/8" dia. x 5/32 lg. Rivet
43	410287	Return Spring
44	125403	Retaining Ring
45	410288	Solenoid Link Spring
46	80135	1/8" x 3/4" Cotter Pin
47	410346	Bronze Speed Clip (Anti-Residual)
48	410081	Solenoid
49	410302	Latch Lever & Bushing Assembly
50	410300	Solenoid Rod
51	72028	Flat Washer
52	410301	Compression Spring
53	410297	Latch Solenoid Brkt. & Bushing Assembly
54	410308	Counter Assembly
55	410330	Cover

ES10 - L6
SELECTOR KEY PANEL ASSEMBLY



ATTACH CLIP (8) BEFORE PUTTING SELECTOR KEYS IN FRAME.

PARTS LIST

Item	Part No.	Part Name
1	410222	Selector Key Panel
2	410226	Selector Key Stop
3	410336	Spring
4	410337	Spring - End R.H.
5	410338	Spring - End L.H.
6	410223	Bearing Strip
7	410221	Selector Key (Set of 20)
8	410225	Spring Clip
9	70786	Machine Screw No. 6-32 x 5/16
10	410353	Selector Key Separator
11	410210	Selector Key Panel (Complete)
12	410227	Credit Window
13	410343	Rubber Strip
14	410355	Retaining Plate
15	410229	Diffuser
16	70204	Speed Nut
17	410230	Latch
18	410231	Spacer
19	410232	Plate
20	71816	Sems No. 8-32 x ½ LG B.H.M.S.

SEEBURG

MASTER-REMOTE AMPLIFIER, TYPE MRA3-L6

The Master-Remote Amplifier, Type MRA3-L6, is a constant voltage type designed for use in the Select-O-Matic 100. It has eight tubes, two of which are 6L6's in a push-pull output stage to supply 25 watts of audio power for operation of the Select-O-Matic speaker and remote speakers.

The output of the low impedance magnetic pickup of the Select-O-Matic 100 is connected through a single-contact socket to a 6J7 voltage amplifier. The 6J7 is followed by a 6SN7 dual triode. The first section of the 6SN7 provides additional amplification, the second section is a cathode follower for low impedance input to bass and volume control circuits. A treble control circuit and connections for a muting switch are between the two 6SN7 sections. The output from the volume control is amplified by the first section of 6SL7. The second section of the 6SL7 is a phase inverter and drives the 6L6 output tubes.

An automatic volume compensator is incorporated in this amplifier. It compensates for the variations in the average volume levels of different records and makes possible a volume control setting for normal records without danger of blasting or high volume due to exceptionally "loud" records. A 4-position AVC Switch provides a choice of degree of volume compensation from zero (off) to more than 20 db compression.

The compensator uses a 6SL7GT and a 6SK7 tube. One half of the 6SL7 is an amplifier; the other half serves as a rectifier. The 6SK7 is the compensation control tube. The position of these tubes in the amplifier as well as the other tubes is shown in the block diagram, Figure 3.

Use is made of inverse feedback to obtain output regulation necessary for constant voltage operation and to insure a minimum of distortion and hum. The inverse feedback is supplied from a secondary of the output transformer to the cathode circuit of the amplifier section of the 6SL7.

The output transformer has two secondaries. One of these is for the Select-O-Matic speaker and is tapped for switch control of the power to the speaker. The other is for remote speakers and has taps to a terminal strip to accommodate constant voltage speakers or Seeburg type RS speakers.

The volume control adjusts the level of sound from the Select-O-Matic speaker and the remote speakers. It is located on the amplifier so it is accessible at the back of the cabinet. Connections for the control are made through a socket and dummy plug on the amplifier chassis. A remote volume control may be used by replacing the dummy plug with the 7-prong plug of a remote volume control, Type MRVC-1 or DRVC-1. The re-

(Continued on page 4046)

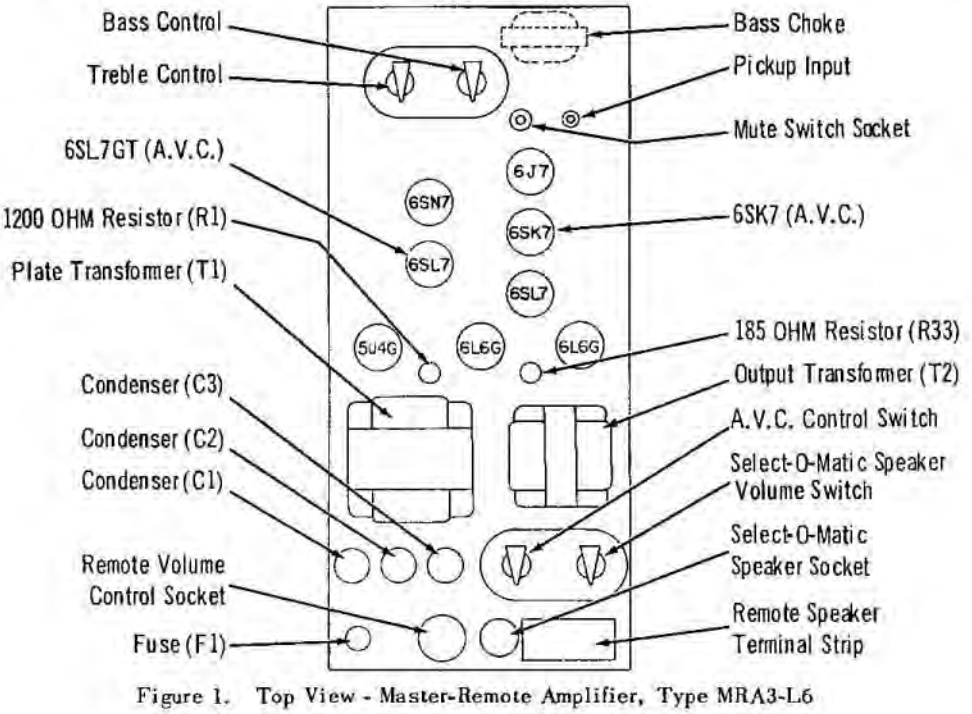


Figure 1. Top View - Master-Remote Amplifier, Type MRA3-L6

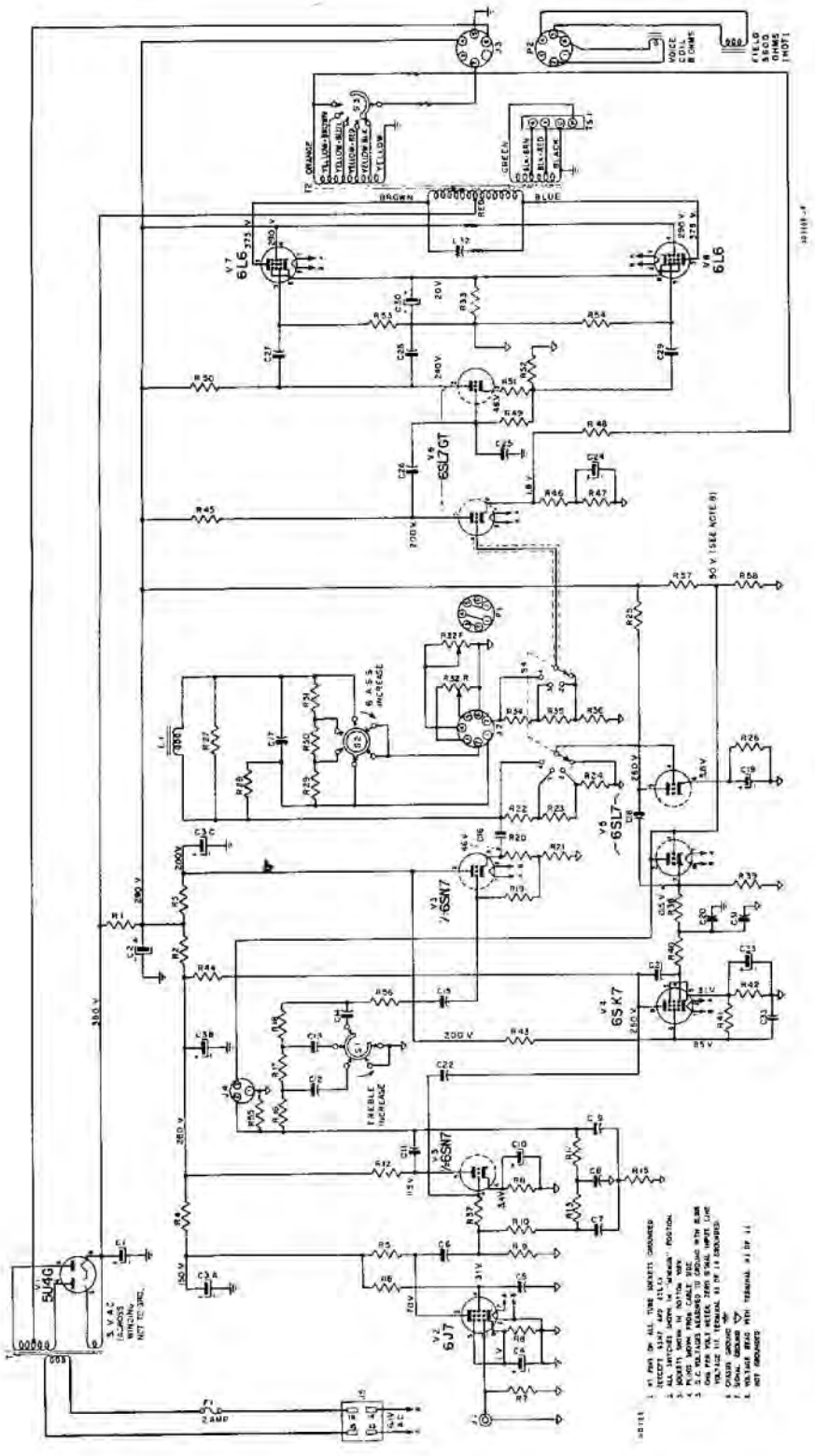


Figure 2. Schematic Diagram – Type MRA3-L6

PARTS LIST

Item	Part No.	Part Name
C1	87596	40 mfd. 450 v. Electrolytic
C2	87594	60 mfd. 350 v. Electrolytic
C3a)		(20 mfd. 350 v. Electrolytic
C3b)	87595	(20 mfd. 350 v. Electrolytic
C3c)		(20 mfd. 350 v. Electrolytic
C4	87598	100 mfd. 6 v. Electrolytic
C5	86146	.05 mfd. 600 v. Condenser
C6	86146	.05 mfd. 600 v. Condenser
C7	86159	.01 mfd. 200 v. Condenser
C8	86158	.02 mfd. 200 v. Condenser
C9	86159	.01 mfd. 200 v. Condenser
C10	87568	20 mfd. 25 v. Electrolytic
C11	86146	.05 mfd. 600 v. Condenser
C12	86116	.001 mfd. 100 v. Condenser
C13	86116	.001 mfd. 100 v. Condenser
C14	86116	.001 mfd. 100 v. Condenser
C15	86140	.05 mfd. 400 v. Condenser
C16	86115	0.5 mfd. 100 v. Condenser
C17	86115	0.5 mfd. 100 v. Condenser
C18	86154	.02 mfd. 600 v. Condenser
C19	87568	20 mfd. 25 v. Electrolytic
C20	86170	0.5 mfd. 200 v. Condenser
C21	86074	.01 mfd. 400 v. Condenser
C22	86198	.06 mfd. 400 v. Condenser
C23	87597	10 mfd. 50 v. Electrolytic
C24	87568	20 mfd. Electrolytic
C25	85003	50 mmf. 400 v. Mica
C26	86154	.02 mfd. 600 v. Condenser
C27	86154	.02 mfd. 600 v. Condenser
C28	85003	50 mmf. 400 v. Mica
C29	86154	.02 mfd. 600 v. Condenser
C30	87571	25 mfd. 50 v. Electrolytic
C31	86170	0.5 mfd. 100 v. Condenser
C32	86071	.005 mfd. 1000 v. Condenser
C33	86140	.05 mfd. 400 v. Condenser
F1	303087	2 amp. Slo-Blo Fuse
J1	300152	P. U. Socket
J2	84265	Vol. Control Socket
J3	84201	Speaker Socket
J4	12034	Mute Socket
	400954	Socket Retainer
J5	300007	Power Connector
L1	305106	Bass Choke
P1	305019	Dummy Plug Assem.
P2	402430	Speaker Plug
R1	81143	1200 ohm * w. w. 10 w. Resistor
R2	82776	8200 ohm 1 w. Resistor
R3	82820	8200 ohm 2 w. Resistor
R4	82448	0.1 meg. ½ w. Resistor
R5	82448	0.1 meg. ½ w. Resistor
R6	82457	0.56 meg. ½ w. Resistor
R7	82436	10,000 ohm ½ w. Resistor
R8	82424	1000 ohm ½ w. Resistor
R9	82460	1 meg. ½ w. Resistor
R10	82456	0.47 meg. ½ w. Resistor
R11	82425	1200 ohm ½ w. Resistor
R12	82676	47,000 ohm * ½ w. Resistor
R13	82452	0.22 meg. ½ w. Resistor
R14	82452	0.22 meg. ½ w. Resistor
R15	82666	0.1 meg. * ½ w. Resistor
R16	82442	33,000 ohm ½ w. Resistor
R17	82443	39,000 ohm ½ w. Resistor
R18	82445	56,000 ohm ½ w. Resistor
R19	82453	0.27 meg. ½ w. Resistor
R20	82418	330 ohm ½ w. Resistor
R21	82432	4700 ohm 1 w. Resistor
R22	82448	100 K ½ w. Resistor
R23	82676	47 K * ½ w. Resistor
R24	82442	33 K ½ w. Resistor
R25	82456	470 K ½ w. Resistor
R26	82682	62 K * ½ w. Resistor
R27	82442	33,000 ohm ½ w. Resistor
R28	82432	4700 ohm ½ w. Resistor
R29	82427	1800 ohm ½ w. Resistor
R30	82427	1800 ohm ½ w. Resistor
R31	82427	1800 ohm ½ w. Resistor
R32r)	302007	16,000 ohm Volume
R32f)		5,000 ohm Control
R33	81144	185 ohm * w. w. Resistor
R34	82442	33 K ½ w. Resistor
R35	82438	15 K ½ w. Resistor
R36	82445	56 K ½ w. Resistor
R37	82666	0.1 meg. * ½ w. Resistor
R38	82468	4.7 meg. ½ w. Resistor
R39	82467	3.9 meg. ½ w. Resistor
R40	82460	1 meg. ½ w. Resistor
R41	82441	27 K ½ w. Resistor
R42	82438	15 K ½ w. Resistor
R43	82445	56 K ½ w. Resistor
R44	82452	0.22 meg. ½ w. Resistor
R45	82666	0.1 meg. * ½ w. Resistor
R46	82690	470 ohm * ½ w. Resistor
R47	82428	2200 ohm ½ w. Resistor
R48	82629	5600 ohm *½ w. Resistor
R49	82457	0.56 meg. ½ w. Resistor
R50	82666	0.1 meg. * ½ w. Resistor
R51	82432	4700 ohm ½ w. Resistor
R52	82666	0.1 meg. *½ w. Resistor
R53	82453	0.27 meg. ½ w. Resistor
R54	82453	0.27 meg. ½ w. Resistor
R55	82457	0.56 meg. ½ w. Resistor
R56	82456	0.47 meg. ½ w. Resistor
R57	82460	1 meg. ½ w. Resistor
R58	82451	180 K ½ w. Resistor
S1	305025	Treble Switch
S2	305026	Bass Switch
S3	305111	Speaker Switch
S4	305107	D. P. 4 Pos. 2 Gang Switch
T1	305104	Power Transformer
T2	305105	Output Transformer
TS1	305009	Terminal Strip

Resistors marked thus (*) = 5% Tolerance – All others = 10%

(Continued from page 4043)

mote volume control cable may be up to one hundred feet in length without introducing hum, distortion or loss of volume.

Bass and Treble controls are mounted on the amplifier. Each is a four-postion switch.

Heater current for the amplifier tubes is supplied at 6.3 volts from the Selection Receiver. Plate current for the tubes is from an included plate supply transformer and 5U4G rectifier. The plate supply transformer primary is protected by a fuse located on the amplifier chassis.

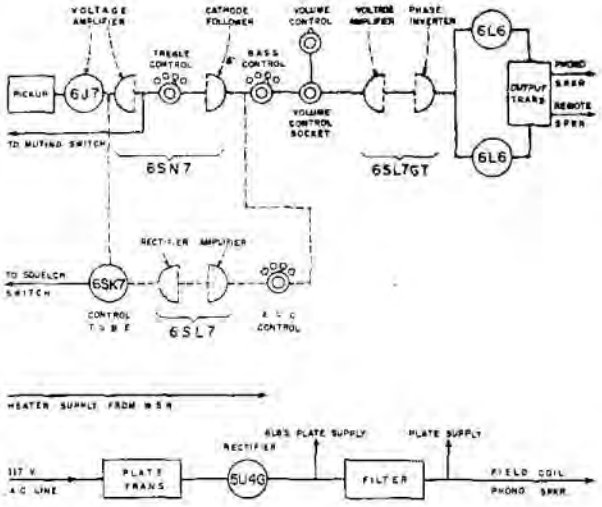


Figure 3. Block Diagram - Type MRA3-L6

The Voice coil impedance of the Select-O-Matic speaker is 8 ohms. Field coil d.c. resistance, measured when the field has attained normal operation temperature, is 5600 ohms.

A total of 25 watts of audio power is available from this amplifier. This power can be divided in various proportions between the Select-O-Matic Speaker and Remote Speakers.

1. *TYPE CV SPEAKERS*, if used, are connected to terminals *C* and *H*. The *VOLUME* (watts) of each *TYPE CV SPEAKER* is then set at the speakers.

2. *TYPE RS SPEAKERS*, if used, are connected to terminals *C* and *1* (1 watt per speaker), or the terminals C and 4 (4 watts per speaker), according to volume desired.

3. *THE SELECT-O-MATIC SPEAKER SWITCH* is set according to volume desired. *IF NO REMOTE SPEAKERS ARE USED, THE SELECT-O-MATIC SPEAKER SWITCH MUST BE SET AT 16* watts.

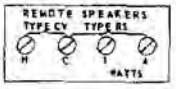


Figure 4.

Figure 5.

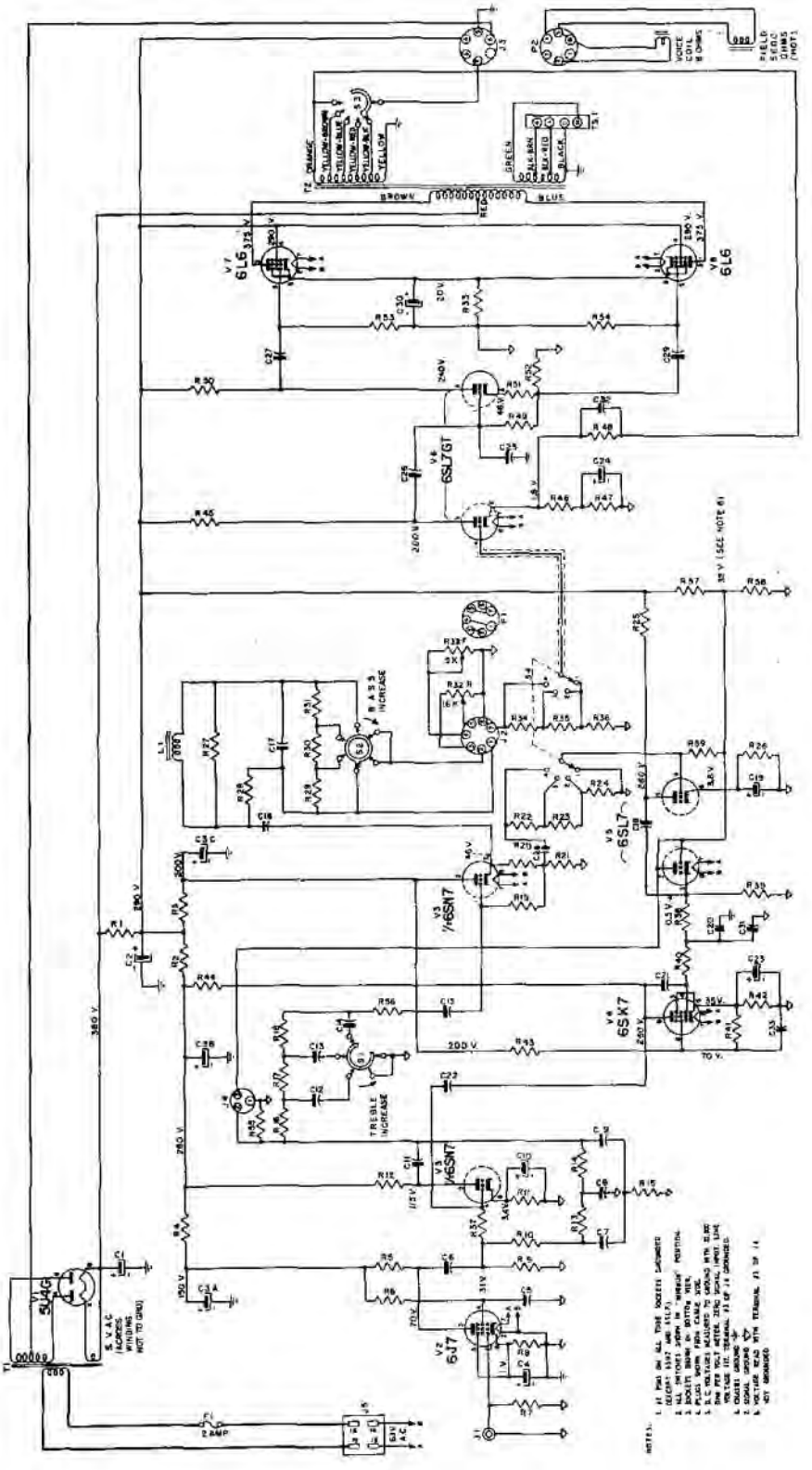
4. *THE WATTS OF ALL SPEAKERS MUST BE ADDED (INCLUDING THE SELECT-O-MATIC SPEAKER) AND THIS TOTAL WATTAGE MUST NOT EXCEED 25 WATTS.* If the total watts exceed 25, an external power amplifier, Seeburg Type *ARA1-L6, may be used to supply part of the speaker load, or speakers may be removed, or lower volume steps may be used.

* To connect CV type speakers on an ARA1-L6 amplifier, set the matching plug on 2 and connect the speakers to the terminal strip. Total watts of speakers connected to the ARA1-L6 must not exceed 18. To connect RS type speakers, see instructions on matching plug escutcheon.

Additional Parts List — MRA3-L6

Part No.	Description
602046	Tube Clamp
84220	Octal socket
10832	Electrolytic mtg. plate
305112	4 - lug terminal strip
305113	7 - lug terminal strip
400596	6 - lug terminal strip
300074	Escutcheon (Tone Control)
305108	Escutcheon (SPKR - A.V.C.)

Part No.	Description
300061	Fuse Receptacle
300076	Bar Knob (Tone Control)
305027	Knob (SPKR - A.V.C.)
300085	Grid Clip
10876	Grid cap shield
302047	Volume Control Key
305002	Volume Control Bracket



Diagram, Type MRA 3-L 6 Above Serial No. 14,000.

PARTS LIST

Item	Part No.	Part Name
C1	87596	40 mfd. 450 v. Electrolytic
C2	87594	60 mfd. 350 v. Electrolytic
C3a		
C3b	87595	20 mfd. 350 v. Electrolytic
C3c		
C4	87598	100 mfd. 6 v. Electrolytic
C5	86146	.05 mfd. 600 v. Condenser
C6	86146	.05 mfd. 600 v. Condenser
C7	86159	.01 mfd. 200 v. Condenser
C8	86158	.02 mfd. 200 v. Condenser
C9	86159	.01 mfd. 200 v. Condenser
C10	87568	20 mfd. 25 v. Electrolytic
C11	86146	.05 mfd. 600 v. Condenser
C12	86116	.001 mfd. 100 v. Condenser
C13	86116	.001 mfd. 100 v. Condenser
C14	86116	.001 mfd. 100 v. Condenser
C15	86140	.05 mfd. 400 v. Condenser
C16	86115	0.5 mfd. 100 v. Condenser
C17	86115	0.5 mfd. 100 v. Condenser
C18	86154	.02 mfd. 600 v. Condenser
C19	87568	20 mfd. 25 v. Electrolytic
C20	86170	0.5 mfd. 200 v. Condenser
C21	86074	.01 mfd. 400 v. Condenser
C22	86198	.06 mfd. 400 v. Condenser
C23	87597	10 mfd. 50 v. Electrolytic
C24	87568	20 mfd. Electrolytic
C25	85012	250 mmf. 400 v. Mica
C26	86154	.02 mfd. 600 v. Condenser
C27	86154	.02 mfd. 600 v. Condenser
C28	86158	.02 mfd. 200 v. Condenser
C29	86154	.02 mfd. 600 v. Condenser
C30	87571	25 mfd. 50 v. Electrolytic
C31	86170	0.5 mfd. 100 v. Condenser
C32	86204	.0015 μfd 200 v. Condenser
C33	86140	.05 mfd. 400 v. Condenser
F1	303087	2 amp. Slo-Blo Fuse
J1	300152	P. U. Socket
J2	84265	Vol. Control Socket
J3	84201	Speaker Socket
J4	12034	Mute Socket
J5	300007	Power Connector
L1	305106	Bass Choke
P1	305019	Dummy Plug Assembly
P2	402430	Speaker Plug
R1	81143	1200 ohm * w. w. 10 w. Resistor
R2	82776	8200 ohm 1 w. Resistor
R3	82820	8200 ohm 2 w. Resistor
R4	82448	0.1 meg. ½ w. Resistor
R5	82666	0.1 meg. * ½ w. Resistor
R6	82457	0.56 meg. ½ w. Resistor
R7	82436	10,000 ohm ½ w. Resistor
R8	82424	1000 ohm ½ w. Resistor
R9	82460	1 meg. ½ w. Resistor
R10	82456	0.47 meg. ½ w. Resistor
R11	82425	1200 ohm ½ w. Resistor
R12	82676	47,000 ohm * ½ w. Resistor
R13	82452	0.22 meg. ½ w. Resistor
R14	82452	0.22 meg. ½ w. Resistor
R15	82779	0.11 meg. * ½ w. Resistor
R16	82442	33,000 ohm ½ w. Resistor
R17	82443	39,000 ohm ½ w. Resistor
R18	82445	56,000 ohm ½ w. Resistor
R19	82453	0.27 meg. ½ w. Resistor
R20	82418	330 ohm ½ w. Resistor
R21	82432	4700 ohm 1 w. Resistor
R22	82448	100 K ½ w. Resistor
R23	82444	47 K ½ w. Resistor
R24	82442	33 K ½ w. Resistor
R25	82456	470 K ½ w. Resistor
R26	82445	56 K ½ w. Resistor
R27	82442	33,000 ohm ½ w. Resistor
R28	82432	4700 ohm ½ w. Resistor
R29	82427	1800 ohm ½ w. Resistor
R30	82427	1800 ohm ½ w. Resistor
R31	82427	1800 ohm ½ w. Resistor
R32r)	302007	16,000 ohm Volume
R32f)		5,000 ohm Control
R33	81144	185 ohm * w. w. Resistor
R34	82642	33 K * ½ w. Resistor
R35	82438	15 K ½ w. Resistor
R36	82642	33 K * ½ w. Resistor
R37	82666	0.1 meg. * ½ w. Resistor
R38	82467	3.9 meg. ½ w. Resistor
R39	82468	4.7 meg. ½ w. Resistor
R40	82460	1 meg. ½ w. Resistor
R41	82438	15 K ½ w. Resistor
R42	82438	15 K ½ w. Resistor
R43	82445	56 K ½ w. Resistor
R44	82452	0.22 meg. ½ w. Resistor
R45	82666	0.1 meg * ½ w. Resistor
R46	82659	330 ohm * ½ w. Resistor
R47	82428	2200 ohm ½ w. Resistor
R48	82629	5600 ohm * ½ w. Resistor
R49	82457	0.56 meg. ½ w. Resistor
R50	82666	0.1 meg. * ½ w. Resistor
R51	82432	4700 ohm ½ w. Resistor
R52	82666	0.1 meg. * ½ w. Resistor
R53	82453	0.27 meg. ½ w. Resistor
R54	82453	0.27 meg. ½ w. Resistor
R55	82457	0.56 meg. ½ w. Resistor
R56	82456	0.47 meg. ½ w. Resistor
R57	82460	1 meg. ½ w. Resistor
R58	82457	560 K ½ w. Resistor
R59	82453	0.27 meg. ½ w. Resistor
S1	305025	Treble Switch
S2	305026	Bass Switch
S3	305111	Speaker Switch
S4	305107	D. P. 4 Pos. 2 Gang Switch
T1	305104	Power Transformer
T2	305105	Output Transformer

Resistors marked thus (*) = 5% Tolerance – All others = 10%

SEEBURG

HIGH FIDELITY MASTER-REMOTE AMPLIFIER,

Type MRA4-L6

The Master-Remote Amplifier, Type MRA4-L6 is a low distortion, wide frequency range, constant voltage type designed for use in the Select-O-Matic "100". It has eight tubes, two of which are 6L6's in a push-pull output stage to supply 25 watts of audio power for operation of the Select-O-Matic speakers and remote speakers.

The output of the low impedance magnetic pickup of the Select-O-Matic "100" mechanism is connected through a single-contact socket to a 5879 voltage amplifier. The 5879 is followed by a 6SN7 dual triode. The first section of the 6SN7 provides additional amplification, the second section is a cathode follower for low impedance input to bass and volume control circuits. A treble control circuit and connections for a muting switch are between the two 6SN7 sections. The output from the volume control is amplified by the first section of a 12AX7. The second section of the 12AX7 is a phase inverter and drives the 6L6 output tubes.

An automatic volume compensator is incorporated in this amplifier. It compensates for the variations in the average volume levels of different records and makes possible a volume control setting for normal records without danger of blasting or high volume due to exceptionally "loud" records. A 4-position AVC Switch provides a choice of degree of volume compensation from zero (off) to more than 20 db compression.

The compensator uses a 6SL7GT and a 6SK7 tube. One half of the 6SL7 is an amplifier; the other half serves as a rectifier. The 6SK7 is the compensation control tube. The position of these tubes in the amplifier as well as the other tubes is shown in the block diagram, Figure 2.

Use is made of inverse feedback to obtain output regulation necessary for constant voltage operation and to insure a minimum of distortion and hum. The inverse feedback is supplied from a secondary of the output transformer to the cathode circuit of the amplifier section of the 12AX7

The output transformer has two secondaries. One of these is for the Select-O-Matic speakers and is tapped for switch control of the power to the speakers. The other is for remote speakers and has taps to a terminal strip to accommodate High Fidelity Remote Speakers.

The volume control adjusts the level of sound from the Select-O-Matic speaker and the remote speakers. It is located on the amplifier so it is accessible at the back of the cabinet. Connections for the control are made through a socket and dummy plug on the amplifier chassis. A remote volume control may be used by replacing the dummy plug with the 7-prong plug of a remote volume control, Type MRVC-1 or DRVC-1. The remote volume control cable may be up to one hundred feet in length without introducing hum, distortion or loss of volume.

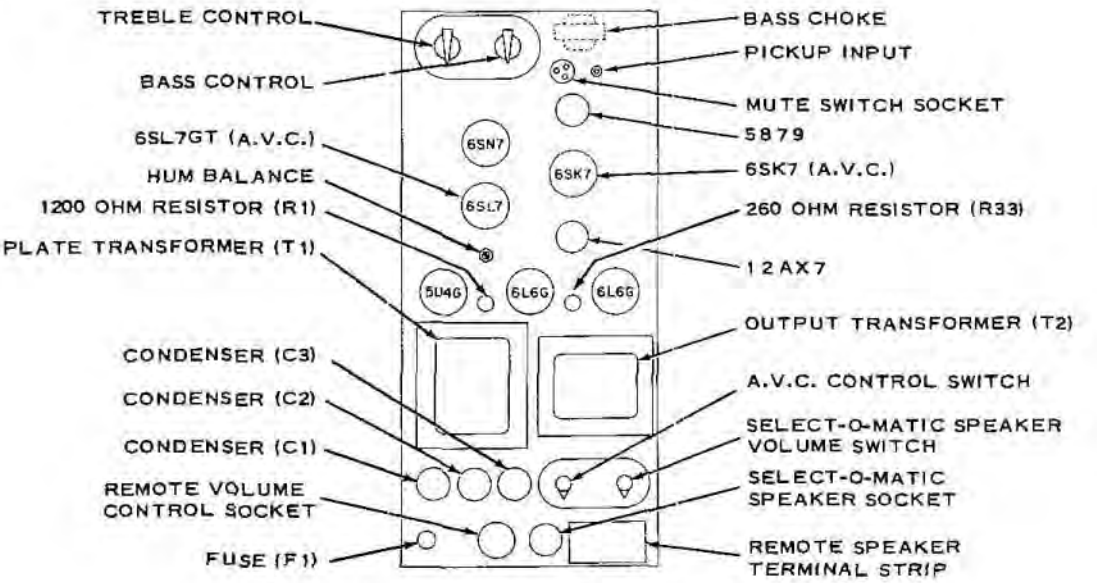


Figure 1. Top View – Master-Remote Amplifier, Type MRA4-L6

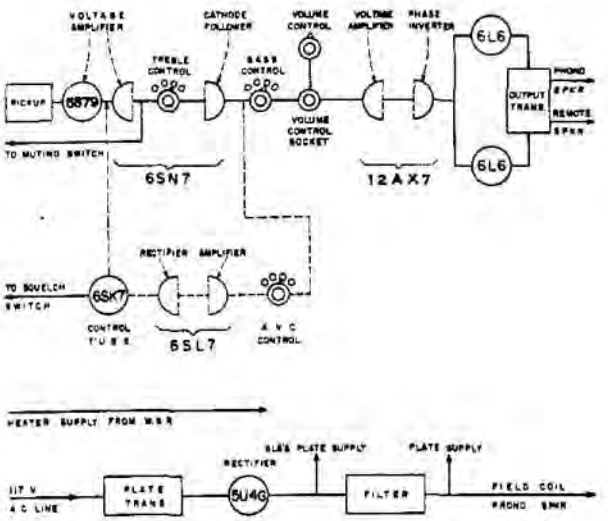


Figure 2. Block Diagram — Type MRA4-L6

Heater current for the amplifier tubes is supplied at 6.3 volts from the Selection Receiver. Plate current for the tubes is from an included plate supply transformer and 5U4G rectifier. The plate supply transformer primary is protected by a fuse located on the amplifier chassis.

The Voice Coil impedance of the 15" Select-O-Matic Speaker is 8 ohms; its field coil d.c. resistance, measured when the coil has attained normal operating temperature, is 5600 ohms.

The Voice Coil impedance of the 5" PM type "High Frequency" speaker is 12 ohms.

The total amplifier output power of 25 watts can be divided between the Select-O-Matic speakers and remote speakers with the proportions of volume conveniently adjusted by use of the Select-O-Matic Speaker Switch located at the lower end of the amplifier and shown in Figure 3. The switch is set to provide the desired balance of volume between the Select-O-Matic speakers and the remote speakers but the total power (in watts) of all the speakers in use must not exceed 25. The load (in watts) should also not be lower than 25% of the total, (6 watts).

IF NO REMOTE SPEAKERS ARE USED, THE SPEAKER SWITCH MUST BE SET AT 16 WATTS.

High Fidelity Remote, Type HF, Speaker, if used, are connected to the Amplifier terminal strip shown in Figure 4. If only ONE or TWO Remote High Fidelity speakers are to be used, they are connected in parallel to terminals L and G. With this connection 8 watts will be available at each remote speaker.

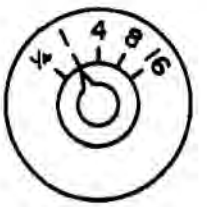


Figure 3.
Speaker Switch

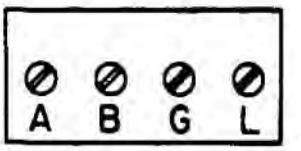


Figure 4.
Terminal Strip

No. 18 wire should be used for lines of less than 50 feet. No. 14 wire should be used for longer lines up to 100 feet.

If it is necessary to place remote speakers at a distance greater than 100 feet, or more than TWO remote speakers are desired, High Fidelity Constant Voltage transformer Kit, Type CVTK-1, *Seeburg Part No. 503330* should be used with each speaker. Connection should then be made to the 70 volt Constant Voltage terminals, A and B, on the amplifier. The volume (watts) of each speaker is adjusted at the taps of the CV Transformer.

If the total watts of the remote speakers and the Select-O-Matic cabinet speakers exceed 25 watts, an external Power Amplifier, *Seeburg Type HFA1-L6* may be used to supply part of the load.

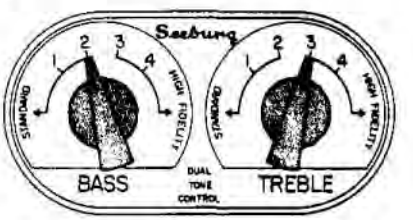
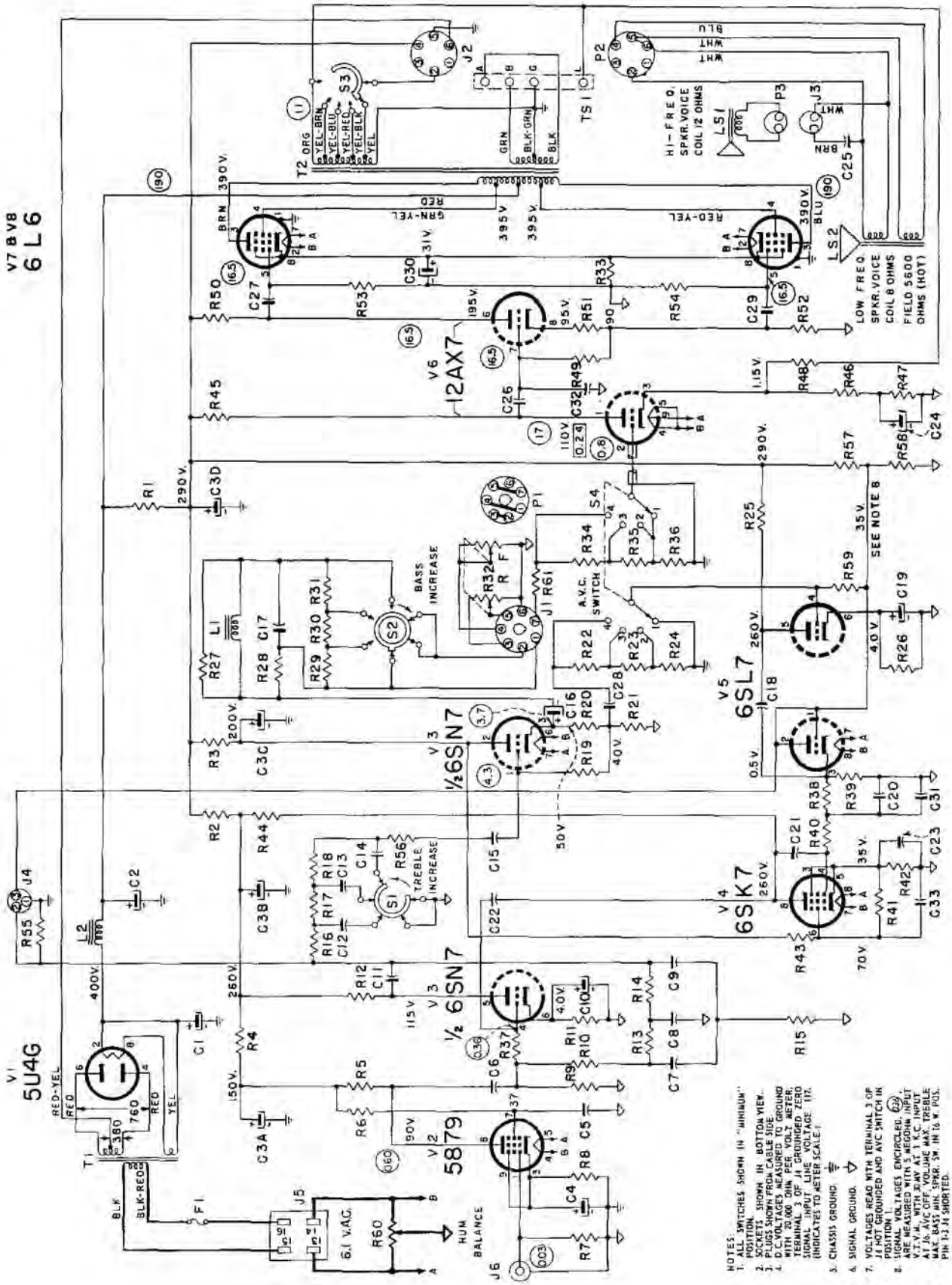


Figure 5. Tone Controls

The Bass and Treble controls are four-position switches with an indicating escutcheon shown in Figure 5. The position of the controls when an amplifier is in normal use is determined by the records being reproduced, the room size and other acoustical conditions. "Flat" response of the amplifier is had with the bass control at 2 and the treble control at 3 but with average conditions and typical records, very realistic reproduction is obtained by setting the bass at 3 and the treble at 3.

HIGH FIDELITY MASTER-REMOTE AMPLIFIER, TYPE MRA4-L6



NOTES:
1. ALL SWITCHES SHOWN IN "MINIMUM" POSITION.
2. SOCKETS SHOWN FROM CABLE SIDE.
3. PLUGS SHOWN FROM CABLE SIDE.
4. D.C. VOLTAGES READ FROM GROUND WITH 20,000 OHMS PER VOLT METER. TERMINAL 3 OF J4 GROUNDED. ZERO SIGNAL INPUT. LINE VOLTAGE 117. (INDICATES TO METER SCALE.)
5. CHASSIS GROUND.
6. SIGNAL GROUND.
7. VOLTAGES READ WITH TERMINAL 3 OF J4 NOT GROUNDED AND AVC SWITCH IN POSITION 1.
8. SIGNAL VOLTAGES ENCIRCLED (0.8), ARE MEASURED WITH 5 MEGOHM INPUT METER WITH .3 MV AT 1 K.C. INPUT TO AMPLIFIER WITH VOLUME CONTROL AT MAX. BASS AND TREBLE. SPKR. IN 16 W. POS. PIN 1 TO J4 SHORTED.

PARTS LIST on Reverse Side

PARTS LIST

Item	Part No.	Part Name
C1 / C2	87596	40 mfd. 450 V. Lytic
	10832	Electrolytic mtg. plate
C3a		10 mfd. 350 V. Lytic
C3b	87609	20 mfd. 350 V. Lytic
C3c		20 mfd. 350 V. Lytic
C3d**		40 mfd. 350 V. Lytic
	602125	Electrolytic mtg. plate
C4	87598	100 mfd. 6 V. Lytic
C5	86146	.05 mfd. 600 V. Paper
C6	86146	.05 mfd. 600 V. Paper
C7	86213	.005 mfd. 400 V. ± 10% Paper
C8	86212	.01 mfd. 400 V. ± 10% Paper
C9	86213	.005 mfd. 400 V. ± 10% Paper
C10	87568	20 mfd. 25 V. Lytic
C11	86146	.05 mfd. 600 V. Paper
C12	86207	.001 mfd. 200 V. Paper
C13	86207	.001 mfd. 200 V. Paper
C14	86207	.001 mfd. 200 V. Paper
C15	86140	.05 mfd. 400 V. Paper
C16	87602	10 mfd. 150 V. Lytic
C17	86115	0.5 mfd. 100 V. Paper
C18	86154	.02 mfd. 600 V. Paper
C19	87568	20 mfd. 25 V. Lytic
C20	86170	0.5 mfd. 100 V. Paper
C21	86212	.01 mfd. 400 V. Paper
C22	86198	.06 mfd. 400 V. ± 10%
C23	87597	10 mfd. 50 V. Lytic
C24	87568	20 mfd. 25 V. Lytic
C25	86215	4 mfd. 200 V. Paper
C26	86146	.05 mfd. 600 V. Paper
C27	86146	.05 mfd. 600 V. Paper
C28	86158	.02 mfd. 200 V. Paper
C29	86146	.05 mfd. 600 V. Paper
C30	87604	25 mfd. 50 V. Lytic
C31	86170	0.5 mfd. 100 V. Paper
C32	85003	50 mmfd. 500 V. Mica
C33	86140	.05 mfd. 400 V. Paper
F1	303087	2 amp. Slo-Blo Fuse
	300061	Fuse Receptacle
J1	84265	Vol. Control Socket
J2	84201	Speaker Socket
J3		2 Prong Socket
J4	12034	Mute Socket
	400954	Socket Retainer
J5	300007	Power Connector
J6	300152	Pu Socket
	305022	Insulating Washer
L1	305106	Bass Choke
L2**	305190	Filter Choke
P1	305019	Dummy Plug Assem.
P2	402430	Speaker Plug
P3		Tweeter Plug
R1	81143	1200 ohm ± 5% W.W. 10 W.
R2	82776	8200 ohm ± 10% 1 W.
R3	82820	8200 ohm ± 10% 2 W.
R4	82448	0.1 Meg. ± 10% ½ W.
R5	82675	82 K ± 5% ½ W.
R6	82456	470 K ± 10% ½ W.
R7	82436	10,000 ohm ± 10% ½ W.
R8	82677	620 ohm ± 10% ½ W.
R9	82460	1 Meg. ± 10% ½ W.
R10	82455	0.39 Meg. ± 10% ½ W.
R11	82425	1200 ohm ± 10% ½ W.
R12	82676	47,000 ohm ± 5% ½ W.
R13	82457	560 K ± 10% ½ W.
R14	82457	560 K ± 10%
R15	82453	270 K ± 10% ½ W.
R16	82442	33,000 ohm ± 10% ½ W.
R17	82443	39,000 ohm ± 10% ½ W.
R18	82445	56,000 ohm ± 10% ½ W.
R19	82453	0.27 Meg. ± 10% ½ W.
R20	82418	330 ohm ± 10% ½ W.
R21	82432	4700 ohm ± 10% ½ W.
R22	82448	100 K ± 10% ½ W.
R23	82444	47 K ± 10% ½ W.
R24	82442	33 K ± 10% ½ W.
R25	82456	470 K ± 10% ½ W.
R26	82442	56 K ± 10% ½ W.
R27	82436	10,000 ohm ± 10% ½ W.
R28	82432	4700 ohm ± 10% ½ W.
R29	82426	1500 ohm ± 10% ½ W.
R30	82427	1800 ohm ± 10% ½ W.
R31	82428	2200 ohm ± 10% ½ W.
R32a)	302007	16,000 ohm Volume
R32b)	302007	5,000 ohm Control
	302047	Volume Control Key
	305002	Volume Control Bracket
R33	81145	260 ohm ± 5% W.W.
R34	82642	33 K ± 5% ½ W.
R35	82438	15 K ± 10% ½ W.
R36	82642	33 K ± 5% ½ W.
R37	82666	0.1 Meg. ± 5% ½ W.
R38	82467	3.9 Meg. ± 10% ½ W.
R39	82468	4.7 Meg. ± 10% ½ W.
R40	82460	1 Meg. ± 10% ½ W.
R41	82438	15 K ± 10% ½ W.
R42	82438	15 K ± 10% ½ W.
R43	82445	56 K ± 10% ½ W.
R44	82452	0.22 Meg. ± 10% ½ W.
R45	82667	0.47 Meg. ± 5% ½ W.
R46	82659	330 ohm ± 5% ½ W.
R47	82433	5600 ohm ± 10% ½ W.
R48	82629	5600 ohm ± 5% ½ W.
R49	82457	0.56 Meg. ± 10% ½ W.
R50	82789	.39 Meg. ± 5% ½ W.
R51	82433	5600 ohm ± 10% ½ W.
R52	82789	.39 Meg. ± 5% ½ W.
R53	82453	0.27 Meg. ± 10% ½ W.
R54	82453	0.27 Meg. ± 10% ½ W.
R55	82457	0.56 Meg. ± 10% ½ W.
R56	82448	0.1 Meg. ± 10% ½ W.
R57	82460	1 Meg. ± 10% ½ W.
R58	82457	0.56 Meg. ± 10% ½ W.
R59	82453	0.27 Meg. ± 10% ½ W.
R60	602846	75. ohm W.W. 1 W.
R61	82640	27,000 ohm ± 5% ½ W.
LS1	406260	5" Speaker
LS2	406350	15" Speaker
S1	305025	Treble Switch
S2	305026	Bass Switch
S3	305111	Speaker Switch
S4	305107	D.P. 4 Pos. 2 Gang Sw.
T1**	305162	Power Transformer
T1*	305163	Power Transformer
T2	305164	Output Transformer
TS1	305185	Terminals Strip 4 Lugs
	602046	Tube Clamp
	84220	Octal Socket
	302329	5-lug Terminal Strip
	400596	6-lug Terminal Strip
	305113	7-lug Terminal Strip
	305167	Tone Control Escutcheon
	305183	Spkr-AVC Escutcheon
	300076	Tone Control Bar Knob
	305027	Spker-AVC Knob

* USED ONLY WHEN L2** IS USED.
** NOT USED ON SOME MRA4-L6 AMPLIFIERS.

WIRED SELECTION RECEIVER
TYPE WSR5-L6

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Schematic Diagram ---------- 5087

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SEEBURG

SEEBURG
WIRED SELECTION RECEIVER
TYPE WSR5-L6

The Wired Selection Receiver, Type WSR5-L6, is the power distribution and control center of the Select-O-Matic for operation from the Electric Selector and Wired Wall-O-Matics. Power enters the Receiver through the line cord and main switch and is distributed, directly at 117-volts or through transformers, to the electric selector, the Select-O-Matic Mechanism, the cabinet lighting, the amplifier, and the Wall-O-Matics. All connections to the Receiver are made with plugs which are of different types and sizes to avoid possibility of incorrect connections.

Included in the Receiver are a Step Switch and Relay Assembly, a 2050 tube, and a Credit and Cancel Unit for selection of records. The Step Switch and Relay Assembly and the 2050 tube are for selections from Wired Wall-O-Matics. The Credit and Cancel Unit is a part of the electric selector system for selections made at the Select-O-Matic.

A 25-volt transformer supplies power for up to six Type "3W-1" Wired Wall-O-Matics. Another transformer, the selection receiver power transformer, has five output windings for control circuits, the Select-O-Matic Mechanism indicator lights, and heater current for the tubes in the Master Remote Amplifier.

One of the secondaries of the selection receiver power transformer provides approximately 30-volts, a.c. This 30-volt output is rectified by a full-wave selenium rectifier for 25-volt d.c. supply for some of the relays of the Step Switch and Relay Assembly, for d.c. supply for a timing relay in the Credit and Cancel Unit, and for bias supply for the 2050 tube. Another secondary provides approximately 150-volts for operating the step switches through the plate circuit of the 2050 tube.

Access to the interior wiring and components is had, while the unit is normally operating, by removing the cover plate on the outside of the rear door of the M100B Select-O-Matic 100. To remove the cover plate, take off the three wing-nuts located inside the door just above the amplifier and selection receiver and loosen the screw at

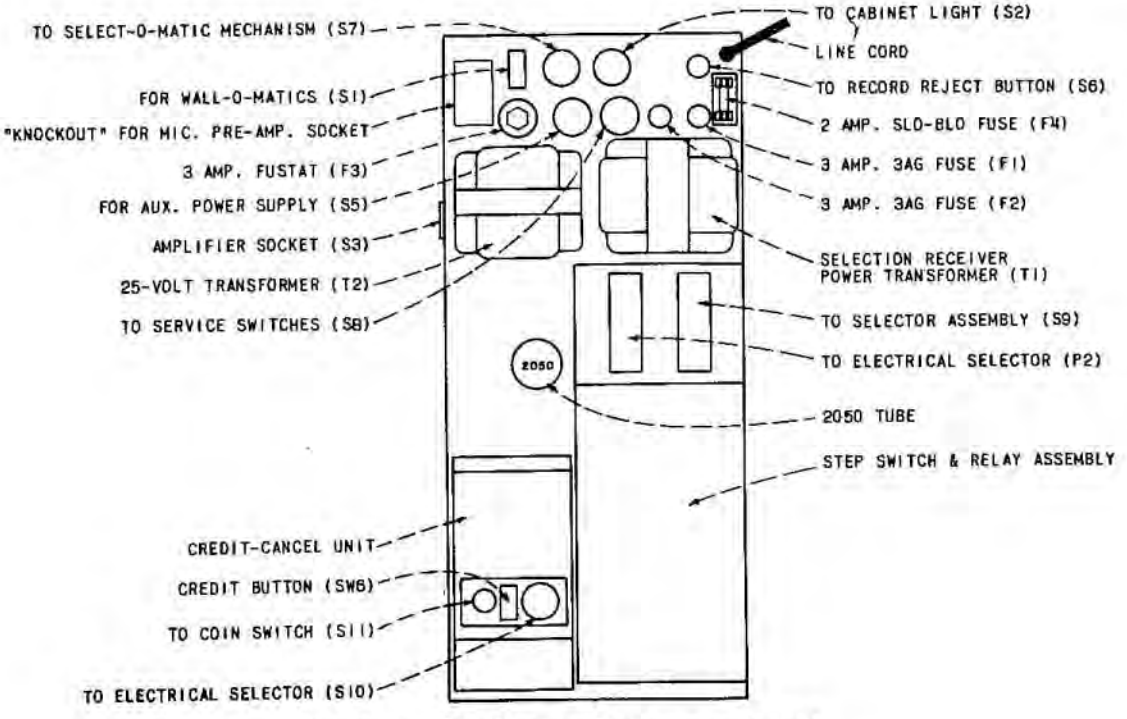


FIGURE 1. TOP VIEW OF SELECTION RECEIVER

the center of the bottom edge of the plate. After removing the nuts, pull out on the plate so the three bolts are out of the holes in the door and lift up on the plate to disengage hooks at the lower edge.

The Selection Receiver may be removed from its mounting by removing the cover plate and loosening the four screws holding the flanges of the unit. With the four screws loosened, slide the unit away from the amplifier to disengage the locating pins and amplifier sockets connection. It may then be lifted from the mounting frame.

CREDIT AND CANCEL UNIT, TYPE CCU-2

The Credit and Cancel Unit, although included in the selection receiver, is a part of the electrical selector system of the Select-O-Matic "100". The operation and adjustments of the unit are discussed in detail in the information on the Electrical Selector, Type "ES6-L6", beginning on page 3039.

STEP SWITCH AND RELAY ASSEMBLY OPERATION

The fundamental purpose of the Step Switch and Relay Assembly is to energize a selector coil and a group solenoid in the Solenoid Assembly (of the Select-O-Matic Mechanism) according to the selection made with a Type "3W-1" Wired Wall-O-Matic. The Assembly consists of two step switches, a reset magnet, a transfer relay, two timing relays, and a play control relay. (The play control relay is not directly involved in the operation of the remote control system.)

When a selection is made from a Wall-O-Matic, a rotating switch blade in the Wall-O-Matic causes intermittant grounding of the grid of the 2050 tube in the selection receiver. The grounding occurs in two series of "pulses". These pulses are of approximately 1/25 second duration with a 1/25 second interval between each successive pulse and with approximately 1/5 second interval between the two series. The number of pulses in each of the two series is determined by which selector buttons are operated at the Wall-O-Matic and will determine, in turn, which selector coil and which group solenoid will be energized.

Each time the grid of the 2050 tube is grounded during one of the "pulses", the tube passes current through its plate circuit and a step relay coil in that circuit. The relay coil attracts its armature and operates the ratchet of the step switch so the switch is advanced one step. In the normal rest position of the Assembly, none of the relays are energized, the two step switches are in "zero" position and the coil of the Unit Step Relay is in the plate circuit of the 2050 tube through Contact "A" of the Transfer Switch. When a selection is made, the first pulse of the first series energizes the Unit Step Relay, advances the step switch one contact, and closes contacts "G" and "F". Contact "G" completes a d.c. circuit to the Reset Magnet causing that magnet to be energized and engage pawls with the ratchets of both step relays. Contact "F" completes a d.c. circuit to the Transfer Relay so it is energized, opening Contact "D" and closing Contact "E". Both the Reset Magnet and the Transfer Relay have slow-release timing so they remain in the energized positions for an appreciable time after the first pulse from the 2050 tube had ended to permit the Step Relay armature to return to its normal position with Contacts "G" and "F" open. Before either relay will drop out, the second pulse of the series operates the armature of the Unit Step Relay and again the relays are energized. As long as the pulses continue with 1/25 second intervals between them the following condition will prevail: Contacts "G" and "F" open and close with each "pulse" from the Wall-O-Matic, the pawls engage with the step switch ratchets, and the Transfer Relay Contact "E" remains closed. Because the step switch ratchets are engaged by the pawls, the step relay will advance the step switch one step or contact with each pulse.

When the second pulse of the first pulse series advances the Unit Step Switch a second time, a cam on that switch operates the make-before-break contacts of the Transfer Switch so the 2050 tube plate circuit is connected

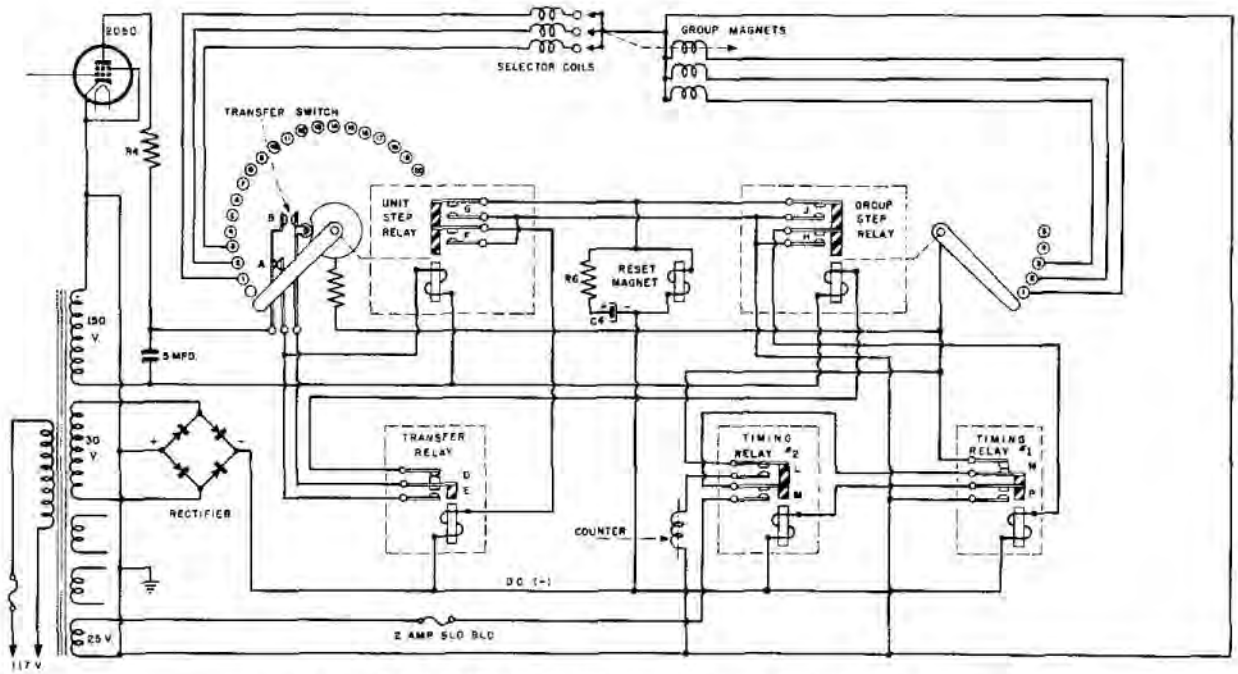


FIGURE 2. SIMPLIFIED SCHEMATIC DIAGRAM - STEP SWITCH ASSEMBLY

to the Unit Step Relay through Contacts "B" ("A" open) and Contact "E" of the Transfer Relay. This circuit condition is retained through subsequent steps of the Unit Step Switch.

The 1/5 second interval between the end of the last pulse of the first series and the beginning of the first pulse of the second series causes the Unit Step Relay to open the "G" and "F" contacts long enough to allow the Transfer Relay to drop out but not long enough to allow the Reset Magnet to disengage the Step Switch ratchet pawls. Therefore, during this 1/5 second interval when the Transfer Relay drops out, the Unit Step Switch remains in the advanced position and the plate circuit of the 2050 tube is transferred to the Group Step Relay through Contacts "B" and "D". When the first pulse of the second series operates the 2050 tube, the Group Step Relay will be energized and Contacts "J" and "H" will be closed for the duration of the pulse.

Contact "J" energizes the Reset Magnet so it maintains its energized position as long as the pulses of the second series operate the Group Step Relay. Contact "H" closes the d.c. circuit to the #1 Timing Relay. This relay has slow-release timing so it remains in the energized position during the 1/25 second intervals between the pulses forming the second series. When the #1 Timing Relay is energized Contact "N" opens and Contact "P" closes. Contact "P" closes the d.c. circuit to the #2 Timing Relay which, in turn, closes Contact "M" and Contact "L".

The conditions prevailing as long as the pulses of the second series continues with 1/25 second interval between them are: advance of the Group Step Switch with each pulse (Group Step Relay energized through Contacts "B" and "D"); the Reset Magnet energized so the Unit Step Switch is in its advanced position; the Timing Relays #1 and #2 energized; Contact "M" closed; Contact "L" closed; Contact "N" open.

After the last pulse of the second series has operated the Group Step Relay, Contacts "J" and "H" remain open and the #1 Timing Relay drops out. When this occurs, Contact "P" opens and Contact "N" closes. Contact "N" will close the "Selection Circuit" for current supply to a selector coil and a group solenoid. The #2 Timing Relay has slow-release timing so there will be an interval of approximately 1/20 second before Contact "M" is opened to interrupt the selection circuit. The Reset Magnet timing is such that it drops out after Contact "M" has opened, releases the Step Switch ratchet pawls, and the step switches reset to normal position.

Contact "L", which is closed during the second series of pulses, completes a circuit to a selection counter solenoid in the Electrical Selector.

The number of steps the Unit Step Switch makes during the first series of pulses determines which one of twenty selector coil circuits will be energized. Because there is one open contact for the first step, the number of this circuit will be, numerically, one less than the number of pulses in the first series. The number of steps made by the Group Step Switch will determine which one of five group solenoids will be energized. The first pulse of the second series will advance the group switch to the A-B solenoid circuit, the second to the C-D solenoid circuit, and so on to the fifth pulse for the J-K solenoid circuit. The selection made, then, will require from two to twenty-one pulses in the first series and from one to five in the second series with the predetermined interval of approximately 1/5 second between the two series.

It is to be noted that operation of the relays is determined largely by the time interval between pulses, not by the duration of the individual pulses. The individual pulses of a selection series must be of only sufficient duration to insure full operating strokes of the step relay armatures but may be of any duration more than this minimum requirement. The intervals between the pulses must be long enough for the step relay armatures to return to normal position for another stroke but not enough to permit the transfer relay to release during the first series or the #1 Timing Relay to release during the second series. The interval between the last pulse of the first series and the first pulse of the second series must be timed to permit the transfer relay to release but must not be long enough to allow the release magnet to return to normal position.

Both the pulse length and the intervals between pulses is determined by the design and operation of the Wall-O-Matic. The contacts on the selector plate and the rotating control arm of the Wall-O-Matic are arranged for correct pulsing when the arm operates between the speed limits of 22 to 26 revolutions per minute.

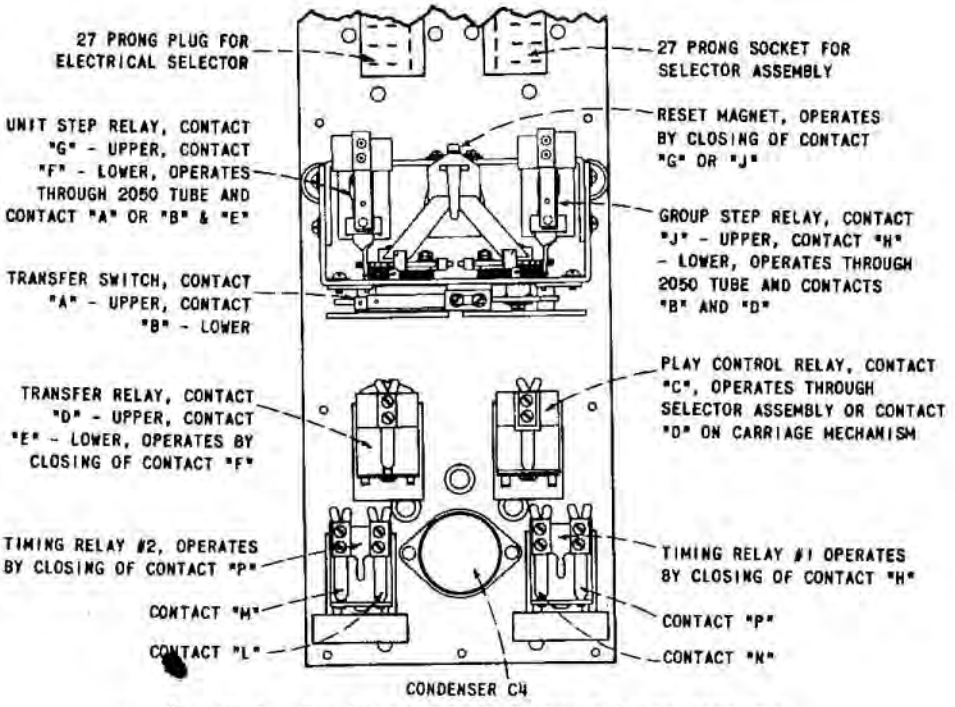


FIGURE 3. TOP VIEW OF STEP SWITCH & RELAY ASSEMBLY

RELAY ADJUSTMENTS

Relay	Armature Gap	Contact	Contact Gap	Normal Position
Timing Relay #1	1/32"	N	1/64"	Closed
		P	1/64"	Open
Timing Relay #2	1/32"	L	1/64"	Open
		M	1/64"	Open
Transfer Relay	3/64"	D	1/32"	Closed
		E	1/32"	Open
Play Control Relay*	3/64"	C	1/32"	Open
Transfer Switch	See Step Switch Adjustments	A	1/64"	Closed
		B	App. 1/32"	Open
Group Step Magnet		H	1/64"	Open
		J	1/64"	Open
Unit Step Magnet		F	1/64"	Open
		G	1/64"	Open
Reset Magnet**	See RESET MAGNET POSITION, Page 5085			

All Coil Resistance = 500 ohms, except * = 40 ohms & ** = 325 ohms

STEP SWITCH ASSEMBLY ADJUSTMENTS

RATCHET AND SWITCH

The ratchets are attached to the switch shafts with pins or set screws. They should be positioned so the outer blades of the step switches are approximately centered on the lowest contact (on the contact plate) when the stud on the side of the ratchet wheel is against the stop on the assembly frame.

The ratchets should be set on the shafts for a minimum of end play consistent with no binding.

RATCHET RETURN SPRING

The ratchet return spring for the unit step switch should have enough tension to require 90 to 115 grams (3-1/4 to 4 oz.) tangential force to move the ratchet to the 5th position of the step switch. This force is measured at the point of a ratchet tooth with the switch contact plates removed and will be approximately correct if the spring is wound one full turn when the switch is in the rest position.

The return spring for the group step switch should require 60 to 75 grams (2 to 2-3/4 oz.) tangential force to move the ratchet to the 5th position. The tension will be approximately correct if the spring is wound 3/4-turn when the switch is in the rest position.

STEP RELAY MAGNET POSITION

Adjust the step relay magnet vertically so the ratchet wheel tooth will over-ride the end of the release dog .010" to .020" when the armature is seated.

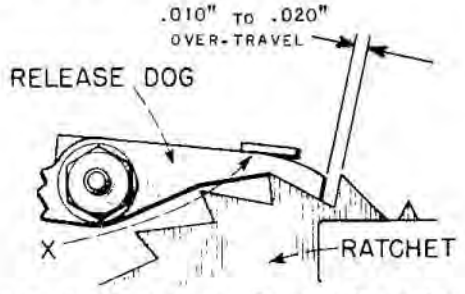


FIGURE 5. SIDE VIEW - RELEASE DOG & RATCHET

The upper edge of the pawl guide opening is the stop for upward travel of the pawl. With the pawl against the guide, the clearance between the ratchet teeth and the pawl should not be less than .005".

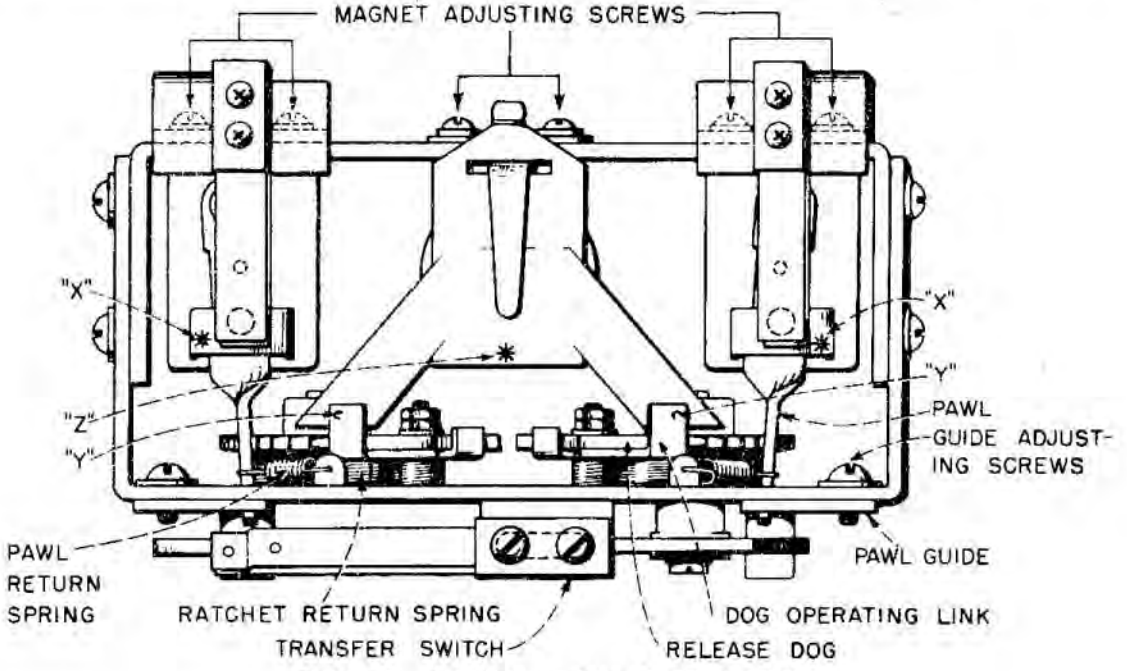


FIGURE 4. TOP VIEW OF STEP SWITCH ASSEMBLY

PAWL GUIDE

The pawl guides are adjusted so the pawls will strike the bottom of the ratchet teeth when the pawl moves down to engage the ratchet.

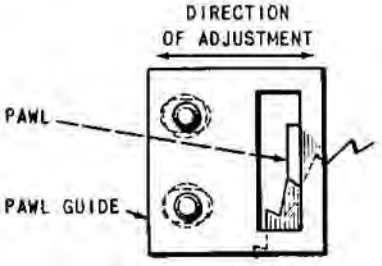


FIGURE 6. PAWL GUIDE POSITION

The guide adjustment must be made so there will be a .004" to .010" gap between the pawl and the guide at the bottom of the stroke.

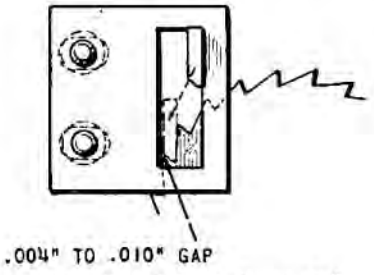


FIGURE 7. PAWL & GUIDE GAP

PAWL RETURN SPRING

The pawl return spring should have enough tension to require 10 to 15 grams (approximately 1/2 oz.) force to start the pawl away from the side of the pawl guide. This force is measured on the pawl, at the spring, with the pawl in the rest position.

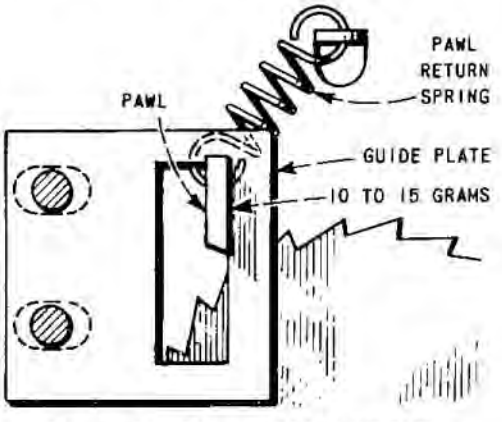


FIGURE 8. RETURN SPRING TENSION

STEP MAGNET TAIL SPRINGS

The tail spring pressure, measured at the front of the bridge on the step magnet armature ("X", Figure 4) should be 50 to 75 grams (1-3/4 to 2-1/2 oz.) to just close the switch contacts (when the contacts are correctly adjusted).

CONTACT PLATE SWITCH BLADES

The switch blades should have 10 to 35 grams pressure against the contacts. The pressure will be approximately correct if the blades are formed so their tips extend 5/32" above the contact assembly when the plates are removed.

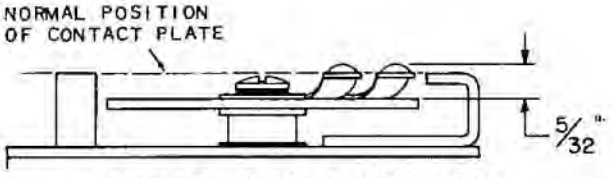


FIGURE 9. SWITCH BLADE POSITION

When the contact plates are in position the switch blades should move freely over the contacts. If the contacts become rough or gummed, they should be cleaned with a clean cloth. Tarnish or dirt can be removed by polishing with a clean cloth moistened, slightly, with light oil. *Do not use sandpaper or emery cloth for cleaning the contacts and do not lubricate them with vaseline, grease or oil.*

RESET MAGNET POSITION

Adjust the reset magnet vertically so the release dogs engage the ratchet teeth with the armature extension clearing the dimples ("Y", Figure 4) on the dog operating links 1/64" when the magnet is energized.

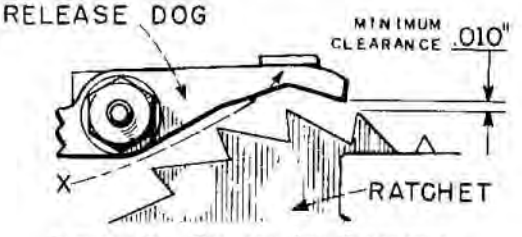


FIGURE 10. RELEASE DOG CLEARANCE

The armature travel must be sufficient to permit the release dogs to lift and clear the ratchet teeth .010" minimum when the magnet is not energized.

The tabs on the release dog operating links which engage the dogs and couple them to the reset magnet should not bind tightly but should not permit more than .005" free travel between the dogs and the links.

RESET MAGNET TAIL SPRING

The pressure applied to the end of the reset magnet armature ("Z", Figure 4) to start it from the rest position should be 100 to 140 grams (3-1/2 to 5 oz.).

RELEASE DOG SPRINGS

An upward pressure of 15 to 20 grams (1/2 to 3/4 oz.) applied at the dimple on the release dog operating links ("Y", Figure 4) should start the dogs from seated position. This pressure will be approximately correct if the springs are wound 1/2 to 3/4 turn.

TRANSFER SWITCH POSITION

Adjust the position of the switch on the mounting bracket so the roller is in the notch of the contactor assembly disc and the first operation of the step magnet causes no change from normal position of the roller blade. The second operation of the step magnet should raise the roller to the outer diameter of the disc.

The position of the switch should be such that the disc does not bind or drag on the flanges of the roller and the roller bracket should not strike the switch contact plate.

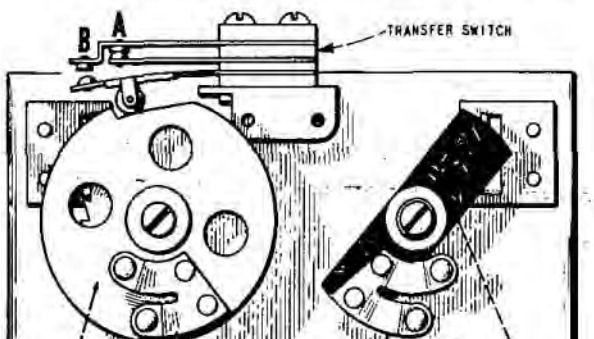


FIGURE 11. SIDE VIEW - TRANSFER SWITCH

TRANSFER SWITCH CONTACTS

1. With the step switch in the rest position so the roller is in the notch of the contactor disc, adjust the lower blade for 1/2 to 3/4 oz. pressure of the roller against the disc.

   Adjust contact "B" gap 1/64".
   Adjust contact "A" pressure 1 oz.

2. The second operation of the step magnet should result in closing contact "B" with 1 oz. pressure and opening contact "A" 1/64" to 1/32" gap.

LUBRICATION

The following points should be lubricated with a drop of SAE #10 oil. (Do not use a vegetable base oil.)

1. Pawl pivots and sliding surfaces of the pawls on the step relay armatures.
2. Pawl guides at area of contact with pawls.
3. Step switch shaft bearings.
4. Roller on roller blade of transfer switch.
5. Relay hinges.

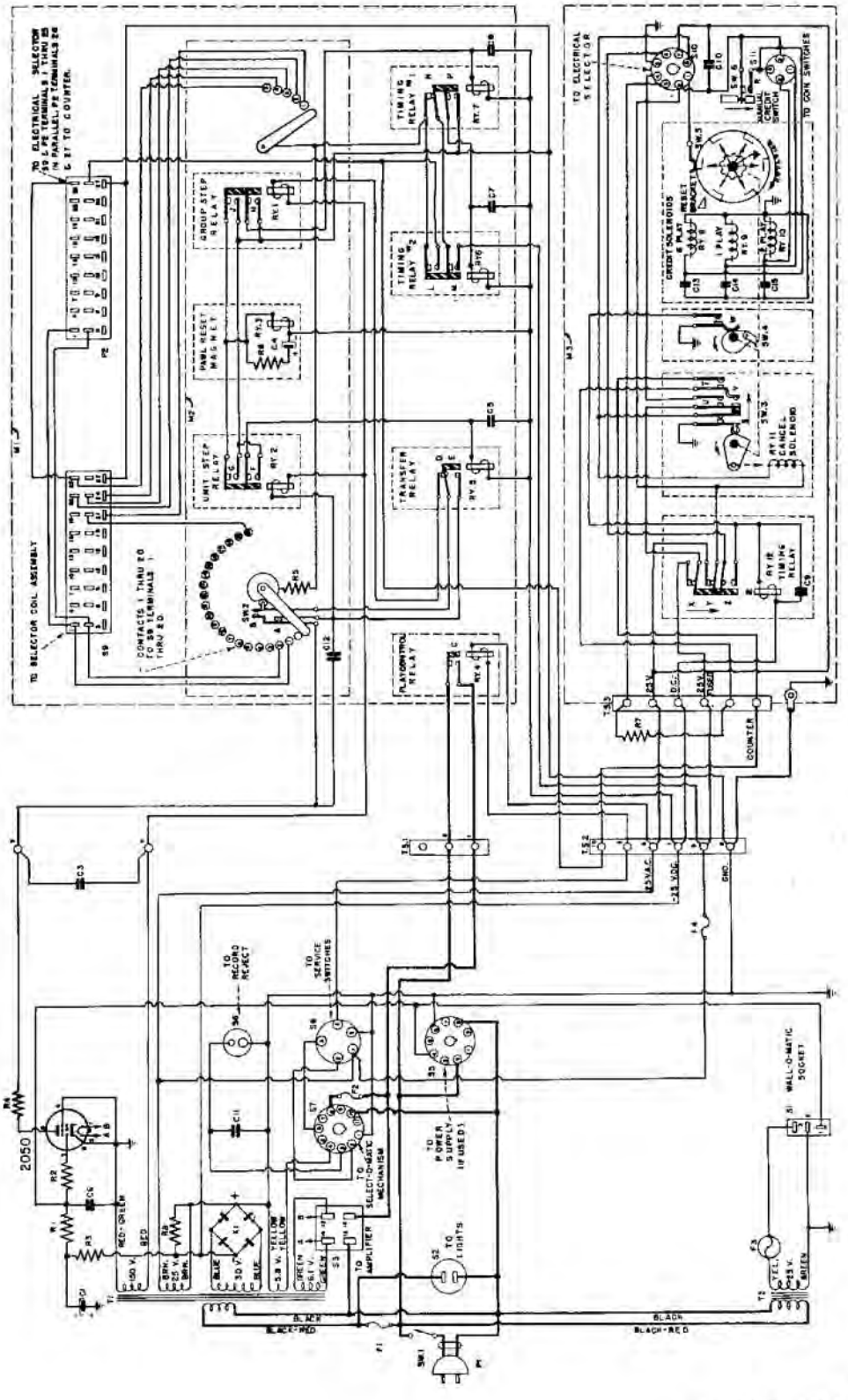


FIGURE 12. SCHEMATIC DIAGRAM

PARTS LIST on Reverse Side

PARTS LIST FOR FIGURE 12, PAGE 5087

Item	Part No.	Description
C1	87571	25 mfd. 50 v. Electrolytic
C3	11076	5.0 mfd. 300 v. Condenser
C4	87583	300 mfd. 50 v. Electrolytic
C5	86009	.05 mfd. 200 v. Condenser
C6	86009	.05 mfd. 200 v. Condenser
C7	86009	.05 mfd. 200 v. Condenser
C8	86009	.05 mfd. 200 v. Condenser
C9	86009	.05 mfd. 200 v. Condenser
C10	86009	.05 mfd. 200 v. Condenser
C11	86008	.1 mfd. 200 v. Condenser
C12	86069	.005 mfd. 1000 v. Condenser
C13	86173	.01 mfd. 200 v. Condenser
C14	86173	.01 mfd. 200 v. Condenser
C15	86173	.01 mfd. 200 v. Condenser
F1	303257	3 amp. Fuse, 3AG
F2	303257	3 amp. Fuse, 3AG
F3	301205	3 amp. Fuse, Fustat
F4	303087	2 amp. Fuse, Slo-Blo
M1	303283	Step Switch & Relay Assembly
M2	303063	Step Switch Assembly
M3	400910	Credit & Cancel Assembly
P1	303089	Line Cord & Plug Assembly
P2	303080	27-Prong Plug
R1	82448	.1 meg 10% 1/2 w. Resistor
R2	82436	10,000 ohm 10% 1/2 w. Resistor
R3	82444	47,000 ohm 10% 1/2 w. Resistor
R4	82764	47 ohm 10% 1 w. Resistor
R5	81141	1 ohm W.W. 5 w. Resistor
R6	82403	18 ohm 10% 1/2 w. Resistor
R7	81141	1 ohm W.W. 5 w. Resistor
R8	82432	4700 ohm 10% 1/2 w. Resistor
RY1	303097	Group Step Relay
RY2	303098	Unit Step Relay
RY3	303065	Pawl Release Magnet
RY4	303077	Play Control Relay
RY5	303074	Transfer Relay
RY6	303255	Timing Relay #2
RY7	303075	Timing Relay #1
RY8	400509	Credit Solenoid
RY9	400509	Credit Solenoid
RY10	400509	Credit Solenoid
RY11	400567	Cancel Solenoid
RY12	400571	Relay Assembly
S1	12006	3 Contact Socket
S2	11401	A.C. Socket
S3	301020	4 Contact Socket
S5	84244	9 Contact Socket
S6	301019	2 Contact Socket
S7	303253	11 Contact Socket
S8	84283	5 Contact Socket
S9	11202	27 Contact Socket
S10	84220	Socket (Octal)
S11	400938	Socket (Small 4 Contact)
SW1	F1349	Toggle Switch
SW2	303099	Transfer Switch
SW3	400960	Cam Switch Assembly
SW4	400589	Timing Relay Switch
SW5	400924	Credit Switch
SW6	400572	Manual Credit Switch
T1	303083	Power Transformer
T2	301315	25 v. Transformer
TS1	11358	Terminal Strip
TS2	11041	Terminal Strip
TS3	400596	Terminal Strip
X1	400587	Selenium Rectifier

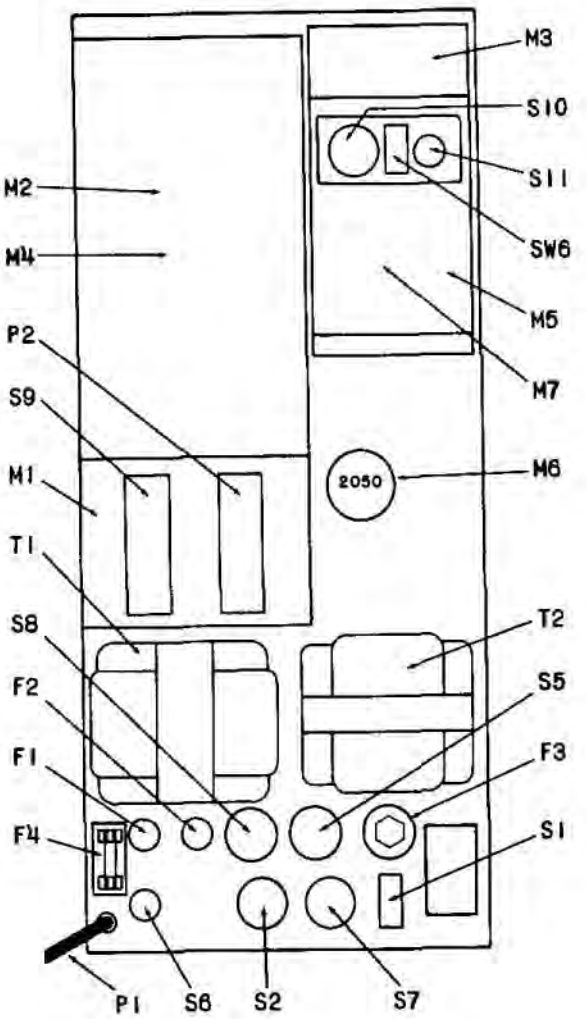


FIGURE 13.

PARTS LIST

Item	Part No.	Description
F1	303257	3 amp. 3AG Fuse
	300061	Fuse Receptacle
F2	303257	3 amp. 3AG Fuse
	300061	Fuse Receptacle
F3	301205	3 amp. Fustat
	303090	Fustat Receptacle
F4	303087	2 amp.3AG Slo-blo Fuse
	304141	Fuse Block
M1	303283	Step Switch & Relay Assembly
M2	303254	Adjustment Label
M3	400910	Credit & Cancel Assembly
M4	303256	Cover
M5	400580	Cover
M6	84220	Octal Socket, 2050
M7	400951	Adjustment Label
P1	303113	Line Cord & Plug
P2	303080	27-contact Plug
S1	12006	3-contact Socket
S2	11401	A.C. Socket
S5	84244	9-contact Socket
S6	301019	2-contact Socket
S7	303253	11-contact Socket
S8	84283	5-contact Socket
S9	11202	27-contact Socket
S10	84220	Octal Socket
S11	400938	Small 4-contact Socket
SW6	400572	Manual Credit Switch
	400536	Button
	10377	Shoulder Screw
	72236	Spring Tension Washer
T1	303083	Power Transformer
T2	301315	25-volt Transformer

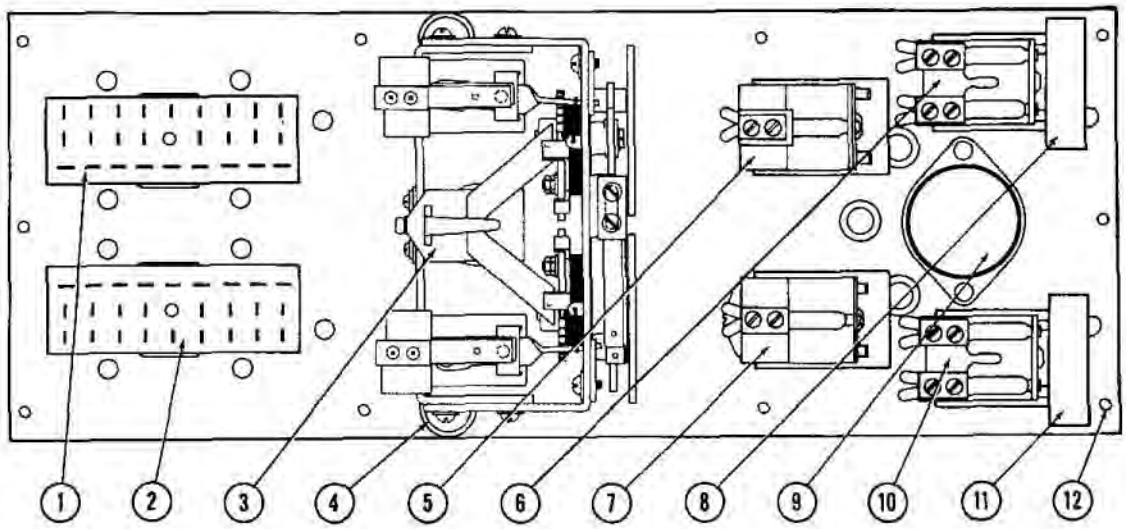


Figure 14. #303283 Step Switch & Relay Assembly

PARTS LIST

Item	Part No.	Description
1	11202	27-contact Socket (S9)
2	303080	27-contact Plug (P2)
3	303063	Step Switch Assembly (M2)
4	10848	Cup Washer
	78000	Grommet
5	303077	Play Control Relay (RY4)
	303128	Coil & Frame Assembly
	303127	Contact Assembly (C)
6	303075	Timing Relay #1 (RY7)
	303094	Coil & Frame Assembly
	303093	Contact Assembly (N)
	303092	Contact Assembly (P)
7	303074	Transfer Relay (RY5)
	303130	Coil & Frame Assembly
	303129	Contact Assembly (D & E)
8	86009	.05 mfd. 200 v. Condenser (C8)
9	87583	300 mfd. 50 v. Electrolytic (C4)
10	303255	Timing Relay #2 (RY6)
	303096	Coil & Frame Assembly
	303095	Contact Assembly (M)
	303095	Contact Assembly (L)
11	86009	.05 mfd. 200 v. Condenser (C7)
12	76046	#6 x 1/4" Slotted Hex. Head Self-tapping Screw, Type 1

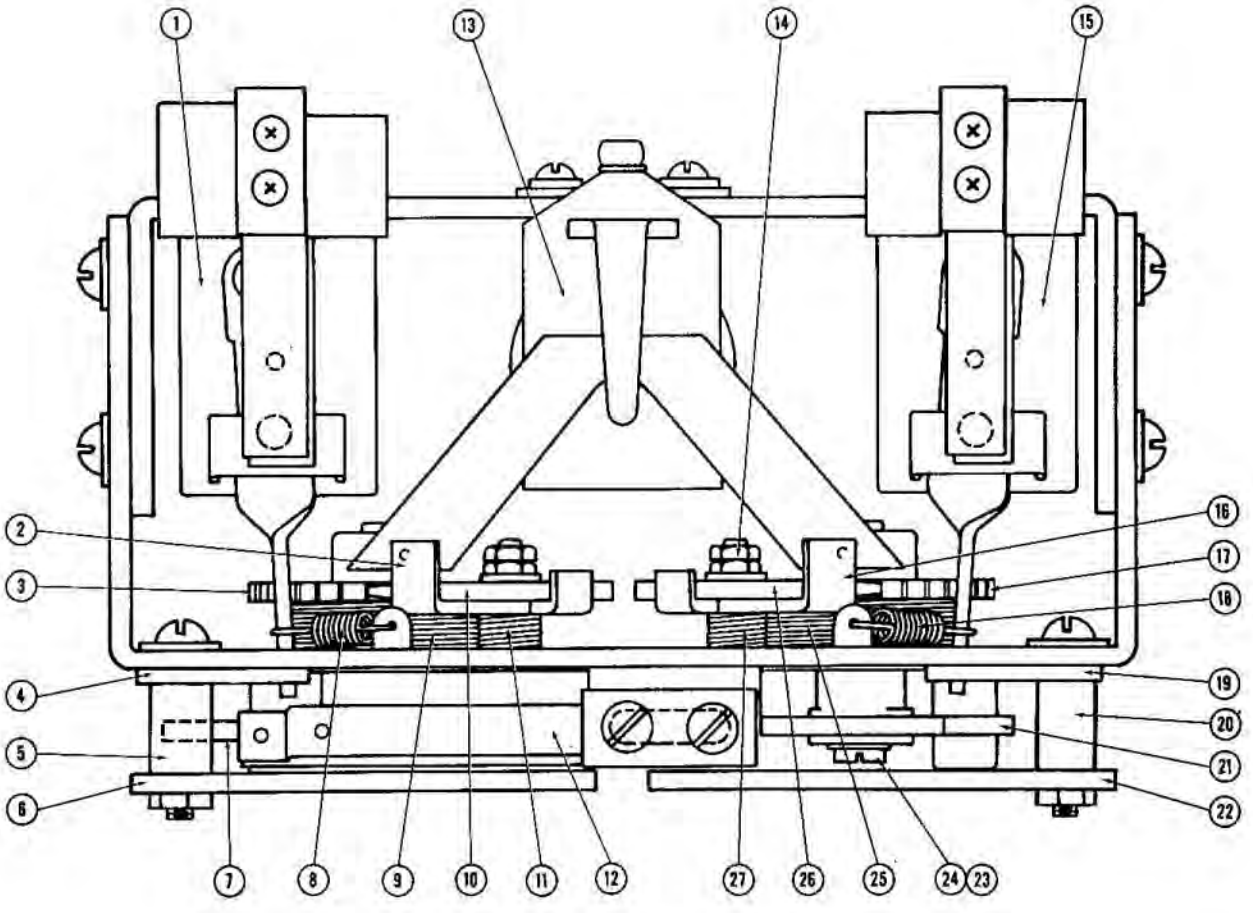


FIG. 15. #303063 STEPPER ASSEMBLY

PARTS LIST

Item	Part No.	Description
1	303098	Unit Stepper Relay (Includes 303064, 303100, 303102)
	303064	Magnet & Frame Assembly
	303100	Armature Assembly
	303102	Tail Spring
	303066	Switch Assembly (Contact G and F)
	303175	Switch Mounting Screws (3-48 x 15/16)
	303176	Switch Mounting Bracket
2	303177	Dog Operating Link
3	303179	Ratchet and Shaft
4	303187	Pawl Gate
5	303188	Contact Plate Spacer
6	303069	Contact Plate
7	303071	Contactor
	303184	Contactor Mounting Washer (Not Shown)
	303183	Contactor Mounting Screw (Not Shown)
8	303106	Pawl Return Spring
9	303104	Return Spring
10	303181	Dog
11	303107	Dog Return Spring
12	303099	Transfer Switch Assembly (Includes following 4 items)
	303182	Switch Mounting Screws (5-40 x 9/16)
	303117	Switch Mounting Bracket
	303115	Transfer Switch (Contacts A and B)
	303189	Switch Retainer Plate
13	303065	Pawl Release Magnet, complete
	303103	Tail Spring, only
14	303185	2-56 Hex. Nuts
	303186	#2 Washers (under nuts)
15	303097	Group Stepper Relay (Includes 303067, 303101, 303102)
	303067	Magnet and Frame Assembly
	303101	Armature Assembly
	303102	Tail Spring
	303066	Switch Assembly (Contact J and H)
	303175	Switch Mounting Screws (3-48 x 15/16)
	303176	Switch Mounting Bracket
16	303178	Dog Operating Link
17	303180	Ratchet and Shaft
18	303106	Pawl Return Spring
19	303187	Pawl Gate
20	303188	Contact Plate Spacer
21	303072	Contactor
22	303070	Contact Plate
23	303184	Contactor Mounting Washer
24	303183	Contactor Mounting Screw
25	303105	Return Spring
26	303181	Dog
27	303108	Dog Spring

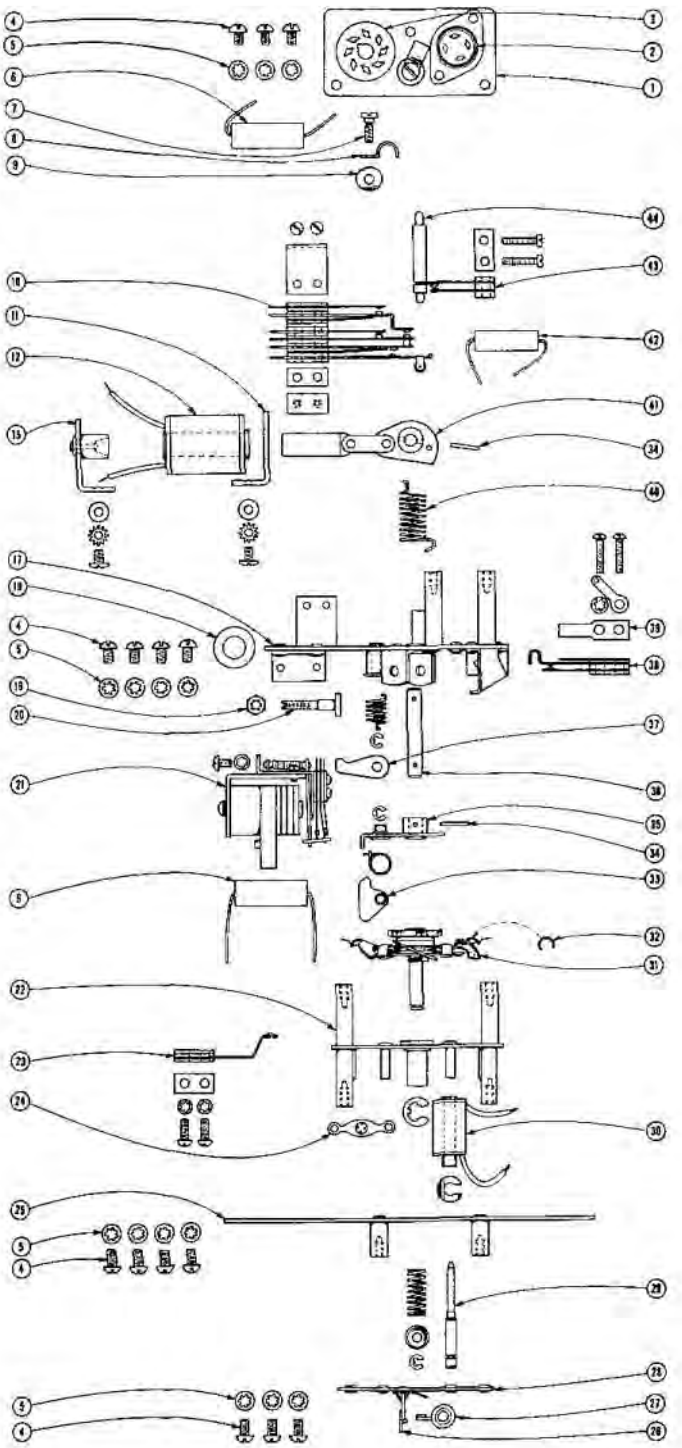
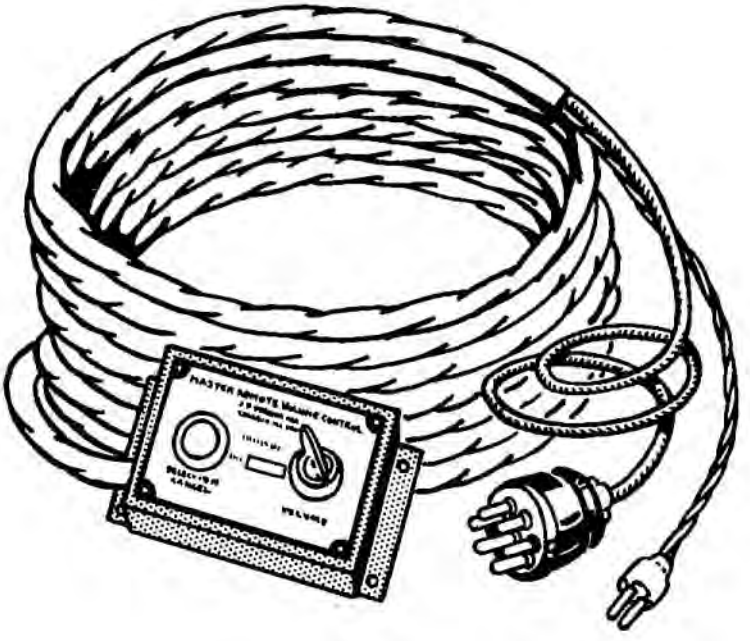


FIG. 16. CREDIT & CANCEL ASSEMBLY

Item	Part No.	Description
1	400936	Socket Mtg. Plate Assembly
2	400938	4-prong Socket
	400954	Socket Retainer
3	84220	8-prong Socket
4	71001	8-32 x 1/4 R.H. Mach. Screw
5	73082	Lock Washer
6	86009	.05 mfd. 200 v. Paper Condenser
7	10377	Shoulder Screw
8	A250952	Cable Clamp
9	72236	Spring Tension Washer
10	400960	Cam Switch
	71198	5-40 x 1-1/4 Screw
	400601	Spacer
	400597	Tension Plate
	F200028	Tapped Sw. Cap
11	400570	Solenoid Bracket
	71464	8-32 x 1/4 B.H. Mach. Screw
	73090	Lock Washer
	72191	Flat Washer
12	400567	Cancel Solenoid
15	400958	Solenoid Bracket & Stop Assem.
17	400955	Panel Assembly
18	78016	Rubber Grommet
19	70003	10-32 Hexagon Nut
20	400540	Pawl Arm Stop
21	400571	Timing Relay
	400614	Coil & Field Piece Assembly
	400613	Tail Spring
	400612	Contact & Armature Assem. (Contacts X, Y, Z)
22	400920	Coin Solenoid Panel Assem.
23	400507	Wiper Switch Assembly
	400597	Tension Plate
	71678	5-40 x 3/8 R.H. Mach. Screw
24	74019	Solder Lug
25	400511	Mtg. Panel & Spacer Assem.
26	400596	Terminal Strip
27	81141	1 ohm W.W. Resistor
28	400588	Retainer Plate Assembly
29	400959	Solenoid Plunger Assembly
	400518	Compression Spring
	400603	Cup Washer
	R231163	Retaining Ring
30	400509	Solenoids, Credit
	14445	"C" Washer
31	400924	Credit Switch
	125403	Retaining Ring
	72293	Phos. Bronze Spring Washer
32	504192	Credit Switch Spring
33	400553	Pawl Assembly
	400556	Pawl Spring
	R231163	Retaining Ring
34	80098	Pin
35	400549	Pawl Arm Assembly
36	400929	Shaft
37	400542	Lock Pawl
	400545	Lock Pawl Spring
	R231163	Retaining Ring
38	400589	Timing Relay Switch
	71676	5-40 x 7/16 R.H.Mach. Screw
	73116	Lock Washer
	74047	Solder Lug
39	400611	Buffer Blade, only
40	400557	Cam Spring
41	400931	Cam & Plunger Assembly
42	86173	.01 mfd. 200 v. Paper Condenser
43	400572	Manual Credit Switch
	400597	Tension Plate
	71233	5-40 x 5/8 F.H. Mach. Screw
44	400536	Manual Credit Button
	400580	Cover Assembly (Not Shown)
	400951	Contact Instruction Label (Not Shown)

MASTER REMOTE VOLUME CONTROL
TYPE MRVC-1



INSTALLATION INSTRUCTIONS

1. Determine location of the Remote Volume Control and best routing for the cable, keeping in mind appearance and possibility of physical damage to the cable as well as convenience of control.

2. Remove the back door of the Phonograph. Replace the 7-prong dummy plug in the Amplifier chassis with the large 7-prong plug on the cable of the Remote Volume Control.

3. Replace the Selection Cancel plug in the Selection Receiver with the 2-prong plug on the Remote Volume Control cable.

4. Arrange the cable from the plugs so it passes through the notch in the back door.

5. Fasten the cable to the wall of the cabinet with one of the clamps, allowing enough slack cable in the cabinet to avoid strain on the cable or plugs.

6. Lay the cable from the cabinet to the Remote Volume Control, passing the cable loosely over pipes and through necessary holes in walls and floors.

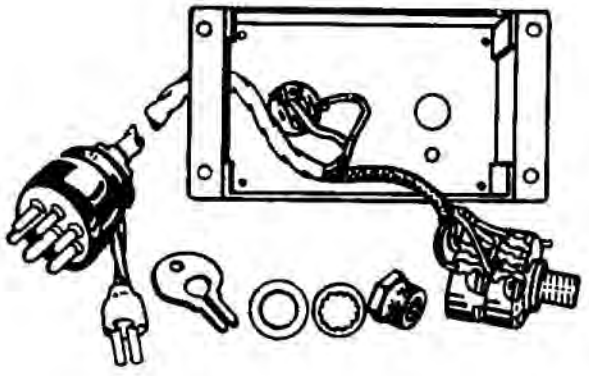
7. Fasten the control box securely in place with screws.

8. Fasten the cable securely, starting at the control with a clamp adjacent to the control box. Take up excess cable as it is fastened.

9. When the cable is installed, excess cable can be coiled or folded in the cabinet. Leave enough slack to permit moving the phonograph from the wall for maintenance and cleaning.

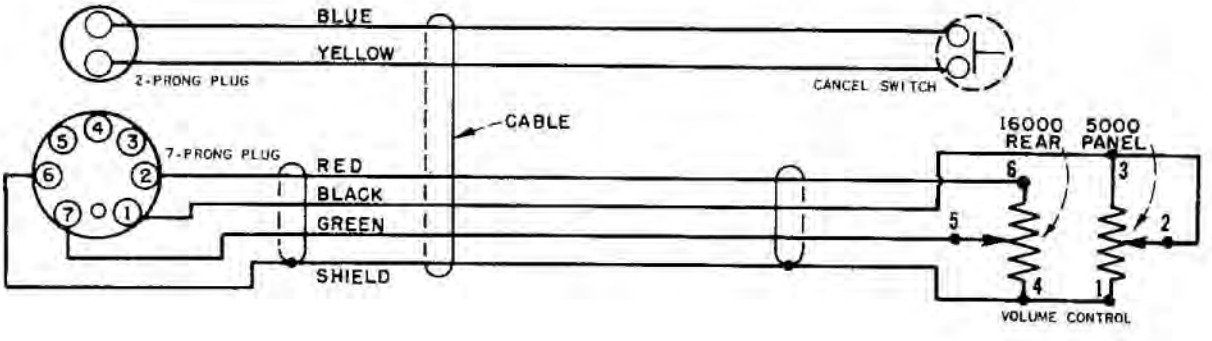
10. If it is necessary to disconnect the Control to pass the cable through holes in walls or floors, prepare it as shown in Figure A and reconnect it according to the diagram. Solder all connections. *Do not use acid core solder or acid solder flux.*

PARTS LIST



Part No.	Description
503034	Control Box
302007	Volume Control
73110	Lock Washer
72162	Flat Washer
12105	Selection Cancel Button
302070	Acorn Nut
503037	Cable
402041	7-Prong Large Plug
402066	2-Prong Plug
302047	Key
402098	Cable Clamp (10)

SCHEMATIC DIAGRAM



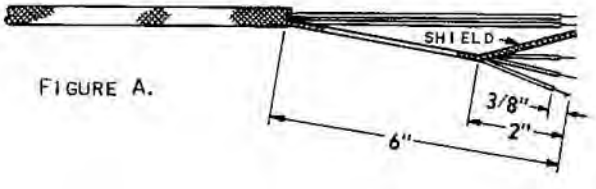
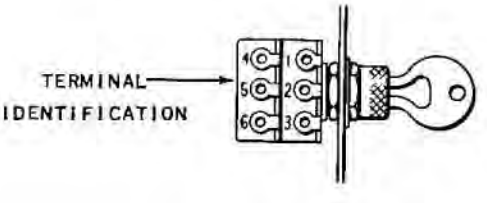


FIGURE A.



5—10—25c SLUG REJECTOR

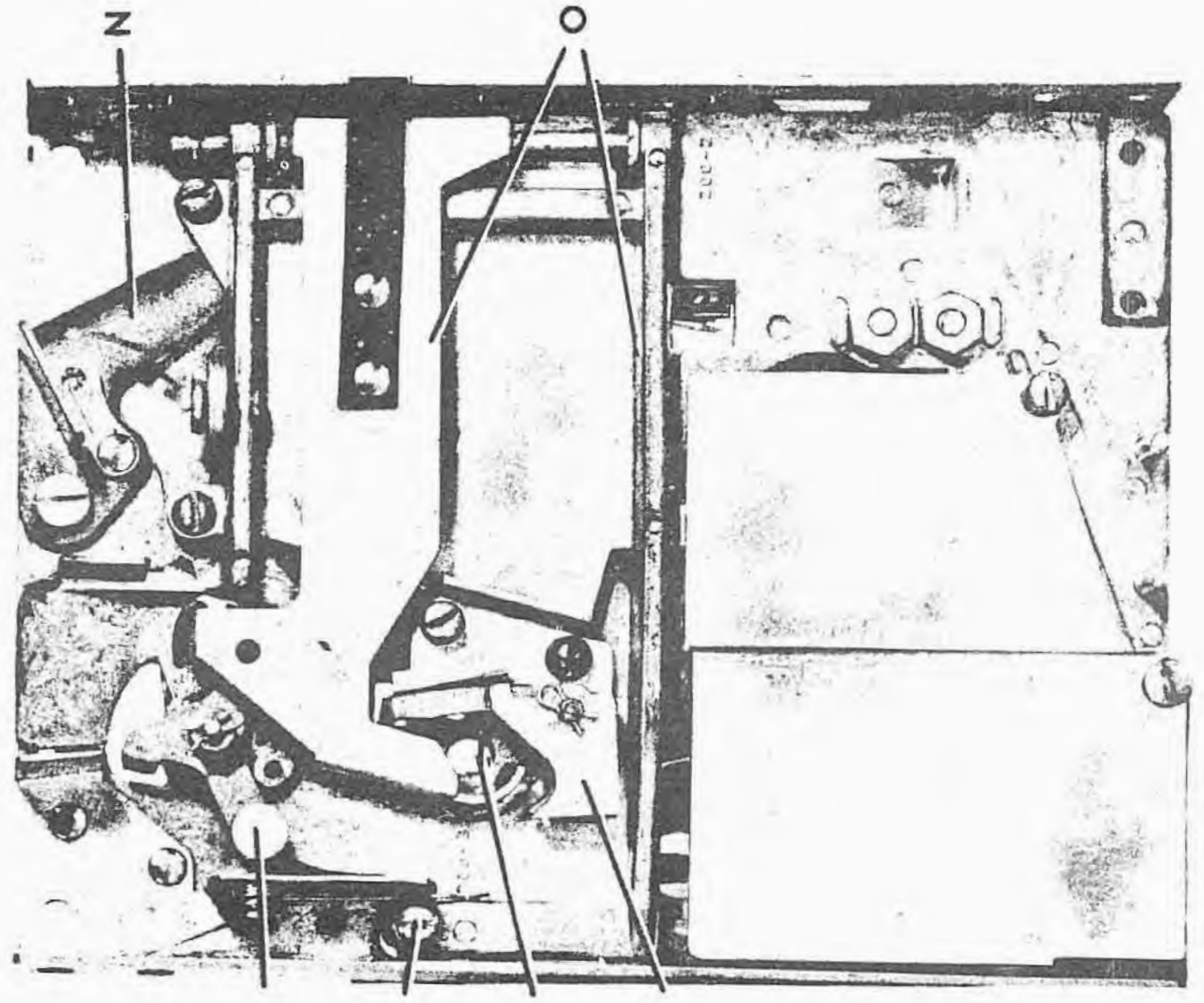
THEORY OF OPERATION

When a piece of metal that is an electrical conductor is passed through a magnetic field, a small voltage is generated within the metal. The voltage thus generated, short-circuited within the body of the metal, causes currents to flow in it. These currents set up magnetic forces in opposition to the magnetic field. The opposing fields tend to resist the force which drives the metal.

Since various metals have different degrees of electrical conductivity, it is possible to detect one metal from another by noting the behavior of each in the magnetic field.

The speed of a metal coin rolling or falling through a magnetic field will be governed by the electrical conductivity of the metal. This is the basic principle used in the detection of coins in the 5 — 10 — 25c slug rejector.

5 — 10 — 25c SLUG REJECTOR



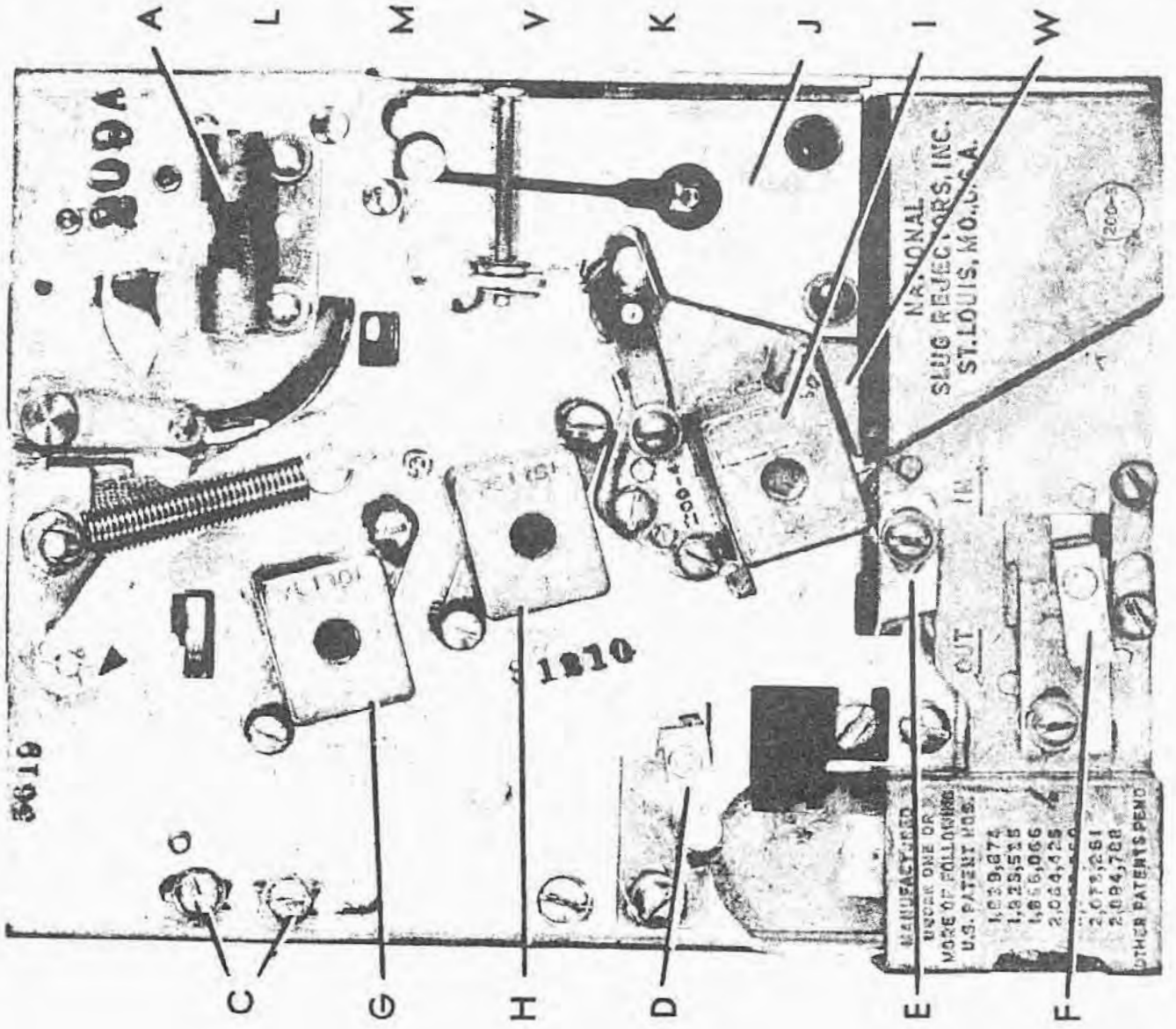


FIG. 1

LEVELING

IT IS ABSOLUTELY NECESSARY THAT THE SLUG REJECTOR BE LEVEL. The spirit level, (A), is provided for indicating the position of the rejector.

SERVICE NOTES

It is recommended that the magnets never be removed unless absolutely necessary. If they are removed, they should be handled with care and a soft iron "keeper" should be placed across the pole faces.

The 10c scavenger gate, (J), has an adjusting screw, (M), which is set to allow the gate to just close. If the screw is not far enough in, the gate will not close. If the screw is too far in, the rear scavenger gates, (O), will be held open.

The 5c undersize gauge, (K), must work freely at all times. If any adjustment is made, the unit should be tested with dimes as well as nickels since the undersize gauge wire, (V), on this gauge, also serves to deflect dimes into the proper path.

The rotary quarter sizer, (L), has no adjustment but should work freely at all times, turning easily with the weight of the quarter.

The scavenger wiper blade, (N), is effected by the adjustment of the deflector, (C), for fast moving 25c size slugs. It is important that this part move freely and returns to its normal position after the scavenger is released.

Use no lubricants.

KEEP THE REJECTOR CLEAN AND LEVEL. If it is necessary to dismantle the rejector for cleaning, be sure to replace washers under the screw heads so the screws will not protrude into the path of a coin.

Adjustments of the slug rejector are given in Figures 2 to 9, inclusive. These illustrations also show the paths of coins and slugs through the rejector. Before making any adjustments, study the illustrations so the reason for the adjustment is fully understood. Guess work and "cut and try" is seldom successful and usually results in unsatisfactory operation.

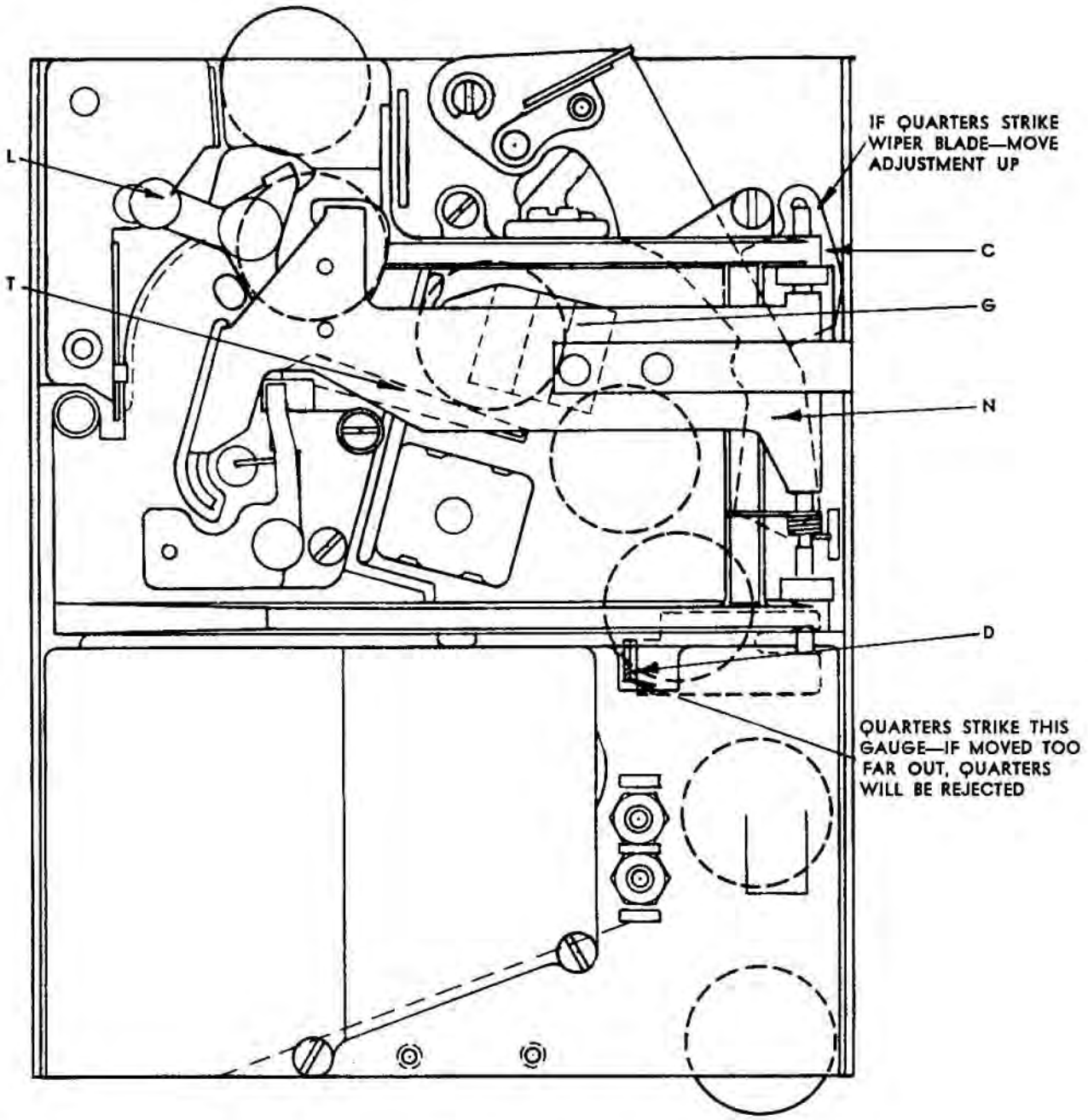


FIG. 2—PATH OF 25c COIN

Fig. 2 shows the path of a genuine 25 cent coin. The coin first drops in the arms of the rotary sizing gauge (Item L) which turns under the weight of a good coin and deposits it upon inclined rail (Item T). As the coin rolls down the rail past the 25c magnet (Item G) its speed is checked (by generated currents) and it leaves the rail at an angle that will permit it to miss the brass deflector (wiper blade) (Item N) and land with its center of gravity to the right of the copper deflector (Item D), thus it is accepted.

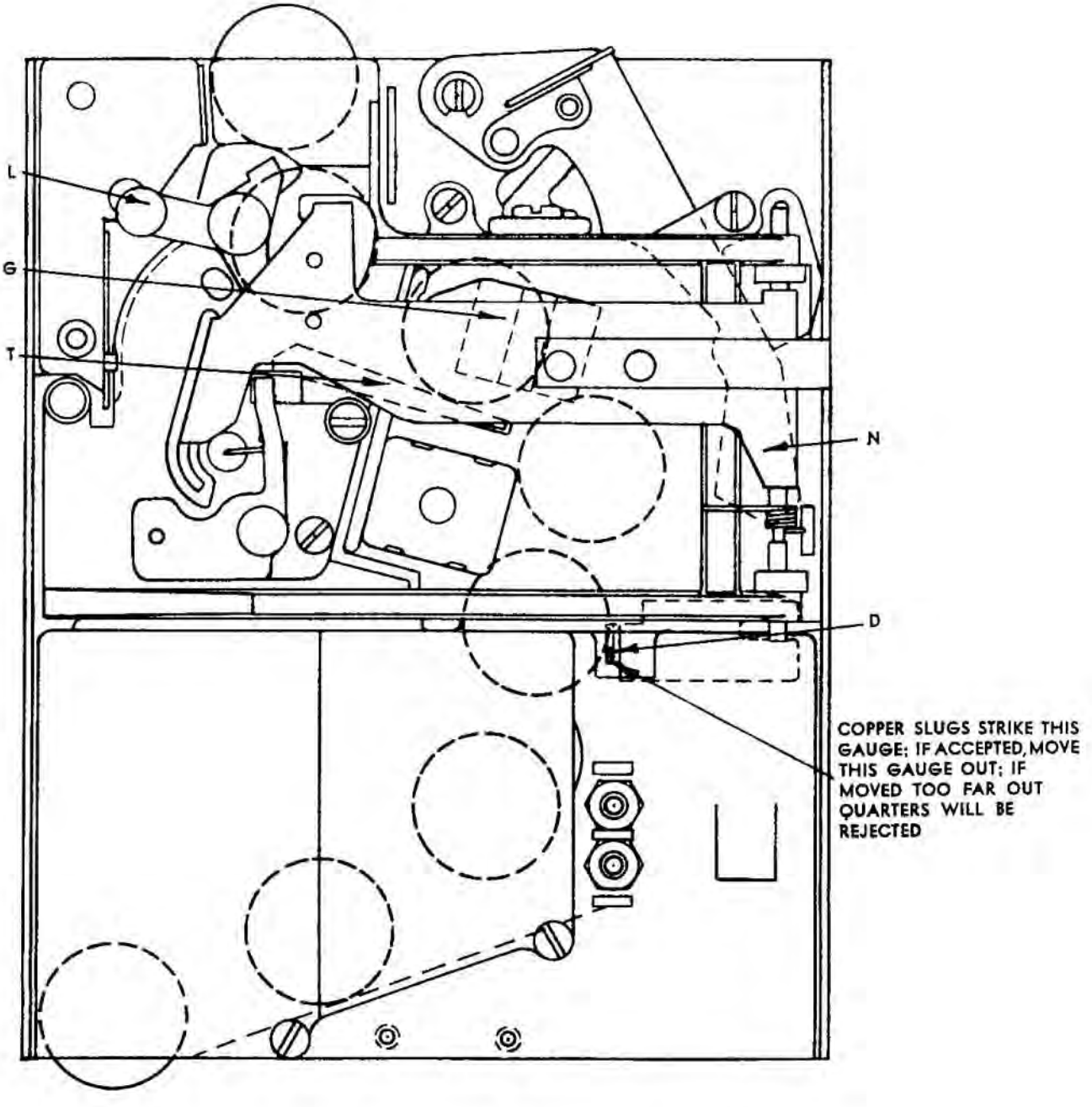


FIG. 3—PATH OF 25c SIZE COPPER SLUGS

A 25c size slug of copper follows the same path as the quarter until it reaches the magnet (Item G). Since copper is a very good electrical conductor, currents of a rather high order are generated. The copper slug will drop almost straight down at the end of the rail and strike the copper deflector (Item D) with its center of gravity to the left.

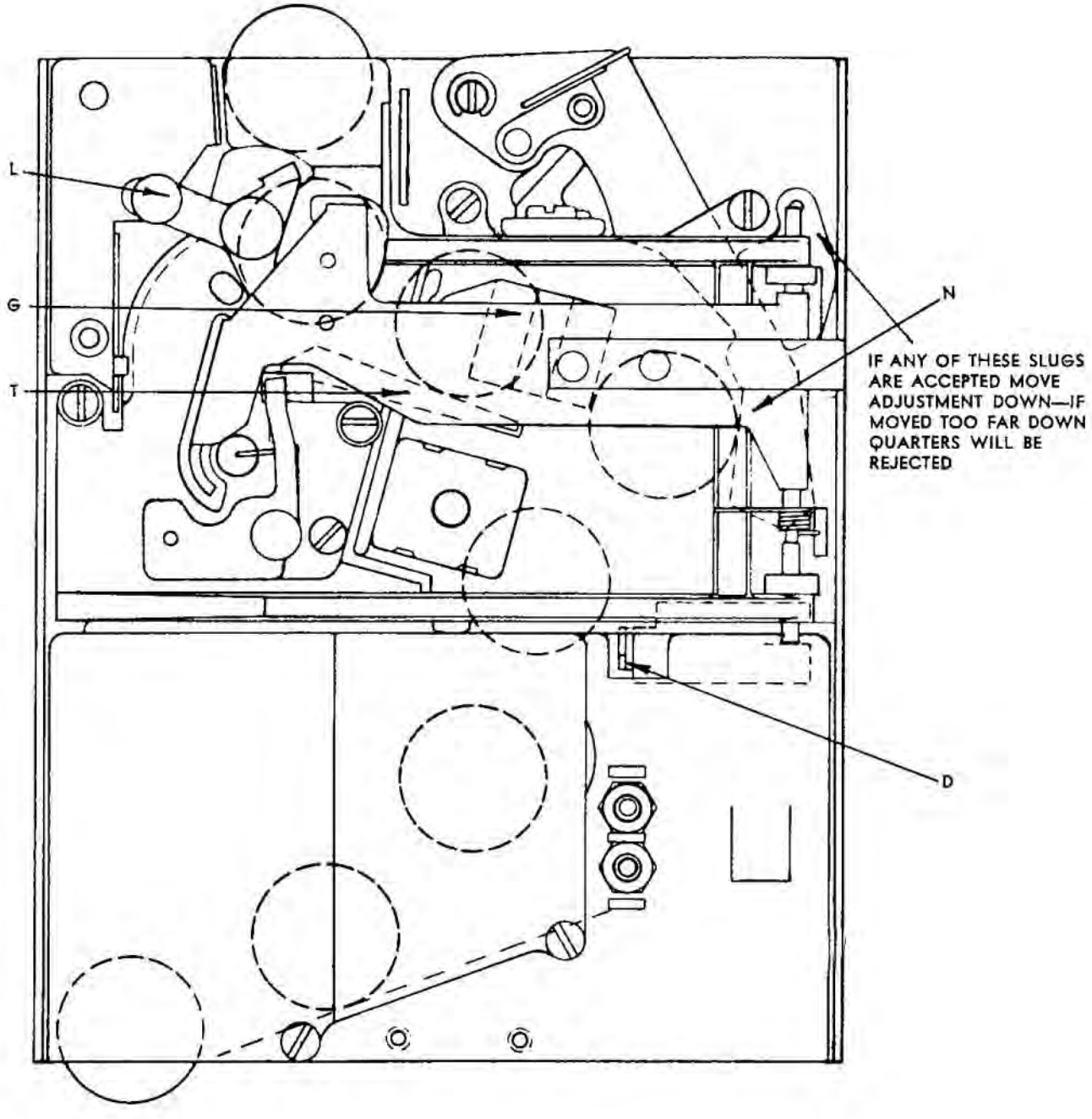


FIG. 4—PATH OF 25c SIZE BRASS, LEAD, ZINC, OR GERMAN SILVER SLUGS

25c size slugs of brass, lead, zinc or German silver have a higher electrical resistance than a quarter and as a result go through the magnetic field at a greater speed. This raises the angle in which they leave the rail to a point where they strike the brass deflector (wiper blade) (Item N) and are deflected to the left of the copper gauge (Item D).

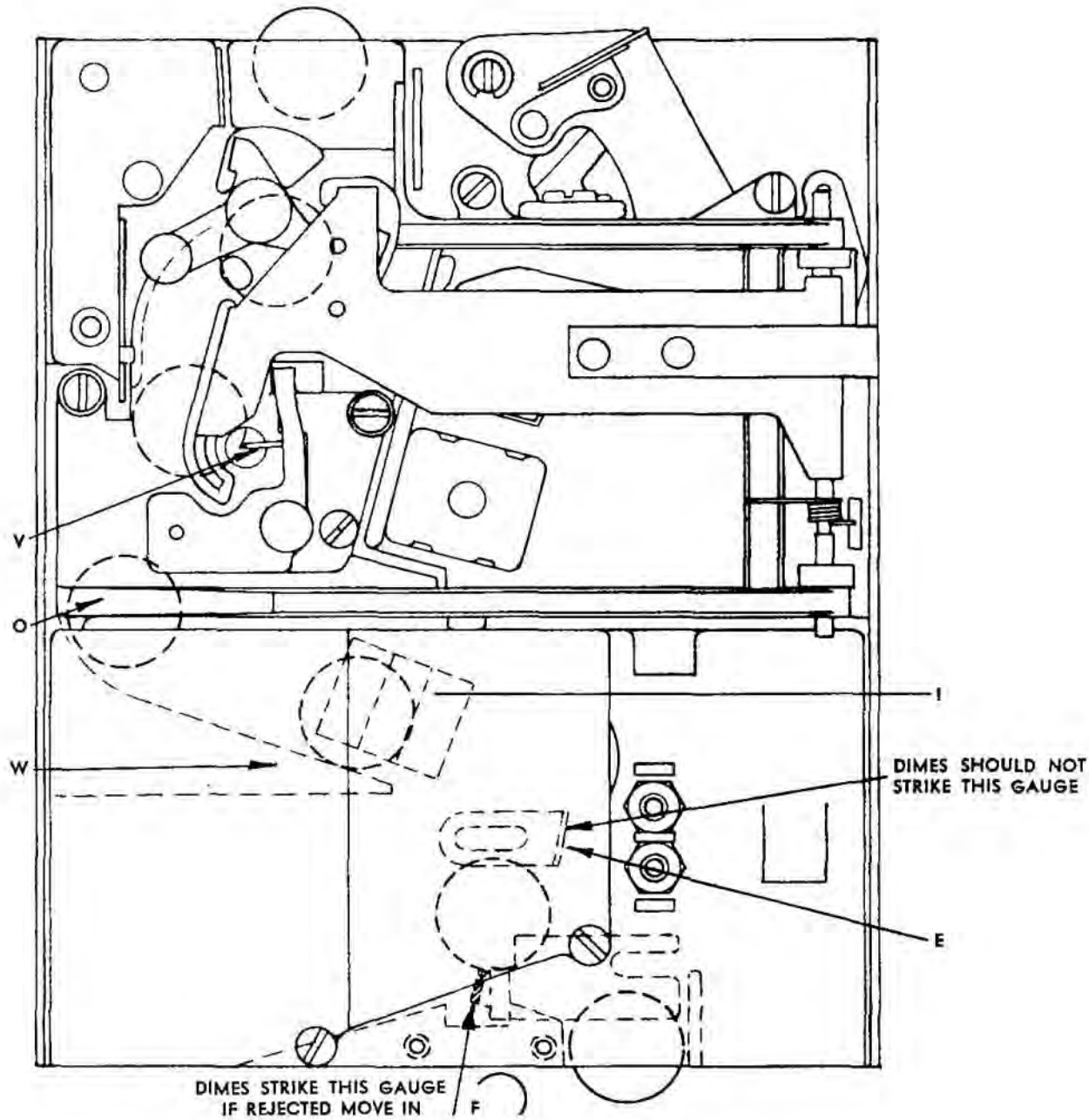
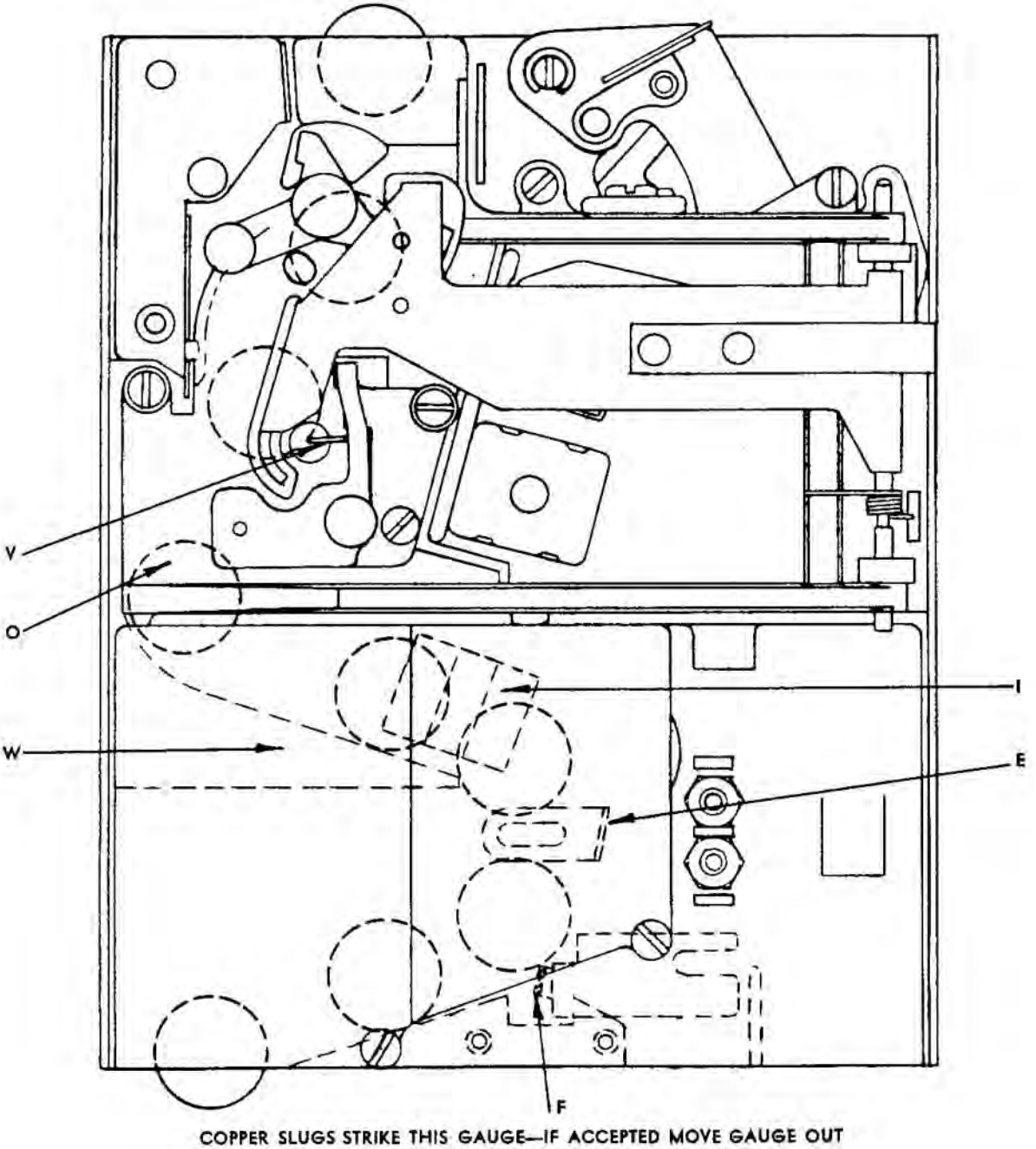


FIG. 5—PATH OF 10c COIN

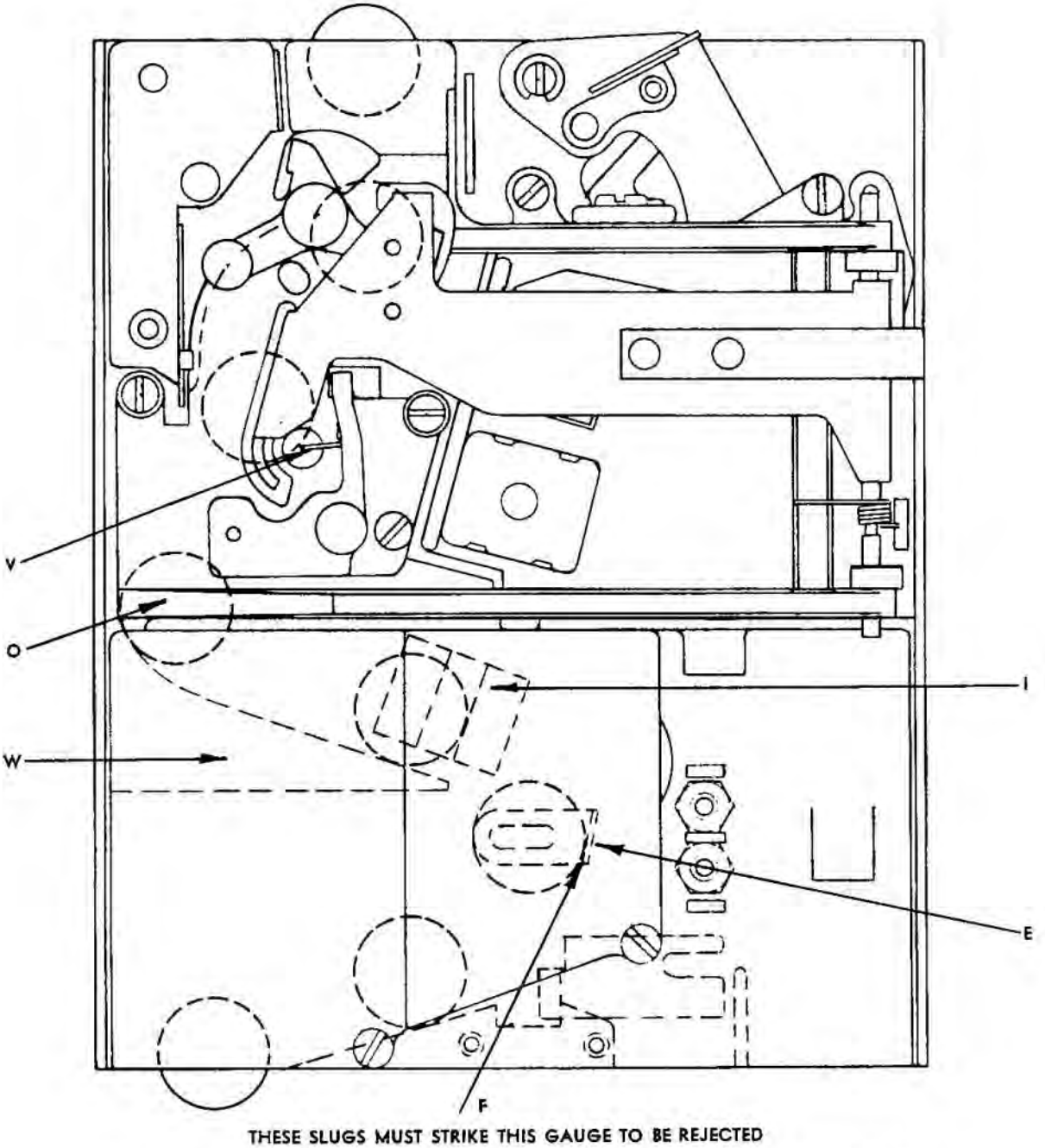
As a 10c size coin enters the slug rejector it passes through the 25c rotary gauge and to the left of the 5c undersize gauge wire (Item V) (oversize 10c slugs stop here). At the bottom edge of the scavenger gate (Item O) the dime is deflected through an opening in the frame plate of the unit and is deposited on the 10c rail (Item W) which is mounted on the bottom edge of the 10c scavenger gate (undersize slugs are rejected here) if the coin is of the correct size it rolls down the 10c rail (Item W), passing through the field of magnet (Item I) where its speed is retarded enough to prevent it from striking brass deflector (Item E) and will land on copper deflector (Item F) with its center of gravity to the right.



COPPER SLUGS STRIKE THIS GAUGE—IF ACCEPTED MOVE GAUGE OUT
IF MOVED TOO FAR OUT DIMES WILL BE REJECTED

FIG. 6—PATH OF 10c SIZE COPPER SLUGS

10c size slugs of copper follow the path of the dime to the magnet where it is retarded more than a dime due to the higher conductivity of copper. The copper slug as a result drops off the rail onto the copper deflector gauge (Item F) with its center of gravity to the left.



THESE SLUGS MUST STRIKE THIS GAUGE TO BE REJECTED

FIG. 7—PATH OF 10c SIZE LEAD, ZINC, BRASS, OR GERMAN SILVER SLUGS

10c size slugs of brass, lead, zinc or German silver also pass the magnet (Itm I) via the route of a good 10c coin, here again the spurious coins having a higher electrical resistance will leave the rail (Item W) at a higher rate of speed and strike the brass deflector (Item E).

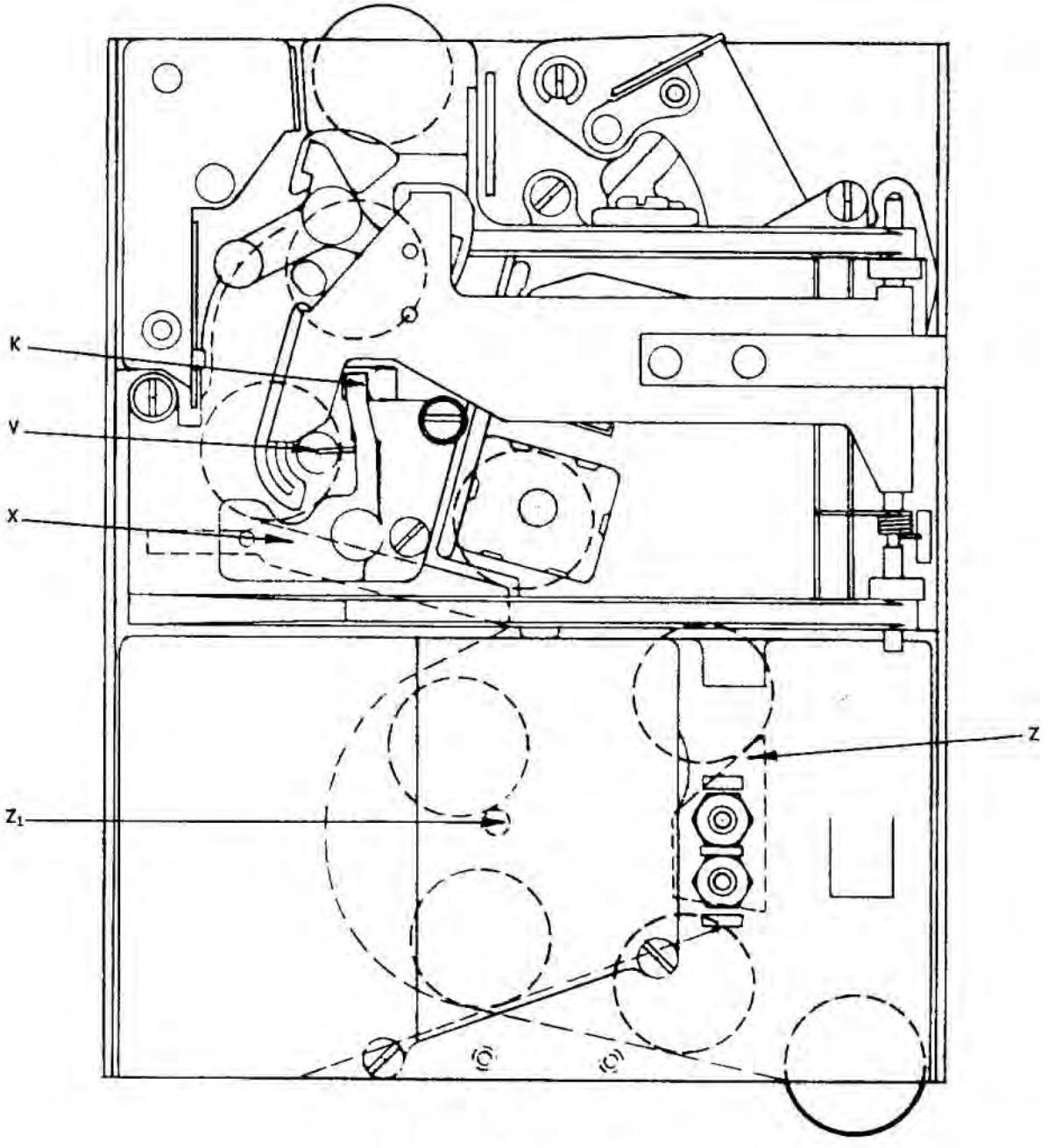


FIG. 8—PATH OF 5c COIN

The 5c coin will pass through the 25c rotary gauge and engage the 5c undersize gauge lever (Item K). If the coin is of the correct diameter, lever K will turn slightly on its pivot and withdraw undersize gauge wire (Item V) from the path of the coin to permit it to drop on the rail (Item X). The genuine 5c coin, having an unusually high resistance will roll down rail X at a high rate of speed striking the anvil (Item Z) from which it will rebound with enough force to clear the barrier stud (Item Z1). Thus it is shown that 5c coins are tested for hardness as well as electrical resistance.

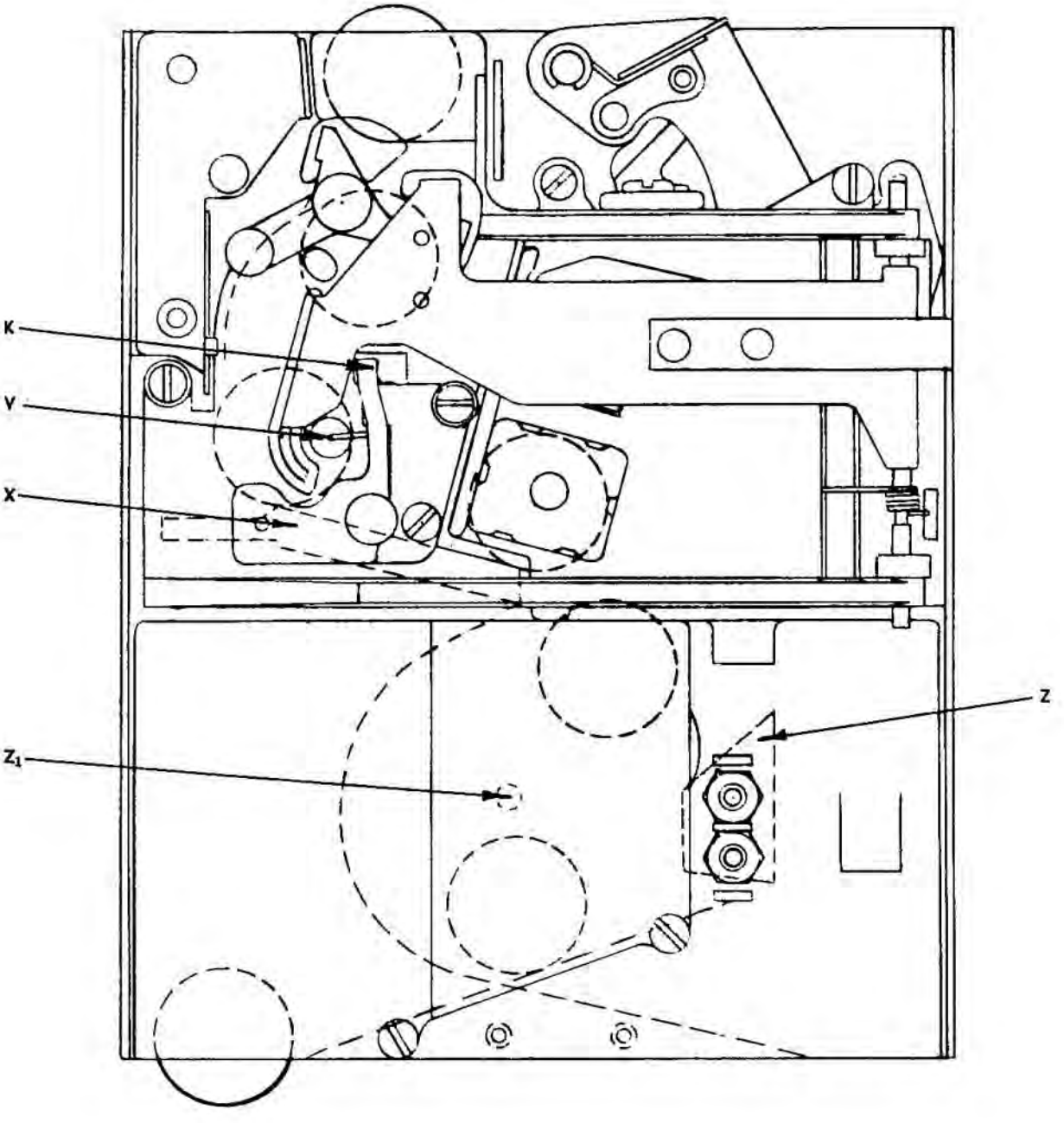


FIG. 9—PATH OF 5c SIZE BRASS, ZINC OR COPPER SLUGS

5c size slugs of brass, copper or zinc all have electrical resistance much lower than the alloy of which nickels are made and as a result will be slowed down in the magnetic field, this will cause all such spurious coins to strike the anvil too low or miss it entirely and thus be rejected.

TO: Seeburg Operators

SUBJECT: Conversion to 10¢ - 3 for 25¢

To convert a Seeburg "100" Selection Phonograph to 10¢ and 3 for 25¢ play, proceed as follows:

1. Remove back panel from lower back door. (This panel covers amplifier and selection receiver.)

2. If phonograph is a model "R" remove the credit and cancel unit from the machine. No matter what the model proceed as follows:

3. Remove three screws holding plate that is back-stop for coin solenoid plungers. On "R'S" this is part of mounting bracket. On others, a terminal board is mounted on the plate. Remove the three coin solenoid plungers and springs.

4. Remove the four screws on the next plate. This plate holds the coin solenoid in position. On other than "R'S", this is the plate that holds the credit and cancel unit in the selection receiver. So, as the last screw is removed, unless you hold the credit and cancel unit it will fall into bottom of phonograph.

5. Now shift positions of the coin solenoids. Trade positions of the 5¢ solenoid and 10¢ solenoid. The 10¢ solenoid will have a spot of orange paint on it. The 5¢ solenoid will not be painted. Put the 25¢ solenoid (the one with red paint) in the position next to the 5¢ solenoid. In other words, next to where the 10¢ solenoid was originally.

6. Using reverse procedure, reassemble the unit.

7. Remove the slug rejector. On the front lower half of the slug rejector will be found a thin plate. Remove the one screw and one nut securing this plate. Under this plate will be found a 5¢ pendulum. Secure this pendulum in the down position. Replace plate.

8. Coin Instructions: On models A, G, W, and R it is necessary to change an instruction glass on the front of the cabinet. On models B, BL, and C, a small piece of plastic in the title strip holder acts as instruction card. On the "A", the six screws securing the coin insert casting must be taken out in order to remove the casting to change the glass. On models G, W, and R simply remove the two tinnerman speed nuts found holding lower strip behind the instruction glass. The glass can now be worked loose and the new one installed. If the speed nuts were not broken when removed pinch them with a pair of pliers and re-use.

You are now set for 10¢ and 3 for 25¢ play.