

## GENERAL

This section contains cleaning, lubrication, adjustment, and repair and replacement procedures for the phonograph. Cleaning and lubrication procedures should be performed at regular intervals. Adjustment and repair and replacement procedures should be performed only when necessary.

## PREVENTIVE MAINTENANCE

### CLEANING

In addition to cleaning the cabinet exterior each time the location is visited (see your Owner's Manual), clean the cabinet interior every three to six months, as required. Keeping the cabinet interior clean reduces dust, resulting in increased record and component life. Always clean the phonograph cabinet prior to lubrication.

- a. Use a vacuum cleaner, if available, to remove heavy dust deposits.

**WARNING**

Use solvents in a well-ventilated area only; do not use solvents of any type on plastic parts.

- b. Use a clean, lint-free cloth saturated in denatured alcohol to clean mechanical parts.

- c. Clean electrical parts using a clean, dry cloth or camel's hair brush.

- d. Clean the slug rejector as specified in the applicable slug rejector manual.

- e. Clean the credit unit and search unit commutator boards with alcohol. Remove caked-on dirt using a pencil eraser or light abrasive cleaner.

### FIVE-YEAR LUBRICATION

Your phonograph requires lubrication only twice a decade - every five years - to maintain smooth, trouble-free operation. Lubricate the credit unit and record changer mechanism as shown:

- 6 One Drop F-1379 Light Machine Oil

Do Not Over-Lubricate

Do Not Use Oil or Grease on Solenoid Plungers

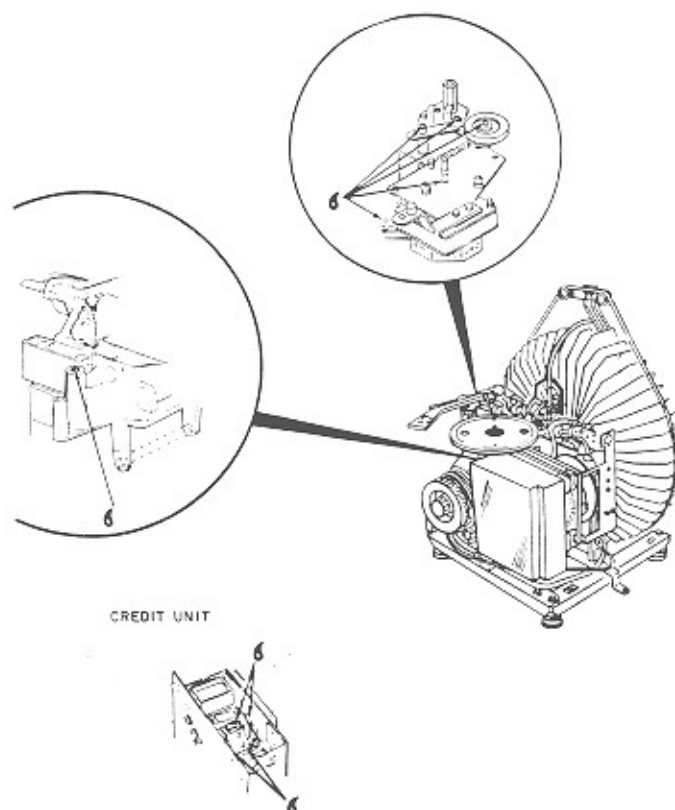


FIGURE 4-1. PHONOGRAPH LUBRICATION

## ADJUSTMENTS

Phonograph adjustments are listed in Table 4-1. Amplifier adjustments are contained in Section 2. Perform adjustments when indicated by troubleshooting procedure, Section 3.

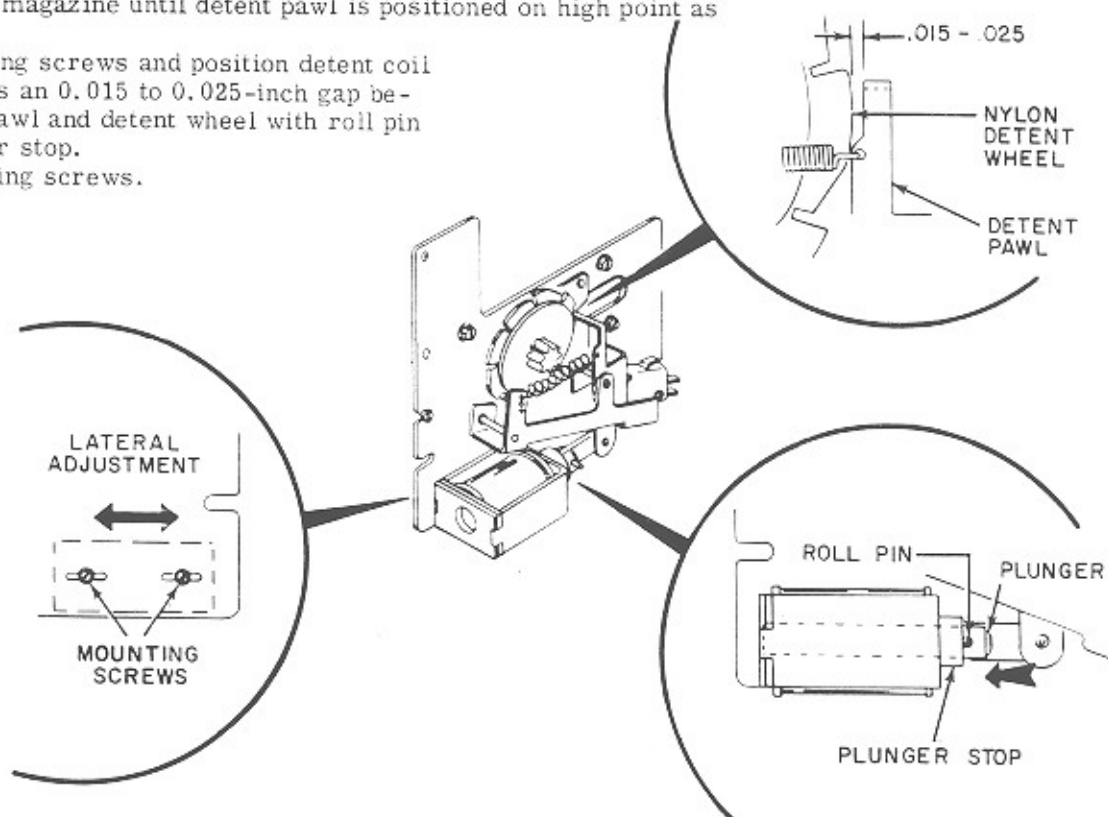
TABLE 4-1. PHONOGRAPH ADJUSTMENTS

ADJUSTMENT	PAGE
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## MAGAZINE MOTOR AND DETENT ASSEMBLY ADJUSTMENTS

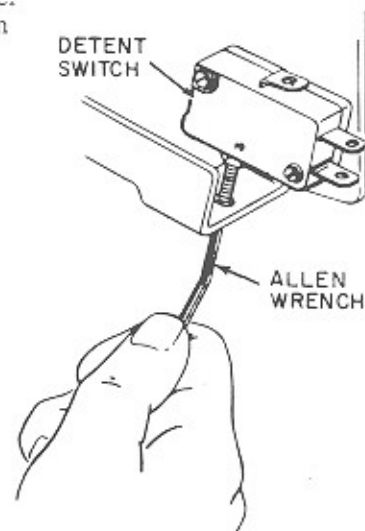
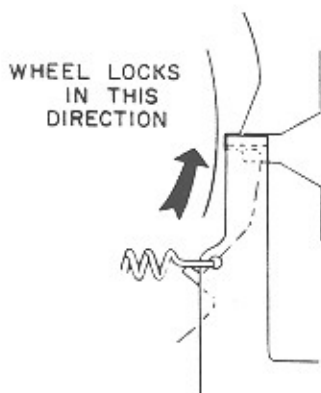
Obtain 0.015 to 0.025 — inch gap between detent pawl and high point of detent wheel.

- Release detent pawl from detent wheel.
- Rotate record magazine until detent pawl is positioned on high point as shown.
- Loosen mounting screws and position detent coil so that there is an 0.015 to 0.025-inch gap between detent pawl and detent wheel with roll pin against plunger stop.
- Tighten mounting screws.



### Adjust magazine detent switch.

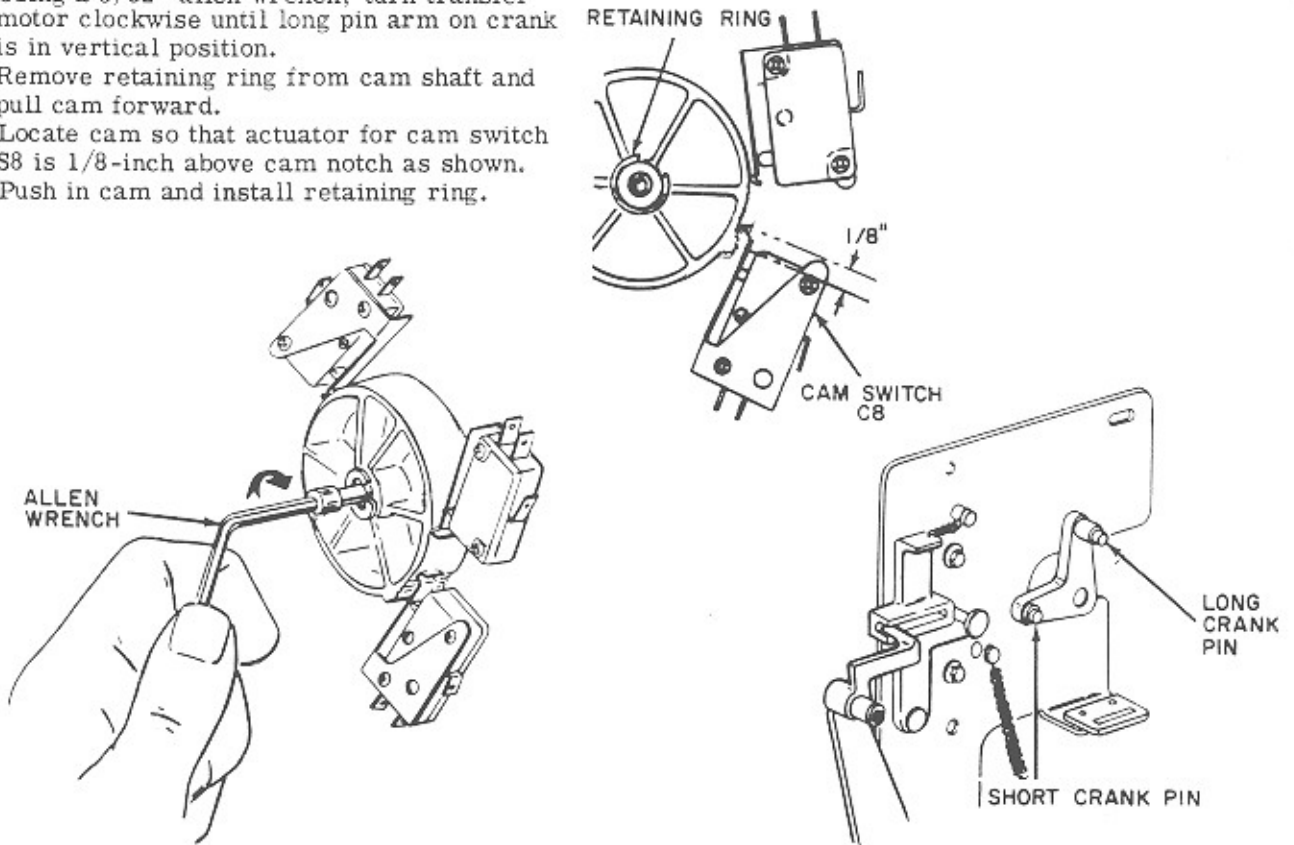
- Rotate detent wheel until pawl is seated in notch, locking wheel in place.
- Turn detent switch actuating screw in until switch just clicks, then turn screw in 1/2 turn more for stable adjustment.



## CAM SWITCH ADJUSTMENTS

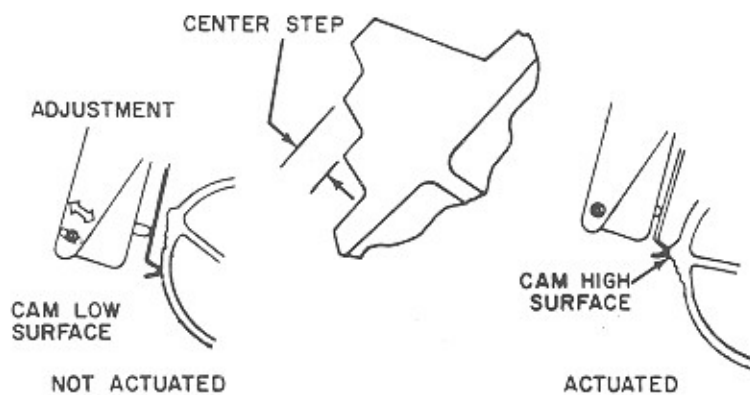
### Locate Cam in Proper Position

- Using a 5/32" allen wrench, turn transfer motor clockwise until long pin arm on crank is in vertical position.
- Remove retaining ring from cam shaft and pull cam forward.
- Locate cam so that actuator for cam switch S8 is 1/8-inch above cam notch as shown.
- Push in cam and install retaining ring.



### Check and Adjust Cam Switch Operation

- Check that each cam switch operates (on and off) center cam step.



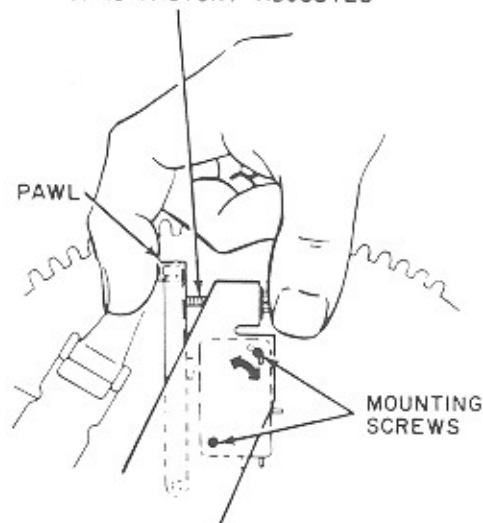
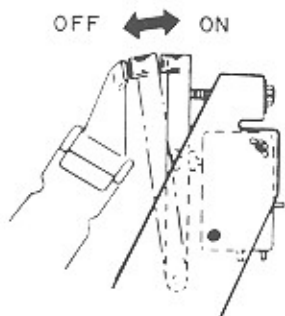
- To adjust a switch, loosen mounting screw closest to actuator end and move switch housing accordingly.
- Tighten mounting screw and recheck operation.

## STOP SWITCH ASSEMBLY ADJUSTMENTS

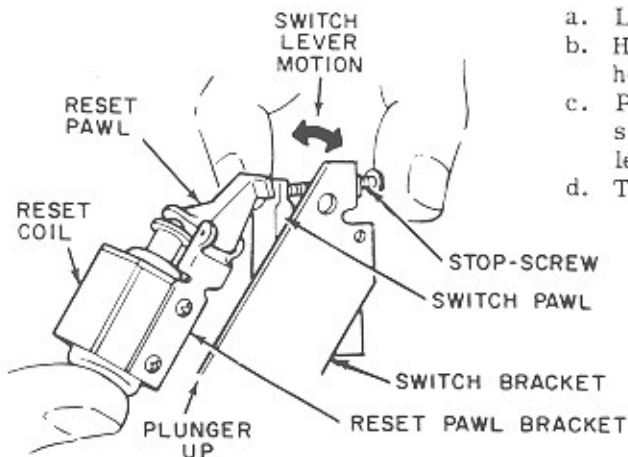
### Adjust left side switch.

- Hold pawl against stop screw using thumb and fore-finger.
- Loosen mounting screw nearest stop screw and move switch against pawl as far as it will go.
- Tighten mounting screw.
- Release pawl and stop screw, check that switch releases.
- If switch does not release, loosen mounting screw and adjust switch position so that it actuates and releases as pawl is moved back and forth.

NOTE: DO NOT TRY TO ADJUST STOP-SCREW  
IT IS FACTORY ADJUSTED



### Adjust reset coil.

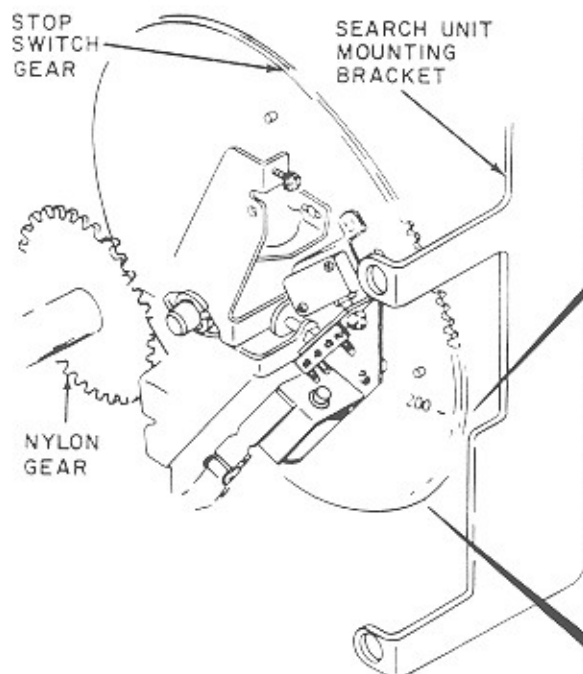


- Loosen screws holding reset pawl bracket.
- Hold reset coil plunger flush with bottom of coil, and hold left side switch pawl against stop screw.
- Position reset pawl bracket so tips of reset pawl and switch pawl will just miss each other as stopping switch lever is pivoted through its entire range of motion.
- Tighten screws and recheck switch operation.

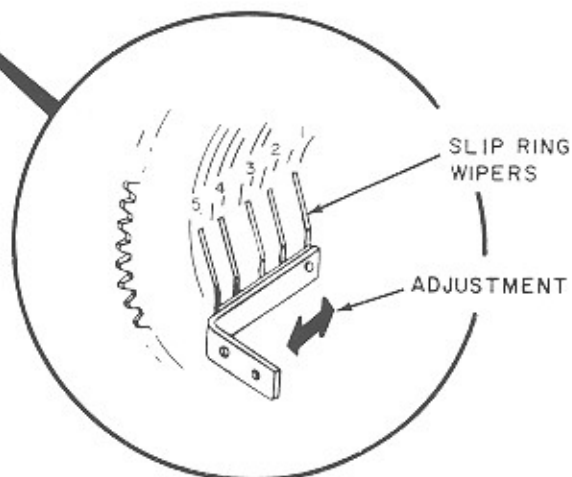
## STOP SWITCH ASSEMBLY ADJUSTMENTS (CONTINUED)

Align stop switch.

1. Lock magazine at selection A1. (Rotate the magazine until selection A1 is at top center. Engage the detent, locking the magazine in place.)



2. Mesh the stopping switch gear with the large nylon gear so that the 200 index mark on the stopping switch gear is in line with the step on the search unit mounting bracket.

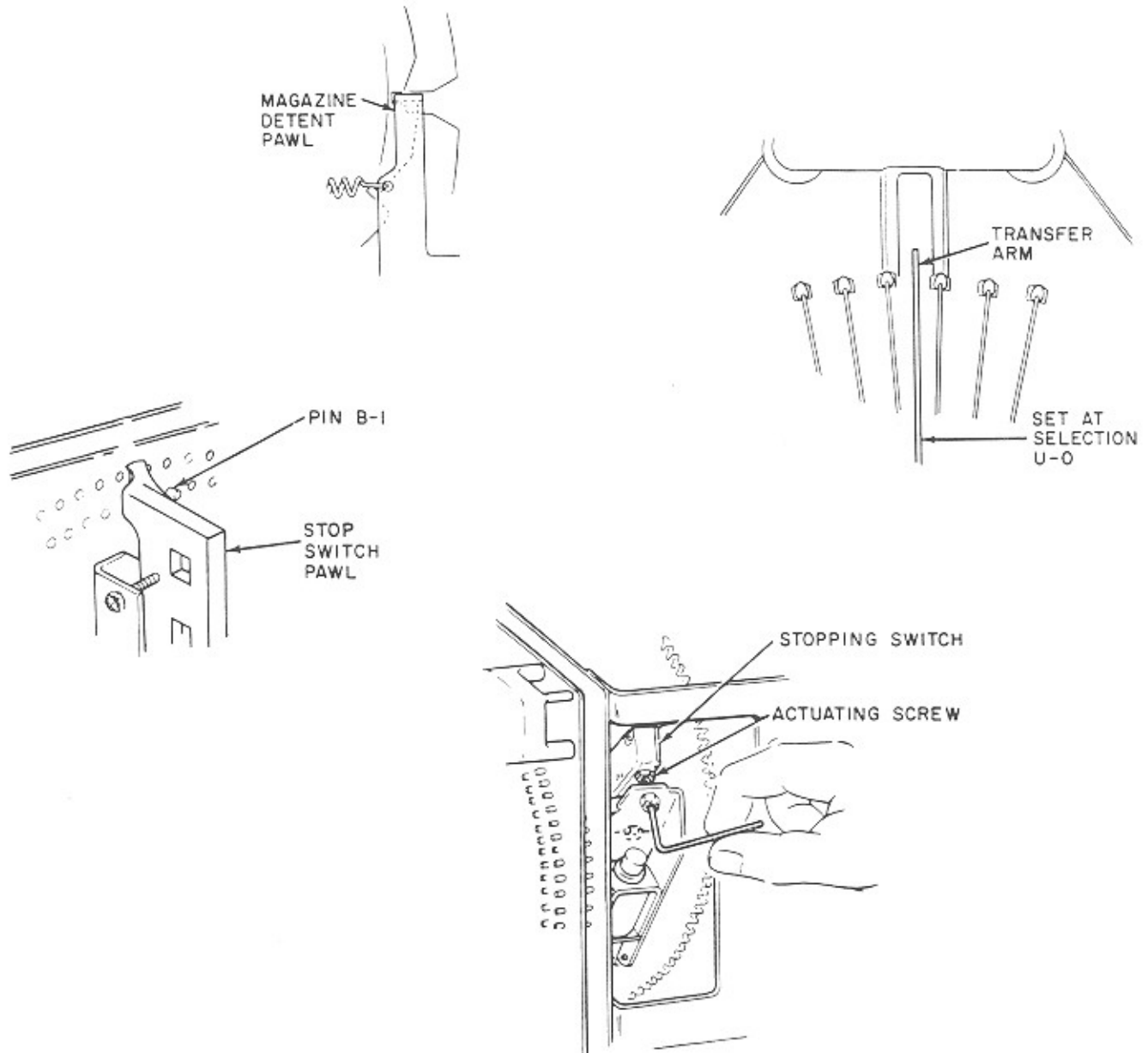


3. Check to see that the slip ring wipers are properly aligned with their respective slip rings. If necessary loosen the slip ring wiper assembly mounting screw and move the entire assembly horizontally until the ends of the wipers are tracking in the center of the rings.

## STOP SWITCH ASSEMBLY ADJUSTMENTS (CONTINUED)

Adjust stop switch pawl.

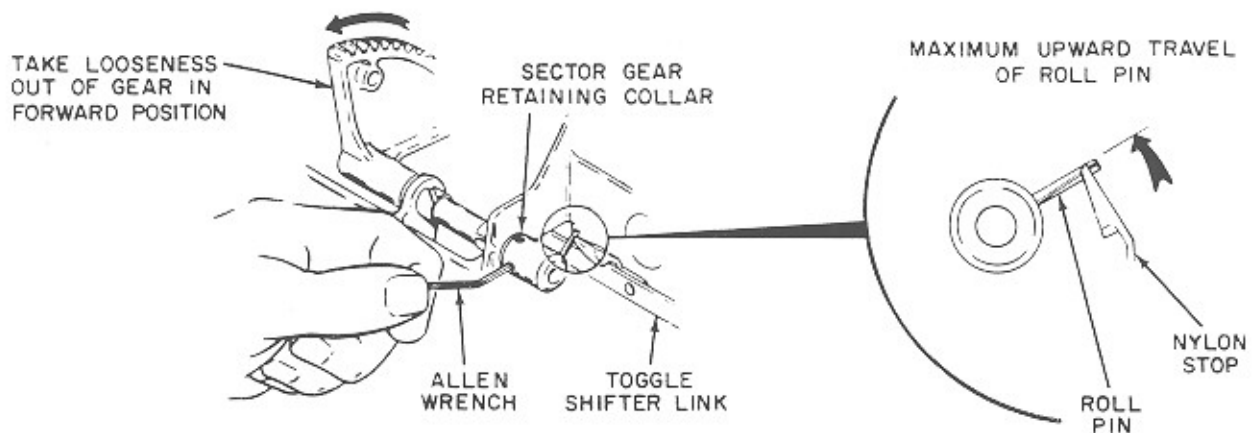
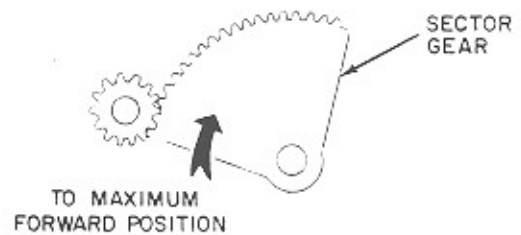
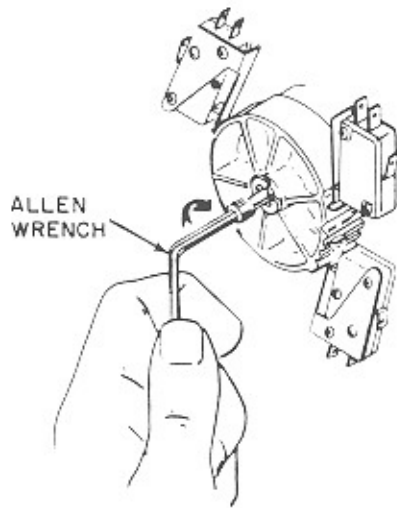
- Manually rotate record magazine and lock in position at selection U-O.
- Manually set search unit pin B1.
- Locate stop switch pawl on pin B1 as shown.
- Back stopping switch actuating screw out past the point where switch clicks (releases).
- Turn stopping switch actuating screw in until switch just clicks (actuates); then turn screw in 1-2/3 turns further.
- Turn on mechanism service switch and cycle record changer at least twice to check stopping switch adjustment.



## SECTOR GEAR ADJUSTMENTS

### Adjust the Sector Gear Retaining Collar

- Using a 5/32-inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum up, or forward position.
- Set retaining collar so that roll pin is flush with top surface of toggle shifter link nylon stop. Take all looseness out of sector gear in forward direction.
- Check that there is no end play in sector gear shaft.



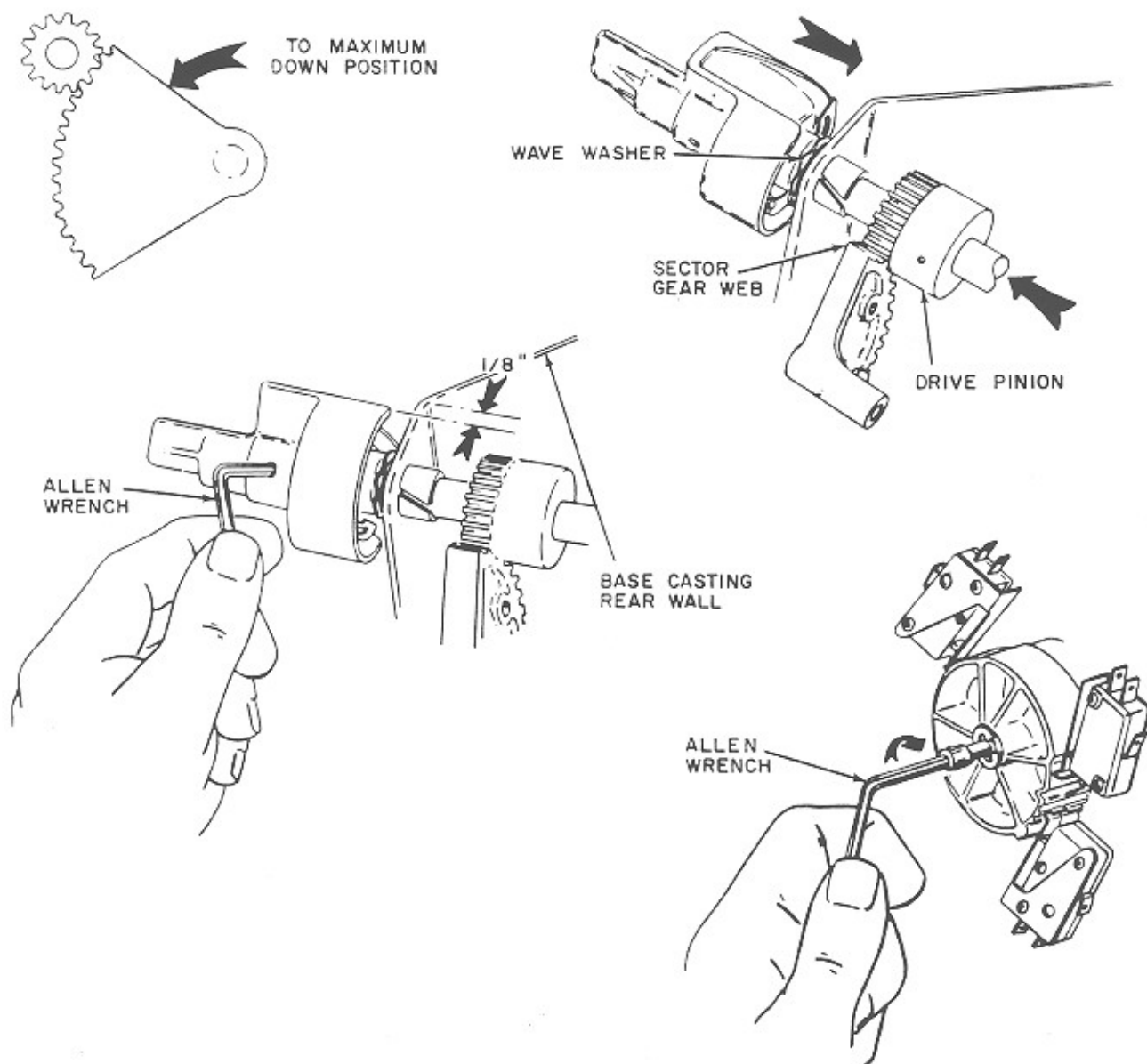


## TONE ARM CAM ADJUSTMENTS

### Adjust Tone Arm Cam.

- Using a  $5/32$ -inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum down position. Remove all looseness in upward direction.
- Loosen allen screws and position tone arm cam so straight cutout in cam surface is  $1/8$ -inch from base casting rear wall front surface plane. Use a  $1/8$ -inch allen wrench to gauge this distance.
- Remove end play from shaft and tighten allen screws.

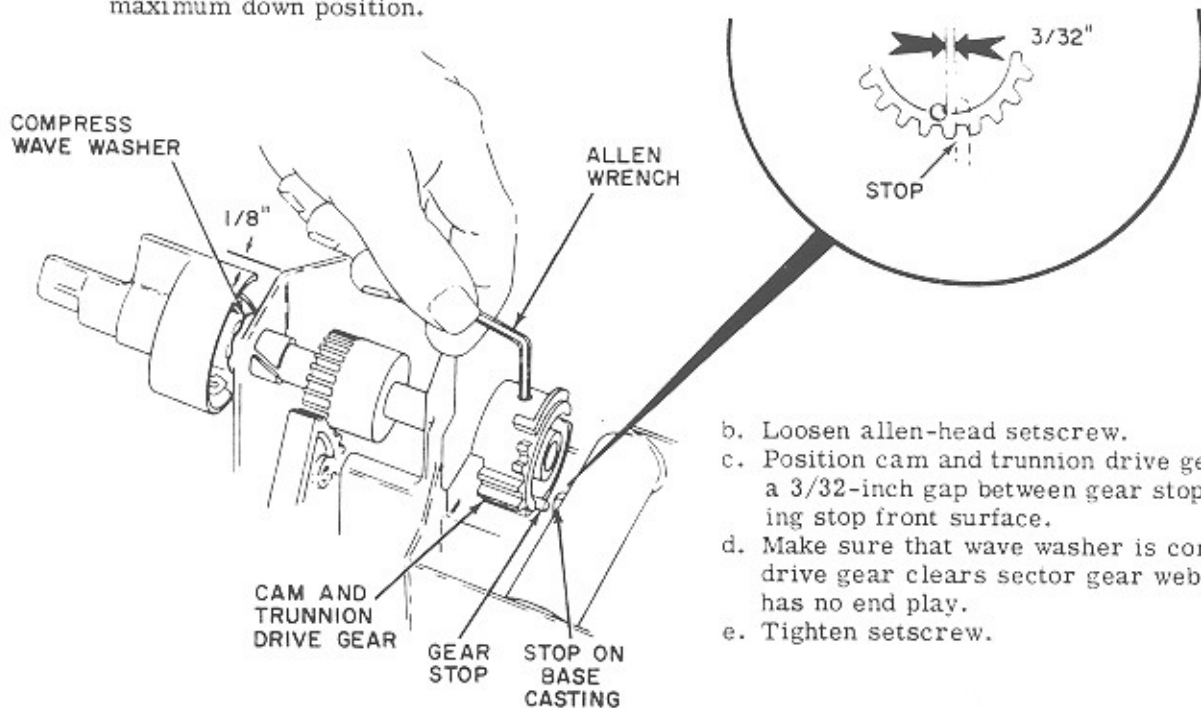
NOTE: Pinion gear teeth must not ride on sector gear web.



## CAM AND TRUNNION DRIVE GEAR ADJUSTMENT

### Adjust Cam and Trunnion Drive Gear.

- a. Using a 5/32-inch allen wrench, turn transfer motor shaft clockwise until sector gear is in maximum down position.

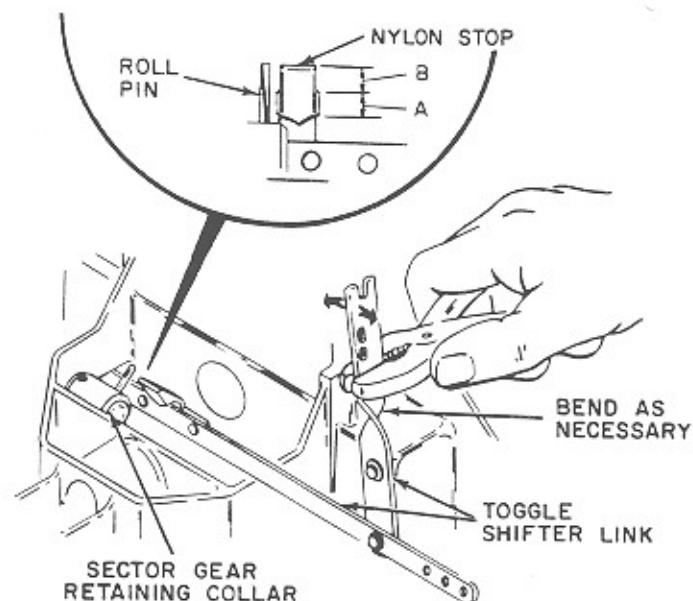


- b. Loosen allen-head setscrew.
- c. Position cam and trunnion drive gear so there is a 3/32-inch gap between gear stop and base casting stop front surface.
- d. Make sure that wave washer is compressed, that drive gear clears sector gear web, and that shaft has no end play.
- e. Tighten setscrew.

## TOGGLE SHIFTER LINK ADJUSTMENT

### Adjust Toggle Shifter Link.

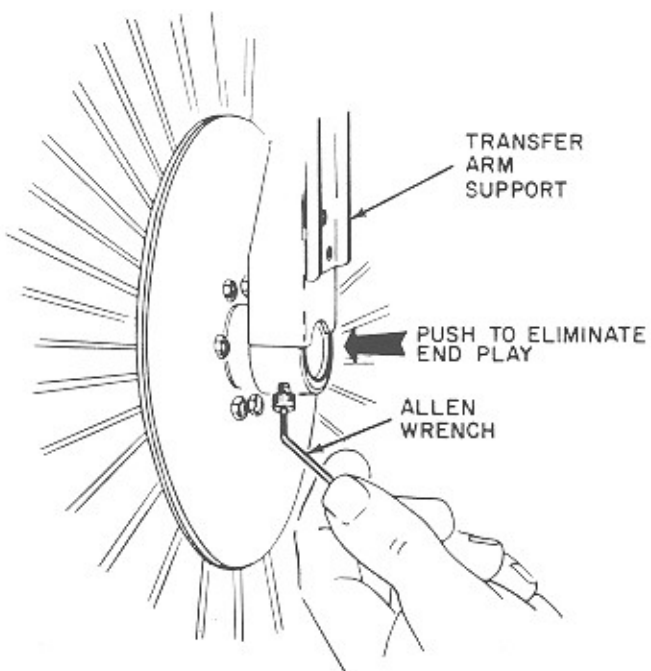
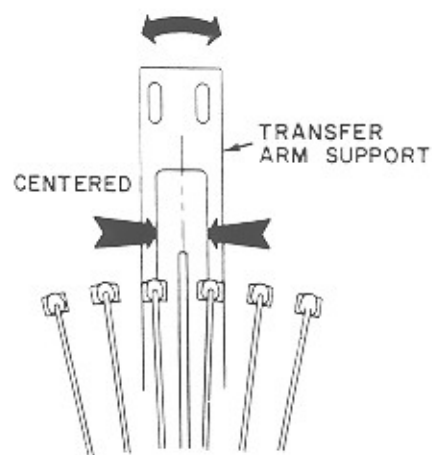
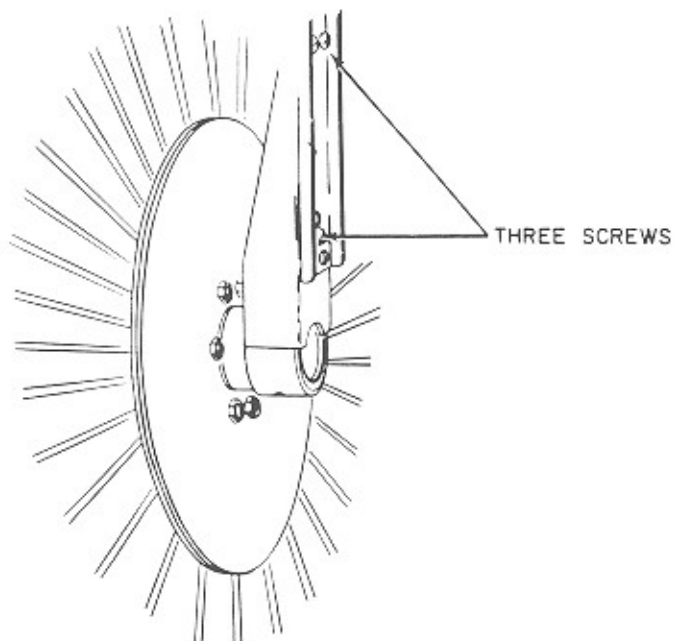
- a. Bend toggle shifter link vertical member so sector gear retaining collar roll pin will contact nylon stop in area "A", but not area "B" as transfer motor cycles.
- b. Check adjustment with toggle shifter pins in both positions.



## RECORD MAGAZINE TRANSFER ARM SUPPORT ADJUSTMENT

Eliminate Magazine End Play and Center Transfer Arm Support.

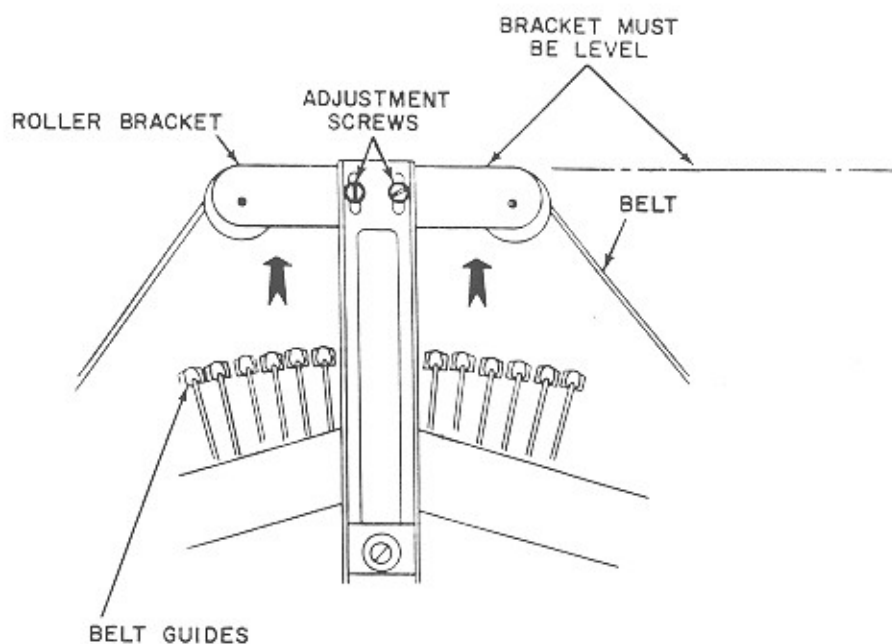
- Loosen setscrews in transfer arm support.
- Push transfer arm support onto magazine shaft to eliminate end play and adjust it so transfer arm will not rub on either side of opening.
- Tighten setscrews.
- If slight adjustment is necessary after setscrews are seated, loosen three screws on rear of transfer arm support, adjust, and tighten screws.



## MAGAZINE BELT ADJUSTMENT

### Tighten Magazine Belt.

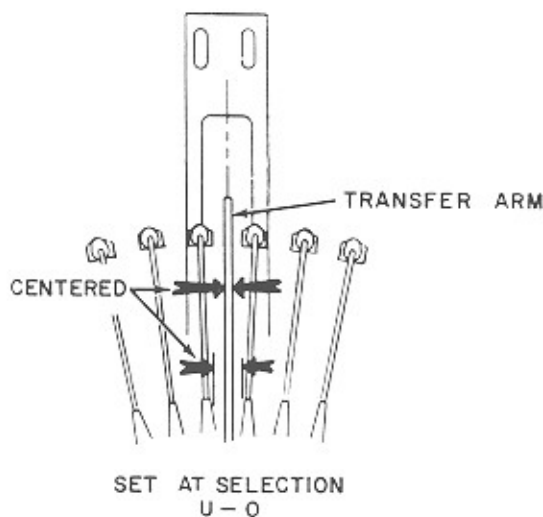
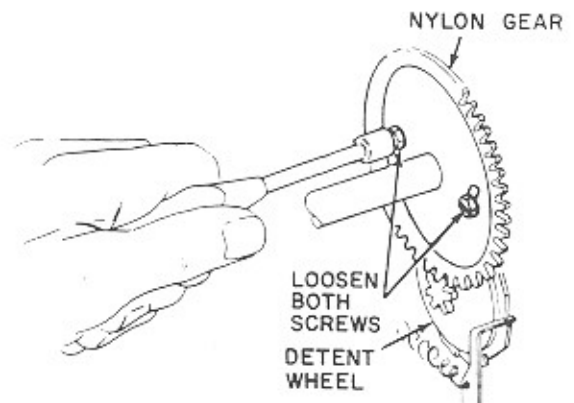
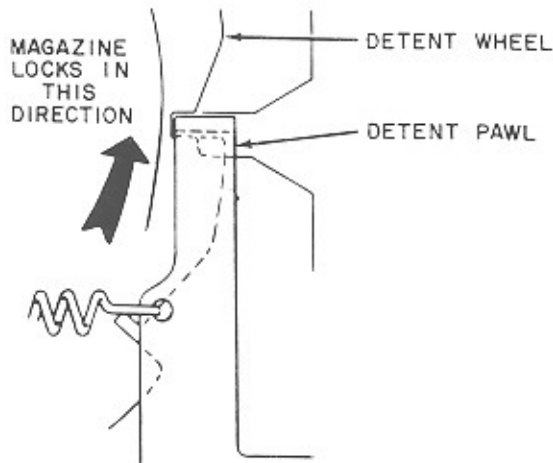
- Loosen two adjustment screws shown.
- Raise bracket to tighten belt around magazine.
- Check that belt rides evenly in center of belt guides, all the way around the magazine.



## ALIGNING MAGAZINE STOPPING POSITION WITH TRANSFER ARM

### Align Stopping Position of Magazine with Transfer Arm.

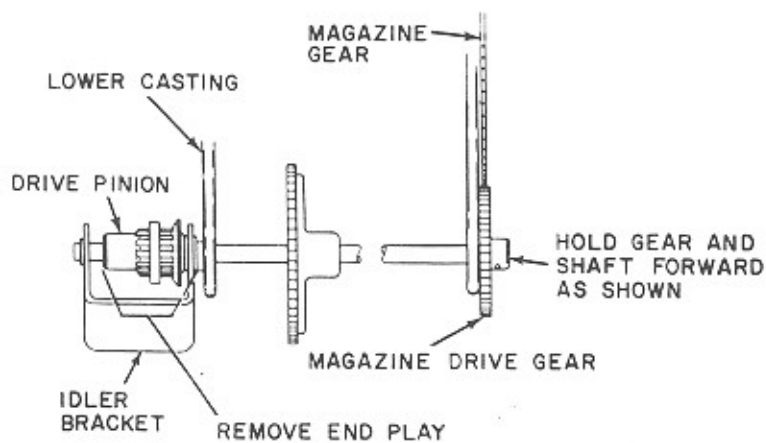
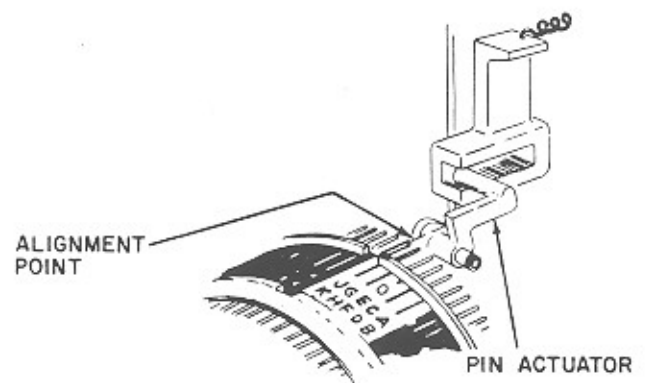
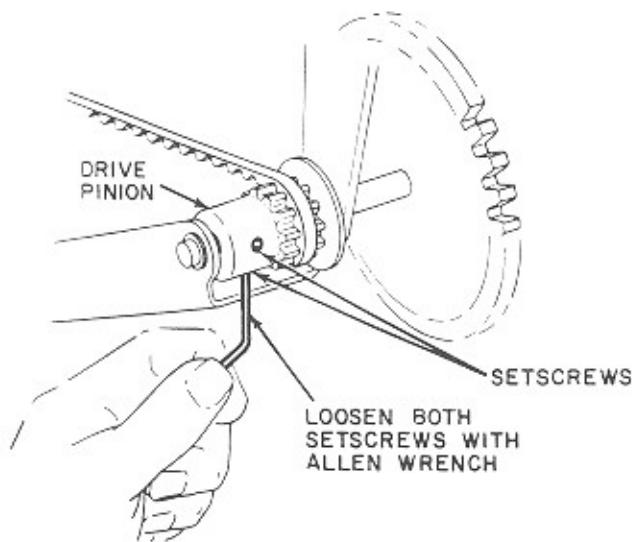
- Rotate magazine until selection is at top center. Allow magazine detent to engage and lock magazine in place.
- Loosen two screws in large nylon gear.
- With detent wheel locked, move magazine until transfer arm is centered in record slot.
- Tighten two screws in large nylon gear securely.



## POPULARITY METER ALIGNMENT

### Align Popularity Meter.

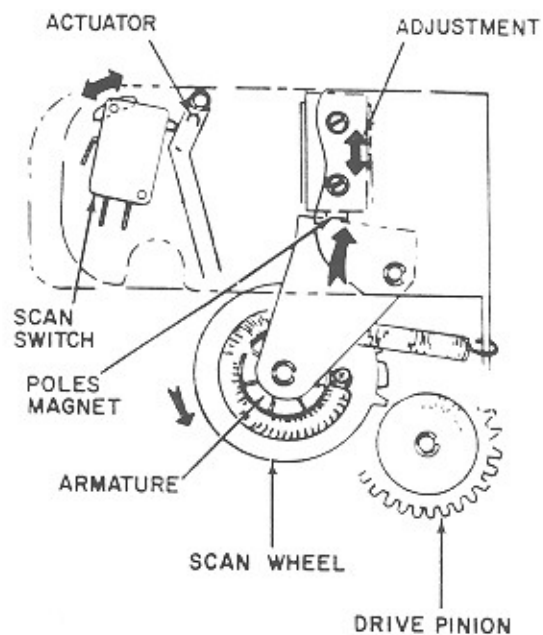
- a. Remove popularity meter.
- b. Loosen setscrews in popularity meter drive pinion.
- c. Release magazine detent. Rotate magazine until selection U-O is at top center.
- d. Allow detent to engage, locking magazine in place.
- e. Install popularity meter and rotate until pin marked U-O is centered over pin actuator.
- f. Be sure that crank is properly aligned and that popularity meter is all the way on the shaft.
- g. Remove all end play. Tighten two setscrews.



## SCAN CONTROL ADJUSTMENTS

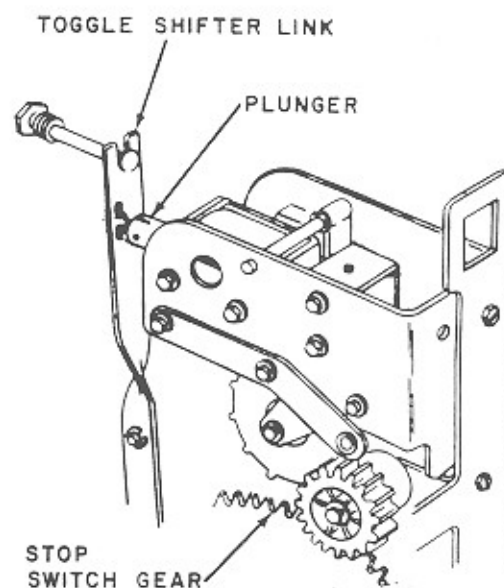
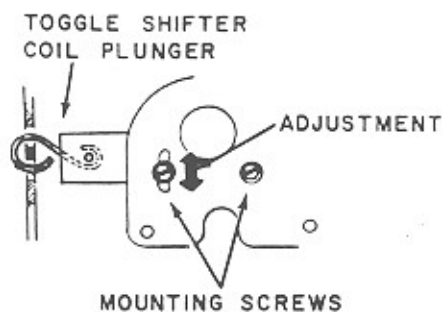
### Adjust Scan Control.

- Rotate magazine until scan wheel is in maximum counterclockwise position as shown.
- Loosen scan switch top mounting screw.
- Move switch against actuator until switch has operated, and switch button is almost bottomed.
- Tighten top mounting screw.
- With armature held against magnet pole pieces, scan wheel should barely clear drive pinion. Rotate scan wheel one full turn to check this adjustment.



### Adjust Toggle Shifter Coil.

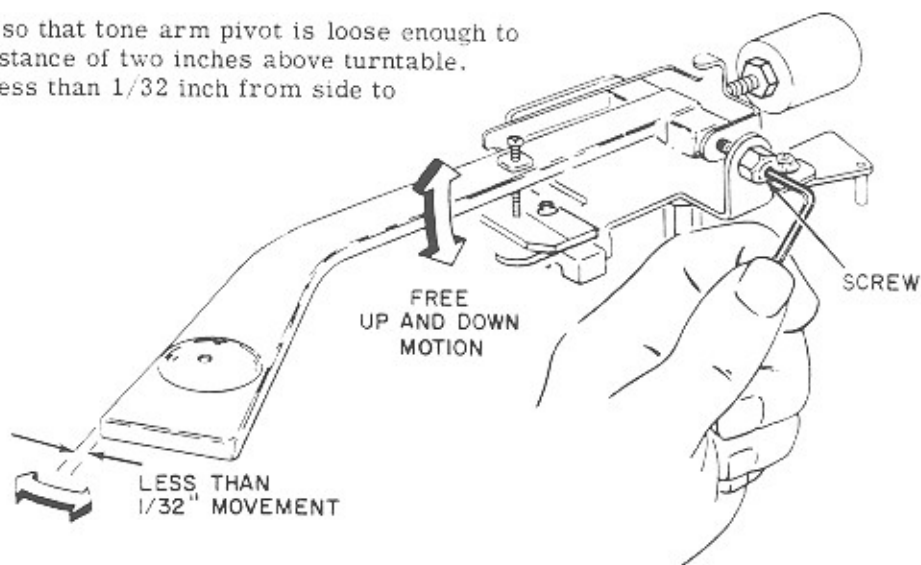
- Loosen two mounting screws for toggle shifter coil.
- Adjust coil until it is level and plunger mover freely in and out.
- Make sure that drive pinion is meshed properly with stop switch gear.
- Tighten two screws.



## TONE ARM ADJUSTMENTS

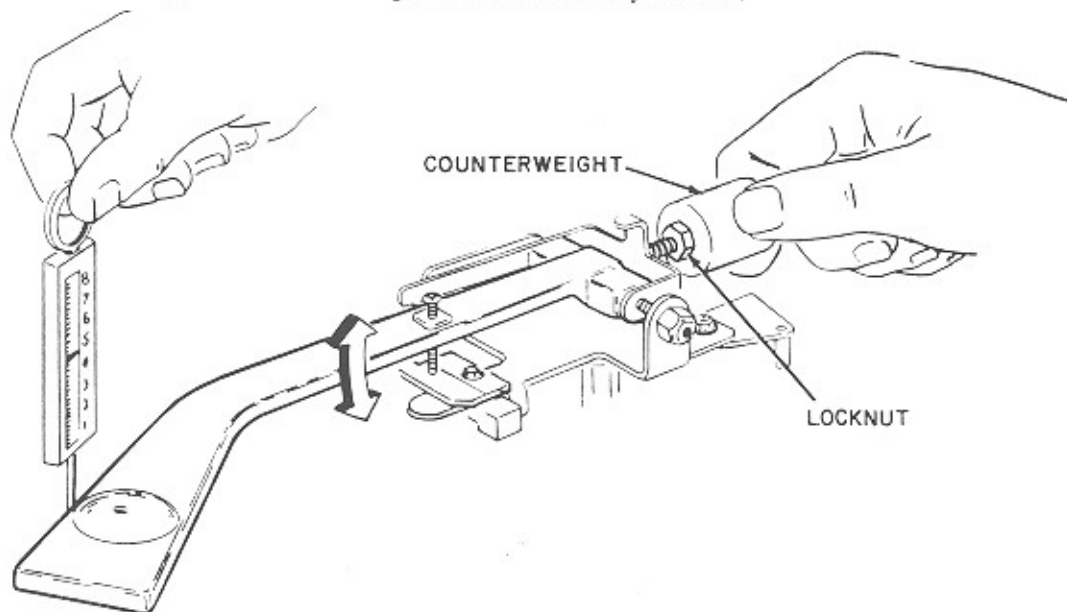
### Adjust Vertical Pivot.

- Adjust tone arm pivot screw so that tone arm pivot is loose enough to move free vertically for a distance of two inches above turntable.
- Check that tone arm moves less than  $1/32$  inch from side to side.



### Set Stylus Force.

- Loosen lock nut.
- Attach a suitable gram gauge to tone arm as shown. Adjust counterweight for 4 to 5 grams pressure.
- Tighten lock nut against counterweight and recheck adjustment.

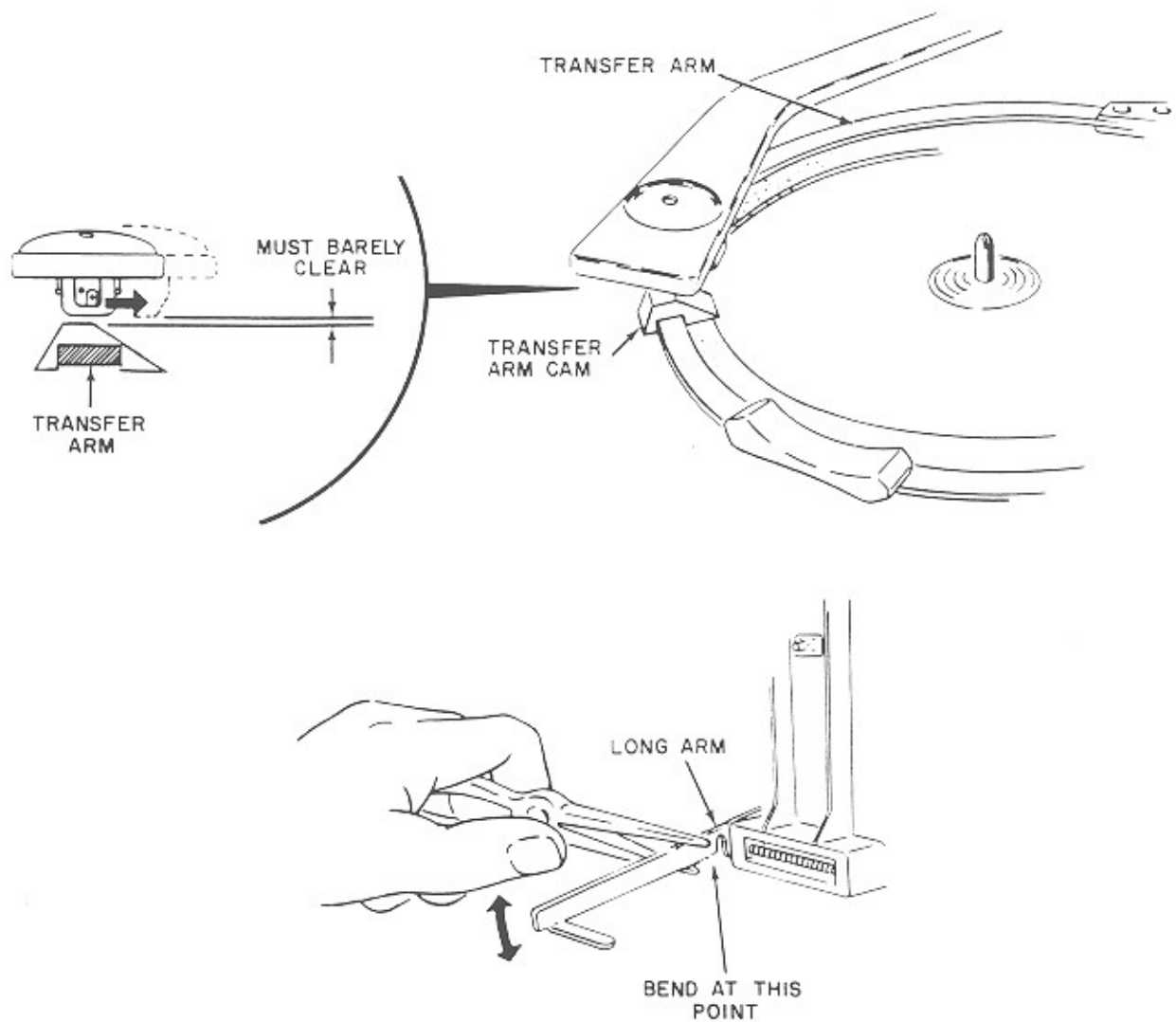




## tone arm adjustments (CONTINUED)

### Set Stylus Clearance.

- Operate transfer assembly to place transfer arm next to tone arm.
- Stylus must barely clear transfer arm as tone arm swings over it. Adjust clearance by bending long arm of tone arm rest, as necessary, at point shown.

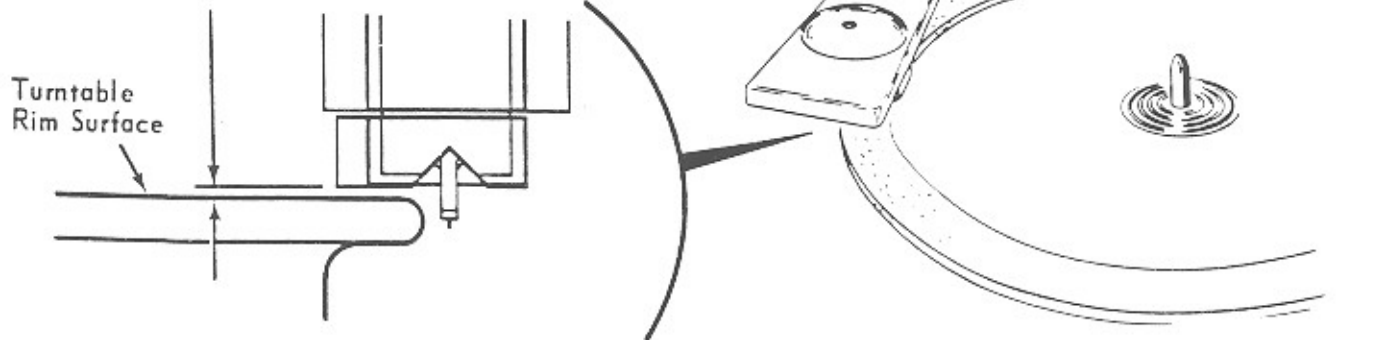


## TONE ARM ADJUSTMENTS (CONTINUED)

### Set Stylus Height.

- Operate transfer assembly to position tone arm over turntable rim.
- Turn adjustment screw until stylus tip is  $1/32$  inch below rim surface with tone arm in play position.

$1/64$  to  $1/32$  Inch



### Set Stylus Setdown Position and Tone Arm Cutoff Switch.

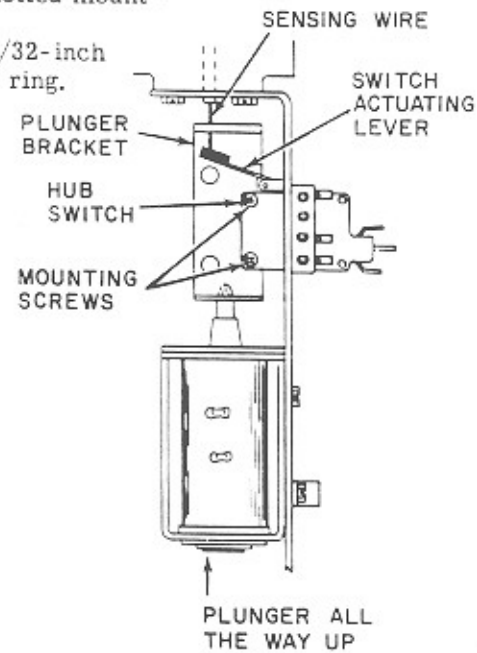
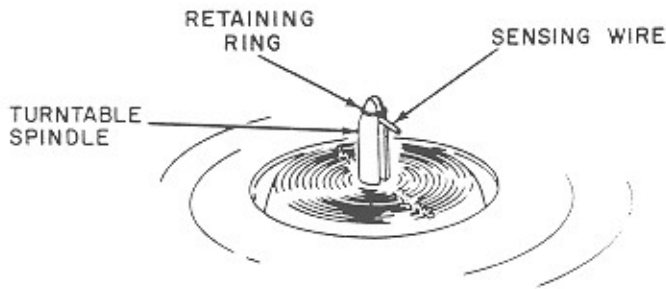
- Place undersize ( $6-13/16$ -inch diameter) record on turntable.
- Operate transfer assembly to bring tone arm to play position.
- Loosen mounting screw.
- While holding cam follower plate against tone arm cam, move tone arm, as required, until stylus is  $3/64$ -inch from record edge.
- Tighten mounting screw and check adjustment.
- Locate tone arm stylus in record cutout groove.
- Loosen two mounting screws on cutoff reed switch mounting plate.
- Position mounting plate, as necessary, until reed switch is closed. The magnet on the under side of the tone arm operates the cutoff switch. Adjust switch so it operates before stylus enters "closed" record groove.



## AUTOMIX ADJUSTMENTS

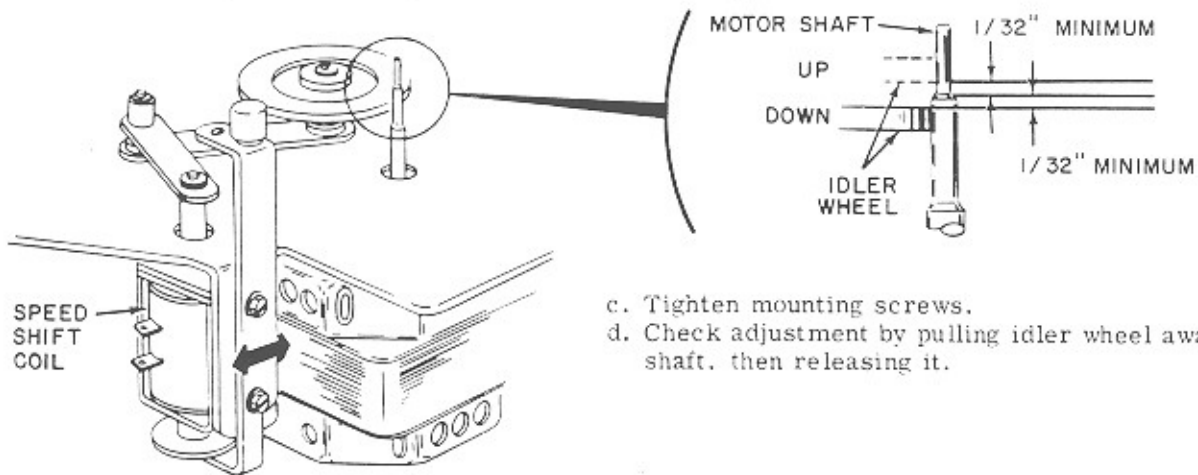
### Obtain 1/32-inch Gap between Sensing Wire and Turntable Spindle Retaining Ring.

- Loosen mounting screws and move hub switch down as far as slotted mounting holes will allow.
- While holding plunger all the way up, raise hub switch until a 1/32-inch gap exists between sensing wire and turntable spindle retaining ring.
- Tighten switch mounting screws.



### Adjust Speed Shift Coil so that Idler Wheel Rim Clears Motor Shaft Step by at Least 1/32 inch.

- Loosen speed shift coil mounting screws.
- Adjust speed shift coil so that idler wheel rim clears motor shaft step by at least 1/32 inch in both full up and full down coil plunger position. The coil frame will pivot slightly about the top mounting screw hole, just enough to allow up and down adjustment of the idler linkage.

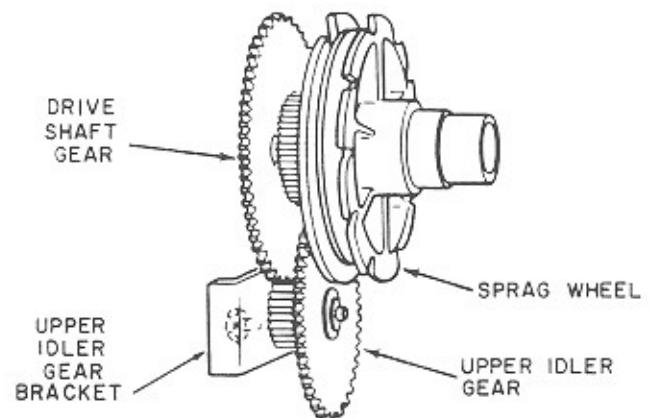
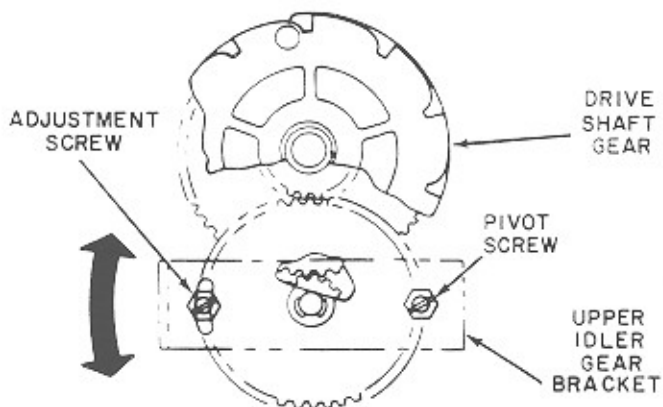


- Tighten mounting screws.
- Check adjustment by pulling idler wheel away from motor shaft, then releasing it.

## SEARCH UNIT GEAR ADJUSTMENT

### Mesh Drive Shaft Gear, Upper Idler Gear, and Sprag Wheel Pinion.

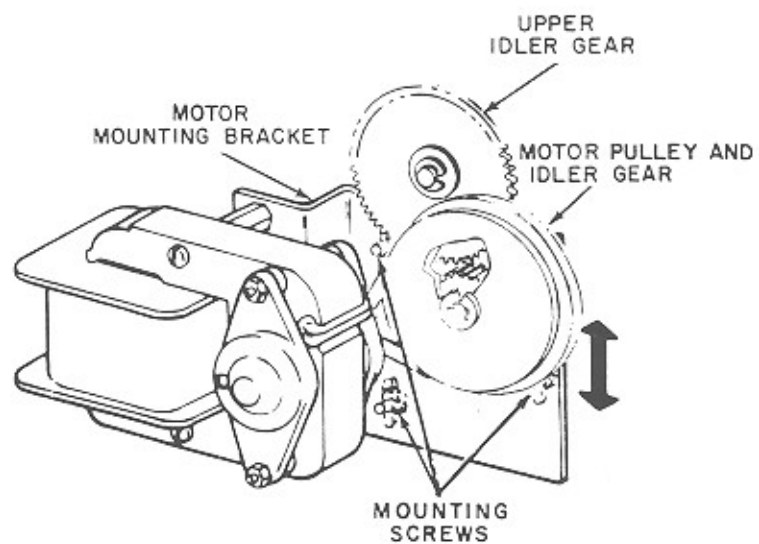
- Loosen upper idler gear bracket pivot screw and adjustment screw.
- Pivot bracket, as shown, until all gears move freely with a minimum of backlash.
- Tighten screws and recheck adjustment.



## SEARCH UNIT GEAR ADJUSTMENTS (CONTINUED)

### Align Motor Idler Gear To Upper Idler Gear.

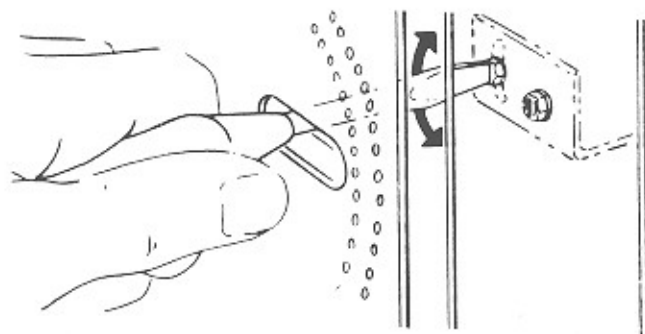
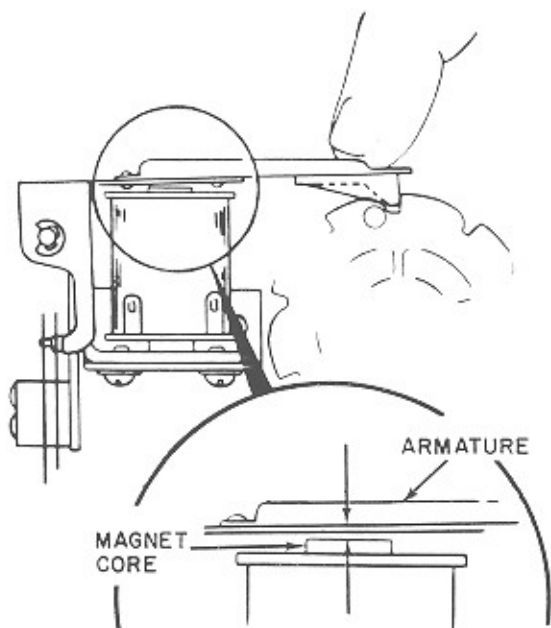
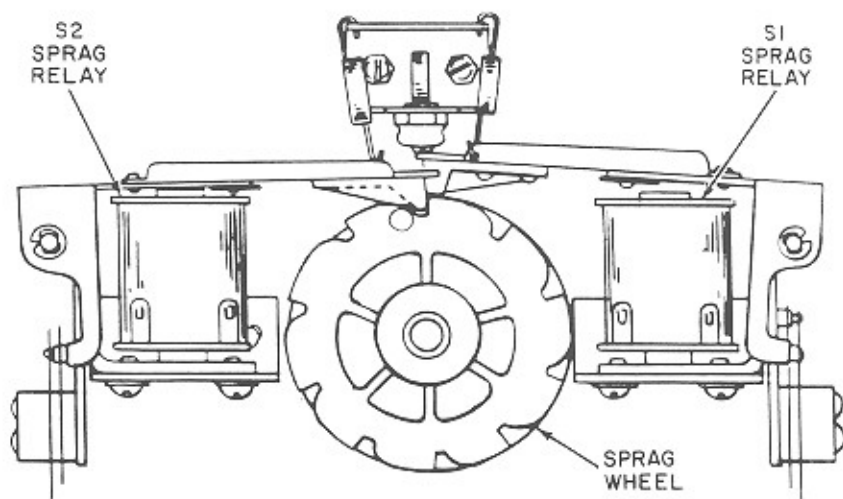
- Loosen three motor mounting screws in motor mounting bracket.
- Move motor assembly as shown until motor meshes with upper idler gear without binding and with minimum backlash.
- Tighten screws and recheck adjustment.



## SPRAG RELAY ADJUSTMENTS

### Adjust Sprag Relay Core Gap.

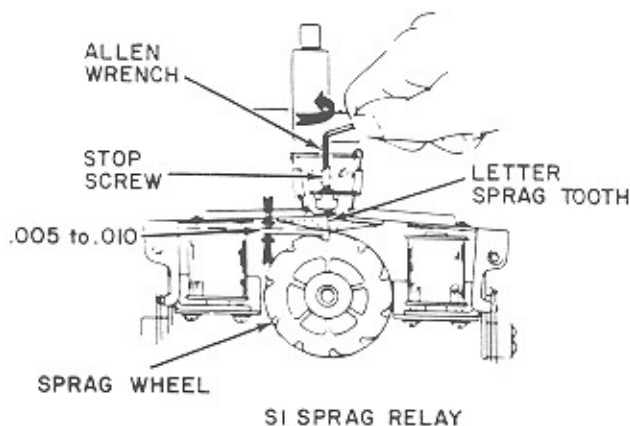
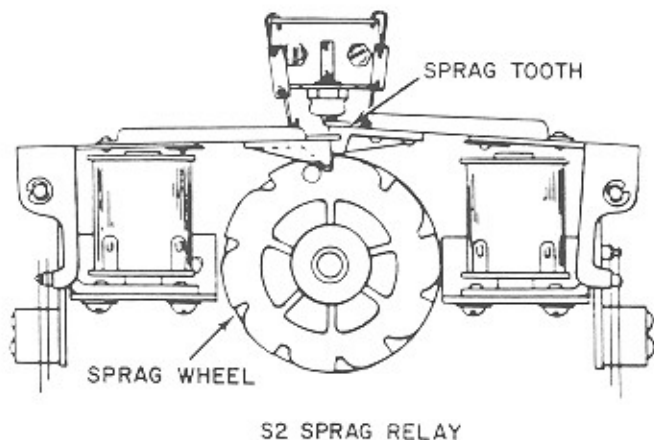
- Bottom sprag relay S2 tooth in any one sprag wheel notch.
- While holding tooth in notch, check clearance between sprag relay armature and magnet core. A piece of ordinary bond paper should just pass through this gap.
- To adjust clearance, loosen sprag relay mounting and pivot screws and move relay as required.
- Tighten screws and recheck adjustment.
- Repeat steps a through d to adjust sprag relay S1.



## SPRAG RELAY ADJUSTMENTS (CONTINUED)

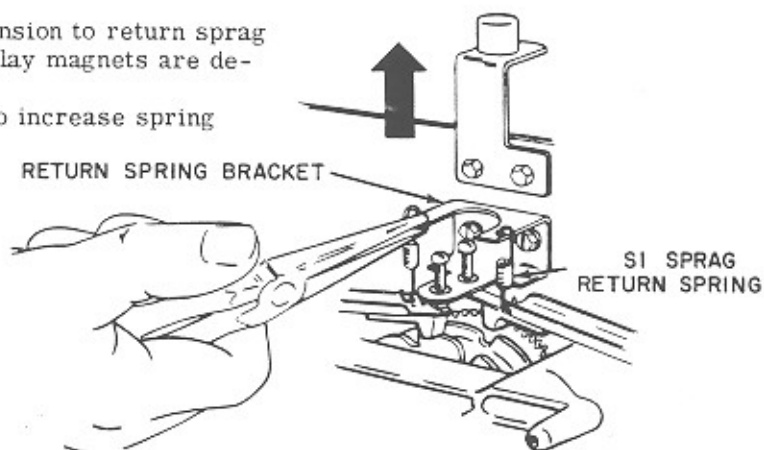
### Adjust Sprag Tooth-To-Wheel Clearance.

- Align sprag relay S2 tooth with high point on sprag wheel.
- Turn in stop screw until sprag relay tooth binds against sprag wheel. Do not force sprag wheel around when checking binding.
- Back stop screw off 1/4-turn for 0.005- to 0.010- inch clearance as shown.
- Repeat steps a through c to adjust sprag relay S1 for 0.018- to 0.030-inch clearance.



### Adjust Return Spring Force.

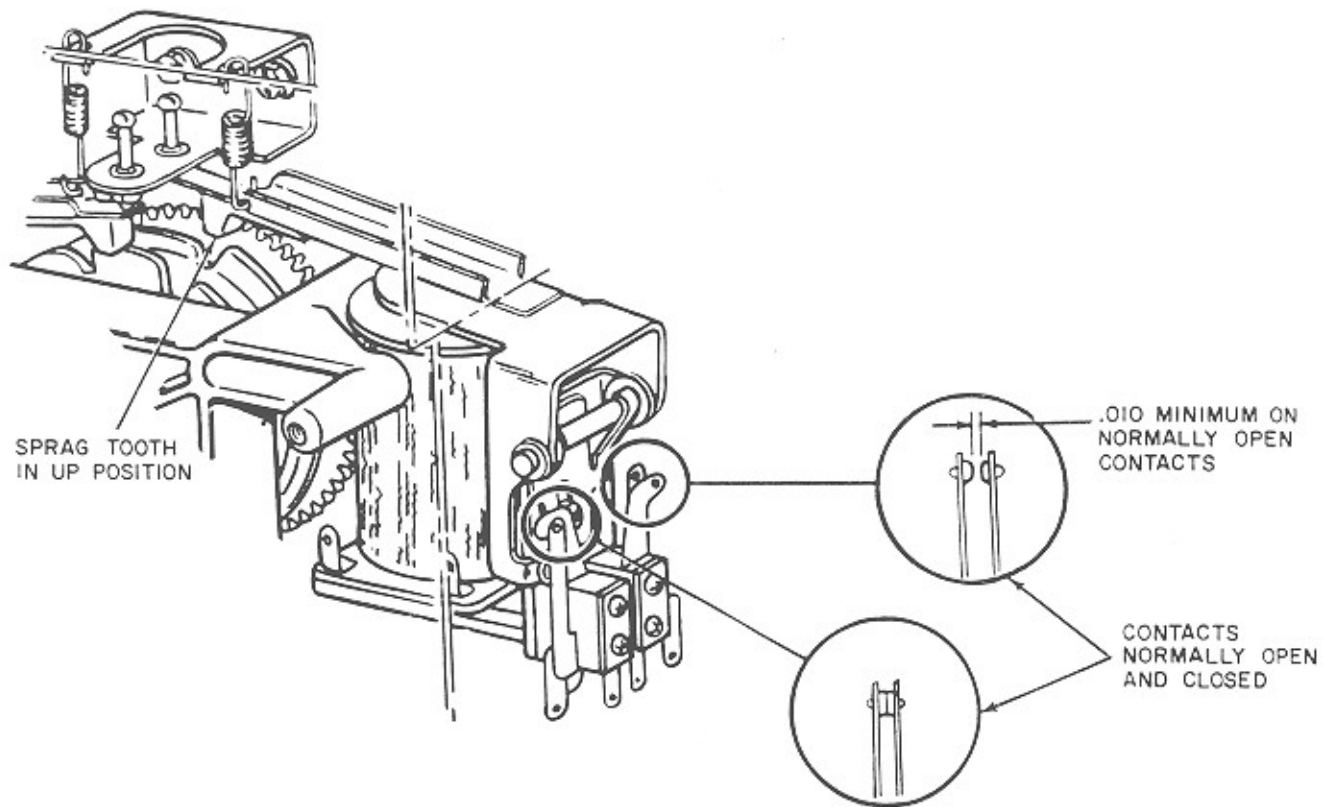
- Check that return springs have enough tension to return sprag relay armatures to rest position when relay magnets are de-energized.
- Bend return spring bracket, as shown, to increase spring tension. Do not bend S1 arm more than 1/16 inch; do not bend S2 arm more than 1/64 inch.
- If proper tension cannot be obtained, replace return spring.



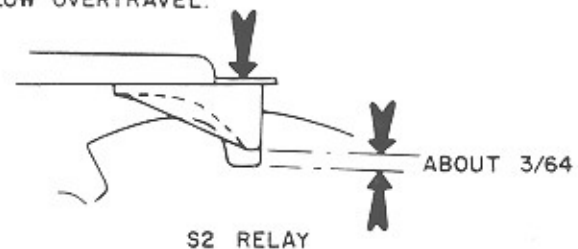
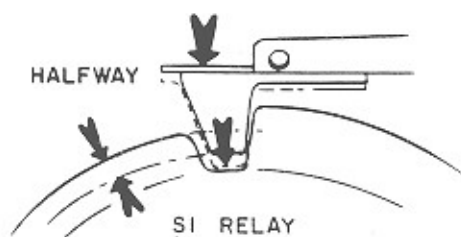
## SPRAG RELAY ADJUSTMENTS (CONTINUED)

### Adjust Relay Contact Make and Break Position.

- Slowly bottom sprag relay S1 tooth in a sprag wheel detent while observing relay contacts.
- Check that contacts make before break halfway down into detent. Bend contact arms as required.
- Repeat steps a. and b. for sprag relay S2. The contacts should make and break about  $3/64$  inch from detent bottom.



CONTACT SHOULD MAKE OR BREAK AT THIS POINT OF DOWNWARD TRAVEL OF TOOTH INTO NOTCH TO ALLOW OVERTRAVEL.

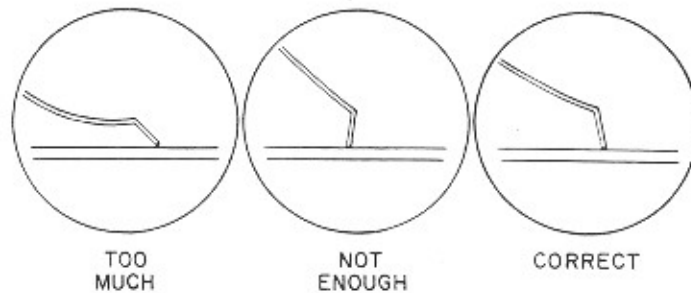




## SEARCH WIPER ADJUSTMENTS

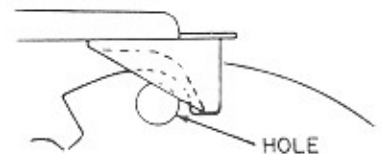
### Adjust Wiper Blade Contact Force.

- Loosen wiper arm hub setscrew and back wiper arm assembly away from commutator board.
- Move wiper arm assembly toward board until blades just touch segments, then move wiper arm assembly toward circuit board  $1/16$ - to  $1/32$ -inch. The blades should be formed as shown.
- Check wiper position on segments, then tighten hub setscrew.

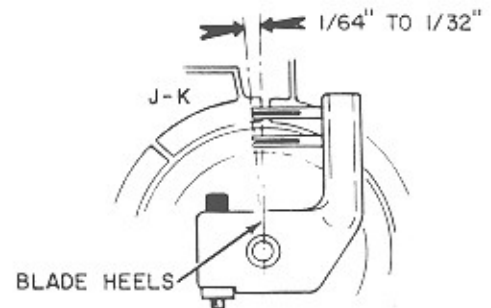


### Position Inside (Letter) Wiper on Commutator Board.

- Bottom sprag relay S2 tooth in sprag wheel notch closest to sprag wheel hole.
- Check that outer wiper on inside circuit board is positioned on segment J-K. Segment J-K is located to the left of the board top center (facing the circuit board back side).
- If wiper arm and wipers of inside circuit board are not properly aligned as shown, loosen hub setscrew, and while holding sprag relay S2 tooth in position as in step a, rotate wiper arm assembly to align wipers.
- Tighten setscrew.



**NOTE:** When changing position of wiper arm assembly, be sure to maintain proper contact pressure.

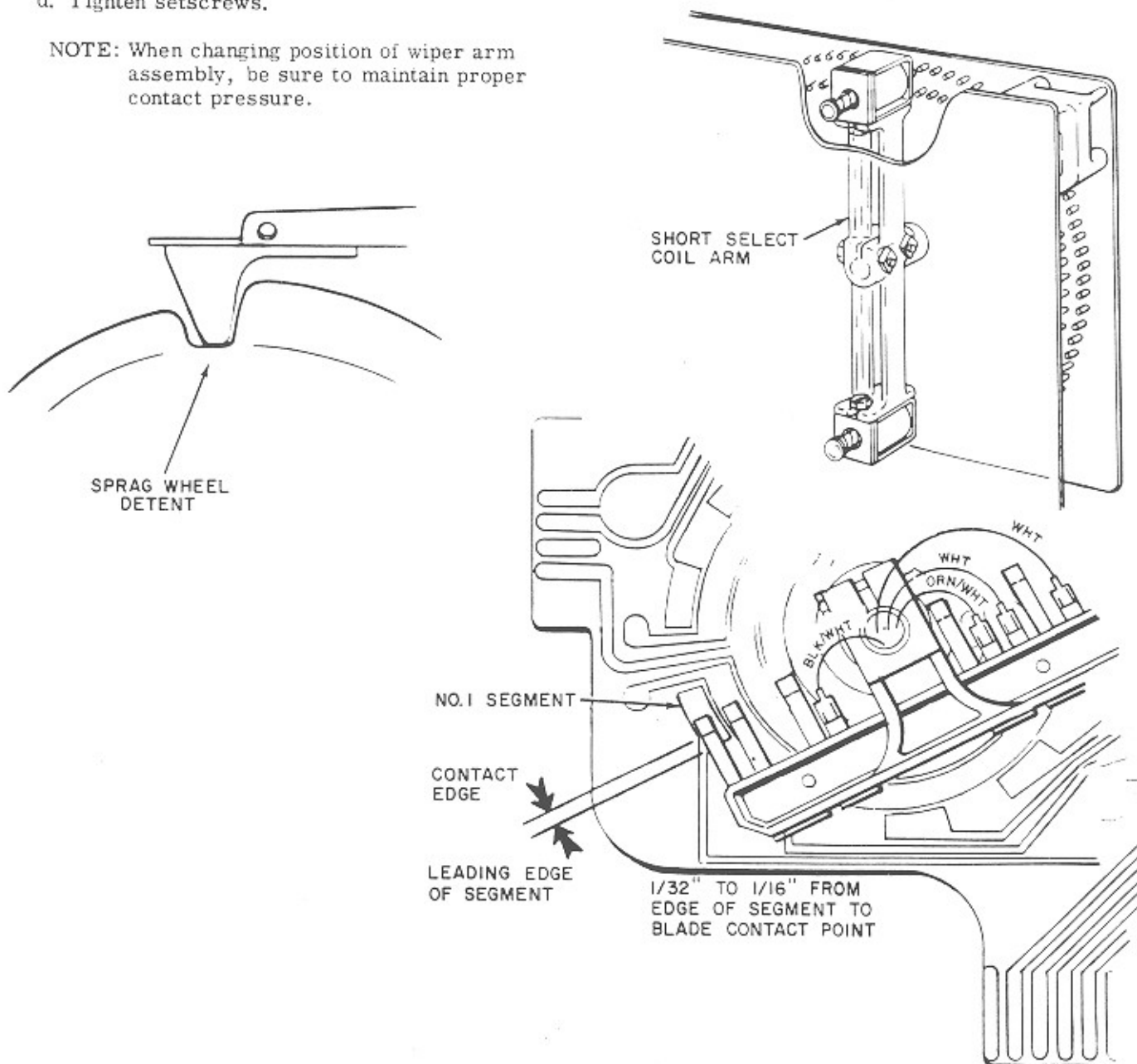


## SEARCH WIPER ADJUSTMENTS (CONTINUED)

Position Outside (Number) on Commutator Board.

- Bottom sprag relay S1 tooth in sprag wheel notch. Check that short select coil arm is up.
- Check that wiper arm side with three blades on it is positioned on segment 1, as shown.
- If adjustment is necessary, loosen the hub setscrew and, while holding sprag relay S1 tooth in position as in step a, rotate wiper arm assembly to align wipers.
- Tighten setscrews.

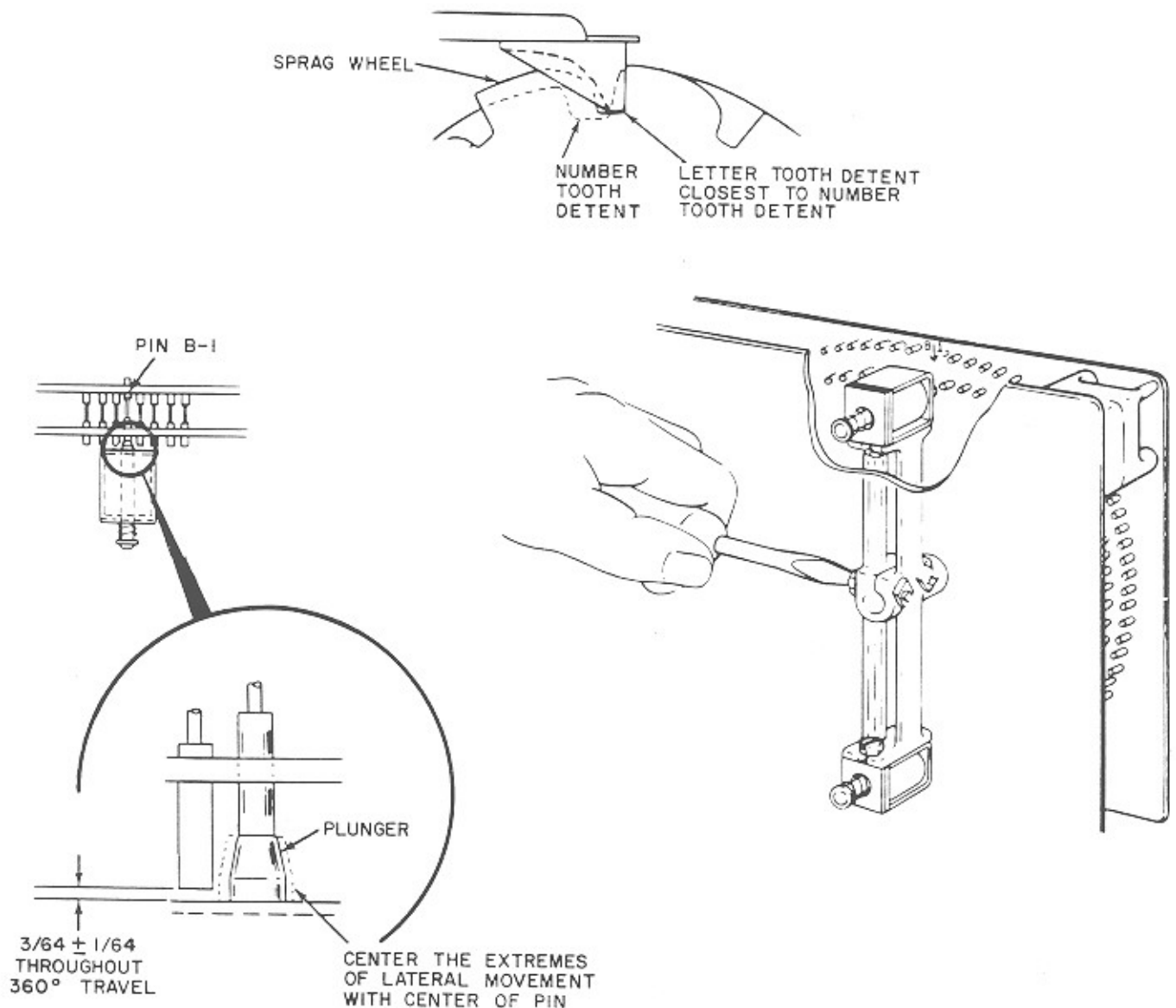
NOTE: When changing position of wiper arm assembly, be sure to maintain proper contact pressure.



## SELECT COIL ADJUSTMENTS

### Plunger-To-Pin Alignment.

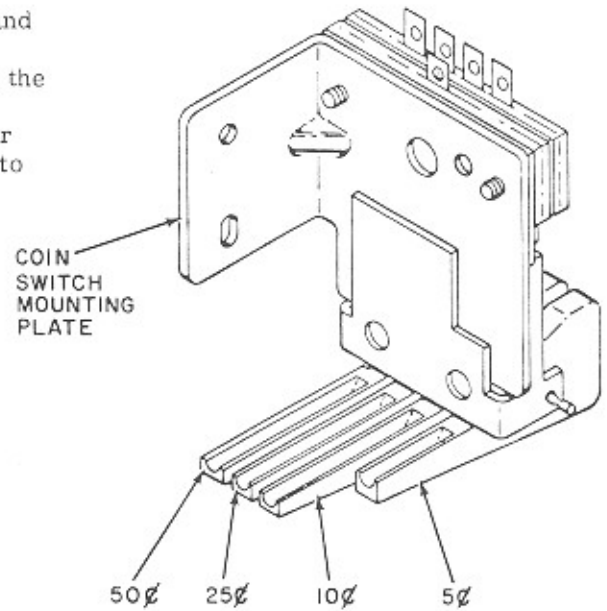
- Bottom sprag relay S1 (numbers) tooth in any number detent.
- Bottom sprag relay S2 (letters) tooth in sprag wheel detent closest to the chosen number detent.
- Push out the pins above B-1 to facilitate viewing.
- Check that select coil plunger on short select coil arm is aligned with pin B-1 on pinwheel assembly.
- If adjustment is required, loosen select coil arm assembly mounting screws just enough to center plunger over pin B-1 without moving forward or back along drive shaft.
- Check for a clearance of  $3/64 \pm 1/64$  inch between the coil frames and pins for 360-degree select coil arm travel.



## COIN SWITCH ADJUSTMENTS

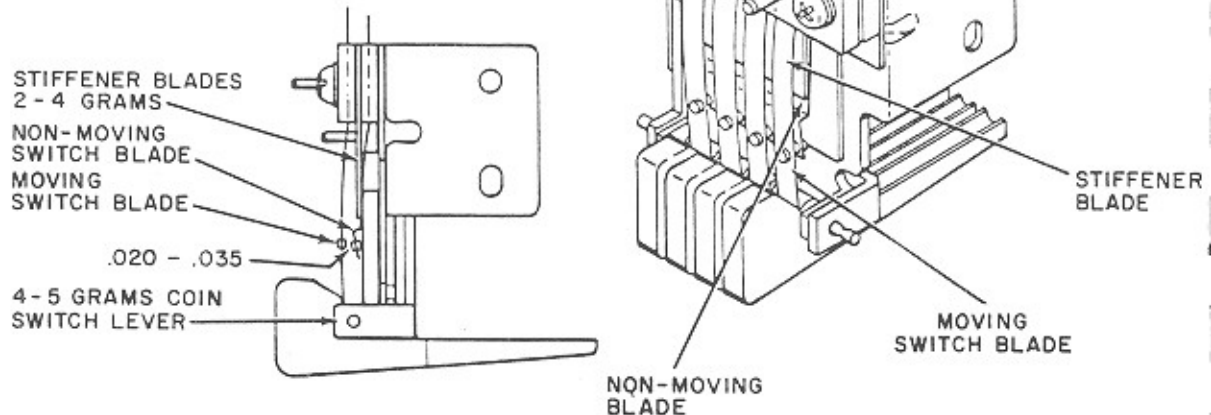
### Operational Check.

- Hold plastic coin switch lever in normal position and drop a coin through slug rejector.
- When the coin comes to rest on the lever, release the lever slowly.
- Check that the weight of the coin operates the lever enough to close the coin switch and allow the coin to fall free.
- Repeat steps a, b, and c for other three levers.



### Contact Pressure and Gap.

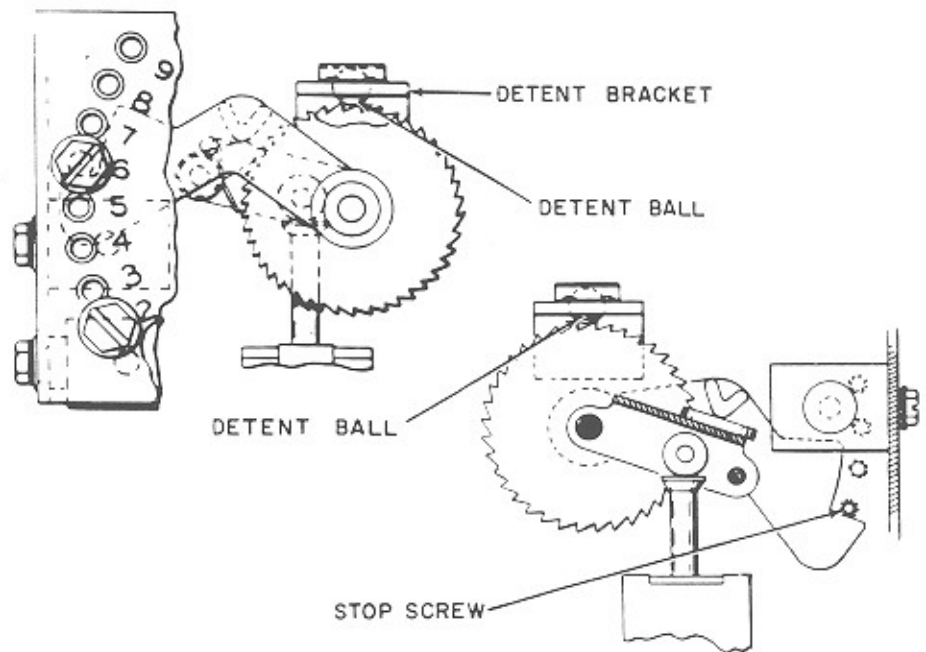
- Check that each moving switch blade pushes against its lever with 4- to 5-grams force to hold lever against cushion.
- Check that each non-moving blade pushes against its stiffener blade with 2- to 4- grams force.
- Adjust contact pressure by bending contact blade near fiber insulator.
- Check that gap between contacts at each switch is 0.020 to 0.035-inch (about 1/32).
- Adjust gap by bending stiffener blade.



## CREDIT UNIT ADJUSTMENTS

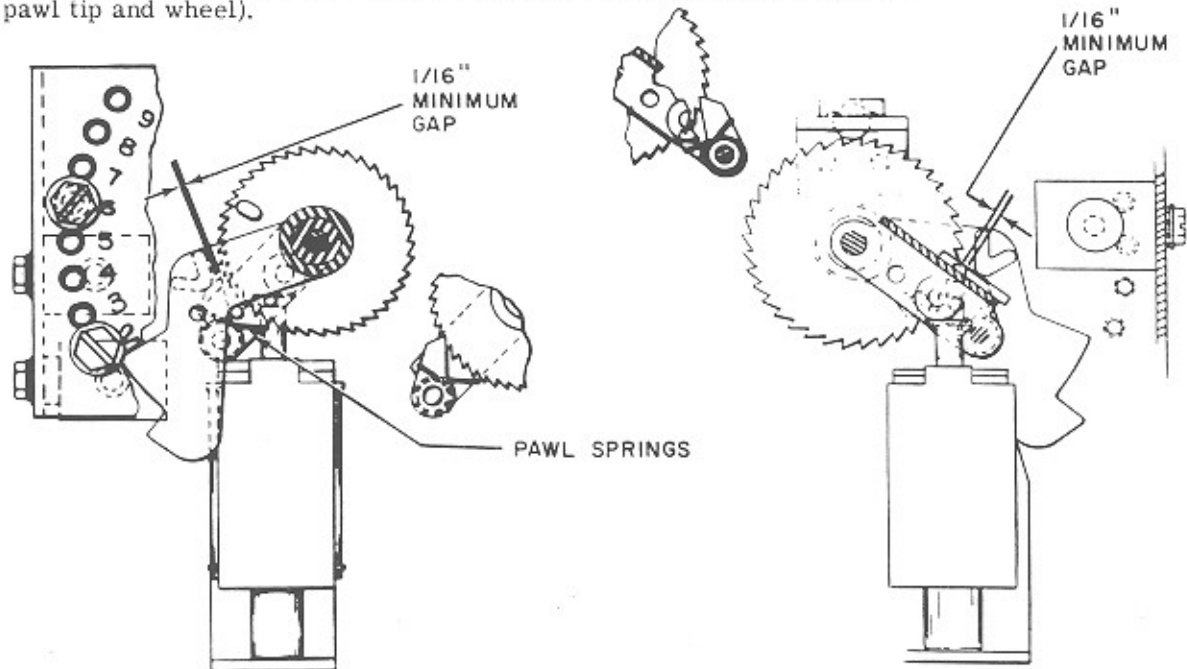
### Adjust Detent Bracket

- Loosen two screws holding detent bracket to credit unit back plate.
- Push credit or cancel coil plunger upward until corresponding stop arm strikes its stop screw or stop coil plunger.
- Adjust detent bracket until detent ball is seated between teeth. Check that there is no under travel.
- Tighten screws to secure bracket.



### Adjust Pawl Springs

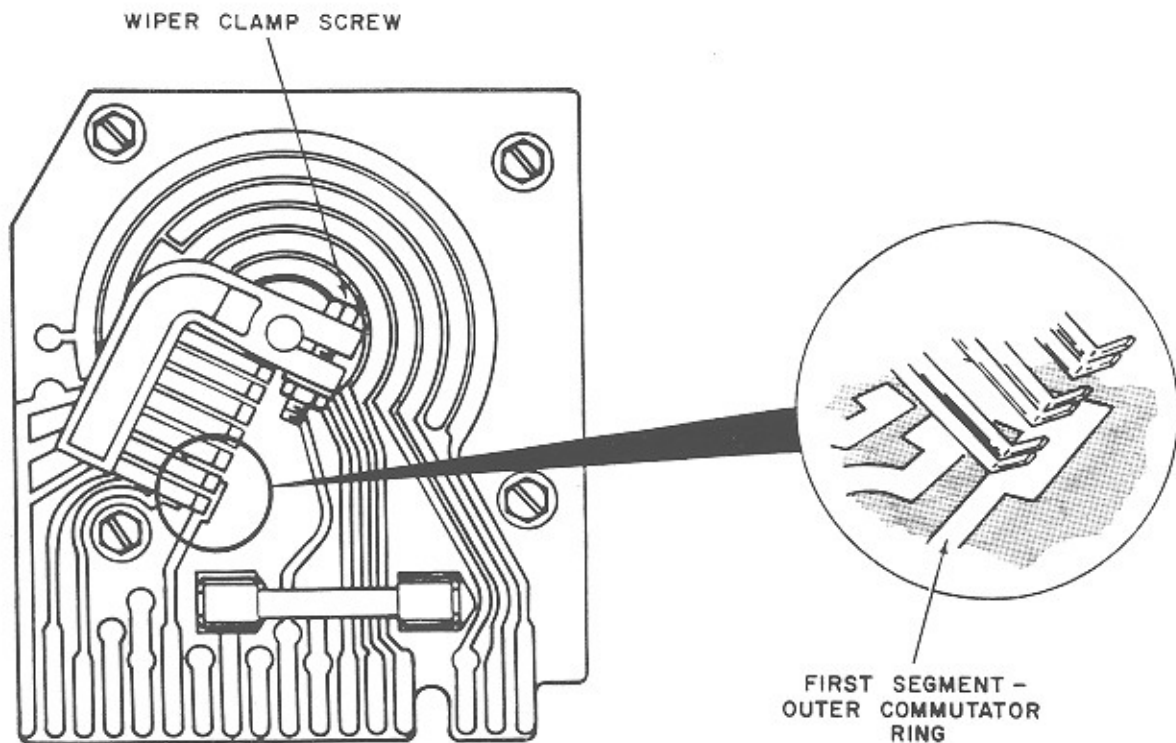
- Check that pawl springs provide about 4 grams force between pawl tips and credit wheel when assembly has lifted far enough to permit engagement of pawl and wheel.
- Check that this force provides positive engagement and yet permits roller and bracket to return to rest position (1/16-inch minimum gap between pawl tip and wheel).



## CREDIT UNIT ADJUSTMENTS (CONTINUED)

### Adjust Wiper Assembly

- a. Loosen wiper clamp screw and remove wiper assembly from shaft.
- b. Sight along profile of blades to make sure that all blade tips lie in the same plane (even with each other).
- c. Bend blades as required.
- d. Slide wiper assembly onto shaft with clamping screw just tight enough to hold it in position.
- e. Push wiper assembly down shaft until wipers just touch commutator board.
- f. Continue to slide wiper assembly about 1/16-inch more, until wiper is flush with end of shaft. Do not tighten screw.
- g. While holding credit unit in normal operating position, rotate credit wheel counterclockwise as far as it will go. This is home position.
- h. Rotate wiper assembly on shaft until blade heels line up with first segment leading edge as shown.
- i. Check wiper force again as in step f.
- j. Tighten wiper clamp screw to hold wiper assembly in this position.
- k. Check wipers for tracking on their respective commutator rings.



## REPAIR AND REPLACEMENT

Most of the repair and replacement procedures for the phonograph are of an obvious nature and may be performed without the use of special tools and techniques. Before attempting to perform any repair or replacement of parts, check for obvious faults as described on page 3-1.

When replacing a part, use only the correct ROWE part. Refer to the Parts Catalog section manual for correct ROWE part number and description. Order all parts from your authorized ROWE Distributor.

## TESTING TRANSISTORS

Test transistors (See figure 4-2) using a volt-ohm-milliammeter as follows:

- Set the meter function switch to OHMS and the range switch to a medium scale (such as X10 on Simpson 260).
- Connect ohmmeter to transistor leads to check NPN silicon transistors as follows:

### NOTE

Some meters use the black or negative lead as the positive lead for ohms scale, Triplet being one of these.

+ to emitter	- no reading
- to collector	
+ to collector	- no reading
- to emitter	
+ to base	- low reading (about 500 ohms)
- to collector	
+ to collector	- no reading
- to base	
+ to emitter	- no reading
- to base	
+ to base	- low reading (about 500 ohms)
- to emitter	

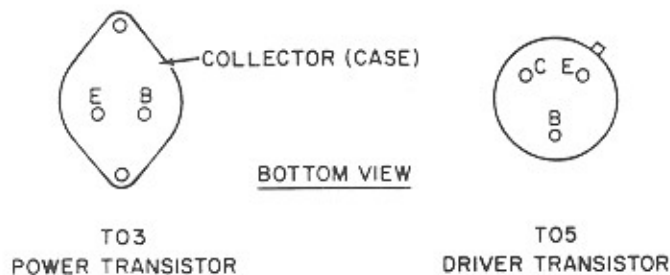


FIGURE 4-2. TRANSISTOR LEAD LOCATION

- With positive meter lead on collector and negative lead on emitter, touch base to collector. Check that the meter shows a low reading to indicate that the transistor is conducting.
- All previous tests indicate a good transistor. Any deviation from these conditions indicates a defective transistor.
- For PNP transistors, reverse the polarities and proceed as in the previous steps.

Test silicon diodes as follows (See figure 4-3):

- Set the meter function switch to OHMS and the range switch to a medium scale.
- Connect the diode as shown in figure 4-3.

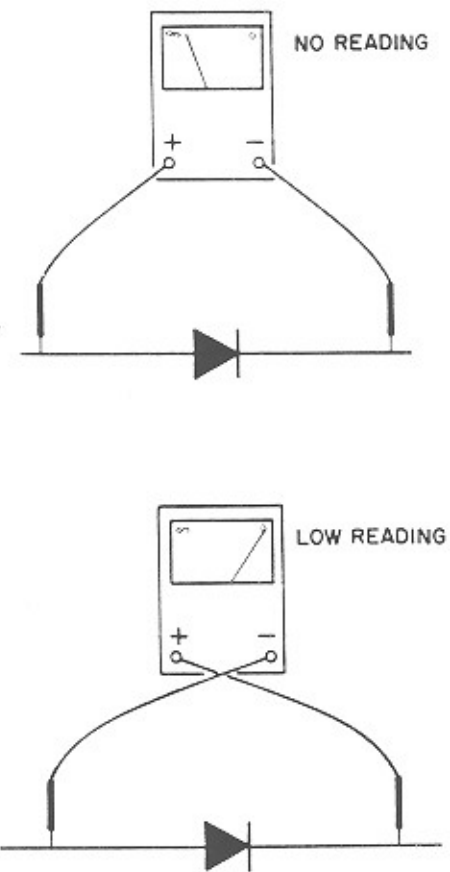


FIGURE 4-3. DIODE TEST HOOKUP

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