



WURLITZER
1856 • 1956

WURLITZER PRESENTS

Centennial
MODEL 2000

WORLD'S FINEST PHONOGRAPH



THE WURLITZER
CENTENNIAL MODEL 2000
FEATURING 200 SELECTIONS

Here is the phonograph that sets new standards for the automatic music world. A phonograph built to the exacting requirements of Wurlitzer quality . . . incorporating Wurlitzer matchless cabinet beauty, incomparable high-fidelity tone, fascinating Carousel Record Changer action—and, in addition, the extra programming possibilities of 200 selections.

Style-wise, the Wurlitzer Centennial Model 2000 is basically and purposely patterned to the brilliantly beautiful Centennial Model 1900. Its chrome-trimmed dome, exquisitely colored record changer compartment, Swedish modern pilasters, gracefully contoured rigidized metal grille with stainless steel kickplate are identical.

Its selector panel is sensationally different. A center section, flanked by novel rotopage programs, puts a total of 80 top tunes in sight at all times—makes viewing the others a fascinating diversion of button-actuating the power-turned pages.

Here is another progressive development on the Model 2000 . . . PLAYRAK, the simplest, most flexible coin registration unit ever devised for a phonograph. It makes possible half-dollar play—another Wurlitzer first in coin-operated music.

In every way, the Wurlitzer 200-Selection Centennial Model is certain to prove a terrific location-getter with an earning potential unparalleled in the industry.

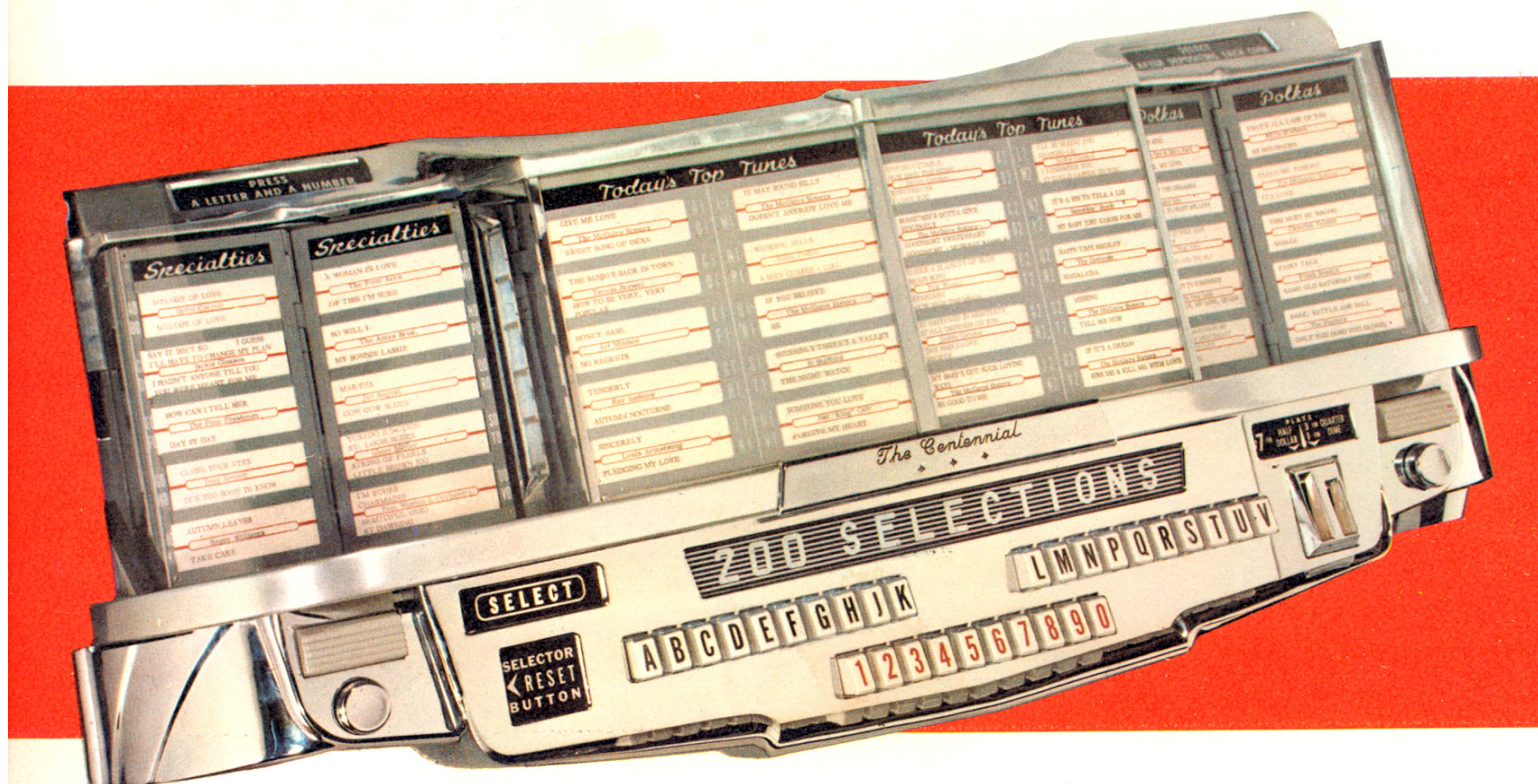
*Available in
Persian Turquoise, Glacier White, Chinese Black Cabinets
and Desert Haze as illustrated.*



MODEL 2000

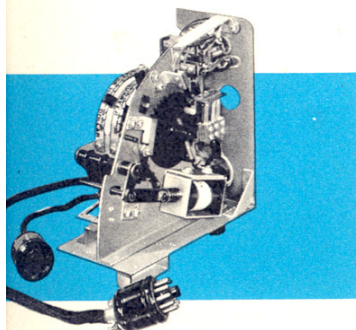
Dramatic innovations in

PROGRAM VIEWING AND SELECTION



The Wurlitzer 2000 makes tune choosing from 200 selections interesting, accurate and simple. The fixed program holder offers 40 top tunes on the center panel, plus 20 more on each of the roto-page "books" that flank it—a full 80 selections visible at all times. A finger touch on the illuminated bar at either end of the selector panel power-turns the pages. Each "book" is separately powered and actuated, thus enabling

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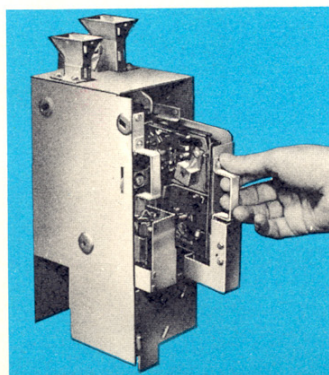
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50¢ PLAY NOW POSSIBLE

With its double coin entry and twin slug rejector provision, the Model 2000 makes it possible to incorporate 50¢ play. This phonograph may be ordered from the factory with a single entry for coins of 5-10-25¢ denomination and a single slug rejector, or with a double

coin entry and a second slug rejector as optional equipment to receive half-dollar coins. The phonograph is equipped with a housing for twin slug rejectors with electrical contacts installed. Either slug rejector may be inserted or removed in a matter of seconds. Never before was a coin mechanism so simple and easy to service. If the 50¢ coin adaption is desired after delivery, the conversion to twin slug rejectors is merely a matter of slipping in a double coin entry casting, one coin chute, and snapping the 50¢ slug rejector into the place permanently provided for it.



The Carousel mechanism is a triumph of high-speed, trouble free operation. Plays vertically both sides of one hundred 45 RPM records without grabbing or turning them over.

New, contoured, single low inertia tone arm with Zenith Cobra Stylus glamorously graceful in appearance, with all adjustment mechanism concealed.

Record-Now-Playing indicators pop up, stay up until tune is played. One at each base of the Carousel arch indicates which selection is playing.

Single direction turntable is flywheel balanced to assure accurate record speed. Self-centering chuck gently holds the records in playing position.

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The time-tested record changer mechanism, located directly below the record carrier, consists of a single cam and two clutches which operate the record lift arms.

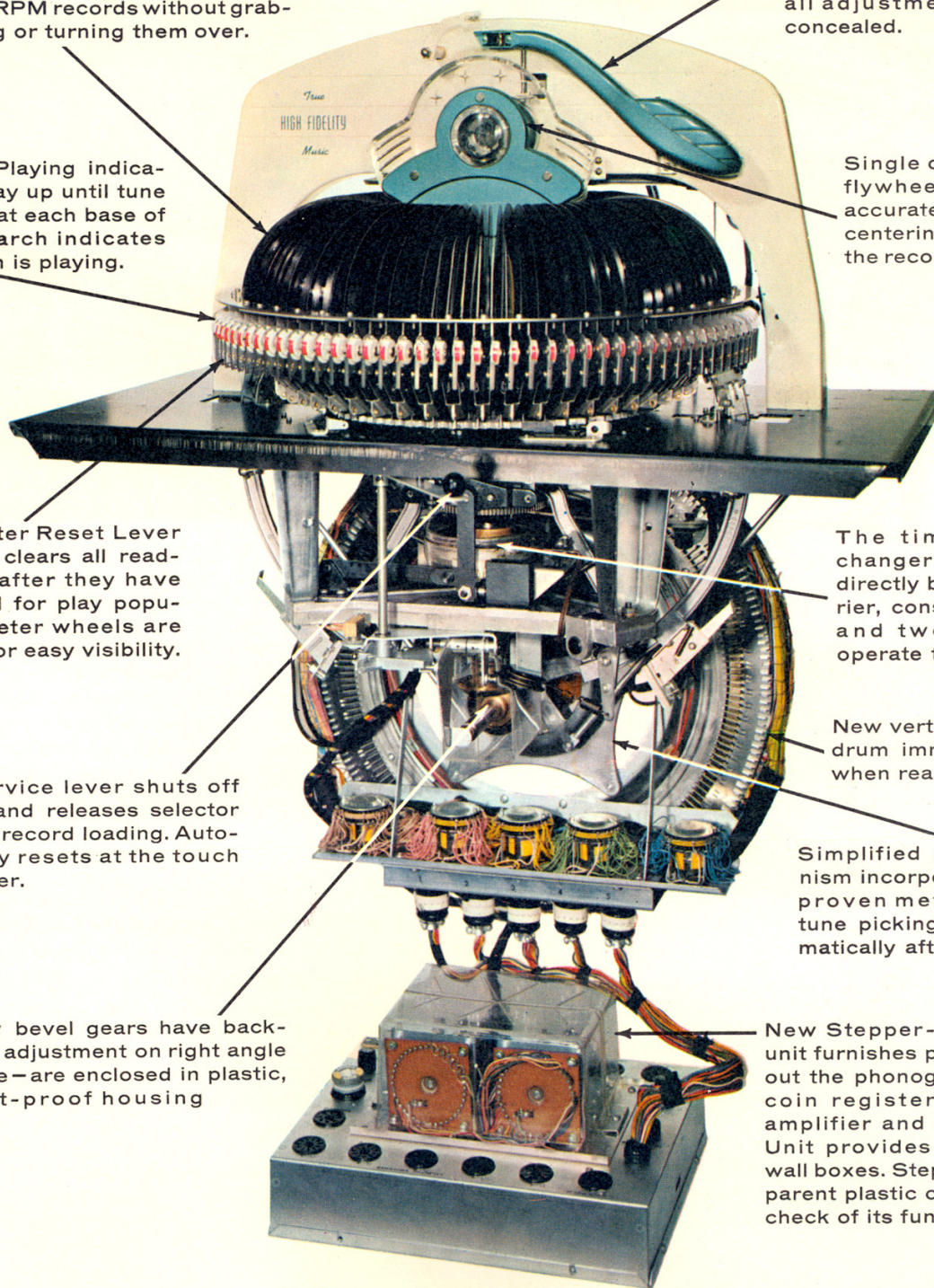
New service lever shuts off motors and releases selector for easy record loading. Automatically resets at the touch of a finger.

New vertical position selector drum immediately accessible when rear door is opened.

New bevel gears have backlash adjustment on right angle drive—are enclosed in plastic, dust-proof housing

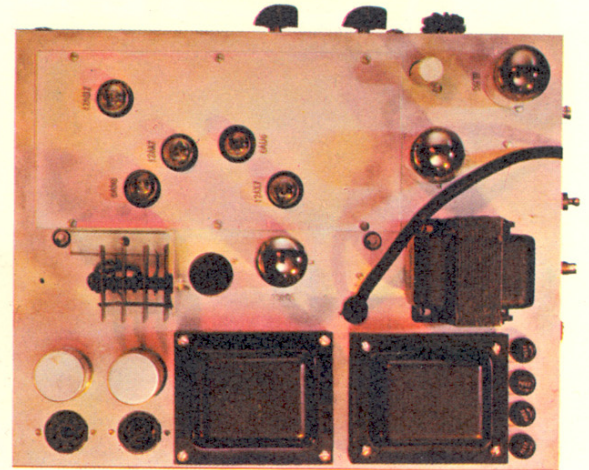
Simplified selector mechanism incorporates Wurlitzer's proven method of positive tune picking. Positions automatically after record loading.

New Stepper-Junction Box unit furnishes power throughout the phonograph including coin register mechanism, amplifier and slug rejector. Unit provides power to the wall boxes. Stepper has transparent plastic cover for visual check of its functioning.



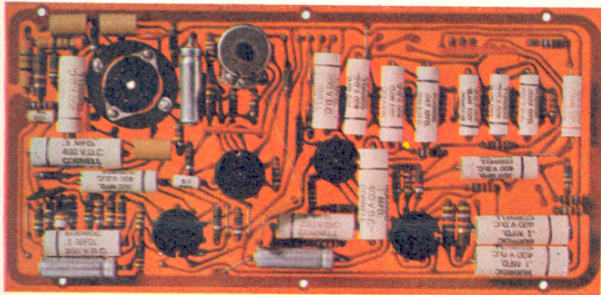


Speaker placement in cabinet

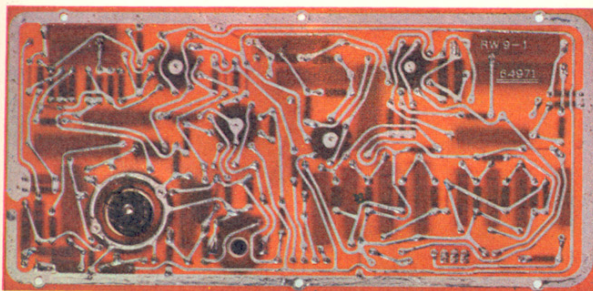


New Dynatone Amplifier

THE FINEST IN HIGH-FIDELITY TONE



Placement of tubes and electronic components



Printed Wiring Circuits

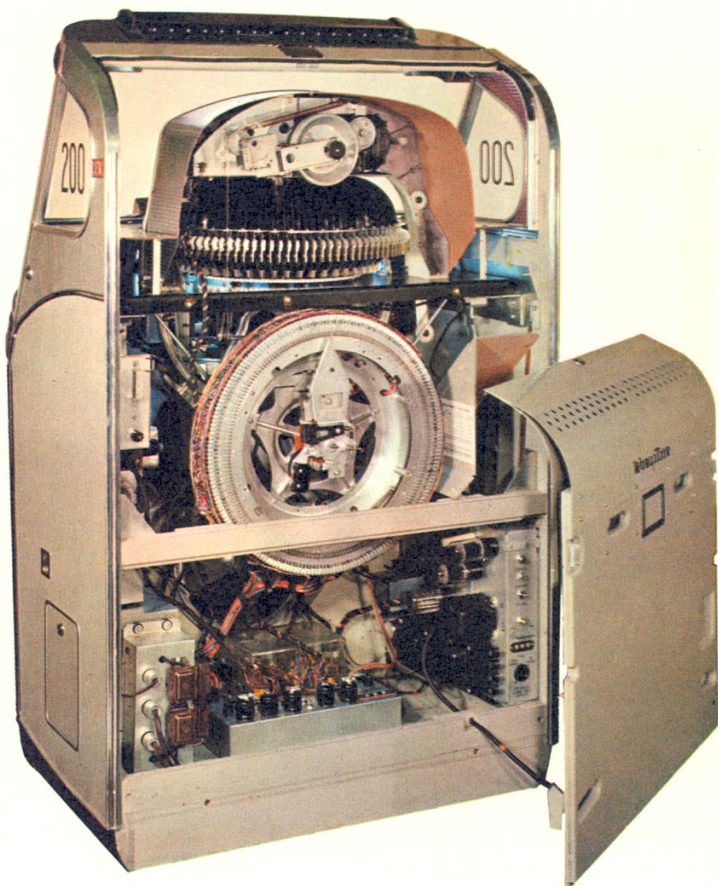
The Wurlitzer Model 2000 utilizes the same advanced Dynatone Sound System introduced in the Model 1900.

Three 12-inch bass woofers and twin 4-inch treble tweeters offer more speaker cone area than any competitive phonograph. True high-fidelity and finer tonal clarity are achieved by their purposely varied resonances.

The new Dynatone amplifier incorporates printed wiring circuits—another Wurlitzer exclusive in the automatic phonograph field. Through this advancement, over 200 hand soldering operations are eliminated, thus assuring uniformity of vital wiring connections. Amplifier is equipped with a built-in volume level control.

All pre-amp tubes are shock mounted for longer life. Sound system maintenance is reduced to a minimum.

Wurlitzer Phonographs have always been recognized by location owners and patrons for offering the finest sound in automatic music. The Centennial Model 2000 carries that tradition to new levels of both listening pleasure and operating profit.



WURLITZER MODEL 2000 SPECIFICATIONS

DIMENSIONS:

Height — 55-5/8" Depth — 27-7/8"
Width — 33-11/16" Weight — 375 lbs.
Packed for shipment — 435 lbs. approximate

COIN EQUIPMENT:

Single coin entry 5-10-25c. Three-in-one magnetic slug rejector. New simplified coin register mechanism. On-off automatic coin return. Optional equipment — double coin entry accepting half dollars.

RECORD CHANGER:

Provides 200 selections from 100 seven-inch 45 RPM records. Playmeter included.

SOUND SYSTEM:

Includes pre-amp automatic level control, and volume control. Dual tone and fader controls.

tone Arm:

Single, low pressure tone arm with Zenith Cobra Cartridge. Plays both record sides.

WATTAGE:

Complete phonograph, 425. Standby, 140 watts.

LIGHTING:

Three 20-watt, one 14-watt, two 4-watt.

NUMBER OF SELECTIONS:

200

TYPE OF RECORD PLAYED:

Seven-inch 45 RPM.

CABINET FINISH:

Persian Turquoise	Chinese Black
Glacier White	Desert Haze

REMOTE:

200-selection wall box, Model 5210, available.

AUXILIARY SPEAKERS:

Will use any present Wurlitzer Speaker.
Models 5115 - 5116 - 5117 available.

TUBE COMPLEMENT:

1 type 5U4GA (or 5U4GB)	
1 type 12AU7A	1 type 6AU6
2 type 12AX7	1 type 6AN8
2 type 6L6GB	

A MODEL OF ACCESSIBILITY

The Wurlitzer Centennial Model 2000 follows the Wurlitzer tradition of easy service accessibility. All exterior parts, including the cabinet itself, are interchangeable with the Model 1900 except the dome, glass and frame, the selector panel and the cheeks that flank it.

The single piece dome simplifies record and title strip changing. The Super-Vu window raises to afford exceptional service clearance, and is fully supported. Entire top section is tamper-proof and double-walled for ventilation. Four hand holes and ready-roll casters permit marvelous mobility. Two removable rear doors give complete access to the cabinet interior.

Servicing the mechanism is simplicity itself. Remove four screws, loosen two cables and the entire top casting lifts out. Remove one "C" washer and the record carrier lifts out. All selector drum adjustments can be made from the rear of the phonograph. Remove five screws and the entire drum lifts out, exposing practically all other units for service.

Coin mechanism tilts forward and locks in position or can be entirely removed, if desired. Slug rejectors slide in and out of holder and make automatic contact when reinserted.

New reject button is lever operated. No cables. Combination junction box and stepper unit rests on floor of phonograph. Unit is plug-connected, can be removed and replaced on location.

Cash box door has separate lock, opens into metal lined casing holding fabric bag which cannot be reached from inside of phonograph. Sturdy metal trim-guard discourages tampering.

NEW WURLITZER MODEL 5210 200 SELECTION WALL BOX

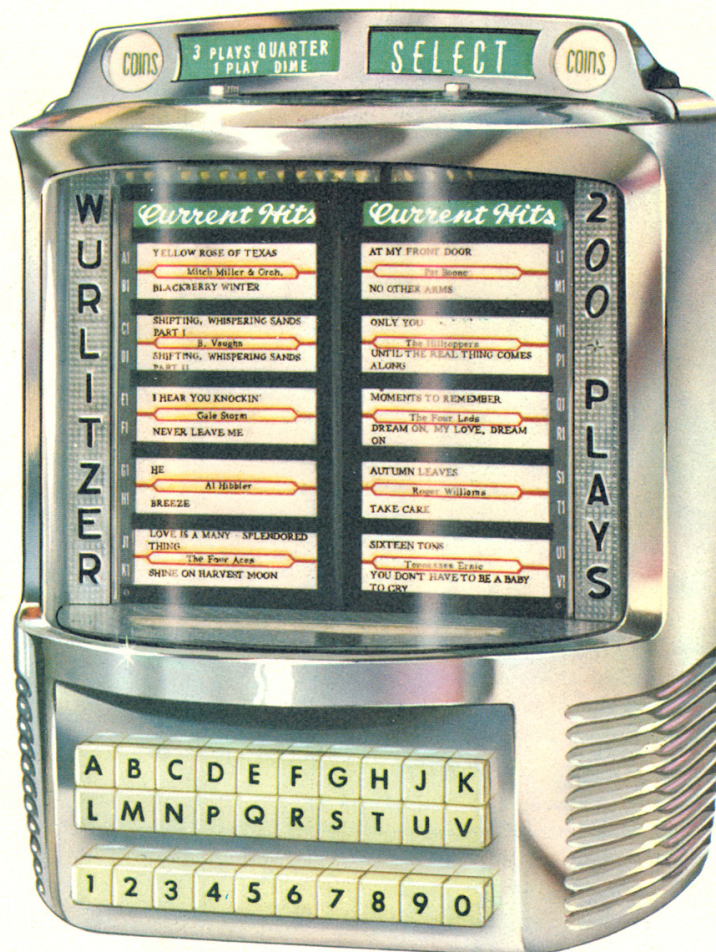
Greatest Array of Play-Promoting Features Ever Found in a Wall Box

Double coin entry for greater customer convenience.

Title strips illuminated from top and bottom for easier selection.

Three-in-one magnetic slug rejector has two-nickel feature. Permits 10c operation with nickels.

Two-button selection duplicates phonograph.



Make selection light indicator eliminates customer confusion.

Top operated program pages automatically return to display top twenty tunes.

Beautiful chrome-plated die cast case.

Single Ace lock with individual keys is located on side of case above coin return. When cover is removed the cash box is readily accessible.

DIMENSIONS: 14-7/32" High; 11" Wide; 7-31/32" Deep; 25 lbs. Weight

THE RUDOLPH WURLITZER CO.



NORTH TONAWANDA, NEW YORK

ESTABLISHED 1856

WURLITZER

PHONOGRAPH

SERVICE MANUAL & PARTS LIST

Model 2000

Hi-Fidelity



Jukebox Arcade Jukebox Manuals & Literature
jukeboxmanuals.com



WURLITZER
1856 • 1956

WURLITZER PRESENTS

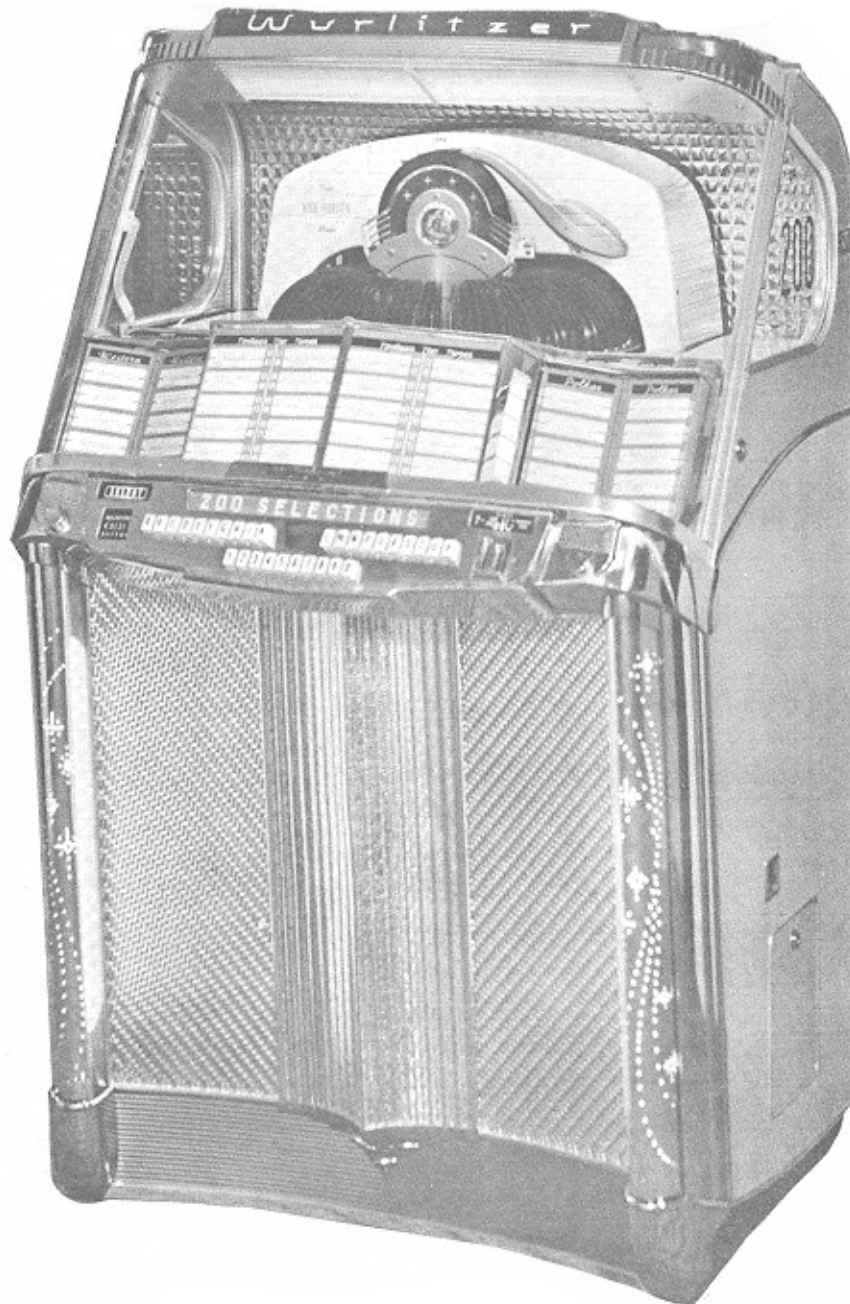
Centennial
MODEL 2000

WORLD'S FINEST PHONOGRAPH

Jukebox Arcade

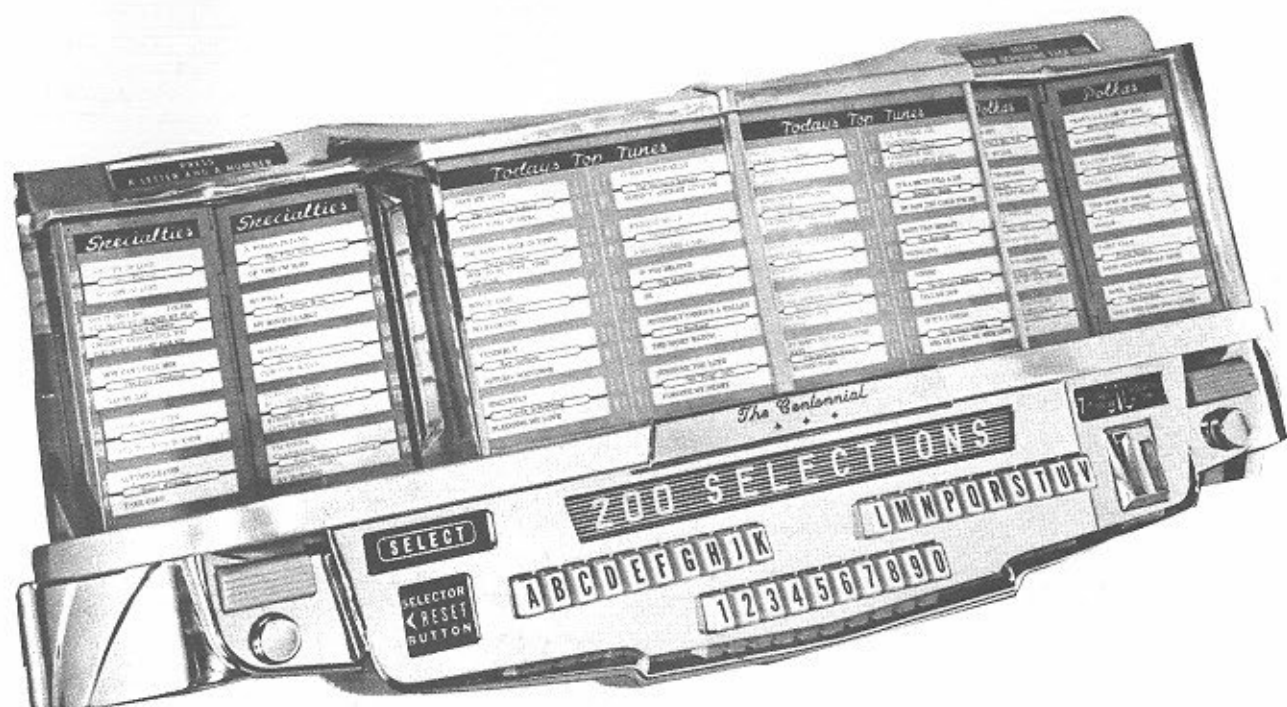
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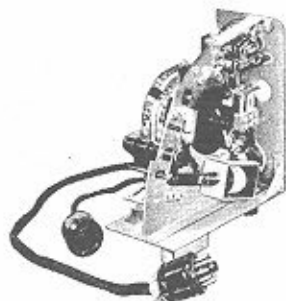
MODEL 2000

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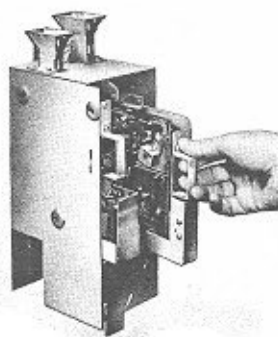
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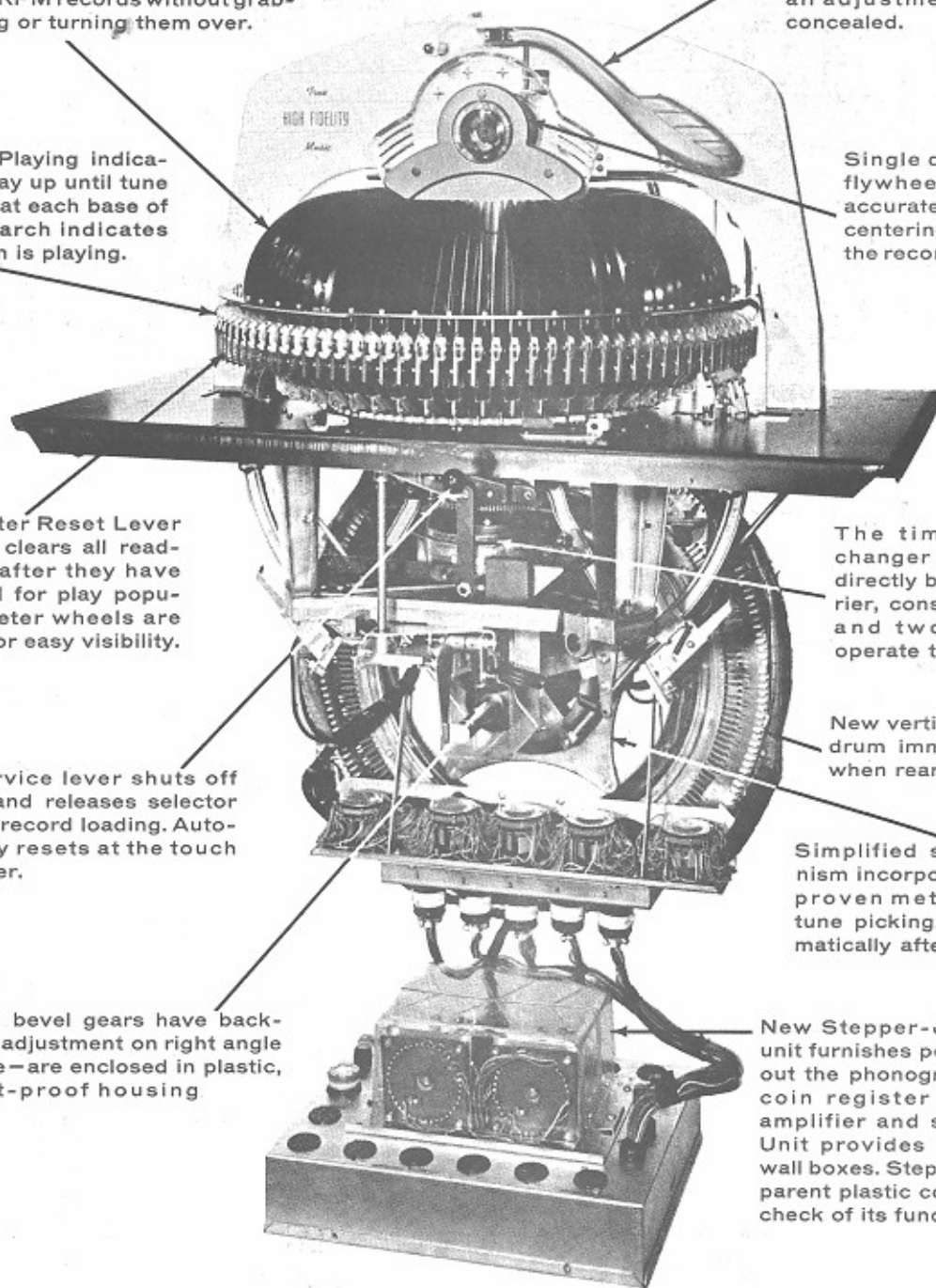
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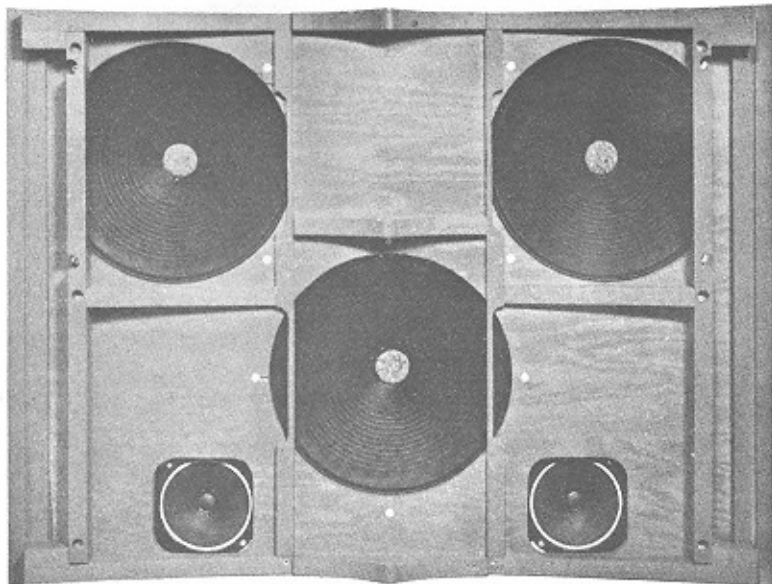
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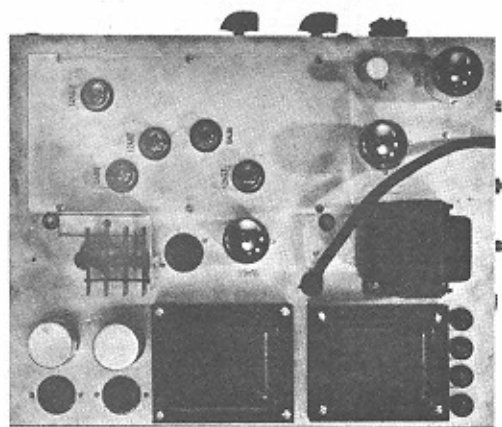
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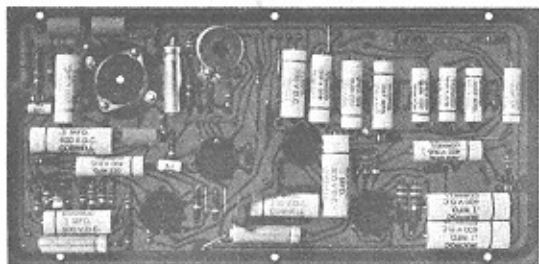


Speaker placement in cabinet

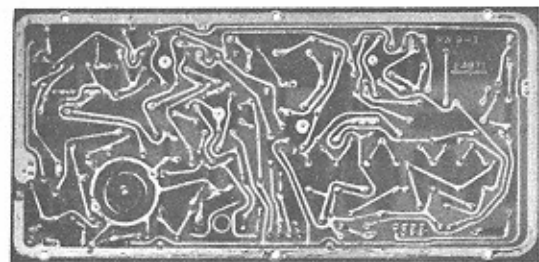


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THE FINEST IN HIGH-FIDELITY TONE



Placement of tubes and electronic components



Printed Wiring Circuits

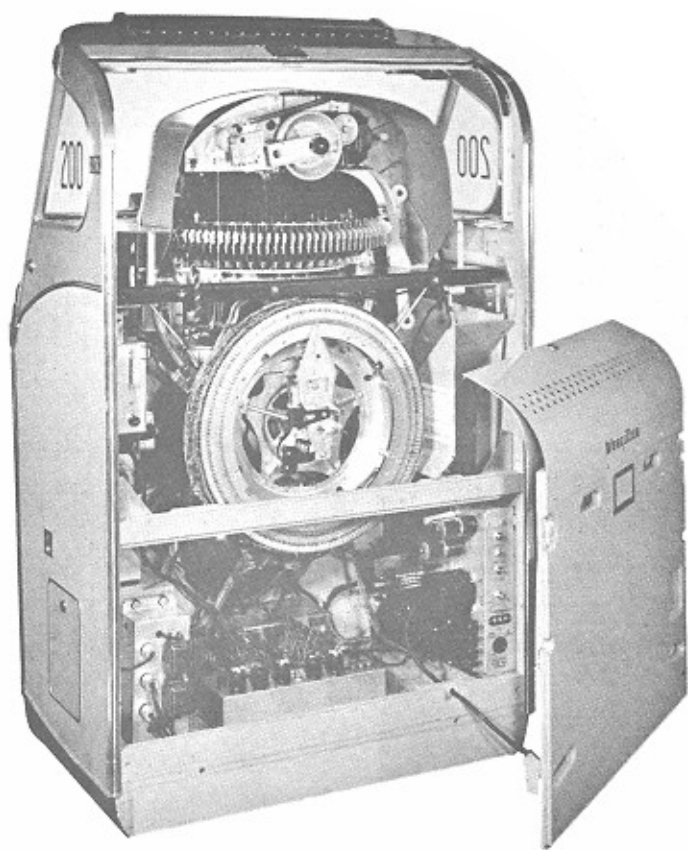
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SOUND SYSTEM:

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TONE ARM:

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WATTAGE:

Complete phonograph, 425. Standby, 140 watts.

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The single piece dome simplifies record and title strip changing. The Super-Vu window raises to afford exceptional service clearance, and is fully supported. Entire top section is tamper-proof and double-walled for ventilation. Four hand holes and ready-roll casters permit marvelous mobility. Two removable rear doors give complete access to the cabinet interior.

Servicing the mechanism is simplicity itself. Remove four screws, loosen two cables and the entire top casting lifts out. Remove one "C" washer and the record carrier lifts out. All selector drum adjustments can be made from the rear of the phonograph. Remove five screws and the entire drum lifts out, exposing practically all other units for service.

Coin mechanism tilts forward and locks in position or can be entirely removed, if desired. Slug rejectors slide in and out of holder and make automatic contact when reinserted.

New reject button is lever operated. No cables. Combination junction box and stepper unit rests on floor of phonograph. Unit is plug-connected, can be removed and replaced on location.

Cash box door has separate lock, opens into metal lined casing holding fabric bag which cannot be reached from inside of phonograph. Sturdy metal trim-guard discourages tampering.

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THE MODEL 2000 WURLITZER PHONOGRAPH

SPECIFICATIONS

DIMENSIONS:

Height	55-5/8"
Width	33-11/16"
Depth	27-7/8"
Weight	375 lbs.

WATTAGE

Complete Phonograph	- 425 Watts
Stand-by	- 140 Watts

LIGHTING

3-20 Watt Fluorescent
1-14 Watt Fluorescent
2-4 Watt Fluorescent

TUBE COMPLEMENT

1-5U4 GB, 2-6L6 GB, 2-12AX7,
1-6AU6, 1-6AN8, 1-12AU7.

COIN EQUIPMENT

5-10-25¢ Slug Rejector
50¢ Slug Rejector
Simplified Coin Register Mechanism

RECORD CHANGER

Carousel type 100 record holders for 45 R.P.M. records. Individual play meter for each record holder.

SOUND SYSTEM

Improved high fidelity amplifier with automatic level control. Printed circuitry predominates in the new design. The speaker and cross-over network includes 2 Woofers, 1 Midrange, and 2 Tweeters for full range reproduction. Provisions for auxiliary speakers have been included.

DESCRIPTION

The Wurlitzer Model 2000 High Fidelity Phonograph (Fig. 1) is available in a selection of four colors: Desert Haze, Glacier White, Persian Turquoise, and Chinese Black.

The two center title strip holders and the right and left page groups of title strip holders are accessible when the dome is raised. A free-play switch is located back of the right center title strip holder adjacent to the electric counter. The frame for the two center program holders and its mounting plate and silk screen assembly are held in by two truss

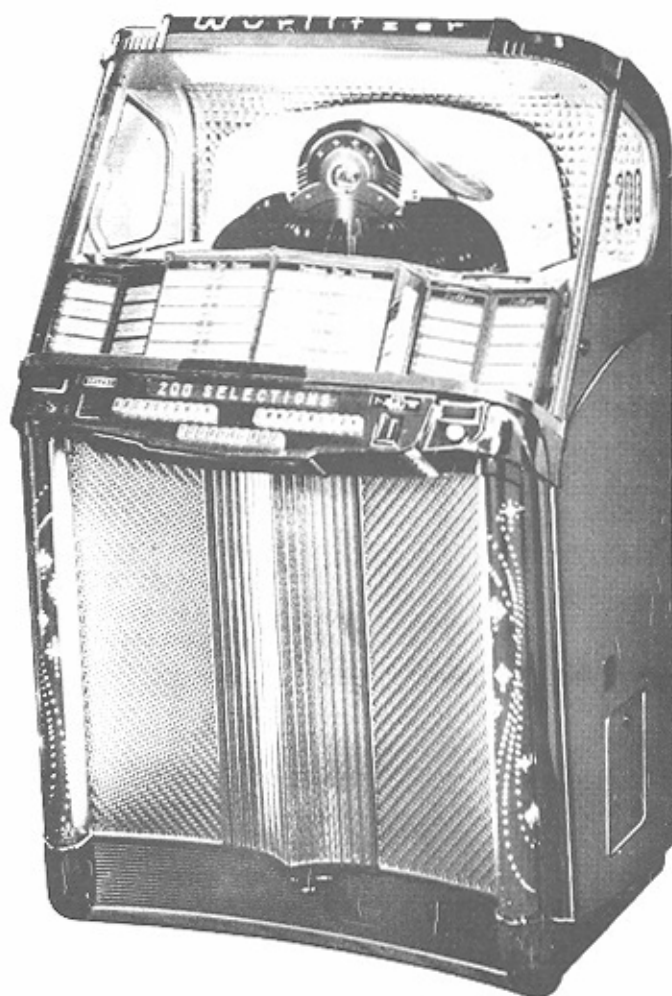


Fig. 1

head machine screws. After the mounting plate has been removed, the selector button and switch assembly may be removed by taking out four thumb screws. Also the right or left program selector unit (Page Turners) may be removed by means of one long head thumb screw and three short head thumb screws. The right or left upper pilaster casting and the pilaster are held in by one long head thumb screw.

The complete record changer assembly may be removed from its mounting rails and set on a rack of some sort for greater accessibility. The five speaker units and accompanying cross-over network may be serviced from the rear of the cabinet.

WURLITZER MODEL 2000 PHONOGRAPH COIN REGISTER MECHANISM

1. GENERAL DISCUSSION

a. The slug rejectors and the coin register mechanism are mounted on the inside right hand wall of the phonograph cabinet as shown in Figure 2. The slug rejector unit evaluates the coins passing thru and either rejects or accepts them in accordance with their quality and denomination. Electrical impulses are transmitted to the coin register mechanism by the various coin switches on the slug rejectors. The coin register mechanism (Fig. 3) sets up selection credits in accordance with the denomination of the coins accepted and the price per play as pre-set on the coin register mechanism. Electrically the coin register is the key to the electric selector system. It keeps track of the plays paid for and cancels one off each time a selection is made. When all plays are cancelled it stops the phonograph. As a part of the electric selector system the functional sequences of the slug rejectors and coin register will be in schematic form on pages 13 thru 22.

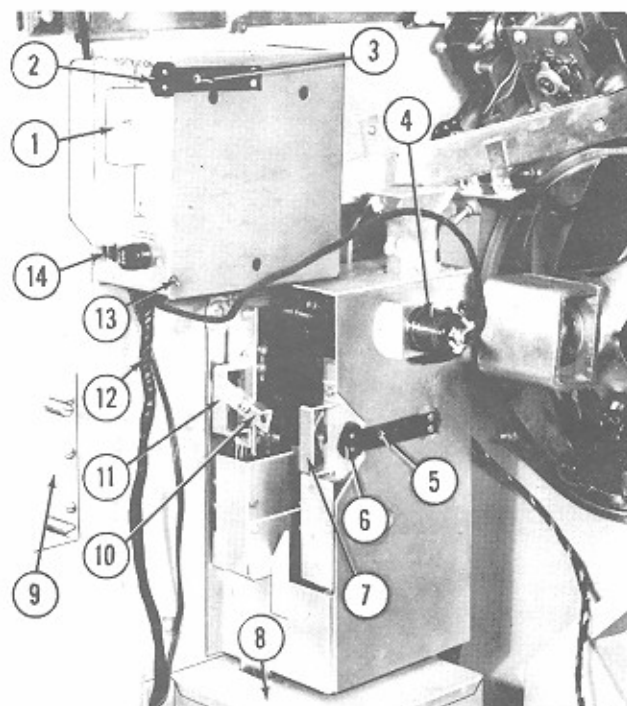


Fig. 2. COIN EQUIPMENT ARRANGEMENT

1. Coin Register Mechanism	65791
2. Catch and Spring Assembly	64883
3. Screw, 1/4-6 Type "Z"	73531-5
4. Plug, Female, 5 Prong	16617
5. Screw, 1/4-6 Type "Z"	73531-5
6. Catch and Spring Assembly	64883
7. Slug Rejector, 50¢	66185
8. Coin Bag Housing Assembly	62602
9. Plate, Back Rail	65569
10. Locking Bar	66166
11. Slug Rejector Assembly, 5-10-25¢	65790
12. Plug, 11 Prong, to Junction Box	54878
13. Pin, Hinge	66445
14. Switch	62886

2. DESCRIPTION

a. To remove the slug rejectors for inspection or adjustment, remove the back door and loosen or take out the shipping screw that holds the spring latch for the 50¢ unit (Fig. 2). Unlock the turn button on the 5-10-25¢ unit and slide the slug rejectors to the rear. See Figures 3 and 4.

b. To remove the coin register mechanism for adjustment or re-setting, loosen or take out the shipping screw in the spring latch. Unlatch the unit and swing it back and down on the hinge pins (Fig. 2). To remove from the cabinet, disconnect the two junction plugs and disengage the hinge pins from the cover. See Figure 5.

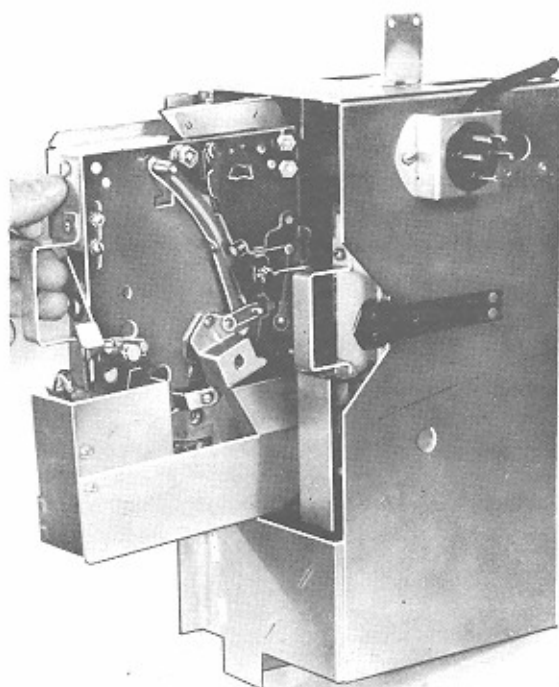


Fig. 3. SLUG REJECTORS

c. Slug Rejectors.

(1) The slug rejectors for the Model 2000 are products of National Rejectors, Inc. of St. Louis, Missouri. For service and parts other than those shown as Wurlitzer assemblies in Figures 6 and 7, it is recommended that the services rendered by National Rejectors, Inc., and their branch offices, be employed.

(2) The coin hopper, top bracket, bottom bracket, locking bar, handle, coin switch, contact plate, switch guard (not shown), and lower bracket assembly (Fig. 6) are components of the 5-10-25¢ slug rejector which have been added on Wurlitzer's assembly lines.

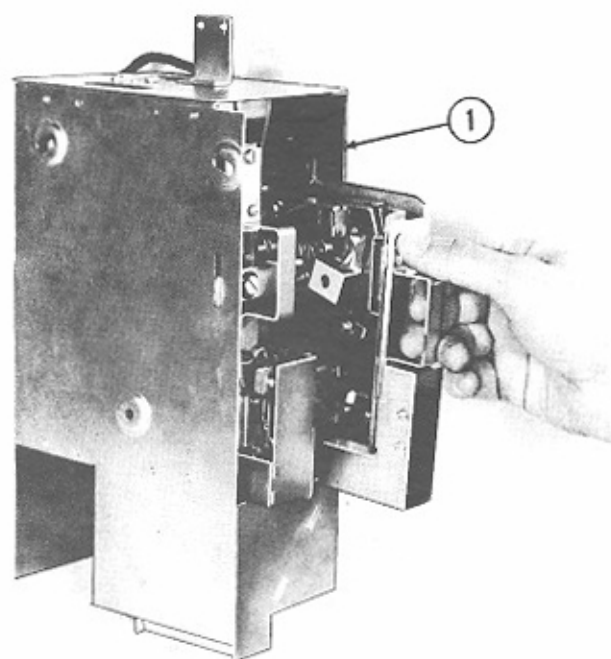


Fig. 4. SLUG REJECTOR ARRANGEMENT

1. Cover Assembly, Slug Rejectors

66146

(3) The following Wurlitzer components (Fig. 7) have been added to the 50¢ slug rejector: contact plate assembly, mounting plate, handle, coin switch assembly, and switch guard (not shown).

(4) The Model 2000 slug rejectors and the coin register mechanism is set at the factory to deliver one play for a dime or two nickels, three plays for a quarter, and seven plays for a half dollar. In cases where it is desired to deliver one play for a nickel, the 5-10-25¢ slug rejector (Fig. 6) may be adjusted to stop the nickel "flipper" action with the No. 4 screw in the flipper bracket.

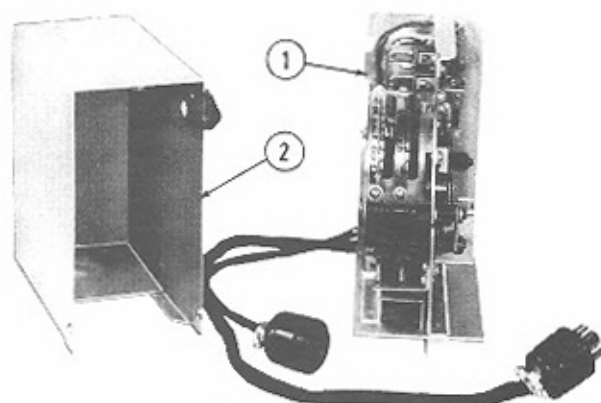


Fig. 5. COIN REGISTER MECHANISM

1. Coin Register Mechanism

65791

2. Cover Assembly, Coin Register

66246

(5) The two slug rejectors are mounted directly over the coin box and adjacent to the coin return cup. Coins that are rejected by the rejectors will drop into the coin return cup. Coins that are ac-

cepted will actuate a coin switch mounted directly under the coin track being used by that particular coin as it passes to the cash box. In the case of one play for two nickels, the "flipper" guides the first coin into a coin track that has no coin switch and it drops directly into the cash box. The flipper turns half way over for each nickel and therefore guides the second nickel to the five cent coin switch. Electrical impulses from the four separate coin switches serve to set up the coin register mechanism in accordance with the denomination of the coin, the accumulator stop arm, and the switch settings of the coin register.

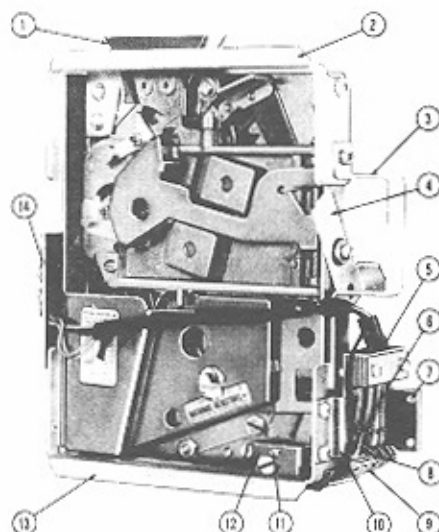


Fig. 6. SLUG REJECTOR ASSEMBLY 5-10-25¢

65790

1. Coin Hopper and Support Assembly	49949
2. Bracket, Coin Rejector, Top	66162
3. Handle	66140
4. Lock Bar	66166
5. Coin Switch Assembly	66168
6. Contact Opening - 1/32"	
7. Mounting Holes for Switch Guard	
8. Switch Blade	
9. Coin Switch Actuator	
10. Mounting Bracket, Coin Switch	
11. Nickel Flipper Screw	
12. Nickel Flipper Assembly	
13. Bracket, Coin Rejector, Bottom	66163
14. Contact Plate Assembly	66170

3. OPERATION

a. Key Switch.

(1) When only one play is to be delivered by the coin register mechanism the coin switch impulse will be applied directly to the set-up relay (Fig. 9) and the key-switch (Fig. 8) will have no function in the selection circuits.

(2) When more than one play is to be registered, the coin magnets are brought into action. When a coin magnet is energized, the armature on the lower end of the lever, hub, and stud assembly is attracted by the coin magnet, disengaging the escapement pin (stud) from the corresponding accumu-

lator wheel. Under spring loading, the accumulator wheel will advance to a point determined by the accompanying "accumulator stop lever". The spring loading of the accumulator wheel, being stronger than that of the cancel wheel (Fig. 10) will advance the cancel wheel a number of teeth as determined by the accumulator stop lever setting. Advance of the cancel wheel one or more teeth moves the key switch actuator away from the blade of the key switch and allows the switch to close.

(3) Closing of the key switch (Fig. 10) energizes the set-up relay. The electrical condition provided by the closed key switch permits selection until the key switch is again opened by action of the cancel wheel and key switch actuator.

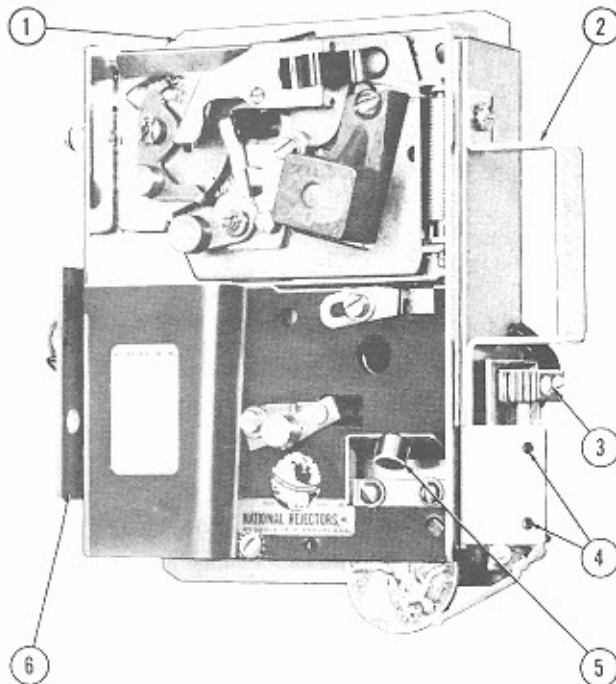


Fig. 7. SLUG REJECTOR ASSEMBLY, 50¢ 66185

1. Mounting Plate	66187
2. Handle	66140
3. Coin Switch Assembly	66190
4. Mounting for Coin Switch Guard	
5. Levers Weighed (National)	6119-8UB
6. Contact Plate Assembly	66189

b. Cancellation.

(1) When selection is made the cancel solenoid (Fig. 10) will be energized. Cancel action operates the "pivot arm and pawl" assembly (Fig. 10) which retracts the cancel wheel one tooth.

(2) The cancel wheel has a drive pin (Fig. 9) which extends thru to engage the two accumulator wheels as shown in Figure 9. The cancel wheel drive pin will thus retard the accumulator wheel one es-

capement for each selection made. The escapement is provided by a small pin (stud) mounted to the corresponding "lever, hub, and stud assembly" as shown in Figure 9. At the same time cancel action provides reloading of the accumulator wheel spring.

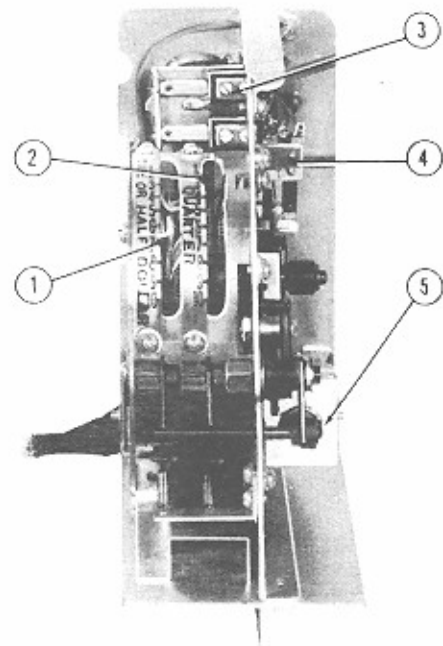


Fig. 8. COIN REGISTER MECHANISM 65791

1. Stop Lever and Spring Assembly	66132
2. Stop Lever and Spring Assembly	66132
3. Set-up Relay	55144
4. Key Switch	66082
5. Door and Switch Assembly	66118

(3) The "pivot arm and pawl" assembly also is provided with a drive pin which extends thru to engage the two lock-out levers. The lock out levers function to lock the escapement pins out of engagement with the accumulator wheels during advance to their stop position. The drive pin on the "pivot arm and pawl" serves to disengage the lock-out levers during cancellation and permit engagement of the escapement pin.

c. Electrical.

The electrical functions of the coin register mechanism and schematic diagrams of the entire electric selector system will be discussed in detail on pages 13 thru 22.

4. ADJUSTMENTS

a. Slug Rejectors.

(1) The mechanical adjustments of the slug rejectors should be made in accordance with "Rejector Manual" furnished by National Rejectors, Inc.

(2) Coin switch adjustment on the 5-10-25¢ slug rejector (see Fig. 6) should be accomplished by setting the blades of the switches and the switch actuators to provide about 1/32" opening of the contacts when the paddle end of the actuator is held against the coin exit by outward tension of the movable contact blade. The object is to maintain point contact during the entire time that the coin is passing the coin switch actuator. Care should be exercised to avoid any delay of the coin, especially in the case of the quarter. As shown in Figure 11 a thin quarter should, after being stopped at the coin paddle by blocking its way, pass slowly thru the critical point shown in Figure 11 by its own weight. There should be no current flowing in the coin circuits when these tests are made. A pulse longer than three seconds may blow the average 0.8 Amp fuse which protects the coin magnets.

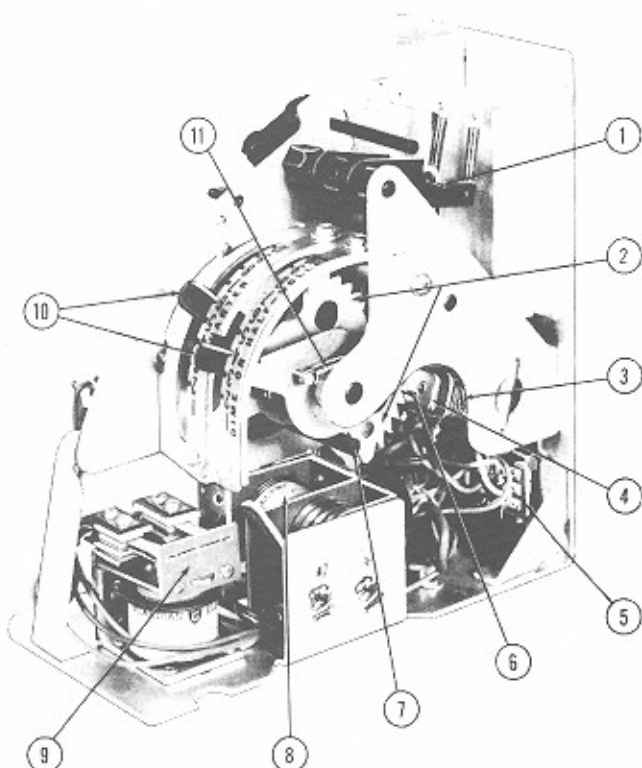


Fig. 9. COIN REGISTER COMPONENTS

1. Latch Pin (Stud), Lock-out Lever	66051
2. Accumulator Wheel	66131
3. Coin Magnet and Bracket Assembly	66128
4. Lever, Hub, and Stud Assembly	66129
5. Switch, Dime-Half Dollar	62886
6. Escapement Pin (Stud)	66051
7. Drive Pin	66045
8. Relay, Pulse	64796
9. Relay, Set-up	55144
10. Stop Lever and Spring Assembly	66132
11. Spring, Accumulator Wheel	66074

(3) The 50¢ slug rejector has a single coin switch (Fig. 12), however the adjustment requirements are similar to those described in (2). This work may be done by removing the slug rejector and holding it in an upright position to make the mechanical adjustments and tests.

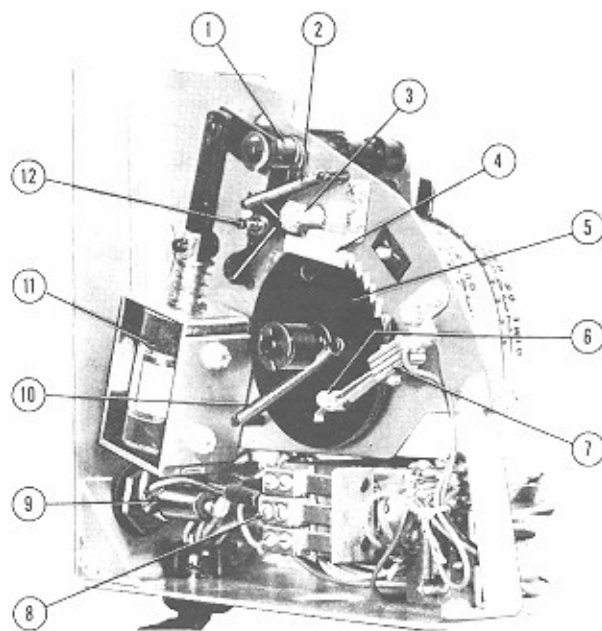


Fig. 10. COIN REGISTER MECHANISM - OPERATION

1. Pivot Arm and Pawl Assembly	66125
2. Spring, Cancel	66071
3. Adjustment Cam	42868
4. Guard, Cancel Pawl	66393
5. Cancel Wheel	66124
6. Actuator, Key Switch	58255
7. Switch Assembly, Key	66082
8. Relay, Pulse	64796
9. Fuse Post	45352
10. Spring, Cancel Wheel	66071
11. Solenoid, Cancel	65069
12. Pawl Assembly	66127

(4) The final test for each of the slug rejectors should be made in the phonograph by testing each coin track with ten consecutive operations. If one out of ten operations fails to credit, that particular coin switch should be re-examined.

b. Coin Register Adjustments.

(1) When the studs, on the lower end of the two "lever, stud, and hub" assemblies, are engaged with the first tooth of their respective accumulator wheels, as shown in Figure 13, the "driver pin" of the cancel wheel should rest squarely against the lower edge of both accumulator wheels. Should this condition not exist examine the unit for bent pins or sprung frame. Correction should be made before proceeding with adjustments.

(2) Based on the condition required in (1) the "key switch and bracket" may be moved on its mounting point by loosening the two screws shown in Figure 14, to provide opening of its contacts as shown. The key switch actuator, mounted on the cancel wheel, should be only slightly on the flat portion of the tip of the key switch blade. The switch contacts should be open 1/32".

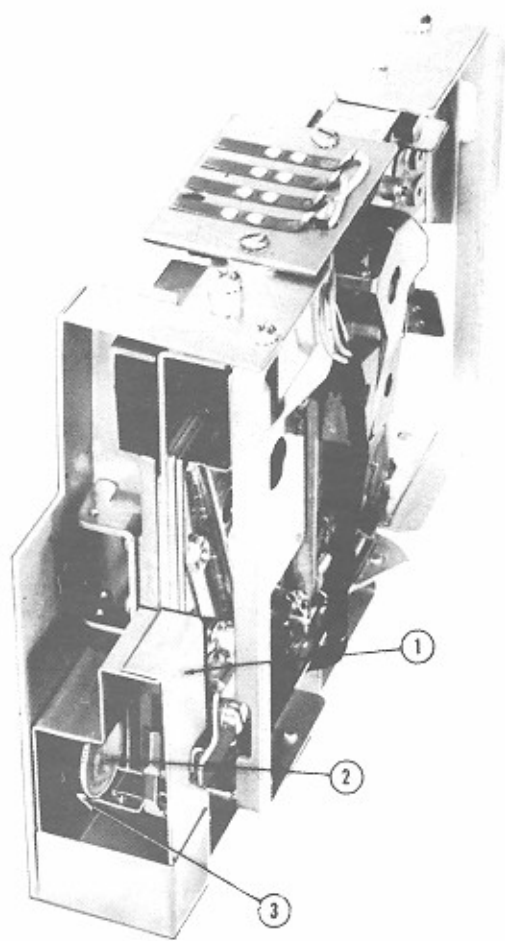


Fig. 11. SLUG REJECTOR, 5-10-25¢ - ADJUSTMENTS

- | | |
|------------------------------|-------|
| 1. Switch Guard Assembly | 66173 |
| 2. Thin Quarter | |
| 3. Actuator, 25¢ Coin Switch | |

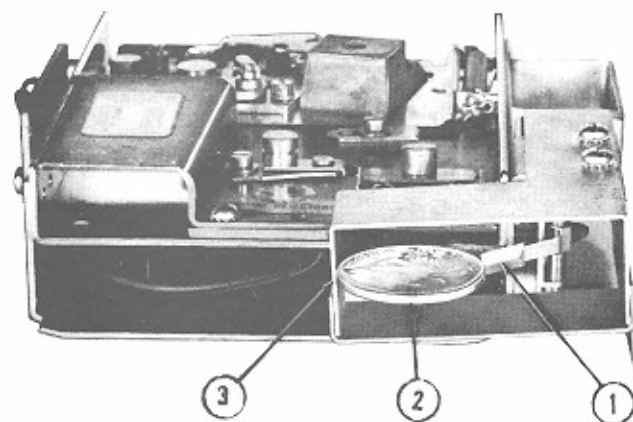


Fig. 12. SLUG REJECTOR, 50¢ - ADJUSTMENTS

- | | |
|------------------------------|-------|
| 1. Actuator, 50¢ Coin Switch | |
| 2. Thin Half Dollar | |
| 3. Guard, 50¢ Coin Switch | 66192 |

(3) For this adjustment the cancel solenoid adjusting screws (Fig. 14) should be loosened and the cancel solenoid should be lowered to the limit of its adjustment. The indexing strips shown in Figure 15

should be set at the center of their adjustment range and the "stop levers" set for 5 plays. Release of the escapement studs on the "lever, hub, and stud" assemblies will permit the accumulator wheels to advance half way. The eccentric adjusting cam shown in Figure 16 should be set to limit the cancel action when the "pivot, arm, and pawl" assembly is manually actuated as indicated by the arrow. The limit should be governed by cancellation of one tooth on the cancel wheel with .010" overtravel as shown in Figure 17.

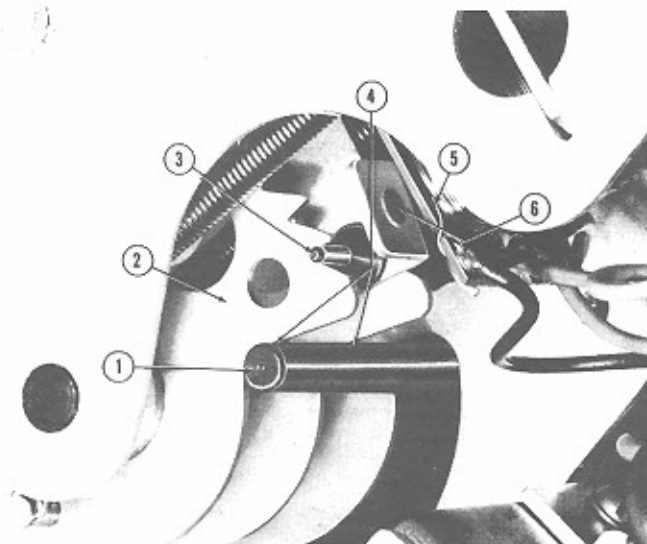


Fig. 13. COIN REGISTER MECHANISM - ADJUSTMENTS

- | | |
|--|-------|
| 1. Driver Pin, Cancel Wheel | 66045 |
| 2. Accumulator Wheel and Hub Assembly | 66131 |
| 3. Lever, Hub, and Stud Assembly | 66129 |
| 4. Point of Contact - Driver Pin | |
| 5. Coin Magnet (Coil Assembly) | 65770 |
| 6. Armature End of "Lever, Hub, and Stud Assembly" | |

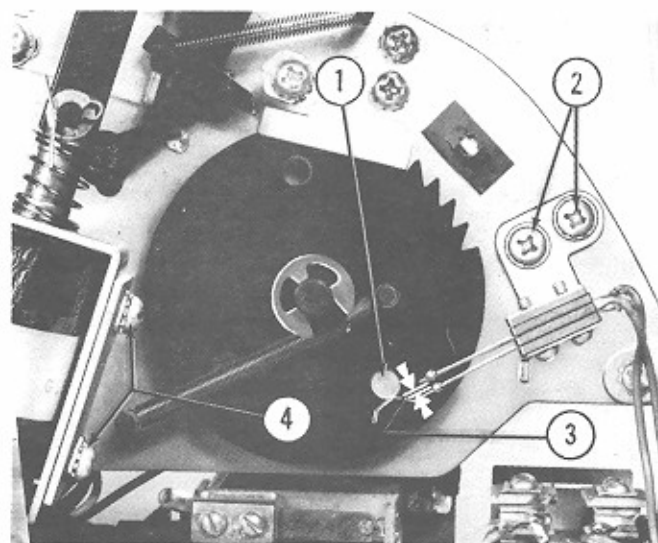


Fig. 14. KEY SWITCH - ADJUSTMENT

- | | |
|--------------------------------------|----------|
| 1. Actuator, Key Switch | 58255 |
| 2. Adjusting Screws, Key Switch | 73533-22 |
| 3. Key Switch Opening 1/32" | |
| 4. Adjusting Screws, Cancel Solenoid | 73533-22 |

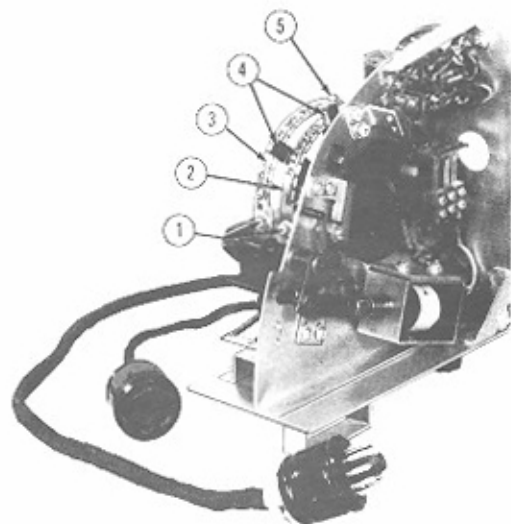


Fig. 15. STOP LEVER AND QUADRANT INDEXING STRIP ADJUSTMENT

- | | |
|--|---------|
| 1. Adjusting Screws, Indexing Strip | 73533-1 |
| 2. Indexing Strip, 25¢ | 66133 |
| 3. Indexing Strip, Dime or Half Dollar | 66135 |
| 4. Stop Lever and Spring Assembly | 66132 |
| 5. Adjusting Screws, Indexing Strip | 73533-1 |

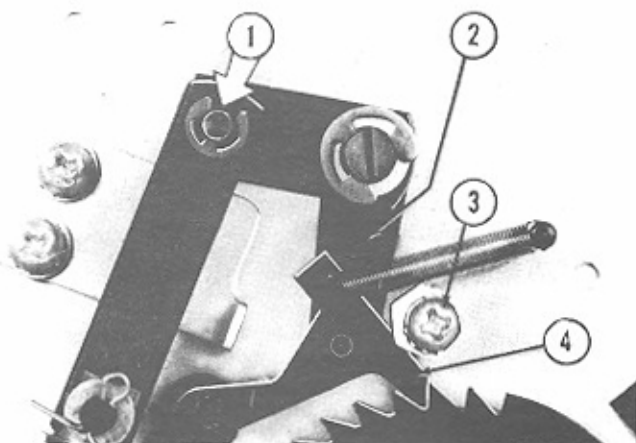


Fig. 16. CANCEL PAWL AND SOLENOID ADJUSTMENT

- | | |
|-----------------------------------|-------|
| 1. Manually Actuate at this Point | 66125 |
| 2. Pivot Arm and Pawl Assembly | 42868 |
| 3. Adjustment Cam, Eccentric | 66127 |
| 4. Pin and Pawl Assembly | |

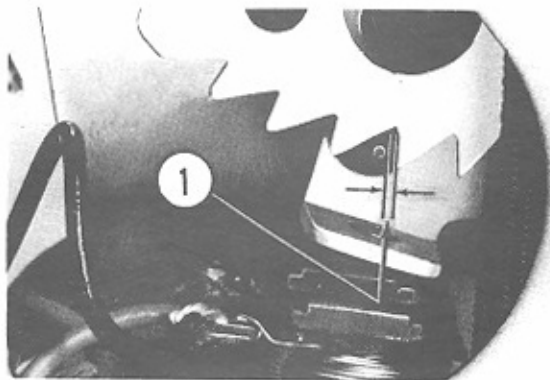


Fig. 17. ADJUSTMENT CAM SETTING

1. Over-travel .010"

(4) With cancellation held in position as described in (3) move the cancel solenoid up until its plunger is firmly bottomed and tighten the adjusting screws.

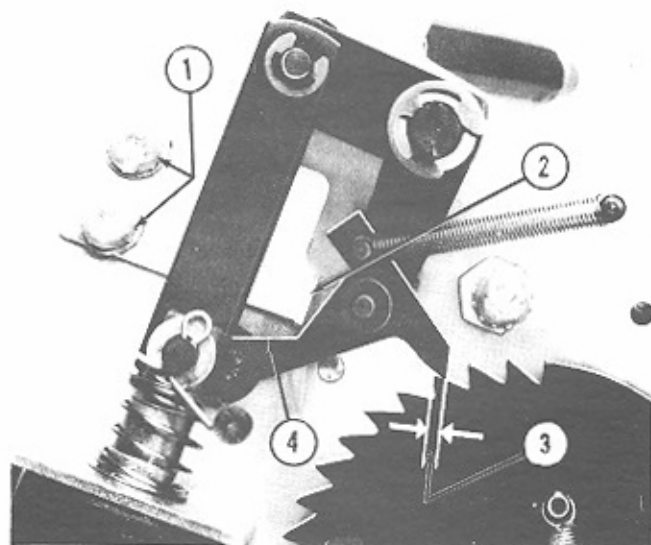


Fig. 18. CANCEL PAWL STOP BRACKET ADJUSTMENT

- | | |
|---|----------|
| 1. Adjusting Screws, Cancel Pawl Stop Bracket | 73533-21 |
| 2. Stop Bracket, Cancel Pawl | 66069 |
| 3. Engagement Point 1/3 of Slant Surface | |
| 4. No Drag of Pawl on Bracket | |

(5) The cancel pawl stop bracket should be adjusted by means of its mounting screws to provide engagement of the cancel pawl with the adjacent cancel wheel tooth at a point about 1/3 of the slant surface of the tooth as shown in Figure 18. The bracket should be entirely free, from surface of the cancel pawl marked "No drag", during its entire cancellation action.

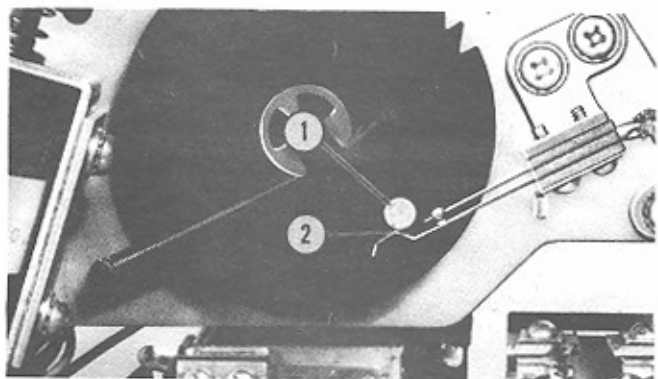
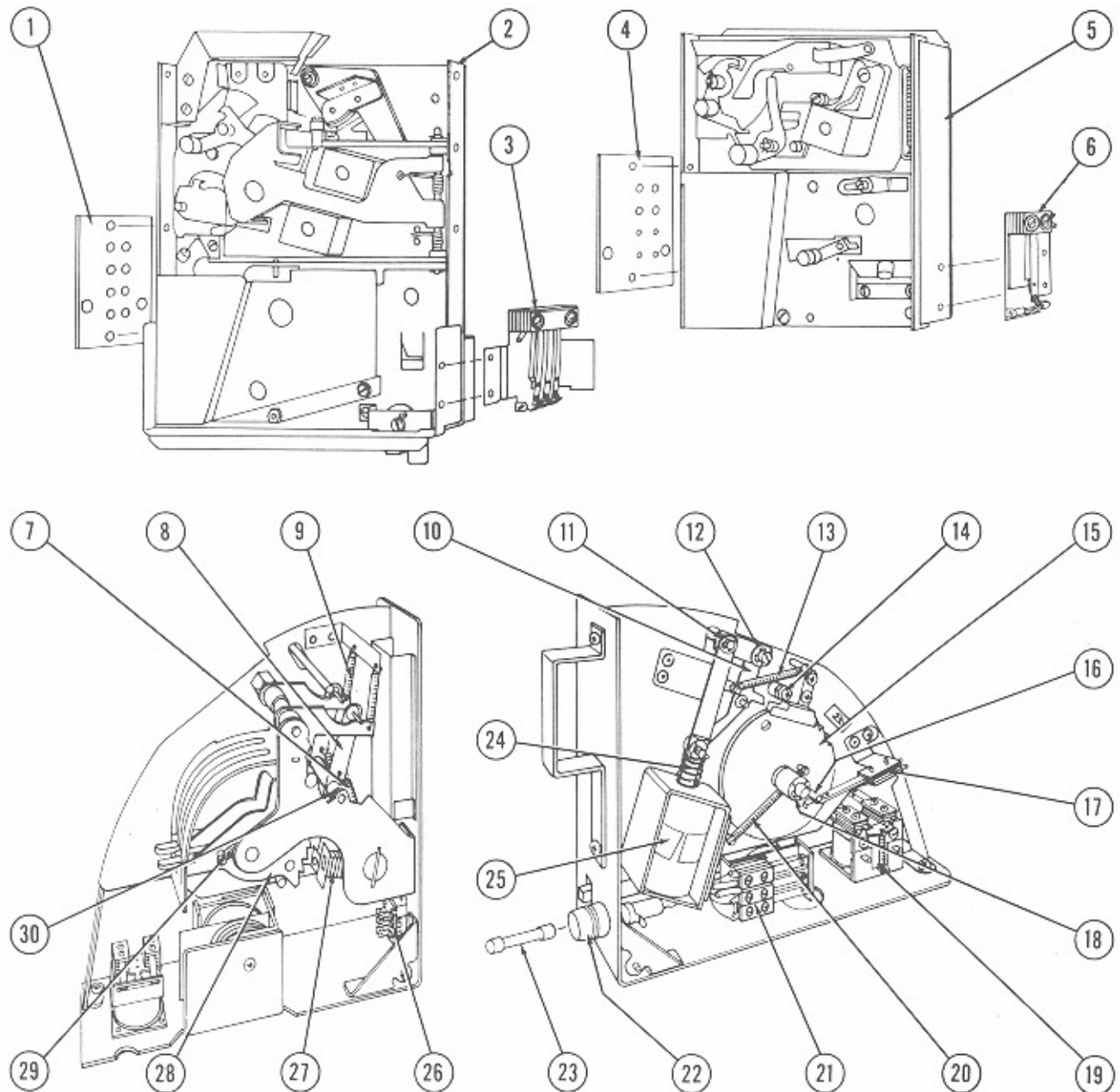


Fig. 19. KEY SWITCH CLEARANCE

- | | |
|---------------------------------|-------|
| 1. Actuator, Key Switch | 58255 |
| 2. Clearance from Movable Blade | |

(6) When all but one tooth of the accumulator wheels have been cancelled, or when only one credit has been set up, the actuator on the cancel wheel should have clearance at the key switch as shown in Figure 19. When all credits are cancelled the key switch should again be open as shown in Figure 14.



COIN REGISTER MECHANISM AND SLUG REJECTORS

1. Contact Plate Assembly	66170	16. Actuator, Plastic	58255
2. Slug Rejector (5¢-10¢-25¢)	66164	17. Switch Assembly	66082
3. Coin Switch Assembly	66168	18. Retaining Ring	73724-25
4. Contact Plate Assembly	66189	19. Relay, Set-up	55144
5. Slug Rejector (50¢)	65599	20. Spring, Cancel	66071
6. Coin Switch Assembly	66190	21. Relay, Pulse	64796
7. Spring, Cancel	58781	22. Fuse Post	45352
8. Lever, Hub and Stud Assembly	66129	23. Fusetron	14524
9. Spring, Pawl	62145	24. Spring, Solenoid Return	66072
10. Pivot Arm and Pawl Assembly	66125	25. Solenoid, Cancel	65069
11. Retaining Ring	73724-15	26. Slide Switch	62886
12. Retaining Ring	73724-21	27. Coin Magnet and Bracket Assembly	66128
13. Spring Pawl	62145	28. Accumulator Wheel and Hub Assembly	66131
14. Adjustment Cam	42868	29. Spring, Accumulator Wheel	66074
15. Cancel Wheel Assembly	66124	30. Retaining Ring	73724-18

MODEL 2000 ELECTRIC SELECTOR SYSTEM

1. GENERAL DISCUSSION

The electric selector system combines the electrical functions of the slug rejectors (Fig. 20), the coin register mechanism (Fig. 21), the selector switch assembly (Figs. 22 and 23), the selector drum and group relay assembly (Figs. 24 and 25) and the junction box unit (Figs. 26 and 27). The electric power for these units is supplied thru the junction box, by components of the Model 530 Amplifier.

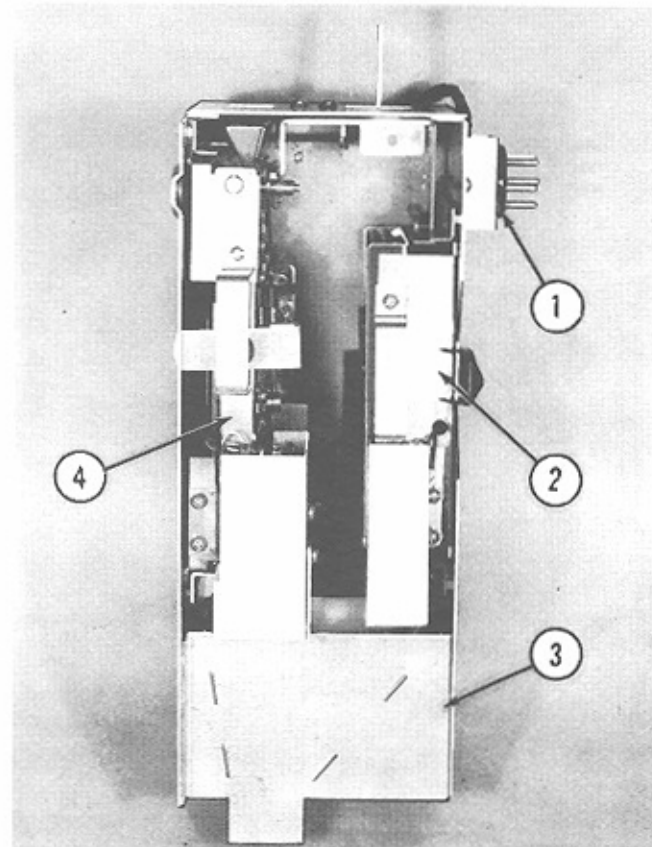


Fig. 20. ELECTRIC SELECTOR SYSTEM - SLUG REJECTORS

1. Plug, 5 Prong	13089
2. Slug Rejector, 50¢	66185
3. Cover Assembly, Slug Rejectors	66146
4. Slug Rejector, 5-10-25¢	65790

2. DESCRIPTION

a. The slug rejector assembly consists of two National Slug rejectors with Wurlitzer electrical modifications, mounted in a cover assembly with a plug connector to the coin register mechanism. The function of this assembly is to evaluate the coins presented thru the coin chutes and send impulses to the coin register in accordance with the value of the coin accepted. Should the coin not be acceptable it will be rejected and dropped into coin return cup instead of the cash box.

b. The coin register mechanism (Fig. 21) consists of two accumulator escapement wheels, a cancel wheel and solenoid, two stop levers, and two relays. Its functions are: (1) To convert the various coin impulses, from the slug rejector assembly, to selection credits in accordance with the pre-determined price per play as set up by the stop levers and the switch setting. (2) To set up the initial selection circuit for operation of the electric selector system. (3) To cancel one of the credits set up on the accumulator wheels each time a selection is made. (4) To open the "set-up" circuit and prevent selection after all credits have been used.

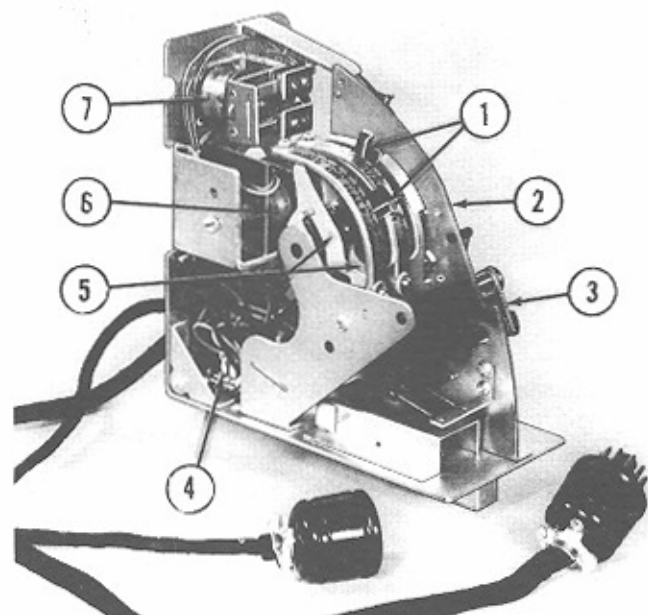


Fig. 21. COIN REGISTER MECHANISM - FUNCTIONS

1. Stop Levers	66132
2. Cancel Wheel (Out of View)	66124
3. Cancel Linkage (Pivot Arm and Pawl)	66125
4. Switch, 10 - 50	62886
5. Accumulator Wheels	66131
6. Pulse Relay	64796
7. Set-up Relay	55144

c. The selector switch assembly (Figs. 22 and 23) is made up of two letter switch banks of ten switches each and one number switch bank of ten switches. The two letter switch banks are mechanically linked to provide locking action for both switch banks while selection is being completed. The latch solenoid (Fig. 23) functions to provide latching action for any letter or number switch when it is pressed all the way in. Unless the "selector button release switch", located in the left hand cheek casting, is used, the letter or number selector switch will remain latched until the other number or letter switch is pressed and the selection completed. The "selector button release switch" permits the release of either a letter or a number switch any time before selection has been completed. The wiring of both the letter and number switches is a continuous series circuit, therefore all letter or number switches beyond the one being used, will be isolated from the source of power and only the

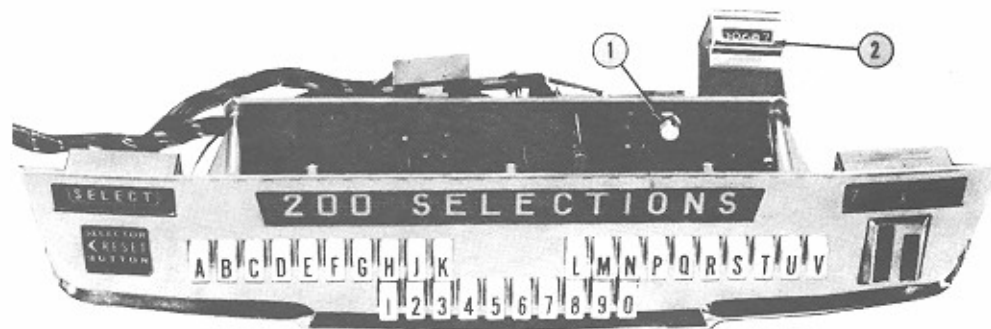


Fig. 22. SELECTOR SWITCH ASSEMBLY

65786

1. Free Play Switch

56233

2. Electric Counter

53829

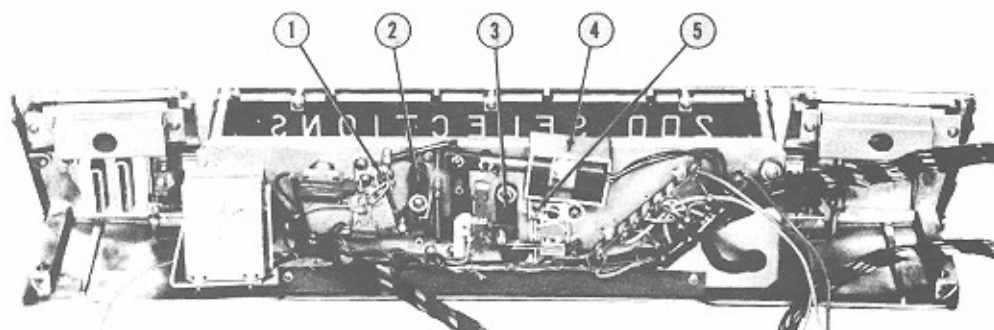


Fig. 23. SELECTOR SWITCH FUNCTIONS

1. Series Switch, Letter

64982

2. Letter Latch (Trip Lever and Spacer Assembly)

65010

3. Number Latch (Pawl, Stud, and Spacer Assembly)

65745

4. Latch Solenoid

60717

5. Series Switch, Number

64981

switch being used may receive the selection pulse. Both the number and the letter latch linkage (Fig. 23) are accompanied by the conventional latch switches. The latch switches are mechanically closed by their respective button linkages at the time the buttons are fully depressed for latching. As the latch levers of either or both letter and number links engage their respective latches, the series switch for either or both will be opened by the corresponding latch arm. The letter and number series switches open to isolate the initial selection circuit until the selection has been electrically completed and the selector switches have been released for further selection. As the selection is made by the manual operation of the selector buttons as described above, a 24V D.C. circuit is completed to the pulse relay (Fig. 21). Following this pulse relay circuit all selection circuits and associated functional circuits are electrically handled by the electric selector system.

Included in the selector switch assembly is the electric counter (Fig. 22) and a free-play switch for convenience in servicing.

d. The selector drum assembly (Figs. 24 and 25) consists of a circular drum containing 200 selector latch pins (Fig. 24). When one or more of

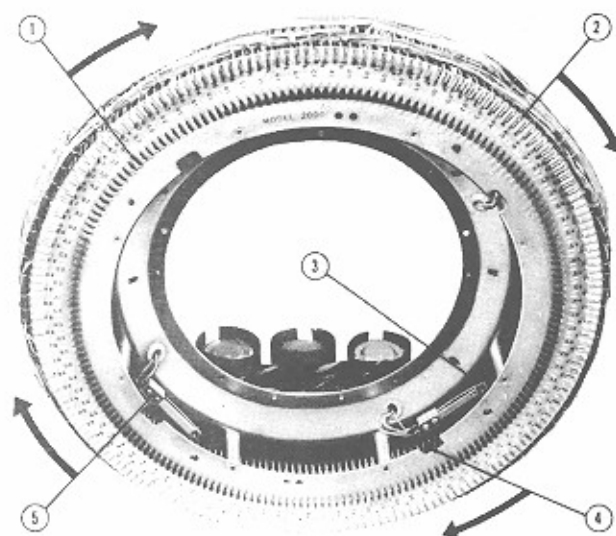


Fig. 24. ELECTRIC SELECTOR ASSEMBLY

65794

1. Latch Pin, Selector (200)

57701

2. Coil and Core Assembly (200)

65771

3. Spacer (Actuator, Over-ride Switch)

65507

4. Spring, Latch Pin (200)

57110

5. Switch Assembly, Over-ride (4)

65952

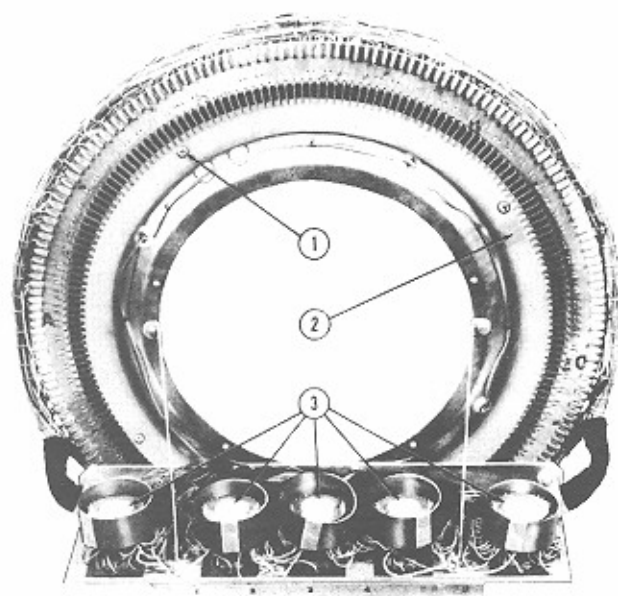


Fig. 25. ELECTRIC SELECTOR ASSEMBLY

65794

- | | |
|---|----------|
| 1. Screw, 8-32 x 5/16", Switch Actuator (4) | 73533-35 |
| 2. Wobble Ring | 65763 |
| 3. Relay, 48 Pole | 65692 |

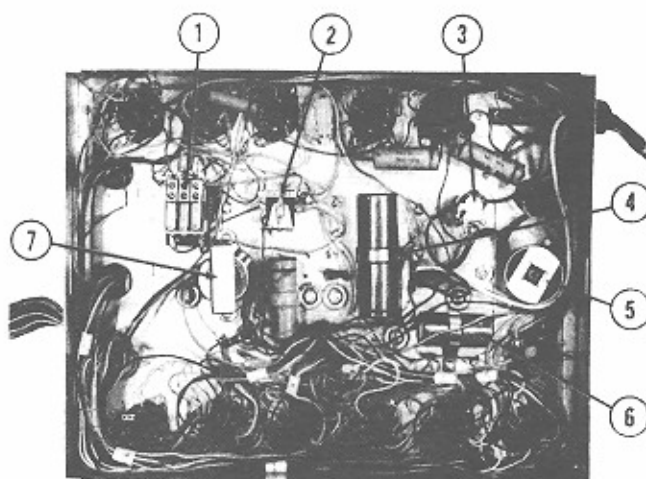


Fig. 27. JUNCTION BOX, BOTTOM VIEW

- | | |
|----------------------------|-------|
| 1. Relay, Reversing | 65750 |
| 2. Relay, Over-ride, No. 1 | 56884 |
| 3. Relay, Pulse | 65752 |
| 4. Capacitor, 500 Mfd. | 71816 |
| 5. Socket, Fustat | 61857 |
| 6. Capacitor, 100 Mfd. | 73862 |
| 7. Transformer, 5.5V Lamp | 65609 |

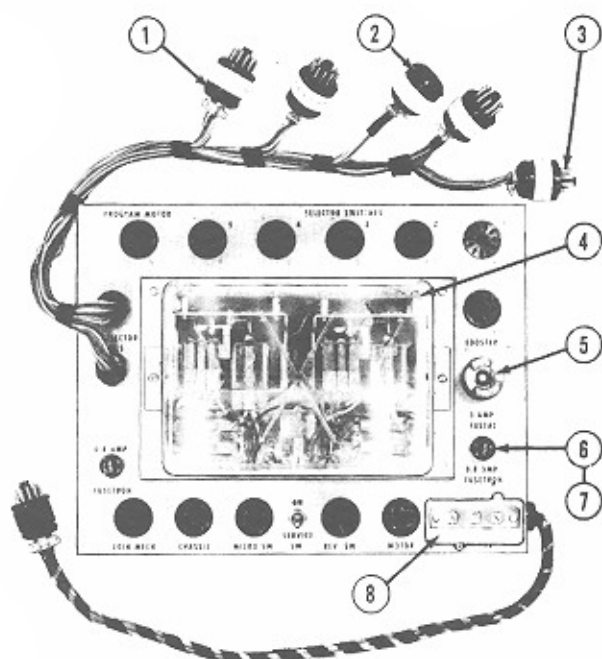


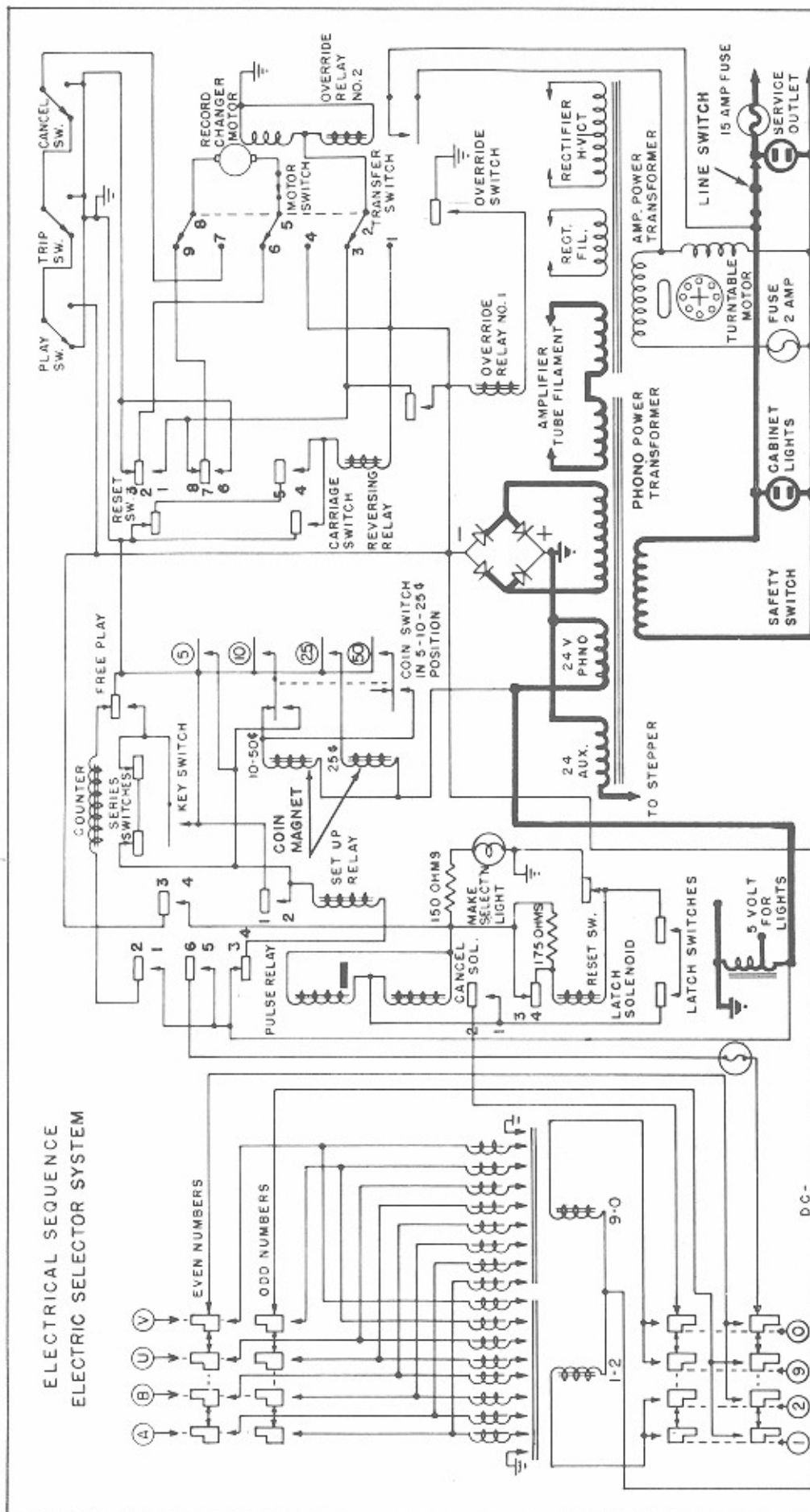
Fig. 26. JUNCTION BOX, TOP VIEW

- | | |
|----------------------------|-------|
| 1. Cap, Octal Plug | 16610 |
| 2. Socket, 11 Prong | 58898 |
| 3. Plug, 11 Prong (5) | 54878 |
| 4. Cover, Plastic, Stepper | 65801 |
| 5. Fustat, 3 Amp. | 61858 |
| 6. Fuse Post | 51485 |
| 7. Fusetron, 0.8 Amp. | 14524 |
| 8. Cover, Terminal Strip | 44943 |

e. The junction box (Figs. 26 and 27) is provided with plugs and sockets for inter-connection of the various components of the electric selector system, the record changer, and the power supply. The stepper unit for remote selection is mounted on the upper side of the junction box. Details for stepper and wall box service will be published in another group. The inside of the junction box contains the wall box pulse relay, over-ride relay No. 1, the reversing relay, the 5V panel light transformer, and several capacitors for stepper operation and filter circuits.

3. OPERATION

A complete sequence description with schematic diagrams of the system appears on pages 13 thru 22. These sequence diagrams have been prepared as an aid to service in checking the continuity and voltage of the various circuits to isolate and locate electrical failures.



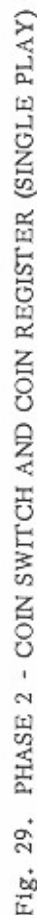
PHASE 1 - STAND-BY CIRCUITS

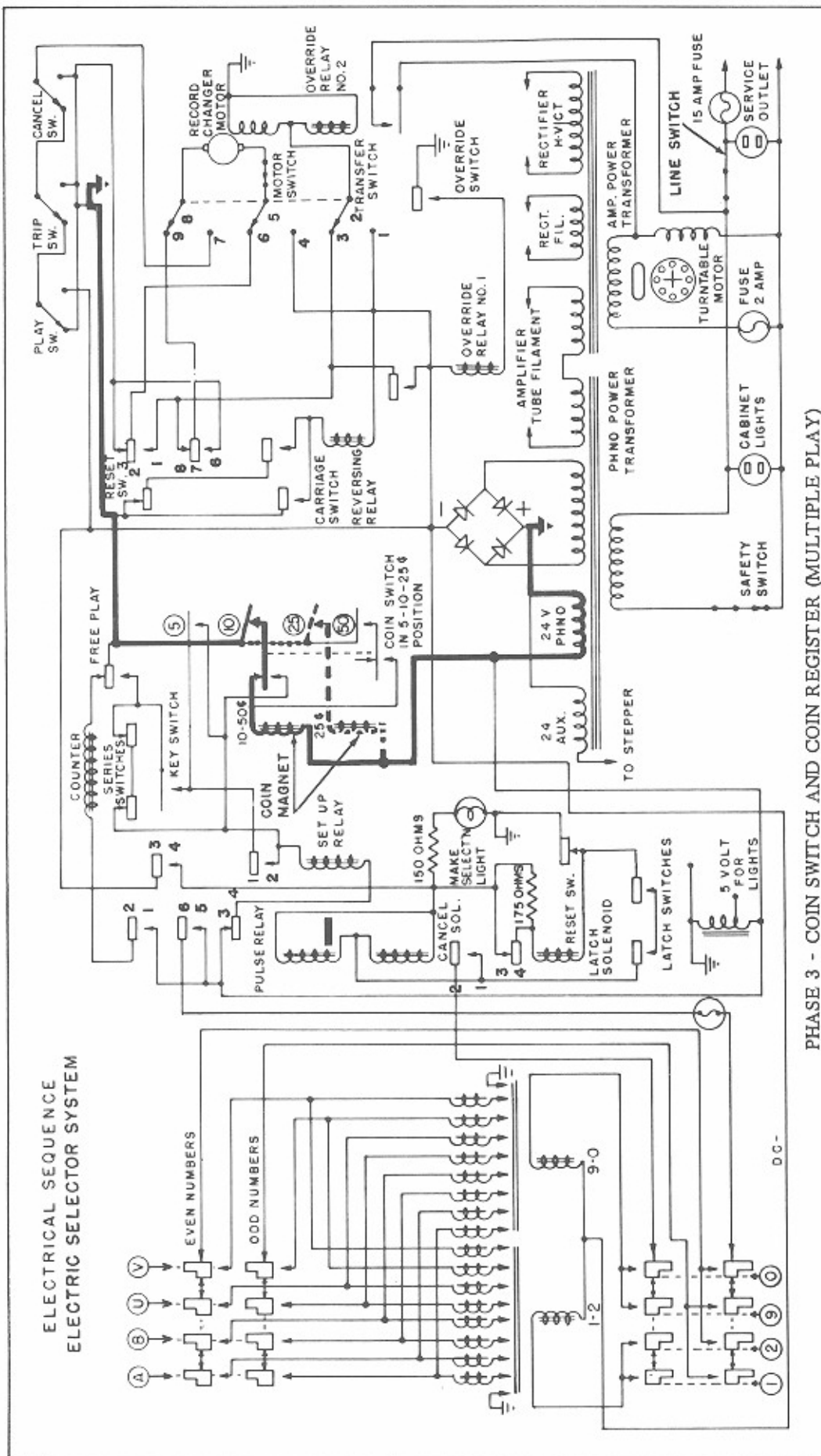
Closing of the line switch provides 110V A.C. to the primary of the phonograph power transformer, 24V A.C. for selector operation, 24V A.C. for wall box and stepper operation, and 28V D.C. for phonograph and stepper operation. The 24V A.C. phonograph circuit energizes a separate transformer in the junction box to furnish 5V

panel light circuits. The energized circuits are shown in heavy lines.

NOTE: When the line cord is plugged in, the service outlet is energized even though the line switch is in the "Off" position.

Fig. 28. PHASE 1 - STAND-BY CIRCUITS





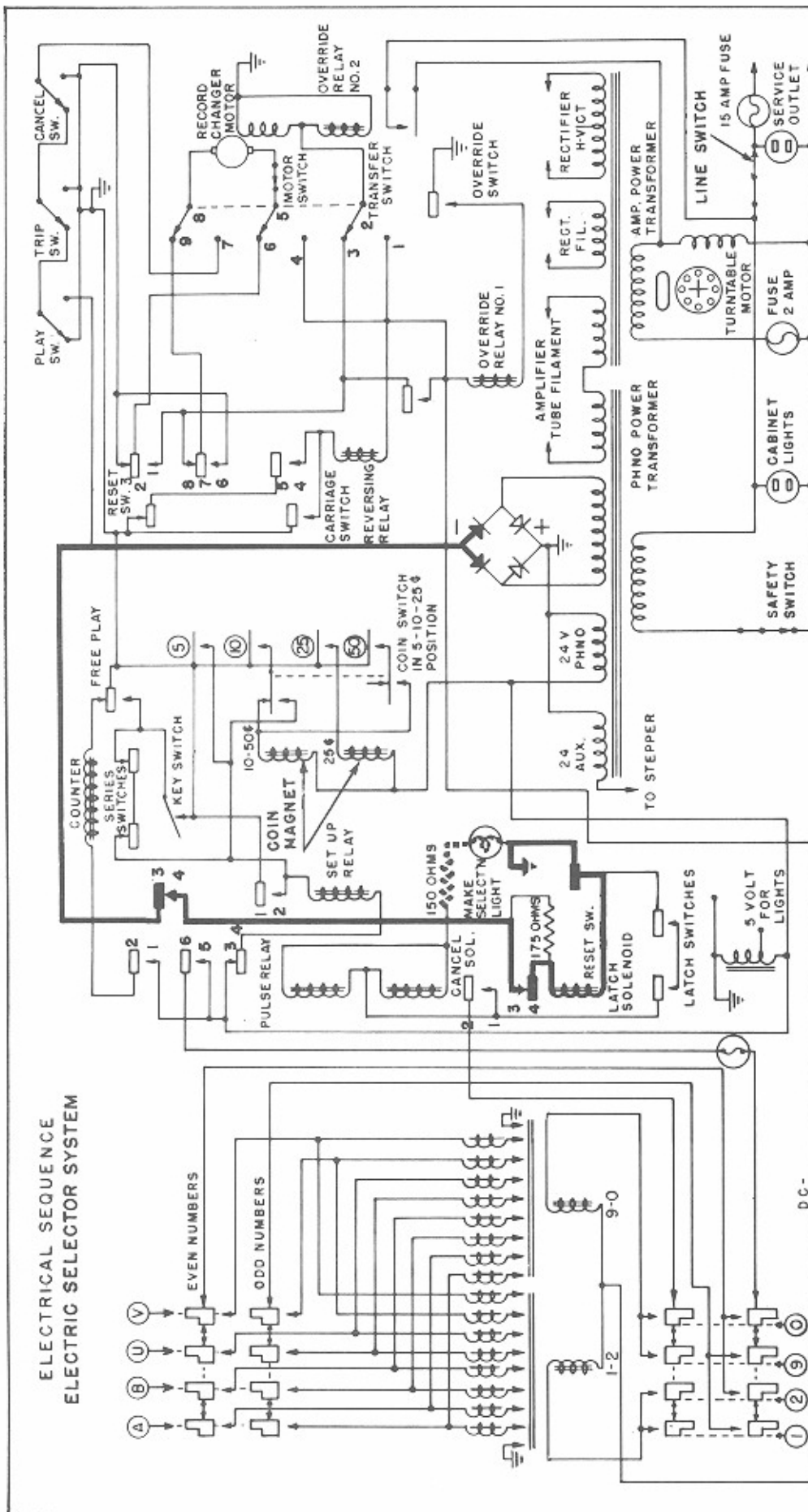
NOTE: A 50¢ coin will produce the same result when the register switch is in the 10, 25, 50¢ position.

a. With the register switch in the 5-10-25¢ position, a dime on the coin switch will complete a circuit to the 10-50¢ coin magnet as shown in heavy line from ground at the 24V secondary winding, thru the 10-50¢ coin magnet, the register switch, and the 10¢ coin switch to the common ground.

b. With the register switch in either of its two positions a 25¢ coin on the coin switch will complete a circuit to the 25¢ coin magnet as shown in broken line from ground at the 24V secondary winding, thru the 25¢ coin magnet, and the 25¢ coin switch to the common ground.

Fig. 30. PHASE 3 - COIN SWITCH AND COIN REGISTER (MULTIPLE PLAY)





PHASE 5 - LATCH SOLENOID, MAKE SELECTION LAMP

a. The closing of contacts 3 and 4 of the set-up relay completes a 28V D.C. circuit to the latch solenoid as shown in heavy line from the negative side of the rectifier thru contacts 3 and 4 of the set-up relay, contacts 3 and 4 of the latch solenoid switch, the coil of the latch solenoid, and the "reset switch" to positive ground. At the same time, contacts 3 and 4 of the set-up relay provide D.C. for the make selection lamp as shown in broken line, thru the 150 ohm resistor and the make selection lamp to ground.

b. When the latch solenoid is energized its plunger operates linkage to provide latching action for both the letter and number buttons. The buttons switches are thus held firmly engaged during the selection pulse. At the end of the plunger action the latch solenoid switch is actuated. Contacts 3 and 4 open to reduce the current flow thru the solenoid coil. Contacts 1 and 2 close to prepare the D.C. circuit to the number button switches and the group relays.

Fig. 32. PHASE 5 - LATCH SOLENOID, MAKE SELECTION LAMP

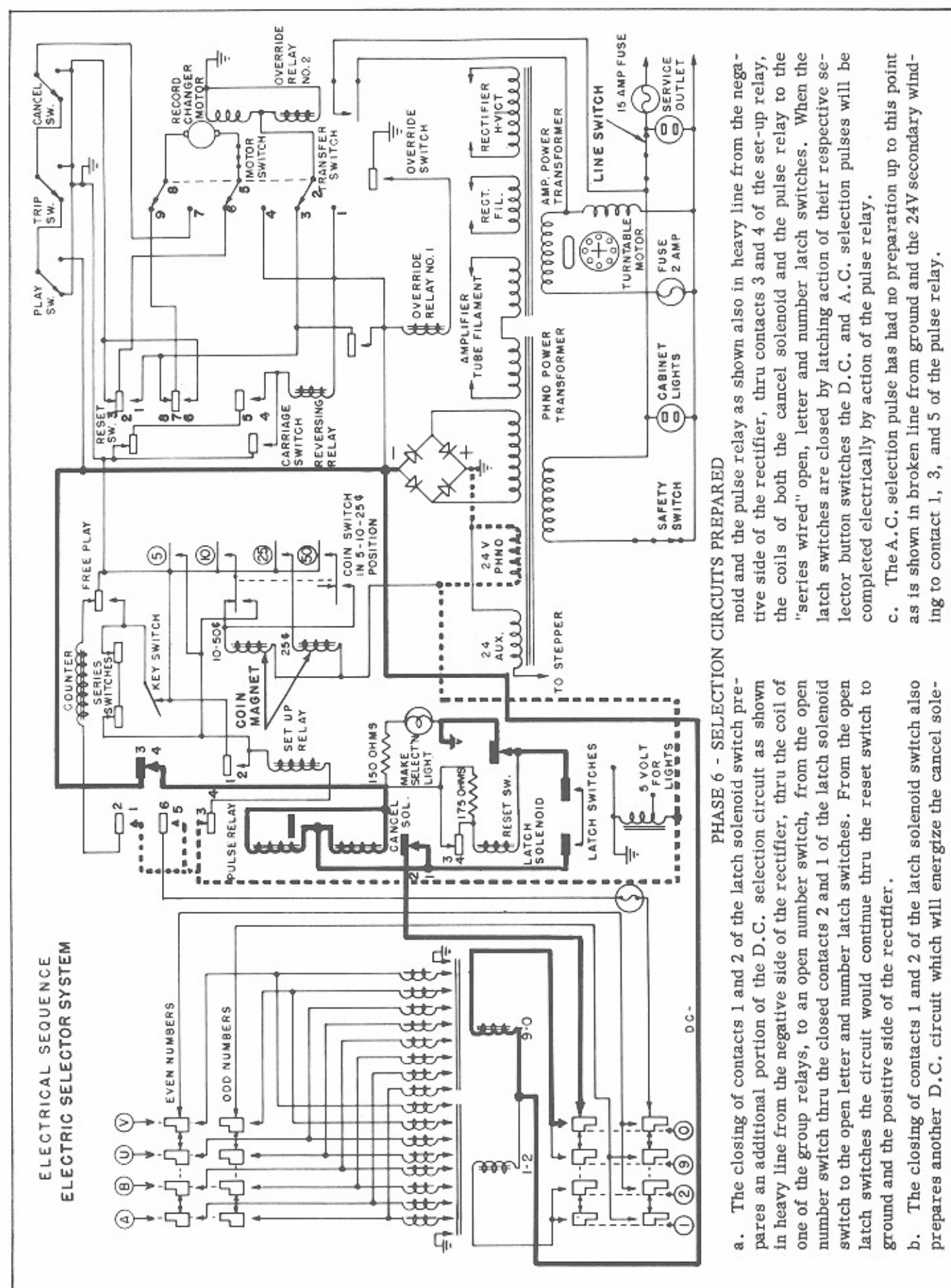


Fig. 33. PHASE 6 - SELECTION CIRCUITS PREPARED

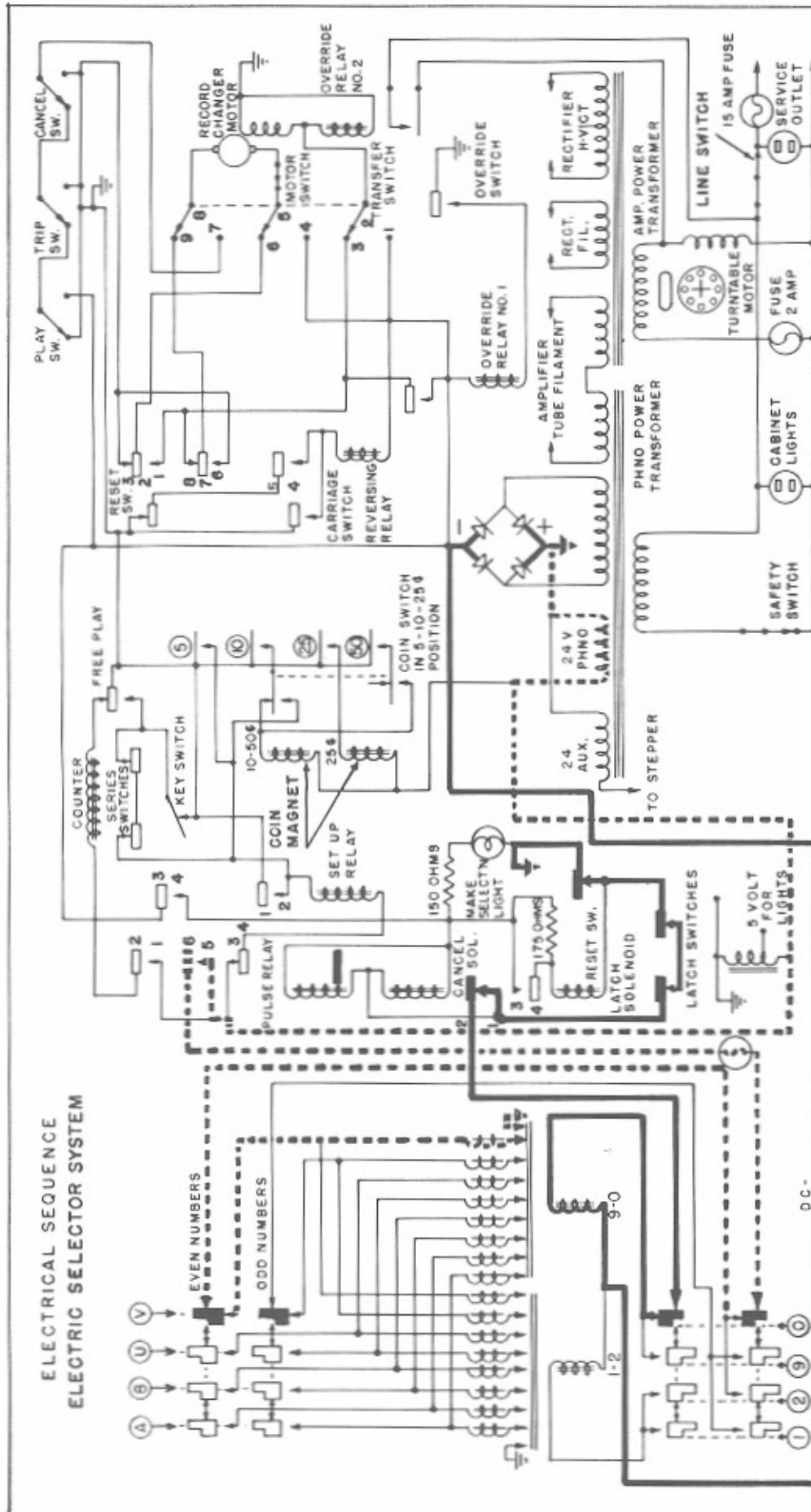
PHASE 6 - SELECTION CIRCUITS PREPARED

a. The closing of contacts 1 and 2 of the latch solenoid switch prepares an additional portion of the D.C. selection circuit as shown in heavy line from the negative side of the rectifier, thru contacts 3 and 4 of the set-up relay, the coils of both the cancel solenoid and the pulse relay to the "series wired" open, letter and number latch switches. When the latch switches are closed by latching action of their respective selector button switches the D.C. and A.C. selection pulses will be completed electrically by action of the pulse relay.

c. The A.C. selection pulse has had no preparation up to this point as is shown in broken line from ground and the 24V secondary winding to contact 1, 3, and 5 of the pulse relay.

a. The closing of contacts 1 and 2 of the latch solenoid switch prepares an additional portion of the D.C. selection circuit as shown in heavy line from the negative side of the rectifier, thru the coil of one of the group relays, to an open number switch, from the open number switch thru the closed contacts 2 and 1 of the latch solenoid switch to the open letter and number latch switches. From the open latch switches the circuit would continue thru the reset switch to ground and the positive side of the rectifier.

b. The closing of contacts 1 and 2 of the latch solenoid switch also prepares another D.C. circuit which will energize the cancel solenoid and the positive side of the rectifier.

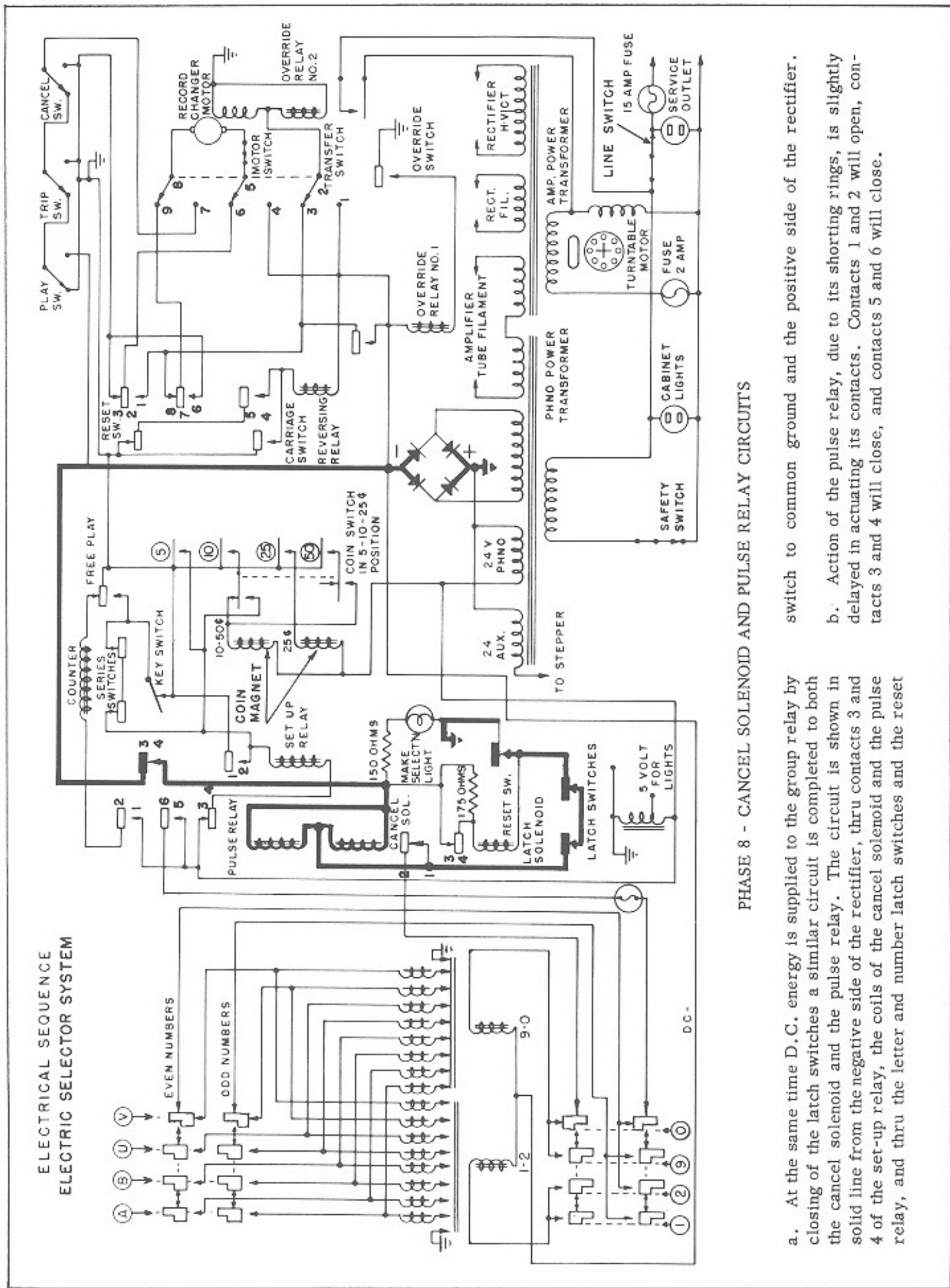


PHASE 7 - D.C. SELECTION CIRCUIT

a. When both a letter button and a number button are pressed as shown in this phase, the corresponding latch switches are closed by the latching mechanism. The D.C. circuit to the selected group relay is completed as shown in heavy line from the negative side of the rectifier thru the group relay coil and the selected button switch, thru contacts 2 and 1 of the latch solenoid switch, both the letter and number latch switches and the reset switch to ground and the positive

side of the rectifier. Actuation of the group relay complete a ground circuit to that particular group of selector coils preparing the A.C. selection circuit for the letter coil selected, as shown in broken line from common ground and the 24V transformer winding to open contact 5, of the pulse relay, then from contact 6 thru the .8 Amp. fuse and selection switch "O", thru (even numbers selector switch) "V", thru selector coil "VO" to common ground.

Fig. 34. PHASE 7 - D.C. SELECTION CIRCUIT



PHASE 8 - CANCEL SOLENOID AND PULSE RELAY CIRCUITS

- a. At the same time D.C. energy is supplied to the group relay by closing of the latch switches a similar circuit is completed to both the cancel solenoid and the pulse relay. The circuit is shown in solid line from the negative side of the rectifier, thru contacts 3 and 4 of the set-up relay, the coils of the cancel solenoid and the pulse relay, and thru the letter and number latch switches and the reset switch to common ground and the positive side of the rectifier.
- b. Action of the pulse relay, due to its shorting rings, is slightly delayed in actuating its contacts. Contacts 1 and 2 will open, contacts 3 and 4 will close, and contacts 5 and 6 will close.

Fig. 35. PHASE 8 - CANCEL SOLENOID AND PULSE RELAY CIRCUITS

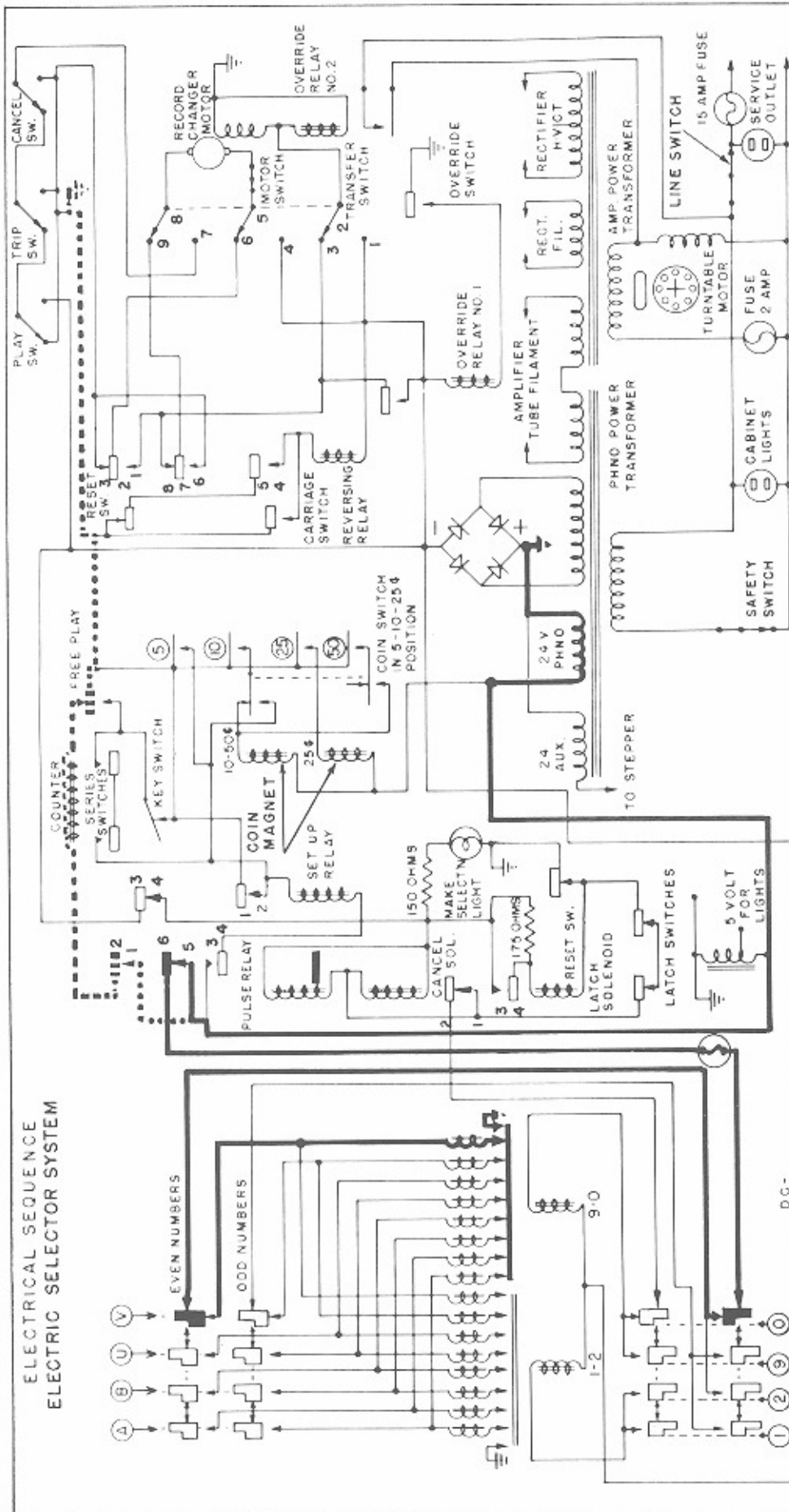


Fig. 36. PHASE 9 - SELECTOR COIL CIRCUIT, COUNTER CIRCUIT, AND RESET CIRCUIT

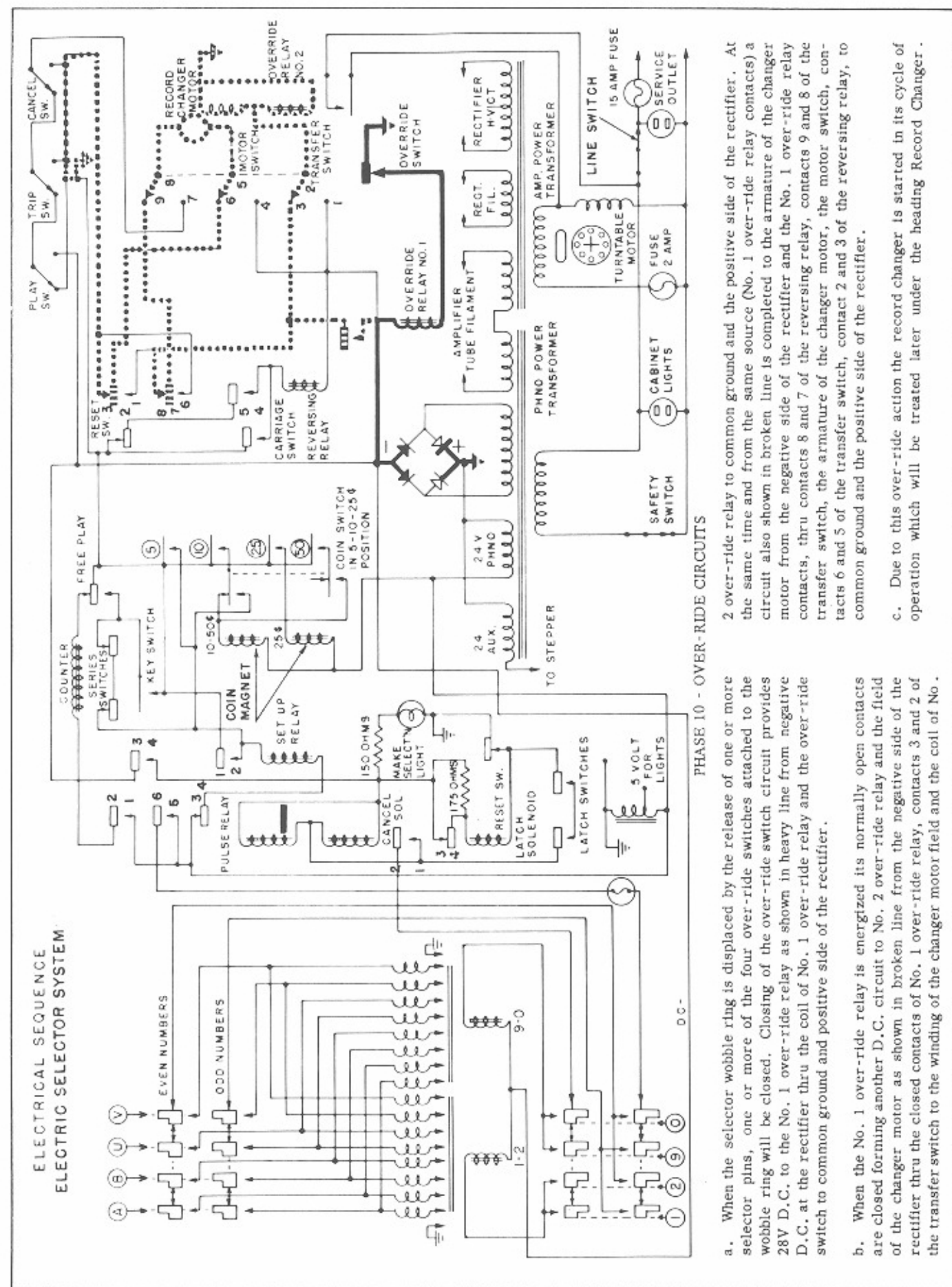


Fig. 37. PHASE 10 - OVER-RIDE CIRCUITS

2 over-ride relay to common ground and the positive side of the rectifier. At the same time and from the same source (No. 1 over-ride relay contacts) a circuit also shown in broken line is completed to the armature of the changer motor from the negative side of the rectifier and the No. 1 over-ride relay contacts, thru contacts 8 and 7 of the reversing relay, contacts 9 and 8 of the transfer switch, the armature of the changer motor, the motor switch, contacts 6 and 5 of the transfer switch, contact 2 and 3 of the reversing relay, to common ground and the positive side of the rectifier.

c. Due to this over-ride action the record changer is started in its cycle of operation which will be treated later under the heading Record Changer.

a. When the selector wobble ring is displaced by the release of one or more selector pins, one or more of the four over-ride switches attached to the wobble ring will be closed. Closing of the over-ride switch circuit provides 28V D.C. to the No. 1 over-ride relay as shown in heavy line from negative D.C. at the rectifier thru the coil of No. 1 over-ride relay and the over-ride switch to common ground and positive side of the rectifier.

b. When the No. 1 over-ride relay is energized its normally open contacts are closed forming another D.C. circuit to No. 2 over-ride relay and the field of the changer motor as shown in broken line from the negative side of the rectifier thru the closed contacts of No. 1 over-ride relay, contacts 3 and 2 of the transfer switch to the winding of the changer motor field and the coil of No.

4. ADJUSTMENTS

Selector Switch Assembly, Figs. 38 and 39.

a. It is essential that both the letter and number button switches, as well as their latch bars, operate without any friction, from maximum depressed position to complete retracted position. Their respective latch bars (Items 5 and 7, Fig. 38) must engage freely with all of the switch "push rods" and retract freely when the switch "push rods" are fully retracted. The two letter switch latch bars are linked together by item 3 and coupled to the "shaft, link and lever assembly" (Item 6) with an adjustable plate and the adjustment screws shown in item 9. The adjustment of these links should provide accurate synchronization of the two latch bars and minimum play, consistent with freedom of operation, between button action and latching action. The latch bar of the number switch is coupled directly to its "shaft, link, and lever assembly", item 8. There should also be a minimum of play consistent with freedom of operation, between the number buttons and the number latch.

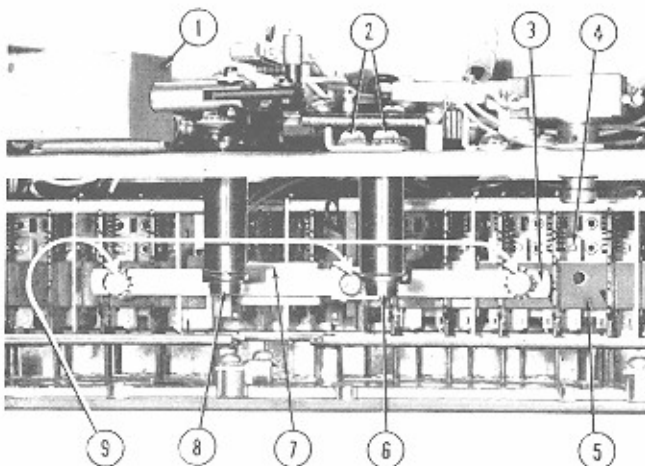


Fig. 38. SELECTOR SWITCH ADJUSTMENTS

1. Latch Solenoid	60717
2. Stop Bracket, Latch Solenoid	56628
3. Linkage, Latch Bars	65617
4. Switch Contact, Movable	
5. Latch Bar, Selector Switch, Letters	65646
6. Shaft, Link, and Lever Assembly, Letters	60452
7. Latch Bar, Selector Switch, Numbers	65646
8. Shaft, Link, and Lever Assembly, Numbers	60454
9. Adjustment Points	

b. With the latch solenoid resting against the stop bracket loosen the two screws (Item 2, Fig. 39) and set the bracket to provide 1/32" clearance between the letter latch pin (Item 12, Fig. 39), and the letter pawl (Item 13, Fig. 39).

c. Both the letter latch pawl and the number latch pawl (Items 3 and 4, Fig. 39) have adjusting

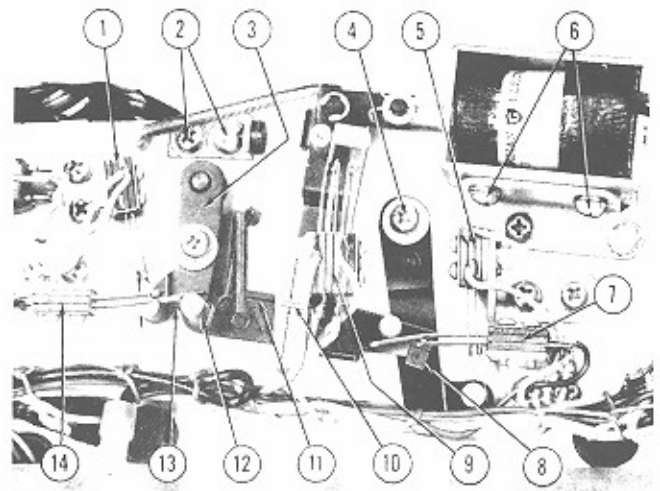


Fig. 39. SELECTOR SWITCH ADJUSTMENTS

1. Series Switch, Letters	64982
2. Stop Bracket, Cancel Solenoid	56628
3. Letter Latch	65010
4. Number Latch (Pawl, Stud, and Spacer Assembly)	65745
5. Series Switch, Numbers	64981
6. Adjusting Screws, Cancel Solenoid	73533-22
7. Latch Switch, Numbers	64980
8. Latch Pin, Numbers (Trip Lever, Stud and Spacer Assembly)	56714
9. Latch Solenoid Switch	66113
10. Clearance 1/32"	
11. Release Lever, Tab. (Release Lever, Stud and Spacer Assembly)	56713
12. Latch Pin, Letters	56712
13. Pawl, Letter Latch	65010
14. Latch Switch, Letters	64980

screws. These latch pawls should be adjusted to engage fully with their respective latch pins (Items 8 and 12) when their respective selector buttons are fully depressed and their release levers are permitted to make engagement by manually actuating the latch solenoid.

d. Adjustment of the release lever clearance (Item 11) is accomplished by the position of the latch solenoid (Item 6), however it is recommended that the latch solenoid switch (Item 9) be loosened at its mounting bracket to prevent bending of its blades when the latch solenoid is moved.

(1) The latch solenoid may now be moved on its elongated mounting holes to provide clearance of the closest release tab (Item 11) of 1/32" from its corresponding latch lever when the solenoid plunger is held firmly at the bottom of its stroke and the latch pins are fully engaged as described in "c" above. Tighten the latch solenoid mounting screws and re-inspect for correct action and clearance.

(2) The latch solenoid switch may now be adjusted to provide 1/32" to 1/16" opening of its normally closed contacts when the latch solenoid is held in its fully actuated position. At the same time the

normally open contacts should close and over-travel enough to provide good wiping action.

e. The letter and number series switches (Items 1 and 5) should be adjusted to provide $1/32$ " opening of their contacts when one of their respective buttons is pressed and fully latched. When the buttons are released these switches must close and over-travel enough to provide good wiping action of the contacts.

f. The letter and number latch switches (Items 14 and 7) should be adjusted to provide contact opening of $1/32$ " when at rest. When the latch solenoid is energized or manually held in its actuated position

and a letter and number button is fully depressed, the letter and number latch switches should close and over-travel enough to provide good wiping action of the switch contacts.

5. LUBRICATION

The electrical contacts are made of silver and are naturally quite soft. Cleaning should be accomplished with carbon tetrachloride and the contacts burnished with a tool for that purpose or a strip of heavy bond paper. Avoid abrasives. Mechanical linkage and shaft bearings should be lightly lubricated with a wax free and acid free S.A.E. No. 10 oil.

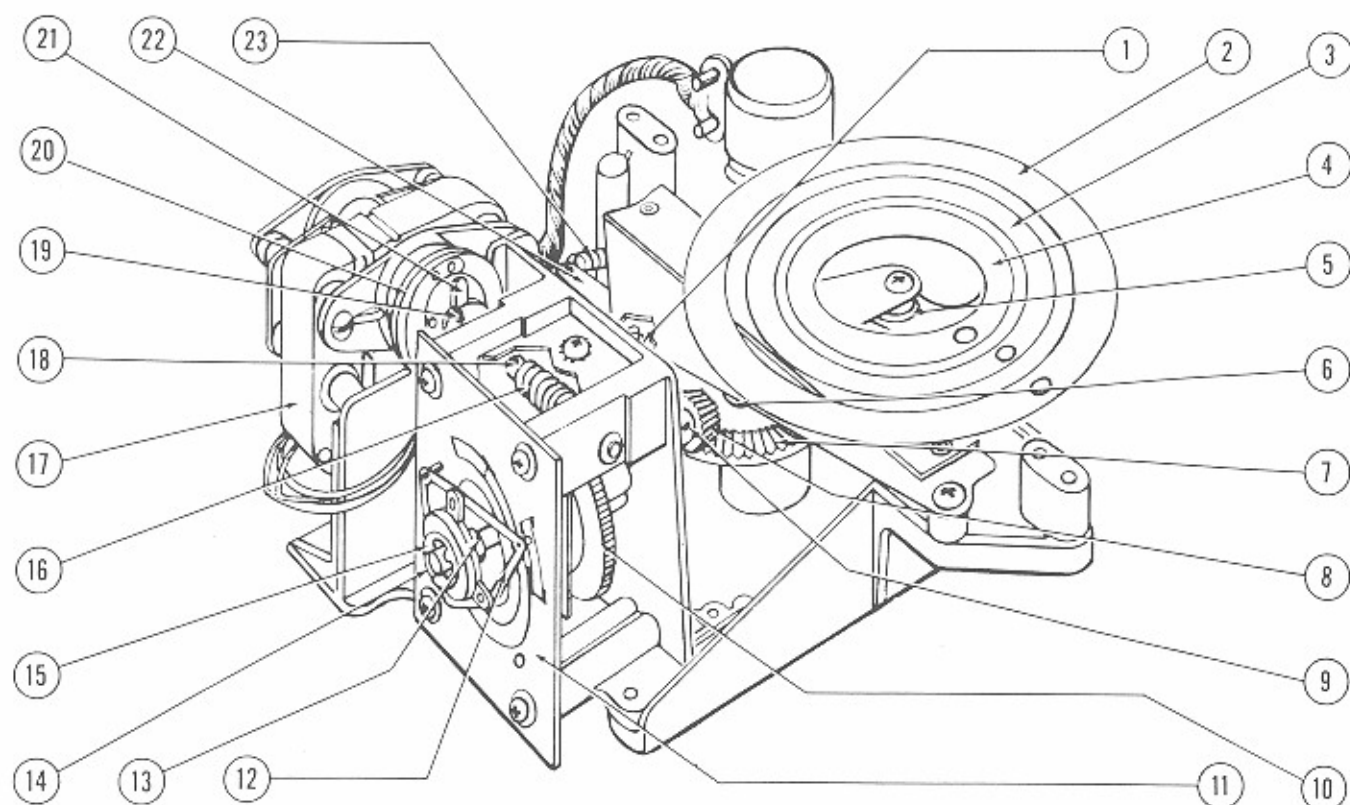


Fig. 40. PROGRAM SELECTOR R.H. 65787 - L.H. 65788

1. Retaining Ring	73728-18	13. Roll Pin	73782-6
2. Ring and Bearing Assembly, Outer	66405	14. Washer	53541
3. Ring and Bearing Assembly, Center	66406	15. Retaining Ring	73724-25
4. Ring and Bearing Assembly, Inner	66407	16. Worm Gear, Program Changer	66353
5. Retaining Ring	73728-18	17. Motor, Page Turner	66399
6. Retaining Ring	73724-25	18. Roll Pin	73782-3
7. Cam and Bearing Assembly	66409	19. Roll Pin	73782-5
8. Bevel Gear, Program Changer	66324	20. Spring and Plate Assembly	66439
9. Roll Pin	73782-4	21. Hub and Drive Assembly	66436
10. Shaft and Nylon Gear Assembly	66326	22. Segment, Bushing and Roller Assembly	66340
11. Contact Plate Assembly	66331	23. Spring, Program Selector	66508
12. Coupling, Insulator and Spring Assembly	66346		

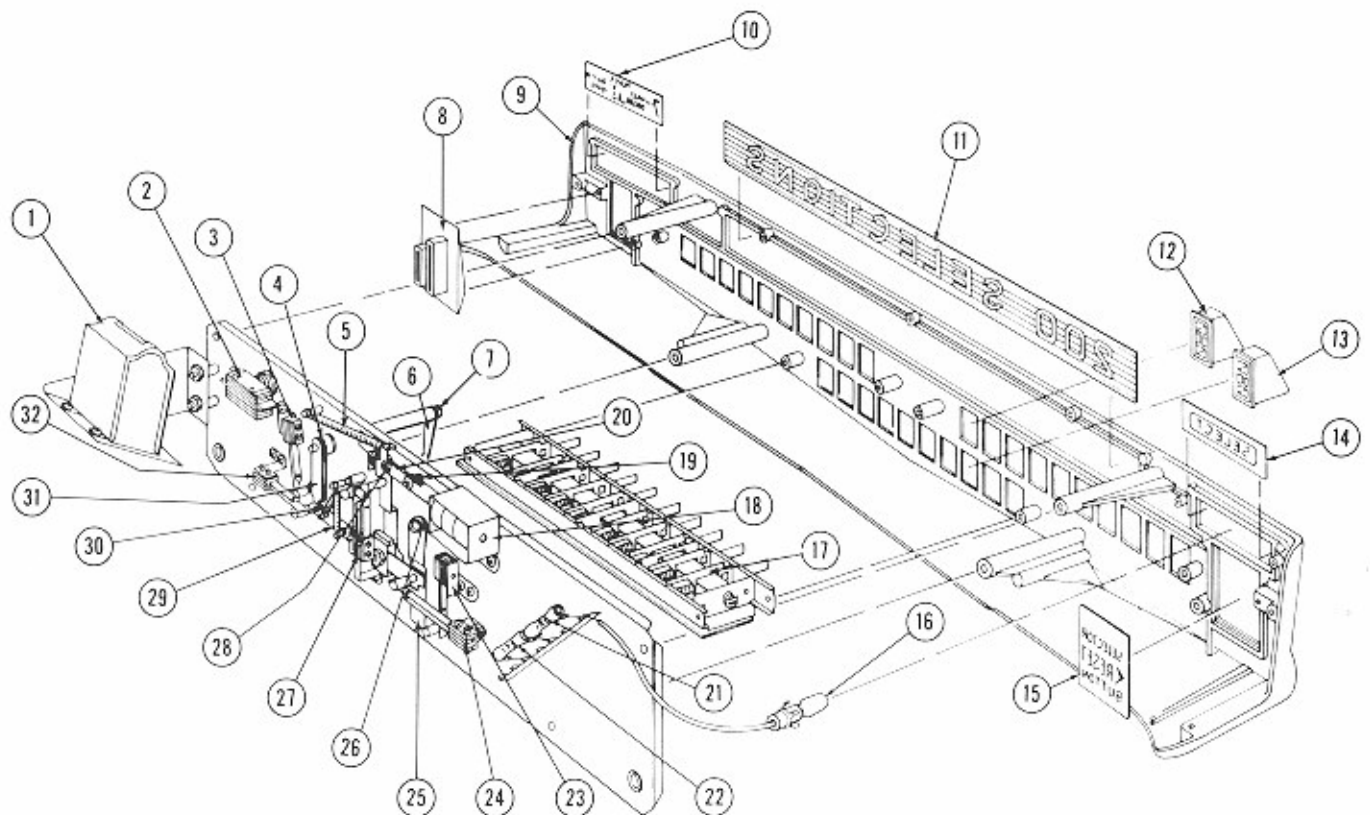


Fig. 41. SELECTOR SWITCH ASSEMBLY

1. Electric Counter	53829	14. Escutcheon Plate (Select)	65754
2. Switch, Free-Play	56233	15. Escutcheon Plate (Reset)	65753
3. Series Switch, Letters	64982	16. Lamp, G.E. #44	24689
4. Link and Hub Assembly	56654	17. Selector Switch, Letters	65647
5. Spring, Solenoid Return	57130	Selector Switch, Numbers	65648
6. Lever and Hub Assembly	60453	18. Solenoid, Latch Interlock	60717
7. Taper Pin	65362	19. Pin, Solenoid Shaft	65947
8. Coin Entry Casting	65503	20. Link, Solenoid Connection	56608
9. Selector Casting	65466	21. Resistor, 150 Ohms, 5 Watt	71883-2
10. Coin Denomination Plate		22. Resistor, 175 Ohms, 5 Watt	71884-3
(7 for Half, 3 for Quarter, 1 for Dime)	65755	23. Series Switch, Numbers	64981
(3 Plays Quarter, 1 Play Dime or 2 Nickels)	65756	24. Latch Switch, Numbers	64980
(4 Plays Quarter, 1 Play Dime, or 2 Nickels)	65824	25. Pawl, Stud, and Spacer Assembly	65745
(5 Plays Quarter, 2 Plays Dime, 1 Play Nickel)	65827	26. Link and Hub Assembly	56653
(9 for Half, 4 for Quarter, 1 for Dime)	65833	27. Switch Assembly	66113
(4 Plays Quarter, 1 Play Dime)	66426	28. Retaining Ring	73724-15
(3 Plays Quarter, 1 Play Dime)	66427	29. Spring, Letter Latch	57128
11. Escutcheon Plate (200 Selections)	65693	30. Spring, Number Latch	57129
12. Buttons, Letters, (A to V)	65657 to 65676	31. Trip Lever and Spacer Assembly	65010
13. Buttons, Numbers (1 to 0)	65677 to 65686	32. Latch Switch, Letters	64980

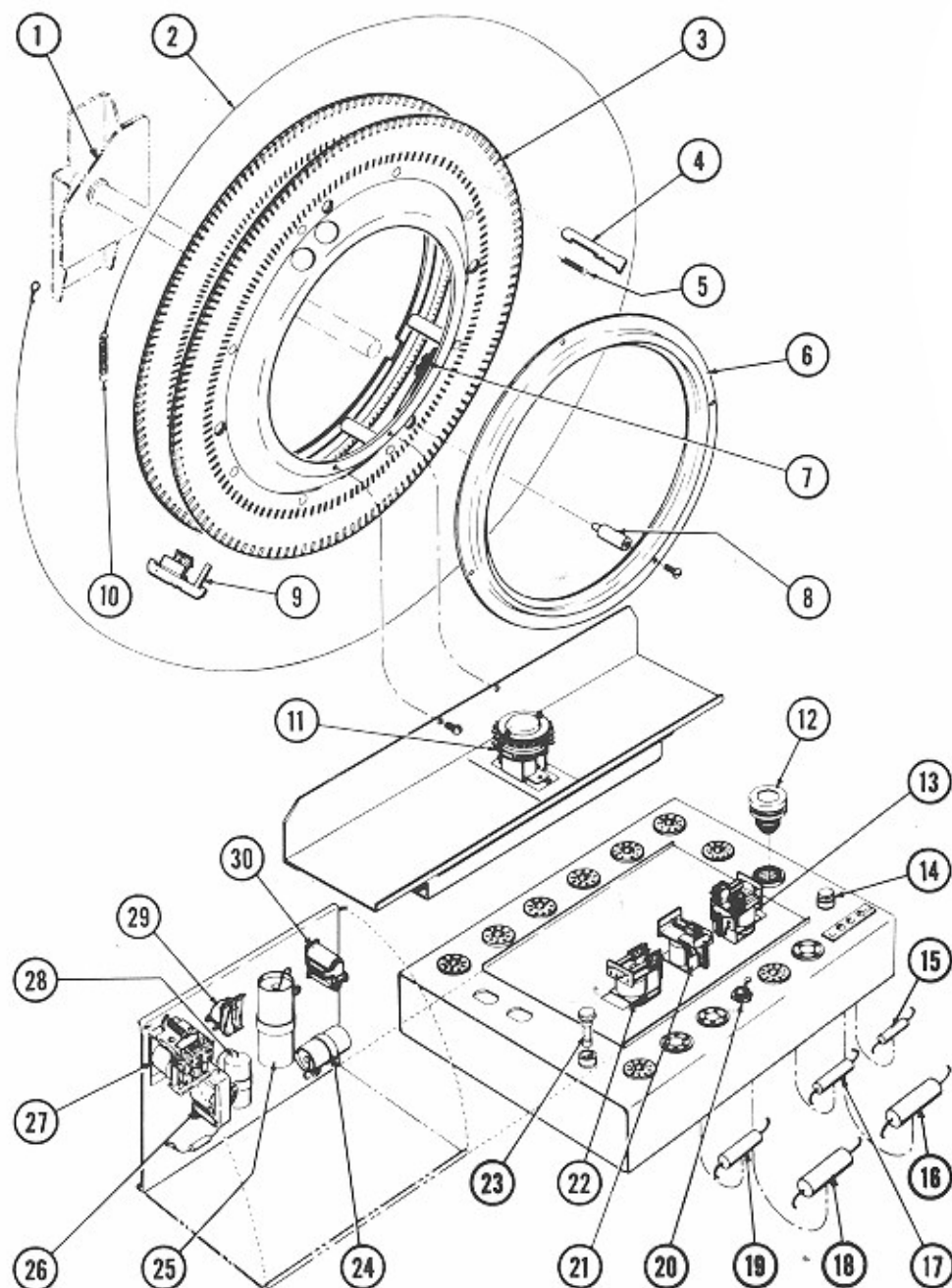


Fig. 42. ELECTRIC SELECTOR AND JUNCTION BOX STEPPER UNIT

1. Contact Plate Assembly (Reference)	65724	16. Capacitor, 0.1 MFD.	73033-14
2. Wire Band	65853	17. Capacitor, .022 MFD.	71187-24
3. Selector Mounting Plate Assembly	65563	18. Capacitor, 0.1 MFD.	73033-14
4. Latch Pin, Selector	57701	19. Capacitor, .01 MFD.	71183-14
5. Spring, Latch Pin	57110	20. Switch, Toggle	53648
6. Wobble Ring	65763	21. Relay, Transfer	65748
7. Switch Assembly, Override	65952	22. Relay, Timing	65749
8. Spacer (Actuator)	65507	23. Fusetron, 0.3 Amps.	14524
9. Coil and Core Assembly	65771	24. Capacitor, 100 MFD.	73862
10. Spring, Selector Coil Retainer	57115	25. Capacitor, 500 MFD.	71816
11. Relay, 48 Pole	65692	26. Transformer	65609
12. Fustat, 3 Amp.	61858	27. Relay, Reversing	65750
13. Relay, Timing	65747	28. Capacitor, 0.5 MFD.	73099-140
14. Fuse Post	45352	29. Relay, Override No. 1	56884
15. Resistor, 1000 Ohms	72192-32	30. Relay, Pulse	65752

SCHEMATIC WIRING DIAGRAM MO

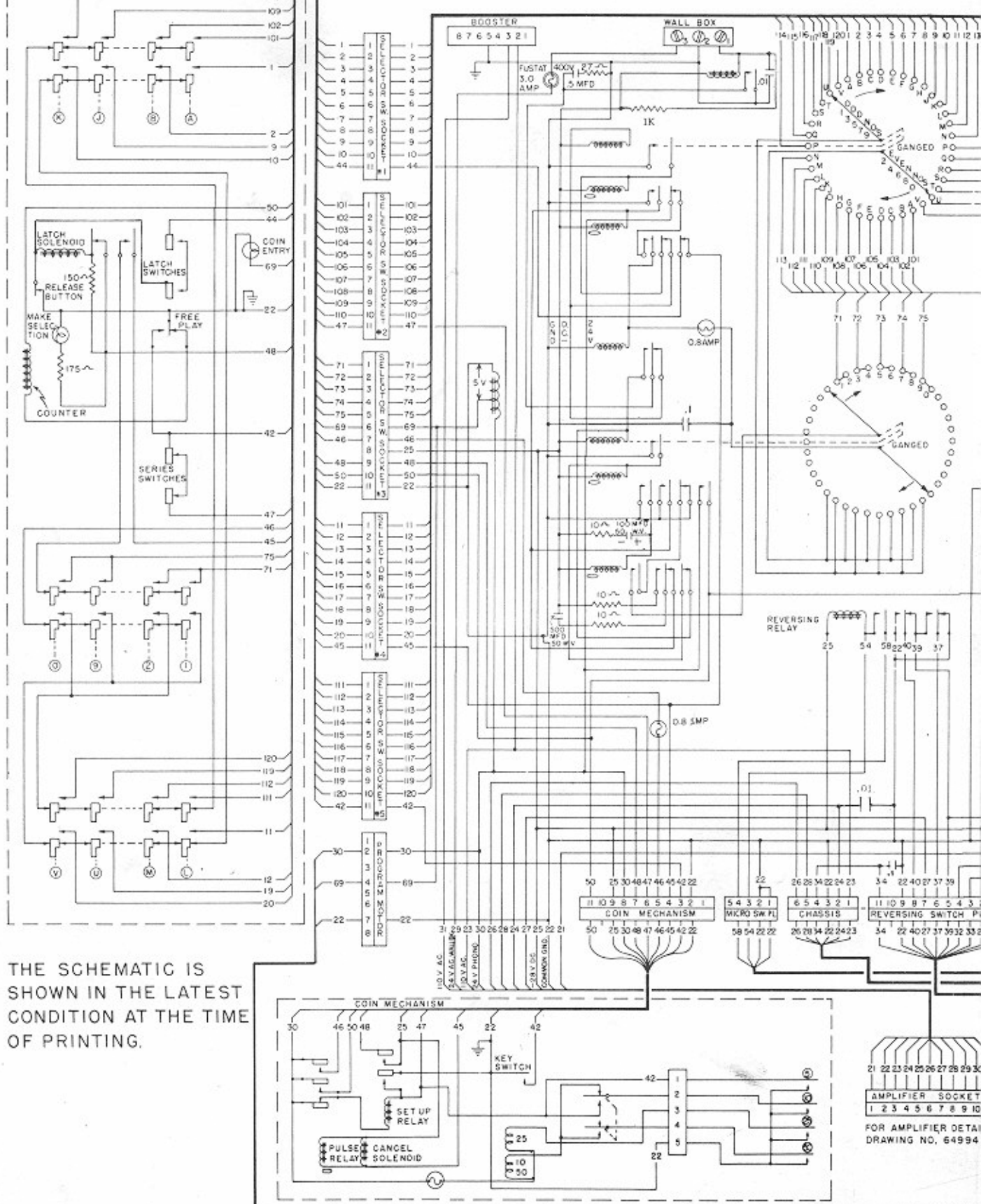
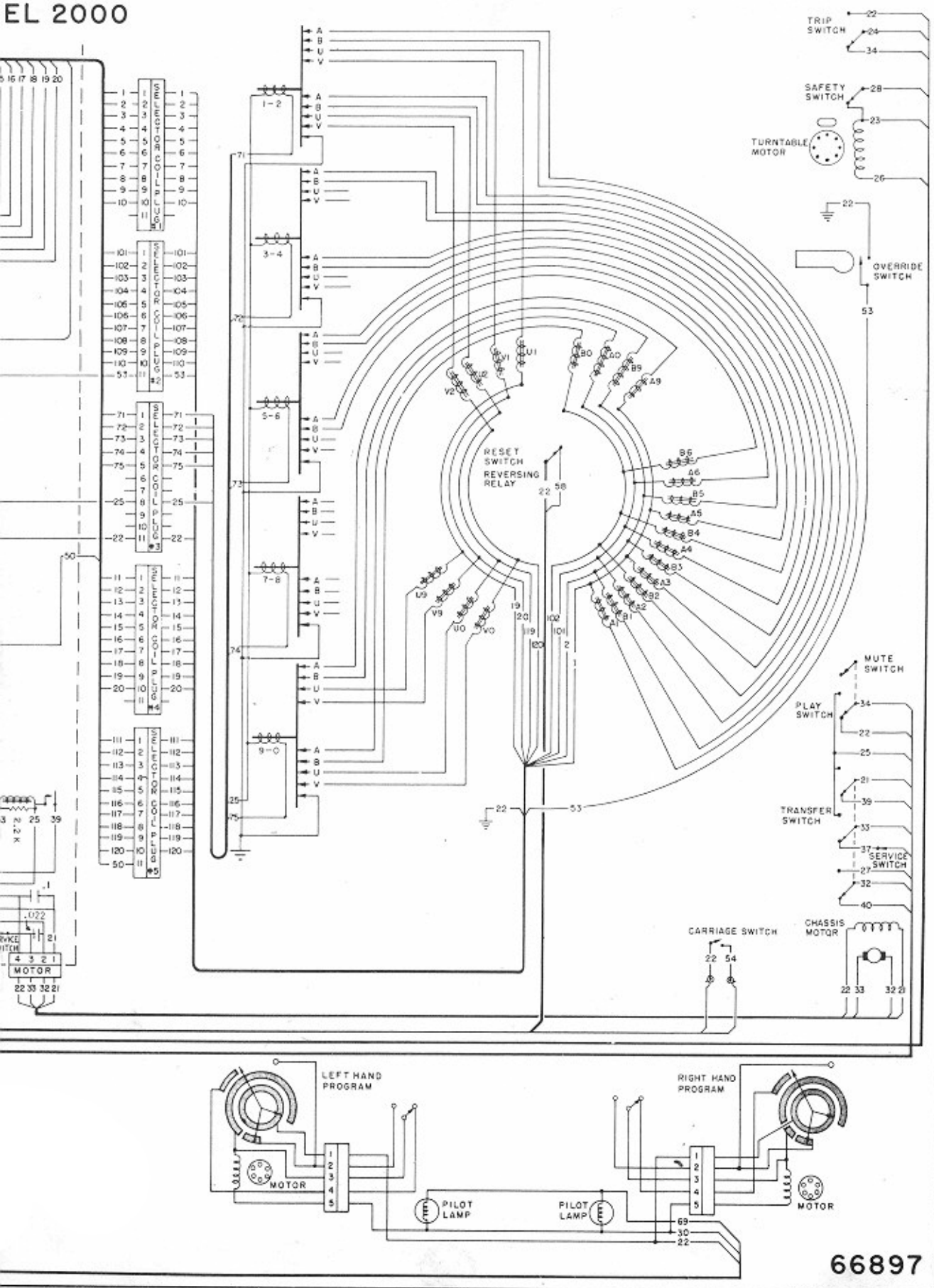


Fig. 43. COMPLETE PHONOGRAPH

EL 2000



SCHEMATIC WIRING DIAGRAM

WURLITZER MODEL 2000 RECORD CHANGER

1. GENERAL DISCUSSION

The Wurlitzer Model 2000 record changer (Fig. 44) is scientifically designed and fabricated. It is calculated to function without interruption throughout its service life. All components and systems have been carefully factory-adjusted and tested, thus minimizing the possibility of breakdown or malfunctioning. The record changer accommodates 100 seven inch, 45 R.P.M. records, which provide a choice of 200 selections. Outstanding features of the Model 2000

record changer mechanism are simplicity of design and built-in timing. Normally, only minor field adjustments may be required. However, this service manual, if studied carefully, will equip service personnel for meeting practically all service requirements that may arise. The Model 2000 Wurlitzer record changer is a precision-built mechanism, and although sturdily constructed, it should be handled like any other finely made instrument.

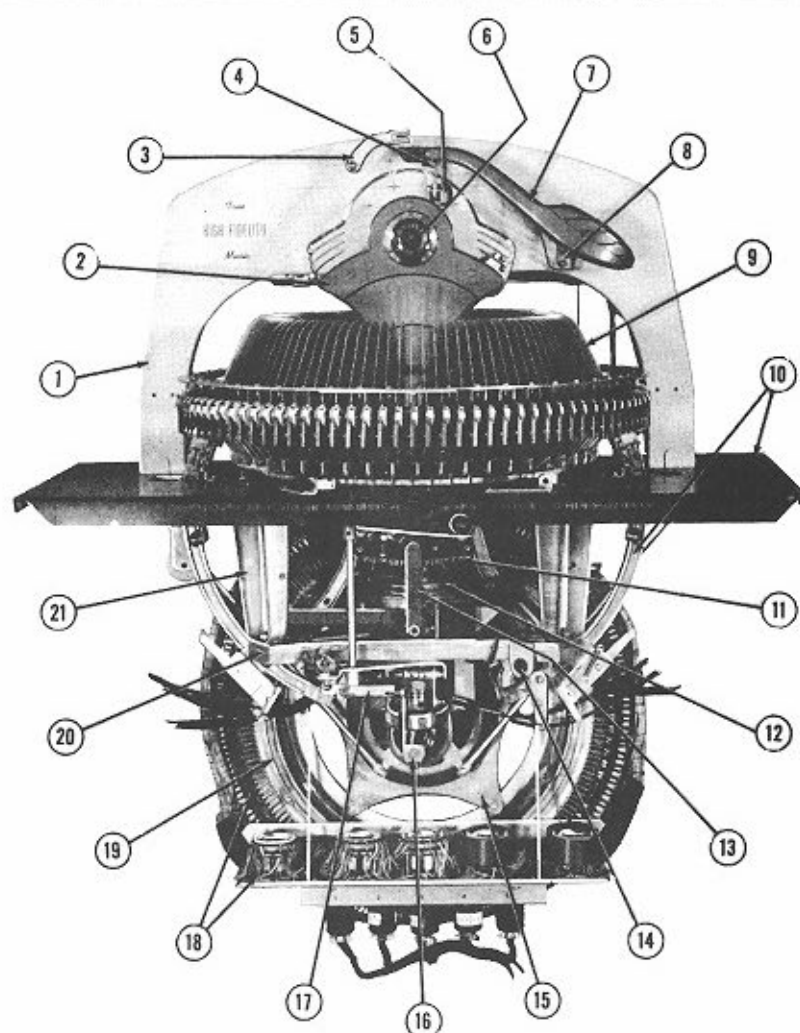


Fig. 44. MODEL 2000 RECORD CHANGER (FRONT VIEW)

1. Top Support Casting Assembly	64522	11. Main Gear and Ratchet Wheel Assembly	59732
2. Record Guide Assembly	64561	12. Main Cam and Bushing Assembly	62792
3. Tone Arm Brush Assembly	64559	13. Link and Lever Assembly, Record Lift Arms	59599
4. Tone Arm Feed-in Adjusting Screw	64422	14. Shaft and Cancel Arm Assembly	65555
5. Tone Arm Release Lever and Bracket Assembly	64530	15. Selector Casting and Bearing Assembly	65762
6. Turntable Shaft and Record Clamp Assembly	64552	16. Cancel Arm and Shaft Assembly	65544
7. Tone Arm Assembly	64526	17. Release Lever and Shaft Assembly	65776
8. Mounting Bracket, Tone Arm Assembly	64574	18. Electric Selector and Group Relay Assembly	65794
9. Record Carrier Assembly	65907	19. Wobble Ring	65763
10. Chassis Mounting Plate and Record Lift Arm Assembly	65879	20. Chassis Casting and Shaft Assembly	65894
		21. Support, (3 Used)	59716

2. DESCRIPTION

Five major assemblies, or groups of assemblies make up the record changer, Figure 44. The top support casting assembly (Item 1) includes the turntable assembly, the tone arm assembly, and the turntable motor and bracket assembly. Item 2, the record carrier assembly. Item 3, the chassis mounting plate and record lift arm assembly. Item 4, the chassis frame assembly, includes the main shaft assembly and the selector casting assembly. Item 5, the electric selector and group relay assembly. Each

of these assemblies is described separately in the following paragraphs.

a. The top support casting assembly is attached to the chassis mounting plate with four screws. The entire top support casting assembly may be detached as a unit by removing the four screws, disconnecting the electrical connections and two actuating cables.

The sub assemblies and components of the top support casting assembly (See Figs. 44 and 45) are as follows:

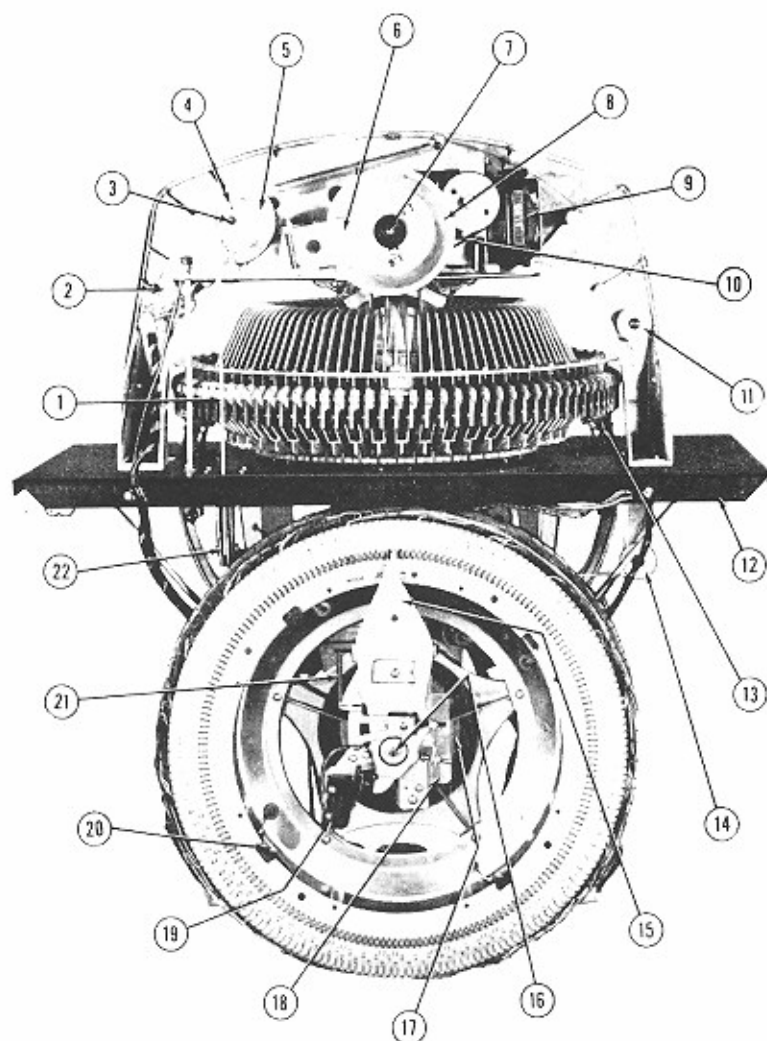


Fig. 45. MODEL 2000 RECORD CHANGER (REAR VIEW)

1. Cable, Record Clamp	59871	12. Chassis Mounting Plate	59827
2. Bracket and Trip Switch Assembly	67353	13. Bracket and Roller Assembly, Lift Arm Guide	65887
3. Release Lever Shaft, Tone Arm	59457	14. Mounting Bracket and Pulley Assembly	65900
4. Pulley, Drive	59415	15. Crank, Bracket, and Nut Assembly	65737
5. Cam, Record Clamp	59464	16. Screw, 10 - 32 x 3/4" Socket Hd.	73875
6. Arm and Roller Assembly, Record Clamp	59922	17. Contact Plate Assembly	66186
7. Turntable Shaft and Record Clamp Assembly	64552	18. Contact Blade and Plate Assembly	65724
8. Fly-wheel and Drive Pulley Assembly	59456 and 64190	19. Micro Switch (Carriage)	66002
9. Turntable Motor and Mounting Bracket Assembly	61533	20. Switch Assembly, Over-ride	65952
10. "O" Ring (Drive Belt)	60881	21. Spring, Selector Crank "Kick-off"	65810
11. Pulley, Cable Guide	59487	22. Mounting Bracket and Idler Pulley Assembly	61574

(1) Tone Arm Assembly.

A bracket on the right front side of the top support casting mounts the tone arm assembly (Fig. 44). The complete tone arm assembly consists of the tone arm casting, mounting casting and pin assembly, gimbal and stop nut assembly, feed-in guide bracket, counterweight, speed clip, and output wiring harness.

(2) Tone Arm Release Lever Shaft.

The tone arm release lever shaft is mounted in two bearings -- one in the support casting and one in the back plate. Mounted on the shaft are the feed-in guide lever actuating cam, the actuating pulley, and the record clamp cam. The actuating pulley, to which is connected the record clamp cable, serves to operate the record clamp lever, tone arm release and feed-in lever, the tone arm, and the record clamp cam.

(3) Tone Arm Release Lever and Bracket Assembly (Fig. 44).

The tone arm release lever is mounted behind the tone arm on the upper right side of the support casting (Fig. 44). The function of the release lever is to guide the tone arm needle to the feed-in groove of the record to be played. The tone arm release and feed-in lever function to guide the tone arm through the tone arm feed-in guide bracket. The feed-in adjusting screw is located in one end of the tone arm release bracket and functions to engage the needle with the feed-in groove of the record.

(4) Record Guide Assembly.

The record guide assembly is attached to the lower center of the support casting by a shaft through a pivot casting. This method of mounting allows the complete assembly to pivot and operate a safety switch if a broken or warped record becomes jammed against it. The record track, in turn, is pivoted laterally at the bottom of the record guide assembly and functions as a stop for a record from either side of the record carrier. The safety switch is operated by a bracket and stop nut assembly attached to the record guide assembly. The record guide assembly is spring-loaded to assure return to its normal position when obstruction has been removed.

(5) Turntable Motor and Mounting Bracket Assembly (Fig. 45).

The turntable motor and mounting bracket assembly is mounted on the left rear of the top support casting assembly (Fig. 45). The motor operates on 115 volt, 60 cycle current. Power is supplied to the turntable motor when over-ride relay No. 2

has been actuated by over-ride switch action and over-ride relay No. 1. See Page 35, Phase 2.

(6) Turntable Shaft and Record Clamp Assembly (Figs. 44 and 45).

The turntable shaft and record clamp assembly is made up of two shafts, one fitted inside the other. These two shafts are assembled inside a removable sleeve, which, in turn, is mounted in the top support casting. The inner, sliding shaft operates the record clamp mechanism. The outer shaft operates the turntable and clamp assembly. A drive pulley and fly wheel assembly is mounted on the rear end of the outer shaft. The record clamp plate is mounted on the rear end of the inner, record clamp, shaft.

(7) Record Clamp Lever and Bracket Assembly.

The record clamp, lever and bracket assembly is mounted on the right of the back plate of the top support casting. The record clamp lever is pivoted on its mounting bracket to transfer action of the record clamp cam to the sliding shaft which operates the record clamps (Fig. 45). The record clamp cam, in turn, is actuated by the pulley and cable which is connected to the record clamp lever, operated by the main cam.

(8) Tone Arm Brush Assembly (Fig. 44).

The tone arm brush assembly is mounted at the upper left center of the top support casting and is actuated by a cable linked to the transfer switch actuator arm. Since the transfer switch is actuated each time a record is played, the needle brush is also operated once for each record played. The brush moves away from the path of the tone arm after brushing the tip of the needle.

(9) Tone Arm Brush Cable Guide Pulley.

A plastic guide pulley and bracket assembly is mounted at the rear left side of the support casting (Fig. 45) to guide the cable linked to the tone arm brush assembly and the actuating arm of the transfer switch.

(10) Trip Switch.

The trip switch is mounted on a bracket which is pivoted to the rear side of the support casting. The pivot mounting of the trip switch and bracket assembly serves to provide adjustment for trip action at the cut-off groove of the record.

(11) Safety Switch.

As described in paragraph (4), the safety switch is the means by which power is shut off in case

of a record jam at the record guide assembly. It is a normally open micro switch, mounted on the rear side of the support casting, slightly to the right of the record guide assembly.

b. Record Carrier Assembly (Fig. 44).

The record carrier assembly is made up of the record carrier casting, the carrier drive pawl arm, carrier drive pawl arm spring, 100 individual record holders with record play counters, and the four carrier ring and silk screen assemblies.

The record carrier assembly is mounted on the upper end of the selector shaft assembly and is held in place by a large retaining ring. The record carrier assembly is removable as a complete unit. The individual record holders, with their accompanying play counters, however, may be removed separately. The sub assemblies of the record carrier assembly may be described as follows:

(1) Record Carrier Casting and Drive Pawl.

The record carrier casting and drive pawl assembly is the foundation for the carrier and mounts the 100 record holder and counter assemblies which are held in place by the indexing teeth on the circumference of the casting. These teeth function to engage the back stop pawls to provide accurate indexing of the carrier when its searching action is stopped to present the selected record for engagement with the turntable. The carrier drive pawl and spring are mounted on the under side of the carrier casting engaging the carrier drive arm assembly to provide rotation of the record carrier in a clockwise direction only. The record carrier casting is fitted with a rubber ring and clamping plate that serve to hold the record holders in place at the center of the casting.

(2) Record Holders.

The record holder assemblies are replaceable units. The play counters which are a riveted part of the holders count up to 40 plays for each of the 100 records.

(3) Carrier Ring and Silk Screen Assembly.

The carrier ring is made up of four equal segments which together form the complete carrier ring. Twenty-five record holders are fastened in pairs to each segment by small screws and speed units or tapping plates where the segments join. The four segments are identified by the last number at the ends of the segment as A1-M8, A6-M3, B1-L3, B6-L8. Each side of every record is identified on the carrier ring by a letter and a number such as A1-B1, C1-D1, E1-F1 etc. These numbers are silk screened on the carrier ring segments.

c. Chassis Mounting Plate and Record Lift Arm Assembly (Fig. 44).

The chassis mounting plate is the supporting member of the record changer. The following items are considered integral parts of the chassis mounting plate; reinforcement plates, spring cups, hold-down clamps, and left arm spring brackets. Attached to the mounting plate to complete the assembly are three carrier rollers, the tone arm brush cable guide pulley and bracket assembly (See Fig. 45).

Although the record lift arm assembly may be considered a sub assembly, it is included in the chassis mounting plate and lift arm assembly. The record lift arms are attached to the chassis mounting plate by a bracket and three screws. The chassis mounting plate supports the top support casting, the record changer motor and the chassis frame assembly. The chassis frame assembly is hung from the chassis mounting plate by three chassis frame supports shown in Figure 44. Two backstop pawls and the loading levers and switch are mounted at the front of the chassis mounting plate. The loading lever and linkage turns off power to the changer motor and releases the selector crank from engagement with any selector pins which may be released. The record carrier is thus free to be rotated for changing of records.

d. Chassis Frame Assembly.

The chassis frame assembly includes the chassis frame casting, the selector shaft assembly, the three chassis frame supports, and the casting for the electric selector. This assembly serves as a mount for the main cam and shaft assembly, the record lift arm link and lever assembly, the record clamp and tone arm lever, the shaft and cancel arm assembly, the mute and play switch actuator arm, the transfer switch actuator arm assembly, the transfer switch, and the mute and play switch (See Figs. 44-45).

(1) Link and Lever Assembly (Fig. 44).

The function of the link and lever assembly is to transmit the movement of the cam follower (roller) from the main cam record lift surface to either one of the two record lift arms that has been selected to raise. The link and lever assembly is attached to the chassis frame casting by a bracket. A roller guide track is provided to assure vertical movement of the link and lever assembly.

(2) Record Clamp and Tone Arm Lever.

The record clamp and tone arm lever is mounted separately on the rear of the chassis frame casting. It actuates the record clamp and the tone arm cam and shaft.

(3) Shaft and Cancel Arm.

The cancel arm is pinned on a shaft mounted through the right front member of the chassis frame casting. Also pinned to this shaft is the cancel lever and roller which operates off the main cam. The function of the cancel arm is to actuate the plunger and crank arm through the lateral selector shaft to reset the selector pin and release the carriage switch after a selection has been made.

(4) Mute and Play Switch Actuator Arm and Transfer Switch Actuator Arm.

These two actuator arms are mounted on and pivot on the same shaft on the back of the chassis frame casting. This function is to operate the transfer switch and tone arm brush, and the mute and play switch.

(5) Transfer Switch - Mute and Play Switch.

The transfer switch functions to change operation of the record changer from record handling operation to searching operation. The mute and play switch functions to stop the record handling operation at the correct position for playing of the selected record. Its muting function is to reduce amplifier out-put until the needle has reached the playing groove of the record.

e. Selector Shaft Assembly.

The selector shaft assembly includes the arm and hub assembly on which the record carrier is mounted, the selector drive clutch and hub, the drive clutch spring and felt washers, gear and ratchet wheel assembly, main cam and bushing assembly, thrust bearing and spacers, and the main selector shaft and bevel gear assembly.

(1) Arm and Hub Assembly.

The arm and hub assembly is pinned to the upper end of the main selector shaft with a roll pin. The arm of this unit engages the record carrier drive arm on the under side of the record carrier casting and drives the record carrier through its searching phase.

(2) Drive Clutch Hub.

The drive clutch hub is pinned to the main selector shaft and functions to hold the drive clutch spring and act as the driven member of the drive clutch.

(3) Drive Clutch Spring.

The drive clutch spring functions as the idler member of the clutch and fits snugly around the drive clutch hub. The hub of the main gear thus be-

comes the driving member of the clutch. The clutch will, without lost motion, drive the main selector shaft in a clockwise direction only. It automatically releases on reverse action of the main gear.

(4) Gear and Ratchet Wheel Assembly.

The gear and ratchet wheel assembly is bearing mounted on the main selector shaft directly above and close to the main cam. As stated above, the selector shaft is clutch driven by the hub of this gear only when it turns in a clockwise direction. When the changer motor reverses and turns the main gear and ratchet wheel assembly in a counter-clockwise direction, the ratchet wheel on the under side of the main gear will be engaged by the pawl assembly on the main cam. Thus the main cam may be turned only in a counter-clockwise direction to perform its record handling function.

(5) Pawl Assembly.

Although the pawl assembly is included here as a component of the main selector shaft assembly, it is actually attached to the main cam. As stated above, the pawl will engage the ratchet wheel to drive the main cam in a counter-clockwise direction only.

(6) Strap and Spring Assembly.

The strap and spring assembly is composed of two semi-circular metal straps, riveted together at one end. The coil spring provides tension for the strap around the lower end of the hub of the "main gear and ratchet wheel assembly". When the gear and ratchet wheel assembly is turning in a clockwise direction, the strap and spring assembly engages the pawl assembly and holds the driving dog of the pawl assembly away from the ratchet wheel teeth. This action of the strap and spring assembly eliminates any ratchet noise. During this phase of operation the strap and spring assembly remains stationary and slips on the hub of the moving main gear and ratchet wheel assembly. When the changer motor reverses and the main gear and ratchet wheel assembly turns in a counter-clockwise direction, the strap and spring assembly releases the pawl assembly to engage with the ratchet wheel and drive the main cam through its record handling phase.

(7) Main Cam and Bushing Assembly.

The main cam and bushing assembly is mounted on a hollow "shaft, plate, and bushing assembly" riveted to the chassis frame. It is held down on this hollow shaft by means of a thrust bearing assembly and retaining ring. The main selector shaft has its lower bearings contained in the hollow shaft and bushing assembly. The main gear and ratchet wheel is thus concentric with and directly over the main cam and bushing assembly. The cam is pro-

vided with five accurately timed cam tracks for operation of five arm and roller assemblies as follows: record lift arm link and lever assembly, cancel arm, transfer switch actuating lever, mute and play switch actuating lever, record clamp and tone arm cam actuating lever.

(8) Cancel Mechanism (Fig. 44).

The cancel action created by the cancel cam is transferred by the "shaft and cancel arm assembly" through a cable and idler pulley to the "cancel arm and shaft assembly", and the "release lever and shaft assembly" to the "shaft and cap assembly" (cancel plunger) which extends through the lateral selector shaft to the selector crank. Cancel action is thus provided for the selector crank.

(9) Cancel Mechanism Assembly (Fig. 45).

The cancel mechanism assembly (selector crank) consists of the mounting bracket and bearing assembly, which includes the tube (hollow selector shaft with the cancel cap and plunger), the crank support bracket and stop nut assembly, the crank bracket and nut assembly, the contact plate and blade assembly, the switch bracket and actuator assembly, and associated small parts and springs. The cancel mechanism assembly has an important function in selecting. The lateral selector shaft (tube) is closely coupled to the main selector shaft by a pair of bevel gears, therefore the selector crank is accurately synchronized with the record carrier. Its first function is to actuate the carriage switch when the tip of the crank is interrupted, in its searching cycle, by a released selector latch pin.

(10) Motor Reversing Function.

When the selector crank is interrupted by a release selector latch pin, the carriage switch actuates the reversing relay and causes the searching action to stop and the record handling action to start. At this time the clutch spring exerts some counter-clockwise influence on the selector shaft, also the loading influence of the selector crank "kick-off" spring tends to turn the selector shaft counter-clockwise. The record carrier will therefore back up slightly and engage one of the holding pawls to properly index the record carrier for record handling.

f. Electric Selector and Group Relay Assembly (Fig. 44).

The electric selector and its mounting casting are mounted on the chassis frame to support the selector unit in a vertical position at the rear of the phonograph. Included with this unit are the wobble ring, the over-ride switches, five number group relays, the selector crank and shaft assembly, and wiring harness including contact plate and carriage switch.

(1) Electric Selector.

The electric selector itself consists of two hundred selector magnets and two hundred selector latch pins with their individual actuating springs.

(2) Wiring Harness.

The wiring harness for the electric selector is made up of selector coil lead wires, over-ride and carriage switch lead wires, group relay lead wires, and appropriate connecting plugs.

(3) Wobble Ring (Fig. 44).

The wobble ring is lightly spring-loaded against the ledge formed by the inside shoulder of the 200 selector latch pins. It is so mounted that the release movement of one or more selector latch pins will displace the ring enough to actuate one or more of the four over-ride switches.

(4) Over-ride Switches (Fig. 45).

The over-ride switches are mounted at 90° intervals on the outer circumference of the selector mounting ring. They are actuated by plastic spacers attached to the wobble ring. The function of the over-ride switch circuit will be described in detail in the following paragraph on operation.

(5) Selector Casting (Fig. 44).

The selector casting is provided with bushings for the selector crank and shaft, a thrust bearing adjustment to permit accurate adjustment of the selector bevel gears, and a rotary contact plate to transmit the carriage switch function. It is securely mounted to the chassis frame and is treated as a component of that assembly.

(6) Carriage Switch (Fig. 45).

The carriage switch is mounted on the mounting bracket assembly as shown in Figure 45. It functions when the selector crank is intercepted, in its searching action, by one of the selector latch pins. The electrical function of the carriage switch will be discussed in detail in the following paragraph on operation.

(7) Junction Box and Stepper Unit (Figs. 26 and 27).

The junction box and stepper assembly is mounted on the floor of the phonograph. At the front of the junction box are mounted the sockets for the selector switch assembly and the socket for the program motor. At the rear are the sockets for the coin register mechanism, the chassis socket, two switch sockets, and the changer motor socket. For convenience the service switch and the wall box terminal strip are mounted at the rear also. On the

left is a socket for installation of a Model 222 Booster, a 3 Amp. Fustat for protection of the line to the first group of wall boxes, and an 0.8 Amp. Fusetron for protection of the stepper selection circuit. On the right is a cable and plug assembly for connection to the electric selector and an 0.8 Amp. Fusetron for protection of the selector switch selection circuit. The cable and plug at the left end of the junction box provides connection to the source of power supply furnished by the amplifier. Under the chassis pan are mounted the reversing relay, the pulse relay, over-ride relay number one, the 5.5V panel light transformer and several components of the stepper. The electrical function of the relays will be discussed in detail in the following paragraph on Operation.

3. OPERATION

(Figs. 46 thru 53).

The model 2000 record changer goes through a complete operating cycle each time a record is played. This cycle begins with the phonograph in its normal "at rest" position and passes through nine distinct phases of operation until the phonograph returns to its original "at rest" position. All of the mechanical operation of the record changer depends upon the operation, in proper sequence, of the over-ride switch, the carriage switch, the transfer switch, the mute and play switch, and the trip switch or the cancel switch. The following description of the operation of the phonograph is therefore, divided into nine phases based on the sequential operation of the foregoing electrical switches. These nine phases are as follows:

a. Phase 1 -- Phonograph at Rest. (Fig. 46)

In describing the electrical and mechanical conditions of the record changer during its first phase of operation, it is assumed that the phonograph has been plugged in and is ready for insertion of a coin. In this "stand-by" condition the fluorescent lights and the coin entry lights are on and low temperature voltage is applied to the heater elements of the amplifier tubes.

(1) Electrical Condition -- Phase 1.

The electrical condition of the record changer during the stand-by or (at rest) phase is shown in Figure 46. Negative D.C. voltage is present at one side of the coil of over-ride relay No. 1, the open contacts of over-ride relay No. 1, one side of the reversing relay coil, two open contacts of the transfer switch, and one open contact of the play switch. Positive D.C. voltage appears at one side of over-ride relay No. 2, the motor field, the closed play, trip and cancel switches, and the open transfer switch contacts. No action therefore will take place until the No. 1 over-ride relay is energized.

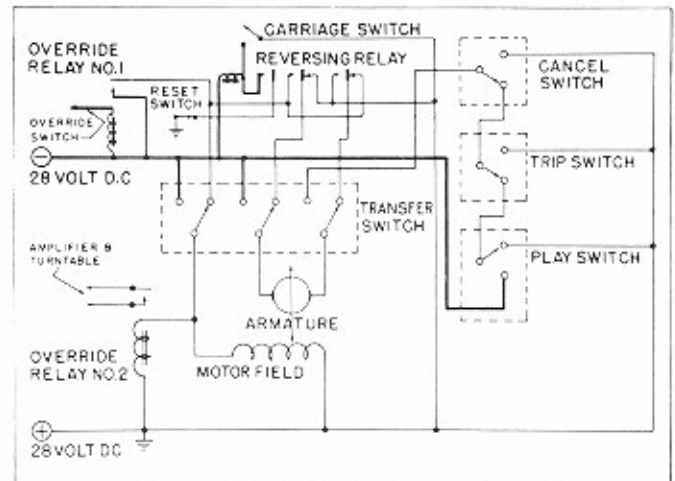


Fig. 46 PHASE I - PHONOGRAPH AT REST

(2) Mechanical Condition -- Phase 1.

When the phonograph is at rest, the record lift arms are held in their full downward position by record lift arm track of the main cam. The transfer switch is actuated by the transfer switch track of the main cam. The play switch cam track has no function at this time. The tone arm and turntable cam track of the main cam is at its fully actuated position, holding the tone arm cam and the turntable cams at their maximum actuated positions.

b. Phase 2 -- Over-ride Switch and Over-ride Relays. (Fig. 47)

When a coin is registered on the coin register mechanism and a selection is made as shown in the sequence schematics on the electric selector system, one or more of the over-ride switches close and energize over-ride relay No. 1, shown in broken line.

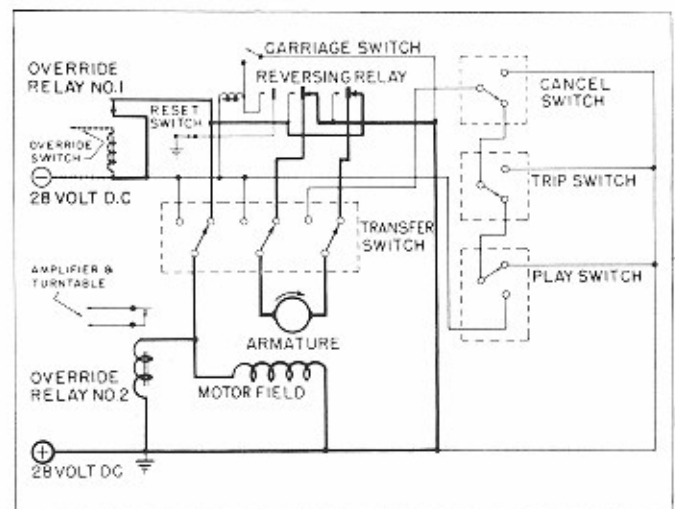


Fig. 47 PHASE 2 - OVERRIDE CIRCUITS

(1) Electrical Condition -- Phase 2.

When over-ride relay No. 1 is energized its normally open contacts close as shown in Figure 47 and simultaneously completes three D.C. circuits. One to over-ride relay No. 2 which provides A.C. for the amplifier and the turntable motor, one to the D.C. motor field, and one to the armature of the D.C. motor. These circuits are shown in heavy lines. Thus the changer motor starts its clockwise operation to drive the record carrier through its searching phase.

(2) Mechanical Condition -- Phase 2.

When the selector shaft turns in a clockwise direction, the record carrier rotates in a clockwise direction, and the selector crank rotates in a counter-clockwise direction until the selector crank is intercepted by the released selector latch pin. Meanwhile the main cam remains in its original at rest position. The searching phase is therefore the only action to take place up to this time.

c. Phase 3 -- Carriage Switch and Reversing Relay. (Fig. 48)

When the searching selector crank is intercepted by a released selector latch pin, the selector crank shifts under spring loading on its mounting bracket. The shifting motion of the selector crank actuates the carriage switch, also mounted on the selector crank mounting bracket. The shifting motion continues slightly further and stops against the selector stop bracket.

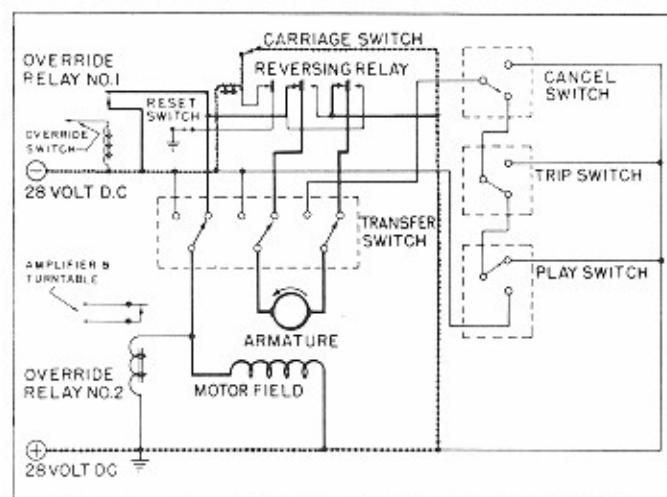


Fig. 48 PHASE 3 - CARRIAGE SWITCH AND REVERSING RELAY

(1) Electrical Condition -- Phase 3.

The closing of the carriage switch completes a D.C. circuit to the reversing relay coil, as shown in broken line. The reversing relay has two single pole, double throw switches and functions as a

pole changer for the armature of the changer motor. As shown in heavy lines (Fig. 48), this pole changing function is the only electrical change effecting the mechanism.

(2) Mechanical Condition -- Phase 3.

When the reversing relay is actuated, the direction of the changer motor is reversed. The clutch spring on the hub of the main gear and the drive clutch hub will therefore release its hold and the record carrier will be free to stop against one of the two back-stop pawls. Meanwhile, the ratchet wheel on the under side of the main gear will engage the driving pawl on the top side of the main cam. Counter-clockwise rotation of the changer motor and the main gear produces engaging action of the driving pawl. Thus, the main cam turns in a counter-clockwise direction and the various cam follower rollers are affected by their respective cam tracks. After a few degrees of rotation, of the main cam, the roller of the actuator arm for the transfer switch drops off the lobe on its cam track and the transfer switch retracts to its normal position.

d. Phase 4 -- Transfer Switch. (Fig. 49)

The transfer switch functions to change control of the changer motor circuit from the over-ride and reversing switch controls, to the play switch, trip switch, and cancel switch controls. During the following portion of the cycle of operation these former switches will be reset to again perform their initial functions in the next cycle of operation.

(1) Electrical Condition -- Phase 4.

An examination of Figure 49 shows the changer motor circuit following the operation of the transfer switch. Although the two motor circuits have been maintained without interruption and in the same polarity as shown in phase 3, the initial switching components have been entirely isolated.

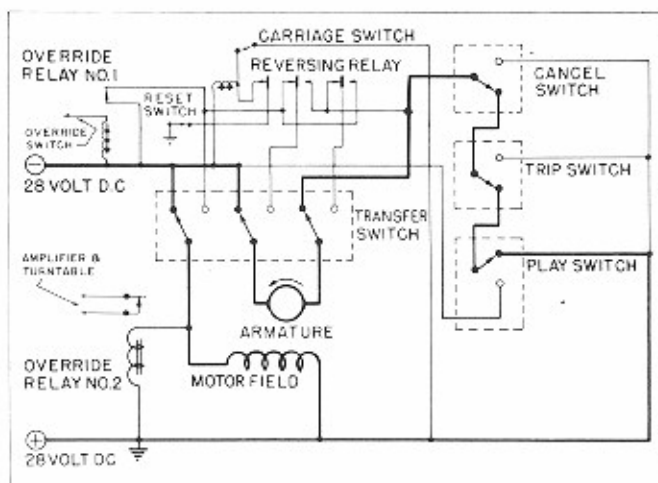


Fig. 49 PHASE 4 - TRANSFER SWITCH

(2) Mechanical Condition -- Phase 4.

After the transfer switch operates, the main cam continues to turn in a counter-clockwise direction. At this point one record lift arm is indexed to be intercepted by a record holder while the other is indexed to raise a record to the playing position. The link and lever assembly is actuated by the main cam outer vertical track to raise the free record lift arm and the cancel lever is actuated by the main cam inner vertical track to operate the cancel linkage and reset the selected latch pin. The changer motor continues and the upper lateral cam track will operate the tone arm actuator and linkage to engage the tone arm with the record and release it for compliance with the record groove. At this point the adjustable lobe on the lower lateral cam track will operate the mute and play switch to stop the mechanism in this "play position".

e. Phase 5 -- Mute and Play Switches Actuate. (Fig. 50)

When the play switch operates, positive 28 volt D.C. is removed from one side of the armature of the record changer motor, and negative 28 volt D.C. is applied to that side, thus forming a direct shunt across the armature. This condition produces a strong resistance to rotation of the armature and is in effect a dynamic brake. The record changer accordingly is stopped quickly in the play position and held stationary during the playing cycle. See Fig. 50.

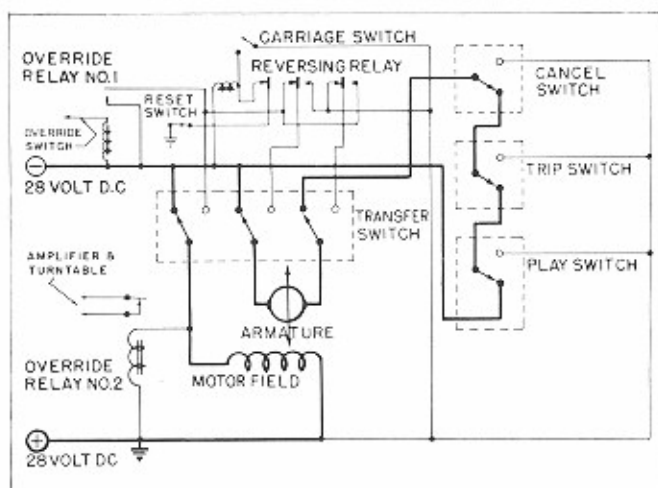


Fig. 50 PHASE 5 - PLAY SWITCH FUNCTION

(1) Electrical Condition -- Phase 5.

Figure 50 shows the active circuits in solid lines from both sides of the armature through the cancel switch, the trip switch, and the play switch forming a complete shunt as explained above. Negative 28 volt D.C. is still applied to one side of the motor field and positive 28 volt D.C. to the other side. Not shown in solid lines, over-ride relay No. 2 is still energized to maintain turntable, and amplifier

operation. The muting switch not shown, actuates in conjunction with play switch to reduce the amplifier out-put during the record changing cycle and pre-set the automatic level control to provide gradual increase in volume from needle contact to the playing grooves of the record.

(2) Mechanical Condition -- Phase 5.

During this phase the D.C. record changer motor remains stationary with dynamic braking in force, as described in (1) and the record lift arms remain stationary, one against the record carrier and the other in its raised position. Meanwhile, the turntable operates until the tone arm has reached the cut-off groove of the record where the trip switch will be actuated.

f. Phase 6 -- Trip Switch Function. (Fig. 51)

The function of the trip switch, as shown in heavy lines, Figure 51, is to open the shunt circuit and apply positive 28 volt D.C. to one side of the armature of the changer motor. As the motor resumes its counter-clockwise rotation the mechanism cycle will advance. Within several degrees, mechanical action actuates the play switch and then releases the trip switch.

(1) Electrical Condition -- Phase 6.

An examination of Figure 51, shown in heavy lines, finds negative 28 volt D.C. is present at one side of the changer motor field and one side of the changer motor armature. Positive 28 volt D.C. is present at the opposite sides of both. Over-ride relay No. 2, not shown in heavy lines, still remains energized due to the position of the transfer switch.

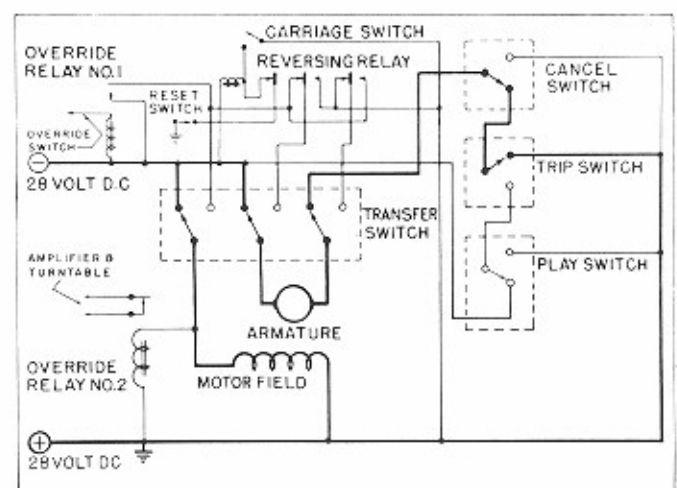


Fig. 51 PHASE 6 - TRIP SWITCH FUNCTION

(2) Mechanical Condition -- Phase 6.

As explained above, when the trip switch operates, the record changer motor starts the main

cam turning in a counter-clockwise direction. After it has turned a few degrees, the play switch lobe operates the actuating arm to release the play switch. At this point the play switch is in position to take over the trip switch function as the tone arm swings away from its trip position. At this time, with the exception of the over-ride relay No. 1 circuit, the electrical condition is again as shown in Figure 49.

g. Phase 7 -- Reversing Relay and Re-set Circuit. (Fig. 52)

(1) Electrical Condition -- Phase 7.

As shown in heavy lines, Figure 52, since its initial circuit was established in phase 3, Figure 48, the reversing relay has been held interlocked by its contacts 5 and 4, and the reset switch. Within four or five degrees following the play switch action the reset switch will be opened by its main cam lobe and the reversing relay will be released preparatory to starting a new cycle.

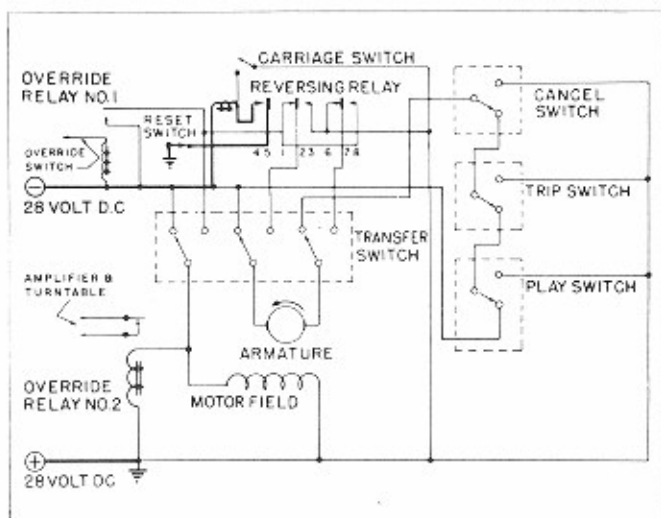


Fig. 52 PHASE 7 - REVERSING RELAY AND RESET CIRCUIT

(2) Mechanical Condition -- Phase 7.

During this phase of the cycle of operation the main cam continues in its counter-clockwise rotation to return the tone arm to its original position and lower the record into its position in the record carrier.

h. Phase 8 -- Transfer Switch and Full Cycle Function. (Fig. 53)

When the main cam has completed its cycle the transfer switch will again be actuated to its original position, thus functioning as a full cycle switch.

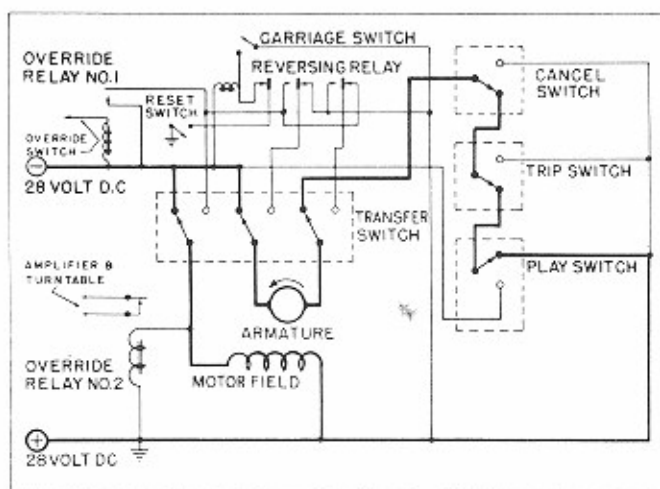


Fig. 53 PHASE 8 - TRANSFER SWITCH AND FULL CYCLE FUNCTION

(1) Electrical Condition -- Phase 8.

In this full cycle position all circuits revert to the condition described in phase 1 when the over-ride switch is open at the selector drum. When the over-ride switch at the selector drum is closed due to more than one selection, the electrical condition will revert to the condition described in phase 2.

(2) Mechanical Condition -- Phase 8.

At the completion of the cycle as described above, the mechanism has returned to its "at rest" position and all switches have been reset preparatory to making another selection in accordance with which selector latch pin or pins have been released.

4. ADJUSTMENTS

Although each Wurlitzer Model 2000 Phonograph is carefully adjusted at the factory, various factors such as rough handling during shipment may make it necessary to check adjustments. Before making adjustments it should be remembered that the mechanical operation of the phonograph depends primarily upon the proper operation of a number of switches. Therefore, if the phonograph fails to function properly, check the adjustment of the various control switches first. When it is certain that all switches are operating properly, it will be easier to locate the reason for a mechanical malfunction.

The following nine paragraphs (a to i inclusive) are provided in a group at this point, only as a matter of convenience in checking a phonograph that is assumed to be in normal mechanical adjustment. All, except the reset switch for the reversing relay, the service switch, and the loading switch, have their adjustments dependent on proper mechanical adjustment of the components which serve to produce their

operation. The failure, therefore, of a switch may indicate some change in mechanical adjustment since final inspection at the factory.

a. Safety Switch. (Fig. 54)

The record guide being in proper adjustment will pre-determine the following switch setting:

(1) Turn the safety switch adjusting screw counter-clockwise until the safety switch is released.

(2) Now turn the safety switch adjusting screw back in a clockwise direction until the safety switch again actuates.

(3) Continue the clockwise movement of the adjusting screw for one half to one full turn to provide reasonable overtravel of the switch.

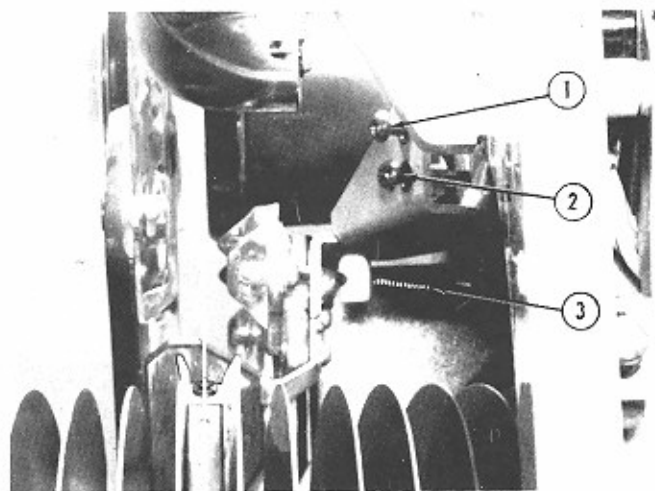


Fig. 54. SAFETY SWITCH

- | | |
|------------------------------------|----------|
| 1. Screw, Safety Switch Adjusting | 73800 |
| 2. Screw, Record Guide Adjusting | 73656-72 |
| 3. Spring, Record Guide Retracting | 59606 |

b. Over-ride Switches, Electric Selector.
(Fig. 55)

When a selector latch pin is released, the "wobble ring and spacer (actuator) assembly" will be displaced, causing one or more of the actuators to actuate their respective over-ride switches as shown in Figure 55. The wobble ring is out of view on the front side of the selector drum, however, it appears as Item 19, Fig. 44. There is no adjustment provided for the over-ride switches, however, the forming of the blades should enable positive contact with good wiping action of one or two of the switches when the wobble ring is displaced by any single selector latch pin. The inner blades of the over-ride switches should exert enough pressure against their respective actuators to hold the wobble ring against the shoulders of the selector latch pins with a pressure of 20 grams.

Check for proper over-ride switch action by using several different selector pins one at a time.

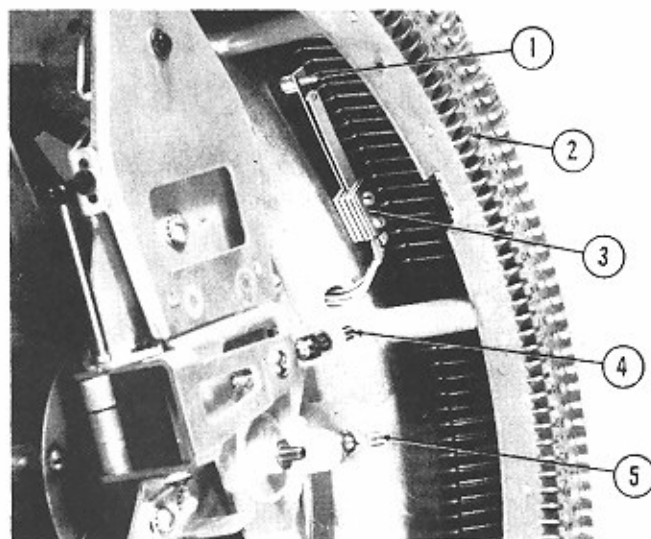


Fig. 55. OVER-RIDE SWITCHES, ELECTRIC SELECTOR

- | | |
|---|-------|
| 1. Actuator (Spacer)(4 Used) | 65507 |
| 2. Selector Latch Pin (200 Used) | 57701 |
| 3. Over-ride Switch (4 Used) | 65952 |
| 4. Screw, Selector Crank Stop Adjustment | 65702 |
| 5. Screw, Selector Crank Centering Adjustment | 65760 |

Switch action may readily be identified by listening for over-ride relay action when contact is made. The relay action should occur at about one third of the travel distance of the selector latch pin. Also the relay should be released at about the same point when the pin is reset.

c. Carriage Switch and Reversing Relay.
(Fig. 56)

The carriage switch functions as the actuating component for the reversing relay, therefore, its operation must be closely synchronized with the position of the record carrier and, as stated before, its adjustment is dependent on the proper mechanical adjustment of several other sub-assemblies of the record changer. Adjustment of the carriage switch, if necessary, may be accomplished as follows:

(1) With the record carrier positioned at, preferably, B1 and held against the proper back-stop pawl, the selector crank stop adjustment (Item 7, Fig. 56) should be free enough to allow adjustment of the carriage switch actuating screw. (Item 2).

(2) Set the carriage switch actuating screw to produce switch action, when the selector crank is moved in a clockwise direction, at a point where the trailing side of the lip of the selector crank is at the center of the B1 selector latch pin but not further than 1/32" beyond the side of the B1 selector latch pin.

(3) There should be 1/64" to 1/32" over-travel, as measured at the tip of the selector crank, before the selector crank stop adjustment is engaged by the selector stop bracket, (Item 1, Fig. 56).

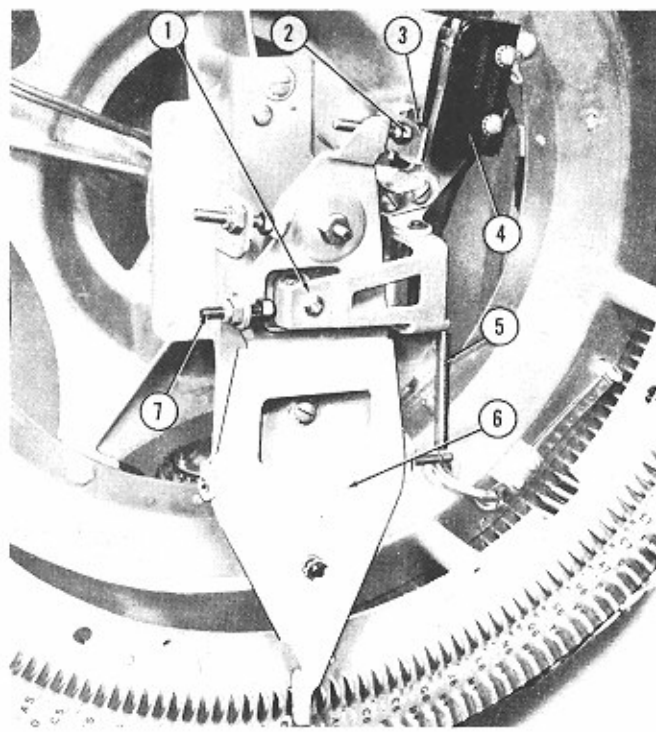


Fig. 56. CARRIAGE SWITCH FOR REVERSING RELAY

- | | |
|--|-------|
| 1. Stop Bracket, Selector Crank | 65906 |
| 2. Screw, Carriage Switch Adjusting | 65760 |
| 3. Bracket and Lever, Switch Actuator | 65905 |
| 4. Micro Switch, Carriage | 66002 |
| 5. Spring, Kick-off | 65810 |
| 6. Selector Crank, Assembly | 65737 |
| 7. Screw, Selector Crank Stop Adjustment | 65702 |

d. Transfer Switch Adjustment. (Fig. 57)

The transfer switch is mounted on the chassis casting and is located behind the selector drum and under the record changer motor at the rear of the phonograph. The selector drum has been removed to permit illustration in Figure 57. The transfer switch actuating arm has two adjusting screws, one

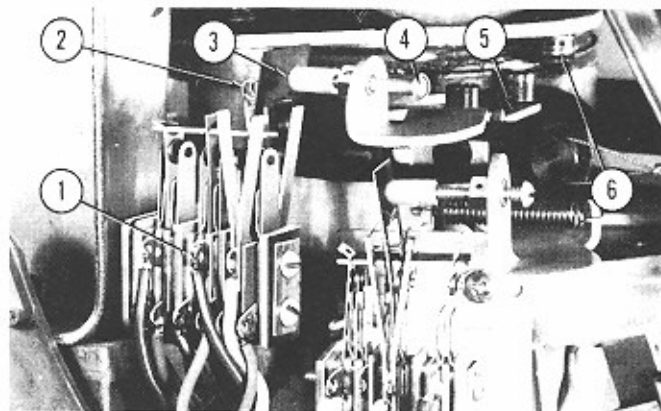


Fig. 57. TRANSFER SWITCH ADJUSTMENT

- | | |
|---|-----------------|
| 1. Transfer Switch | 59569 |
| 2. Over-center Spring | 59569-1 |
| 3. Position of Switch to Start Adjustment | |
| 4. Adjusting Screw and Actuator | 73574-31, 58255 |
| 5. Actuating Arm, Transfer Switch | 59691 |
| 6. Actuating Arm and Roller, Turntable and Tone Arm | 59688 |

of which regulates the tension of the needle brush actuating cable and the other regulates the amount of throw used to actuate the transfer switch. The transfer switch actuating arm (Item 5, Fig. 57) is pivoted on the chassis casting and is operated by the lateral lobe on the main cam. An approved method for adjusting the transfer switch is described below:

(1) Advance the record changer cycle until the roller of the transfer switch actuating arm is at the base of the long lateral lobe on the main cam. In this position the adjusting screw for the transfer switch (Item 4) should be backed off enough to clear the retracted actuating tab of the switch. This is the normal position of the transfer switch.

(2) The main cam should now be advanced until the roller of the transfer switch actuating arm rides up on the lobe of the cam.

(3) Set the transfer switch adjusting screw to throw the transfer switch to its over-center position. After the switch has actuated, continue to advance the adjusting screw enough to provide 1/32" to 1/16" over-travel of the actuating tab.

(4) Turn on the service switch to test for operation.

NOTE: As described under "Operation, Phase 8", when the roller is raised to the lobe of the cam, the transfer switch serves as a full cycle switch, and the mechanism is then in a position to again start the searching cycle or to stop. This position is generally referred to as the "at rest" position of the record changer.

e. Mute and Play Switch Adjustments. (Figs. 58, 59 and 60)

The cam lobe that operates the mute and play switch is fastened to the lateral surface of the main cam with two locking screws and is movable to

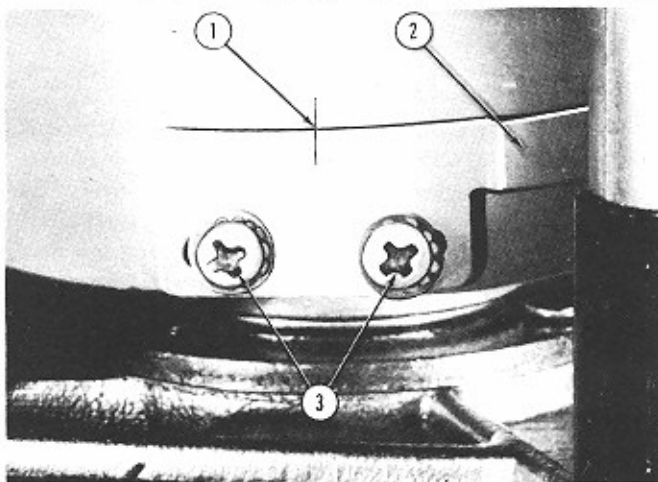


Fig. 58. TIMING OF MUTE AND PLAY SWITCH

- | | |
|--|----------|
| 1. Timing Marks, Main Cam and Adjustable Cam | |
| 2. Adjustable Cam, Mute and Play Switch | 62768 |
| 3. Locking Screws, Adjustable Cam | 73534-14 |

permit advance or delay in the action of the mute and play switch. Figure 58 shows index lines that appear on the main cam and the mute and play cam. An adjustment of the cam as shown is accurate in the majority of cases, however, the following method may be used for this adjustment:

(1) Set the mute and play cam lobe so that its timing mark aligns with the mark on the main cam.

(2) With the roller of the mute and play switch actuating arm at the base of the mute and play cam but still on the main cam adjust the stop plate (Item 6, Fig. 59) to provide 0 to 1/64" clearance between the roller and the cam as shown in Item 2, Fig. 60.

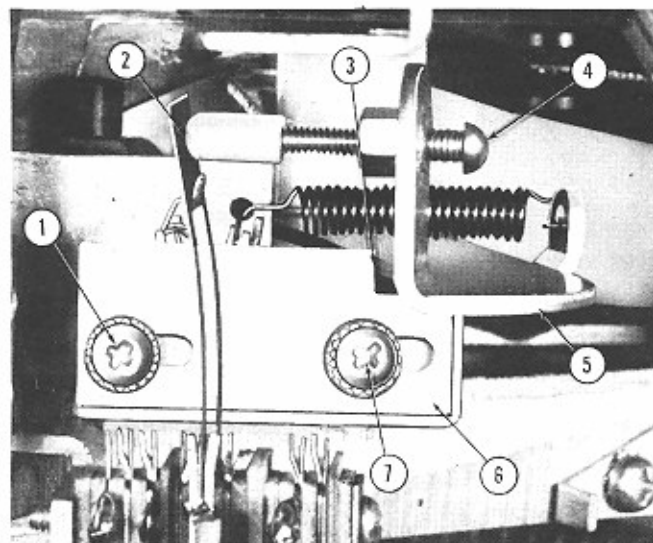


Fig. 59. STOP PLATE SETTING, MUTE AND PLAY SWITCH ACTUATING ARM

- | | |
|--|----------|
| 1. Locking Screw | 73533-22 |
| 2. Switch Tab, Overtravel Measured at this point | |
| 3. Stop Position | |
| 4. Adjusting Screw | 73574-31 |
| 5. Actuating Arm, Mute and Play Switch | 62761 |
| 6. Stop Plate | 62769 |
| 7. Locking Screw | 73533-22 |

(3) Set the actuating screw of the mute and play switch actuating arm (Fig. 59) to allow 1/32" to 1/16" over-travel of the switch tab after the switch has actuated over-center, under the spring loading of the actuator arm. Check for proper action with the roller of the arm on top of the mute and play lobe in the play position. Too much over-travel of the switch at the original setting may produce improper action of the switch in the play position. In some cases it may be necessary to slightly reduce switch over-travel to obtain proper action in the play position.

(4) To check for proper action under operating conditions, cycle the mechanism to the play position and observe the turntable cam during trip switch operation. If there is any forward movement of the turntable cam when the trip switch actuates,

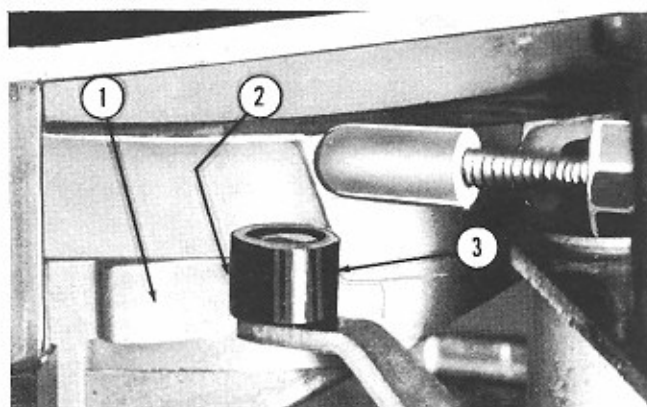


Fig. 60. STOP PLATE SETTING, MUTE AND PLAY SWITCH

- | | |
|--|-------|
| 1. Mute and Play Switch Cam | 62768 |
| 2. Zero to 1/64" Clearance (Stop Plate Setting) | |
| 3. Roller, Mute and Play Switch Actuating Assembly | 56592 |

the mute and play switch is stopping the mechanism, in its play position, too early. In this case move the cam lobe (Fig. 58) slightly in the direction opposite to the rotation of the main cam. Also observe the turntable cam when the mechanism 'stops' in the play position. If there is any reverse action of the turntable cam at the play position, the mute and play switch is stopping the mechanism too late. In this case move the cam lobe (Fig. 58) slightly in the direction of rotation of the main cam. It may be necessary to repeat one or the other of these operations to insure the best play position and provide maximum freedom of the tone arm for compliance with the record grooves.

f. Trip Switch.

Adjustment of the trip switch will be covered in detail in paragraph x, page 50.

g. Reset Switch Adjustment. (Fig. 61)

As explained in Phase 7 under Operation, the reset switch functions to reverse the polarity of the changer motor armature preparatory to the searching

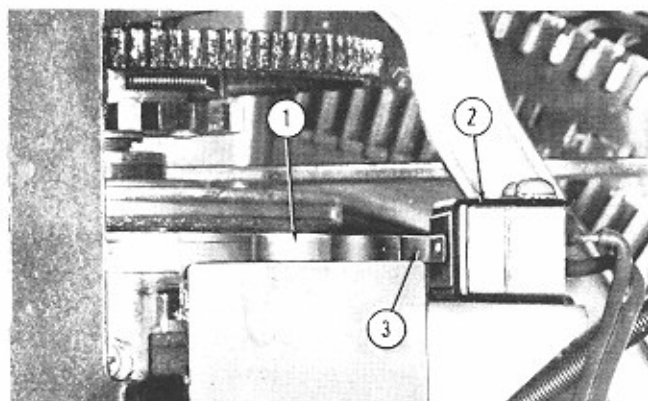


Fig. 61. RESET SWITCH ADJUSTMENT

- | | |
|--------------------------------|-------|
| 1. Main Cam Lobe | |
| 2. Micro Switch, Reset | 53809 |
| 3. Actuating Arm, Reset Switch | |

phase of the next cycle. Should this switch not open to release the reversing relay the mechanism would immediately repeat its record handling phase without any preparatory searching or indexing. In case the reversing relay becomes energized and interlocked due to making other adjustments, it may be released by momentarily opening the main power switch.

(1) Adjust the reset switch on its mounting bracket to provide $1/32''$ to $1/16''$ over-travel of its arm when the switch is actuated by the cam lobe (See Fig. 61).

(2) Also check the amount of over-travel when the switch arm is released by the cam lobe. The over-travel should be about equal in both positions.

h. Service Switch.

The service switch, shown at the rear of the junction box in Figure 26, serves as an aid in making adjustments at the back of the phonograph. It stops the changer motor at any phase of the cycle.

i. Loading Switch.

The loading switch is also in the motor circuit, however, it functions as an aid to loading the record carrier at the front of the phonograph. The release lever and shaft assembly (Item 17, Fig. 44) operates the loading switch and stops the changer motor only when it is in the searching phase of the cycle.

j. Record Lift Arm Roller Guides. (Figs. 62 and 63)

Mounted at the upper ends of the record lift arms are two guide tips, mounted on a pivot pin or (shaft, - Item 8, Fig. 62). These guide tips are spring loaded by a spring (Item 4) to spread them apart. With the lift arms down in their normal position these guide tips are squeezed together by the "bracket and roller assembly" (Fig. 63). One of these rollers is mounted on a stationary shaft which is part of the bracket and pin assembly (Item 12, Fig. 63) and the other is mounted on an eccentric shaft (Item 2). As the lift arm moves upward to take out a record, these guide tips spread apart, as they leave the compressing effect of the two guide rollers, to engage and raise the record. The pivot pin (shaft) of the guide tips extends inward from the lift arm to engage with the slot in the adjustable plate (Item 8, Fig. 63), when the lift arms are in their normal lowered position. This slot in the adjustable plate serves to accurately position the lift arm for indexing with the center of the record holders of the carrier.

(1) Advance the record changer cycle to a point where the lift arms are free to be moved up and down between the guide rollers.

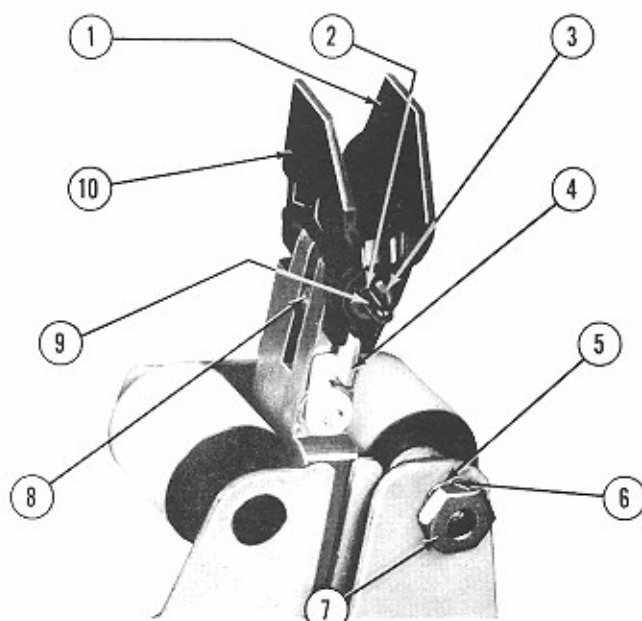


Fig. 62. BRACKET AND ROLLER ASSEMBLY, LIFT ARM GUIDE

1. Guide Tip, R.H.	65730
2. Washer (2 used)	65937
3. Retaining Ring	73724-9
4. Stop, Guide Tips	65526
5. Washer	65937
6. Lock Washer	73605-5
7. Nut, 6-32 Hex	73601-6
8. Spring	65812
9. Shaft	65938
10. Guide Tip, L.H.	65731

(2) Adjust the eccentric shaft (Item 2, Fig. 63) to provide clearance of the guide tips, as they are raised and lowered between the rollers, of .003" to .006".

(3) Carefully position the adjustable plate (Item 8, Fig. 63) to guide the tips of the lift arm in

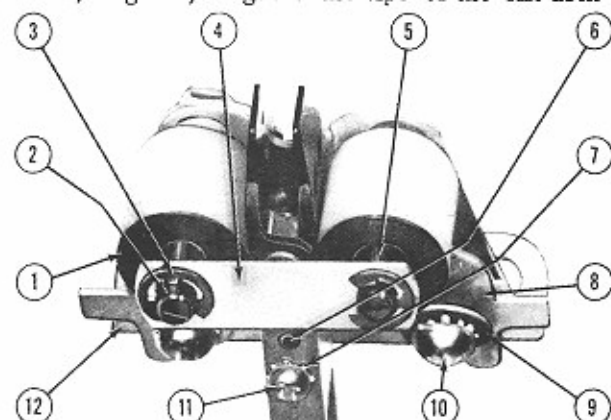


Fig. 63. BRACKET AND ROLLER ASSEMBLY, LIFT ARM GUIDE

1. Roller, Record Lift Arm Guide (2 Used)	65939
2. Stud, Eccentric, Lift Arm Guide	66181
3. Retaining Ring (2 Used)	73724-18
4. Strap	65940
5. Spacer (2 Used)	65942
6. Roll Pin	73782-32
7. Lock Washer No. 4	73607-3
8. Plate, Lift Arm Guide	66182
9. Washer, (4 Used)	49387
10. Screw, (2 Used)	73533-34
11. Screw- 4-40x3/8"	73533-7
12. Bracket and Pin Assembly	65888

the center of the maximum .006" clearance provided in (2). When the lift arm moves up or down, the pivot pins of the guide tips leave or enter the slots in the adjustable plates and the guide tips move out or into engagement with the guide rollers. During these two phases of operation the guide tips should move freely with no drag whatsoever and should remain straight up. When raising, they should spread evenly on both sides of the axis of the lift arms.

(4) The lift arms should now be properly positioned by adjusting the "bracket and roller assemblies" at their elongated mounting holes. The lift arms should be down, the pivot pin (shaft) of the guide tips in the slots of the adjusting plates, and the center line of lift arms must be equally displaced to the rear of the radial line from the main center support casting. The position described above has been established during assembly by means of a fixture to provide displacement of 0° - 54' for each lift arm. This position is scribe marked on the mounting plate for the bracket and roller assembly and on the bracket for the adjustable plate.

k. Record Lift Arm Setting. (Fig. 64)

Each record lift arm is equipped with a bracket, stop nut and screw assembly (Item 1, Fig. 64). The adjusting screw (Item 2) stops against the under side of the mounting plate to control the height to which the record lift arm may be raised. The height at which the adjusting screw stops the lift arm is determined by the lift action necessary to properly position the record for turntable handling. Due to the combined effect of both the "record stop" (See Item 2, Fig. 65) and the record lift arm, it will be necessary to adjust the record stop before proceeding with the record lift arm setting. These two adjustments may be accomplished as follows:

(1) Clamp record disc X42226 or equivalent on the turntable.

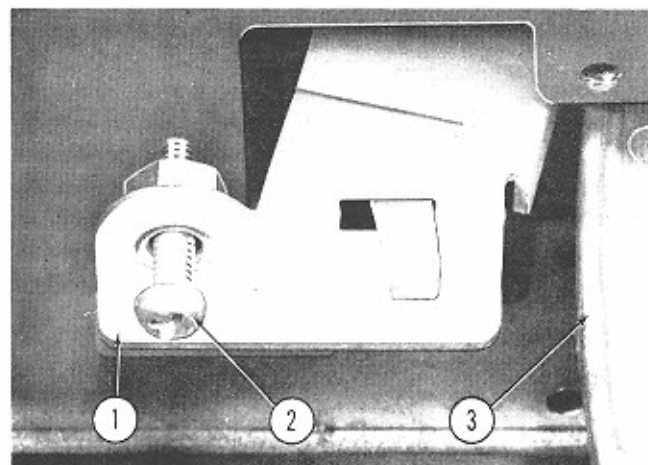


Fig. 64. RECORD LIFT ARM SETTING

- | | |
|--|----------|
| 1. Bracket and Stop Nut Assembly, L.H. | 65831 |
| 2. Adjusting Screw | 73503-91 |
| 3. Record Lift Arm - L.H. | 65487 |

(2) Loosen the two screws (Item 4, Fig. 65) that hold each record stop bracket.

(3) Move the stop bracket (Item 3) until the record track rests lightly against the outside edge of the record disc (X42226).

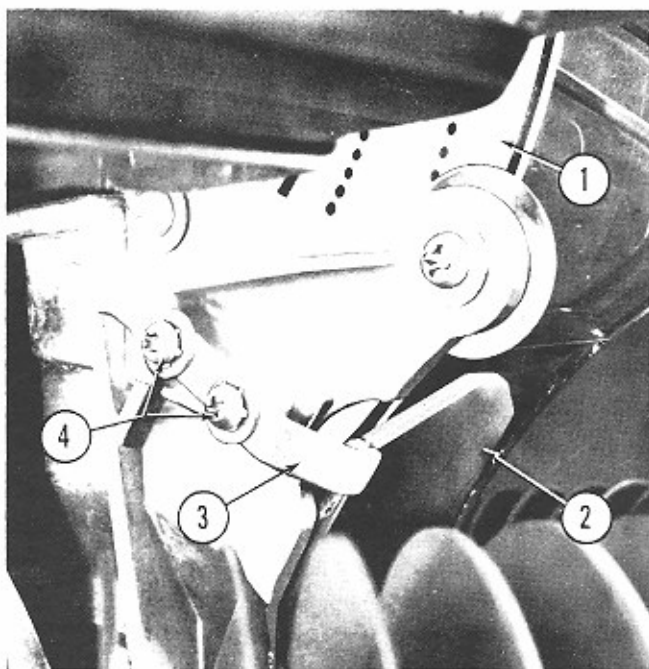


Fig. 65. RECORD STOP BRACKET ADJUSTMENT

- | | |
|------------------------|---------|
| 1. Record Disc | X42226 |
| 2. Record Track | 59425 |
| 3. Record Stop Bracket | 59434 |
| 4. Adjusting Screws | 73533-3 |

(4) Tighten the screws holding the stop bracket.

(5) Remove the record disc and move the record track (Item 2) to the opposite side of the record guide.

(6) Make the same record stop bracket adjustments described in steps (3) and (4).

(7) Adjust the screw in each "record lift arm bracket and stop nut assembly" to stop the upward movement of the arm at a point where the top of the arm just touches the outer edge of the record disc X42226.

NOTE: To make the above adjustments without the aid of record disc X42226, adjust the record stop brackets to position the track about 1/16" from the outside edge of an average size record when it is clamped on the turntable. Adjust the record lift arm stop screws to limit the raising action of the arms to about 1/16" between the outside edge of the record and the top end of the left arm.

1. Record Lift Arm Centering Adjustment. (Figs. 66 and 67)

Mounted to the under side of the chassis mounting plate are two bracket and roller assemblies which serve to center the tips of the record lift arms with respect to a record being played. On each of these two brackets one guide roller (Item 5) is mounted on a fixed stud and the other is mounted on an eccentric stud (Item 2). Thus, the roller on the eccentric stud may be adjusted to bring the rollers into engagement with the ramp on the lower end of the lift arm.

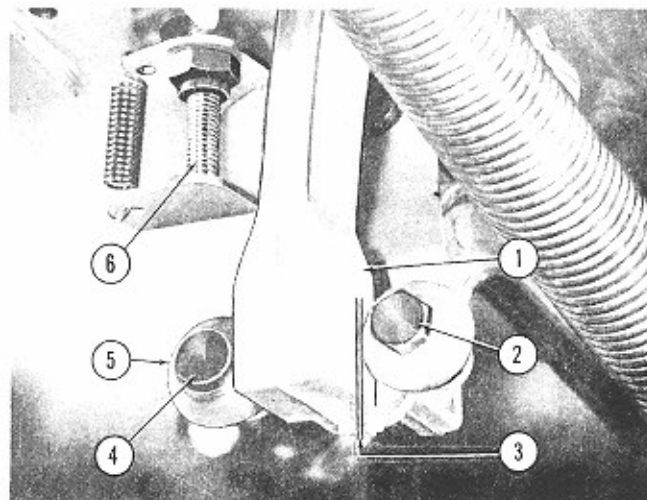


Fig. 66. RECORD LIFT ARM CENTERING ADJUSTMENTS

- | | |
|---------------------------------|-----------|
| 1. Ramp, Record Lift Arm | 65986 |
| 2. Stud, Eccentric | 65985 |
| 3. .005" Clearance | 65985 |
| 4. Stud, Fixed (Shoulder Rivet) | 65989 |
| 5. Roller, Lift Arm Guide | 73660-161 |
| 6. Screw, Centering Adjustment | |

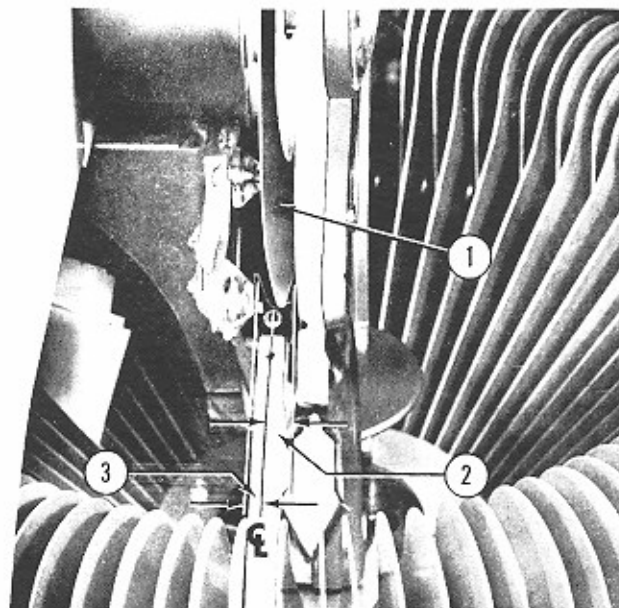


Fig. 67. RECORD LIFT ARM CENTERING ADJUSTMENT

- | |
|-----------------------------------|
| 1. Record, Clamped on Turntable |
| 2. Distance to be Equal to Item 3 |
| 3. Distance to be Equal to Item 2 |

(1) With the ramp (Item 1, Fig. 66) on the lower end of the record lift arm between the two rollers, in the play position, set and tighten the eccentric stud to provide free passage of the ramp between the rollers with .005" max. clearance between the ramp and the rollers.

(2) With a record clamped on the turntable and the corresponding lift arm in its raised position, (Fig. 67) set the adjusting screw (Item 6, Fig. 66) for the centering roller and bracket assembly so that the guide tips of the record lift arm are equally spaced on either side of the record as shown in Figure 67.

m. Setting for Loading Switch Cam. (Fig. 68)

After assembly of the selector crank and shaft, the loading switch cam and release lever group may be adjusted. The main cam should be in its "at rest" phase of the cycle. The pin on the cancel arm assembly (Item 9, Fig. 68) should be located on the flat position of the release cam (Item 10) and the loading switch (Item 11) should be actuated to its closed position by the lug on the heel of the cam.

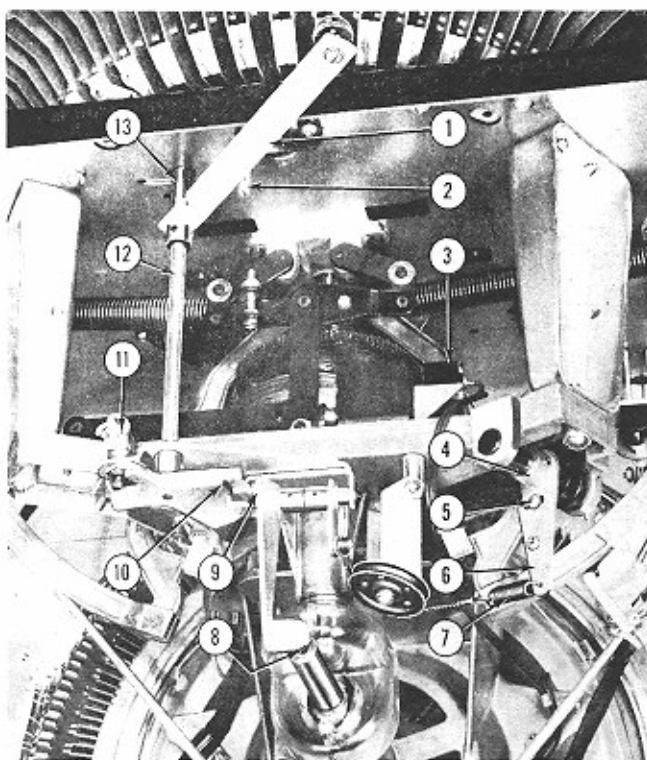


Fig. 68. SETTINGS FOR LOADING SWITCH CAM

- | | |
|-----------------------------------|----------|
| 1. Release Lever and Hub Assembly | 65744 |
| 2. Stop Pin, Loading Switch Cam | 65516 |
| 3. Micro Switch, Reset | 53809 |
| 4. Actuator, Cancel Arm Assembly | 65519 |
| 5. Screw, Adjusting | 73533-35 |
| 6. Arm, Cancel Lever, Lower | 65520 |
| 7. Spring, Cancel Arm Lever | 65811 |
| 8. Cap and Shaft Assembly | 65527 |
| 9. Cancel Arm Assembly | 65544 |
| 10. Cam, Release | 65729 |
| 11. Switch, Loading | 53648 |
| 12. Shaft, Loading Switch Cam | 65533 |
| 13. Spring, Release Lever Return | 65807 |

(1) In this position set the release lever (Item 1) against the stop pin (Item 2) and tighten the set screws in the hub of the release lever.

(2) When the release lever is pulled forward to the loading position, the pin in the cancel arm (Item 9, Fig. 68) should fall in the detent of the loading cam (Item 10) and hold there. At the same time, the loading cam should engage and throw the loading switch to its open position. Care should be exercised in making the above adjustment to avoid using the switch as a stop in either direction.

n. Selector Crank Clearance. (Figs. 69 and 70)

To make this adjustment, the selector latch pins must be latched in their set position, and the loading switch cam in its play position.

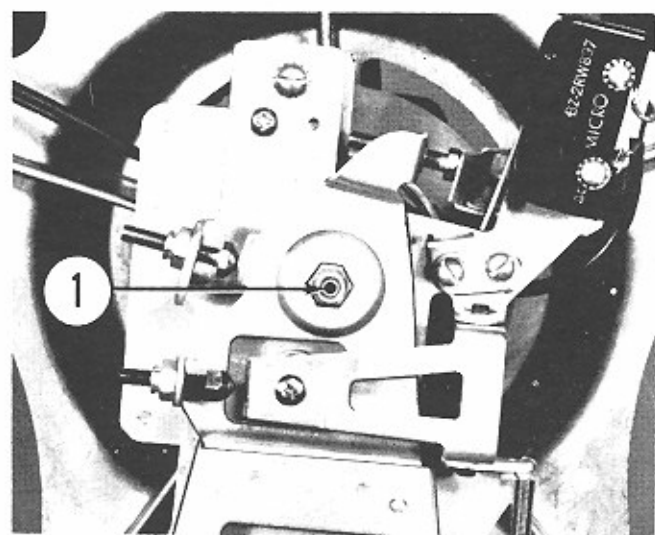


Fig. 69. SELECTOR CRANK CLEARANCE

1. Adjusting Screw, Selector Crank Clearance

73875

(1) Adjust the hollow head set screw in the center of the selector (Item 1, Fig. 69) so that its pressure against the "cap and shaft assembly" and the loading cam at the front will position the selector crank to provide $1/32"$ to $1/16"$ clearance between the lip of the selector crank and the ends of the 200 selector pins, as shown in Figure 70. This measurement should be checked at several positions on the selector drum.

o. Cancel Arm Setting. (Fig. 68)

The selector crank and shaft being assembled, the cancel arm assembly (Item 4, Fig. 68) may be adjusted.

(1) With the roller of the cancel arm assembly (Item 4) against the main cam cancel track in its "at rest" position, and the cancel arm (Item 9) against the "cap and shaft assembly" (Item 8), loosen

the two adjusting screws (Item 5) that hold the "lower cancel lever" (Item 6) and move the lower cancel lever to take up all the slack in the cancel cable and spring (Item 7).

(2) Tighten the two locking screws in this position and test to insure a minimum of slack without applying any tension or stretch to the spring.

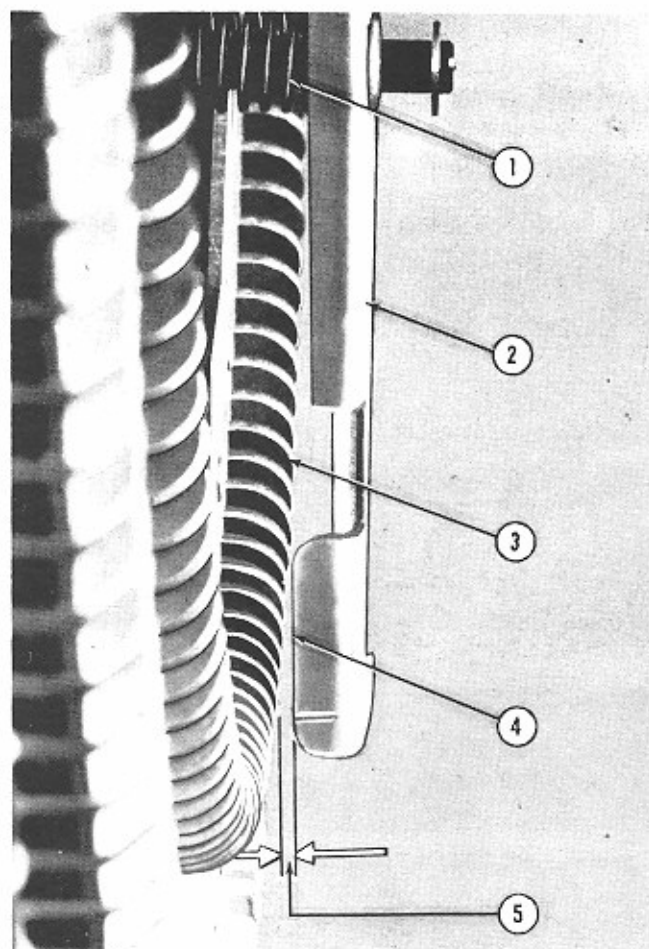


Fig. 70. SELECTOR CRANK CLEARANCE

- | | |
|---------------------------------|-------|
| 1. Spring, Selector Crank | 65809 |
| 2. Selector Crank | 65737 |
| 3. Selector Latch Pins | 57701 |
| 4. Lip of Selector Crank | |
| 5. $1/32"$ to $1/16"$ Clearance | |

p. Record Lift Arms, Retracted Adjustment. (Fig. 71)

When the main cam of the record changer is in its "at rest" position, the cam roller of the "link and lever assembly" (Item 2, Fig. 71) will be at its highest position on the cam track and the record lift arms will be held in their lowered position. In this position, the top of the record lift arm guide tips (See Items 1 and 2, Fig. 72) should clear the under side of the record holders by approximately $1/4"$. The record lift arms should bottom against their stop brackets without tension against the brackets and without any looseness. Adjustment may be accomplished as follows:

(1) Loosen the lock nut and clamping screw (Items 1 and 3, Fig. 71).

(2) Turn the hex head adjusting screw into the stop nut to lower the lift arms or back it out to permit them to raise, thereby obtaining the requirement as stated above. If necessary, the lower stop brackets may be adjusted slightly to meet the requirements.

(3) Tighten the lock nut and the clamping screw and re-inspect the position of the arms after the mechanism has been operated.

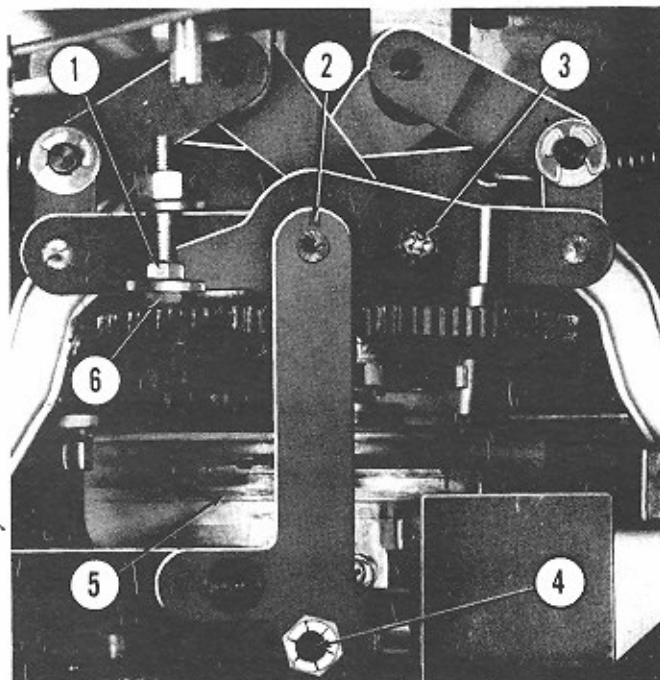


Fig. 71. RECORD LIFT ARM, RETRACTED ADJUSTMENT

- | | |
|--|-----------|
| 1. Lock Nut | 73785 |
| 2. Link and Lever Assembly, Record Lift Arms | 59599 |
| 3. Clamping Screw | 73533-34 |
| 4. Roller Shaft, Link and Lever Assembly | 59599 |
| 5. Main Cam | 62792 |
| 6. Adjusting Screw, Hex Hd. | 73660-161 |

q. Back Stop Pawl Adjustments. (Figs. 72, and 73)

The two back stop pawls are located on top of the chassis mounting plate to the right and left of the center as shown in Item 3, Fig. 72. Each of these pawls will be adjusted independent of the other. However, the adjustment procedure will be the same for both of the pawls. Before proceeding with adjustment of the back stop pawls, the record changer should be in normal operating condition.

(1) Loosen the two screws (Item 4, Fig. 73) that hold the back stop pawl and bracket assembly to the chassis mounting plate.

(2) Turn the record carrier slowly in a clockwise direction until the center line of one of the

record compartments is in accurate alignment with the left hand record lift arm as shown in Fig. 72.

(3) Carefully maintain this condition of alignment and set the left hand back stop pawl to engage with the adjacent tooth of the record carrier casting to a depth of $1/32''$ to $1/16''$ as shown in Fig. 73.

(4) Using the method described in (1), (2), and (3), align and set the right hand back stop pawl.

(5) Now check the alignment of the record lift arms with their respective record compartments in twelve or more various indexed positions of the record carrier. At each check point make sure that the correct tooth of the record carrier is firmly against the corresponding back stop pawl. Alignment of the record compartments with the record lift arms must be kept within a tolerance of $1/32''$.

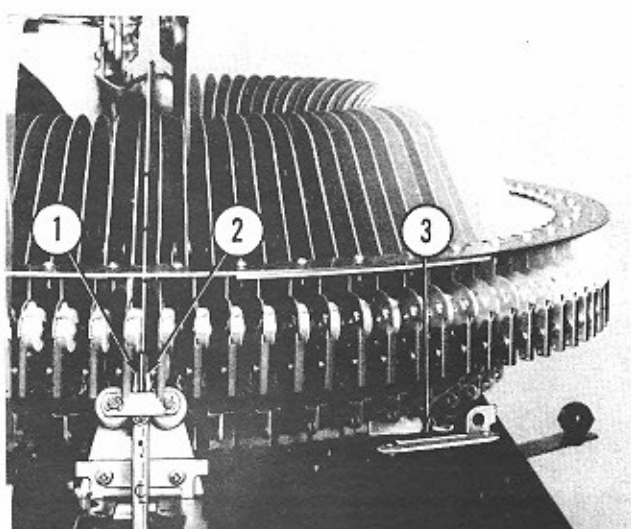


Fig. 72. CENTER LINE FOR BACK STOP PAWL ADJUSTMENT

- | | |
|--|-------|
| 1. Guide Tip, R.H., Record Lift Arm | 65730 |
| 2. Guide Tip, L.H., Record Lift Arm | 65731 |
| 3. Back Stop Pawl and Bracket Assembly | 65890 |

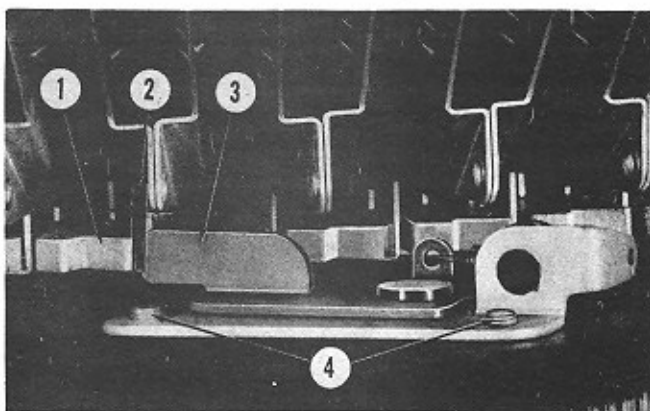


Fig. 73. BACK STOP PAWL SETTING

- | | |
|---|----------|
| 1. Record Carrier Casting | 65496 |
| 2. Depth of Engagement $1/32''$ to $1/16''$ | |
| 3. Back Stop Pawl | 65891 |
| 4. Screws, Adjusting | 73676-46 |

r. Setting of Selector Crank and Shaft. (Figs. 74 and 75)

The selector crank and shaft assembly should be preset as follows:

(1) The two adjusting screws (Items 2 and 9, Fig. 74) which hold the selector crank assembly to the selector bracket and shaft assembly should be set in the center of their adjustment range. The kick-off adjusting screw (Item 11) should be set to position the selector crank mounting shaft (Item 8) in the center of the guide slot (Item 7) in the selector crank mounting bracket.

(2) Install the selector crank and shaft assembly in the selector support casting. The adjustable bushing and bearing assembly (Item 2, Fig. 75) should be screwed into the casting to permit installation of the following items on the shaft of the selector crank and later setting of the bevel gears. The thrust washers (Items 7 and 8), the thrust bearing (Item 3) and the bevel gear (Item 5) will be assembled on the shaft and the bevel gear securely locked to the shaft by the pointed set screw (Item 6) set in the detent of the selector crank shaft.

(3) Tighten down the pointed set screw and its lock nut.

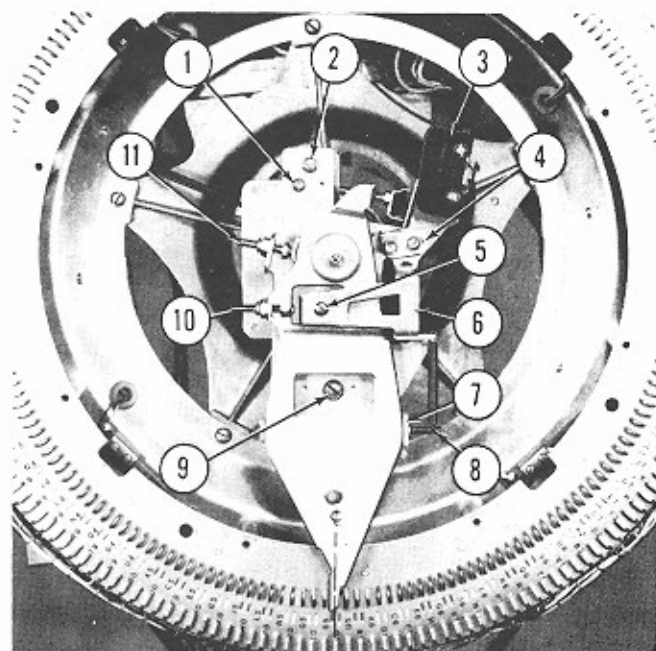


Fig. 74. SELECTOR CRANK AND SHAFT ASSEMBLY AND ADJUSTMENT

1. Anchor Screw, #8 Thread Cutting	
2. Adjusting Screw	73676-47
3. Carriage Switch	66002
4. Selector Crank Stop Bracket	65722
5. Holding Screw, Stop Arm	73787-77
6. Stop Arm, Selector Crank	65906
7. Guide Slot, Selector Crank Bracket	
8. Shaft (Pivot Pin) Selector Crank Mounting	65698
9. Adjusting Screw	73676-47
10. Stop Screw, Selector Crank	65702
11. Adjusting Screw, Kick-off	65760

(4) Move the record carrier to position A1 and set it firmly against the corresponding back stop pawl. Rotate the selector crank to a position where the lip of the crank is located halfway between selector latch pins A1 and D6. With these two settings maintained, screw the adjustable bushing and bearing assembly out far enough to mesh the bevel gear with gear on the main shaft. Continue tightening the mesh of the gears until the gear on the main shaft (Item 4) is firmly up against its thrust bearing and the mounting casting of the record changer mechanism. Now back off the adjustable bushing to provide free running of the bevel gears without back lash.

(5) Lock the adjustable bushing in this position with its set screw (Item 1).

NOTE: During the above steps, the record carrier should be held firmly against the A1 back stop pawl. The selector crank may move slightly off its position between A1 and D6 in meshing of the gears, but this may be compensated for as follows:

(a) Observe the position of the selector crank in relation to A1 and D6 latch pins.

(b) If it has moved from the original setting, loosen the two adjusting screws (Items 9, and 2, Fig. 74) and reset the lip of the selector crank to the center position between A1 and D6, while maintaining the firm position of the record carrier at the A1 back stop pawl.

(c) Tighten the two adjusting screws. Final anchoring of this adjustment is accomplished in production after completion, testing and inspection, by drilling and inserting the #8 thread cutting screw (Item 1, Fig. 74).

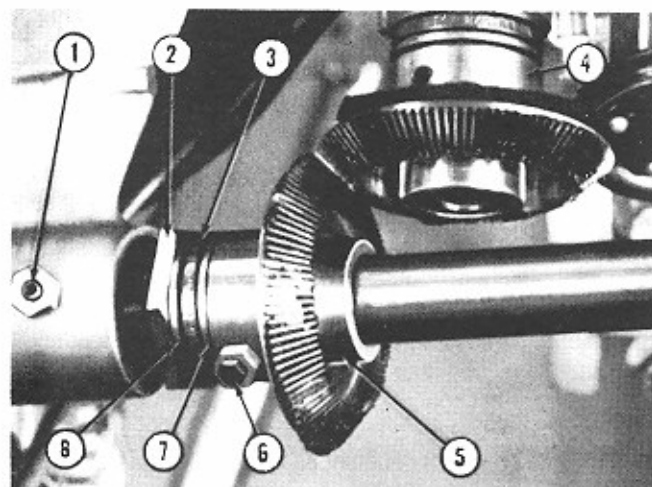


Fig. 75. SELECTOR CRANK AND SHAFT, ASSEMBLY AND ADJUSTMENT

1. Set Screw, Socket Head	73511-32
2. Bushing and Bearing Assembly, Adjustable	65509
3. Thrust Bearing	65689
4. Bevel Gear, Main Shaft	65765
5. Bevel Gear, Selector Shaft	65764
6. Set Screw, Pointed	65712
7. Thrust Washer	52808
8. Thrust Washer	67355

s. Selector Crank Settings. (Fig. 74)

(1) Selector Crank Clearance.

This adjustment has been described in paragraph n.

(2) Carriage Switch Settings.

Adjustment of the carriage, for convenience in checking a phonograph, has been covered in paragraph c.

(3) Selector Crank Stop Settings.

The selector crank stop arm (Item 6, Fig. 74) should be set with its holding screw (Item 5) to provide alignment of the center line of the ball in the stop screw (Item 10) with the front side of the stop arm to 1/32" toward the rear side of the stop arm.

(4) Set the stop screw (Item 10) to stop the selector crank with 1/64" to 1/32" over-travel of the selector crank, as measured at the tip of the crank, after the carriage switch (Item 3) has been actuated.

(5) By depressing the stop bracket against its spring, the selector crank may now be displaced further in a clockwise direction. Set the stop bracket (Item 4) to intercept the selector crank at 1/32" to 3/32" over-travel of the carriage switch as measured at its actuating arm.

(6) The lip of the selector crank may be centered between the cancelled pin and the next following pin as shown at C/L, Fig. 74, between pins S5 and V0. This may be accomplished by adjustment at the kick-off screw (Item 11). After kick-off action the latch pins on each side of the selector crank must be free to full extent when released.

t. Record Clamp Settings. (Figs. 76, 77 and 78)

The turntable release arm is pivoted on a bracket which is mounted on the back plate of the top support casting. The turntable release arm rollers must be centered around the hub of the record clamp plate. This is done by loosening the two mounting screws (Item 6, Fig. 76) and shifting the mounting bracket to provide equal distance of the two rollers from the hub of the record clamp plate, as shown in Fig. 77, and re-tightening the mounting screws. The centering of the release arm rollers, described above, should be carefully re-checked before completing the record clamp adjustments which follow:

(1) Advance the cycle of the record changer to the full extent of the record clamp cam rotation as shown in Figure 76, and at the same time, clamp record disc X42226 on the turntable.

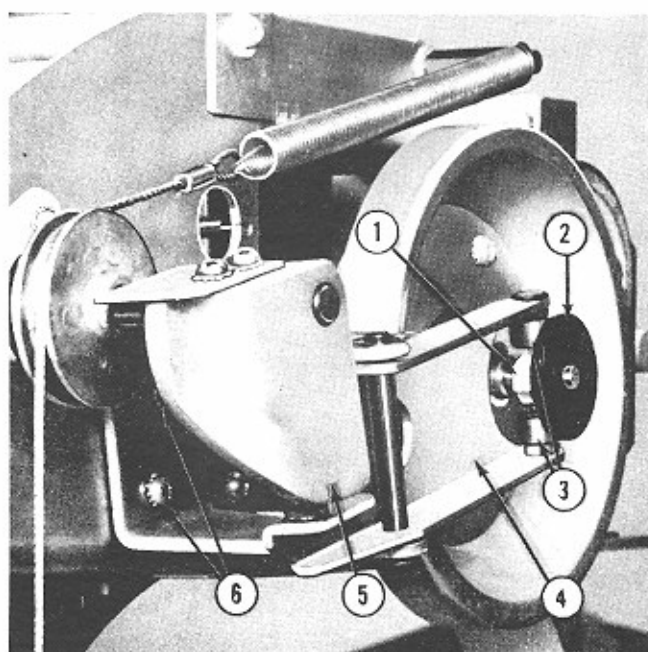


Fig. 76. RECORD CLAMP SETTING

- | | |
|---|----------|
| 1. Lock Nut | 73601-10 |
| 2. Record Clamp Plate | 63205 |
| 3. Turntable Release Arm Rollers | 59485 |
| 4. Turntable Release Arm | 59484 |
| 5. Record Clamp Cam | 59464 |
| 6. Mounting Screws, Turntable Release Arm Bracket | 73533-34 |

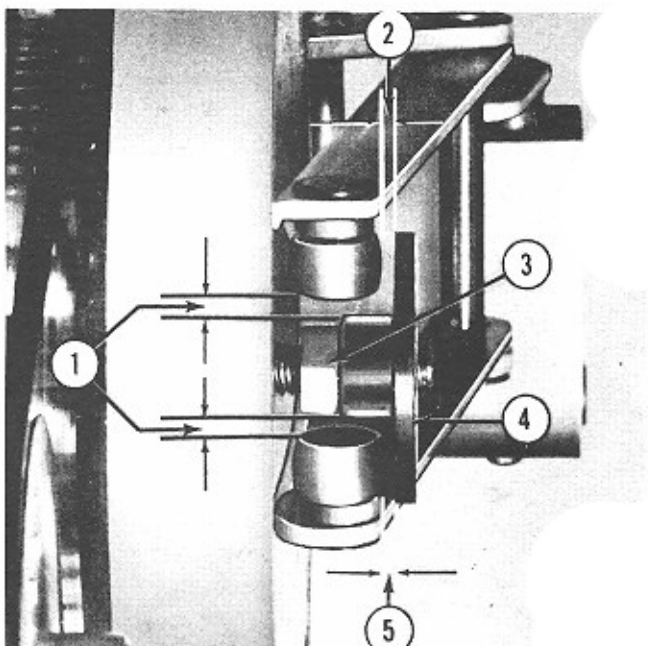


Fig. 77. RECORD CLAMP SETTING

- | | |
|--|----------|
| 1. Equal Distance | |
| 2. Record Clamp Plate Clearance 1/32" to 1/16" | |
| 3. Lock Nut | 73601-10 |
| 4. Record Clamp Plate | 63205 |
| 5. Record Clamp Plate Clearance 1/32" to 1/16" | |

(2) Loosen the lock nut (Item 1, Fig. 76) and adjust record clamp plate (Item 2) to provide 1/32" to 1/16" clearance as shown at Items 2 and 5 of Figure 77. Maintain the clearance described above, tighten the lock nut, and re-check the adjustment.

(3) Advance the cycle of the record changer or manually operate the record clamp cam about 90° to the position which completely retracts the turntable pilot (See Item 2, Fig. 78). In this position, the turntable pilot should be retracted beyond the forward surface of the turntable (Item 3) 1/32" to 1/16".

(4) The record clamp setting, described in step (2) may be varied to minimum, if necessary, to accomplish the requirements of step (3).

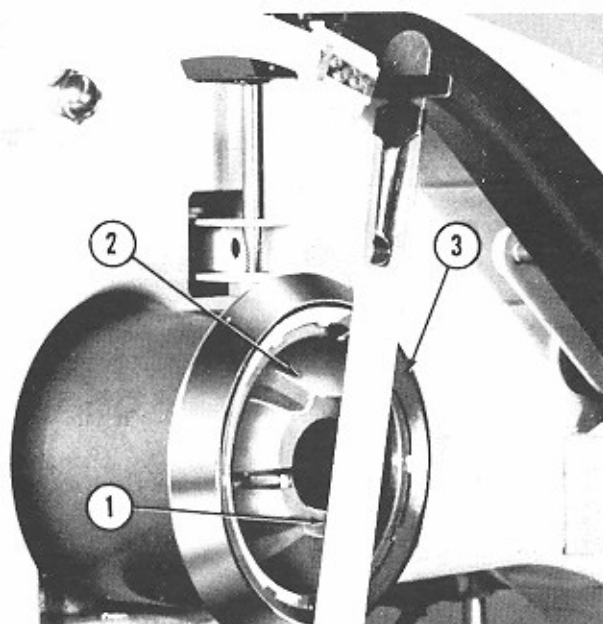


Fig. 78. RECORD CLAMP SETTING

- | | |
|-----------------------------|-------|
| 1. Clearance 1/32" to 1/16" | |
| 2. Turntable Pilot | 59449 |
| 3. Turntable | 64554 |

u. Tone Arm Feed-in Adjustments. (Fig. 79)

There are two methods of making the tone arm feed-in adjustments. One of these methods utilizes record disc X-42226 and the other depends upon measurements made from the turntable pilot to the pick-up needle. Record disc X42226 should be used when available. However, both methods are described below:

Method 1 - Using Record Disc X42226.

(1) From the "at rest" position, advance the cycle of the record changer to a point where the record clamp just actuates to hold the record in place on the turntable, and turn off the power.

(2) Manually release the record clamp by pulling back on the record clamp plate (Item 4, Fig. 77) and clamp record disc X42226, facing to the rear, on the turntable.

(3) Manually advance the cycle by turning the record changer motor counter-clockwise until the pick-up needle is close to or touching the record disc.

The tone arm latch bracket (Item 3, Fig. 79) should still be engaged with the feed-in screw (Item 2).

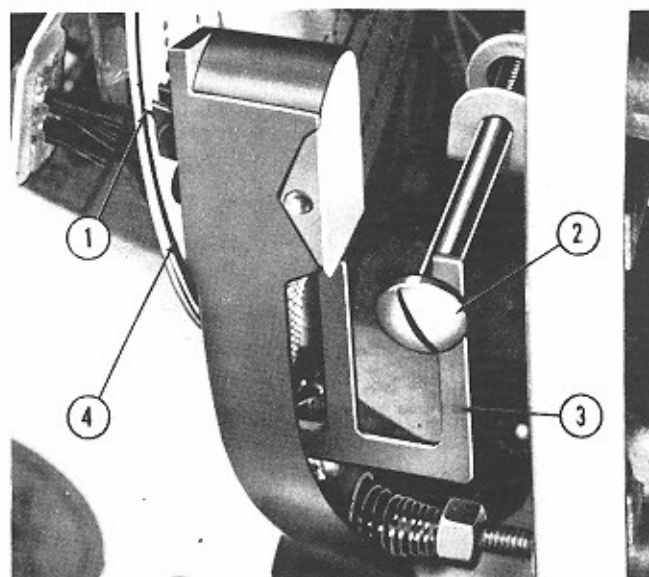


Fig. 79. TONE ARM FEED-IN ADJUSTMENT

- | | |
|-------------------------------------|-------|
| 1. Needle of Pick-up | |
| 2. Tone Arm Feed-in Adjusting Screw | 64422 |
| 3. Tone Arm Latch Bracket | 64423 |
| 4. Outer Ring (Feed-in Groove) | |

(4) Adjust the tone arm feed-in screw to position the pick-up needle in the center of the outer ring of record disc X42226.

Method 2 - Adjust Tone Arm Feed-in by Measurement.

(1) Follow step (1) of method 1.

(2) Follow step (2) of method 1, using a conventional record on the turntable.

(3) Adjust the tone arm feed-in screw to position the pick-up needle 2-5/8" to 2-11/16" from the outside circumference of the turntable pilot.

NOTE: The above method as well as method 1 provides a feed-in position satisfactory for a majority of 7" - 45 R.P.M. records.

v. Tone Arm Latch Bracket Clearance. (Fig. 80)

When the tone arm is released for compliance with the record grooves, the clearance (Item 2, Fig. 80) should be equal on both sides of the feed-in adjusting screw (Item 6). Adjustment may be accomplished as follows:

(1) Advance the cycle to a point where the tone arm is completely released for playing.

(2) With the needle resting on the record, adjust the allen head stop screw (Item 4) to position the release bracket (Item 5) to provide equal clear-

ance of the bracket from the feed-in screw as described above.

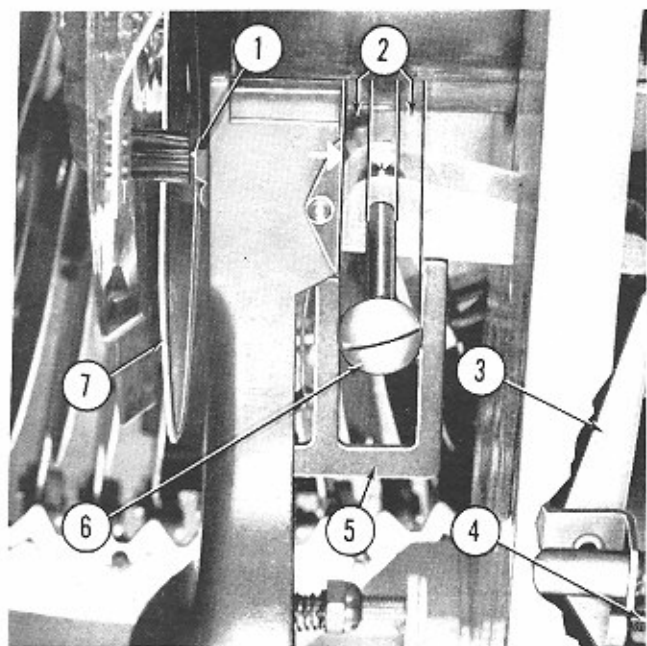


Fig. 80. TONE ARM LATCH BRACKET CLEARANCE

- | | |
|--------------------------------------|-------|
| 1. Pick-up Needle | 57525 |
| 2. Equal Distance | |
| 3. Release Bracket, Tone Arm | 64530 |
| 4. Screw, Allen Head Adjusting | 64427 |
| 5. Latch Bracket, Tone Arm | 64423 |
| 6. Adjusting Screw, Tone Arm Feed-in | 64422 |
| 7. Record | |

w. Needle Pressure Adjustment. (Fig. 81)

The needle pressure adjustment is obtained by turning the needle pressure adjusting nut (Item 3, Fig. 81) in a clockwise direction to increase the pressure. The pressure of the needle against the record should be adjusted to measure 10 to 12 grams as shown in Item 1, Figure 81, and may be accomplished in the following manner:

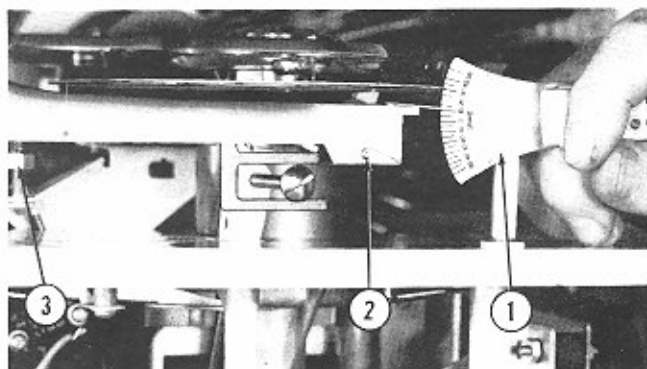


Fig. 81. NEEDLE PRESSURE ADJUSTMENT

- | | |
|---------------------------------------|---------|
| 1. Gram Scale | |
| 2. Tone Arm, Free for Compliance | 64526 |
| 3. Needle Pressure Adjusting Stop Nut | 73865-8 |

(1) Advance the record changer cycle to its playing position and turn the power off, leaving the needle on the record.

(2) Using a sensitive gram scale, as shown in Figure 81, to measure the pressure required to just lift the needle from the record, adjust the stop nut (Item 3) to provide the desired pressure as described above.

x. Trip Switch Adjustment. (Fig. 82)

The trip switch is actuated by a bracket on the tone arm (Item 6, Fig. 82). The action of the trip switch is advanced or retarded by turning the adjustable stop screw (Item 9). The operation of the trip switch should occur when the record has completed its playing. However, some records must use more record space than others, therefore the trip action should be delayed long enough to accommodate the majority of records. As in making the tone arm feed-in adjustment, there are two methods presented for making the adjustments of the trip switch. As before, one method utilizes record disc X42226, and the other depends on measurement as follows:

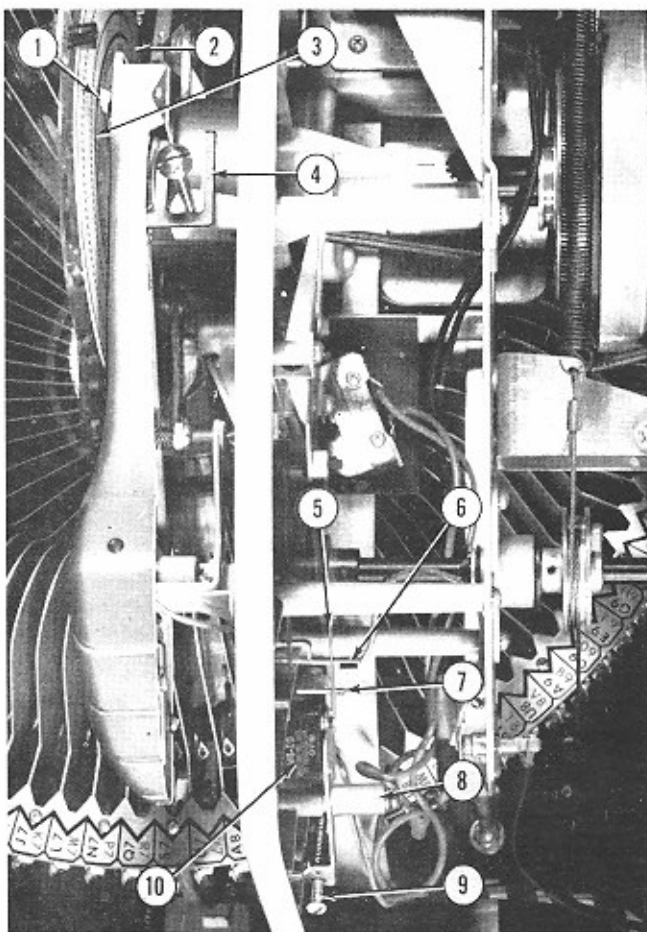


Fig. 82. TRIP SWITCH ADJUSTMENT

- | | |
|---|---------|
| 1. Pick-up Needle | 57525 |
| 2. Record Disc | X42226 |
| 3. Trip Groove | |
| 4. Tone Arm Latch Bracket and Feed-in Screw | |
| 5. Arm, Trip Switch | 59583 |
| 6. Actuating Bracket, Part of Tone Arm | |
| 7. Stop Bracket, Trip Switch | 59432 |
| 8. Mounting Bracket, Trip Switch | 59739 |
| 9. Adjusting Screw, Trip Switch | 73571-4 |
| 10. Micro Switch, Trip | 57851 |

Method 1 - Using Record Disc X42226.

(1) Advance the cycle of the record changer only until the turntable clamps have actuated, and then turn off the power.

(2) Operate the record clamp manually by pulling back on the record clamp plate, and clamp record disc X42226, face to the rear, on the turntable.

(3) Manually advance the cycle of the record changer by turning the motor shaft counter-clockwise until the tone arm is completely released for compliance with the record grooves. The tone arm latch bracket should be entirely free from the feed-in adjusting screw as shown in Figure 80.

(4) The trip switch adjusting screw may now be adjusted to a point where inward movement of the tone arm will actuate the trip switch exactly where the pick-up needle has reached the inner groove of record disc X42226, as shown at Item 1, Figure 82.

Method 2 - Adjusting the Trip Switch by Measurement.

(1) Advance the cycle of the record changer as indicated in step 1 of method 1.

(2) Using any standard record instead of record disc X42226, perform steps 2 and 3 of method 1.

(3) The trip switch adjusting screw may now be adjusted to a point where inward movement of the tone arm will cause the trip switch to actuate exactly at a point where the pick-up needle is $1-11/32"$ to $1-13/32"$ from the outer circumference of the turntable pilot.

NOTE: The above two methods for trip switch setting provide trip action for a majority of 7" 45 R.P.M. records.

y. Tone Arm Balancing. (Fig. 83)

The tone arm should be very carefully balanced on its gimbal by means of the balancing weight and bracket assembly shown in Item 5, Figure 83. When in good balance and otherwise in good adjustment, the tone arm should have no greater than 1 gram tendency to move in either direction from any point in its normal travel. Also, its tendency to remain in one place should be no greater than 1 gram. To properly balance the tone arm proceed as follows:

(1) Without a record, advance the cycle of the record changer to its playing position and turn off the power.

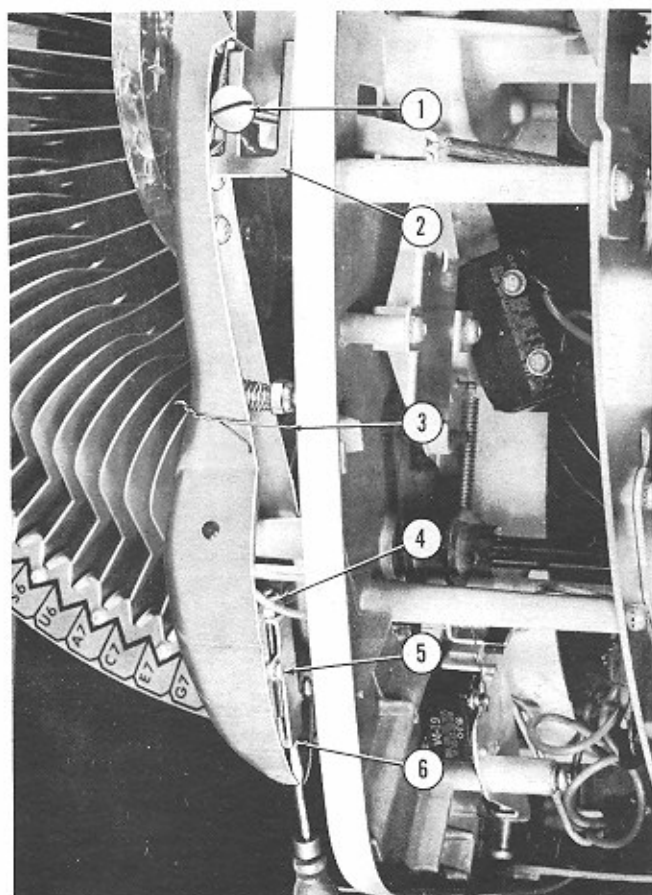


Fig. 83. TONE ARM BALANCING

1. Feed-in Screw, Tone Arm	64422
2. Latch Bracket, Tone Arm	64423
3. Thread, Tie-down	
4. Stop Nut, Tone Arm Balance	23879
5. Balancing Weight and Bracket Assembly	65273
6. Screw, Adjusting	73575-100

(2) Tie a short piece of fine thread around the tone arm and gimbal bracket as shown in Item 3, Figure 83. This tie should be drawn just tight enough to free the tone arm latch equally from either side of the feed-in screw (Item 1).

(3) Using a sensitive gram scale (0 - 10 grams) at the pick-up end of the tone arm, measure the swinging tendencies of the tone arm and adjust the balancing weight (Item 5) to bring the balance within the requirements as described above. The adjusting screw (Item 6) serves to move the balancing weight and bracket assembly in either direction as required.

z. Turntable Drive Gear Adjustments. (Fig. 84)

The turntable drive gears must operate freely at all times. The tension of the thrust spring (Item 4, Fig. 84) against the ball bearing in the end of the rotor shaft should be $2-1/2$ to $3-1/2$ ounces. Adjust the mesh of the gear and worm to obtain minimum back lash without drag, as follows:

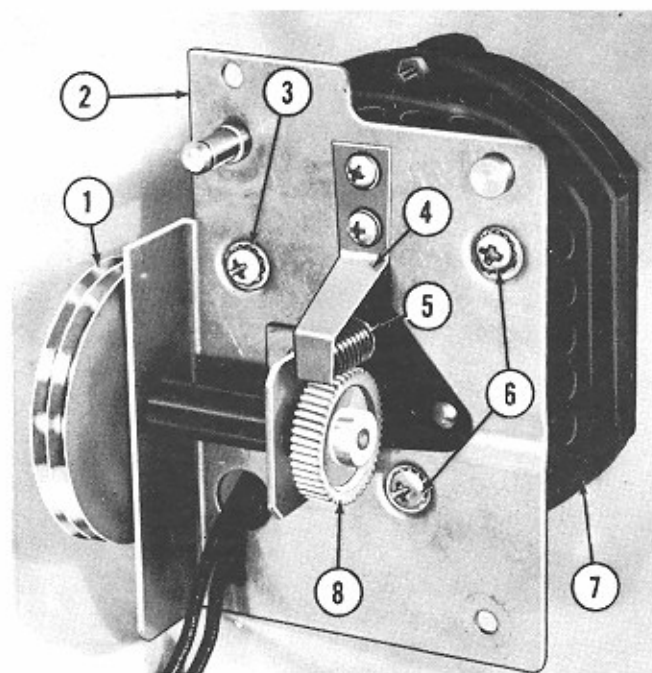


Fig. 84. TURNTABLE DRIVE GEAR ADJUSTMENT

- | | |
|--------------------------|----------|
| 1. Drive Pulley | 64189 |
| 2. Motor Mounting Plate | 60946 |
| 3. Mounting Screw, Motor | 73533-33 |
| 4. Thrust Spring | 60893 |
| 5. Worm Gear | 60869 |
| 6. Mounting Screws | 73533-33 |
| 7. Motor | 66174 |
| 8. Driver Gear | 65203 |

(1) Remove the motor and mounting plate assembly from the top support casting.

(2) Loosen the three screws (Items 3 and 6) that mount the motor to the mounting plate (Item 2), and shift the motor and worm gear assembly (Items 7 and 5) to obtain a minimum of back lash consistent with perfect freedom of operation.

(3) Tighten the three mounting screws, re-check the setting, and re-install the motor and mounting plate assembly.

aa. Main Shaft Drive Gear and Pinion Adjustment. (Fig. 85)

The mounting bracket (Item 2, Fig. 85) for the record changer motor is provided with one elongated mounting hole to permit adjustment of the depth of mesh of the drive pinion (Item 4) with the main drive gear (Item 5). Mesh adjustment may be accomplished as follows:

(1) Loosen the two allen head screws (Item 1) and set the position of the motor and mounting bracket assembly to provide a minimum of back lash consistent with freedom of operation.

(2) After tightening the two mounting screws, check the adjustment by operation in the searching cycle of operation.

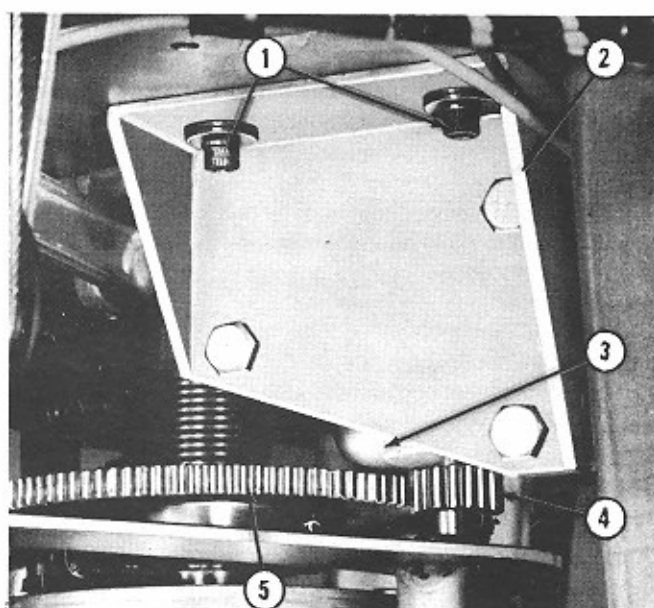


Fig. 85. MAIN SHAFT DRIVE GEAR AND PINION

- | | |
|--|----------|
| 1. Mounting Screws, Adjustment | 73571-16 |
| 2. Mounting Bracket and Motor Assembly | 64539 |
| 3. Motor, Record Changer | 64541 |
| 4. Drive Pinion | 59621 |
| 5. Main Shaft Drive Gear | 59623 |

ab. Actuating Arm and Cable, Tone Arm and Turntable. (Figs. 86 and 87)

The cable that operates both the tone arm and the turntable should be set to operate the turntable cam (Item 3, Fig. 86) through an arc of about 90° when the main cam moves from the "at rest" position to the play position. For installation of a new cable or re-adjustment of the turntable actuating linkage, proceed as follows:

(1) Pass the cable through the hole in the drive pulley (Item 2) and form loops on the cable ends in accordance with measurements shown in Fig. 87.

(2) Using the set screw (Item 5, Fig. 87) lock the cable firmly in the pulley in accordance with the measurements (Items 6 and 7).

(3) Take out the two screws and remove the stop plate (Item 1, Fig. 86).

(4) Rotate the turntable cam counter-clockwise to obtain enough slack in the cable to allow hooking the loop of the cable over the slide pin (Item 11, Fig. 86). The cable should be dressed around the guide pulley as shown in Fig. 86.

(5) The short end of the cable will be wound once around the drive pulley and the loop of the cable hooked to the tension spring (Item 5, Fig. 86) as shown.

(6) Place the roller of the turntable release lever back of the cam as shown at Item 6, Figure 86, and rotate the turntable cam back in a clockwise direction. Re-install and fasten the stop plate (Item 1).

NOTE: In cases where the cable is already properly adjusted and installed in accordance with the above instructions, steps 1 to 6 may be deleted.

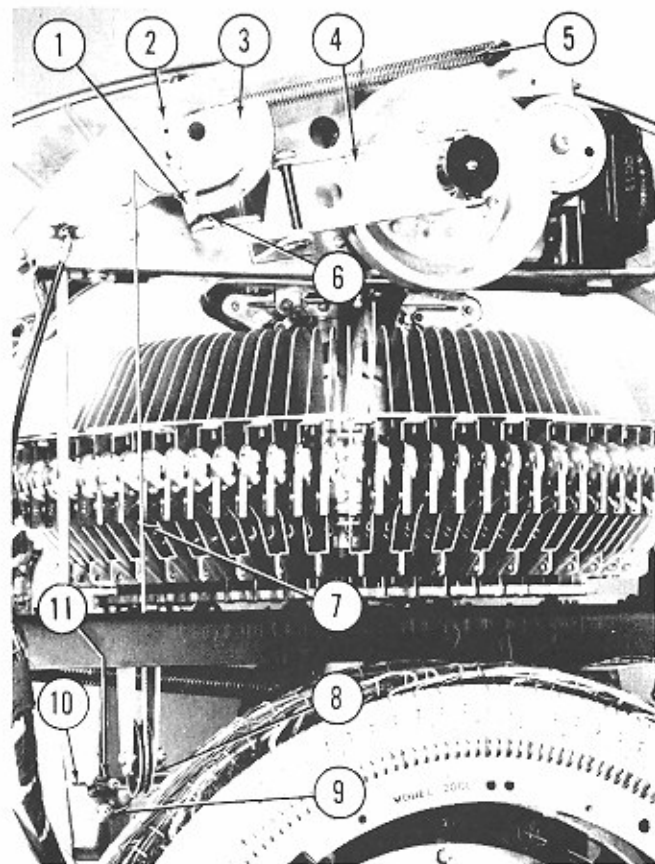


Fig. 86. ADJUSTMENT, ACTUATING ARM AND CABLE, TONE ARM AND TURNTABLE

- | | |
|--|----------|
| 1. Stop Plate, Turntable Cam | 60599 |
| 2. Drive Pulley, Turntable and Tone Arm Cams | 59415 |
| 3. Turntable Cam | 59464 |
| 4. Turntable Release Lever | 59922 |
| 5. Spring, Tension | 61174 |
| 6. Roller, Turntable Release Lever | 59485 |
| 7. Cable, Record Clamp and Tone Arm | 59871 |
| 8. Guide Pulley | 59487 |
| 9. Adjusting Screw | 73502-99 |
| 10. Actuating Arm | 59688 |
| 11. Slide Pin | 59686 |

(7) Turn the adjusting screw (Item 9, Fig. 86) to take up on the cable and position the turntable cam so that the roller of the turntable release lever is well onto the flat portion of the turntable cam.

NOTE: Check operation of the turntable cam in the playing position for complete freedom of the tone arm. In case the tone arm is not completely released, back out the cable adjusting screw to allow further clockwise rotation of the turntable cam and shaft assembly. This will advance the tone arm release cam to its highest point and provide release of the tone arm.

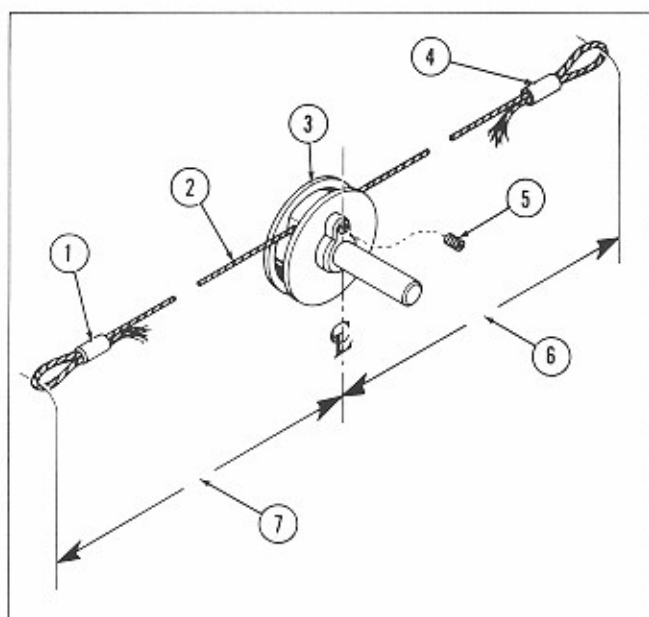


Fig. 87. TURNTABLE CABLE AND DRIVE PULLEY

- | | |
|---|-------|
| 1. Collar (Sleeve) | 61658 |
| 2. Cable | 59871 |
| 3. Drive Pulley | 59415 |
| 4. Collar | 61658 |
| 5. Set Screw | 64427 |
| 6. 6 3/16" From Center Line to Inside of Loop | |
| 7. 18 7/8" From Center Line to Inside of Loop | |

ac. Record Guide and Safety Switch Adjustment. (Fig. 88)

The record guide assembly is mounted on a vertical pivot and is positioned by its adjusting screw (Item 4, Fig. 88) with relation to the record lift arms, right and left. A recommended adjustment procedure follows:

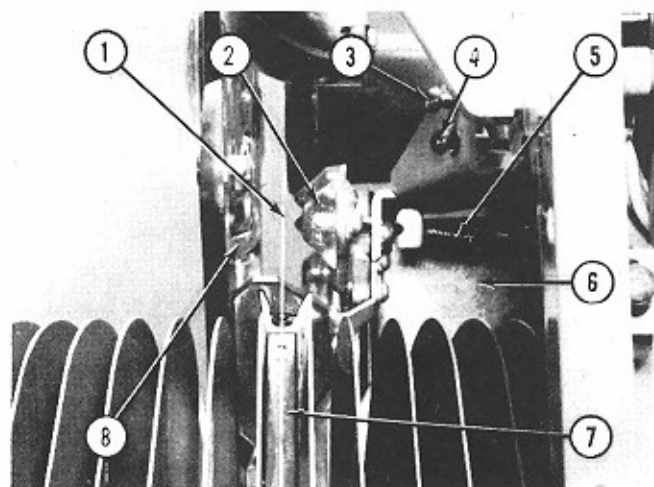


Fig. 88. RECORD GUIDE AND SAFETY SWITCH SETTINGS

- | | |
|------------------------------------|----------|
| 1. Center Line, Record Lift Arm | |
| 2. Plastic Guide Tip | 59743 |
| 3. Screw, Safety Switch Adjusting | 73800 |
| 4. Screw, Record Guide Adjusting | 73656-72 |
| 5. Spring, Record Guide Retracting | 59606 |
| 6. Casting, Record Guide | 59892 |
| 7. Record Lift Arm | 65487 |
| 8. Plastic Guide Plate | 59548 |

(1) Turn the adjusting screw (Item 4) in or out as required to provide equal alignment of the surface of the plastic guide plate (Item 8) with the parallel surface of the front of the top support casting.

NOTE: If the record lift arms have been accurately aligned as described in paragraphs j, k, and l, page 42, and the plastic guide plate is parallel, the angular variation of each record lift arm will be $0^{\circ} 54'$ to the rear of parallel as stated in paragraph j, (4).

(2) After the record guide assembly has been set as described in step (1) and its retracting spring (Item 5) holding the adjusting screw (Item 4) against the support casting, set the safety switch adjusting screw (Item 3) as described in paragraph a.

ad. Tone Arm Brush Setting. (Figs. 89 and 90)

The tone arm brush is operated by a cable attached to the actuating arm for the transfer switch. The action of the tone arm brush may be governed as follows:

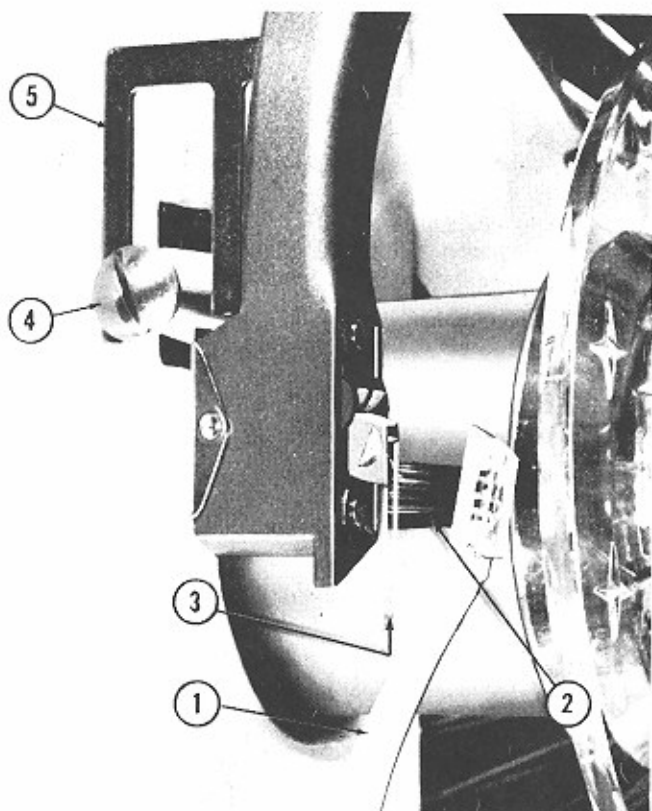


Fig. 89. TONE ARM BRUSH SETTING

- | | |
|---------------------------|-------|
| 1. Arm, Brush Holder | 64560 |
| 2. Tone Arm Brush | 59830 |
| 3. 1/16" Maximum Depth | |
| 4. Feed-in Screw | 64422 |
| 5. Tone Arm Latch Bracket | 64423 |

(1) This procedure should start with the record changer in its normal "at rest" position and the tone arm should be latched in the recess in the "feed-in adjusting screw".

(2) Set the "brush holder arm" (Item 1, Fig. 89) so that when the arm is actuated, the bristles of the brush will sweep across the needle at a depth of not more than 1/16" beyond the needle point, as shown in Item 3, Figure 89.

NOTE: The pick-up characteristics of the Cobra cartridge will be seriously impaired by brushing out any of the damping material around the vane inside the cartridge.

(3) With the record changer mechanism in the "at rest position", turn the adjusting screw (Item 2, Fig. 90) for the tone arm brush to take up or release the actuating cable as required to position the brush 1/4" to 1/2" below the cartridge.

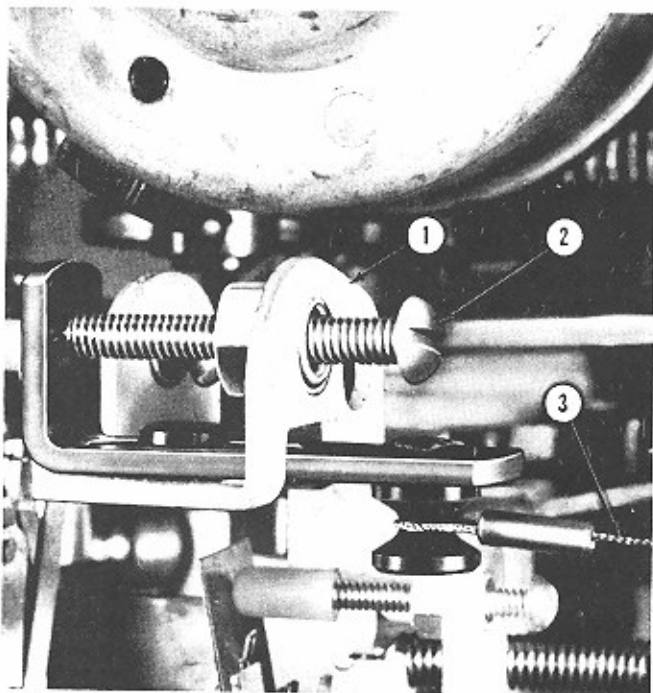


Fig. 90. TONE ARM BRUSH SETTING

- | | |
|------------------------------------|----------|
| 1. Actuating Arm, Transfer Switch | 59691 |
| 2. Adjusting Screw, Tone Arm Brush | 73503-95 |
| 3. Actuating Cable, Tone Arm Brush | 59888 |

ae. Shim Procedure for Assembling the Turntable Shaft. (Fig. 91)

After the thrust bearing group, Items 6, 7, and 8, Fig. 91, has been installed next to the turntable, three fiber washers and two metal washers (shims) should always be used on the turntable end of the turntable shaft in the same order as shown in Items 9, 10, 11, 12, and 13. The fiber washers and metal shims should always be oiled before assembly. The final washer assembly on the fly wheel end of the turntable shaft may vary in the number used to provide proper end play, however, the same rule applies as to the position of the fiber washers and oiling. This washer group should always start and finish with a fiber washer.

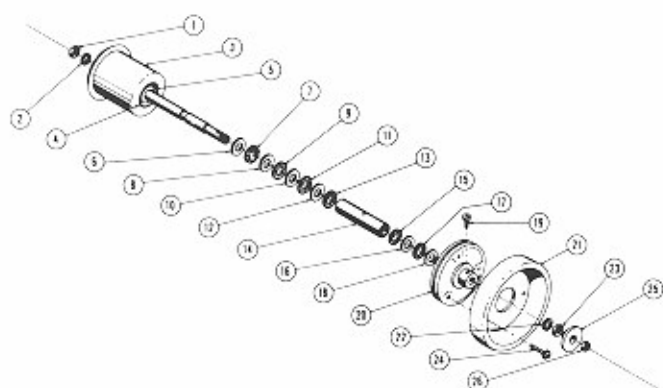


Fig. 91. SHIM PROCEDURE FOR ASSEMBLING THE TURNTABLE SHAFT

1. Nut	59470
2. Lockwasher	73607-12
3. Turntable and Shaft Assembly	64553
4. Oil Slinger	59571
5. Washer, on Shoulder of Shaft	56530
6. Washer	59864
7. Ball Race	59867
8. Washer	59864
9. Washer, Fibre	63732
10. Washer, Metal Shim	63731
11. Washer, Fibre	63732
12. Washer, Metal Shim	63731
13. Washer, Fibre	63732
14. Shaft and Bushing Assembly	59773
15. Washer, Fibre	63732
16. Washer, Metal Shim	63731
17. Washer, Fibre	63732
18. Washer, on Shoulder of Shaft	56530
19. Screw, Special	59399
20. Pulley	64190
21. Fly Wheel	59456
22. Lock Washer	73607-12
23. Nut	59470
24. Screw, Sems	73533-38
25. Plate, Record Clamp	63205
26. Nut	73601-10

5. LUBRICATION

Lubrication of the record changer should be checked periodically to insure continuous operation. Oil and other lubricants should be used as recommended below:

a. Houghton Absorbed Oil, Type L3 (Part No. 34070) should be used at points where a non-fluid type of oil is required, such as:

Main Cam Working Surfaces (Cam Tracks)
Gears and Pinions
Turntable Worm Gear and Pinion
All Spring and Anchor Points

b. S.A.E. No. 10 and waxfree, should be used at the following points:

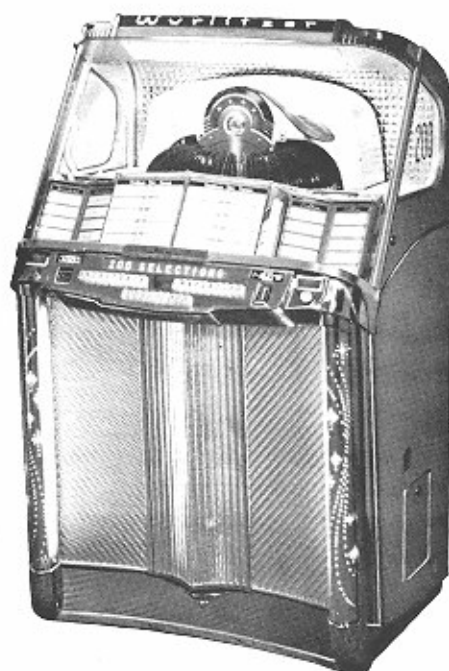
Record Actuator Guide Bearings
Annular Bearings under the Record Carrier
Turntable Drive Shaft and Motor

Tone Arm Actuator Shaft Assembly
Record Carrier Shaft and Bearings
Main Cam Shaft
Selector Shaft
Turntable Sleeve
Fulcrum Points of all Light Weight Linkage and Levers

c. A one-half inch hole, located one and one half inches off center, will be found in the record carrier casting. This hole should be aligned with a corresponding hole in the chassis mounting plate. These two holes will coincide squarely at the front of the record changer when the hole in the record carrier is brought to that position. Oil applied at this point will be absorbed by a felt pad which in turn, lubricates the record lift actuator arms and linkage at their fulcrum points where the heaviest load is applied.

d. The reduction gears of the record changer motor assembly are packed with a non-fluid lubricant (Alvania No. 1). There is one oiler on top of the motor to supply the center bearing. The main cam shaft may be lubricated by placing a small quantity of light oil at the top and center of the main cam.

e. The right and left program selector contact plate assemblies should be lubricated with a special Silicone grease which may be obtained from our parts department under Part No. 67887-A. The gear assemblies should be lubricated with Keystone No. C.P. Soft (Part No. 67500-A).





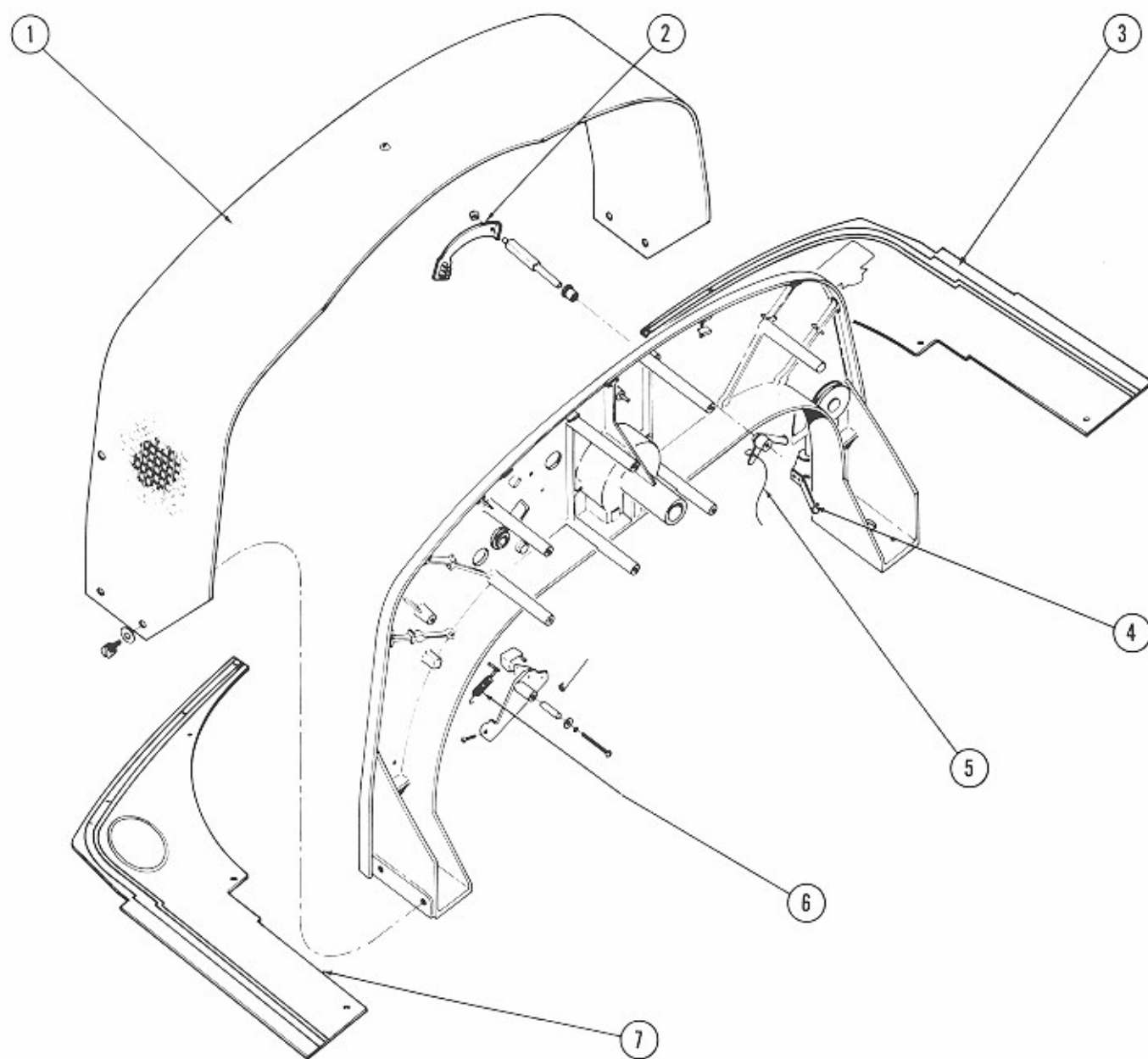


Fig. 93. TOP SUPPORT CASTING ASSEMBLY

1. Cover - Support Casting	64578	5. Cable - Brush - Tone Arm	59888
2. Arm and Brush Assembly - Tone Arm	64559	6. Spring - Override and Trip Switch	59615
3. Decorative Shelf Assembly R.H.	65858	7. Decorative Shelf Assembly L.H.	65859
4. Reset Spring - Play Counter Reset	65105		

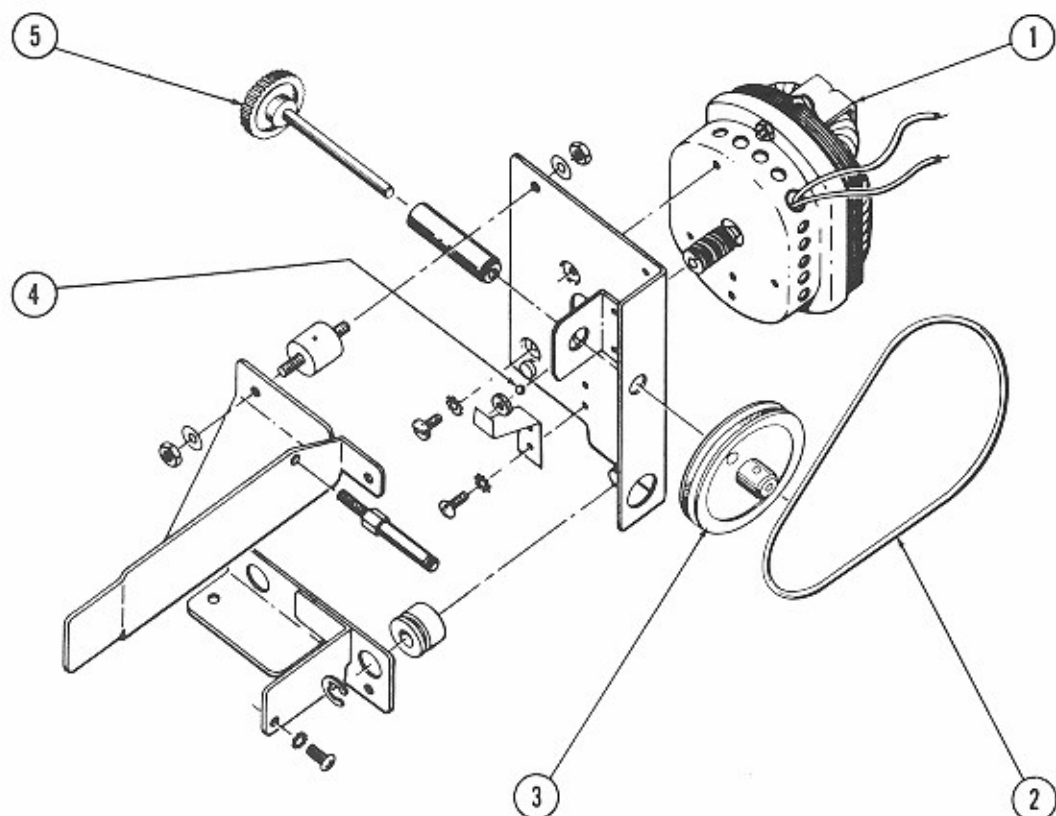


Fig. 94. TURNTABLE MOTOR AND GEAR SHAFT ASSEMBLY

- | | | |
|--------------------------------------|-------|------------------------------|
| 1. Turntable Motor and Worm Assembly | 60955 | 4. Steel Ball |
| 2. "O" Ring - Turntable Drive Motor | 60881 | 5. Gear and Shaft Assembly - |
| 3. Pulley - Turntable Drive Motor | 64189 | Turntable Drive Motor |

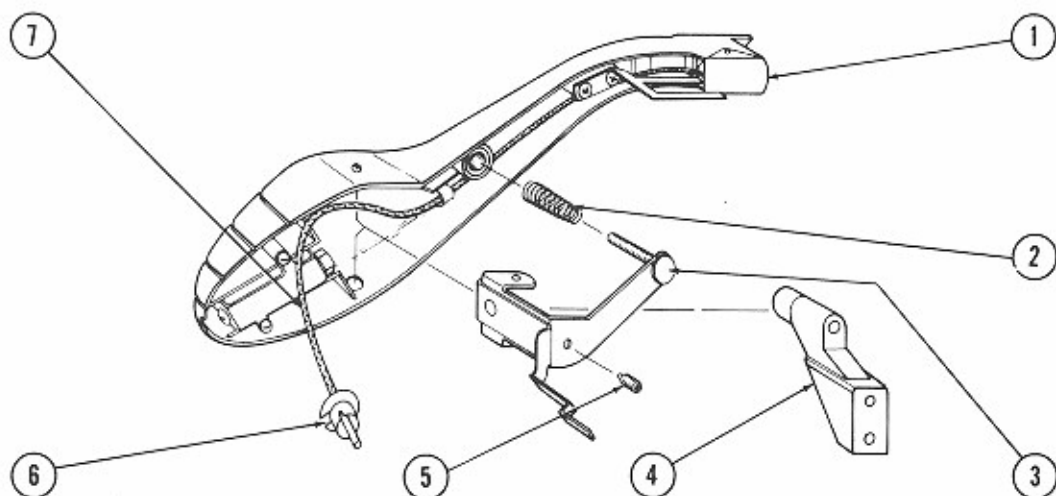


Fig. 95. TONE ARM AND WIRE ASSEMBLY

- | | | | |
|--------------------------------------|-------|-------------------------------|-------|
| 1. Tone Arm and Wire Assembly | 64527 | 5. Adjusting Screw - Tone Arm | 60459 |
| 2. Spring - Tone Arm Pressure | 59711 | 6. Plug | 37146 |
| 3. Gimbal and Stop Nut Assembly | 64433 | Silencer | 50149 |
| 4. Mounting Casting and Pin Assembly | 64574 | 7. Wire Assembly - Tone Arm | 59792 |

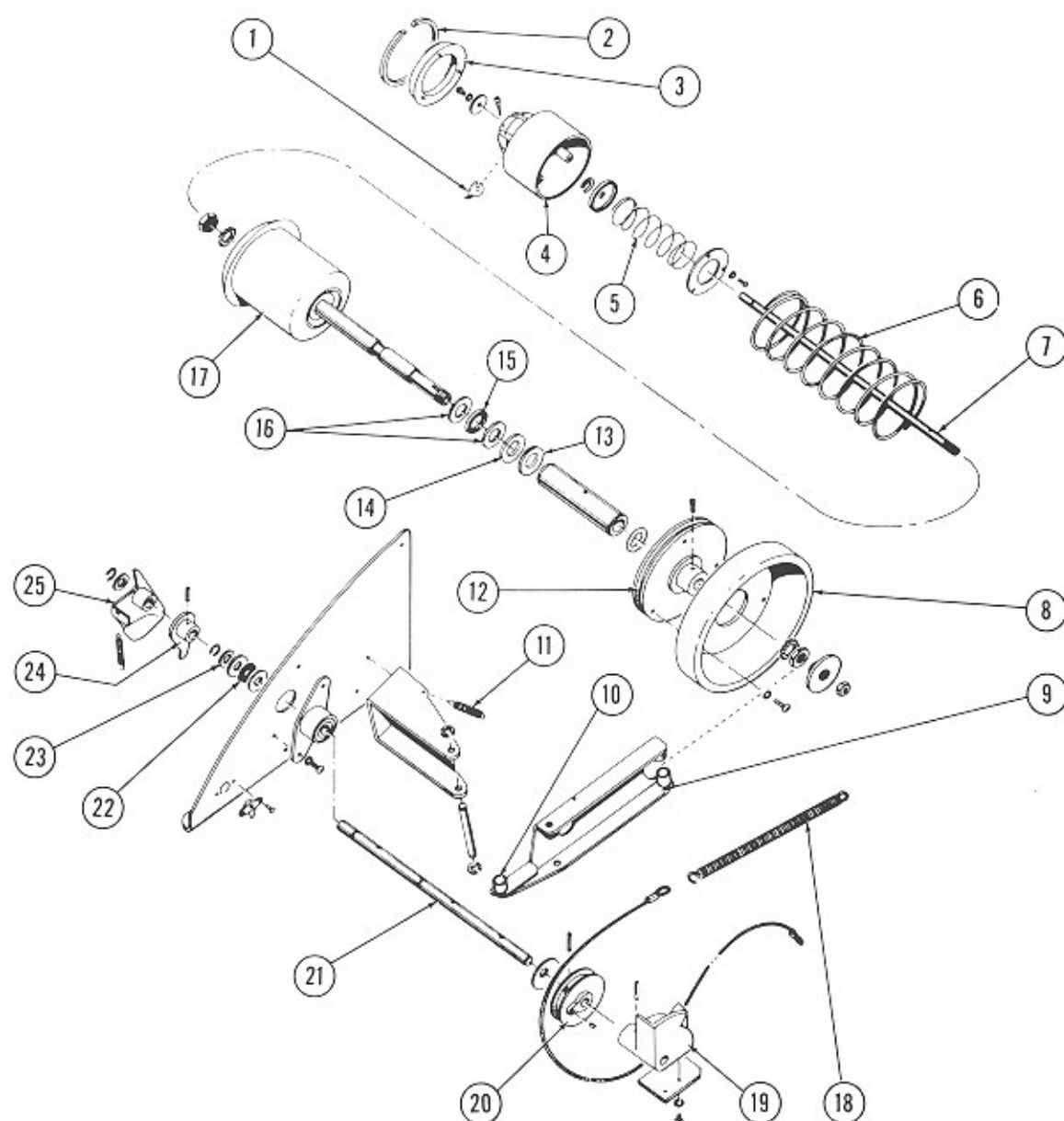


Fig. 96. TURNTABLE SHAFT ASSEMBLY, RECORD CLAMP SHAFT,
AND MOUNTING PLATE AND BALL BEARING ASSEMBLY

1. Lever - Record Clamp	59417	15. Ball Race - Turntable Shaft	59867
2. Retaining Ring - Pilot - Turntable	60681	16. Washer - Turntable Shaft	59864
3. Pad - Turntable	60680	17. Turntable and Shaft Assembly	64553
4. Pilot - Turntable	59449	18. Spring - Turntable Cam	61174
5. Spring - Record Clamp	59418	19. Cam - Record Clamp	59464
6. Spring - Pilot-Record Clamp	59424	20. Pulley - Pressure Pad	59415
7. Shaft - Record Clamp	59416	21. Shaft - Tone Arm	59393
8. Fly Wheel - Turntable	59456	22. Ball Race - Tone Arm Shaft	59679
9. Arm and Roller Assembly	59922	23. Washer - Tone Arm Shaft	59409
10. Roller Assembly - Turntable Release	59485	24. Arm and Hub Assembly - Tone Arm Release	59406
11. Spring - Turntable Release Lever	65096	25. Hub and Lever Assembly - Tone Arm Release	59722
12. Pulley - Turntable	64190		
13. Shim - Turntable Shaft	63731		
14. Washer - Turntable Shaft	63732		

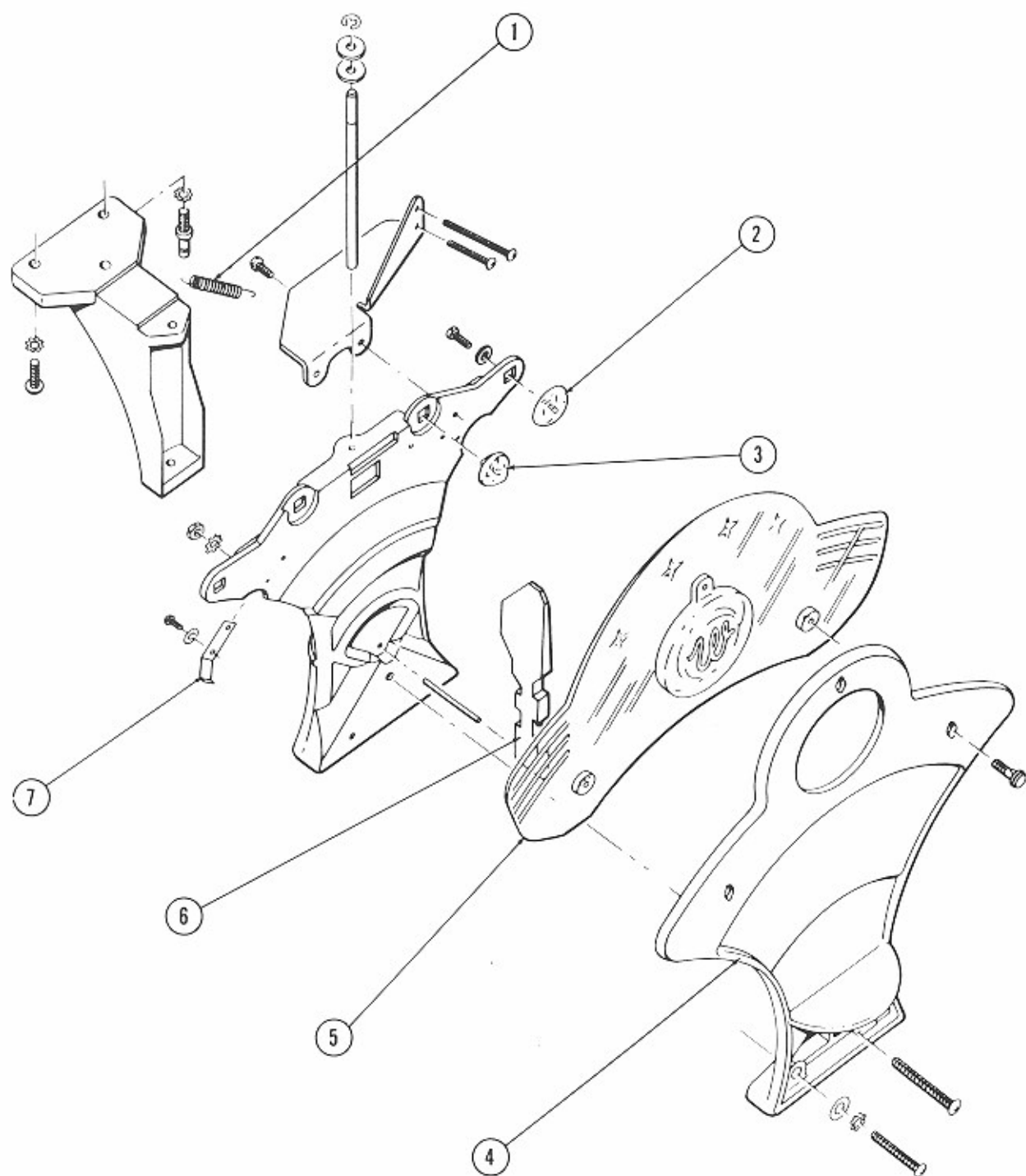


Fig. 97. RECORD GUIDE ASSEMBLY

1. Spring - Return	59606	5. Plate - Record Guide	59548
2. Bumper - Record Guide	59743	6. Track - Record	59425
3. Bumper - Record Guide	59396	7. Stop Bracket - Track	59434
4. Casting - Record Guide - Front	64562		

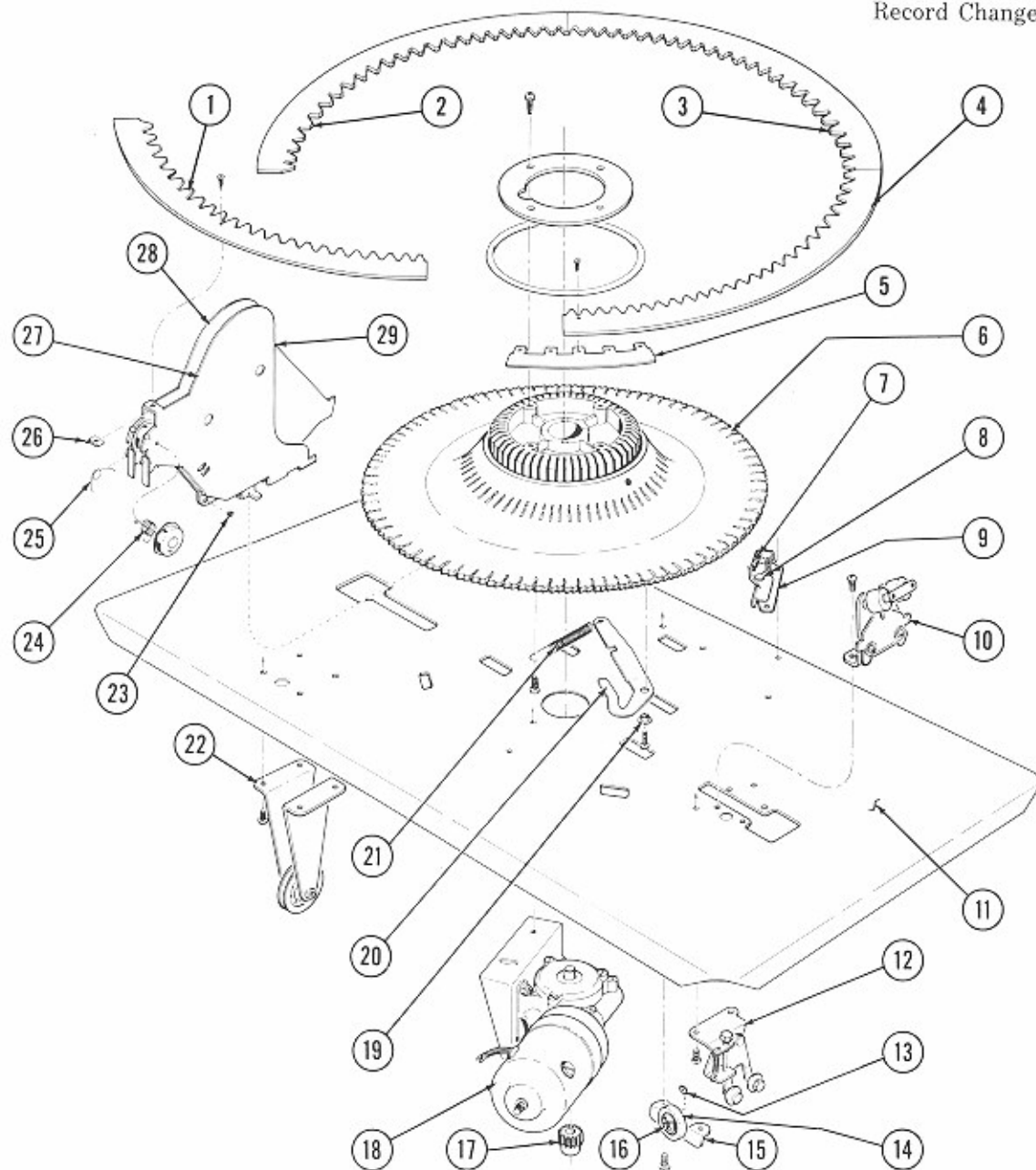


Fig. 98. CHASSIS MOUNTING PLATE AND RECORD CARRIER GROUP

1. Carrier Ring and Silk Screen Assembly (A6-M3)	65553	14. Ball Bearing	59672
2. Carrier Ring and Silk Screen Assembly (B1-L3)	65550	15. Bracket and Pin Assembly	59588
3. Carrier Ring and Silk Screen Assembly (A1-M8)	65551	16. Retaining Ring	73724-25
4. Carrier Ring and Silk Screen Assembly (B6-L8)	65552	17. Pinion	65621
5. Connector Bracket, Carrier	65548	18. Motor and Pinion Assembly	65624
6. Casting, Record Holder	65496	19. Bushing	59737
7. Spring	59710	20. Arm, Carrier Drive	65963
8. Bumper	54246	21. Spring	59709
9. Back Stop Pawl Assembly	65890	22. Mounting Bracket and Idler Pulley Assembly	61574
10. Bracket and Roller Assembly, Lift Arm Guide	65887	23. Eyelet	65714
11. Chassis Mounting Plate	59827	24. Spring	65806
12. Bracket and Roller Assembly L.H.	65885	25. Spring	59901
13. Bracket and Roller Assembly R.H.	65886	26. Nut, Tinnerman	73637-10
13. Spring Washer	73632-16	27. Record Holder and Counter Assembly, Small	65910
		28. Record Holder and Counter Assembly, Large	65909
		29. Record Holder and Nut Assembly	67521

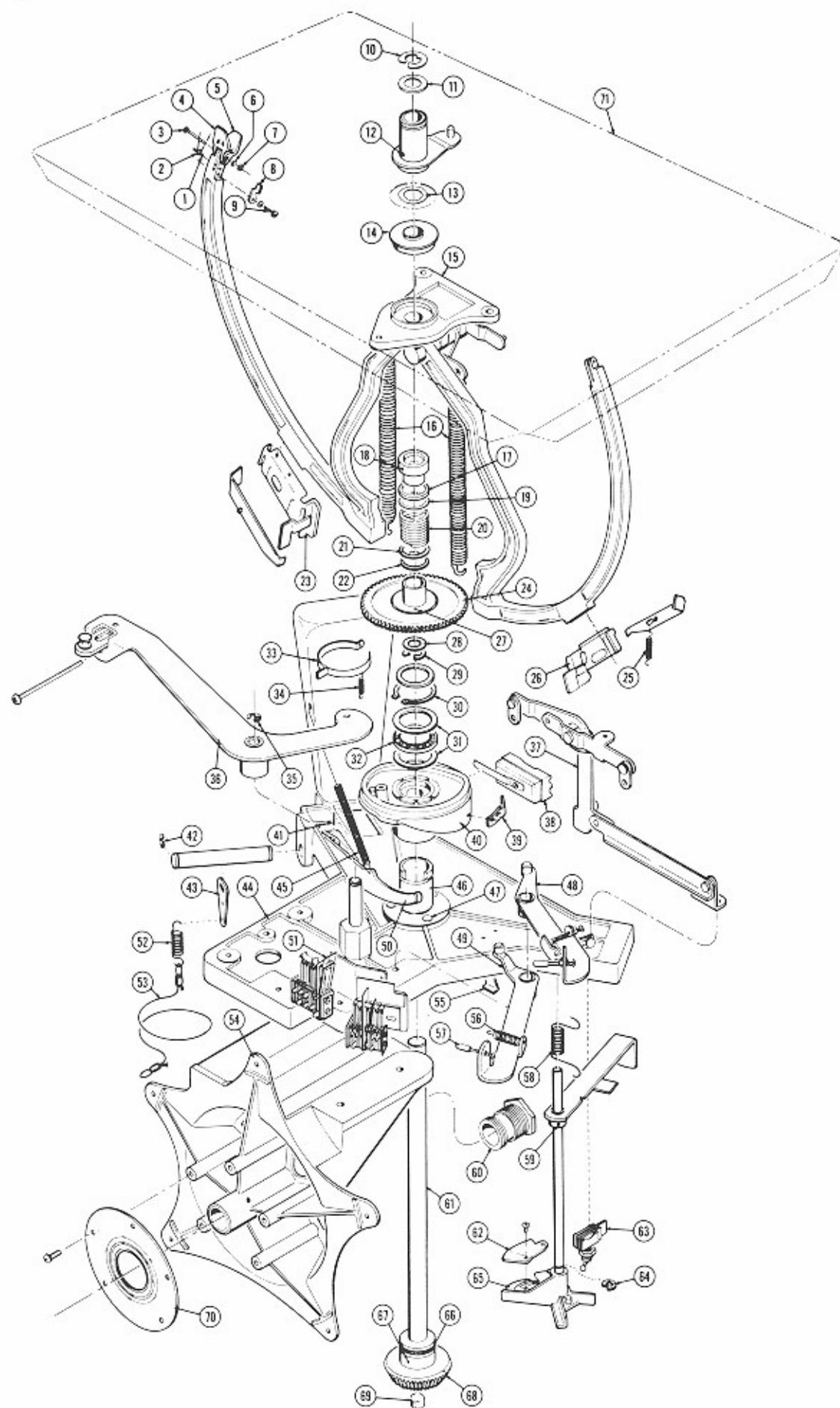


Fig. 99

Fig. 99. RECORD LIFT ARM, MAIN CAM SHAFT AND CHASSIS FRAME GROUP

1. Roll Pin	73782-32	38. Micro Switch	53809
2. Spring	65812	39. Cam Lobe, Mute and Play Switch	62768
3. Shaft	65938	40. Main Cam and Bushing Assembly	62792
4. Guide Tip, L.H.	65731	41. Roll Pin	73782-66
5. Guide Tip, R.H.	65730	42. Retaining Ring	73728-50
6. Washer	65937	43. Arm, Cancel Lever, Lower	65520
7. Retaining Ring	73724-9	44. Chassis Casting and Shaft Assembly	65894
8. Stop, Guide Tip	65526	45. Spring, Cancel Arm Return	59585
9. Screw, 4 - 40 x 5/8" R.H.	73533-7	46. Shaft and Plate Assembly	65836
10. Retaining Ring	73724-87	47. Rivet	60481
11. Washer	59660	48. Actuator Arm Assembly	
12. Roll Pin	73782-35	Transfer Switch	65898
13. Washer, Spring	73870-19	49. Actuator Arm Assembly	62761
14. Ball Bearing	59654	50. Cancel Lever, Hub and Roller Assembly	65913
15. Pivot Casting and Arm Assembly	65880	51. Switch and Bracket Assembly	65977
16. Spring, Record Arm Lifter	59697	52. Spring, Cancel Arm Lever	65811
17. Washer, Felt	59655	53. Cable Assembly, Cancel	65742
18. Roll Pin	73782-88	54. Selector Casting and	
19. Washer, Special	59641	Bearing Assembly	65762
20. Spring, Drive Clutch	59584	55. Stop Bracket	65701
21. Washer, Special	59641	56. Spring	62773
22. Washer, Felt	59655	57. Actuator	58255
23. Bracket and Nut Assembly, L.H.	65831	58. Spring	65807
24. Gear and Ratchet Wheel Assembly	59732	59. Set Screw	73511-29
25. Spring	59894	60. Adjusting Bushing and	
26. Bracket and Nut Assembly, R.H.	65832	Bearing Assembly	65509
27. Roll Pin	73782-50	61. Main Shaft, Gear, and Hub Assembly	65556
28. Washer	59658	62. Plate	65711
29. Retaining Ring	73728-62	63. Switch, Toggle	53648
30. Retaining Ring	73727-112	64. Retaining Ring	73724-18
31. Washer, Special	59641	65. Cam	65729
32. Ball, Race	59637	66. Ball, Race	65689
33. Strap and Spring Assembly	59626	67. Roll Pin	73782-88
34. Spring	59612	68. Gear, Selector, Bevel	65765
35. Retaining Ring	73728-37	69. Plug, Tube	62888
36. Lever Assembly, Record Clamp	59688	70. Contact Plate Assembly	66186
37. Link and Lever Assembly,		71. Chassis Mounting Plate (Reference)	59827
Record Arm	59599	Grease, Keystone #CP Soft	67500-A

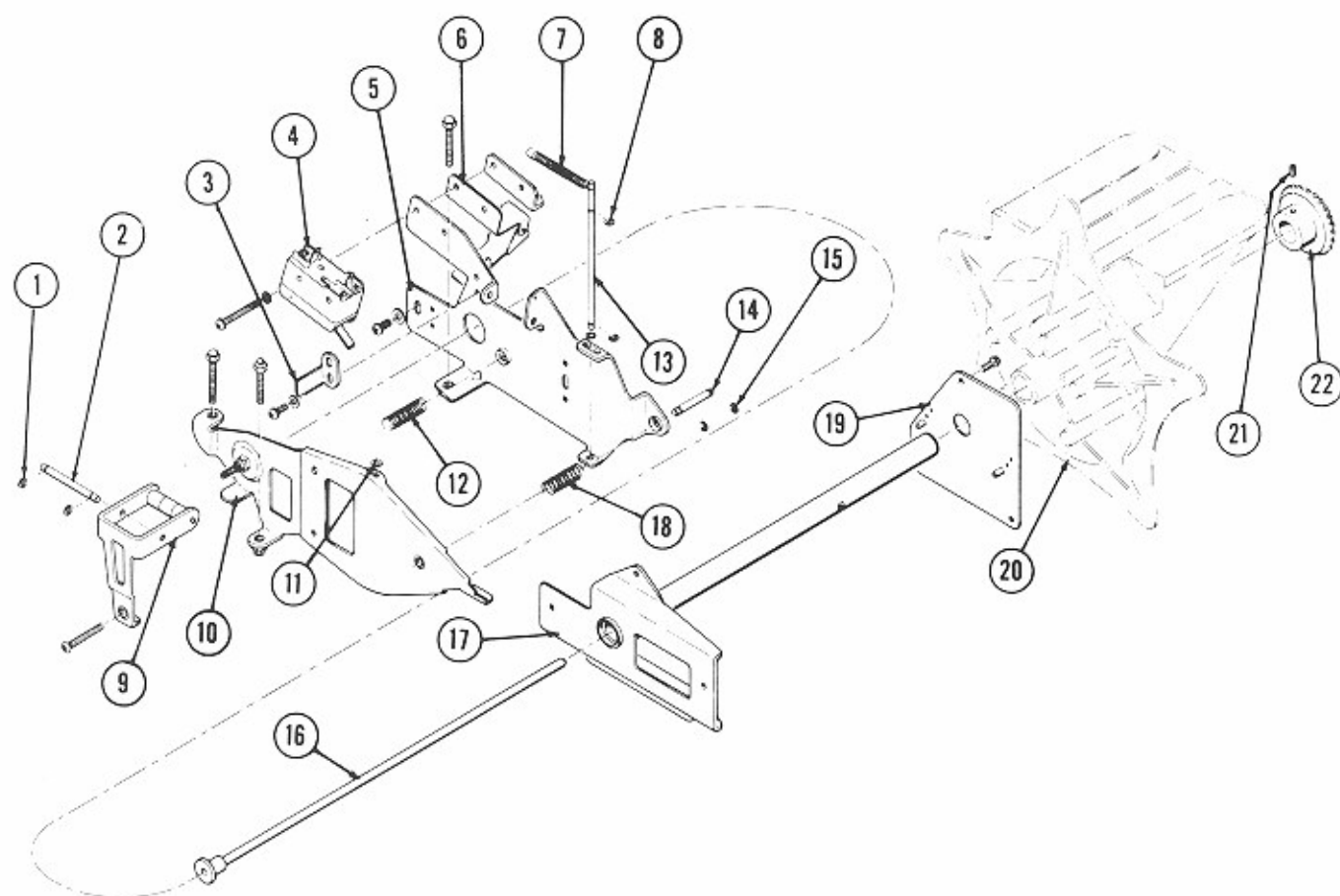


Fig. 100. SELECTOR SHAFT

1. Retaining Ring	73724-18	12. Spring	65808
2. Pin, Stop Bracket, Selector Crank	65699	13. Shaft, Selector Crank Mounting	65698
3. Stop Bracket	65722	14. Pin, Spring	65700
4. Micro Switch	66002	15. Retaining Ring	73724-18
5. Crank Support Bracket and Stop Nut Assembly	65735	16. Shaft and Cap Assembly	65527
6. Bracket and Lever, Actuator Assembly	65905	17. Mounting Bracket and Bearing Assembly	65733
7. Spring	65810	18. Spring	65809
8. Retaining Ring	73724-15	19. Contact Blade and Plate Assembly	65724
9. Stop Bracket, Cup and Pin Assembly	65906	20. Selector Casting and Bearing Assembly (Reference)	65762
10. Crank, Bracket and Nut Assembly	65737	21. Screw, Set, Pointed	65712
11. Shim	67411	22. Gear, Selector, Bevel	65764

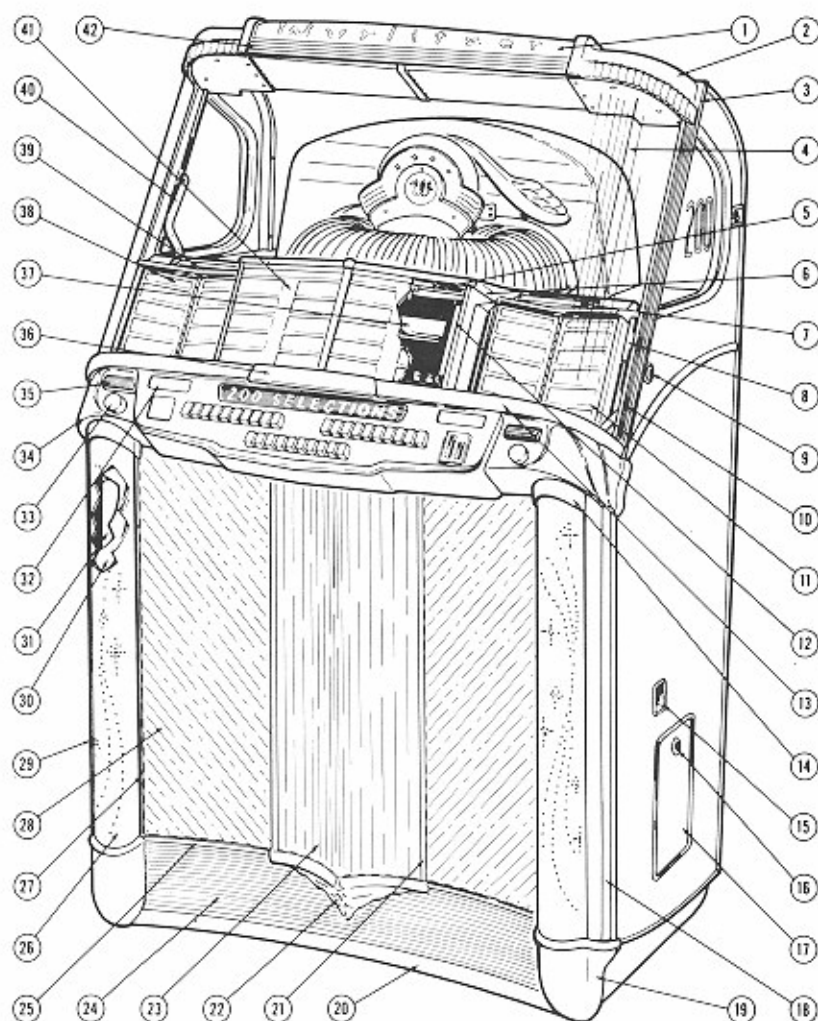


Fig. 101. TRIM AND MOUNTING - FRONT VIEW

1. Valance, Dome		64568			
2. Cap, Dome	R.H. 64496	L.H. 64495	25. Center Grill	L.H. 64768	R.H. 64767
3. Front Extrusion and Channel Assembly	R.H. 68214	L.H. 68213	26. Pilaster, Glass	L.H. 64670	R.H. 64671
4. Door Glass		65590	27. Extrusion, Pilaster Inside	L.H. 64818	R.H. 64817
Gasket Bulk (Specify Length)		65035	28. Grill Screen	L.H. 64820	R.H. 64819
5. Brace and Spring Assembly		66273	29. Extrusion, Pilaster, L.H.		64713
6. Spring Clip (Inside)		66213	30. Color Shield	L.H. 65138	R.H. 65139
7. Descriptive Escutcheon (Press a Letter and a Number)		66196	Gasket, Bulk (Specify Length)		64828
8. Lock Plate and Shield Assembly	R.H. 65258	L.H. 65257	Gasket, Bulk (Specify Length)		64829
9. Lock and Key Assembly		64854	31. Lamp, 20 Watt, Daylight		62424
Lock Strike, Dome R.H.		64848	Starter, 20 Watt		44928
Lock Strike, Dome		64846	32. Lamp, #51		37987
10. Trim Strip	R.H. 65587	L.H. 65586	33. Reject Button Assembly		60275
11. Program Holder and Page Assembly			Switch Reset		66144
(L0 - V0)		65990	Spring		62773
(A4 - K4)		65993	Retaining Ring		73724-31
(A6 - K6, L4 - V4)		65999	Micro Switch		57063
(A0 - K0, L8 - V8)		65997	34. Cheek Casting	L.H. 65495	R.H. 65494
(A8 - K8, L6 - V6)		66001	35. Button, Program Changer		66332
Program Cards		62604	Spring		66556
Retaining Ring (Page Hinge)		73724-9	36. Overlay Casting, Dome		64524
12. Lamp, 4 Watt, Fluorescent		65837	37. Lamp, 14 Watt, Daylight		66281
Starter, 4 Watt		65843	Starter, 14 Watt		44928
13. Extrusion, Dome	R.H. 65589	L.H. 65588	38. Program Holder and Page Assembly		
14. Pilaster, Cap	R.H. 64695	L.H. 64696	(A9 - K9)		65992
15. Coin Return Cup		65649	(L3 - V3)		65991
16. Lock and Key, Ace		58127	(A7 - K7, L9 - V9)		65998
17. Coin Box Door		1052872	(A3 - K3, L5 - V5)		65996
Bracket		65213	(A5 - K5, L7 - V7)		66000
Coin Bag		62670	Program Cards		62604
18. Extrusion, Pilaster, R.H.		64712	Retaining Ring		73724-9
19. Bottom Pilaster Casting	R.H. 64612	L.H. 64611	39. Descriptive Escutcheon (Select After Depositing Each Coin)		66197
20. Extrusion, Lower Grill		64830	40. Fall Support Assembly		65180
21. Extrusion, Grill Screen	R.H. 64814	L.H. 64815	41. Program Holder and Silk Screen		
22. Center Bottom Grill Casting		64636	(A1 - K1, L1 - V1)		65930
23. Grill Screen, Center		64821	(A2 - K2, L2 - V2)		65931
24. Kick Plate		64825	Classification Slip (Today's Top Tunes)		65872
			42. Trim Strip		64571

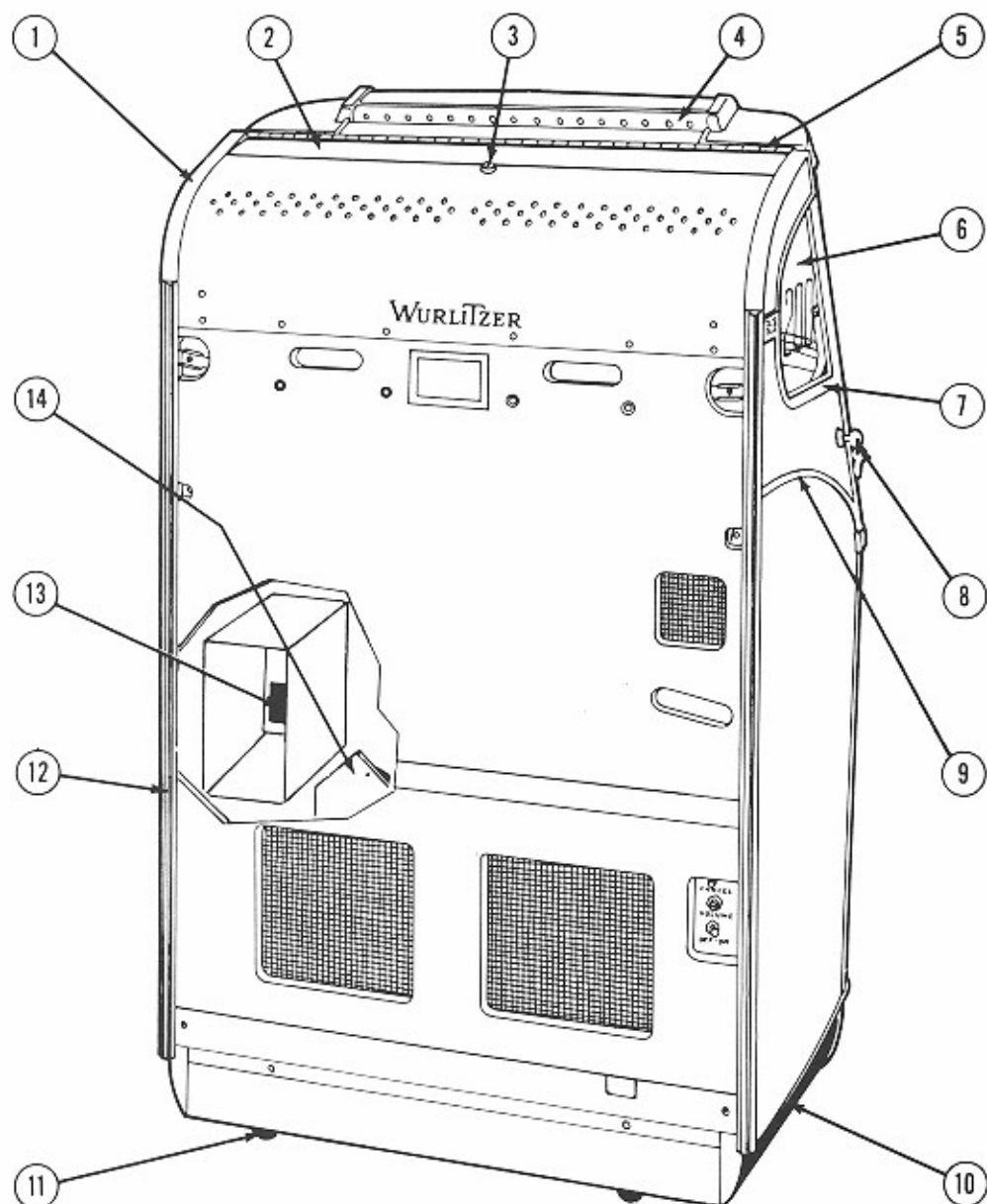


Fig. 102. TRIM AND MOUNTING - REAR VIEW

1. Extrusion, Back Bumper	R.H. 64802	L.H. 64803	8. Lock and Key Assembly	64854
2. Top Plate, Cabinet		64886	Lock Strike, Dome L.H.	64849
3. Lock and Key Assembly, Dome		64854	Lock Strike, Dome	64846
4. Top Plate and Light Shield Assembly		65187	9. Trim Moulding	L.H. 65819 R.H. 65820
Lamp, 20 Watt, Soft White		54855	10. Trim Strip, Lower	L.H. 65065 R.H. 65064
Starter, 20 Watt		44928	11. Caster, Single	50323
5. Hinge, Dome		64871	12. Extrusion, Back Bumper Moulding	R.H. 64801 L.H. 65465
6. Side Glass and Silk Screen Assembly	L.H. 65654	R.H. 65653	13. Contact Plate Assembly (Slug Rejector Cover) 5-10-25 Cent	66155
Gasket, Side Glass (Bulk, Specify Length)		64510	Contact Plate Assembly (Slug Rejector Cover) 50 Cent	66158
7. Extrusion, Side Glass	L.H. 64662	R.H. 64661	14. Coil, Cross-Over (Speaker)	62843

COMPLETE PHONOGRAPH FUNCTIONAL

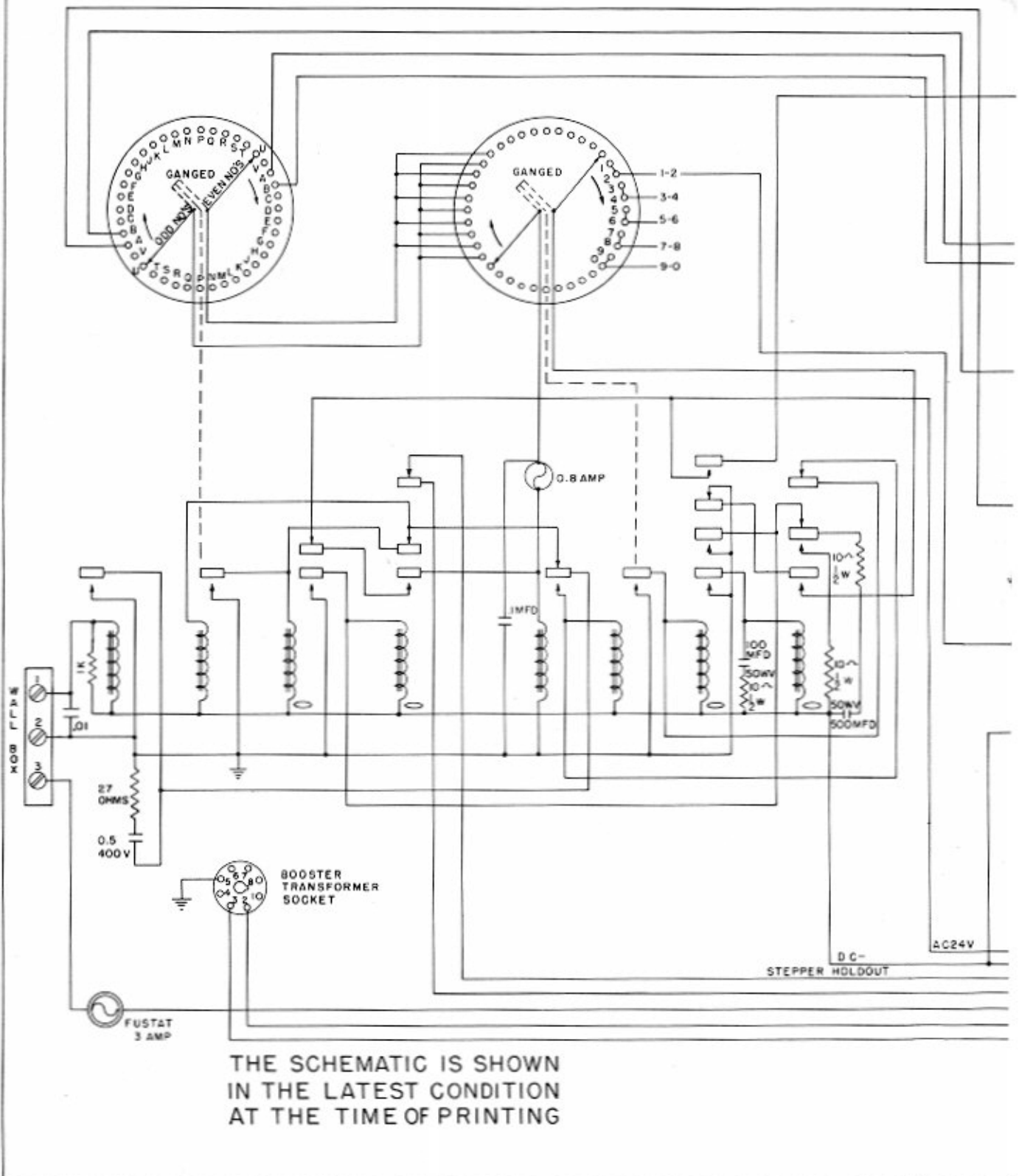
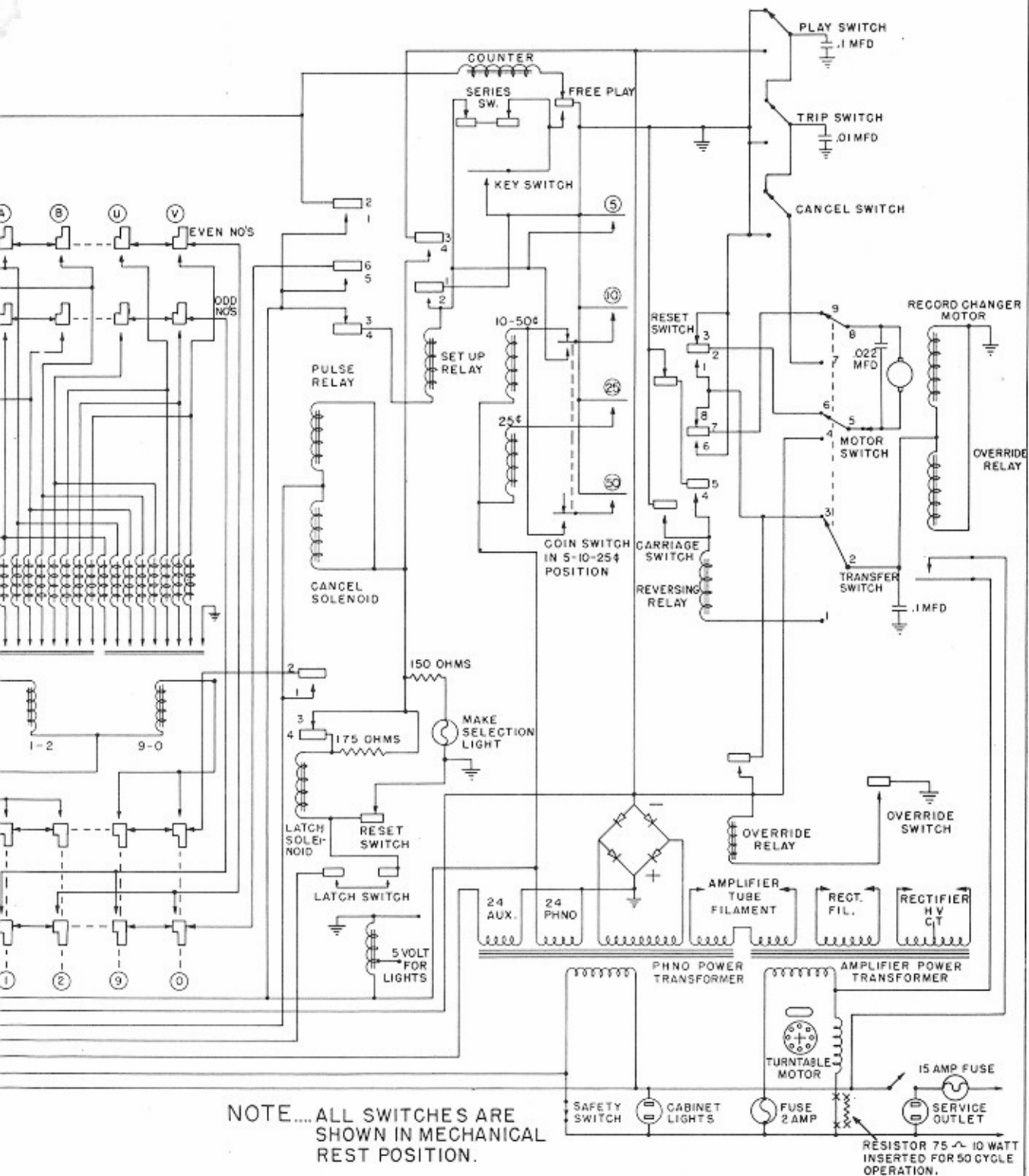


Fig. 92. 60 CYCLE - COMPLETE PH

SCHEMATIC - MODEL 2000 - 60 CYCLE



SOUND SYSTEM MODEL 2000

1. GENERAL DISCUSSION

The Wurlitzer Model 2000 Phonograph Sound System consists of a Dynatone Model 530 Amplifier with built in automatic level control and Zenith Cobra equipped low inertia tone arm, and a high fidelity speaker and cross over network mounted on a single wide angle baffle (See Fig. 103). The speaker compliment consists of two 12" woofers, one 12" mid-range, and two four inch tweeters together with appropriate cross over network

The out-put of the Model 530 amplifier is provided with terminals and a ratio fader control to accommodate auxiliary speaker installations. Remote volume control and cancel facilities are available through the installation of Kit 147, (Part No. 65337).

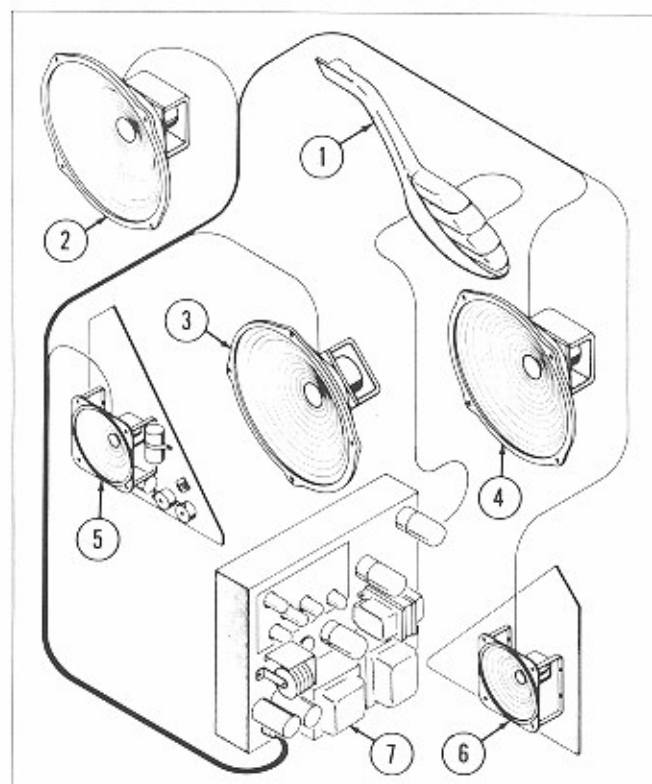


Fig. 103. SOUND SYSTEM - MODEL 2000

1. Tone Arm	64526
2. Speaker - 12 inches	62492
3. Speaker - 12 inches	62493
4. Speaker - 12 inches	62492
5. Speaker - 4 inches	63650
6. Speaker - 4 inches	63650
7. Amplifier	64478

2. DESCRIPTION

a. Tone Arm.

The low inertia tone arm is perfectly balanced as described on page 51, par. y. In it is mounted the exclusive Zenith Cobra Pick-up to provide maximum efficiency in converting record modulation to electrical impulses.

b. Amplifier.

The amplifier is mounted on the inside left hand wall of the cabinet. The "on-off" line switch, cancel switch, and the volume control are mounted in the back of the amplifier just inside the opening in the upper edge of the lower back door of the cabinet.

The fader control and the 115V service outlet are also mounted in the back of the amplifier, but are available only when the lower back door is off. The bass control, the treble control, and the receptacle for the remote control are located on the top side of the amplifier and are accessible when the upper back door is off. The following components are also located on the top side of the amplifier: Single prong input socket, Single prong auxiliary amplifier output socket, Five prong socket for mute and play switch cable.

The following components and receptacles are located on the amplifier chassis pan, near the back door: 2 Amp. A.C. Fuse Post, 2 Amp. D.C. Fuse Post, 8 Amp. A.C. Fuse Post, 15 Amp. Line Fuse Post.

The following sockets are located on the amplifier chassis pan near the front: 8 Prong speaker socket, 2 Prong Fluorescent Ballast socket, 11 Prong chassis cable socket.

All of the varied power requirements, both A.C. and D.C., of the record changer and selector system are provided by the amplifier and its several components. The functions of the amplifier tubes are listed in the following table:

Type	Description	Function
1- 12AU7	Twin Triode	1st Sec. Oscillator and Detector 2nd Sec. Variable Resistance
1- 6AN8	Pentode Triode	1st Sec. Voltage Amplifier 2nd Sec. Cathode Follower
1- 12AX7	Twin Triode	1st Sec. Voltage Amplifier 2nd Sec. Rectifier
1- 6AU6	Pentode	Voltage Amplifier
1- 12AX7	Twin Triode	Phase Inverter
2- 6L6GB	Tetrode	Output
1- 5U4GA	Dual Diode	Full Wave Rectifier

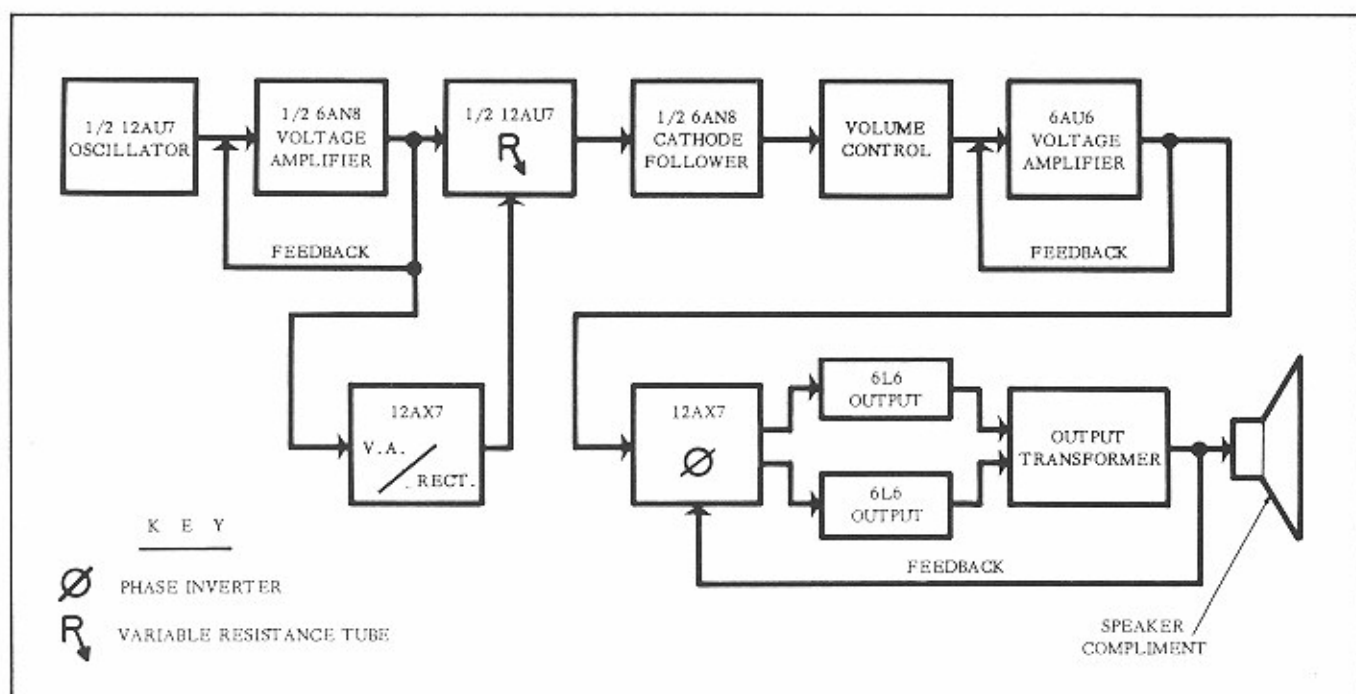


Fig. 104. MODEL 530 AMPLIFIER - BLOCK DIAGRAM FOR SIGNAL TRACING

3. THEORY OF OPERATION

a. Pick-up and Oscillator.

The oscillator section of the 12AU7 (See Fig. 104) operates at approximately 2.5 mc. and is electrically loaded by the coil and vane of the Zenith Cobra pick-up unit which forms the tank component of the oscillator circuit. The vibration of the metal vane, on which the pick-up needle is mounted, varies the resonance of the tank circuit and causes a variable voltage at the plate of the oscillator section of the 12AU7. Accordingly this voltage varies in proportion to the variation of the cutting in the record groove. The pick-up thus performs no work of generating voltage and has no resistance to movement, which reduces record wear to a minimum. The variable

voltage at the oscillator plate is filtered by a resistance and capacitance network, eliminating the radio frequency component and passing on to the first voltage amplifier only the desirable audio frequencies (See schematic diagram page 75). This audio signal is then "high-pass" filtered and applied to the pentode section of the 6AN8 tube for amplification. The amplified signal is developed across a voltage divider where a portion is used for tone compensating feedback, another portion for the automatic level control component, and another portion for the variable resistance section of the 12AU7.

b. Automatic Level Control.

Some of the audio voltage is applied to the voltage amplifier section of the 12AX7 where it is

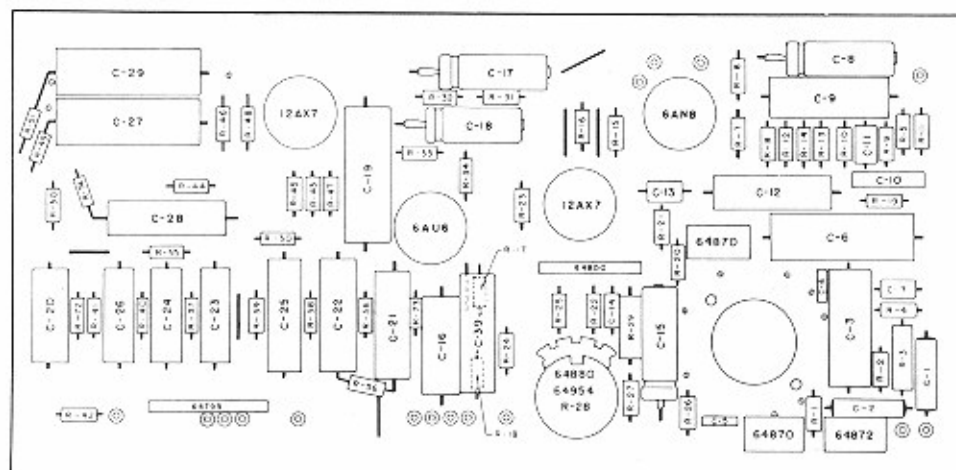


Fig. 105. PRINTED CIRCUIT BOARD

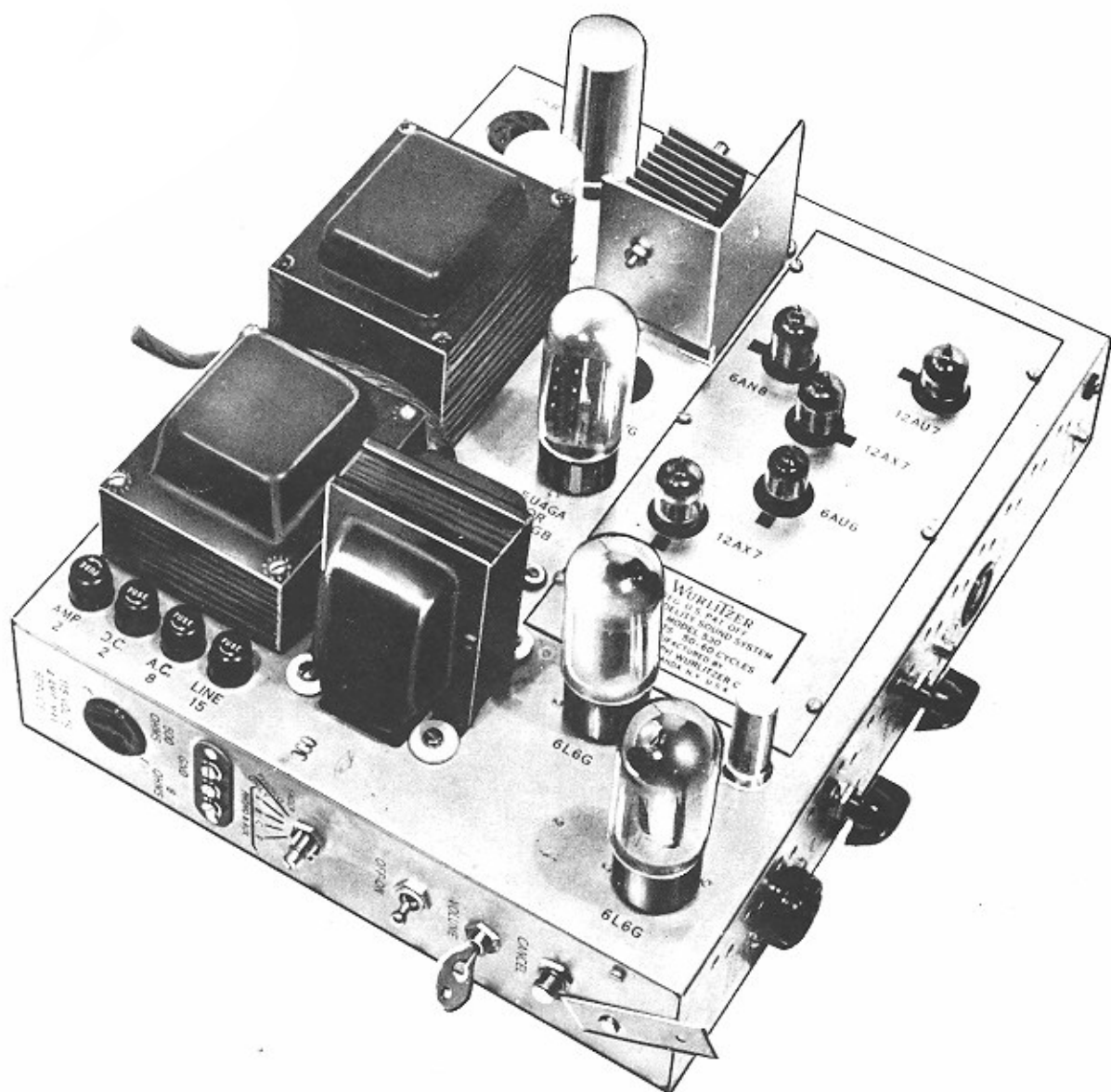


Fig. 106. AMPLIFIER - MODEL 530

amplified and rectified into D.C. voltage, appearing across the time constant circuit at resistor R-25 and the grid of the 12AU7 variable resistance tube. When a high cut record is played this voltage at R-25 will be high. When a low cut record is played this voltage will be low. With this variation of voltage at the grid of the 12AU7, the variable resistance tube automatically regulates the listening level of the record. The audio signal then appears at the cathode follower section of the 6AN8 and is amplified by the 6AU6. With this level control action an even output is maintained regardless of records played.

c. Power Amplifier Section.

The power amplifier section uses the tone controlled out-put signal of the 6AU6 as applied to the first section of the 12AX7 phase inverter to drive the 6L6G push-pull out-put stage of the power amplifier. A variable negative feed back loop is provided from

the out-put side of the transformer to compensate for various auxiliary speaker loads, in its damping effect to permit maximum power out-put with minimum distortion.

d. Mute and Play Switch.

The mute and play switch consists of one double-pole - single-throw switch, one single-pole - double-throw switch, and one single-pole - single-throw switch located on the rear of the record changer (See page 57). The left hand set of contacts (as viewed from the rear of the phonograph) is a double-pole single-throw unit and functions to ground the audio signal at the out-put of the voltage amplifier. This section of the mute and play switch also has a spare blade for muting the Model 231, when used. The center set of contacts (single pole-double throw) function to stop the changer motor in its correct play position by opening the armature circuit and applying

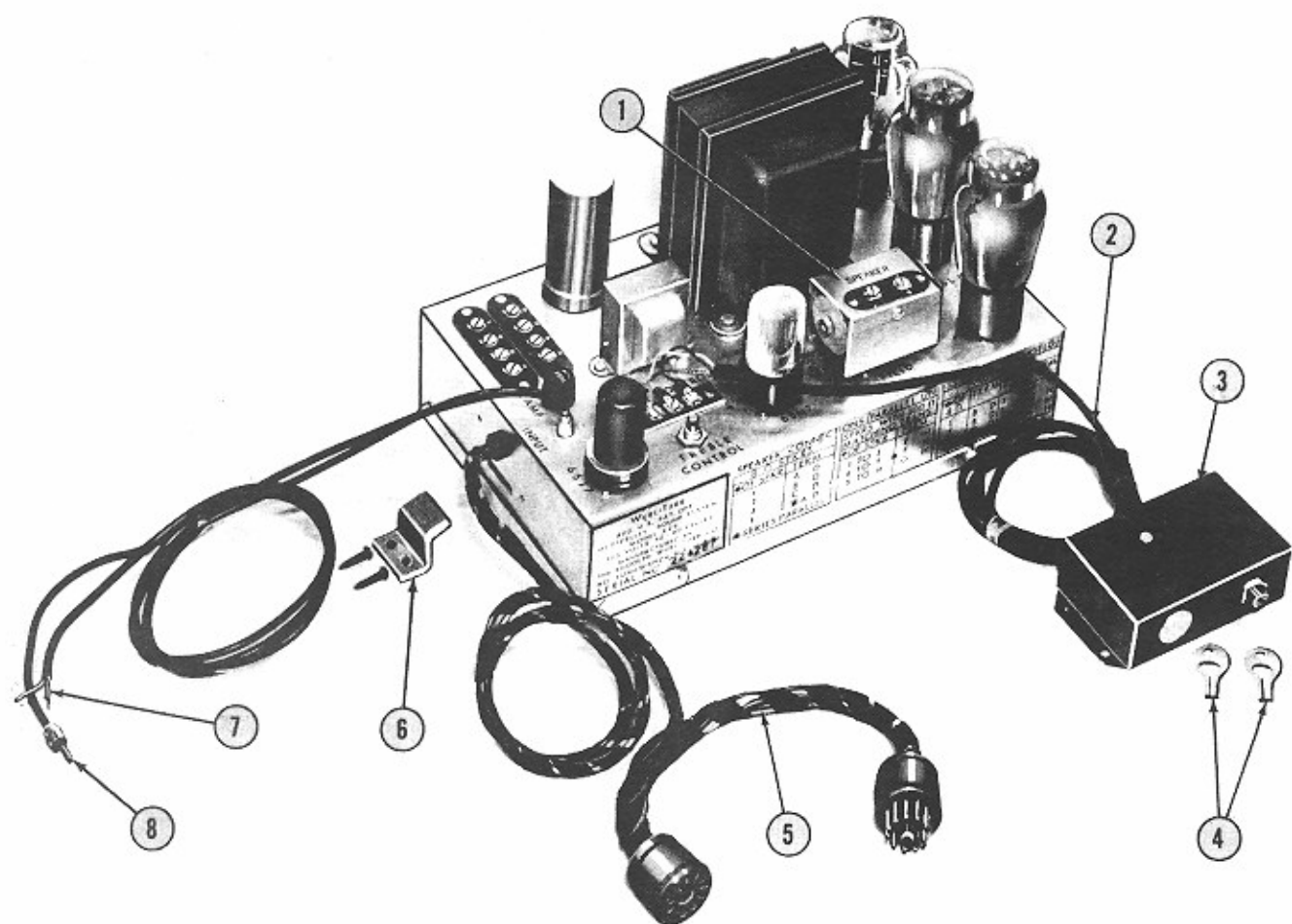


Fig. 107. MODEL 231 AUXILIARY AMPLIFIER EQUIPMENT

1. Resistance Unit, Substituting Speaker Field	55537	5. Adapter Cable, Socket, and Plug Assembly	61928
2. Cable, Volume Control (Bulk)	61968	6. Mounting Bracket	49933
3. Volume Control Assembly	66201	7. Connections to Mute and Play Switch	
4. Key, Volume Control	984	8. Input Cable, to "Aux. Amp" Socket of Model 530	66202

a direct short across the armature for dynamic braking action. The right hand contacts (single pole-single throw) function to apply D.C. voltage to the "time constant" section of the automatic level control to produce low out-put when the needle contacts the record and gradual increase of out-put until the predetermined volume control setting has been reached.

e. Filament Standby Voltage.

The current supply for the heater elements of the amplifier tubes is supplied from the two power transformers. The two filament windings on these two transformers are connected in series. When the phonograph is in standby condition the power transformer for the sound system is not on, therefore the heater elements of the tubes will have only the current supply of one of the power transformers and will be only partially heated. When a selection is made the transformer for the sound system is turned on and the tubes will be quickly heated to operating temperature.

4. AUXILIARY SPEAKERS

Method of Connection

A label will be found, on top of the heat deflector over the amplifier, which gives brief instructions for connecting auxiliary speakers to the Model 530 Amplifier. Detailed information regarding the use and control of auxiliary speakers follows:

a. Auxiliary speakers may be connected to the Model 530 amplifier at a terminal strip located on the back end of the amplifier and marked "8 Ohm," "G.N.D.," and "500 Ohm." The amplifier out-put for auxiliary speakers is designed primarily to accommodate speakers with 500 Ohm line transformers, however voice coil loads of one to three 8 Ohm speakers may be connected in series at the terminals marked "8 Ohm" and "G.N.D." The 8 Ohm out-put is not controlled by the fader switch, and will there-

fore operate directly with phonograph volume. Speakers with 500 Ohm line transformers may be connected in parallel to terminals "GND" and "500 Ohm" and, collectively may be controlled by the fader switch as follows:

(1) With the fader control set at "Phono. Only" all of the amplifier output will be delivered to the phonograph speaker network and the 8 Ohm line, if connected.

(2) With the fader control set at "A", 90% of the amplifier output will be delivered to the phonograph speaker network and the 8 Ohm line, if connected, and 10% will be delivered to the 500 Ohm line. One to three auxiliary speakers may be used.

(3) With the fader control set at "B" 40% of the amplifier output will be delivered to the phonograph speaker network, and the 8 Ohm line, if connected, and 60% will be delivered to the 500 Ohm line. One to five auxiliary speakers may be used.

(4) With the fader control set at "C" 15% of the amplifier output will be delivered to the phonograph speaker network, and the 8 Ohm line, if connected, and 85% will be delivered to the 500 Ohm line. One to eight auxiliary speakers may be used.

(5) With the fader control set at "D" 5% of the amplifier output will be delivered to the phonograph speaker network, and the 8 Ohm line if connected, and 95% will be delivered to the 500 Ohm line. One to eight auxiliary speakers may be used.

NOTE: The current line of Wurlitzer High Fidelity Speakers have tapped transformers with individual volume controls for convenience in adjusting to the requirements of various areas. In cases where one or more of the auxiliary speakers are operated at reduced volume by use of their tapped transformers, more speakers than indicated above may be added to the 500 Ohm line.

b. Installation of auxiliary speakers with 500 Ohm line transformers permits longer runs with low loss and enables the use of various voice coil impedances.

c. The current line of Wurlitzer speakers and many of the earlier Wurlitzer speakers are originally equipped with 500 Ohm line transformers. Speaker Models 5110, 5110A, 5112, 5115, 5116, and 5117 are provided with tapped transformers, with individual volume controls as mentioned in "Note" above. There are line transformers available for such other speakers as are not so equipped. For 3-1/2 Ohm voice coil, line transformers (Part No. 50214) and for 8 or

16 Ohm voice coil, line transformers (Part No. 49775) may be obtained from Wurlitzer Distributors.

d. Whenever the auxiliary speaker load is removed, the fader control should be reset to the "Phono. Only" position to maintain proper out-put balance.

e. The phonograph volume control governs the phonograph speaker network, the 8 Ohm line load, and the 500 Ohm line load. However, the ratio of signal distribution will remain as described in "a" above.

f. Should additional sound distribution be required, the Model 530 amplifier is provided with an auxiliary amplifier output socket which is not governed by the phonograph volume control but does have the advantage of the automatic level control. The Model 231 (Part No. 66198) consisting of a Model 229 H.F. Auxiliary Amplifier, separate volume control, input cables, and adapter cable for attachment to the Model 530 amplifier. (See Fig. 107). The Model 229 H.F. Auxiliary Amplifier supplies an additional 20 watts of power output which is independently controlled by its own volume control which may be installed at the phonograph or at a remote station.



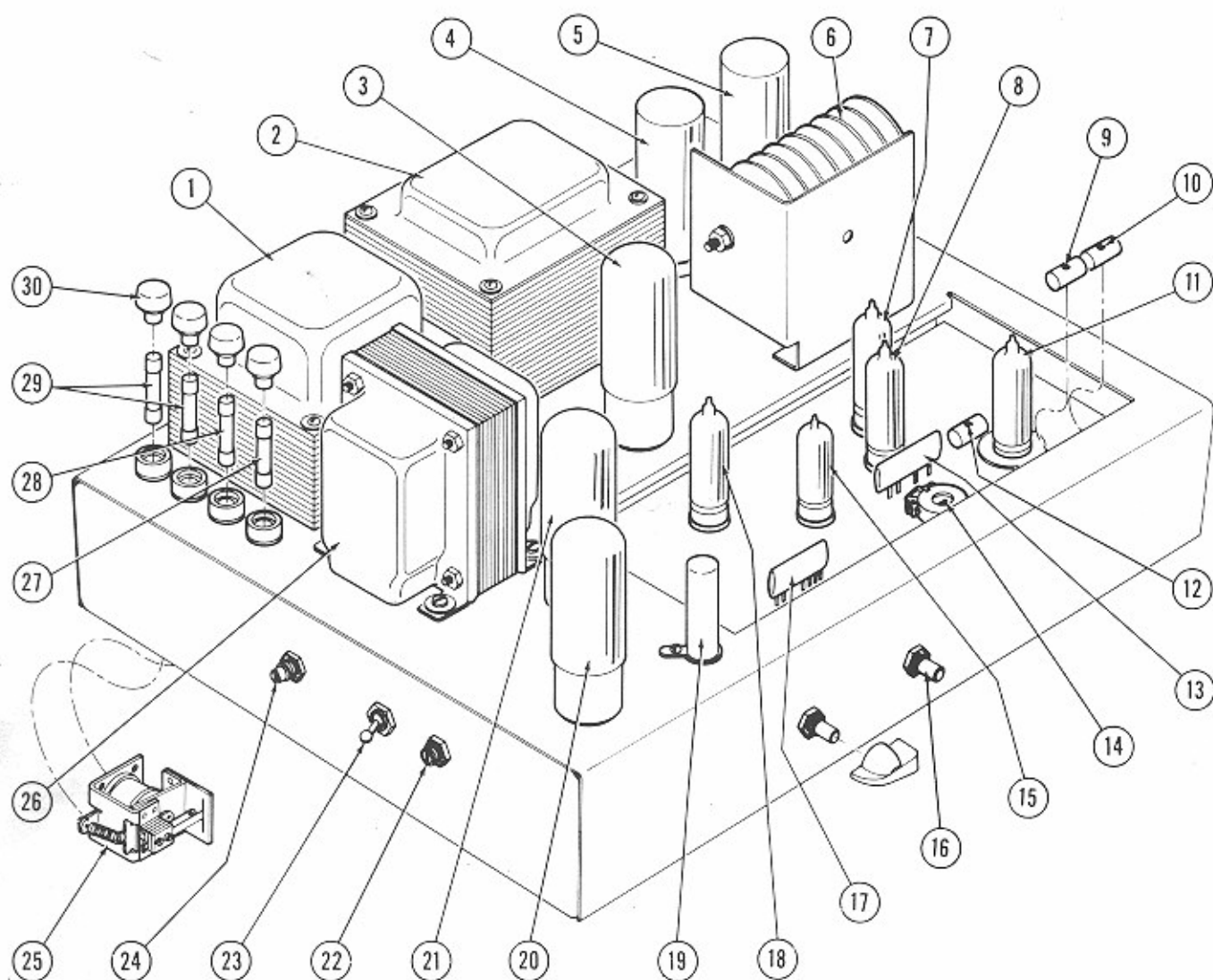


Fig. 108. AMPLIFIER - MODEL 530

1. Power Transformer	65073	16. Switch - Tone Control	64857
2. Transformer - Low Voltage - 117 Volts	64793	17. Printed Circuit - Tone Control	64799
3. Tube - 5U4GB	62742	18. Tube - 12AX7	58427
4. Capacitor - Electrolytic	73474	19. Resistor - Wire Wound	64909
5. Capacitor - Electrolytic	73475	20. Tube - 6L6GB	65341
6. Rectifier - Selenium	56188	21. Tube - 6L6GB	65341
7. Tube - 6AN6	64914	22. Volume Control	64996
8. Tube - 12AX7	58427	23. Switch - Toggle	53648
9. Choke - Filament	64870	24. Switch - Fader	62507
10. Oscillator Coil - Molded	64872	25. Relay Override	56321
11. Tube - 12AU7	58420	26. Transformer - Hi-Fidelity Output	62430
12. Choke - Filament	64870	27. Fuse - 15 Ampere	52196
13. Printed Circuit - Plate - Coupling	64800	28. Fuse - 8 Ampere	15845
14. Potentiometer	64880	29. Fuse - 2 Ampere	56325
15. Tube - 6AU6	64858	30. Fuse Post	45352

SCHEMATIC WIRING DIAGRAM.....530 A

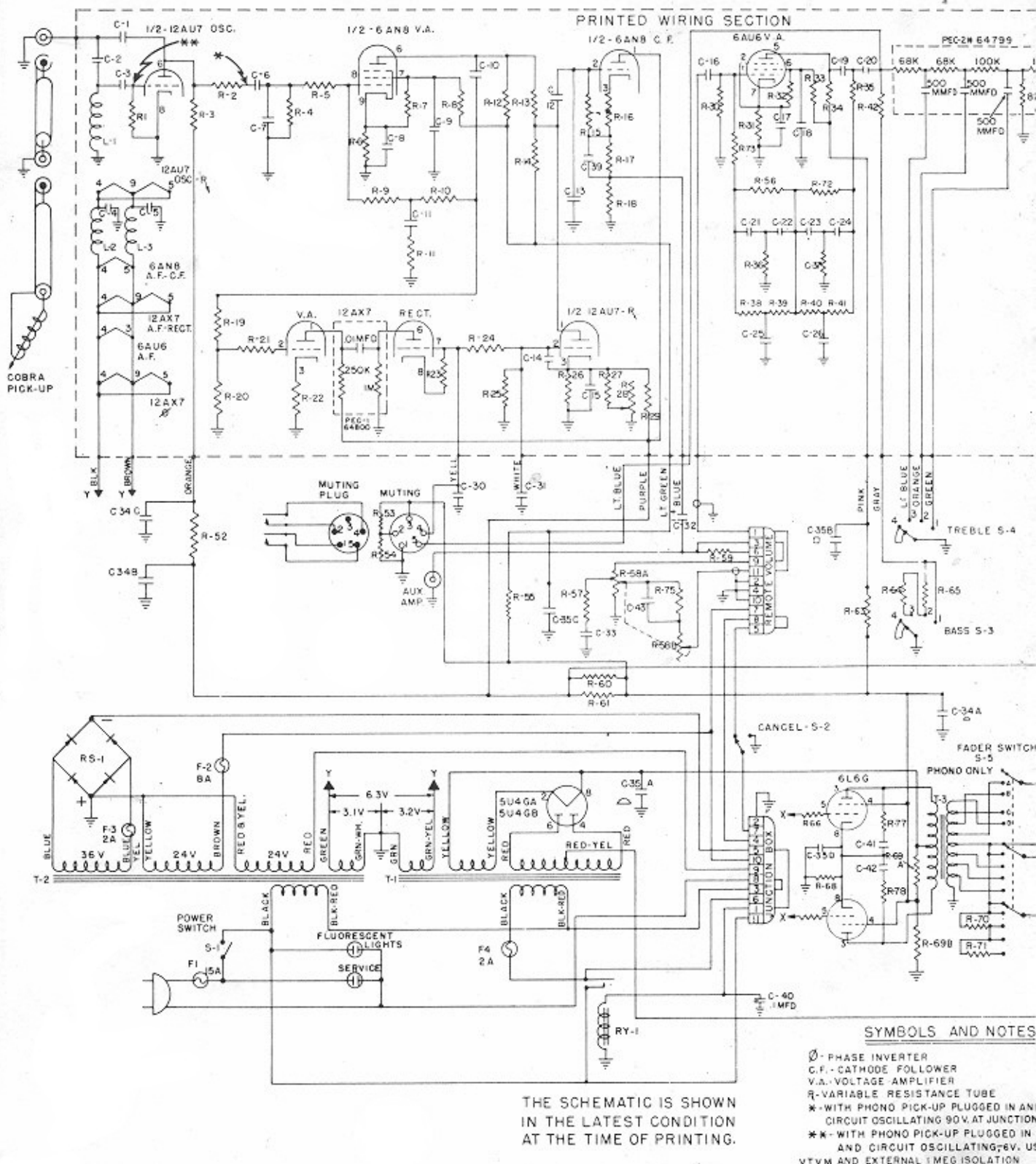
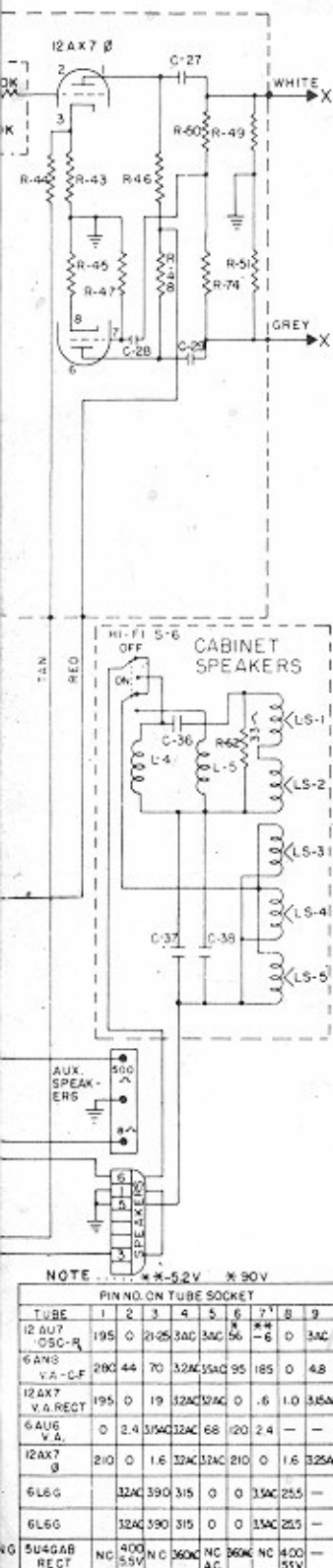


Fig. 92. SCHEMATIC WIRING

AMPLIFIER



ITEM	PART NO.	VALUE	REMARKS
R-1	72264-32	1M	1/2W + 10%
R-2	72234-32	56K	1/2W + 10%
R-3	72377-31	51K	1W + 5%
R-4	72250-32	270K	1/2W + 10%
R-5	72240-32	100K	1/2W + 10%
R-6	72196-31	1.5K	1/2W + 5%
R-7	72254-31	330K	1/2W + 5%
R-8	72233-31	51K	1/2W + 5%
R-9	72278-31	3.9M	1/2W + 5%
R-10	72278-31	3.9M	1/2W + 5%
R-11	72248-32	220K	1/2W + 10%
R-12	72240-32	100K	1/2W + 10%
R-13	72260-31	680K	1/2W + 5%
R-14	72256-31	470K	1/2W + 5%
R-15	72264-31	1M	1/2W + 10%
R-16	72206-32	3.9K	1/2W + 10%
R-17	72206-31	3.9K	1/2W + 5%
R-18	72196-32	1.5K	1/2W + 10%
R-19	72264-32	1M	1/2W + 10%
R-20	72262-32	820K	1/2W + 10%
R-21	72264-32	1M	1/2W + 10%
R-22	72208-32	4.7K	1/2W + 10%
R-23	72226-31	27K	1/2W + 5%
R-24	72268-31	1.5M	1/2W + 5%
R-25	72274-31	2.7M	1/2W + 5%
R-26	72218-31	12K	1/2W + 5%
R-27	72232-32	47K	1/2W + 10%
R-28	64880	500K	BIAS CONTROL
R-29	72386-31	120K	1W + 5%
R-30	72240-32	100K	1/2W + 10%
R-31	72188-31	680	1/2W + 5%
R-32	72254-31	330K	1/2W + 5%
R-33	72244-31	150K	1/2W + 5%
R-34	72242-31	120K	1/2W + 5%
R-35	72232-32	47K	1/2W + 10%
R-36	72237-31	75K	1/2W + 5%
R-37	72220-31	15K	1/2W + 5%
R-38	72244-31	150K	1/2W + 5%
R-39	72244-31	150K	1/2W + 5%
R-40	72226-31	27K	1/2W + 5%
R-41	72226-31	27K	1/2W + 5%
R-42	72237-32	75K	1/2W + 10%
R-43	72198-31	1.8K	1/2W + 5%
R-44	72210-31	5.6K	1/2W + 5%
R-45	72196-32	1.5K	1/2W + 10%
R-46	72240-32	100K	1/2W + 10%
R-47	72264-32	1M	1/2W + 10%
R-48	72240-32	100K	1/2W + 10%
R-49	72248-32	220K	1/2W + 10%
R-50	72250-32	270K	1/2W + 10%
R-51	72248-32	220K	1/2W + 10%
R-52	72192-32	8.2K	1/2W + 10%
R-53	72254-32	390K	1/2W + 10%
R-54	72232-32	47K	1/2W + 10%
R-55	72367-32	12K	1W + 10%
R-56	72260-32	680K	1/2W + 10%
R-57	72210-32	5.6K	1/2W + 10%
R-58A	64956	50K	VOLUME CONTROL
R-58B	64956	50K	VOLUME CONTROL
R-59	72208-32	4.7K	1/2W + 10%
R-60	72352-32	4.7K	1W + 10%
R-61	72352-32	4.7K	1W + 10%
R-62	72300-32	33	1W + 10%
R-63	72362-32	12K	1W + 10%
R-64	72386-32	120K	1/2W + 10%
R-65	72240-32	100K	1/2W + 10%
R-66	72192-32	1K	1/2W + 10%
R-67	72192-32	1K	1/2W + 10%
R-68	70682-2	250	5W W.W.
R-69A	64909	1650	15W W.W.
R-69B	64909	9K	10W W.W.
R-70	72210-32	5.6K	1/2W + 5%
R-71	72210-32	5.6K	1/2W + 5%
R-72	72228-31	33K	1/2W + 5%
R-73	72226-31	27K	1/2W + 5%
R-74	72250-32	270K	1/2W + 10%
R-75	72206-32	3.9K	1/2W + 10%
R-76			
R-77	72336-32	1K	1W + 10%
R-78	72336-32	1K	1W + 10%

ITEM	PART NO.	VALUE	REMARKS
C-1	70527-265	51 MMFD	+ 2.5% CERAMIC
C-2	70527-265	51 MMFD	+ 2.5% CERAMIC
C-3	71227-12	0.1 MFD	200V.
C-4	70745	.0033 MFD	CERAMIC
C-5	70745	.0033 MFD	CERAMIC
C-6	71227-14	0.1 MFD	400V.
C-7	70534-130	100 MMFD	CERAMIC
C-8	73842-51	25 MFD	25V. ELECT.
C-9	71227-12	0.1 MFD	200V.
C-10	70748	.01 MFD	CERAMIC
C-11	70526-230	47 MMFD	CERAMIC
C-12	71220-14	.022 MFD	400V.
C-13	70526-230	47 MMFD	CERAMIC
C-14	70742	1000 MMFD	CERAMIC
C-15	73810-52	20 MFD	50V. ELECT.
C-16	70498	.22 MFD	200V.
C-17	73842-51	25 MFD	25V. ELECT.
C-18	73835-55	4. MFD	200V.
C-19	71227-14	0.1 MFD	400V.
C-20	71217-14	.01 MFD	400V.
C-21	71220-14	.022 MFD	400V.
C-22	71220-14	.022 MFD	400V.
C-23	71205-16	.001 MFD	600V.
C-24	71205-16	.001 MFD	600V.
C-25	71224-12	.047 MFD	200V.
C-26	71208-16	.002 MFD	600V.
C-27	71227-14	0.1 MFD	400V.
C-28	71220-14	.022 MFD	400V.
C-29	71227-14	0.1 MFD	400V.
C-30	70634-220	1 MFD	200V.
C-31	70637-650	2 MFD	50V.
C-32	73864	20 MFD	50V. ELECT.
C-33	71224-12	.047 MFD	400V.
C-34A	73474	20 MFD	400V. ELECT.
C-34B	73474	20 MFD	400V. ELECT.
C-34C	73474	10 MFD	400V. ELECT.
C-34D	73474	20 MFD	50V. ELECT.
C-35A	73475	30 MFD	500V. ELECT.
C-35B	73475	20 MFD	400V. ELECT.
C-35C	73475	20 MFD	400V. ELECT.
C-35D	73475	25 MFD	50V. ELECT.
C-36	70634-650	1 MFD	50V.
C-37	70637-650	2 MFD	50V.
C-38	70637-650	2 MFD	50V.
C-39	71220-14	.022 MFD	400V.
C-40	71195-14	0.1 MFD	400V.
C-41	71750-27	.001 MFD	1000 W.V.
C-42	71750-27	.001 MFD	1000 W.V.
C-43	71183-14	.01 MFD	400 W.V.

ITEM	PART NO.	VALUE	REMARKS
L-1	64872		OSCILLATOR COIL
L-2	64870		FILTER CHOKE
L-3	64870		FILTER CHOKE
L-4	62843	25 MH	CHOKE
L-5	62843	25 MH	CHOKE
S-1	53648	SPST	POWER SWITCH
S-2	56233	SPDT	CANCEL SWITCH
S-3	64857	4 POS. SHORTING	BASS SWITCH
S-4	64857	4 POS. SHORTING	TREBLE SWITCH
S-5	64995	SP3T	FADER SWITCH
S-6	62886	DPDT	HI-FLI, ON - OFF
T-1	65073		POWER
T-2	64793		JUNCTION POWER
T-3	62430		AUDIO OUTPUT
RY-1	56321	SPST	24V. D.C. RELAY
F-1	52196	15 AMP	250V. FUSE
F-2	15845	8 AMP	FUSE
F-3	56325	2 AMP	SLO-BLO FUSE
F-4	56325	2 AMP	SLO-BLO FUSE
LS-1	62494		4" TWEETER
LS-2	62494		4" TWEETER
LS-3	62493	16	12" WOOFER
LS-4	62492	16	12" WOOFER
LS-5	62472	16	12" WOOFER
RS-1	64500	24V.	SEL. RECT.
PEC 1	64800		PLATE - COUPLING
PEC 2	64799		TONE CONTROL - TREBLE

NUMERICAL PARTS LIST

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24689	Lamp, 6.3V, G.E. No. 44	25	57129	Spring - Number Latch - Selector Switch Assembly	25
25202	Steel Ball	60	57130	Spring, Solenoid Return	25
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37987	Lamp #51	67	57701	Selector Latch Pin (200 Used)	11, 26, 39, 45
X42226	Record Disc	43, 50	57851	Micro Switch, Trip	50
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49387	Washer (4 Used)	42	58781	Spring, Cancel	9
49949	Coin Hopper and Support Assembly	4	58898	Socket, 11 Prong	12
50149	Cap, Grooved Silencer	60	59393	Shaft, Tone Arm	61
50323	Caster	68	59396	Bumper, Record Guide	62
51485	Fuse Post Opt.	12	59399	Screw, Special	55
52196	Fuse, 15 Amp. Type ABC	74	59406	Arm and Hub Assembly, Tone Arm Release	61
52808	Thrust Washer .015"	47	59409	Washer, Tone Arm Shaft	61
53541	Washer, .253" I.D. 3/8" O.D.	24	59415	Drive Pulley, Turntable Clamp	30, 53, 61
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