

**WURLITZER
MODEL 2250
PHONOGRAPH**

THE WURLITZER COMPANY
NORTH TONAWANDA, NEW YORK

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THE MODEL 2250 WURLITZER PHONOGRAPH

SPECIFICATIONS

DIMENSIONS:

HEIGHT	56-1/8 Inches
WIDTH	34-1/16 Inches
DEPTH	27-1/2 Inches
WEIGHT	336 Pounds
SHIPPING WEIGHT	396 Pounds

WATTAGE:

Complete Phonograph	300 Watts
Standby	135 Watts

LIGHTING:

Two 25 Watt, 30 Inch Fluorescent Lamps.

CABINET FINISH:

Color-styled Dino-weld side panels.

COIN EQUIPMENT:

Single coin entry for 5, 10, 25, and 50 cent coins. Playrak and slug rejector adjustable for one nickel or two nickels, one to ten plays for a dime, one to ten plays for a quarter, and one to ten plays for a half dollar. Factory setting: one play for a dime, three plays for a quarter, and seven plays for a half dollar.

RECORD CHANGER:

Carousel type, 100 record holders for 45 R.P.M.-7" records. Individual play meter for each record holder.

SOUND SYSTEM:

Wurlitzer Dynatone Amplifier, including pre-amplifier, automatic level control, out-put jack for auxiliary amplifier, bass and treble tone controls, loudness control, and fader control for auxiliary speakers.

SPEAKER COMPLEMENT:

- 2 twelve inch low frequency P. M. speakers.
- 1 twelve inch P. M. Apex Cone speaker.

TUBE COMPLEMENT:

- 1 Type 12AU7A
- 2 Type 12AX7
- 1 Type 6AU6
- 1 Type 6AN8
- 2 Type 6L6GB
- 1 Type 5U4GB

TONE ARM:

Single, low pressure tone arm, equipped with Zenith Cobra "Pick-up". Plays both sides of record.

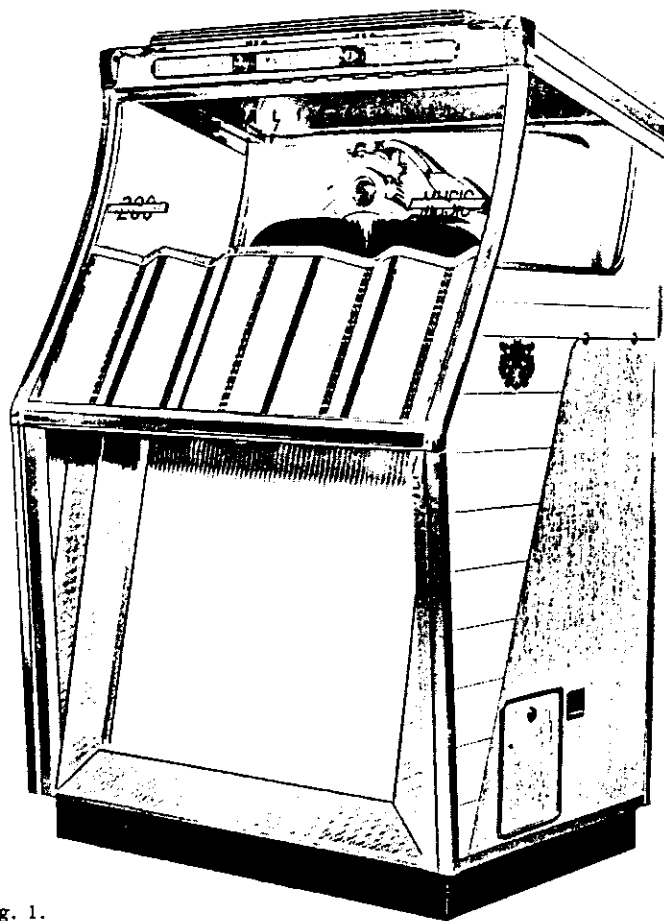


Fig. 1.

DESCRIPTION

The Wurlitzer Model 2250 (Fig. 1) is a two hundred selection, high fidelity phonograph. The side panels are finished in color styled Dino-weld and trimmed in chrome and clear anodized aluminum.

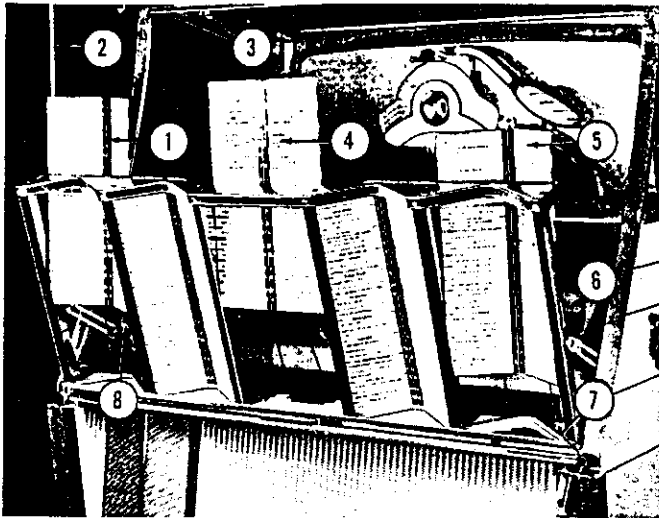
The five title strip holders (Figs. 2 and 3) are mounted in a single program holder assembly which is hinged (Items 4 and 5, Fig. 3) at the bottom to provide accessibility as well as easy removal of the entire assembly. Each of the five plastic title strip holders (Items 1, 4 and 5, Fig. 2) may be readily removed when the program holder is tilted forward as shown in Figure 2. A fall support has been provided at each end of the program holder as shown at Item 6, Fig. 2 to limit the forward position of the assembly. These fall supports may be disengaged for removal of the complete program holder assembly. Fig. 3 shows the assembly removed for programming.

The electric counter and the "free-play" switch assembly (Item 8, Fig. 2) are mounted on a bracket at the left side wall of the cabinet, accessible when the program holder is tilted forward.

MODEL 2250 SLUG REJECTOR AND PLAYRAK

1. GENERAL DISCUSSION

a. The slug rejector and the playrak assemblies are mounted on the inside right hand wall of the cabinets shown in Figure 4. The slug rejector assembly evaluates the coins as they are processed through the various coin tracks and either rejects them or accepts them in accordance with their composition and denomination. Coins that are rejected are dropped into the coin return cup at the outside of right hand cabinet wall. Accepted coins are guided into a coin track for that particular denomination of coin. Each of the four coin tracks are provided with an individual switch



- Fig. 2. PROGRAM HOLDER ASSEMBLY 111909
- | | |
|---|--------------------------|
| 1. Title Strip Holder and Decal Assembly, A1-D0, Vee | 111576 |
| 2. Fall Support, Dome | 111180 |
| 3. Knurled Thumb Screws, 10-32 30940, 8-32 | 69710 |
| 4. Title Strip Holder and Decal Assembly, J1-M0, Flat | 111575 |
| 5. Title Strip Holder and Decal Assembly, S1-V0, Vee | 111579 |
| 6. Title Strip Holder and Decal Assembly, N1-R0, Vee | 111578 |
| 7. Title Strip Holder and Decal Assembly, E1-H0, Vee | 111577 |
| 6. Fall Support | R. H. 69005, L. H. 69006 |
| 7. Hinge | R. H. 69042, L. H. 69041 |
| 8. Electric Counter and Free-play Switch Assembly | 111918 |

The selector switch assembly is mounted to the upper front extrusion with two knurled thumb screws (Item 3, Fig. 2). Access to these mountings may be gained by removal of the light diffuser at top of the cabinet.

For greater accessibility the entire record changer may be removed from its mounting rails. In this case, the back rail should be removed and all plugs disconnected. A stand or rack should be provided for the record changer when removed from the cabinet.

The speaker units are accessible from the rear of the cabinet.

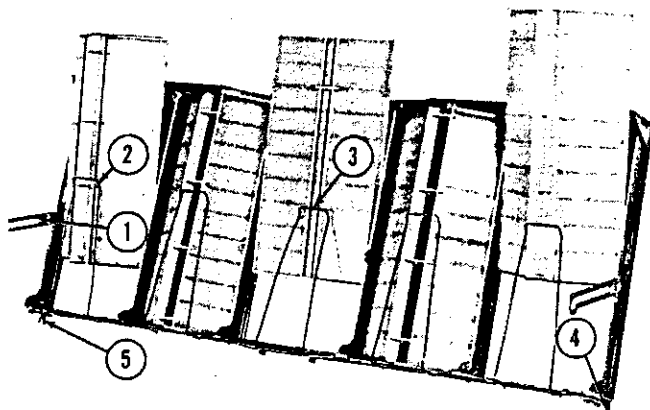


Fig. 3. PROGRAM HOLDER REMOVED

- | | |
|-------------------------------------|--------------------------|
| 1. Fall Support | R. H. 69005, L. H. 69006 |
| 2. Spring, Title Strip Holder, Vee | 68854 |
| 3. Spring, Title Strip Holder, Flat | 69362 |
| 4. Hinge, L. H. | 69042 |
| 5. Hinge, R. H. | 69041 |

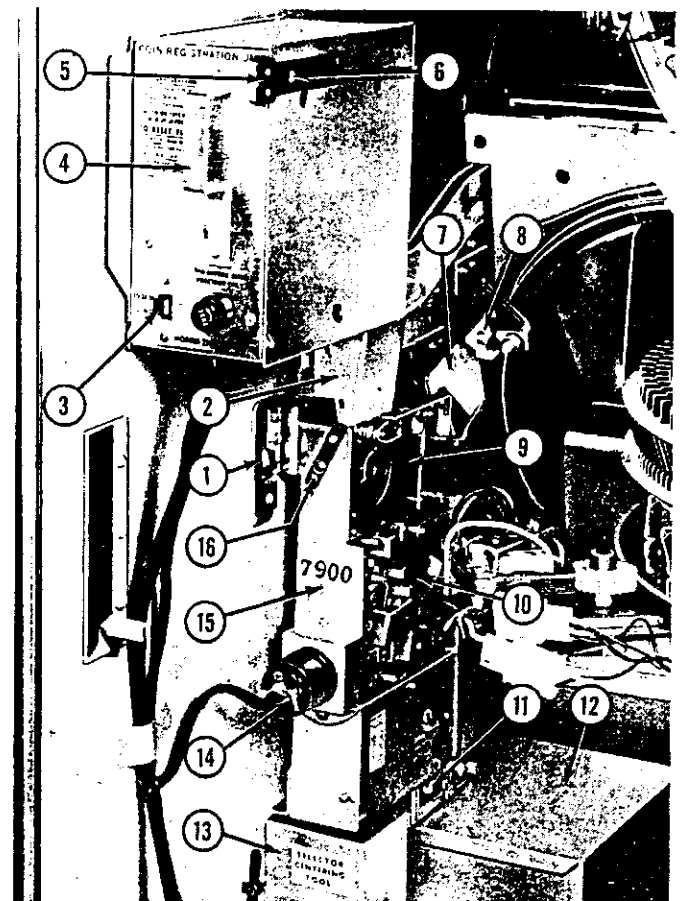


Fig. 4. COIN EQUIPMENT

- | | |
|---|---------|
| 1. Slide Lock | 111125 |
| 2. Lower Coin Chute Assembly | 68712 |
| 3. Switch, Coin Denomination (10 - 50¢) | 62886 |
| 4. Playrak Assembly | 68123 |
| 5. Catch and Spring Assembly | 64883 |
| 6. Shipping Screw | 73531-5 |
| 7. Reject Arm and Pin Assembly | 68546 |
| 8. Latch Lever, Reject Arm | 68304 |
| 9. Coin Separator (National) | |
| 10. 5 - 10 - 25 ¢ Rejector Component (National) | |
| 11. Nickel Flipper (National) | |
| 12. Coin Bag Housing | 68939 |
| 13. Guard, Coin Return Cup | 68725 |
| 14. Plug, 5 Prong Female | 16617 |
| 15. Slug Rejector Assembly | 110982 |
| 16. Latch Spring, Coin Separator (National) | |

to record the coin before it passes on to the cash box (Item 12, Fig. 4). Electrical impulses are transmitted from the coin switch through the cable and plug assembly (Item 14) to the playrak (Item 4) or extended play unit (Kit 151) if used. The playrak or the "E. P." unit (when used) sets up selection credits for the coins accepted, in accordance with the price per play as set up on either one or the other of the credit units. Electrically either of these units becomes the key to the electric selector system, and will keep track of plays paid for, cancelling off credits, each time a selection is made, in accordance with the established price per play. When all credits are cancelled, further selection will be interrupted until additional coins are inserted. As an electrical component of the electric selector system, the slug rejector has been discussed in electrical sequence on pages 17 thru 31 of Model 2100 Service Manual.

2. DESCRIPTION

a. To remove the slug rejector for inspection, cleaning, or adjustment, unlatch the lever (Item 8, Fig. 4) and swing the reject arm (Item 7, Fig. 4) out of the way. The entire assembly is held on its mounting studs by the slide lock (Item 1, Fig. 4). Raise the slide lock and pull the unit to the rear from its mounting studs. As shown in Figure 7, the coin

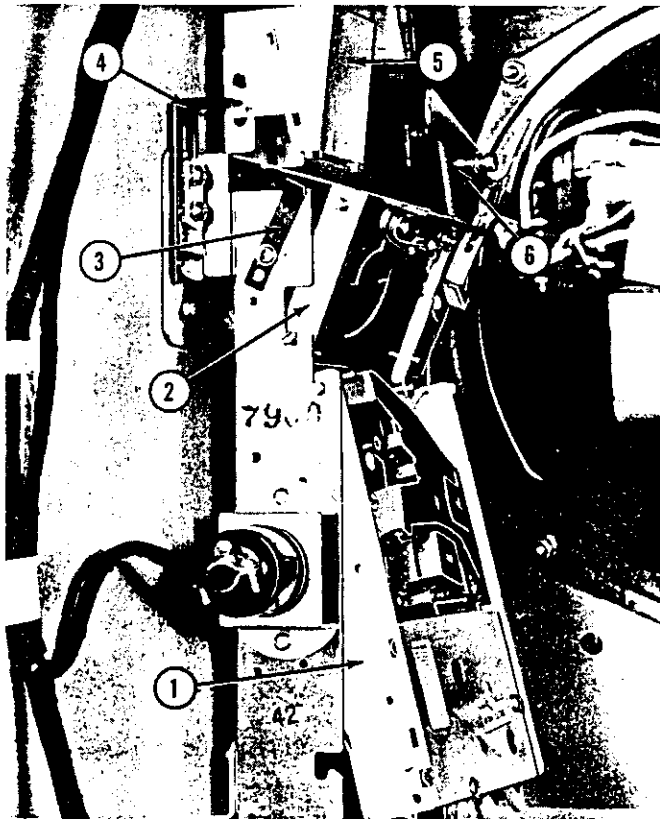


Fig. 5. REMOVAL OF SLUG REJECTOR COMPONENTS

1. 5, 10, 25¢ Unit, Swing Out At Bottom First
2. Coin Separator Removed
3. Latch Spring, Coin Separator
4. Slide Lock, Unlocked
5. Lower Coin Chute, Raised
6. Reject Lever, Disconnected

111125

separator component (Item 2, Fig. 5) and the 5, 10, 25 component (Item 1, Fig. 5) may be removed independently if desired. The spring latch (Item 3) serves to lock these two components in assembly with the mounting channel and half dollar component shown in Figure 7. When the slug rejector is removed, care should be exercised in handling to protect the nickel flipper from being damaged.

b. The Model 2250 Slug Rejector is a product of National Rejectors, Inc. of St. Louis, Missouri. For service and spare parts other than those indicated by part numbers, in Figures 4, 5, 7 and 8 to be of Wurlitzer manufacture, it is recommended that the services rendered by National Rejectors, Inc. and their branch offices, be employed.

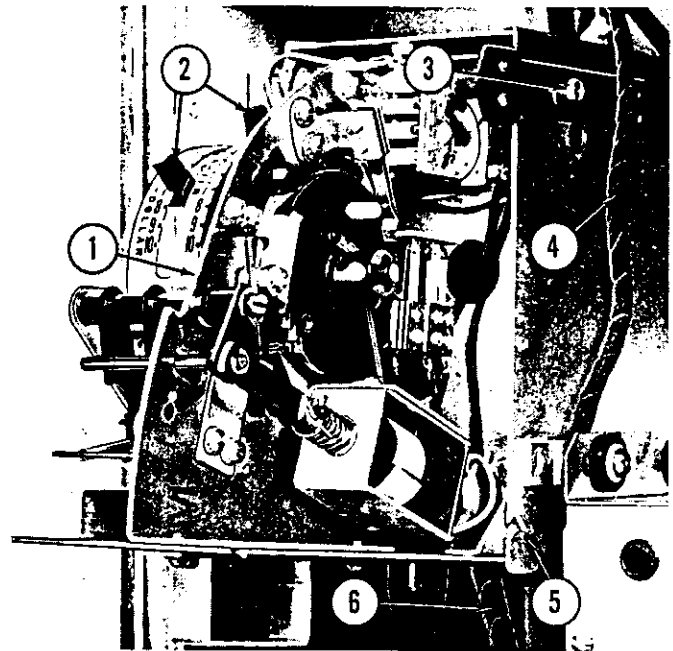


Fig. 6. PLAYRAK OPEN FOR SETTING

1. Front Plate, Cut Back to Permit Disengagement of Hinge Pins
2. Credit Stop Levers 66132
3. Shipping Screw 73531-5
4. Cable to Coin Switches
5. Hinge Pins
6. Cable to Junction Box

c. For access to the playrak for adjustment or resetting, loosen or remove the shipping screw (Item 3, Fig. 6), unlatch the cover and swing it back and downward on its hinge pins (Item 5, Fig. 6). Figure 6 shows the playrak in position for observation or resetting.

CAUTION: To electrically release any of the energized components, turn off the main switch to insure button latch release and clearance of associated D. C. circuits. The playrak may be removed for replacement or repair by removing the plugs of its connecting cables and raising the hinge pins from their bearings. The cover should be closed to the point indicated at Item 1, Fig. 6 for disengagement of the hinge pins.

d. Figure 7 shows the complete slug rejector assembly as used for the Model 2250 Phonograph.

The slide lock and mounting bracket (Item 2, Fig. 7), the reject lever and pin assembly (Item 4), the coin switch wire and plug assembly (Item 5), the lower coin chute assembly (Item 3) and the mounting bracket assembly (Item 9) are Wurlitzer components of the slug rejector assembly. Figure 8 shows the several National components included in the assembly. The mounting channel and half dollar rejector unit (Item 1, Fig. 8) serves as a mounting for the five, dime, and quarter unit (Item 8) and the coin separator unit (Item 4). As shown at Item 2, half dollars are separated from the nickels, dimes, and quarters and by-passed to the coin entry of the half dollar component. The smaller coins enter the 5 - 10 - 25¢ component and are processed in the conventional manner.

e. The coin switch (Item 6, Fig. 7) consists of four single pole blade switches, so mounted that one switch is directly under each of the four separate coin exits. When any one of these coin switches is actuated by a coin being dropped into the coin bag a circuit is closed to a corresponding unit in the playrak to establish selection credits in accordance with the value of the coin and the pre-set price per selection.

The slug rejector and playrak are set during production 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 nickel flipper (Item 7, Fig. 8) may be turned to the position indicated at Item 7 and the

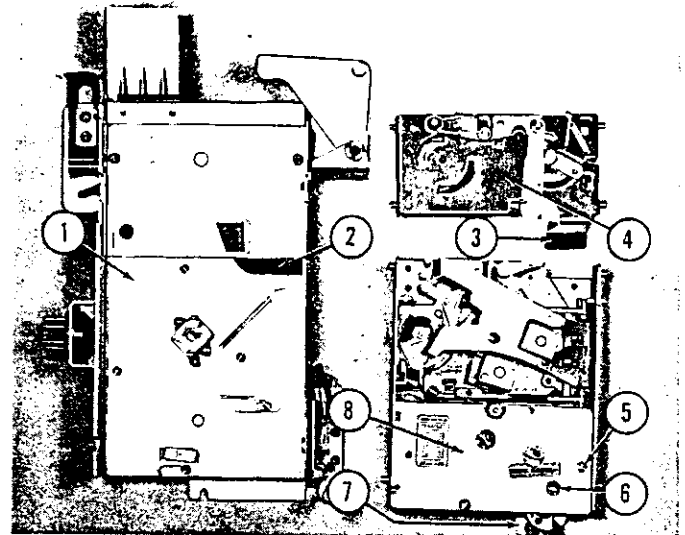


Fig. 8. SLUG REJECTOR COMPONENTS

1. Half Dollar Rejector Component
2. Coin Entry, Half Dollar
3. Half Dollar Deflector
4. Coin Separator Component
5. Screw, Nickel Play
6. Screw, 1 Play for 2 Nickels
7. Nickel Flipper
8. 5 - 10 - 25¢ Rejector Component

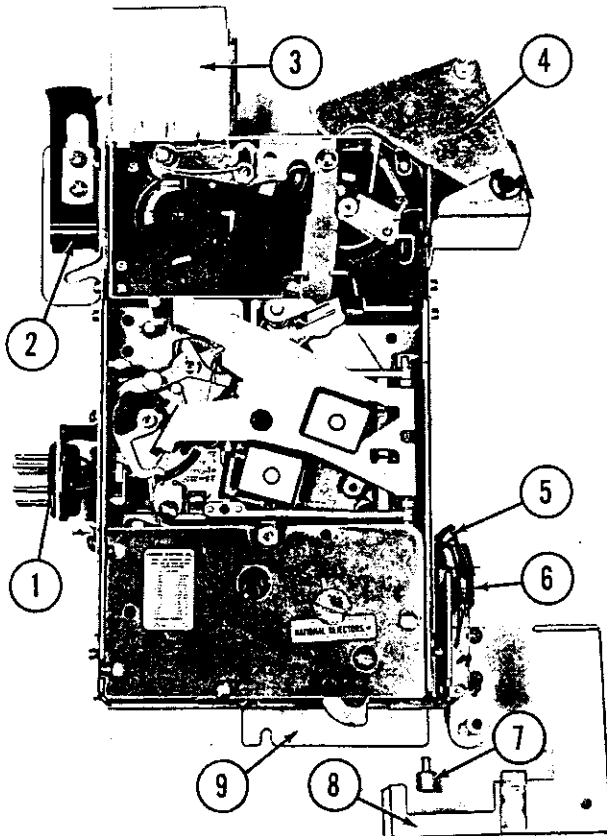


Fig. 7. SLUG REJECTOR ASSEMBLY

- | | |
|---------------------------------------|---------------|
| 1. Plug, 5 Prong, Male | 13089 |
| 2. Slide Lock and Mounting Bracket | 111125--68544 |
| 3. Lower Coin Chute | 68712 |
| 4. Reject Lever and Pin Assembly | 68546 |
| 5. Coin Switch Wire and Plug Assembly | 68550 |
| 6. Coin Switch (only) | 68311 |
| 7. Thumb Screw, 8 - 32 Knurle Head | 35745 |
| 8. Angle and Guard, Coin Switch | 110875 |
| 9. Mounting Bracket | 68547 |

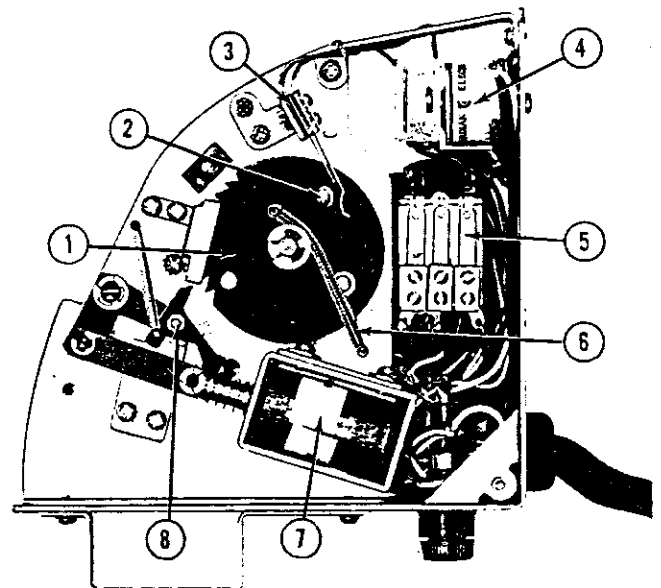


Fig. 9. PLAYRAK COMPONENTS

- | | |
|--------------------------------|-------|
| 1. Cancel Wheel Assembly | 66124 |
| 2. Actuator, Plastic | 58255 |
| 3. Key Switch | 66082 |
| 4. Relay, Pulse | 68211 |
| 5. Relay, Timing No. 1 | 64796 |
| 6. Spring, Cancel Wheel | 66071 |
| 7. Solenoid, Cancel | 65069 |
| 8. Pivot Arm and Pawl Assembly | 66125 |

screw (Item 6) exchanged with the screw (Item 5). This will intercept the alternate turning of the nickel flipper (Item 7) and permit each nickel to actuate the nickel coin switch. Further price settings will be discussed under the playrak heading.

3. ADJUSTMENTS

a. Slug Rejectors

(1) The mechanical adjustment of National components of the slug rejector should be made in accordance with "Rejector Manual" furnished by National Rejectors, Inc. of St. Louis, Missouri or their branch offices.

(2) Coin Switches

Coin Switch adjustment is discussed in detail on pages 5 and 6 of section 5, Service Manual No. 312-S, Volume II.

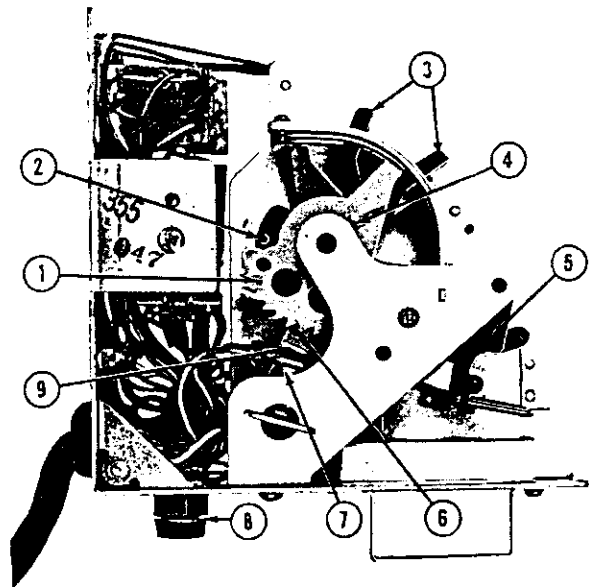


Fig. 10. PLAYRAK COMPONENTS

1. Accumulator Wheel	66131
2. Drive Pin	66045
3. Stop Lever and Spring Assembly	66132
4. Spring, Accumulator Wheel	66074
5. Lock - out Lever and Hub Assembly	66130
6. Escapement Pin (Stud)	66051
7. Coin Magnet and Bracket Assembly	66128
8. Fuse Post	45352
9. Lever, Hub, and Stud Assembly	66129

b. Playrak Adjustments.

Complete adjustment instructions and service data for the playrak will be found on pages 6 and 7 in section 5, Service Manual No. 312-S, Volume II. Figures 9 and 10 (PLAYRAK COMPONENTS) are provided as an aid to service personnel in locating the various components of the playrak (coin register mechanism) and identifying the several points of adjustment referred to above.

MODEL 2250 ELECTRIC SELECTOR SYSTEM

1. DESCRIPTION

The electric selector system of the Model 2250 combines the electrical functions of components contained in the slug rejector assembly, the playrak (or the E.P. unit) when used, the selector button switch assembly, the electric selector assembly, the junction box (and stepper, when used), and the power supply components of the Model 532 Amplifier. All of these units are electrically inter-connected through cables, plugs, and sockets to form the electric selector system for the phonograph. As a complete system, it receives and evaluates coins, sets up selection credits, in accordance with the denomination of the coins received, cancels credits, as selections are made, in accordance with the predetermined price per play, and accumulates the individual plays so selected, on a selector drum capable of banking up to two hundred separate selections to be automatically played by the record changer.

a. The slug rejector assembly operates in the same manner as that of the Model 2100. See paragraph (a), page 11, section 5, of this volume.

b. The playrak assembly is identical with that of the Model 2100. See paragraph b, page 11, section 5 of this volume.

c. The selector switch assembly shown in Figure 11 performs the same electrical functions as the selector switch assembly for the Model 2100 (Pages 11 and 12, section 5, of this volume). However the physical arrangement of its components, as shown in Figure 11, has been changed to conform with the design of the Model 2250. The selector switch assembly is made up of two letter switch banks (Item 1, Fig. 11) of ten letters each and one number switch bank (Item 5) of ten numbers. The latch bars of the two letter switch banks are linked together by the connector link (Item 12) which may be adjusted at the screw (Item 14) to synchronize the latching action of the two selector switch latch bars. Adjustment to minimize the back lash in the latch linkage, has been provided at the two adjustment clips (Items 11 and 8) where they are linked to the two "shaft, link, and lever" assemblies (Items 10 and 4). Latching action is thus provided by the latch solenoid on the opposite side of the "mounting plate, switch, and solenoid assembly" (Item 2). When any letter or number button is pressed all the way in, it will be latched "in" and the remaining letter or number buttons will be latched "out" until selection has been completed or the "Reset Switch" used to momentarily release the latch solenoid. The

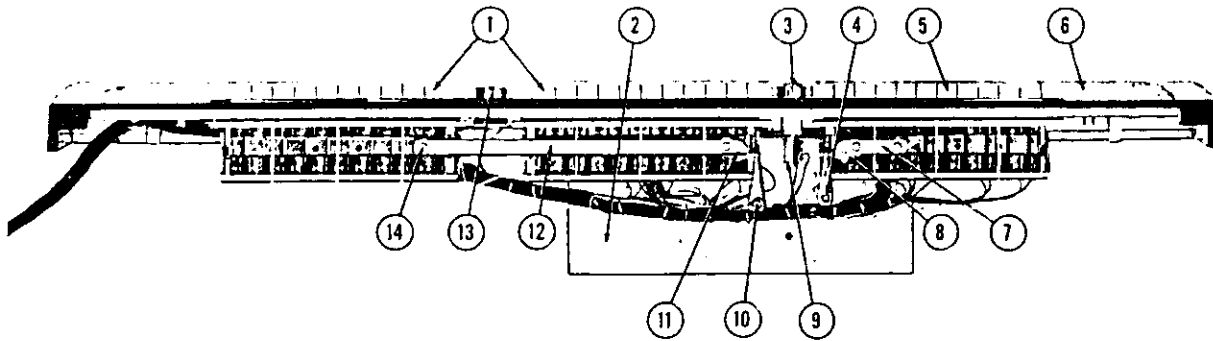


Fig. 11. SELECTOR SWITCH ASSEMBLY

110995

1. Switch and Button Assembly A to K	111059,	L to V	111060	8. Adjustment Clip, Numbers	61343
2. Mounting Plate, Switch, and Solenoid Assembly			69351	9. Reset Switch	68574
3. Reset Button			68556	10. Shaft, Link, and Lever Assembly, Letters	68406
4. Shaft, Link, and Lever Assembly, Numbers			68405	11. Adjustment Clip, Letters	68280
5. Switch and Button Assembly, Letters			111061	12. Connector Link, Letters	68409
6. Program Selector Casting			68299	13. "Select" and "Reset" Casting	68320
7. Connector Link, Numbers			68408	14. Adjustment to Synchronize Latch Bars	

reset switch permits release of either a letter or a number button any time before selection has been completed by pressing the second of the two buttons required. The wiring of both the letter and the number switches is a continuous series circuit which is opened at the selected switch. Therefore all letter and number switches beyond the one selected, will be isolated from the source of power and only the one selected letter and number switch may receive the selection pulse. Both the letter and number latch linkages are accompanied by the conventional latch switches and series switches.

d. For detailed operation of the electrical components mounted on the other side of the mounting plate, see pages 16 thru 30, section 5 of this volume.

e. For detailed procedure in adjustment of the mechanical components of the selector switch assembly, see pages 4 and 5, section 6 of this volume.

f. Electric Selector.

The electric selector assembly (Fig. 12) consists of a circular drum containing 200 latch pins (Item 1) with their accompanying 200 retracting springs (Item 5). These latch pins are actuated, or released, from their latch position by 20 rocker arms (Item 6) mounted on a rotating plate (Item 4). The rotating plate is revolved around the selector latch pins by the selector motor and gear assembly (Item 3). The selection of, or release of latch pins is governed by the following components of the electric selector assembly.

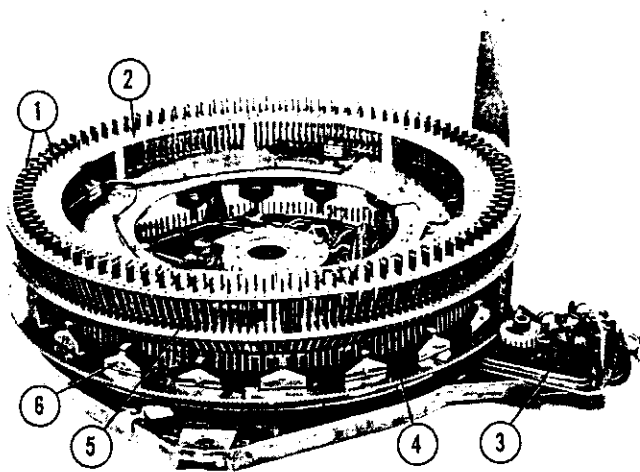


Fig. 12. ELECTRIC SELECTOR ASSEMBLY

110978

1. Selector Latch Pins, Inner and Outer	110941 - 110942
2. Selector Plate and Silk Screen Assembly	111026
3. Motor and Gear Assembly	111913
4. Rotating Plate and Rocker Assembly	111481
5. Spring, Selector Latch Pins	110480
6. Rocker and Bracket Assembly	68807

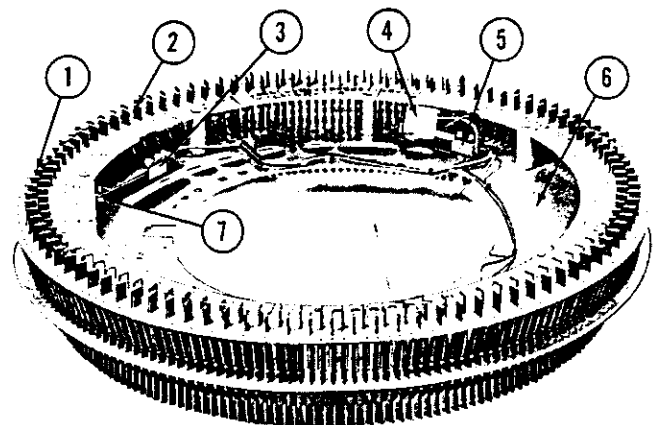


Fig. 13. SELECTOR PLATES AND LATCH PIN ASSEMBLY 111129

1. Latch Pin, Outer	110941
2. Latch Pin, Inner	110942
3. Over-Ride Switch	65952
4. Housing, Female 111528 - Male (Contacts for Housings)	111526
5. Over-Ride Switch	65952
6. Lower Plate and Spacer Assembly	69492
7. Spacer, Wobble Ring	68650

(1) The selector plates and latch pin assembly (Fig. 13) is made up of two types of latch pins i.e. 100 latch pins (inner) shown at Item 2, Fig. 13 and 100 latch pins (outer) shown at Item 1. Mounted on the lower plate and spacer assembly (Item 6) are four over-ride switches (Items 3 and 5) that are actuated by a "wobble ring and spacer" assembly (Item 7). The wobble ring rests on the inner shoulders of the 200 latch pins, underneath the lower plate and spacer assembly. When one or more of the latch pins are released, by action of the rocker arms, the wobble ring will be displaced to actuate one or more of the four, parallel wired, over-ride switches. Closing of the over-ride circuit starts the playing cycle of the record changer.

(2) The rotating plate and rocker assembly is described in detail in sub-paragraph (2), page 14, section 5 of this volume.

(3) The selector casting and solenoid assembly is described in detail in sub-paragraph (3), page 14, section 5 of this volume.

(4) The mounting casting and stop solenoid assembly is described in detail in sub-paragraph (4), page 15, section 5 of this volume.

(5) The assembly of the components described in (4) and (3) as shown in Figure 31, section 5 of this volume, provides the means for selection and release of any one of the 200 selector latch pins described in paragraph (1).

g. Junction Box.

The Model 2250 junction box is provided with plugs and sockets for inter-connection of the various components of the electric selector system, the automatic record player, and the power supply. The construction of the junction box provides for addition of a Model 258 Stepper when required to operate Wall Boxes. Installation instructions accompany each Model 258 Stepper.

2. OPERATION

For detailed description of the operation of the electric selector system refer to pages 16 thru 31, in section 5 of this volume.

3. ADJUSTMENTS

Adjustments of the electric selector assembly prior to synchronization with the main record changer are described in detail starting on page 33 of section 5 in this volume and continuing on page 34.

4. LUBRICATION AND MAINTENANCE

See par. 5, page 34, section 5 of this volume.

MODEL 2250 RECORD CHANGER

1. GENERAL DISCUSSION

The Wurlitzer Model 2250 record changer (Fig. 14) is scientifically designed and fabricated to function without interruption throughout the service life of its several major components. These components have been carefully factory-adjusted and tested under rigid inspection, thus minimizing the possibility of breakdown or malfunction. The mechanism is very similar in construction and capacity to the preceding Model 2150, however the selection arrangement of its 100 seven inch, forty-five R.P.M. records and the sequence of programming has been simplified. Provisions for "extended play" records with duo pricing has been made practicable by the addition of E.P. Kit No. 151. The built-in timing of its mechanical components and its simplicity of design insures a minimum requirement for field adjustments. However, this service manual, if studied carefully, will equip service personnel for handling any problems that may arise in the field. The Model 2250 Wurlitzer record changer is a precision-built mechanism, and although sturdily constructed, it should be handled like any other finely made instrument.

2. DESCRIPTION

a. Five major assemblies, or groups of assemblies make up the record changer, Figs. 14 and 15: The top support casting assembly (Item 2, Fig. 15) including the turntable assembly (Item 3, Fig. 14), the tone arm assembly, and the turntable motor and bracket assembly. The record carrier assembly (Item 2, Fig. 14). The chassis mounting plate and record lift arm assembly (Item 8, Fig. 14). The chassis frame and shaft assembly (Item 18, Fig. 14), which includes the main cam (Item 9) and the drive gear and ratchet assembly (Item 10). And the electric selector assembly (Item 14, Fig. 15). Each of these assemblies are discussed in detail and their respective functions described on pages 36 to paragraph "f" page 40, in section 5 of this manual.

b. The electric selector for the Model 2250 (Fig. 12) is mounted on two support castings (Items 8 and 17, Fig. 15) and the support plate (Item 13, Fig. 15). The components of the electric selector, their respective functions, and settings are discussed in paragraph "d", page 13 in section 5 of this volume.

3. OPERATION

The Model 2250 record changer goes through a complete operating cycle each time a record is played. This cycle begins with the mechanism in its normal "at rest" position and passes through a sequence of distinct phases of operation before returning to its

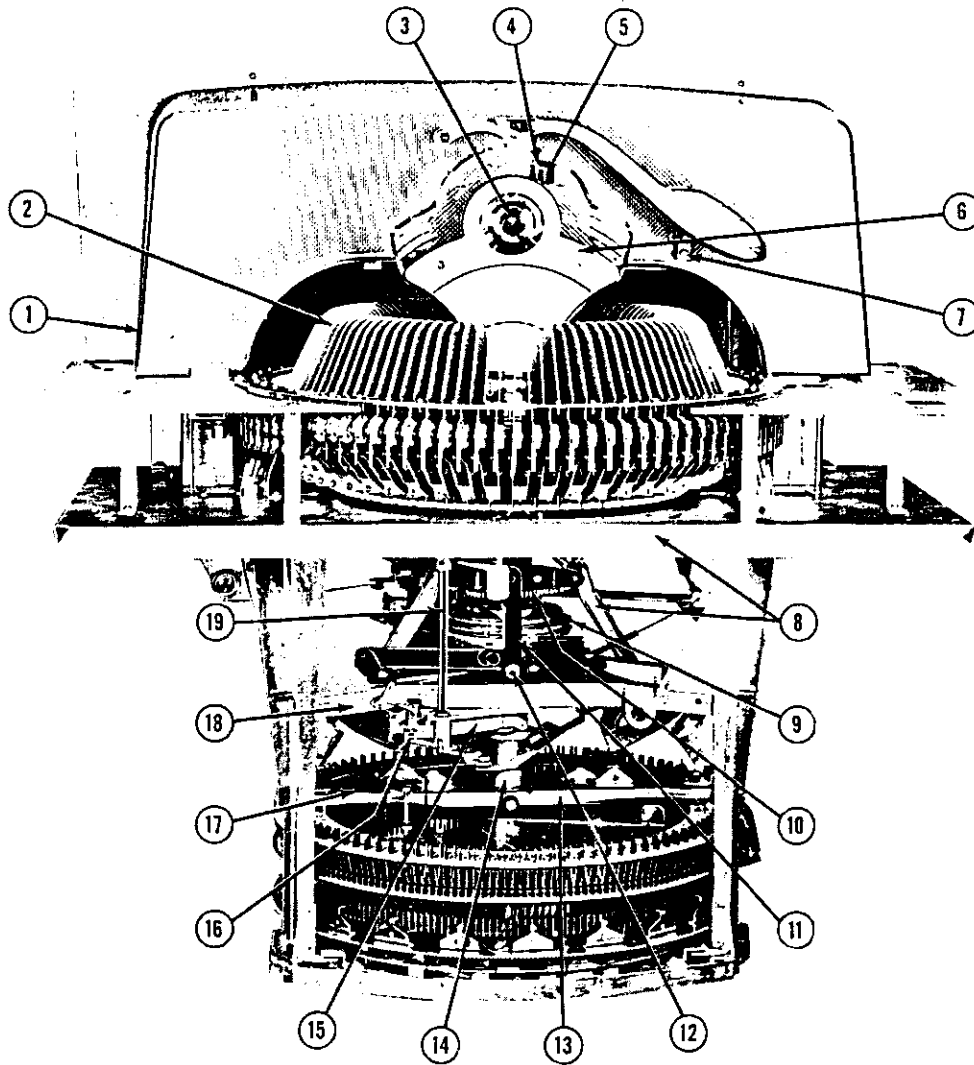


Fig. 14. MODEL 2250 RECORD CHANGER (FRONT VIEW)

1. Cover Assembly, Support Casting	111607	11. Link and Lever Assembly,	
2. Record Carrier Assembly	111035	Record Lift Arms (Whiffletree)	59599
3. Turntable and Shaft Assembly	68102	12. Bearing, Cam Follower	60991
4. Feed - In Adjusting Screw (Pin, Tone Arm Stop)	64422	13. Selector Crank, Inner	110943
5. Tone Arm Release Bracket and Pivot Assembly	111621	14. Sleeve and Bushing Assembly (Loading)	68483
6. Record Guide Assembly	111043	15. Stop Lever and Roller Assembly (Loading)	68525
7. Mounting Casting and Pin Assembly	111054	16. Switch (Loading)	53648
8. Chassis Mounting Plate and Lift Arm Assembly	68459	17. Selector Crank, Outer	110943
9. Main Cam, Bushing, and Pawl Assembly	69596	18. Chassis Frame and Shaft Assembly	68463
10. Gear and Ratchet Wheel Assembly	59732	19. Release Lever and Shaft Assembly	68557

original "at rest" position. All of the mechanical phases of the record changer depend directly upon the orderly sequence of operation of the over-ride switch, the carriage switch, the transfer switch, the "mute and play" switch, and the trip switch or the cancel switch. A complete description of the operation together with schematic diagrams showing the sequential operation of the foregoing switches has been presented on pages 40 thru 44 in section 5 of this volume.

4. ADJUSTMENTS

Although each Wurlitzer Model 2250 Phonograph is carefully adjusted and inspected at the factory,

various factors, such as rough handling during shipment, may make it necessary to recheck certain adjustments before placing the instrument on location. Before making any mechanical adjustments, however, it should be born in mind that the mechanical operation of the phonograph depends primarily upon the proper operation and function of the several switches that govern its mechanical phases. In case of malfunction it is therefore well to first check the setting of the various control switches. When it is certain that all of the control switches are functioning properly, it will be easier to locate the cause of mechanical malfunction. Paragraphs "a" to "h" inclusive on pages 45, 46, and 47, in section 5 of this volume provide

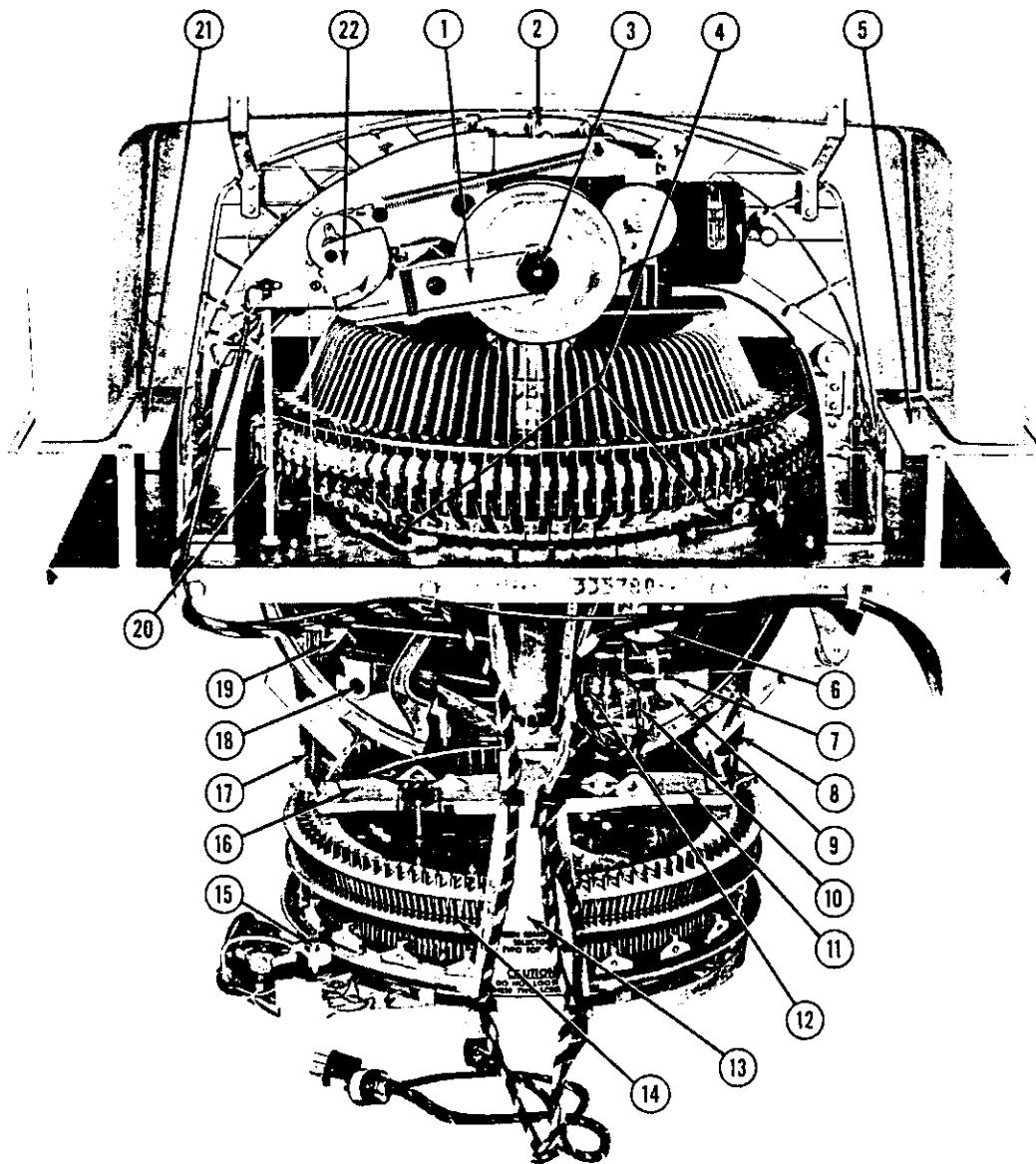


Fig. 15. MODEL 2250 RECORD CHANGER (REAR VIEW)

1. Arm and Roller Assembly, Turntable Release	59922	12. Transfer Switch and Bracket Assembly	59569
2. Support Casting Assembly R.H.	111036	13. Support Plate	68520
3. Plate, Record Clamp	63205	14. Electric Selector Assembly	110978
4. Back Stop Pawl Assembly	65890	15. Motor and Gear Assembly, Electric Selector	111913
5. Decorative Shelf Assembly, L.H.	111440	16. Selector Crank and Stop Nut Assembly	110943
6. Motor Assembly, Record Changer	65625	17. Support Casting, R.H.	67928
7. Actuator Arm, Transfer Switch	59691	18. Shaft and Cancel Arm Assembly	59632
8. Support Casting, L.H.	68700	19. Lever Assembly, Record Clamp	59688
9. Actuator Arm, Mute and Play Switch	62761	20. Bracer Rod	60519
10. Mute and Play Switch and Bracket Assembly	65170	21. Decorative Shelf Assembly, R.H.	111437
11. Selector Crank and Stop Nut Assembly	110943	22. Cam, Record Clamp	59464

detailed instruction for setting the control switches of the mechanism. These switch adjustments are provided, in a separate group and in advance of the mechanical adjustments of the mechanism, only as a matter of convenience in checking a phonograph that is assumed to be in normal mechanical adjustment. All of these switches, except the service switch and the loading switch, have their adjustments dependent on proper mechanical adjustment of the components which serve to produce their operation.

a. The adjustment procedures and illustrations that follow in paragraphs "i, j, k, and l", pages 48, 49, and 50, in section 5 of this volume, cover in detail, the requirement for several components of the Model 2250 which are identical with Model 2150.

b. Selector Crank Clearance. (Figs. 16 and 17)

Aided by the "stop lever and roller assembly" (Item 2, Fig. 16) the "sleeve and bushing assembly" (Item 4) has three functions:

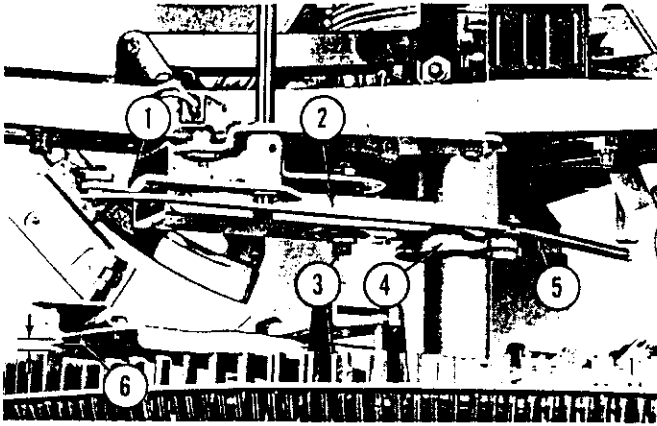


Fig. 16. RELEASE LEVER, LOADING POSITION

1. Link, Release Lever	68567
2. Stop Lever and Roller Assembly	68525
3. Adjusting Screw, Stop Lever	73571-22
4. Sleeve and Bushing Assembly	68483
5. Retracting Spring, Loading Lever	68782
6. Clearance Dimension 1/8" to 1/4"	

(1) It rests directly on the "actuator arm and link assembly" (Item 10, Fig. 18) of the two selector cranks and positions the tips of the selector arms vertically with relation to the tips of the selector latch pins.

(2) It is free to slide downward when actuated by the cancel arm (Item 6, Fig. 18) to reset latch pins after selection of a record has been completed.

(3) It may be rotated about the selector shaft by means of the release lever and link (Item 1, Fig. 16) to change its upward limit of travel in accordance with the cam surface on the flange of the sleeve and the setting of the adjusting screw (Item 3). The setting of this adjustment should be made with the release lever and stop arm rollers in their operating position on the ramps of the flange as shown in Fig. 16, Item 4. With the selector latch pins reset, as shown in Fig. 17, the tips of the two selector cranks should

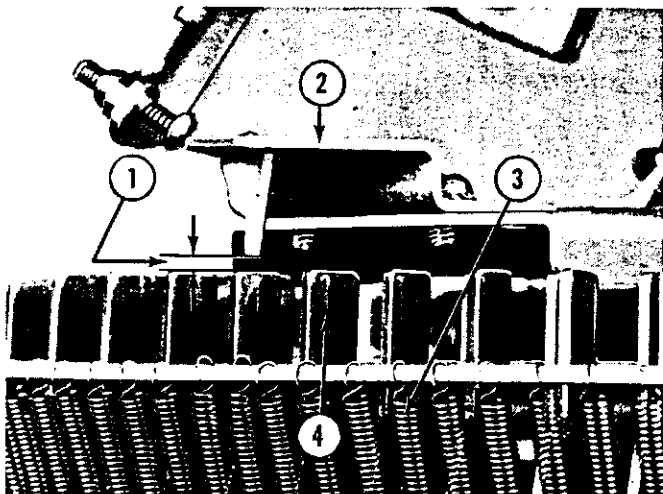


Fig. 17. SELECTOR CRANK CLEARANCE ADJUSTMENT

1. Clearance Dimension 1/16" to 1/8"	
2. Tip and Mounting Bracket Assembly, Outer	110930
3. Spring, Latch Pins	110480
4. Latch Pin, Outer	110942

clear the latch pins by 1/16" to 1/8" as indicated at Item 1, Fig. 17. Assuming the electric selector to be in correct alignment, this dimension should be constant with relation to all selector latch pins in their reset position. When the release lever is moved to the loading position as shown at Item 4, Fig. 16, the tips of the selector cranks should be well clear of any released latch pins as shown at Item 6, Fig. 16. This condition is provided to enable free rotation of the record carrier while changing records, even though some latch pins are in their released position.

c. Cancel Lever Setting. (Fig. 18)

As stated in paragraph "b, (2)" the sleeve and bushing assembly, (Item 5, Fig. 18) may move freely up and down on the selector shaft. The lower end of the sleeve rests on the "actuator arm and link assembly", which in turn, depresses the two selector cranks (Item 7). Thus, when the "tip and mounting bracket assembly" (Item 9) of one of the selector cranks is engaged with a released selector latch pin as shown at Item 8, the selector crank and tip may be depressed by the cancel lever (Item 1) to reset the latch pins. The pressure of the cancel lever is applied through the "yielding" spring (Item 11) to permit sufficient cancel action plus a reasonable amount of over-travel. An approved method for adjustment of the cancel lever (Item 1) follows:

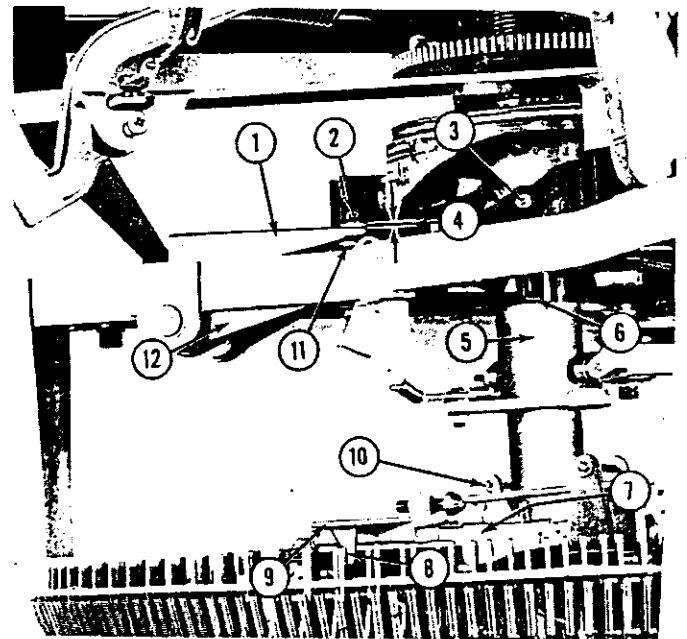


Fig. 18. CANCEL LEVER SETTING

1. Cancel Lever	59632
2. Adjusting Screw	73571-23
3. Point of Maximum Actuation	
4. Dimension, 1/32" Over-travel	
5. Sleeve and Bushing Assembly, Cancel	68483
6. Cancel Arm, Lower	59661
7. Selector Crank and Stop Nut Assembly	110943
8. Engagement of Tip and Latch Pin	
9. Tip and Mounting Bracket Assembly, Outer	110930
10. Actuator Arm and Link Assembly, Selector Cranks	110939
11. Spring, Cancel Lever	110934
12. Cancel Arm, Lower	59661

(1) With a latch pin released and engaged by the tip of a selector crank as shown at Item 8, advance the cycle of operation until the cancel cam is at its maximum point of actuation as shown at Item 3.

(2) Adjust the cancel adjusting screw (Item 2) to provide complete resetting of the latch pin as shown at Item 8, and over-travel of 1/32" as shown under the head of the screw at Item 4. This adjustment is entirely independent of the previous adjustments described or referred to in paragraphs "a" and "b" above.

d. Record Lift Arms, Retracted Adjustment.

Adjustment procedures and illustrations for the record lift arms in their retracted position is described in detail on page 52, section 5 of this volume.

e. Back-Stop Pawl Setting.

Detailed procedure and illustrations for setting of the back-stop pawls is presented in paragraph "p" pages 52 and 53, section 5 of this volume.

f. Selector Cranks and Carriage Switch Settings. (Figs. 19, 20, 21, and 22)

The two selector cranks are mounted on pivot screws (Item 5, Fig. 19) in the "mounting plate and stop nut assembly" (Item 7, Fig. 19). This group of

components, in turn, is mounted about the "selector shaft and adjustment plate assembly" (Item 12, Fig. 19) so that its lateral position may be varied with respect to the "selector shaft and adjustment plate assembly". The variation of this lateral position is governed by the several adjustment screws contained in the assembly to provide indexing of the selector latch pins with the corresponding record holders of the record carrier.

Based on the selector crank clearance adjustments as described in paragraph "b" above, proceed with adjustments of the selector cranks and carriage switch as follows:

(1) The stop bracket (Item 3, Fig. 19) for each of the selector cranks should be set as shown in Fig. 20. The mechanism should be in its normal "at rest" position with the service switch off and the loading lever engaged in its playing position as shown at Item 3, Fig. 20. Set the stop bracket adjusting screws (Items 1 and 5, Fig. 20) to position the tab of the stop brackets to align their lower 1/3 of the flat surface with the ball bearing adjusting screw (Item 2, Fig. 20). The ball bearing adjusting screw will then be set to lightly contact the flat surface of the stop bracket. Any visible tolerance that may exist at the pivot screws of the selector cranks may be taken up at this setting.

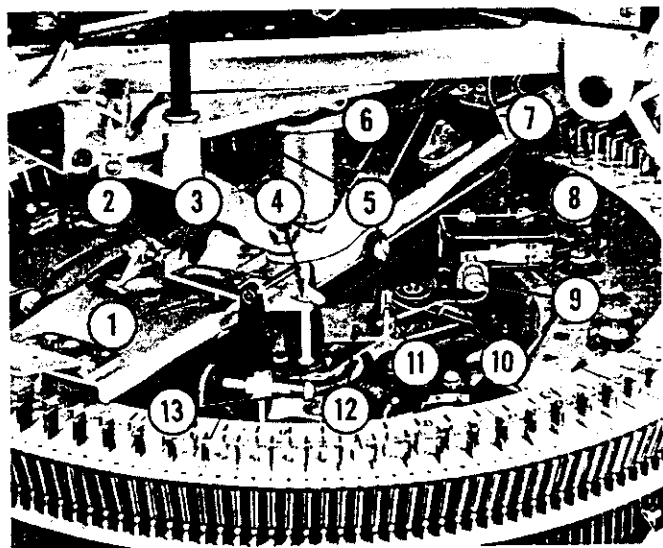


Fig. 19. SELECTOR CRANK SETTINGS

1. Spring, Stop Bracket	68744
2. Adjusting Screw and Bearing Assembly	65702
3. Stop Bracket	68716
4. Adjusting Screw, Stop Bracket, 6-32 x 1-1/2"	73790-78
5. Pivot Screws, Selector Cranks, 8-32 x 5/8"	73790-85
6. Adjustment Plate, Outer Selector Crank	110966
7. Mounting Plate and Stop Nut Assembly	110949
8. Switch, Carriage	110557
9. Screw, Carriage Switch Adjusting	73502-95
10. Switch Lever and Stop Nut Assembly	110937
11. Spring, Switch Lever	68774
12. Selector Shaft and Adjustment Plate Assembly	110952
13. Screw, Selector Crank Stop Adjustment	73503-95

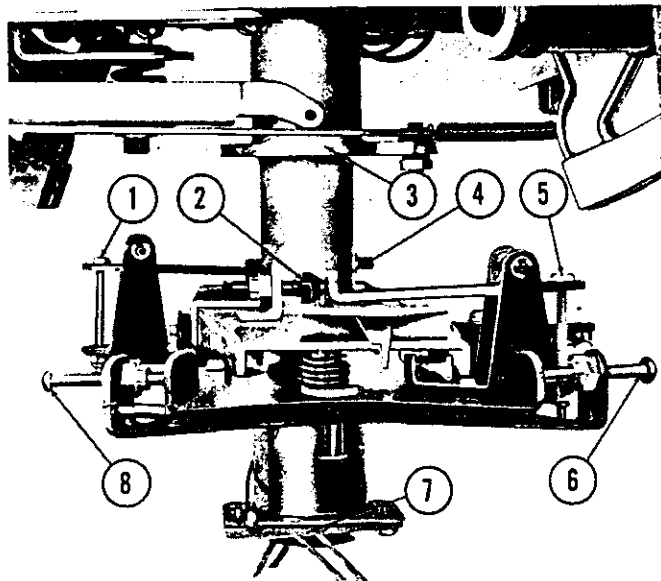


Fig. 20. SELECTOR CRANK SETTINGS

1. Adjusting Screw, Stop Bracket, 6-32 x 1-1/2"	73790-78
2. Adjusting Screw and Bearing Assembly	65702
3. Playing Position of Sleeve and Bushing Assembly	
4. Lower 1/3 of Tab on Stop Bracket	
5. Adjusting Screw, Stop Bracket 6-32 x 1-1/2"	73790-78
6. Adjusting Screw, Selector Crank Stop	73503-95
7. Contact Blade and Plate Assembly	68582
8. Adjusting Screw, Kick-Off	73503-95

(2) To index the selector cranks with record carrier, release one of the inner latch pins (Item 11, Fig. 21) and note the number of the pin as marked on the upper plate of the selector drum.

(3) Manually rotate the record carrier until the inner (stationary) selector crank tip (Item 2, Fig. 21) engages the released latch pin. At the point where the corresponding back-stop pawl drops into the tooth of the record carrier casting which indexes the record holder as noted at the released latch pin, the carriage switch should be adjusted at its adjusting screw (Item 7) to just actuate. The rotation of the record carrier should be repeated and the screw re-adjusted if necessary to provide switch actuation exactly as the back-stop pawl engages.

(4) Using the outer selector crank (with adjustable tip) and one of the outer selector latch pins, set the tip to produce the same result described in (3) above. The relation of carriage switch actuation to back-stop pawl engagement must be identical with both inner and outer tips. When this is accomplished, set the adjustment plate (Item 6, Fig. 19) up against the tip and bracket assembly and lock it in position.

(5) The selector crank stop screw (Item 9, Fig. 21) will be set to stop rotation of the record carrier immediately following actuation of the carriage switch. Over-travel of the back-stop pawl should not exceed 1/16" to 3/32".

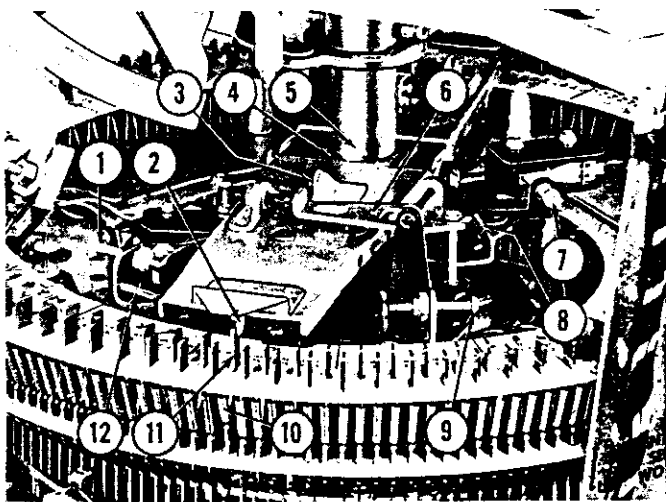


Fig. 21. SELECTOR CRANK AND CARRIAGE SWITCH SETTINGS

1. Adjusting Screw, Kick-Off	73503-95
2. Tip and Mounting Bracket Assembly, Inner	110936
3. Link, Selector Crank Actuator Arm	110928
4. Actuator Arm and Link Assembly	110939
5. Cancel Sleeve and Bushing Assembly	68483
6. Stop Bracket	68716
7. Adjusting Screw, Carriage Switch	73503-95
8. Spring, Switch Lever	68774
9. Adjusting Screw, Selector Crank Stop	73503-95
10. Spring, Selector Latch Pins	110480
11. Latch Pin, Inner	110941
12. Spring, Kick-Off	110480

(6) Cancel the selected latch pin and set the kick-off adjusting screw (Item 1, Fig. 21) to stop the kick-off action (advance) of the selector crank at a point just enough beyond the cancelled pin to permit its release but not enough to allow the tip of the opposite selector crank to interfere with its next succeeding latch pin.

(7) The settings described in (3), (4), (5), and (6) above should be checked and justified at twelve positions around the selector drum, six positions with the inner tip and six positions with the outer tip. Tolerance for carriage switch setting must not exceed 3/6". Tolerance for selector crank stop setting must not exceed 1/16" to 3/32".

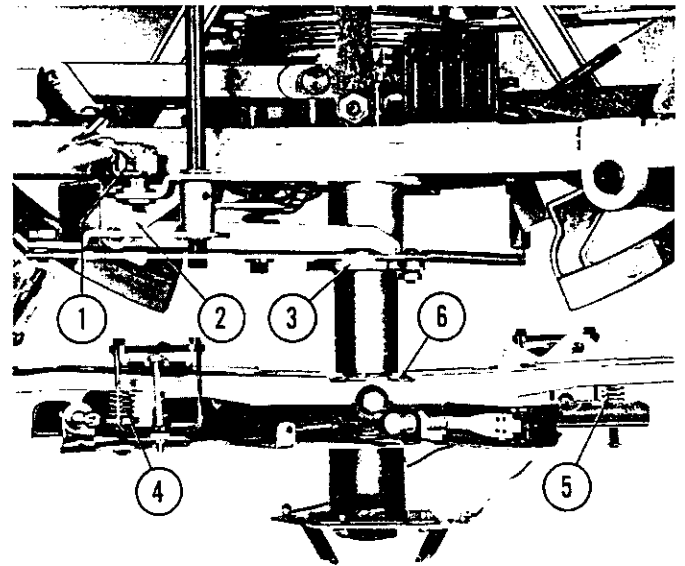


Fig. 22. SELECTOR CRANKS, LOADING POSITION

1. Switch, Toggle (Loading Switch Opens Motor Circuit	53648
2. Switch, Tab on Actuator Arm (Loading)	68559
3. Loading Position of Sleeve and Bushing Assembly	68483
4. Cup Spring, Selector Crank Retracting	65720
5. Cup Spring, Selector Crank Retracting	65720
6. Actuator Arm and Link Assembly, Retracted	110939

g. Record Clamp Settings.

Record clamp settings, tone arm settings and adjustments of all components of the top support casting, are illustrated and described in detail on pages 54 thru 61 in section 5 of this volume.

MODEL 2250 SOUND SYSTEM

1. GENERAL DISCUSSION

The sound system of the Wurlitzer Model 2250 Phonograph consists of the Model 532 Dynatone Amplifier using the Zenith Cobra pick-up mounted in Wurlitzer's low inertia tone arm. The physical characteristics are described on page 8, in section 6 of this volume.

2. DESCRIPTION

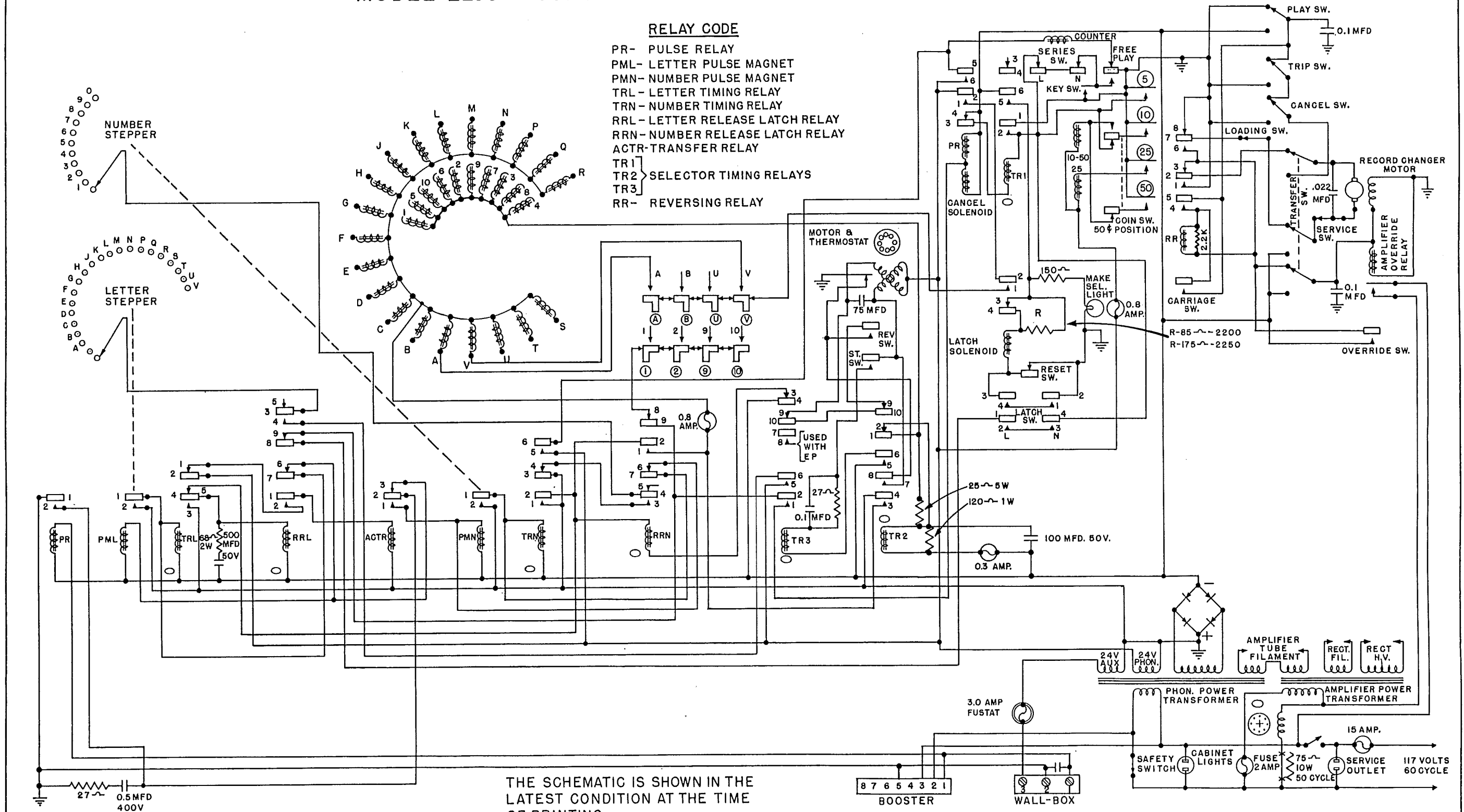
A complete description of the sound system and how it works, including its facilities for accommodating auxiliary sound equipment, will be found on pages 62 thru 66, in section 5 of this volume.



MODEL 2250 — COMPLETE PHONOGRAPH FUNCTIONAL SCHEMATIC

RELAY CODE

- PR- PULSE RELAY
- PML- LETTER PULSE MAGNET
- PMN- NUMBER PULSE MAGNET
- TRL- LETTER TIMING RELAY
- TRN- NUMBER TIMING RELAY
- RRL- LETTER RELEASE LATCH RELAY
- RRN- NUMBER RELEASE LATCH RELAY
- ACTR-TRANSFER RELAY
- TR1 } SELECTOR TIMING RELAYS
- TR2 }
- TR3 }
- RR- REVERSING RELAY

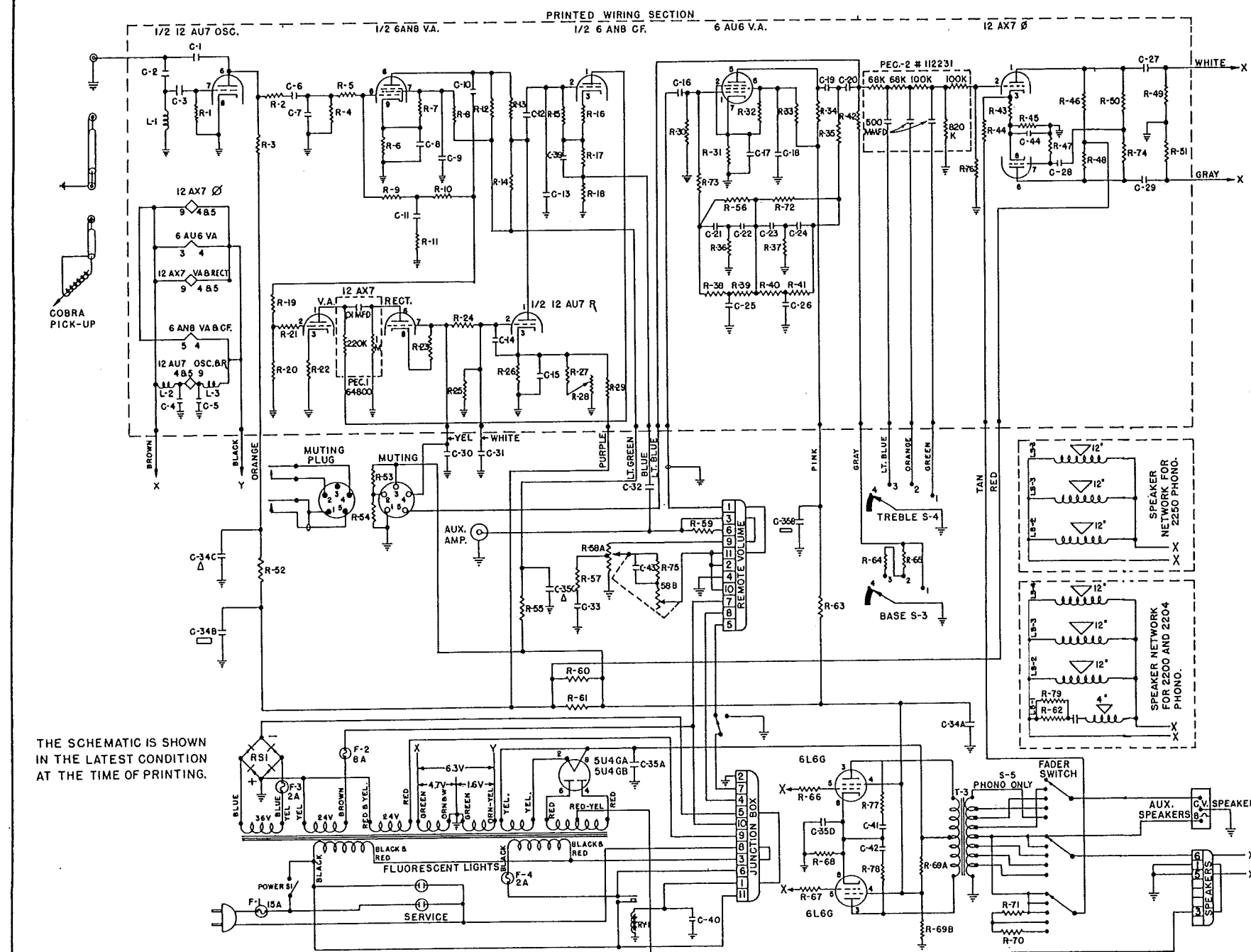


THE SCHEMATIC IS SHOWN IN THE LATEST CONDITION AT THE TIME OF PRINTING.

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Fig. 25. FUNCTIONAL SCHEMATIC MODEL 2250 PHONOGRAPH

MODEL 2250 SCHEMATIC SOUND SYSTEM



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	72333-31	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	72264-32	1M	1/2W ± 10%
R-16	72206-32	3.9K	1/2W ± 10%
R-17	72206-32	3.9K	1/2W ± 10%
R-18	72196-32	1.5K	1/2W ± 10%
R-19	72264-32	1M	1/2W ± 10%
R-20	72259-31	620K	1/2W ± 5%
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	680K	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	72237-31	75K	1/2W ± 5%
R-43	72176-32	220	1/2W ± 10%
R-44	72198-32	1.8K	1/2W ± 10%
R-45	72192-32	1K	1/2W ± 10%
R-46	72240-32	100K	1/2W ± 10%
R-47	72256-32	470K	1/2W ± 10%
R-48	72240-32	100K	1/2W ± 10%
R-49	72256-32	470K	1/2W ± 10%
R-50	72256-32	470K	1/2W ± 10%
R-51	72256-32	470K	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	72362-32	12K	1/2W ± 10%
R-56	72260-32	680K	1/2W ± 10%
R-57	72210-32	5.6K	1/2W ± 10%
R-58A	64966	50K	VOLUME CONTROL
R-58B	64966	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	72288-32	10	1W ± 10%
R-63	72362-32	12K	1/2W ± 10%
R-64	72242-32	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	70897	1650	15W W.W.
R-69B	70897	9K	10W W.W.
R-70	72202-32	2.7K	1/2W ± 10%
R-71	72198-32	1.8K	1/2W ± 10%
R-72	72228-31	33K	1/2W ± 5%
R-73	72226-31	27K	1/2W ± 5%
R-74	72257-31	510K	1/2W ± 5%
R-75	72206-32	3.9K	1/2W ± 10%
R-76	72262-32	820K	1/2W ± 10%
R-77	72336-32	1K	1/2W ± 10%
R-78	72336-32	1K	1/2W ± 10%
R-79	72288-32	10	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 MF	200 V
C-4	70745	.0033 MF	CERAMIC
C-5	70745	.0033 MF	CERAMIC
C-6	71227-14	0.1 MF	400 V
C-7	70534-130	100 MMFD	CERAMIC
C-8	73842-51	25 MFD	25 V. ELECT.
C-9	71227-12	0.1 MF	200 V
C-10	70748	.01 MF	CERAMIC
C-11	70526-230	47 MMFD	CERAMIC
C-12	71220-14	.022 MF	400 V.
C-13	70526-230	47 MMFD	CERAMIC
C-14	70742	1000 MMFD	CERAMIC
C-15	73810-52	20 MFD	50 V. ELECT.
C-16	70498	.22 MF	100 V.
C-17	73842-51	25 MFD	25 V. ELECT.
C-18	73835-55	4 MF	200 V.
C-19	71227-14	0.1 MF	400 V.
C-20	71217-14	.01 MF	400 V.
C-21	71220-14	.022 MF	400 V.
C-22	71220-14	.022 MF	400 V.
C-23	71205-16	.001 MF	600 V.
C-24	71205-16	.001 MF	600 V.
C-25	71224-12	.047 MF	200 V.
C-26	71208-16	.0022 MF	600 V.
C-27	71224-14	.047 MF	400 V.
C-28	71224-14	.047 MF	400 V.
C-29	71224-14	.047 MF	400 V.
C-30	70634-220	1 MF	200 V.
C-31	70637-650	2 MF	50 V. ELECT.
C-32	73293-110	20 MFD	25 V. ELECT.
C-33	71224-12	.047 MF	400 V.
C-34A	73474	20 MFD	400 V. ELECT.
C-34B	73474	20 MFD	400 V. ELECT.
C-34C	73474	10 MFD	400 V. ELECT.
C-34D	73474	20 MFD	50 V. ELECT.
C-35A	73475	30 MFD	500 V. ELECT.
C-35B	73475	20 MFD	400 V. ELECT.
C-35C	73475	20 MFD	400 V. ELECT.
C-35D	73475	25 MFD	50 V. ELECT.
C-36		4 MF	25 V. NON-POLARIZED
C-37			
C-38			
C-39	71220-14	.022 MF	400 V.
C-40	71195-14	0.1 MF	400 V.
C-41	71750-27	.001 MF	1000 W.V.
C-42	71750-27	.001 MF	1000 W.V.
C-43	71183-14	.01 MF	400 W.V.
C-44	73842-51	25 MFD	25 W.V.

ITEM	PART NO.	VALUE	REMARKS
L-1	64872		OSCILLATOR COIL
L-2	64870		FILTER CHOKES
L-3	64870		FILTER CHOKES
S-1	53648	SPST	POWER SWITCH
S-2	68770	SPDT	CANCEL SWITCH
S-3	64857	4 POS. SHORTING	BASS SWITCH
S-4	64857	4 POS. SHORTING	TREBLE SWITCH
S-5	64995	5P3T	FADER SWITCH
T-1	68182		POWER
T-2	68182		JUNCTION POWER
T-3	62430		AUDIO OUTPUT
RY-1	56321	5P5T	24 V. D.C. RELAY
F-1	52196	15 AMP.	250 V. 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	112052		4" SPEAKER
LS-2	62493	15	12" SPEAKER
LS-3	65192	16	12" SPEAKER
LS-4	111691	16	12" SPEAKER
RS-1	64500	24 V.	SBL. RECT.
PEC-1	64800		PLATE - COUPLING
PEC-2	112231		PLATE - COUPLING

A.C. SIGNAL VOLTAGE CHART
 USE BALLANTINE V.T.V.M. OR HEATHKIT VOLTMETER AV-2
 APPLY 180 MILLIVOLT 1000 CYCLE SIGNAL THROUGH 0.01 MFD. CAPACITOR TO JUNCTION OF R-4, R-5, C-6, AND C-7.
 TURN VOLUME CONTROL FULL ON USE 5 OHM. 20 WATT RESISTOR AS OUTPUT LOAD.

SYMBOLS & NOTES
 Ø - PHASE INVERTER
 C.F. - CATHODE FOLLOWER
 V.A. - VOLTAGE AMPLIFIER
 R - VARIABLE RESISTANCE TUBE
 ** - WITH PHONO PICK-UP PLUGGED IN AND CIRCUIT OSCILLATING
 * - WITH PHONO PICK-UP PLUGGED IN AND CIRCUIT OSCILLATING -6V USING V.T.V.M. AND EXTERNAL 1 MEG ISOLATION.
 ALL D.C. VOLTAGES MEASURED FROM GND. USING A V.T.V.M. NO SIGNAL AT 117 VOLT LINE EXCEPT AS NOTED ABOVE.

D.C. AND FILAMENT VOLTAGES

TUBE	PIN NO. ON TUBE SOCKET	1	2	3	4	5	6	7	8	9
12 AU7 OSC.-R	197	0	21.25	4.6	4.6	187	0	8	0	1.48
6 AN8 VA.-G.F.	280	15.5	32	1.59	4.6	112	204	0	4.8	
12 AX7 VA.-RECT.	205	0	1.9	1.58	1.58	0	3	4	4.65	
6 AU6 V.A.	0	1.9	4.65	1.59	1.59	73	91	2	-	
12 AX7	202	0	1.6	1.59	1.59	195	0	1.45	4.6	
6L6G	-	1.6	4.06	3.15	0	0	4.7	24	-	
6L6G	-	1.6	4.06	3.15	0	0	4.7	24	-	
5U4GAB	N.C.	413	N.C.	365	N.C.	365	N.C.	413	-	

MEASURE VOLTAGES TO GROUND

TUBE	1	2	3	4	5	6	7	8	9
12 AU7 OSC.-R	.6								
6 AN8 VA.-G.F.	.6				155		.15		
12 AX7 V.A.-RECT.	57	1.5			56				
6 AU6 V.A.	.025				2				
12 AX7	13.5	.8			13.5	.26			
6L6G			145	13.2					
6L6G			145	13.2					

112238-1

Fig. 24. SCHEMATIC WIRING DIAGRAM MODEL 2250 SOUND SYSTEM

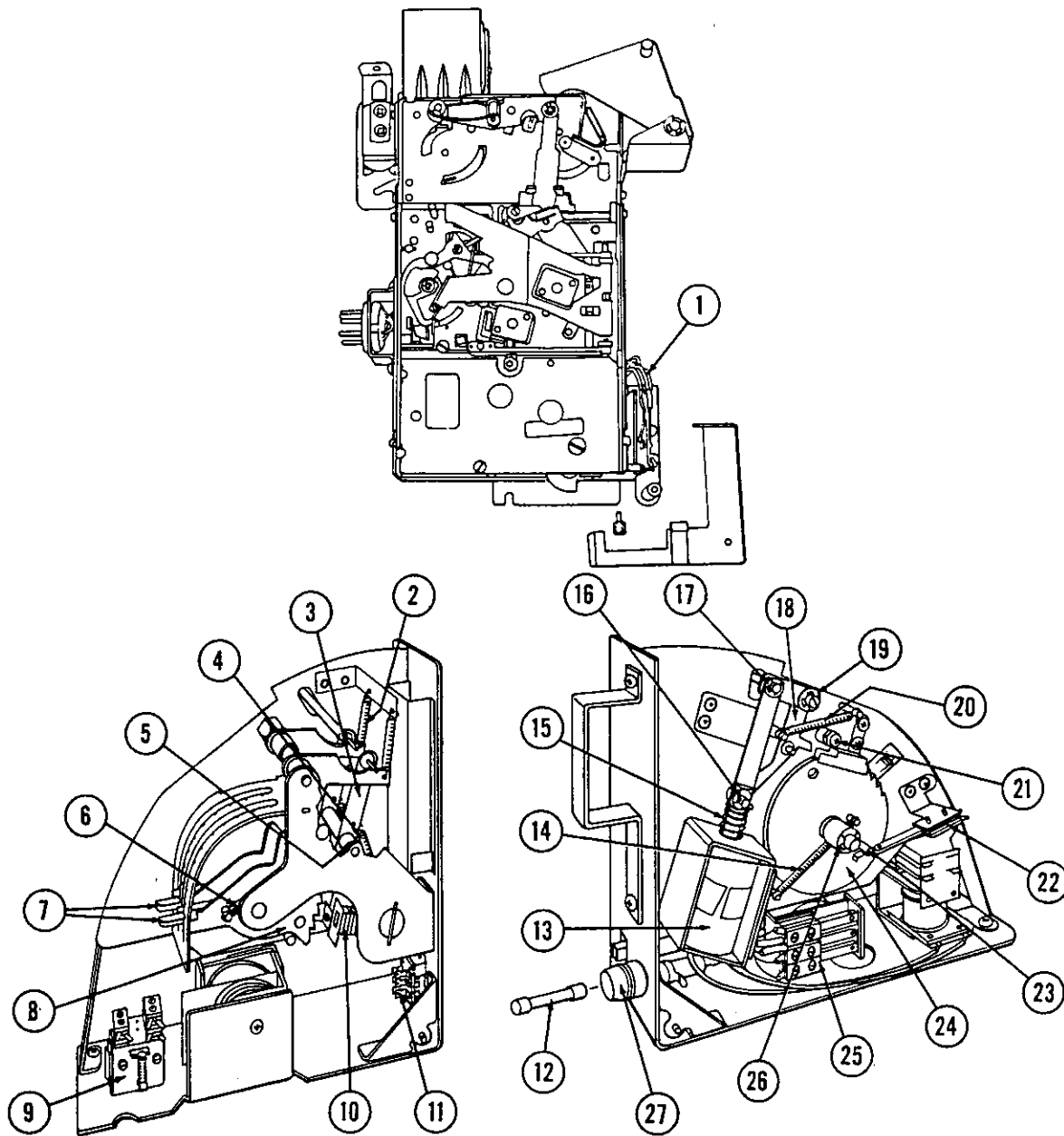


Fig. 26. PLAYRAK AND SLUG REJECTORS

1. Coin Switch Assembly, Slug Rejector Assembly	68311	14. Spring, Cancel	66071
2. Spring, Lock - Out	62145	15. Spring, Solenoid Return	66072
3. Lever, Hub and Stud Assembly	66129	16. Pin, Cancel Plunger	65947
4. Spring, Lever, Hub and Stud	58781	17. Retaining Ring	73724-15
5. Retaining Ring	73724-18	18. Pivot Arm and Pawl Assembly	66125
6. Spring, Accumulator	66074	19. Retaining Ring	73724-21
7. Stop Lever and Spring Assembly	66132	20. Spring, Cancel Pawl	62145
8. Accumulator Wheel and Hub	66131	21. Adjustment Cam	42868
9. Relay, Pulse	68211	22. Switch, Key	66082
10. Coin Magnet	66128	23. Actuator, Plastic	58255
11. Slide Switch	62886	24. Cancel Wheel, Assembly	66124
12. Fusetron, 0.8 Amp.	14524	25. Relay, Timing #1	64796
13. Solenoid, Cancel	65069	26. Retaining Ring	73724-25
		27. Fuse Post	45352

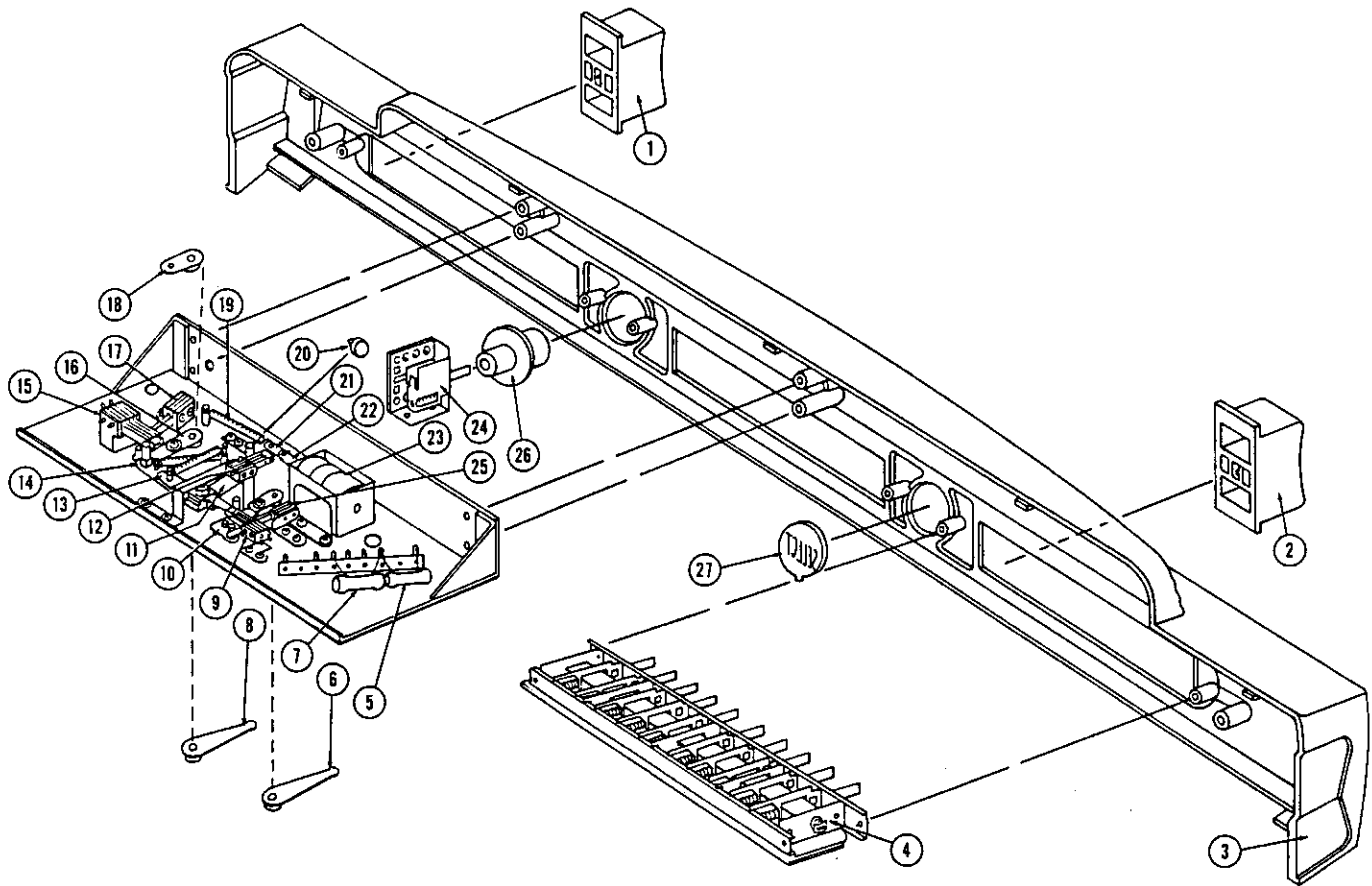


Fig. 27. SELECTOR SWITCH ASSEMBLY 110995

1. Buttons, Numbers, (1 to 0)	111082 to 111091	14. Pawl, Stud and Spacer, Numbers	56712
2. Buttons, Letters, (A to V)	111062 to 111081	15. Switch, Latch, Letters and Numbers	60518
3. Selector Casting	68299	16. Trip Lever and Spacer, Numbers	65010
4. Selector Switch, Letters	111888	17. Switch, Series, Numbers	64982
5. Resistor, 150 Ohm 5 W.	71883-2	18. Link and Hub Assembly, Latch Lever	56654
6. Lever and Hub, Letters	68404	19. Spring, Solenoid Return	57130
7. Resistor, 175 Ohm 5 W.	71884-3	20. Rubber Bumper	54246
8. Lever and Hub, Numbers	60453	21. Link, Solenoid Connector	56608
9. Switch, Latch, Letters and Numbers	60518	22. Pin, Solenoid Shaft	65947
10. Pawl, Stud and Spacer Assembly, Letters	65009	23. Solenoid, Latch	60717
11. Release Lever, Stud and Spacer	56713	24. Switch, Reset	68574
12. Switch, Latch Solenoid	56704	25. Switch, Series, Letters	64981
13. Trip Lever, Stud and Spacer, Letters	56714	26. Reset Button	68556
		27. Instruction Plate, Select	111092

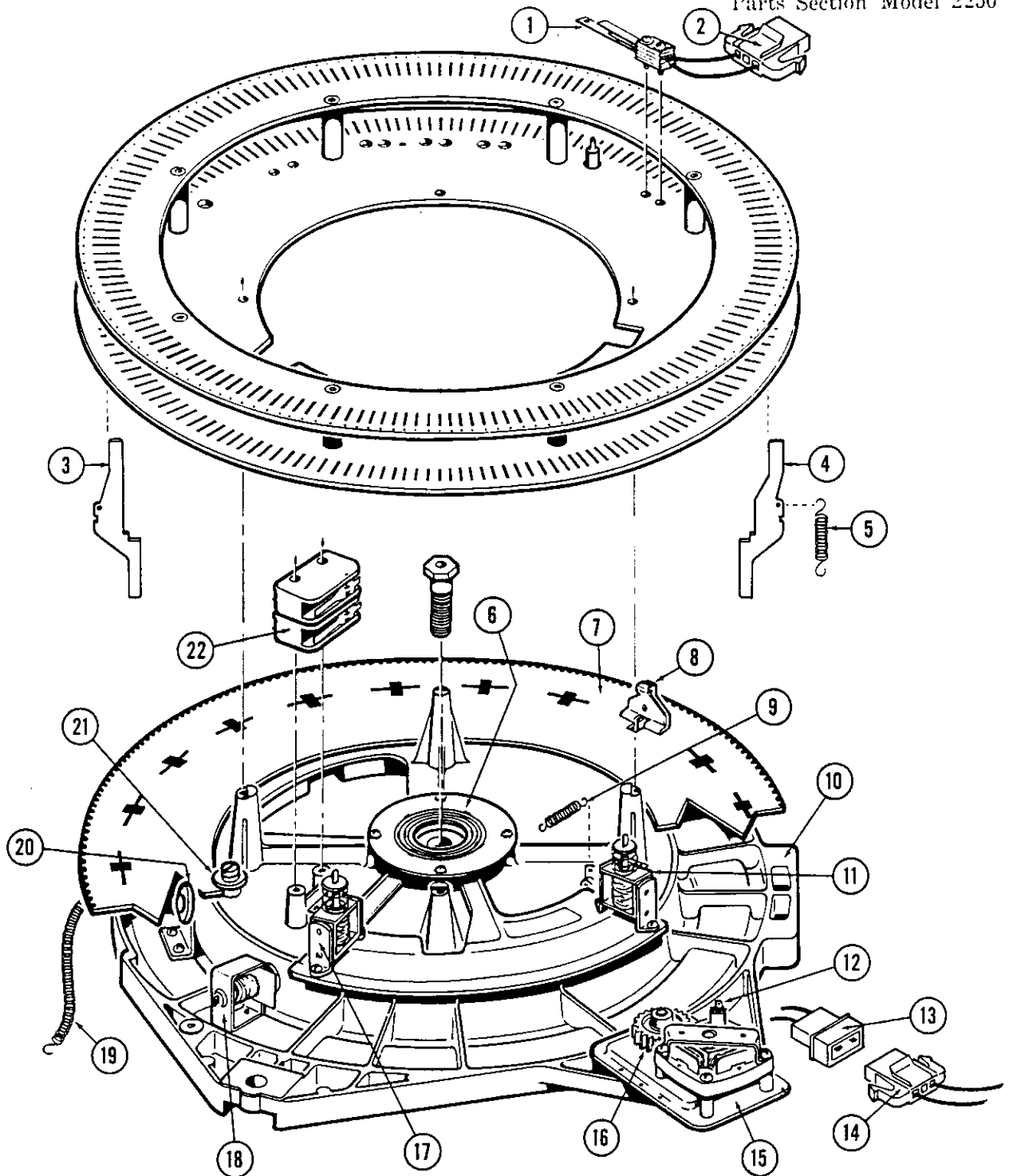


Fig. 28. ELECTRIC SELECTOR 110978

1. Switch Assembly, Override	65952	12. Thermo Cut - Out, Motor	68731-1
2. 3 Circuit Female Housing	111528	13. 3 Circuit Male Housing	111526
3. Latch Pin, Inner, (100)	110941	14. 3 Circuit Female Housing	111528
4. Latch Pin, Outer, (100)	110942	15. Motor and Gear Assembly, Selector	111913
5. Spring, Latch Pin, (200)	110480	16. Gear and Hub Assembly	68717
6. Contact Plate	66186	17. Solenoid, Selector, Number, (9)	68617
7. Rotating Plate	67920	18. Solenoid, Selector, Letter, (20)	68594
8. Bracket and Rocker, (20)	68807	19. Spring, Rocker Arms	68755
9. Spring, Number Quadrant	62773	20. Bracket and Roller Assembly	68651
10. Selector Casting	67921	21. Plastic Roller	68656
11. Solenoid Selector, Number, (1)	68804	22. Micro Switch, Start and Reverse	61596

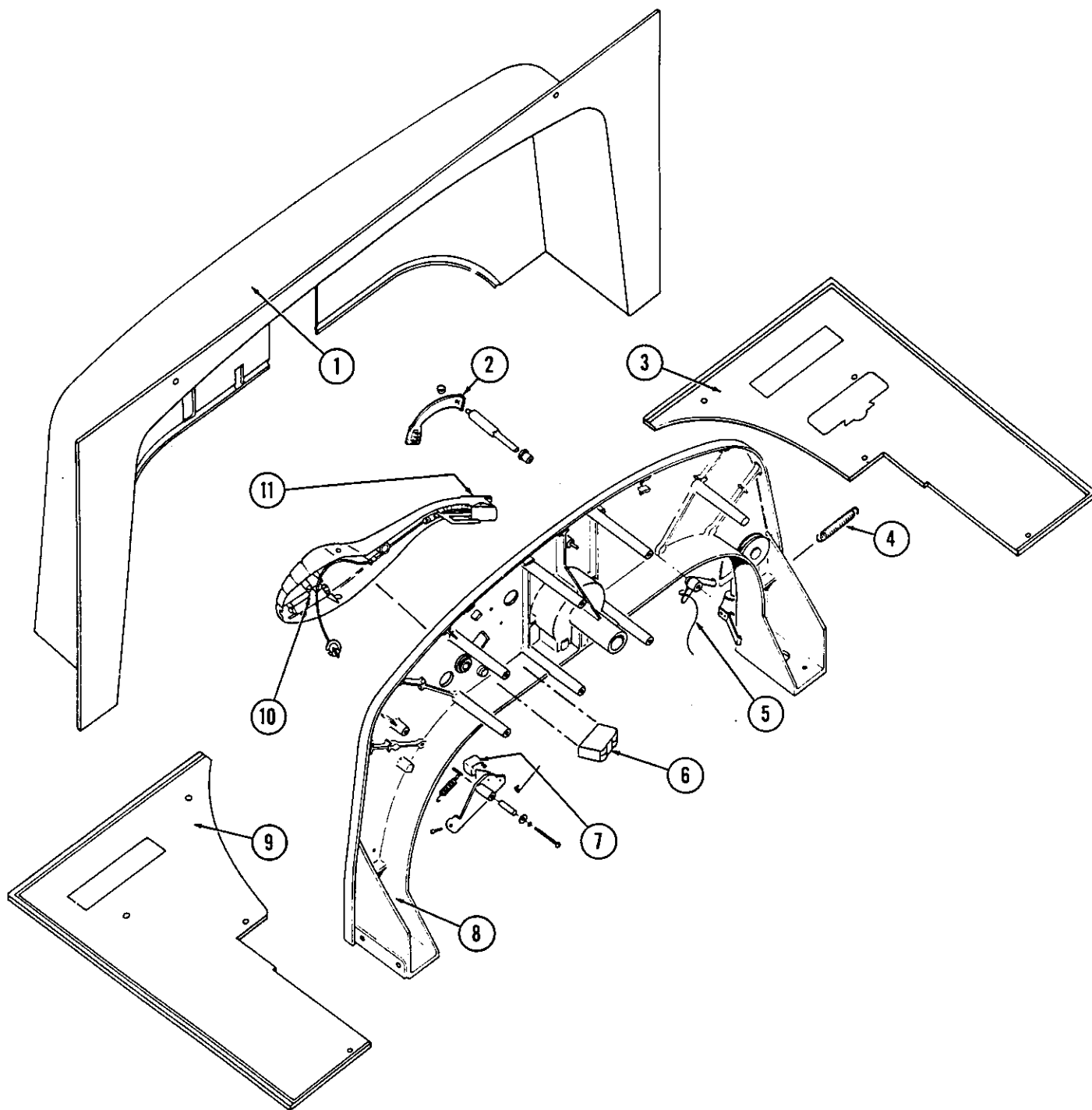


Fig. 29. TOP-SUPPORT-ASSEMBLY 111036

- | | | | |
|---|----------------|--------------------------------|--------|
| 1. Cover Assembly | 111607 | 6. Micro Switch, Safety | 60655 |
| 2. Arm and Brush, Tone Arm | 111136 | 7. Micro Switch, Trip | 57851 |
| 3. Decorative Shelf, L.H. | 111440 | 8. Support Casting and Bushing | 111053 |
| 4. Spring, Record Indicator Bracket
Assembly, L.H. | 59710 | 9. Decorative Shelf, R.H. | 111437 |
| 5. Cable, Tone Arm Brush
Sleeve for Cable 59888 | 59888
59881 | 10. Tone Arm and Wire Assembly | 111049 |
| | | 11. Needle, Green | 57525 |

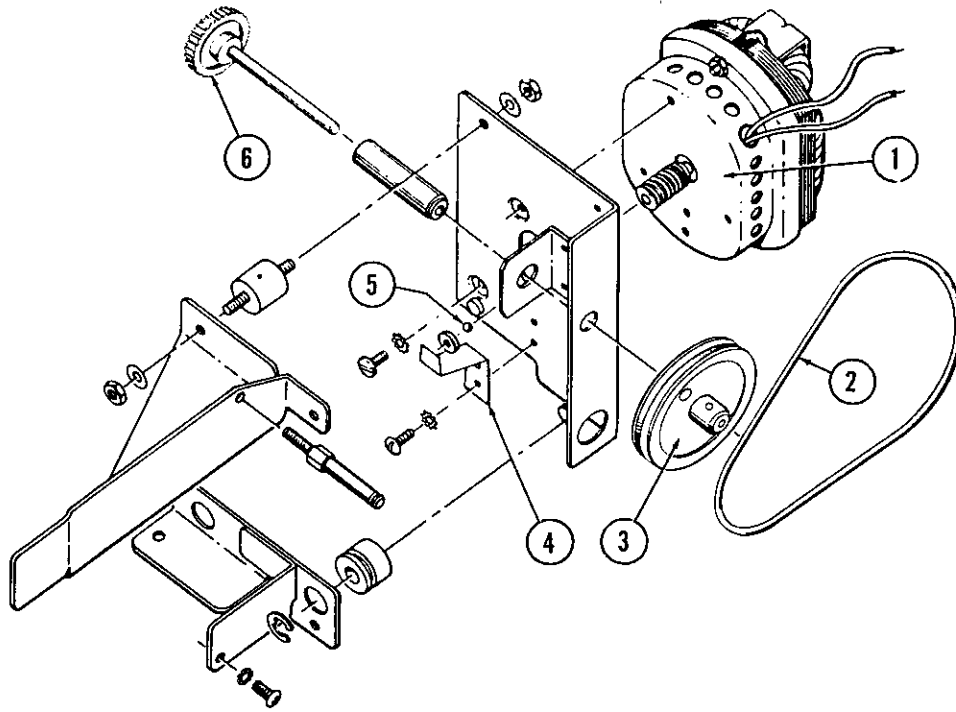


Fig. 30. TURNTABLE MOTOR AND GEAR SHAFT ASSEMBLY

1. Turntable Motor and Worm Assembly	69686	4. Spring Clip	60893
2. "O" Ring, Turntable Drive Motor	60881	5. Steel Ball	25202
3. Pulley, Turntable Drive Motor	64189	6. Gear and Shaft Assembly	65203
Absorbed Oil, 1 Pt.		21934A	

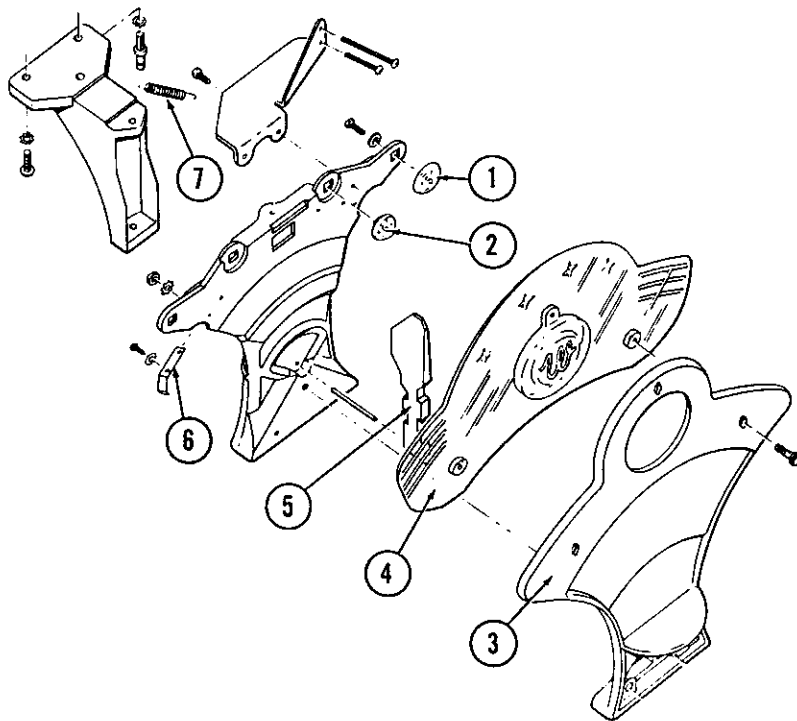


Fig. 31. RECORD GUIDE ASSEMBLY 111043

1. Bumper, Record Guide	59743	5. Track, Record	59425
2. Bumper, Record Guide	59396	6. Stop Bracket, Track	59434
3. Casting, Record Guide, Front	68103	7. Spring, Return	59606
4. Plate, Record Guide	111044		

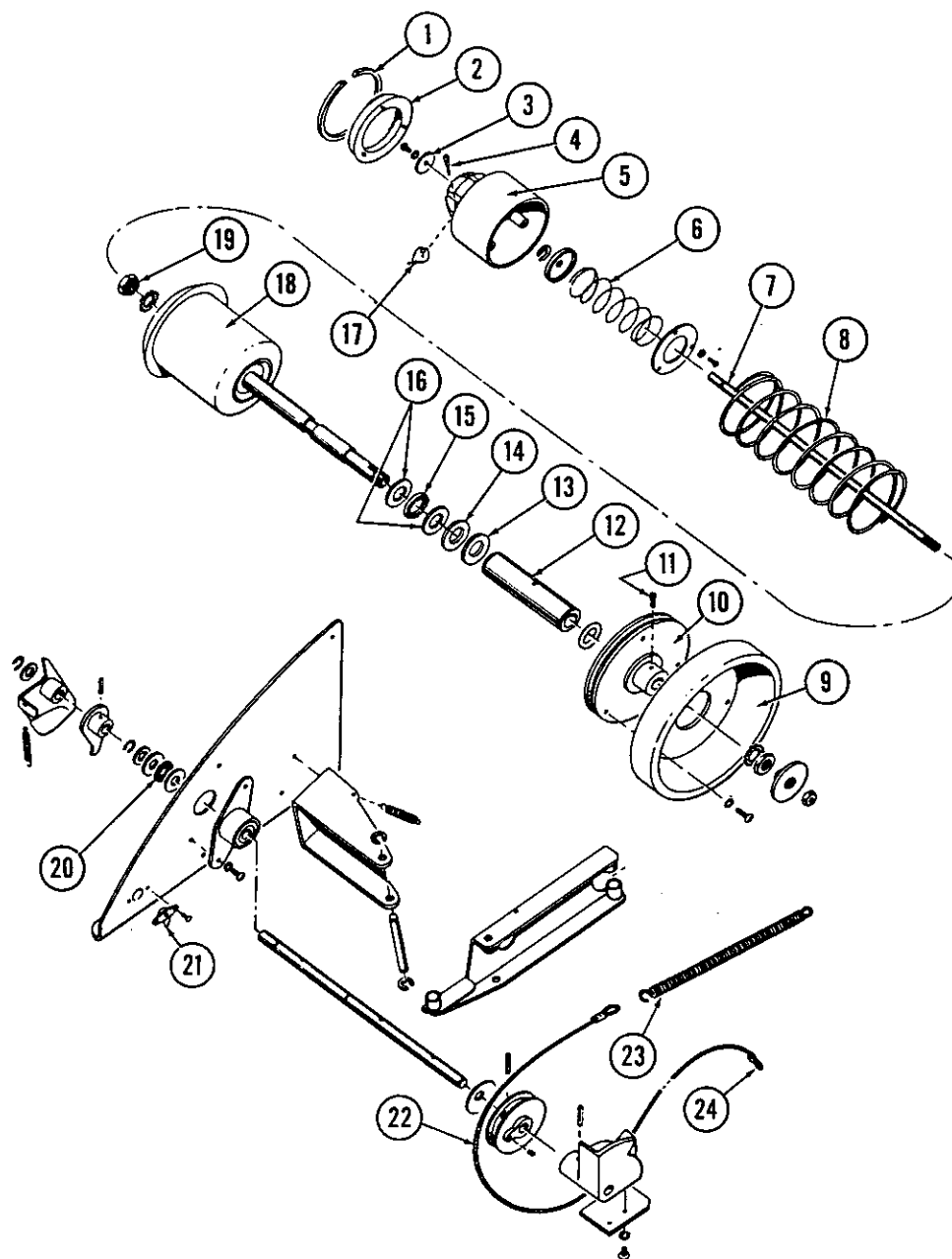


Fig. 32. TURNTABLE SHAFT ASSEMBLY, RECORD CLAMP SHAFT, AND MOUNTING PLATE AND BALL BEARING ASSEMBLY

1. Retaining Ring	60681	13. Shim .005	63731
2. Pad, Turntable	60680	14. Shim .015	63732
3. Washer, Shaft	59423	15. Ball Race	59867
4. Screw, Special, Record Clamp	59419	16. Washers	59864
5. Pilot, Turntable	59449	17. Lever, Record Clamp	59417
6. Spring, Record Clamp	59418	18. Turntable and Shaft Assembly	68102
7. Shaft, Record Clamp	59416	19. Nut, 7/16-20	59470
8. Spring, Pilot, Record Clamp	59424	20. Ball Race	59679
9. Flywheel	59456	21. Socket, Single Prong	43341
10. Pulley, Turntable	64190	22. Cable, Record Clamp and Tone Arm	59871
11. Special Screw	59399	23. Spring, Idler Pulley	61174
12. Sleeve, Bushing	64520	24. Special Service Sleeve for 59871 Cable	61658

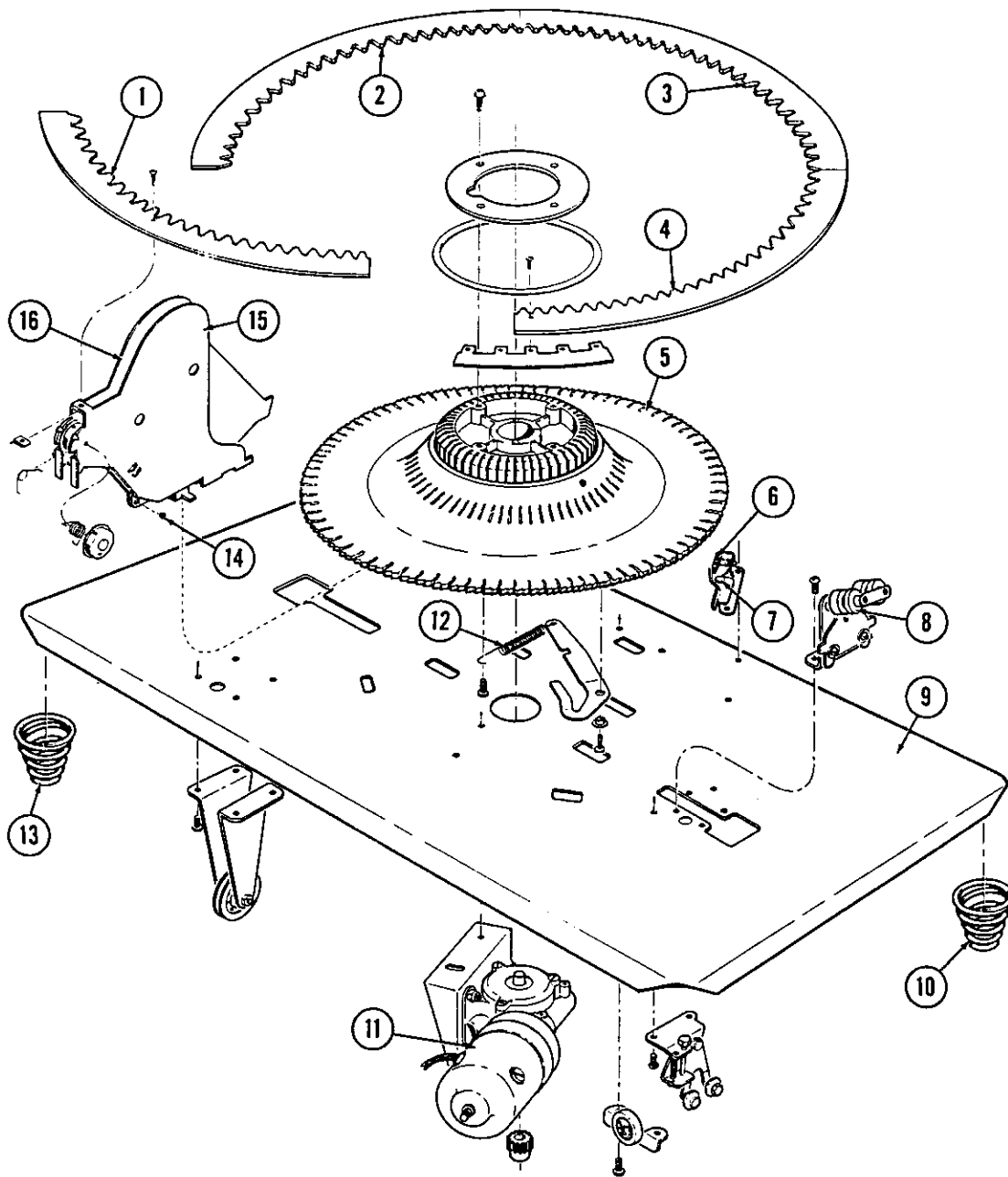


Fig. 33. CHASSIS MOUNTING PLATE AND RECORD CARRIER GROUP

1. Carrier, Ring, A2 - F1	110955	9. Chassis Mounting Plate Assembly	59827
2. Carrier, Ring, R2 - A1	110956	10. Conical Spring (Yellow for Identification)	61059
3. Carrier, Ring, L2 - R1	110954	11. Motor and Pinion	69067
4. Carrier, Ring, F2 - L1	110957	12. Spring, Carrier Drive Pawl	59709
5. Casting, Record Carrier	65496	13. Conical Spring (Red for Identification)	53774
6. Spring, Back Stop Pawl	59710	14. Eyelet, Record Holder	65714
7. Bumper, Back Stop Pawl	54246	15. Record Holder and Counter R.H.	65910
8. Roller, Lift Arm Guide	65939	16. Record Holder and Counter L.H.	65909

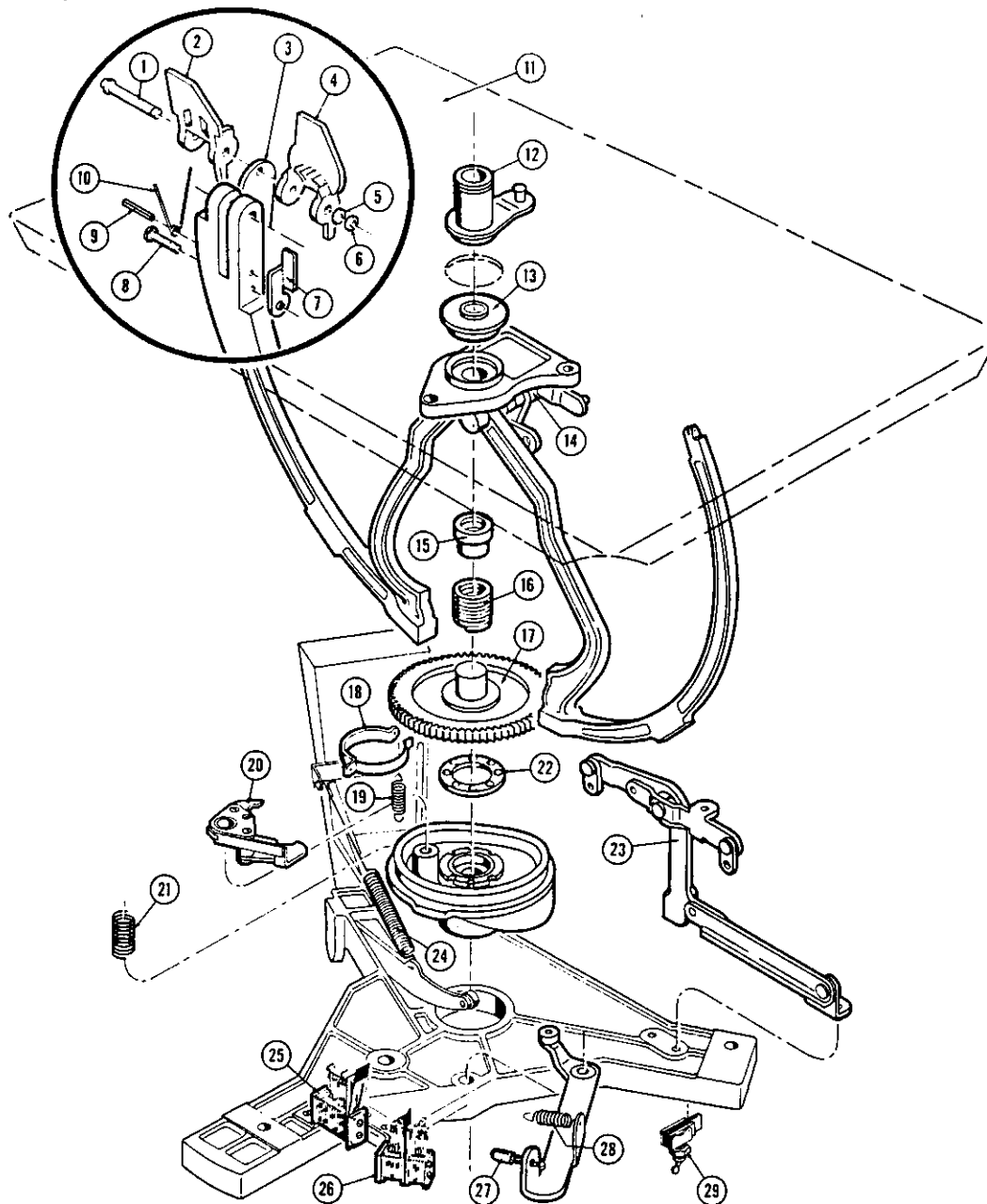


Fig. 34. RECORD LIFT ARM, MAIN CAM AND CHASSIS FRAME GROUPS

1. Shaft, Lift Arm, Guide Tip	65938	16. Spring, Drive Clutch	59584
2. Guide Tip, L.H.	65731	17. Gear and Ratchet	59732
3. Guide Plate	68290	18. Strap and Spring Assembly	59626
4. Guide Tip, R.H.	65730	19. Spring	59612
5. Washer	65937	20. Pawl Assembly	59537
6. Retaining Ring	73724-9	21. Spring, Cancel Arms	110934
7. Stop, Guide Tip	65526	22. Ball, Race	59637
8. Screw, 4 - 40 x 5/8	73533-7	23. Link and Lever Assembly	59599
9. Roll Pin	73782-32	24. Spring	59585
10. Spring	65812	25. Switch, Transfer	59569
11. Chassis Mounting Plate (Reference)	59827	Toggle Spring for 59569 Switch	59569-1
12. Arm and Rivet Assembly	59651	26. Switch, Mute and Play	65170
13. Ball Bearing	59654	27. Actuator	58255
14. Pivot Casting and Arm Assembly	65880	28. Spring	62773
15. Hub, Selector Drive	59656	29. Switch, Toggle	53648

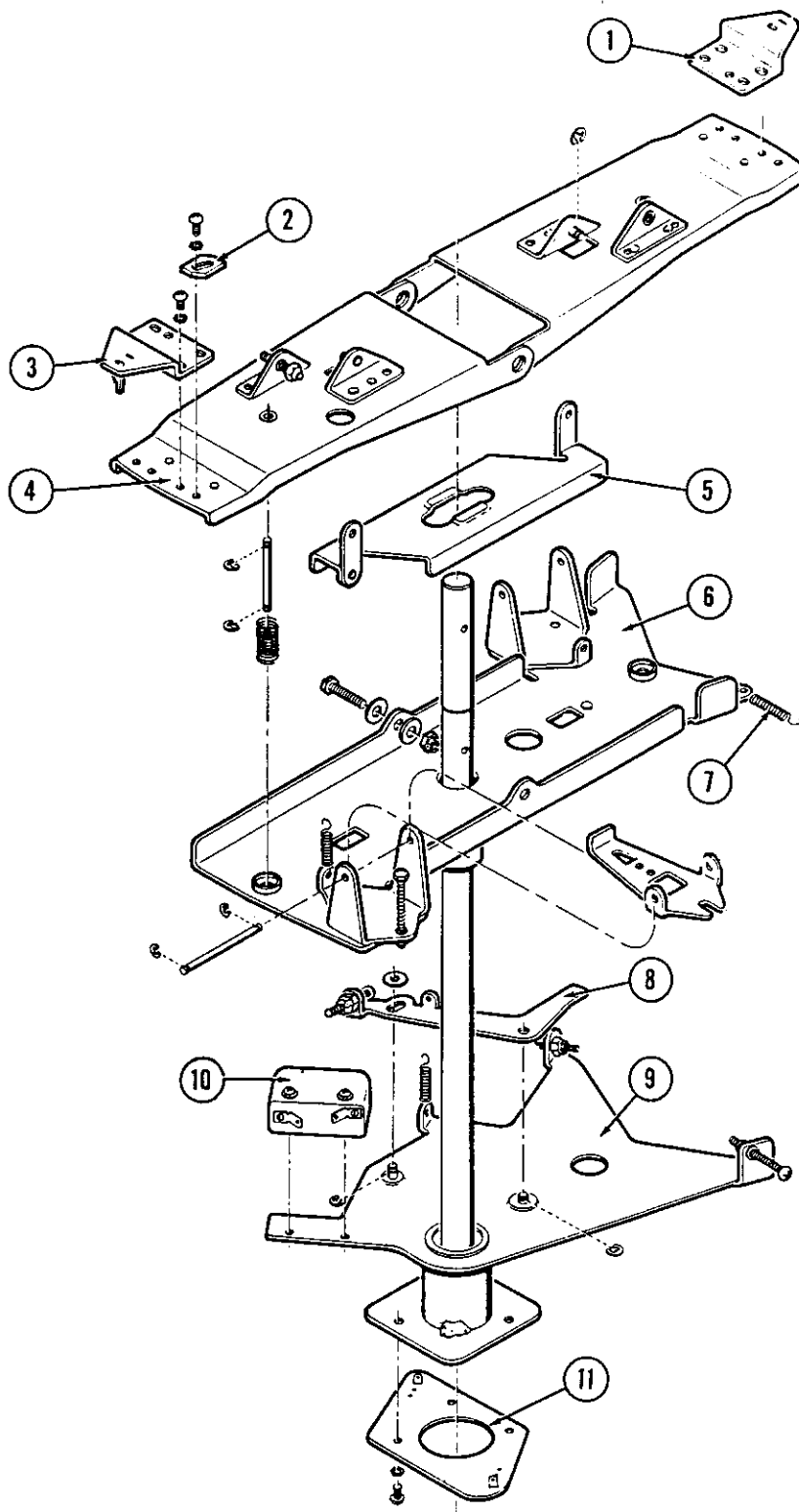


Fig. 35. SELECTOR CRANK AND SHAFT ASSEMBLY 110961

1. Tip and Mounting Bracket Ass'y., Inner	110936	7. Spring, Kick-off	110480
2. Adjustment Plate, Selector Crank	110966	8. Switch Lever and Stop Nut Assembly	110937
3. Tip and Mounting Bracket Ass'y., Outer	110930	9. Selector Shaft and Adjustment Plate Assembly	110952
4. Selector Crank and Stop Nut Assembly	110943	10. Micro Switch	61596
5. Actuator Arm and Link Assembly	110939	11. Contact Plate Assembly	68582
6. Mounting Plate and Stop Nut Assembly	110949		

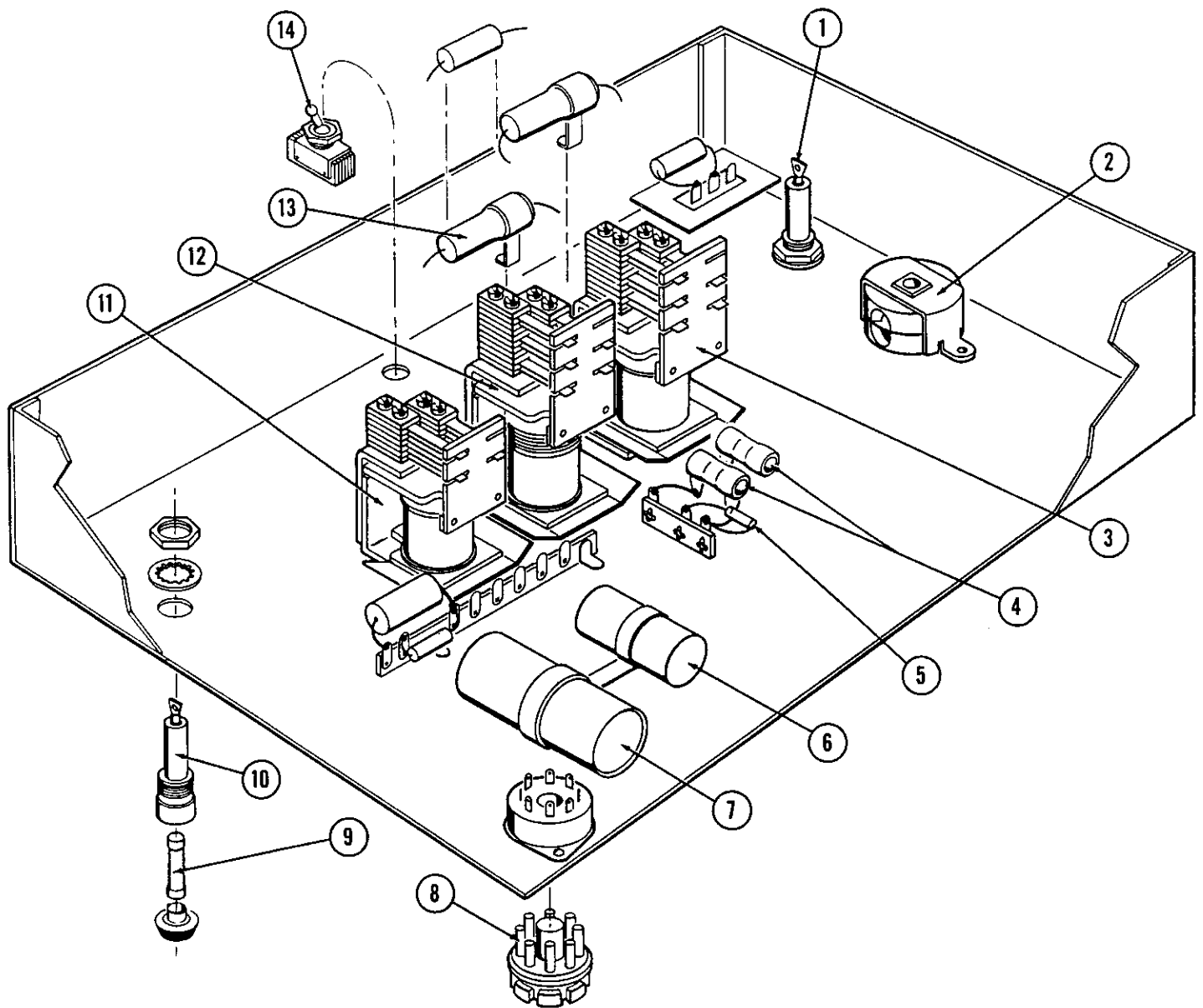


Fig. 36. JUNCTION BOX (UNDERSIDE) 111033

1. Fusetron 0.3 Amp.	45588	8. Shorting Plug Assembly	112043
2. Socket, Fusetat	61857	9. Fusetron 0.8 Amp.	14524
3. Relay, Timing No. 3	68943	10. Fuse Post	51485
4. Resistor, 50 Ohm, 5 W. (2)	72986-2	11. Relay, Reverse	69240
5. Resistor, 120 Ohm, 1 W.	72314-32	12. Relay, Timing No. 2	112360
6. Capacitor, 100 Mfd., 50 V.	73862	13. Capacitor, 25 Mfd., 25 V.	73093-143
7. Capacitor, Electrolytic, 65 Mfd.	70901	14. Switch, Toggle	53648

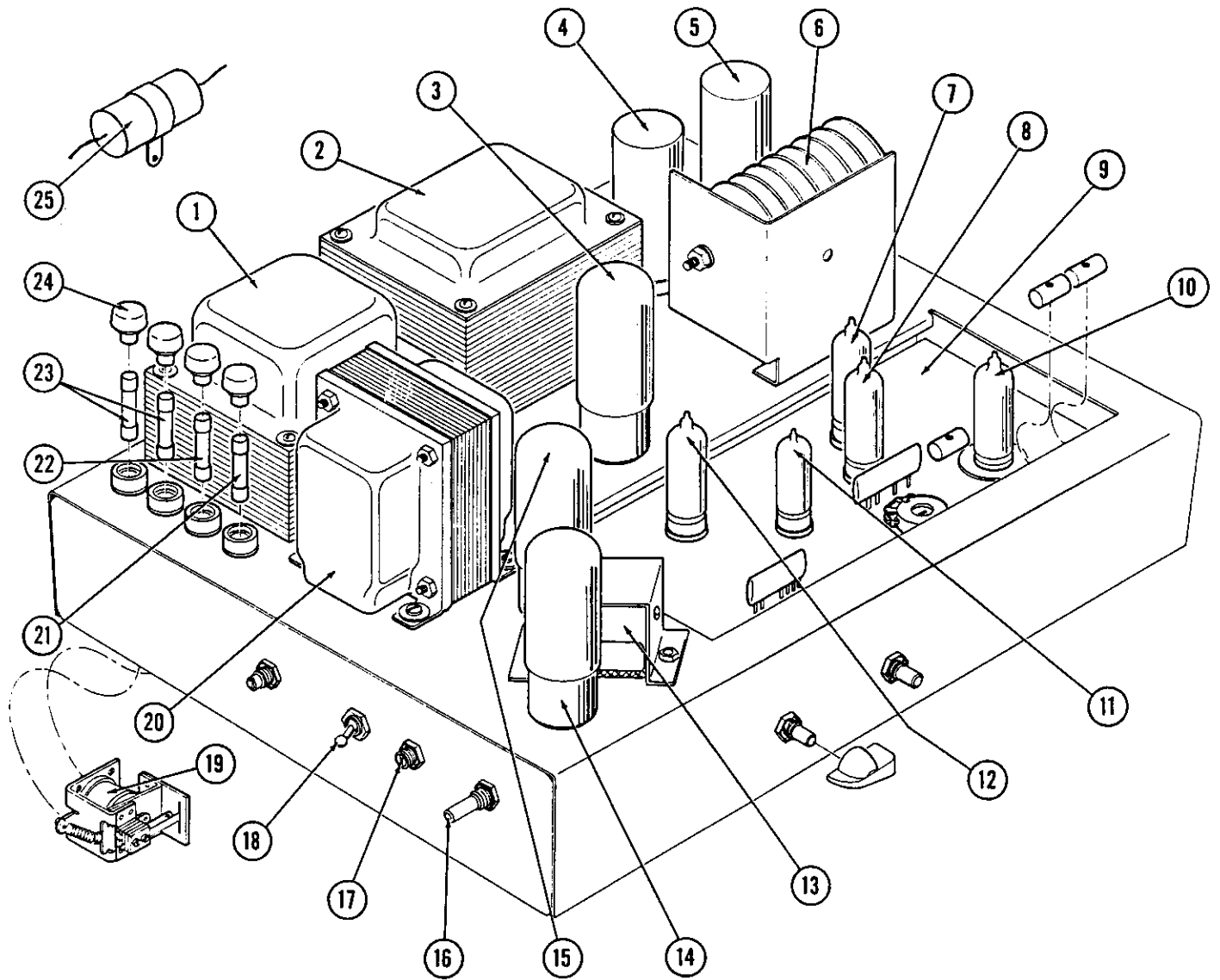


Fig. 37. AMPLIFIER - MODEL 532

1. Transformer - Amplifier - Power	68182	13. Resistor 9000 and 1650 Ohms	70897
2. Transformer - Low Voltage - 117 Volts	68183	14. Tube - 6L6GB	65341
3. Tube - 5U4GB	62742	15. Tube - 6L6GB	65341
4. Capacitor - Electrolytic	73474	16. Switch - Cancel	68770
5. Capacitor - Electrolytic	73475	17. Volume Control - Dual 50K	64996
6. Rectifier - Selenium	56188	18. Switch - Power - Main	53648
7. Tube - 6AN8	64914	19. Relay - Override	56321
8. Tube - 12AX7	58427	20. Transformer - Output	62430
9. Printed Board Assembly	68184A	21. Fuse - 15 Ampere	52196
10. Tube - 12AU7	58420	22. Fuse - 8 Ampere	15845
11. Tube - 6AU6	64858	23. Fuse - 2 Ampere	56325
12. Tube - 12AX7	58427	24. Fuse Post	45352
		25. Condenser - 2 Mfd - 50V (Underside)	73876

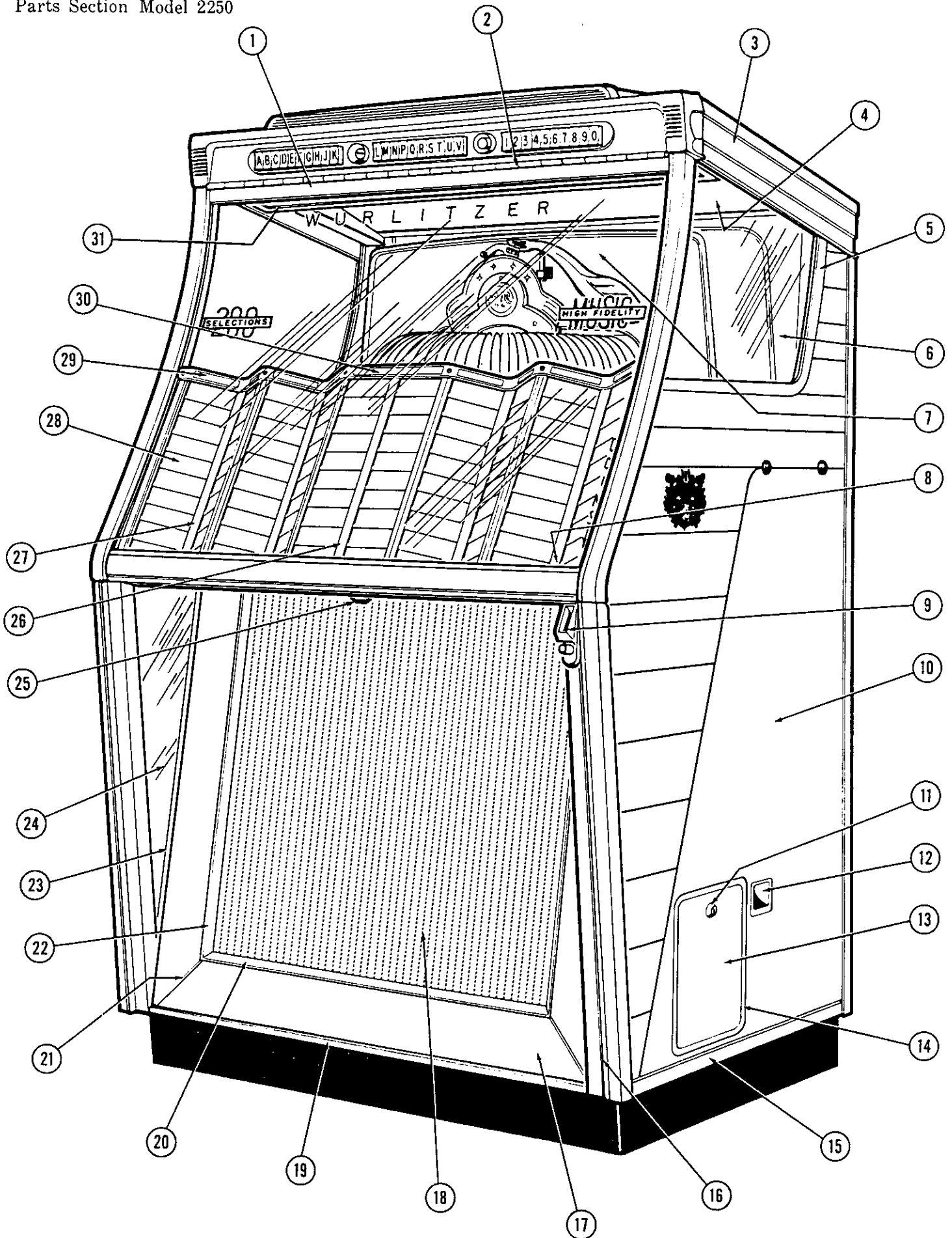



Fig. 38. TRIM AND MOUNTING - FRONT VIEW

 Fig. 38. TRIM AND MOUNTING - FRONT VIEW

1. Extrusion, Upper Door	111193	19. Extrusion, Lower Grille Outer	111289
2. Hinge, Door	111618	20. Extrusion, Lower Grille Inner	111296
3. Extrusion, Top	R.H. 111203 L.H. 111202	21. Piping, Lower Grille	111501
4. Decorative Background, Top	111196	22. Extrusion, Vertical Grill,	
Rivet 1/8 x 1/4 (10 Used)	45122	Inner	L.H. 111409 R.H. 111408
Washer (10 Used)	20644	23. Extrusion, Grille	L.H. 111292 R.H. 111291
5. Extrusion, Side Glass	R.H. 111200 L.H. 111201	24. Side Plate	L.H. 111413 R.H. 111414
6. Side Glass	111222	25. Lock Assembly	69046
7. Glass, Door	111199	Lock Bar and Strike Assembly	112362
Gasket, Bulk (Specify Length)	62197	Spring Clip	69578
8. Coin Denomination Label	(5-10-25) 110032	26. Title Strip Holder, Flat	111518
(PLAYS 7 FOR HALF DOLLAR, 3 FOR QUARTER, 1 FOR DIME)	69360	27. Decalcomania	
(PLAYS 9 FOR HALF DOLLAR, 3 FOR QUARTER, 1 FOR DIME)	69361	(A1-B0, C1-D0)	111536
(PLAYS 5 FOR QUARTER, 1 FOR NICKEL, 2 FOR DIME)	110141	(E1-F0, G1-H0)	111537
(PLAYS 10 FOR HALF DOLLAR, 5 FOR QUARTER, 1 FOR DIME)	110142	(J1-K0, L1-M0)	111538
(PLAYS 1 FOR DIME, 4 FOR QUARTER, 9 FOR HALF DOLLAR)	110127	(N1-P0, Q1-R0)	111539
9. Coin Entry Casting	68881	(S1-T0, U1-V0)	111540
Reject Button	68930	28. Title Strip Holder, Vee	111104
10. Di-Noc Side Panel	R.H. 112049 L.H. 112048	29. Classification Labels	
11. Lock and Key, Coin Box Door	58127	Standard Set	111503
12. Coin Return Cup	68192	Wurlitzer Music	111564
13. Coin Box Door	1156859	EP Album Records	111556
14. Frame, Coin Door	62454	30. Extrusion, Program Holder, Top	111229
15. Extrusion, Lower Side	R.H. 111224 L.H. 111225	31. Extrusion, Upper Front	68906
16. Extrusion,		Light Diffuser, Top	69146
Lower Front	R.H. 111244 L.H. 111243	Rivet (10 Used)	36679
17. Overlay, Grille, Gold	111040	Lamp, 25W. Fluorescent	110965
18. Grille Screen and Pad	112003	Starter Switch	57365

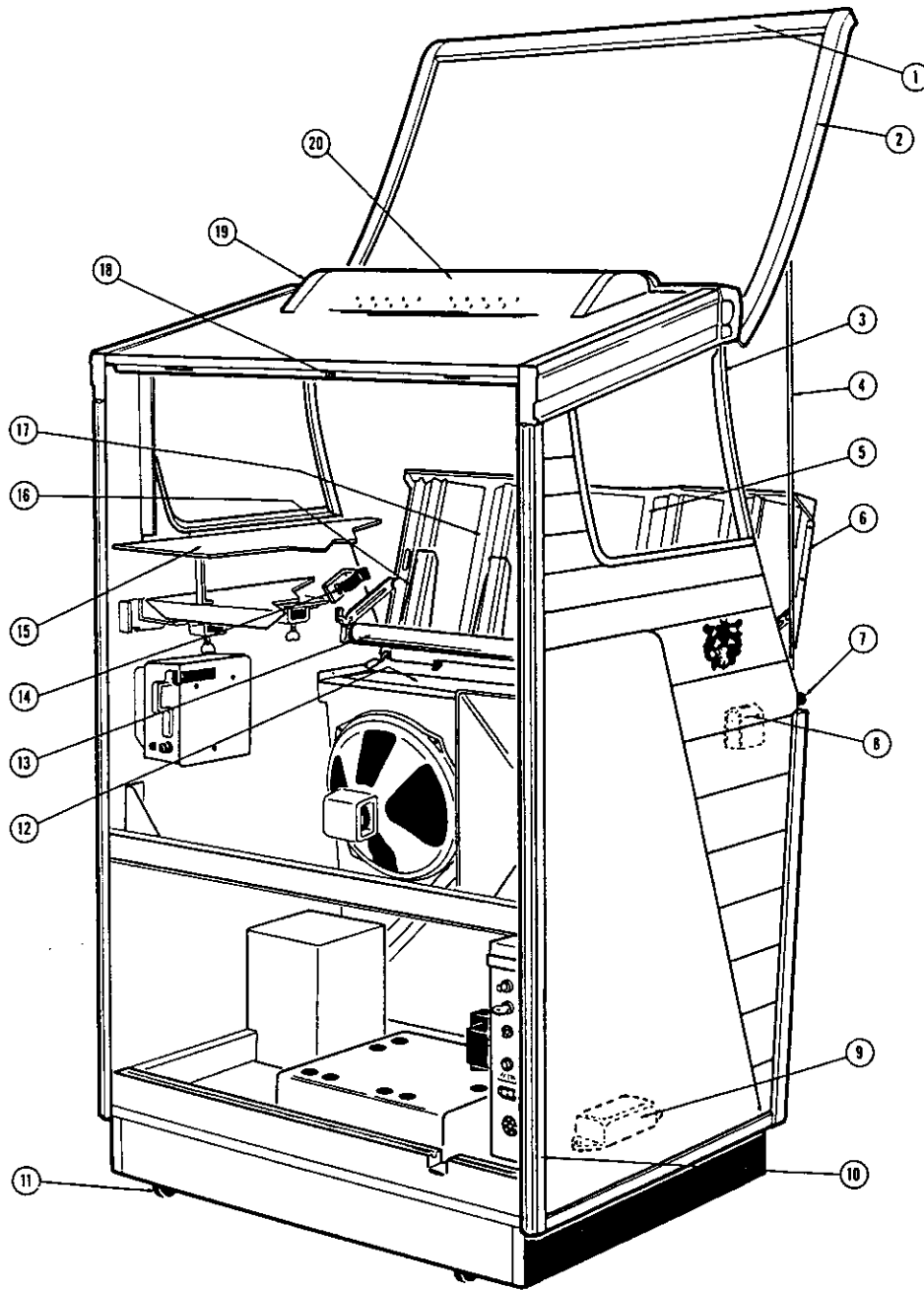


Fig. 39. TRIM AND MOUNTING - REAR VIEW

1. Extrusion, Door, Lower	111192	10. Extrusion, Back	L.H. 111213	R.H. 111175
2. Extrusion, Door	L.H. 111142 R.H. 111143	11. Caster		110680
3. Extrusion, Side Glass	L.H. 111195 R.H. 111194	12. Glass, Light Diffuser, Colored		111622
4. Fall Support Door	111180	Gasket, Bulk (Specify Length)		69217
5. Casting, Separation, Center	L.H. 111150 R.H. 111151	13. Fluorescent Lamp, 25W		110965
6. Program Separator and Fall Support Assembly	L.H. 111863 R.H. 111864	Starter Fluorescent, 25W		57365
Light Shield, Bulk (Specify Length)	69533	14. Bracket and Clamp, Program Holder		111763
7. Bumper, Rubber	L.H. 111252 R.H. 110074	15. Decorative Shelf Assembly	R.H. 111437 L.H. 111440	
8. Electric Counter	69573	16. Spring, Title Strip Holder Vee		68854
Switch, Push Type	56233	Spring, Title Strip Holder Flat		69362
3 Circuit Male Housing	111526	17. Casting, Separator, Inside		111149
9. Ballast, Fluorescent 25W. Single	69419	18. Spring, Back Door Lock		69104
Ballast, Fluorescent 25W. Dual	111566	19. Casting, Top	R.H. 69058 L.H. 69059	
		20. Top		111608

NUMERICAL PARTS LIST

Part No.	Description	Page No.	Part No.	Description	Page No.
13089	Plug, 5 Prong	5	59419	Screw, Special, Record Clamp . . .	26
14524	Fuse, 8/10 Amp. Fusetron or Bussmann M.D.L.	21, 30	59423	Washer, Shaft	26
15845	Fuse, 8 Amp. Little Fuse or Bussmann M.T.H.	31	59424	Spring, Record Pilot	26
16617	Plug, Female, 5 Prong	3	59425	Track, Record	25
20644	Washer	33	59434	Stop Bracket, Record Track	25
25202	Steel, Ball	25	59449	Pilot, Turntable	26
30940	Knurled Thumb Screw 10-32	3	59456	Fly Wheel	26
35745	Thumb Screw, Special 8-32 x 1/4"	5	59464	Cam, Record Clamp	10
36679	Rivet	33	59470	Nut, 7/16" - 20 , Special Turntable Shaft	26
42868	Adjustment Cam	21	59537	Pawl Assembly	28
43341	Socket, Connector, Single Prong	26	59569	Transfer Switch and Bracket Assembly	10, 28
45122	Rivet, 1/8 x 1/4	33	59584	Spring, Selector Drive Clutch	28
45352	Opt. 51485 Fuse Post Bussmann Type H.K.P.	6, 21, 31	59585	Spring, Cancel Lever	28
45588	Fusetron 0.3 Amp.	30	59599	Link and Lever Assembly, Record Arms	28
51485	Fuse Post Opt.	30	59606	Spring, Record Guide, Retracting	25
52196	Fuse, 15 Amp. Type A.B.C.	31	59612	Spring, Friction, Drive Gear	28
53648	Opt. Toggle Switch S.P.S.T.	9, 13, 28, 30, 31	59626	Strap and Spring Assembly, Friction, Drive Pawl	28
53774	Conical Spring, Red Dot, 39 lbs., Front	27	59632	Cancel Lever (Shaft and Cancel Arm Assembly)	10, 11
54246	Bumper, Gate Stop	22, 27	59637	Ball Race, Main Cam Shaft	28
56188	Rectifier, Selenium	31	59651	Arm and Stud Assembly	28
56233	Switch, Push Button, Momentary Contact, S.P.D.T.	34	59654	Ball Bearing, Selector Shaft	28
56321	Relay (Opt. 56322) Override	31	59656	Hub, Selector Drive	28
56325	Fuse, 2 Amp.	31	59661	Cancel Arm Assembly, Lower	11
56608	Link - Solenoid Connection	22	59679	Ball Race, Tone Arm Shaft	26
56654	Link and Hub Assembly	22	59688	Lever Assembly, Record Clamp	10
56704	Switch, Latch Solenoid	22	59691	Actuating Arm, Transfer Switch	10
56712	Pawl, Stud, and Spacer Assembly, Numbers	22	59709	Spring, Carrier Drive Pawl	27
56713	Release Lever, Stud, and Spacer Assembly	22	59710	Spring, Back Stop Pawl	24, 27
56714	Latch Pin, Numbers (Trip Lever, Stud, and Spacer Assembly)	22	59732	Gear and Ratchet Wheel Assembly	28
57130	Spring, Solenoid Return	22	59743	Bumper, Record Guide	25
57365	Starting Switch, 25W. Fluorescent	33, 34	59827	Chassis Mounting Plate	27, 28
57525	Pick-Up Needle, (Cobra Cartridge)	24	59864	Washer, Turntable Shaft, Special	26
57851	Micro Switch	24	59867	Ball Race, Turntable Shaft	26
58127	Lock and Key Assembly	33	59871	Cable, Record Clamp and Tone Arm	26
58255	Actuator, Key Switch	5, 21, 28	59881	Sleeve for Brush Cable	24
58420	Tube, 12AU7A	31	59888	Cable, Tone Arm Brush	24
58427	Tube, 12AX7	31	59922	Arm and Roller Assembly, Record Clamp	10
58781	Spring, Lever, Hub and Stud	21	60453	Lever and Hub Assembly	22
59396	Bumper, Record Guide	25	60518	Latch Switch, Numbers	22
59399	Screw, Special	26	60519	Bracer Rod, Top Support Casting	10
59416	Shaft, Record Clamp	26	60655	Micro Switch, Safety	24
59417	Lever, Record Clamp	26	60680	Pad, Turntable	26
59418	Spring, Record Clamp	26	60681	Retaining Ring, Turntable Pilot	26
			60717	Latch Solenoid	22
			60881	"O" Ring, Turntable Drive	25
			60893	Thrust Spring	25
			60991	Cam Follower, Bearing	9

Numerical Parts List Model 2250

Part No.	Description	Page No.	Part No.	Description	Page No.
61059	Spring, Conical, Chassis Mount, Yellow Dot, 23 lbs., Rear	27	65939	Roller, Record Lift Arm Guide	27
61174	Tension Spring, Turntable Cam	26	65947	Pin, Cancel Solenoid Plunger	21,22
61343	Adjustment Clip, Letters	7	65952	Switch, Over-ride (4 Used)	7,23
61596	Micro Start Switch	23,29	66045	Driver Pin, Cancel Wheel	6
61658	Stud and Screw Assembly	26	66051	Latch Pin (Stud), Lock-out Lever	6
61857	Socket, Fustat	30	66071	Spring, Cancel Wheel	5,21
62145	Spring, Pawl	21	66072	Spring, Solenoid Return	21
62197	Gasket, Bulk (Specify Length)	33	66074	Spring, Accumulator Wheel	6,21
62430	Transformer, Hi Fidelity Output	31	66082	Switch Assembly, Key	5,21
62454	Frame, Cash Box Door	33	66124	Cancel Wheel Assembly	5,21
62742	Tube, 5U4GB	31	66125	Pivot Arm and Pawl Assembly	5,21
62761	Actuating Arm, Mute and Play Switch	10	66128	Coin Magnet and Bracket Assembly	6,21
62773	Spring, Actuator Arm, Mute and Play Switch	23,28	66129	Lever, Hub and Stud Assembly	6,21
62886	Switch, Slide	3,21	66130	Lock-out Lever and Hub Assembly	6
63205	Record Clamp Plate	10	66131	Accumulator Wheel and Hub Assembly	6,21
63731	Shim, Turntable Shaft. .005	26	66132	Stop Lever and Spring Assembly	4,6,21
63732	Washer, Turntable Shaft .015	26	66186	Contact Plate Assembly	23
64189	Pulley, Turntable Drive Motor	25	67920	Rotating Plate, Selector	23
64190	Drive Pulley, Turntable	26	67921	Selector Casting	23
64422	Feed-in Screw, Tone Arm	9	67928	Support Casting, R.H.	10
64520	Sleeve and Bushing Assembly, Turntable	26	68102	Turntable and Shaft Assembly	9,26
64796	Relay, Timing No. 1	5,21	68103	Casting, Record Guide, Front	25
64858	Tube, 6AU6	31	68123	Playrak	3
64883	Catch, Coin Register	3	68182	Transformer, Power	31
64914	Tube, 6AN8	31	68183	Transformer, Low Voltage	31
64981	Switch Assembly, Series, Letters	22	68184-A	Printed Board Assembly	31
64982	Switch Assembly, Series, Numbers	22	68192	Coin Return Cup	33
64996	Volume Control, Dual 50K	31	68211	Pulse Relay	5,21
65009	Pawl, Stud, and Spacer Assembly, Letters	22	68280	Adjustment Clip, Numbers	7
65010	Trip Lever and Spacer, Numbers	22	68290	Guide Plate, Record Lift Arm	28
65069	Cancel Solenoid	5,21	68299	Program Selector Casting	7,22
65170	Mute and Play Switch and Bracket Assembly	10,28	68304	Lever, Reject Arm	3
65203	Gear and Shaft Assembly, Turntable Drive Motor	25	68311	Coin Switch Assembly	5,21
65341	Tube, 6L6GB	31	68320	"Select" and "Reset" Casting	7
65496	Record Carrier Casting	27	68404	Lever and Hub, Numbers	22
65526	Stop, Guide Tips	28	68405	Shaft, Link, and Lever Assembly, Numbers	7
65625	Motor, Record Changer	10	68406	Shaft, Link and Lever Assembly, Letters	7
65702	Stop Screw, Selector Crank	12	68408	Connector Link, Numbers	7
65714	Eyelet	27	68409	Connector Link, Letter Switches	7
65720	Cup Spring, Selector Crank	13	68459	Chassis Mounting Plate and Record Lift Arm Assembly	9
65730	Guide Tip, R.H.	28	68463	Chassis Frame and Shaft Assembly . . .	9
65731	Guide Tip, L.H.	28	68483	Cancel Sleeve and Bushing Assembly	9,11,13
65812	Spring, Guide Tips	28	68520	Support Plate	10
65880	Pivot Casting and Arm Assembly	28	68525	Stop Lever and Roller Assembly, Loading	9,11
65890	Back Stop Pawl and Bracket Assembly	10	68544	Mounting Bracket, Upper	5
65909	Record Holder and Counter Assembly, Large	27	68546	Reject Lever and Pin Assembly	3,5
65910	Record Holder and Counter Assembly, Small	27	68547	Mounting Bracket, Lower	5
65937	Washer (2 Used)	28	68550	Coin Switch, Wire and Plug Assembly	5
65938	Shaft, Guide Tips	28	68556	Reset Button	7,22
			68557	Release Lever and Shaft Assembly	9

Part No.	Description	Page No.	Part No.	Description	Page No.
68559	Actuator Arm and Hub Assembly, Loading	13	69596	Main Cam, Bushing and Pawl Assembly	9
68567	Link, Release Lever	11	69686	Turntable Motor and Worm Assembly	25
68574	Switch, Reset	7,22	69710	Knurled Thumb Screw 8-32	3
68582	Contact Blade and Plate Assembly	12,29	70897	Resistor, 9000 and 1650 Ohms.	31
68594	Solenoid, Letters	23	70901	Capacitor 65 to 93 Mfd., 50V.	30
68617	Number Solenoid (2 to 0)	23	71883-2	Resistor, W.W. 5 Watt 150 Ohm.	22
68650	Spacer, Wobble Ring	7	71884-3	Resistor, 175 Ohm, 5 W, W.W.	22
68651	Bracket and Roller Assembly	23	72314-32	Resistor, 120 Ohm, 1W	30
68656	Plastic Roller, Rotating Plate	23	72986-2	Resistor, 50 Ohm, 5W	30
68671	Selector Switch, Numbers	22	73093-143	Capacitor, 25 Mfd., 25V	30
68700	Support Casting, L.H.	10	73474	Capacitor, Electrolytic 20, 20, 10, 20 Mfd., 275, 275, 338, 35 W.V.	31
68712	Lower Coin Chute Assembly, (Coin Hopper)	3, 5	73475	Capacitor, Electrolytic 30, 20, 20, 25 Mfd., 500, 400, 400, 50 W.V.	31
68716	Stop Bracket, Selector Crank	12,13	73502-95	Screw, 10-32 x 1", R.H.	12
68717	Nylon Gear, Selector Motor	23	73503-95	Screw, Selector Crank Stop, 8-32 x 1-1/4"	12,13
68725	Guard, Coin Return Cup	3	73531-5	Shipping Screw 1/4-6, Type "Z"	3,4
68731-1	Thermo Cut-out, Selector Motor	23	73533-7	Screw, 4-40 x 5/8"	28
68755	Spring	23	73571-22	Adjusting Screw, Stop Lever	11
68770	Cancel Switch	31	73571-23	Cap. Screw, 10-32 x 1-3/4" Soc. Hd.	11
68774	Spring, Stop Bracket	12,13	73724-9	Retaining Ring Truarc No. 9	28
68782	Spring, Release Lever Linkage	11	73724-15	Retaining Ring	21
68804	Number Stop Solenoid No. 1	23	73724-18	Retaining Ring, .187" - .145", Waldes Truarc "E"	21
68807	Rocker and Bracket Assembly	7,23	73724-21	Retaining Ring, Truarc No. 21	21
68854	Spring, Program Holder, "Vee".	3,34	73724-25	Retaining Ring	21
68881	Coin Entry Casting 5-10-25-50	33	73782-32	Roll Pin	28
68906	Extrusion, Upper Front	33	73790-78	Screw, Stop Bracket, 6-32 x 1-1/2"	12
68930	Reject Button	33	73790-85	Screw, 8-32 x 5/8", Selector Crank Pivot	12
68939	Coin Bag Housing	3	73862	Capacitor, 100 Mfd. 50 W.V.	30
68943	Timing Relay No. 3	30	110032	Coin Denomination Label, 5-10-25	33
69005	Fall Support, R.H.	3	110074	Rubber Bumper, R.H.	34
69006	Fall Support, L.H.	3	110127	Coin Denomination Label (Inside) Plays - 9 for Half Dollar, 4 for Quarter, 1 for Dime	33
69041	Hinge, R.H., Program Holder	3	110141	Coin Denomination Label (Inside) Plays - 5 for Quarter, 1 for Nickel, 2 for Dime	33
69042	Hinge, L.H., Program Holder	3	110142	Coin Denomination Label (Inside) Plays - 10 for Half Dollar, 5 for Quarter, 1 for Dime	33
69046	Lock Assembly, Dome	33	110480	Spring, Selector Latch Pins	7, 11, 13, 23, 29
69058	Casting, Top, R.H.	34	110557	Switch, Carriage	12
69059	Casting, Top, L.H.	34	110680	Caster	34
69067	Motor and Pinion Assembly	27	110875	Angle and Guard, Coin Switch	5
69104	Spring, Back Door Lock	34	110928	Link, Selector Crank Actuator Arm	13
69146	Light Diffuser, Top	33	110930	Tip and Mounting Bracket Assembly, Outer	11,29
69217	Gasket, Side Glass, Bulk, (Specify Length)	34	110934	Spring, Cancel Arms	11,28
69240	Relay, Reverse	30	110936	Tip and Mounting Bracket Assembly, Inner	13,29
69351	Mounting Plate, Switch, and Solenoid Assembly	7			
69360	Coin Denomination Label (Inside) Plays - 7 for Half Dollar, 3 for Quarter, 1 for Dime	33			
69361	Coin Denomination Label (Inside) 9 for Half Dollar, 3 for Quarter, 1 for Dime	33			
69362	Spring, Title Strip Holder	3,34			
69419	Ballast, 25W	34			
69492	Lower Plate and Spacer Assembly	7			
69533	Light Shield, Bulk, (Specify Length)	34			
69573	Electric Counter	34			
69578	Spring Clip	33			

Numerical Parts List Model 2250

Part No.	Description	Page No.	Part No.	Description	Page No.
110937	Switch Lever and Stop Nut Assembly	12, 29	111192	Extrusion, Door, Lower	34
110939	Actuator Arm and Link Assembly	11, 13, 29	111193	Extrusion, Upper, Door	33
110941	Latch Pin, Inner	7, 13, 23	111194	Extrusion, Side Glass, R.H.	34
110942	Latch Pin, Outer	7, 11, 23	111195	Extrusion, Side Glass, L.H.	34
110943	Selector Crank, Inner	9	111196	Decorative Background, Top	33
110943	Selector Crank, Outer	9	111199	Door Glass	33
110943	Selector Crank and Stop Nut Assembly	10, 11, 29	111200	Extrusion, Side Glass, R.H.	33
110949	Mounting Plate and Stop Nut Assembly	12, 29	111201	Extrusion, Side Glass, L.H.	33
110952	Selector Shaft Adjustment Plate Assembly	12, 29	111202	Extrusion, Top, L.H.	33
110954	Carrier Ring, L2-R1	27	111203	Extrusion, Top, R.H.	33
110955	Carrier Ring, A2-F1	27	111213	Extrusion, Back, L.H.	34
110956	Carrier Ring, R2-A1	27	111222	Side Glass	33
110957	Carrier Ring, F2-L1	27	111224	Extrusion, Lower, Side R.H.	33
110961	Selector Crank and Shaft Assembly	29	111225	Extrusion, Lower, Side, L.H.	33
110965	Fluorescent Lamp, 25W	33, 34	111229	Extrusion, Program Holder, Top	33
110966	Adjustment Plate, Selector Crank	12, 29	111243	Extrusion, Lower, Front, L.H.	33
110978	Electric Selector Assembly	7, 10	111244	Extrusion, Lower, Front, R.H.	33
110982	Slug Rejector Assembly	3, 5	111252	Rubber Bumper, L.H.	34
110995	Selector Switch Assembly	7	111289	Extrusion, Lower Grille, Outer	33
111026	Selector Plate and Silk Screen Assembly	7	111291	Extrusion, Grille, R.H.	33
111035	Record Carrier Assembly	9	111292	Extrusion, Grille, L.H.	33
111036	Support Casting Assembly, R.H.	10	111296	Extrusion, Lower Grille, Inner	33
111040	Overlay, Grille, Gold	33	111408	Extrusion, Vertical Grille, Inner, R.H.	33
111043	Record Guide Assembly	9	111409	Extrusion, Vertical Grille, Inner, L.H.	33
111044	Plate, Record Guide	25	111413	Side Plate, L.H.	33
111049	Tone Arm and Wire Assembly	24	111414	Side Plate, R.H.	33
111053	Support Casting and Bushing Assembly	24	111437	Decorative Shelf Assembly, R.H.	10, 24, 34
111054	Mounting Casting and Pin Assembly	9	111440	Decorative Shelf Assembly, L.H.	10, 24, 34
111059	Switch and Button Assembly, A to K	7	111481	Rotating Plate and Rocker Assembly	7
111060	Switch and Button Assembly, L to V	7	111501	Piping, Lower Grille	33
111061	Switch and Button Assembly, Numbers	7	111503	Classification Labels, Standard Set	33
111062 to			111518	Title Strip Holder, Flat	33
111081	Buttons, Letters, A to V	22	111526	Three Circuit Male Housing	7, 23, 34
111082 to			111527	Contacts for Housings	7
111091	Buttons, Numbers, 1 to 0	22	111528	Female Housing, 3 Circuit	7, 23
111092	Instruction Plate, Select	22	111536	Decalcomania, A1-B0, C1-D0	33
111104	Title Strip Holder, Vee	33	111537	Decalcomania, E1-F0, G1-H0	33
111125	Slide Lock, Slug Rejector	3, 4, 5	111538	Decalcomania, J1-K0, L1-M0	33
111129	Selector Plates and Latch Pin Assembly	7	111539	Decalcomania, N1-P0, Q1-R0	33
111136	Arm and Brush Assembly, Tone Arm	24	111540	Decalcomania, S1-T0, U1-V0	33
111142	Extrusion, Door, L.H.	34	111556	Classification Label, "EP Album Records"	33
111143	Extrusion, Door, R.H.	34	111564	Classification Label, "Wurlitzer Music"	33
111149	Casting, Separator, Inside	34	111566	Ballast Fluorescent, 25W, Dual	34
111150	Casting, Program Separator, Center, L.H.	34	111575	Title Strip Holder and Decal Assembly, J1-M0, Flat	3
111151	Casting, Program Separator, Center, R.H.	34	111576	Title Strip Holder and Decal Assembly, A1-D0, Vee	3
111175	Extrusion, Back, R.H.	34	111577	Title Strip Holder and Decal Assembly, E1-H0, Vee	3
111180	Fall Support, Door	3, 34	111578	Title Strip Holder and Decal Assembly, N1-R0, Vee	3

Part No.	Description	Page No.	Part No.	Description	Page No.
111579	Title Strip Holder and Decal Assembly, S1-V0, Vee	3	111888	Selector Switch, Letters	22
111607	Cover Assembly, Support Casting .	9, 24	111909	Program Holder Assembly	3
111608	Top, Cabinet	34	111913	Motor and Gear Assembly, Selector	7, 10, 23
111618	Hinge, Door	33	111918	Electric Counter and Free Play Switch Assembly	3
111621	Tone Arm Release Bracket and Pivot Assembly	9	112003	Grille Screen and Pad Assembly	33
111622	Glass, Light Diffuser, Colored . . .	34	112043	Shorting Plug	30
111763	Bracket and Clamp Assembly, Program Holder	34	112048	Di-Noc Side Panel, L.H.	33
111863	Program Separator and Fall Support Assembly, L.H.	34	112049	Di-Noc Side Panel, R.H.	33
111864	Program Separator and Fall Support Assembly, R.H.	34	112360	Relay, Timing No. 2	30
			112362	Lock Bar and Strike Assembly . . .	33
			1156859	Coin Box Door	33

NOTES



e. The coin switch (Item 5, Fig. 5) consists of four individual coin switches, one for each coin track. When one of these switches is actuated by a coin passing through to the coin bag, a signal is applied to a corresponding component of the playrak to establish

selection credits in accordance with the value of the coin and the pre-set price per play. The slug rejector and playrak are set in production 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 nickel flipper (Item 7, Fig. 6) may be turned to the position shown and the screw (Item 6) exchanged with the screw (Item 5). This will intercept the alternate turning of the nickel flipper (Item 7) and permit each nickel to actuate the nickel coin switch.

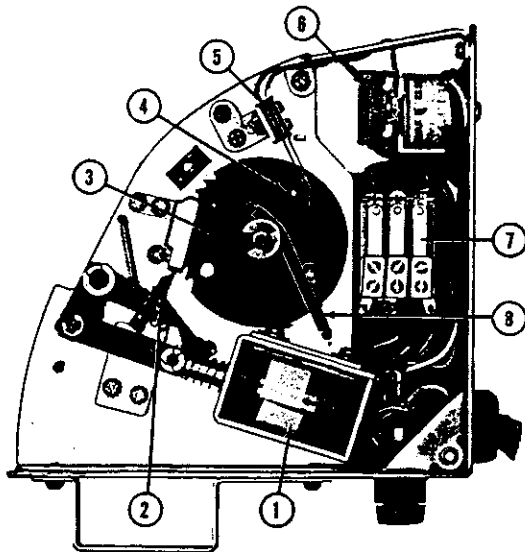


Fig. 7. PLAYRAK COMPONENTS

- | | |
|--------------------------------|-------|
| 1. Cancel Solenoid | 65069 |
| 2. Pivot Arm and Pawl Assembly | 66125 |
| 3. Cancel Wheel Assembly | 66124 |
| 4. Actuator, Plastic | 58255 |
| 5. Key Switch Assembly | 66082 |
| 6. Relay, Pulse | 64796 |
| 7. Relay, Timing No. 1 | 68211 |
| 8. Spring, Cancel Wheel | 66071 |

3. 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 slug rejector (see Fig. 9) 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 9, a thin quarter should, after being stopped at the coin paddle by blocking its way, pass slowly thru the critical point shown in Figure 9 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.

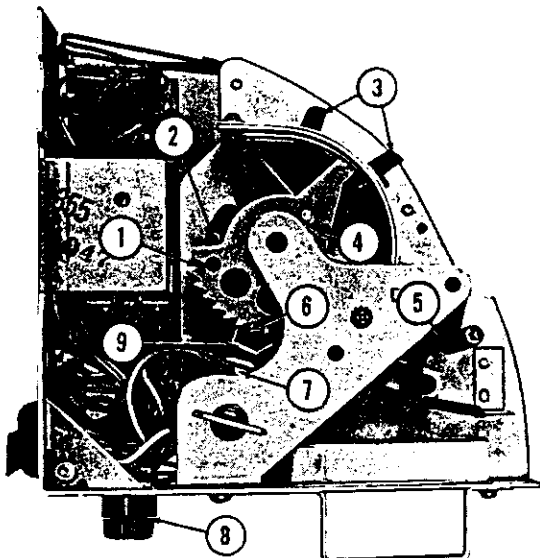


Fig. 8. PLAYRAK COMPONENTS

- | | |
|-------------------------------------|-------|
| 1. Accumulator Wheel | 66131 |
| 2. Drive Pin | 66045 |
| 3. Stop Lever and Spring Assembly | 66132 |
| 4. Spring, Accumulator Wheel | 66074 |
| 5. Lock-Out Lever and Hub Assembly | 66130 |
| 6. Escapement Pin (Stud) | 66051 |
| 7. Coin Magnet and Bracket Assembly | 66128 |
| 8. Fuse Post | 45352 |
| 9. Lever, Hub, and Stud Assembly | 66129 |

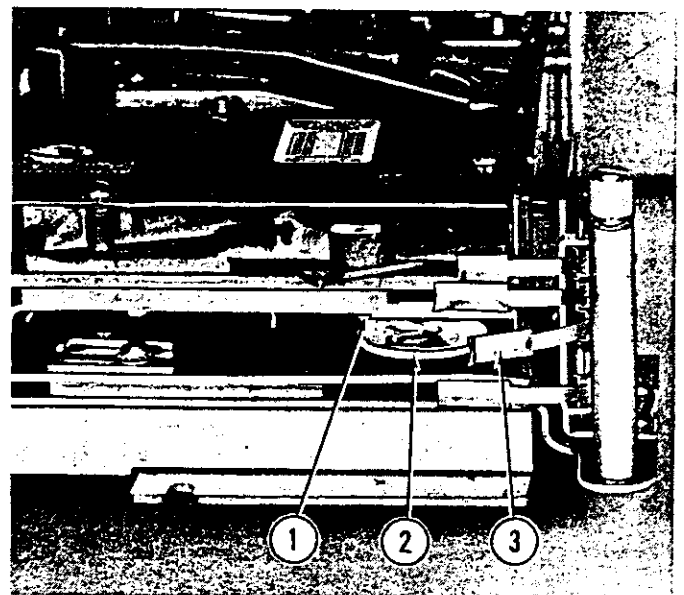


Fig. 9. SLUG REJECTOR COIN SWITCH SETTING

- | |
|-------------------|
| 1. Critical Point |
| 2. Coin |
| 3. Coin Paddle |

(3) 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. Playrak 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 10, 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 10, 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".

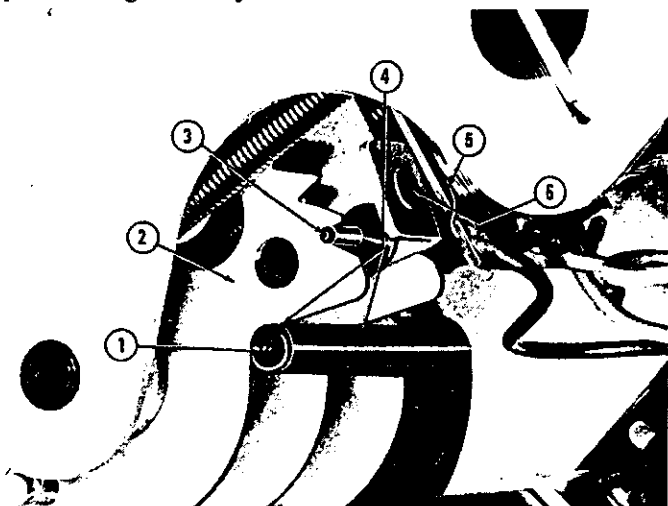


Fig. 10. PLAYRAK ADJUSTMENT

- | | |
|--|-------|
| 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" | |

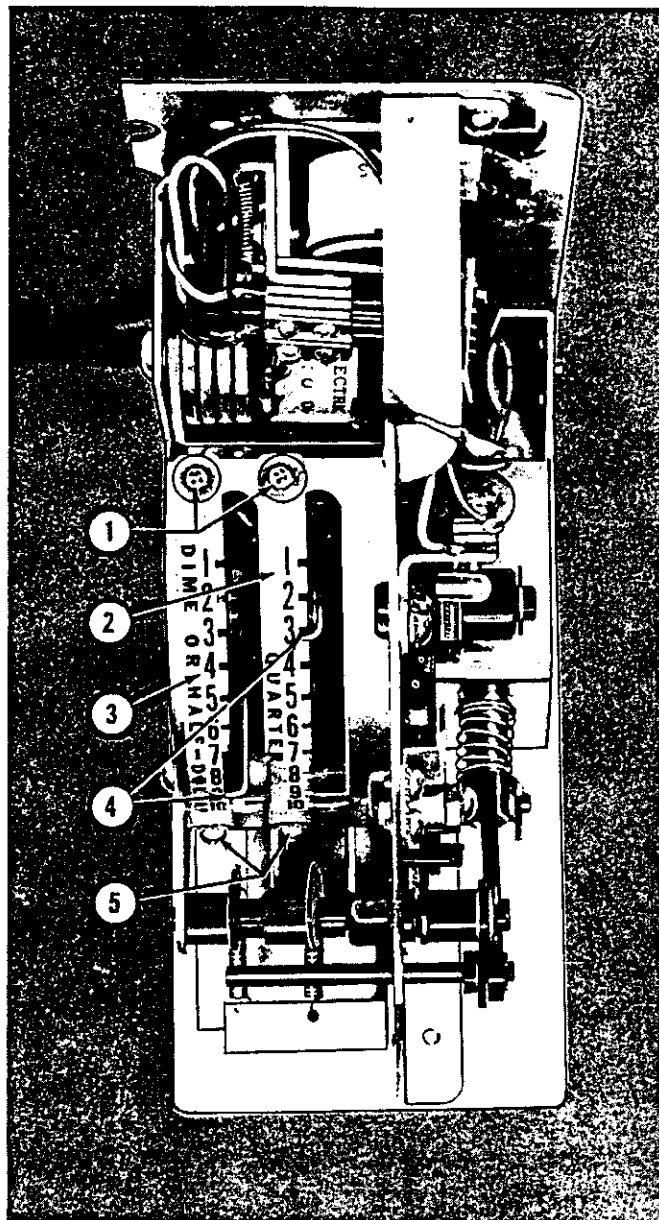


Fig. 12. STOP LEVER AND QUADRANT INDEXING STRIP ADJUSTMENT

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

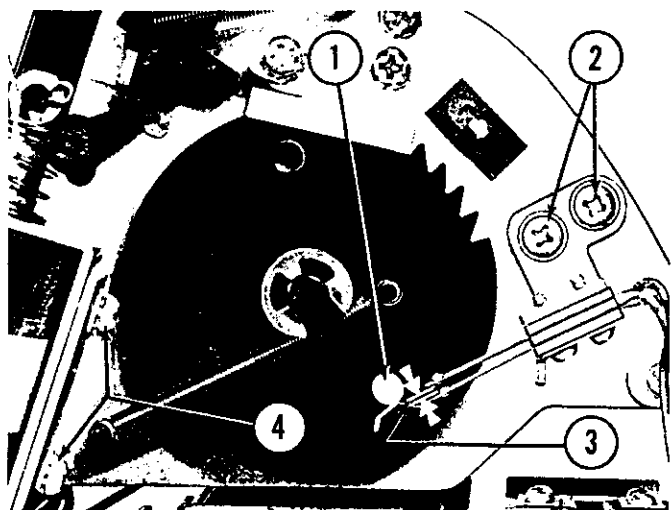


Fig. 11. PLAYRAK

- | | |
|--------------------------------------|----------|
| 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 |

(3) For this adjustment the cancel solenoid adjusting screws (Fig. 11) should be loosened and the cancel solenoid should be lowered to the limit of its adjustment. The indexing strips shown in Figure 12 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 13 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 14.

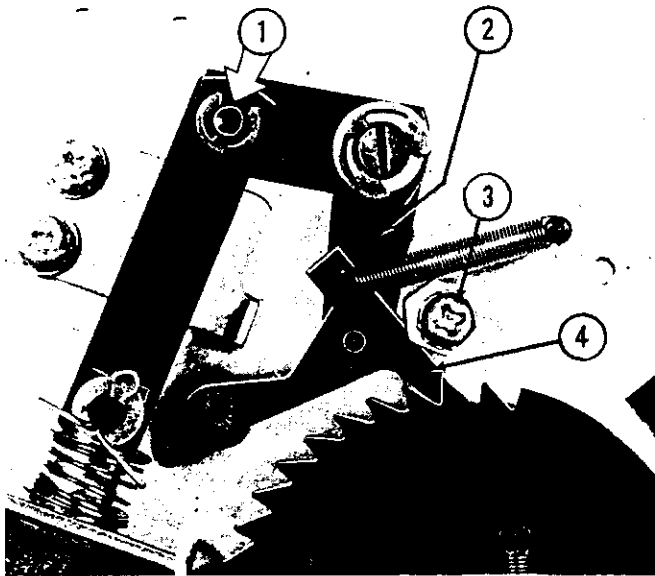


Fig. 13. CANCEL SOLENOID ADJUSTMENT

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

(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.

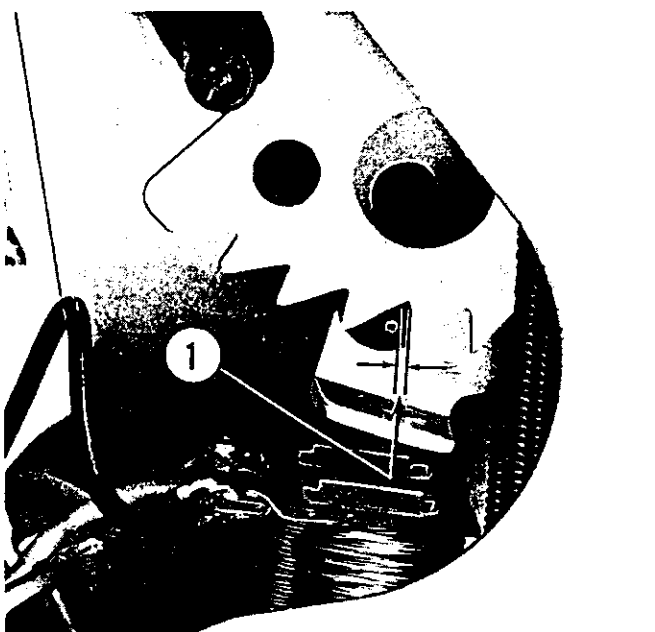


Fig. 14. ADJUSTMENT CAM SETTING

1. Over-travel .010"

(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 15. The bracket should be entirely free, from surface of the cancel pawl marked "No drag", during its entire cancellation action.

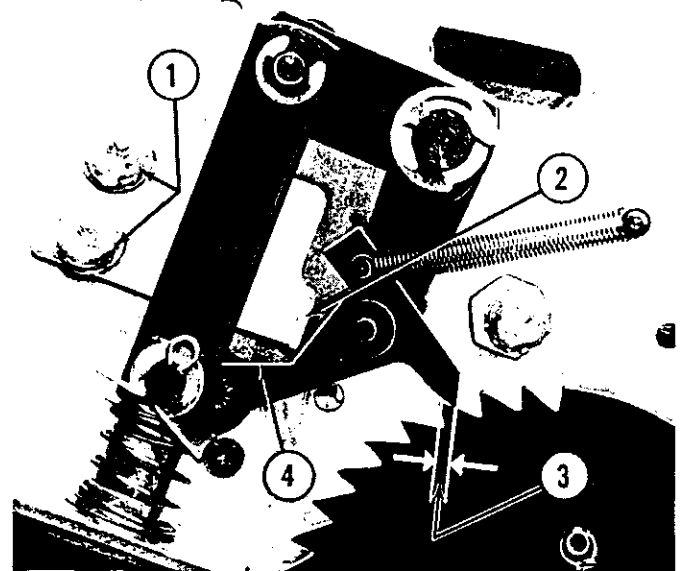


Fig. 15. STOP BRACKET ADJUSTMENT

- | | |
|---|----------|
| 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 | |

(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 16. When all credits are cancelled the key switch should again be open as shown in Figure 11.

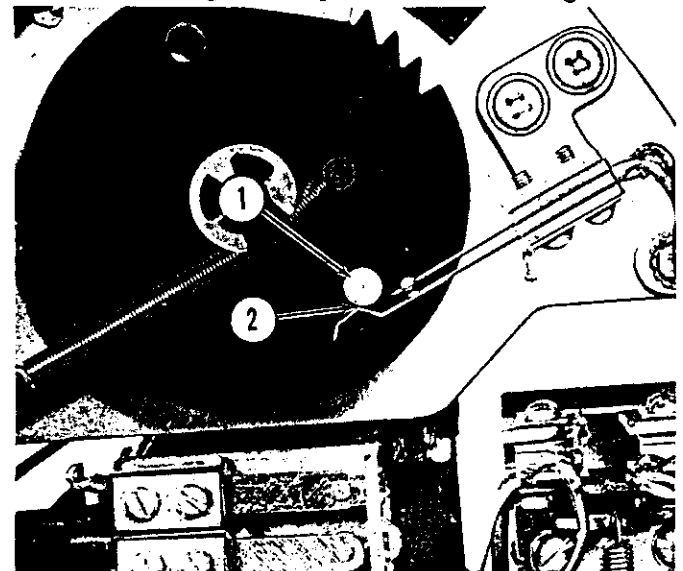


Fig. 16. KEY SWITCH CLEARANCE

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

MODEL 2100 PROGRAM HOLDERS AND PAGE ASSEMBLIES

1. GENERAL DISCUSSION

The title strip holders for the Model 2100 are designed to accommodate standard dual title strips. The arrangement has been set up in ten number groups of twenty letters each. All odd numbers are arranged alphabetically on the left side of the program holder and all even numbers are arranged alphabetically on the right side of the program holder.

2. DESCRIPTION

a. Program Holder and Silk Screen Assembly. (Fig. 17)

The "program holder and silk screen assembly" (Item 9) consists of a full width panel or shelf with support castings for the left and right program holders (Items 2 and 3 respectively). These support castings also serve as mountings for the fluorescent lamps and light diffusers, not visible in this figure. The entire assembly, which does not include the left and right hand "program page assemblies" (Items 1 and 4 respectively), is secured to the left and right hand cheek castings (Items 13 and 5) by two truss head screws. Its power cable and plug to the ballast box is the only other attachment.

b. The two connectors, shown at Item 11, serve to include the reset switch in the circuit of the selector

switch assembly which mounts between the two cheek castings.

c. The two round metal push buttons (Item 12 and 6) operate the selector button reset switch and the coin reject linkage respectively.

d. The two rectangular buttons (Item 7) one in each cheek casting serve to operate the micro switches that energize the left and right hand "Program Selector" (Items 10 and 8 respectively). These program selectors are made up of identical operating components assembled for right hand or left hand installation in a right or left cheek casting together with right and left support castings.

e. Program Holder for the Page Assembly. (Fig. 18)

(1) The program holder (Item 2) for the page assemblies is mounted directly over the program selector unit to provide engagement of the drive pins, on the lower edge of the movable pages, with the corresponding holes in the drive ring and pinion assemblies (see Fig. 19, Items 1, 2, 3, and 7). The latch (Item 1, Fig. 18) holds the page assembly in place after the drive pins have been engaged with their respective drive rings.

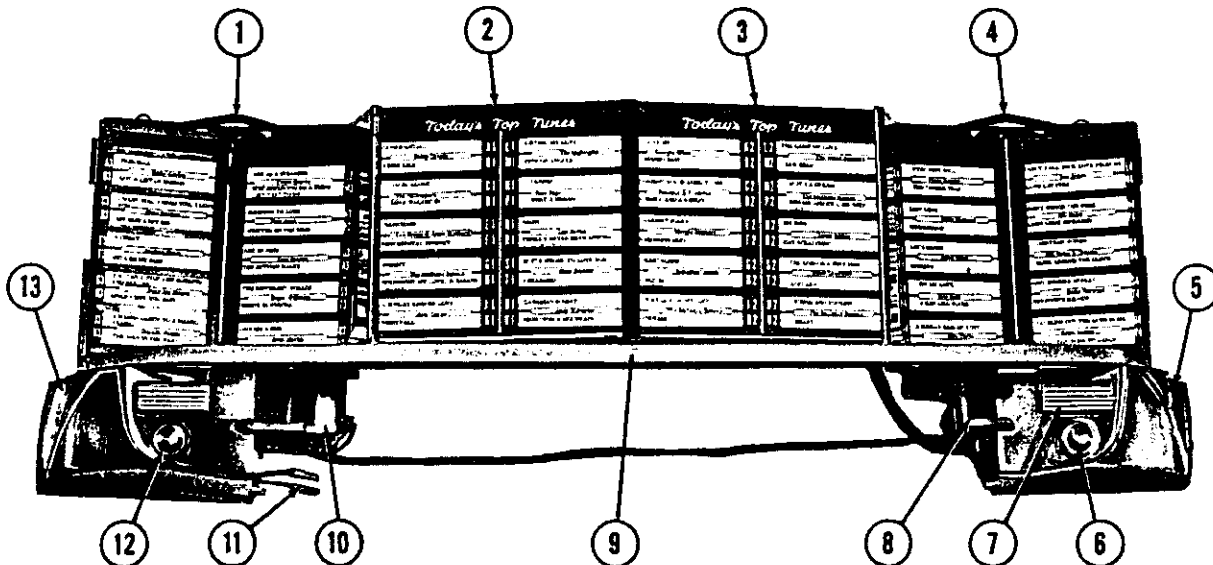


Fig. 17. PROGRAM HOLDERS AND PAGE ASSEMBLIES

1. Program Page Assembly, L.H.	68630	8. Program Selector, R.H.	69057
2. Program Holder and Classification Slip Assembly, L.H.	68242	9. Program Holder and Silk Screen Assembly	66272
3. Program Holder and Classification Slip Assembly, R.H.	68243	10. Program Selector, L.H.	69056
4. Program Page Assembly, R.H.	68631	11. Connectors, Selector Switch Assembly and Reset Circuit	59153
5. Cheek Casting Assembly, R.H.	68628	12. Button, Reset Switch	60275
6. Button, Reject Linkage	60275	13. Cheek Casting Assembly, L.H.	68188
7. Button, Program Selector Switch	68089		

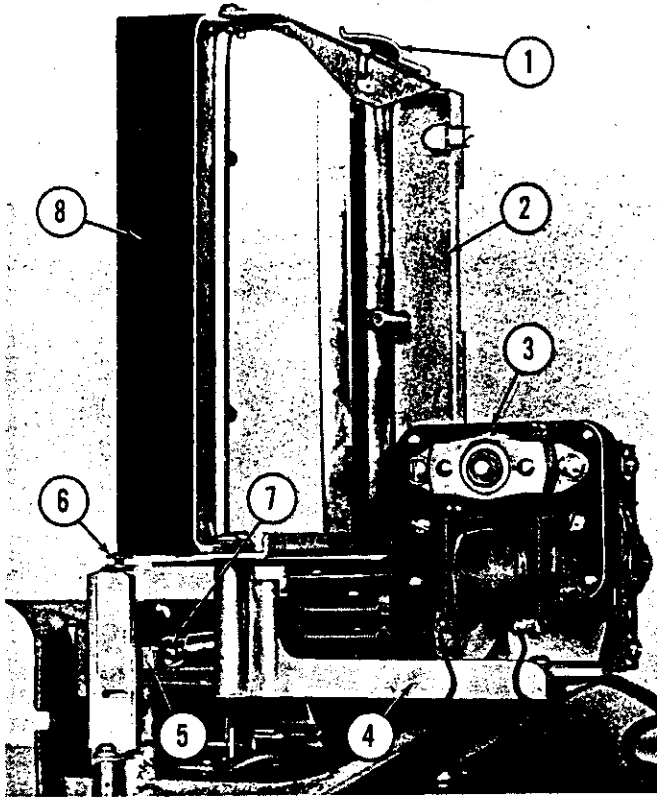


Fig. 18. PROGRAM HOLDER, PAGE ASSEMBLY, L.H.

- | | |
|--|----------|
| 1. Bracket and Lock Lever Assembly, L.H. | 67229 |
| 2. Support Casting, Outside, L.H. | 65976 |
| 3. Motor and Clutch Assembly | 69099 |
| 4. Mounting Casting and Stud Assembly | 66408 |
| 5. Thumb Screw, Short Head | 67400 |
| 6. Screw, Truss Head | 73787-87 |
| 7. Lamp No. 51 | 37987 |
| 8. Support Casting, Inside, L.H. | 65864 |

(2) The support castings for the right hand program selector assembly differ from the left hand castings, however, the program selectors, right and left, are identical.

(3) Fig. 18 shows several other items that are identical in both the right and left installations. Item 3 shows the rear view of the drive motor; Item 4, the program selector as mounted for left hand operation; Item 5, one of the three thumb screws that hold the program selector in the cheek casting; Item 6, one of the two truss head screws that hold the "program holder and silk screen assembly", described in "a"; and Item 7, one of the two panel lamps for the translucent program selector switch buttons.

f. Program Selector, (Figs. 19 and 20)

The program selector functions to turn the pages, one at a time when the program selector button is pressed. The drive ring and pinion assemblies (Items 1, 2, and 3, Fig. 19) are driven by the three segment and roller assemblies shown at Item 5. The roller component of these assemblies is driven by the cam surfaces of the cam and bearing assembly (Item 8, Fig. 20) and segments are retracted by the three

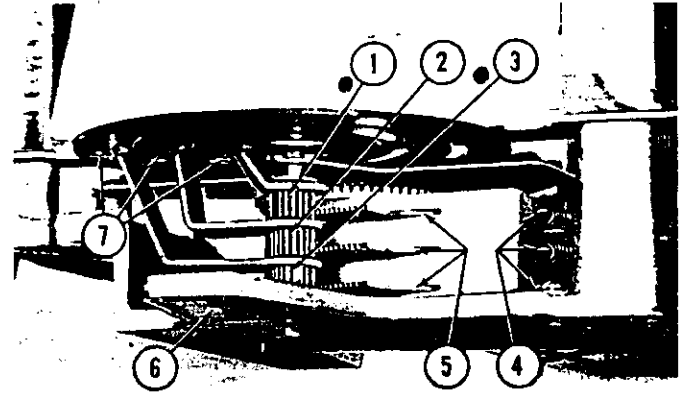


Fig. 19. PROGRAM SELECTOR

- | | |
|---|-------|
| 1. Drive Ring and Pinion Assembly, Upper | 66407 |
| 2. Drive Ring and Pinion Assembly, Intermediate | 66406 |
| 3. Drive Ring and Pinion Assembly, Lower | 66405 |
| 4. Retracting Springs, Segment and Roller | 66508 |
| 5. Segment and Roller Assembly | 66340 |
| 6. Mounting Casting and Stud Assembly, Right and Left | 66408 |
| 7. Engagement Holes for Page Pins | |

springs shown at Item 4 of Figure 19. The mounting casting and stud assembly (Item 6) is the supporting member for the entire program selector unit.

g. Motor and Gear Unit. (Fig. 20)

(1) The motor and clutch assembly (Item 1) engages the shaft and worm assembly (Item 5) when the motor is energized. The shaft and gear assembly (Item 6) is thus set in motion to operate the contactor (coupling, insulator, and spring assembly) (Item 2) and the pinion (Item 7). The cam (Item 8) will turn one quarter of a revolution for each complete turn of the contactor. In this way the contactor stops the motor each time a page is turned.

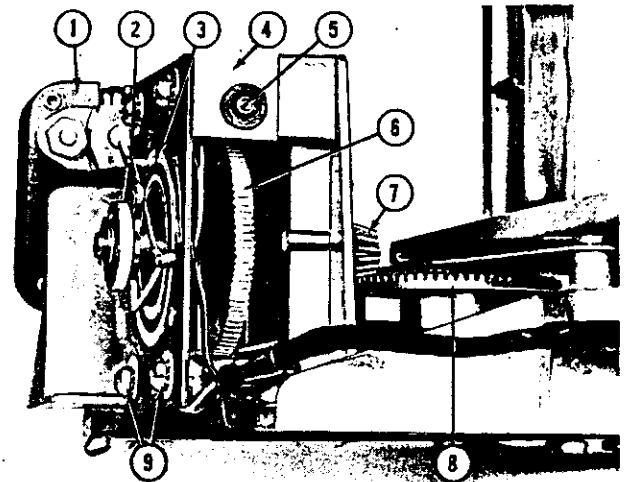


Fig. 20. PROGRAM SELECTOR

- | | |
|---|----------|
| 1. Motor and Clutch Assembly | 69099 |
| 2. Coupling, Insulator, and Spring Assembly | 66346 |
| 3. Contact Plate Assembly | 66331 |
| 4. Mounting Casting and Gear Assembly | 69070 |
| 5. Shaft and Worm Assembly | 66478 |
| 6. Shaft and Gear Assembly | 66335 |
| 7. Bevel Gear | 66324 |
| 8. Cam and Bearing Assembly | 66409 |
| 9. Adjusting Screws | 73533-35 |

(2) Positioning and timing of the electrical contacts is governed by the mounting of the contact plate assembly (Item 3). The contact plate is provided with elongated mounting holes and is set by means of the mounting screws (Item 9).

h. Cheek Casting Assemblies. (Figs. 21 and 22)

(1) The left and right cheek casting assemblies fasten firmly to the cabinet and upper grille plate to provide mountings for the selector switch assembly, the program holder, the program selectors, and the upper pilaster castings.

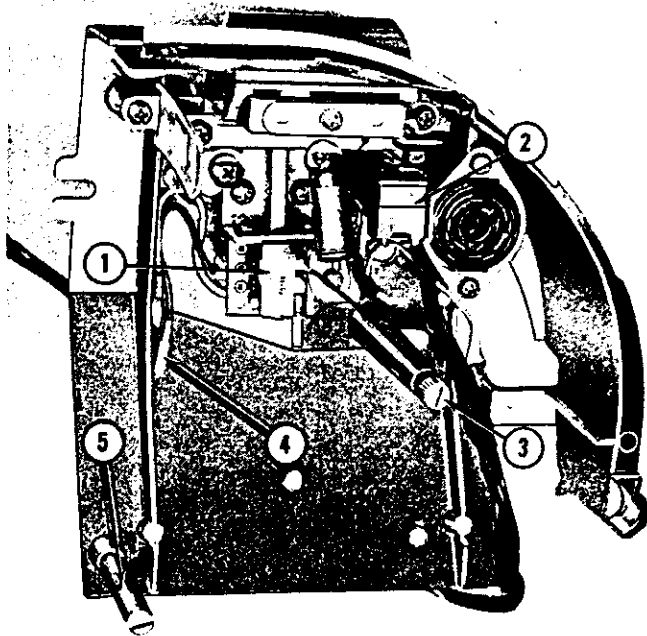


Fig. 21. CHEEK CASTING AND RESET SWITCH ASSEMBLY

- | | |
|------------------------------------|-------|
| 1. Switch, Reset | 66144 |
| 2. Switch, Micro, Program Selector | 57063 |
| 3. Thumb Screw, Short Head | 67400 |
| 4. Connectors | 49153 |
| 5. Thumb Screw, Long Head | 65164 |

(2) The left hand cheek casting (Fig. 21) has mounted within the casting, the single pole double throw micro switch (Item 2) for control of the left program selector, the reset switch (Item 1) for the electric selector circuit, the five prong socket for connecting the program selector when held in place by the thumb screws (Items 3 and 5) and connectors (Item 4) for joining with the selector switch assembly.

(3) The right hand cheek casting (Fig. 22) contains components similar to those in the left casting except for the assembly parts of the coin reject linkage which replace the reset switch of the left casting. Shown at Item 1 is the return spring for the reject linkage, at Item 3 the reject push rod, and at Item 5, the reject and bracket for connecting to the

scavenger linkage of the slug rejector. Adjustment features are provided in this assembly. The switching arrangement for the program selectors is provided with a stop bracket and retracting spring shown at Item 6. The third thumb screw for holding the program selector to the cheek casting is indicated at Item 2 as it was not visible in Figure 21.

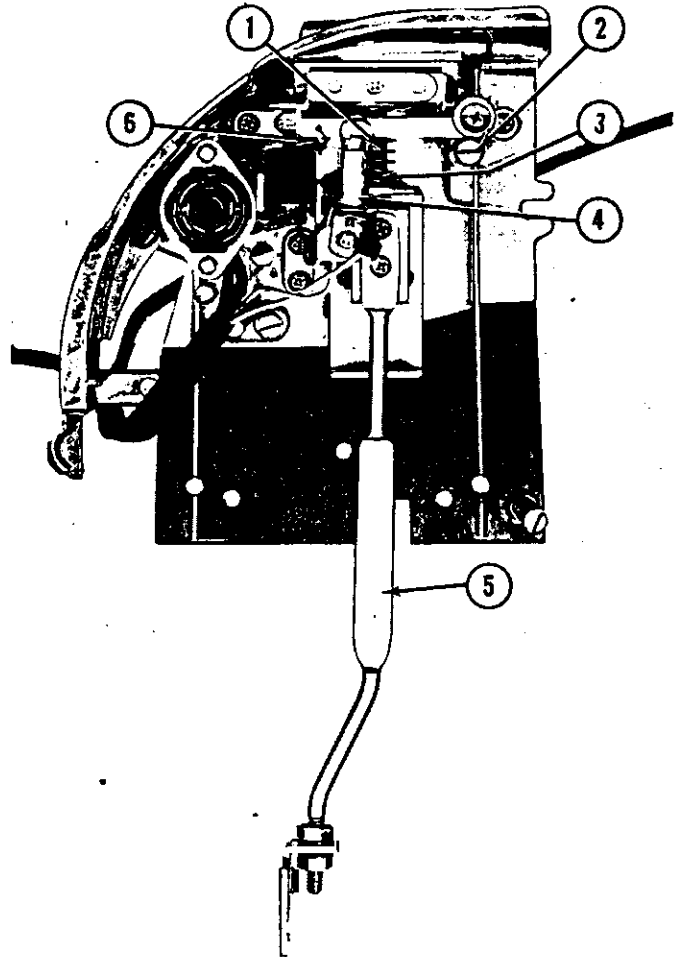


Fig. 22. CHEEK CASTING ASSEMBLY, R.H.

- | | |
|------------------------------------|-------|
| 1. Spring, Reject Push Rod | 66556 |
| 2. Thumb Screw, Short Head | 67400 |
| 3. Push Rod, Reject | 66500 |
| 4. Lamp Socket | 48512 |
| 5. Reject Rod and Bracket Assembly | 69685 |
| 6. Spring, Program Selector Switch | 62773 |

3. OPERATION

The operation of the above units with respect to the electric selector system will be discussed under the paragraph on operation for the electric selector system.

4. ADJUSTMENTS

The few adjustments required for the components of the program selector units are accomplished by jig settings during assembly.

MODEL 2100 ELECTRIC SELECTOR SYSTEM

1. GENERAL DISCUSSION

The electric selector system combines the electrical functions of components contained in program units just described, the slug rejector assembly, the playrak, the selector button switch assembly, the electric selector assembly, the junction box and stepper assembly, and the power supply components of the Model 532 Amplifier. All of these units are interconnected electrically through cables, plugs, and sockets to form the electric selector system. As a complete system, it receives coins, sets up selection credits, cancels credits as selections are made, and accumulates the individual plays so selected on a selector drum capable of accumulating 200 separate selections. The function of the electric selector system is complete at this point.

2. DESCRIPTION

a. The slug rejector assembly (Fig. 23) is a product of National Rejectors, Inc. as described on page 4. The Wurlitzer electrical components consisting of the four unit coin switch (Item 2) and the plug and cable assembly (Item 1) provide the first electrical function of the electric selector system.

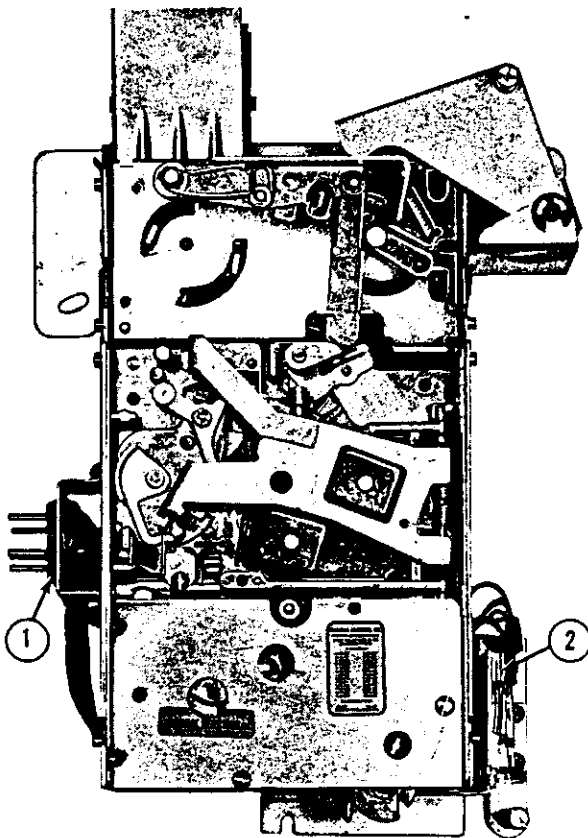


Fig. 23. SLUG REJECTOR

- 1. Plug, Wire, and Coin Switch Assembly
- 2. Coin Switch

68124

68550

68311

b. The playrak assembly (Fig. 24) receives one of four different electrical impulses from the coin switch each time a proper coin is deposited. The playrak mechanism (described on pages 5, 6, and 7) consists of two accumulator (escapement) wheels, a cancel wheel (Item 1) and cancel solenoid (Item 5), two stop levers, and two relays (Items 3 and 4). The functions of the playrak are: (1) To convert the various coin switch impulses to selection credits in accordance with the pre-determined price per play as set up on the stop levers and the 10 or 50¢ switch setting. (2) To establish the initial selection circuit for operation of the selector switch panel. (3) To cancel one of the credits racked up on the accumulator wheels each time a selection is made at the selector switch buttons. (4) To open the key switch (Item 2) and release timing relay No. 1 (Item 4) thus preventing further selection after all credits have been used and cancelled.

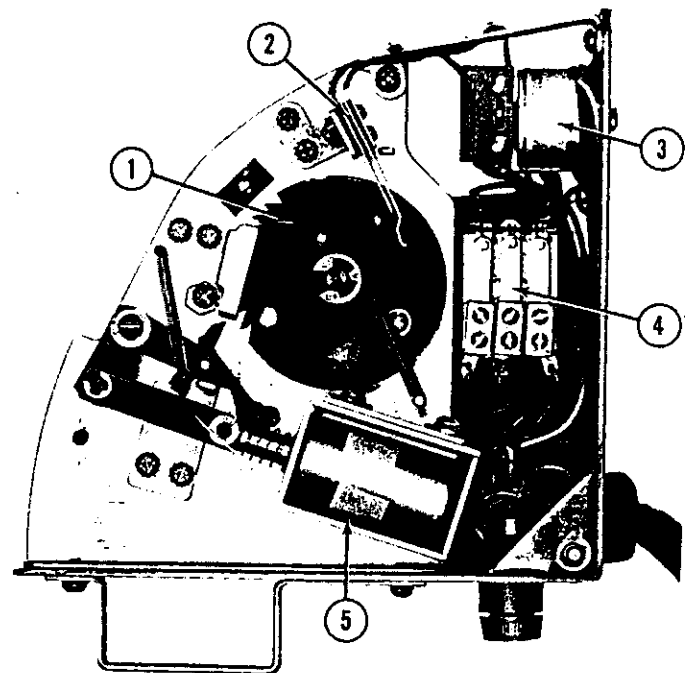


Fig. 24. PLAYRAK

68123

- 1. Cancel Wheel Assembly
- 2. Key Switch Assembly
- 3. Pulse Relay
- 4. Timing Relay No. 1
- 5. Cancel Solenoid

66124

66082

64796

68211

65069

c. The selector button switch assembly (Figs. 25 and 26) 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. 26) functions to provide latching action for

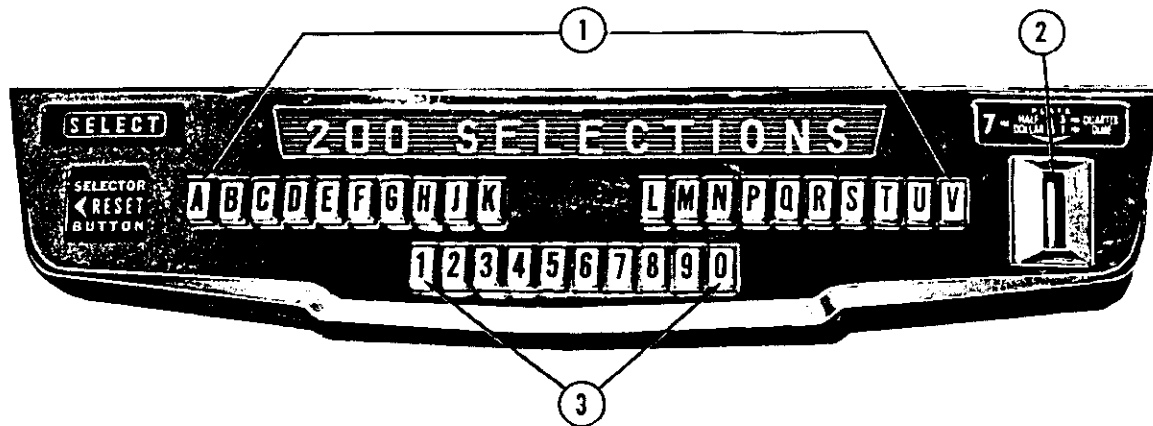


Fig. 25. SELECTOR SWITCH ASSEMBLY

68122

- 1. Letter Buttons
- 2. Coin Entry Casting 5, 10, 25, 50

65657 to 65676
67935

- 3. Number Buttons

65677 to 65686

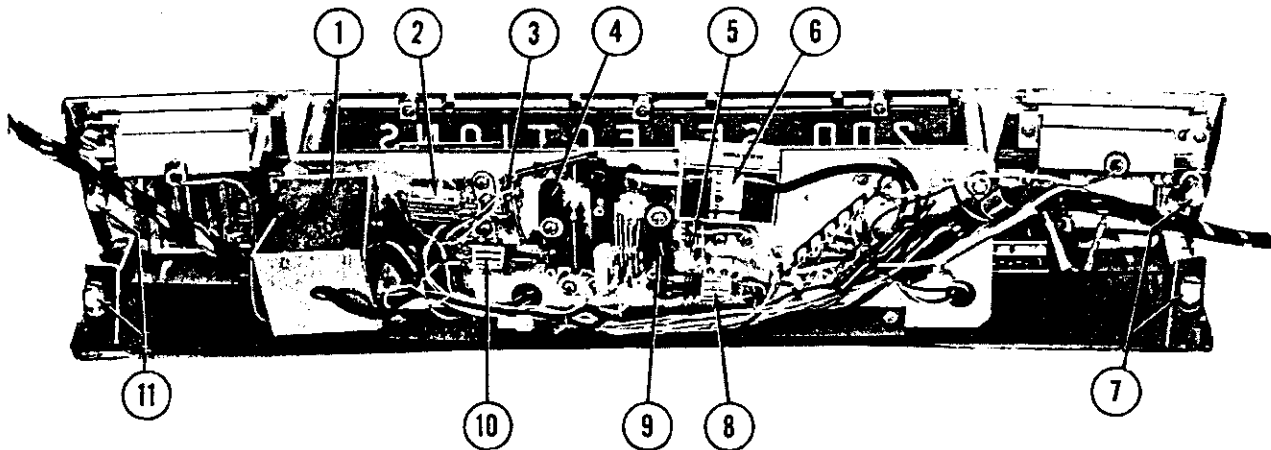


Fig. 26. SELECTOR SWITCH ASSEMBLY

- 1. Electric Counter
- 2. Free-Play Switch
- 3. Series Switch, Letters
- 4. Letter Latch (Trip Lever and Spacer Assembly)
- 5. Series Switch, Numbers
- 6. Latch Solenoid

45345
56233
64982
65010
64981
60717

- 7. Thumb Screw
- 8. Latch Switch, Numbers
- 9. Number Latch (Pawl, Stud, and Spacer Assembly)
- 10. Latch Switch, Letters
- 11. Thumb Screw

65124
60518
65745
60518
67129

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 switch being used may receive the selection pulse. Both the number and the letter latch linkage (Fig. 26) 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 28V D.C. circuit is completed to timing relay No. 2 and the series connected number solenoid. Following this 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. 26) and a free-play switch for convenience in servicing.

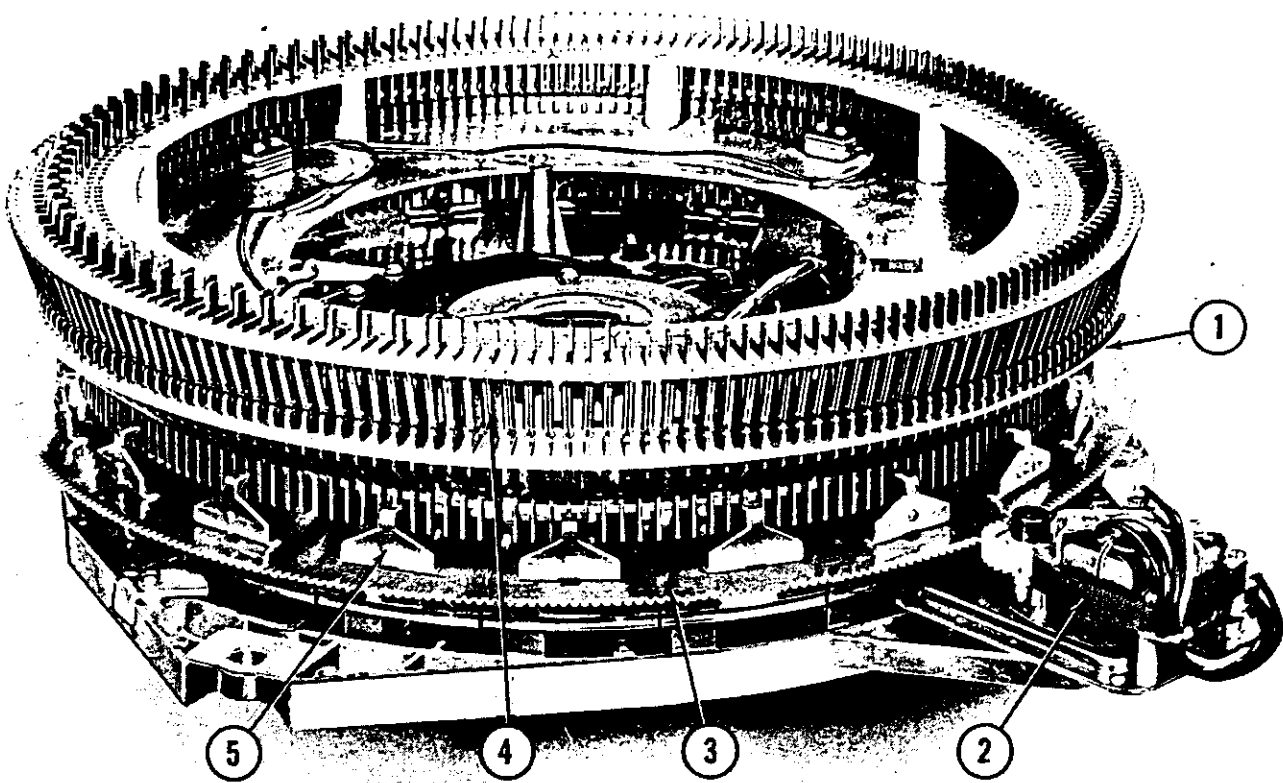


Fig. 27. ELECTRIC SELECTOR ASSEMBLY 68127

- | | | | |
|---|-------|--------------------------------|--------|
| 1. Selector Plates and Latch Pin Assembly | 68794 | 4. Spring, Latch Pin | 110480 |
| 2. Motor and Gear Assembly | 68796 | 5. Rocker and Bracket Assembly | 68807 |
| 3. Rotating Plate and Rocker Assembly | 68245 | | |

d. The electric selector assembly (Fig. 27) consists of a circular drum containing 200 latch pins (Item 1) with their accompanying 200 retracting springs (Item 4). These latch pins are actuated by 20 rocker arms (Item 5) mounted on a rotating plate (Item 3) which is rotated about the latch pins by the selector

motor (Item 2). The selection or release of the latch pins is governed by the following components of the electric selector assembly:

- (1) The selector plates and latch pin assembly (Fig. 28) is made up of three types of latch pins

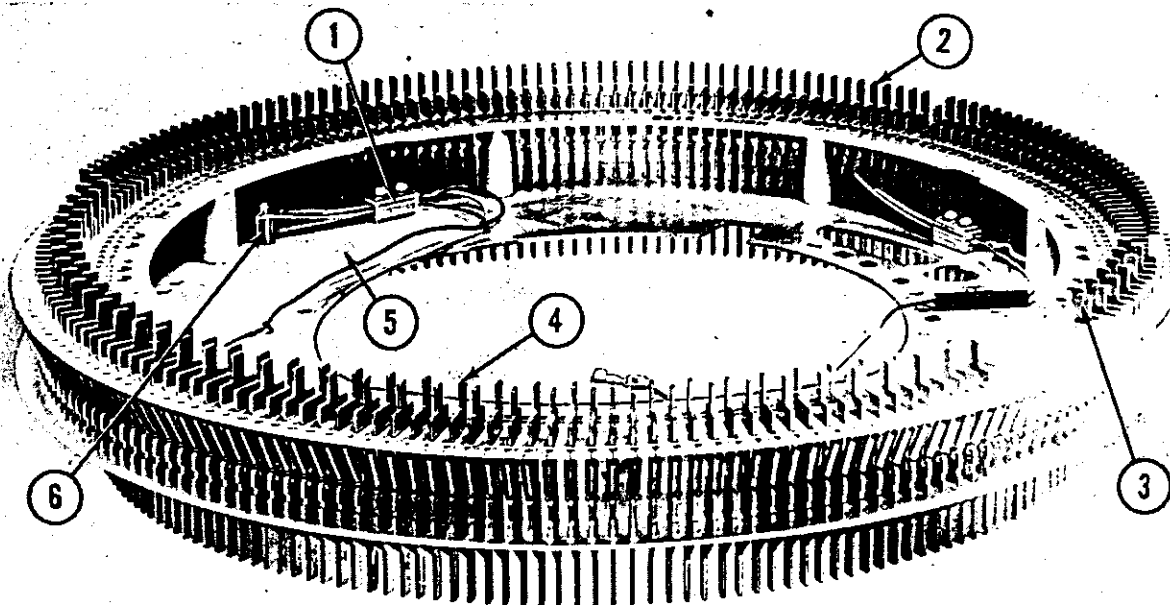


Fig. 28. SELECTOR PLATES AND LATCH PIN ASSEMBLY

- | | | | |
|----------------------------|-------|------------------------------------|-------|
| 1. Over-ride Switch | 65952 | 4. Latch Pin, Inner | 67925 |
| 2. Latch Pin, Outer | 67924 | 5. Lower Plate and Spacer Assembly | 69492 |
| 3. Latch Pin, Intermediate | 67923 | 6. Spacer, Wobble Ring | 68650 |

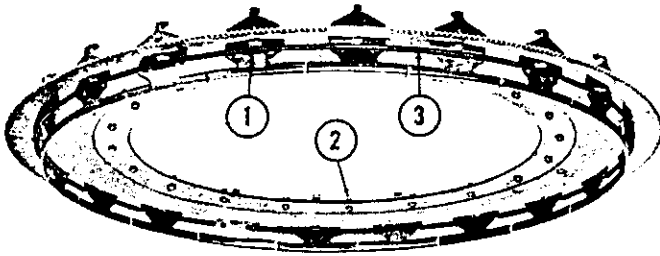


Fig. 29. ROTATING PLATE AND ROCKER ASSEMBLY 68245
 1. Rocker and Bracket Assembly 68807
 2. Stop Pin 68648
 3. Spring 68755

ie. 100 latch pins, outer (Item 2) 50 latch pins, intermediate (Item 3) and 50 latch pins, inner (Item 4). Mounted on its lower plate and spacer assembly (Item 5) are four over-ride switches (Item 1) that are actuated by a wobble ring mounted on four spacers (Item 6). The wobble ring rests on the inner shoulder of the 200 latch pins, underneath the lower plate and spacer assembly. When one or more latch pins are released, the wobble ring will be displaced and will actuate one

or more of the four over-ride switches to start the playing cycle of the record changer.

(2) The rotating plate and rocker assembly (Fig. 29) serves to release the selected latch pin with one of its 20 rocker arm and bracket assemblies (Item 1). The entire rotating plate and rocker assembly rotates from power supplied by the selector drive motor indicated in Figure 27. The selector drive motor is a 24V A.C. reversible, capacitor type motor, mounted to a speed reducing gear box. The output drive gear which engages the rotating plate and rocker assembly is a moulded nylon gear. The 20 stop pins (Item 2) mounted in the rotating plate are provided for proper indexing of the 20 rocker arms. The long spring (Item 3) surrounding the 20 rockers keeps the rockers in a retracted position to permit free searching action of the rotating plate and rocker assembly.

(3) The selector casting (Item 2, Fig. 30) and the 20 letter solenoids (Item 1) function as a mounting base for all of the electric selector components. The 20 letter solenoids are equally spaced so that each

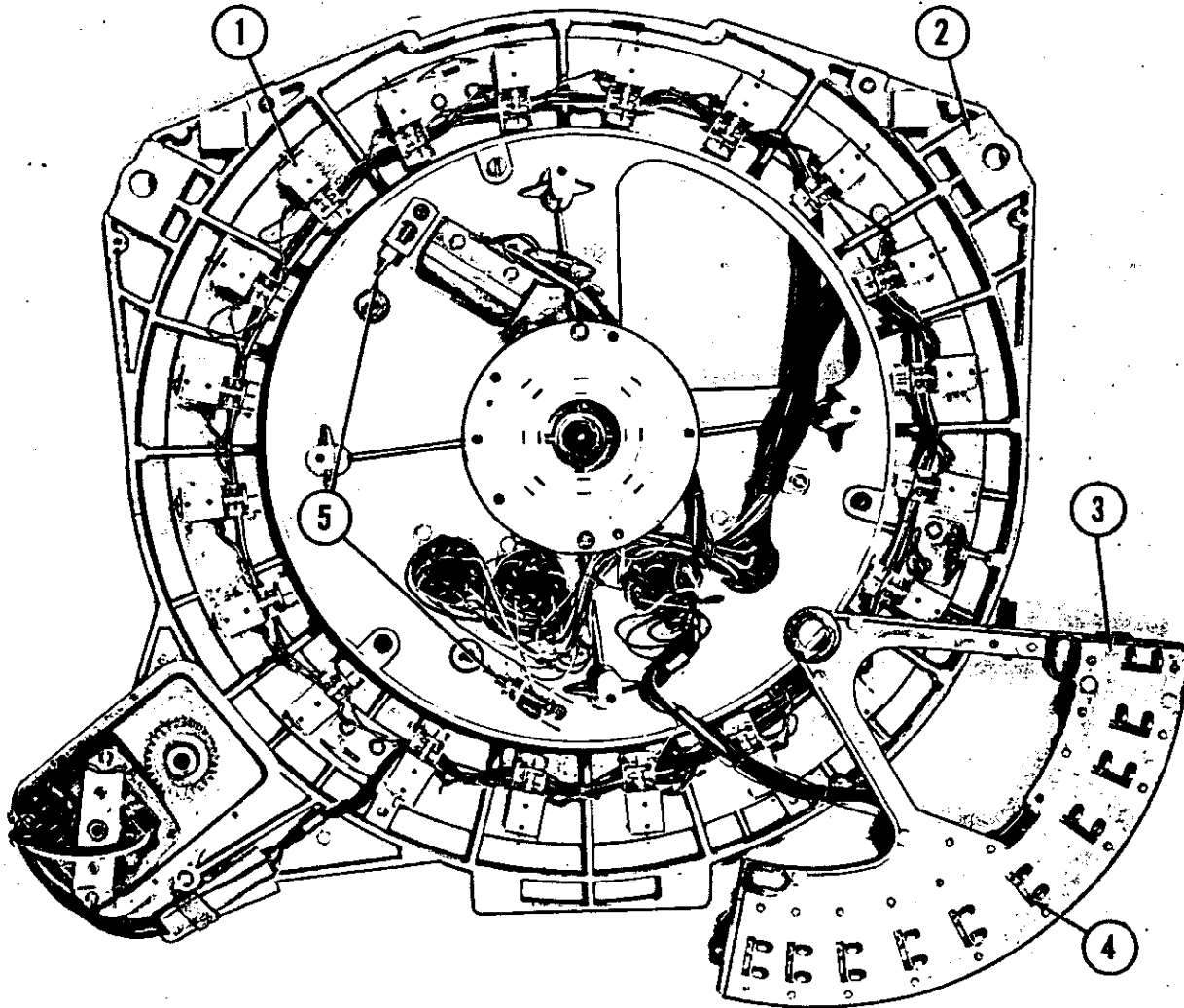


Fig. 30. MOUNTING CASTING AND STOP SOLENOID ASSEMBLY 68127
 1. Letter Solenoid 68594 4. Stop Plate End of Plunger 68608
 2. Selector Casting 67921 5. Stop Screws 73575-95
 3. Mounting Casting and Stop Solenoid Assembly 68793

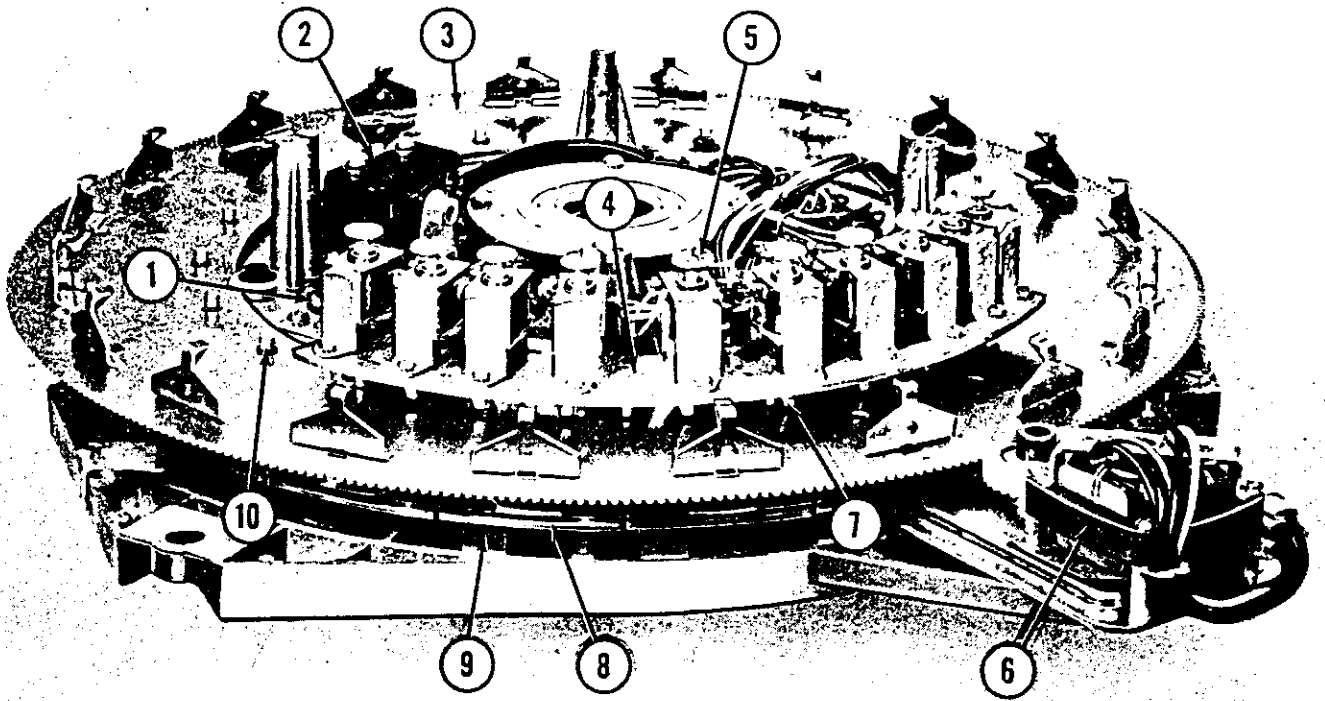


Fig. 31. ELECTRIC SELECTOR, SELECTION COMPONENTS

1. Stop Screw	73575-95	6. Selector Motor	68796
2. Reverse and Start Switches	61596	7. Plunger	68608
3. Rotating Plate and Rocker Assembly	68245	8. Rocker and Bracket Assembly	68807
4. Mounting Casting and Number Solenoids	68276	9. Letter Solenoid	68594
5. Number Solenoid	68617	10. Stop Pin	68648

solenoid plunger may engage the long arm of any one of the rocker arm and bracket assemblies, indicated in Item 1 of Fig. 29, in any one of 10 latch pin positions.

(4) The mounting casting and stop solenoid assembly (Fig. 30) is so arranged that the stop plate ends of the solenoid plungers (Item 4) may stop the

rotating plate and rocker assembly (Fig. 29) in any one of the 10 number positions selected. The entire assembly may pivot slightly on its mount at the center of the selector casting. Its range is governed by the two stop screws indicated at Item 5 and is provided to permit indexing, switch operation, and retracting action under spring loading.

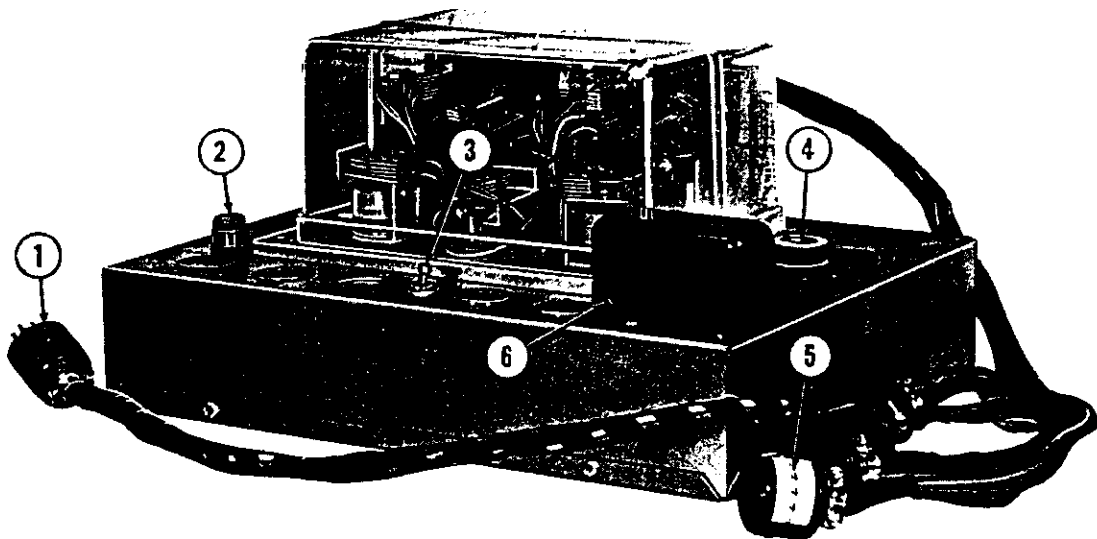


Fig. 32. JUNCTION BOX AND STEPPER UNIT 68125

1. Plug, 11 Prong	54878	4. Fustat, 3 Amp.	61858
2. Fuse Post	51485	5. Socket, 11 Prong	58898
3. Switch, Toggle	53648	6. Cover, Terminal Strip	44943

(5) The assembly of the above components as shown in Figure 31 provides the means for selection and release of any one of the 200 selector latch pins described in paragraph (1).

e. The junction box and stepper unit (Figs. 32, 33, and 34) 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 as shown in Figure 32. Details for stepper and wall box service will be published in another group. The inside of the junction box, Fig. 34, contains the wall box pulse relay, the reversing relay, timing relay No. 2, timing relay No. 3, the 5V panel light transformer, and several capacitors for stepper operation and filter circuits.

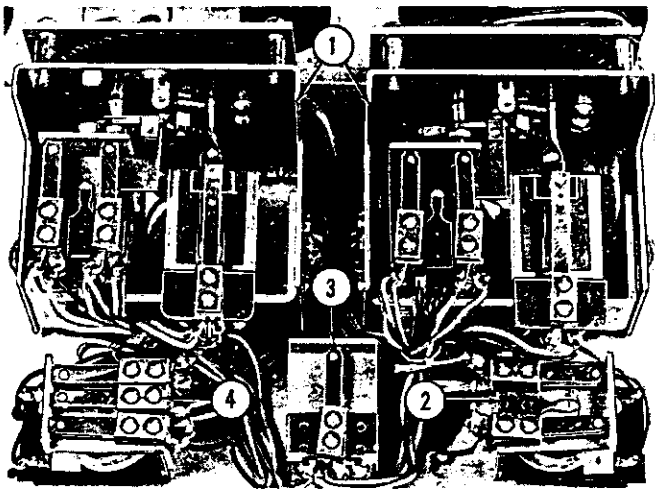


Fig. 33. STEPPER COMPONENTS

- | | |
|----------------------------|-------|
| 1. Stepper Switch Assembly | 68823 |
| 2. Timing Relay, Letters | 68941 |
| 3. Transfer Relay | 65748 |
| 4. Timing Relay, Numbers | 68940 |

3. OPERATION (See Fig. 31)

As soon as both a letter and a number button are engaged at the key board, a number solenoid (Item 5) is actuated according to the numeral depressed at the key-board. The selector drive motor (Item 6) is then started and drives the "rotating plate and rocker assembly" (Item 3) in a clockwise direction, as viewed from the top. One of the 20 stop pins (Item 10) mounted on the rotating plate engages the stop tab of the plunger (Item 7) that has been pulled down into its path by the number solenoid (Item 5). After engaging the stop tab of the number solenoid plunger the stop pin on the rotating plate rotates the mounting casting (Item 4) until it is halted by the forward stop screw (Item 1). Just before striking the stop, the reverse and start switches (Item 2) are actuated. The motion of the mounting casting and the rotating plate is arrested by the forward stop but the stalled motor remains energized to hold the rotating plate and mounting casting against the stop, thus accurately positioning the rocker arms so that all 20 rocker arms are perfectly aligned

with all letter selector pins bearing the same numeral as the selected number solenoid and the depressed button at the key-board. Delay relay circuits en-

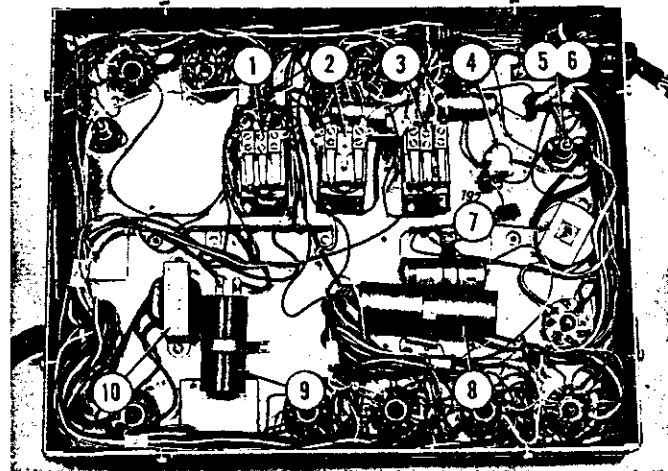


Fig. 34. JUNCTION BOX AND STEPPER COMPONENTS

- | | |
|----------------------------------|-------|
| 1. Relay, Reverse | 65750 |
| 2. Timing Relay No. 3 | 68943 |
| 3. Timing Relay No. 2 | 68942 |
| 4. Pulse Relay | 65752 |
| 5. Fuse Post | 45352 |
| 6. Fuse, 0.3 Amp. | 45588 |
| 7. Socket, Fustat | 61857 |
| 8. Capacitor, 500 Mfd., 50V | 71816 |
| 9. Capacitor, 65 to 93 Mfd., 50V | 70901 |
| 10. Transformer, Panel Lights | 58357 |

energized by the start switch now allow a pulse to be given to the letter solenoid coil corresponding to the letter button depressed at the key-board. The energized letter solenoid (Item 9) strikes the long arm of the rocker arm (Item 8) and pivots the rocker arm at the rotating plate. This causes the finger at the top of the rocker arm to move in and release the selector latch pin corresponding to both the letter and the number selected at the key-board. The unlatched pin provides over-ride switch action as described in paragraph (1).

Immediately after the letter solenoid has been actuated, the selector drive motor is reversed to back the "rotating plate and rocker arm assembly" away from the stop and take the mechanical load off the number solenoid plunger and permit it to retract under its spring loading. The time required for the complete selection cycle indicated by depressing a number and a letter button at the key-board may vary from .090 to .625 seconds, the maximum and minimum times being controlled by the initial position of the "rotating plate and rocker arm assembly" with respect to the number solenoid actuated.

A detailed description of the electrical sequence which occurs in the fractional part of a second, as described above, is provided as an aid to service in checking the continuity and voltage of the various circuits involved and helping to isolate and locate electrical mal-functions. The several circuits involved are shown individually in heavy solid or heavy dotted lines in their order of happening.

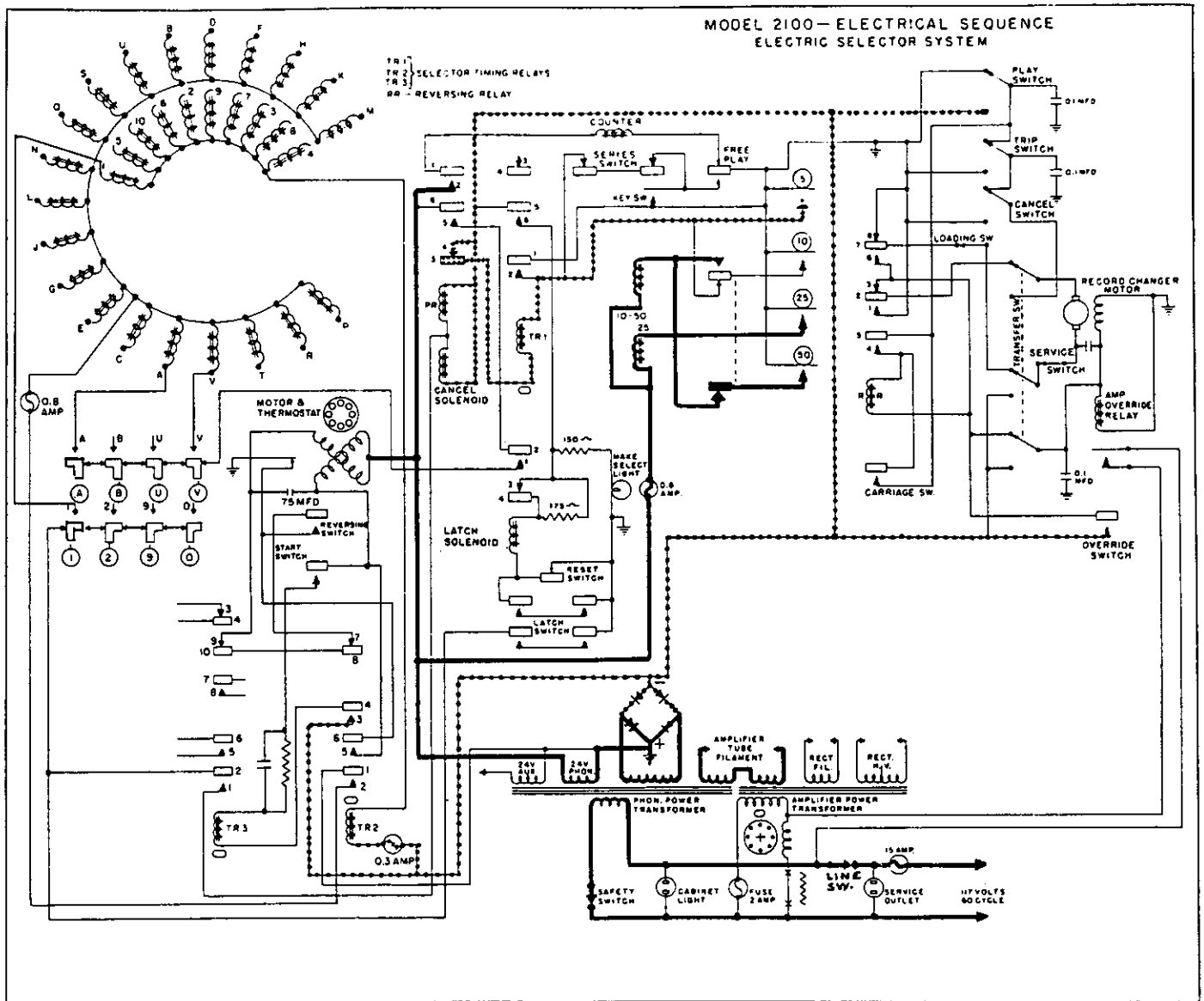


Fig. 35. PHASE 1 - STAND-BY CIRCUITS

a. Closing of the line switch provides 110V A.C. to the primary of the phonograph transformer only. Therefore, as shown in heavy line, 24V A.C. is available at the coin switches for accumulator function and 28V D.C. shown in dotted line, is available for single play function.

b. Under the above conditions these same two

sources of power supply are available for stepper and wall box operation. Also 110V A.C. is available at the booster socket of the stepper and junction box assembly.

c. Power is available at the service outlet whether the line switch is on or off.

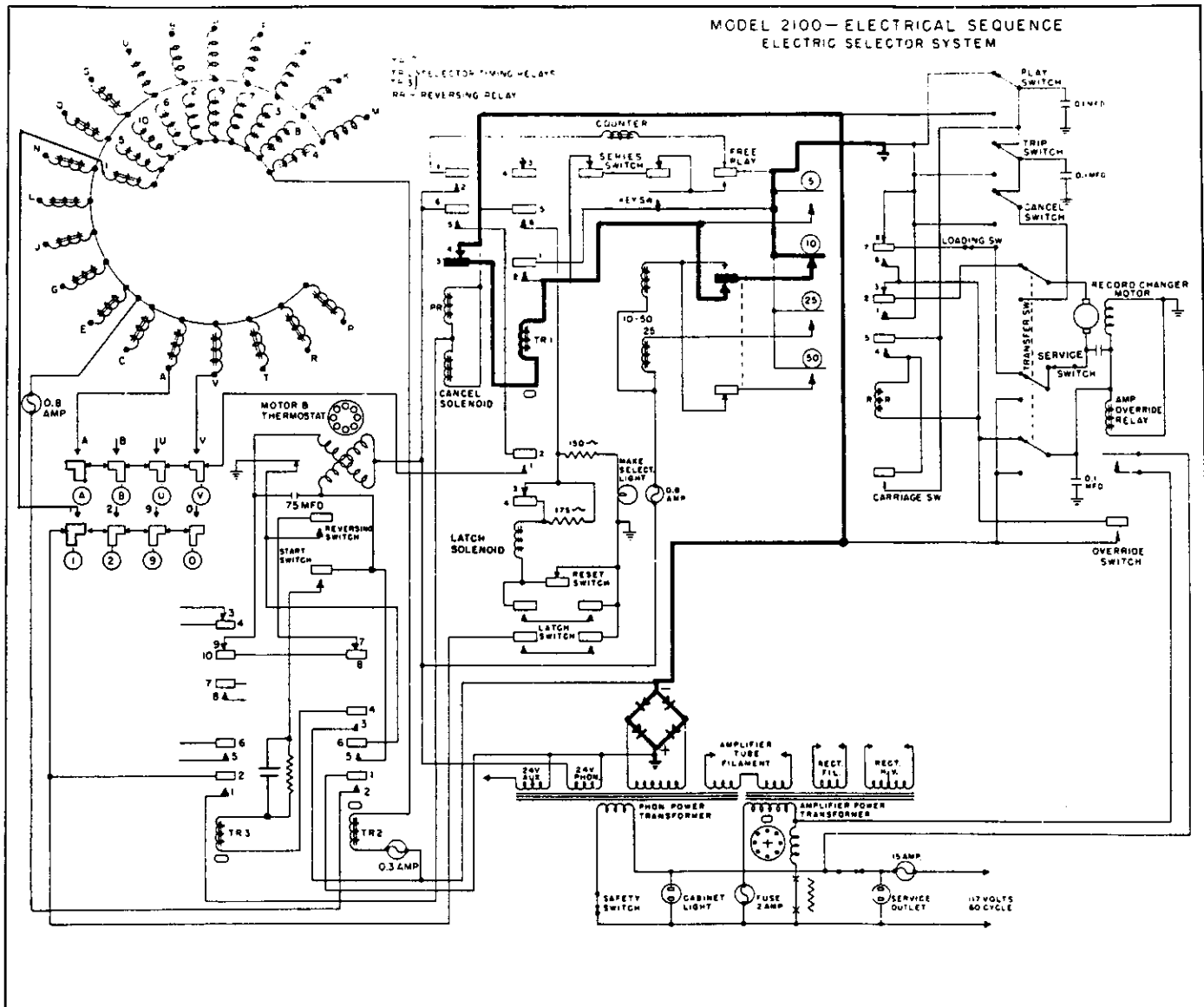


Fig. 36. PHASE 2 - COIN SWITCH CIRCUIT, SINGLE PLAY

a. The Playrak is provided with a double pole sliding switch to change the coin switch circuits to either 5, 10, 25 cent play or 10, 25, 50 cent play. In either case the "5, 10, 25¢" component of the slug rejector may be set to require either 1 nickel or 2 nickels for 1 play. (See Adjustments).

b. When a dime is accepted on the 10¢ coin switch, a 28V D.C. circuit is completed, as shown in heavy line, from the negative side of the rectifier,

thru normally closed contacts 4 & 3 of the pulse relay, the coil of timing relay No. 1, and the 10¢ coin switch to common ground and the positive side of the 28V D.C. rectifier.

c. If the slide switch is set for 5, 10, 25¢ operation, the electrical circuit will be identical except that the 5¢ coin switch instead of the 10¢ coin switch will close the circuit.

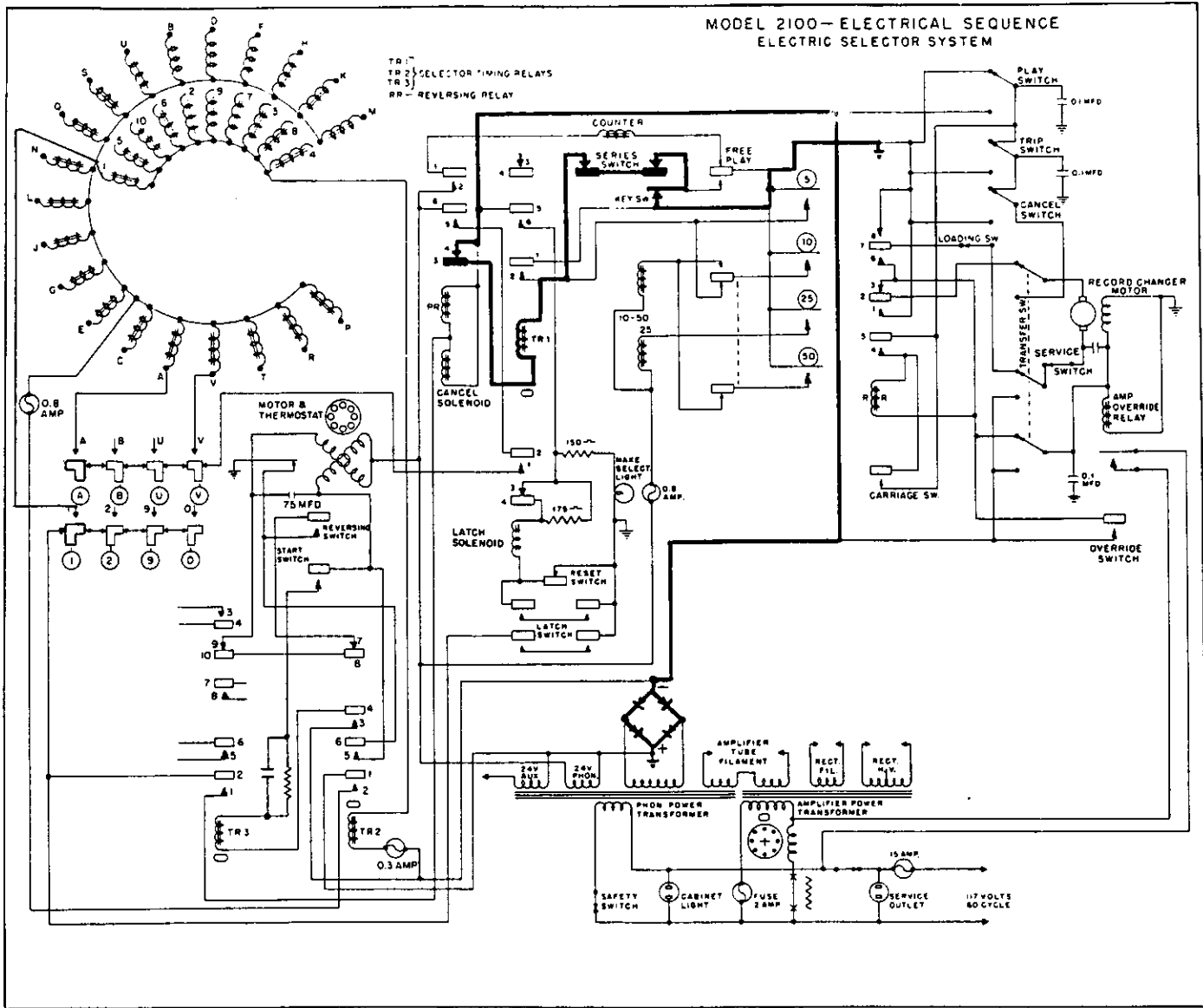


Fig. 38. PHASE 4 - KEY SWITCH AND NO. 1 TIMING RELAY CIRCUIT.

a. When either of the two coin magnets is energized, its corresponding accumulator wheel is released and advances to a credit position as determined by the quadrant setting of the "accumulator stop arm". Advance of either accumulator wheel from one to ten plays will permit the key switch to close and remain closed until all credits have been cancelled by the cancel solenoid and cancel wheel.

b. Closing of the key switch completes a cir-

cuit shown in heavy line from the negative side of the rectifier, thru contacts 4 & 3 of the pulse relay, the coil of timing relay No. 1, the number and letter series switches, and the key switch to common ground and the positive side of the rectifier. The circuit to timing relay No. 1 is thus established as in the previous phases except that it will be re-energized by the series switches after each selection until cancel action has re-opened the key switch.

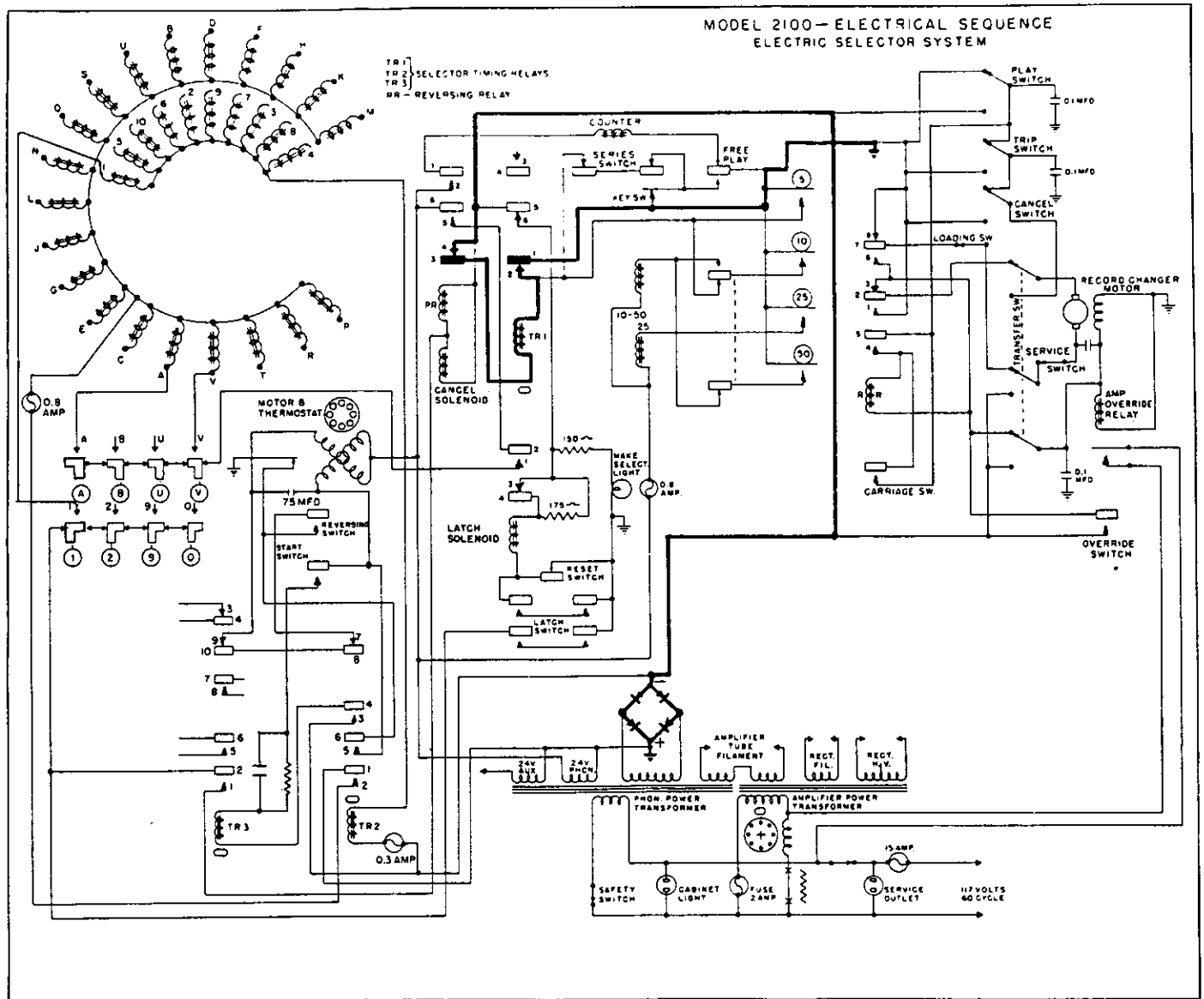


Fig. 39. PHASE 5 - INTERLOCK CIRCUIT, TIMING RELAY NO. 1

a. The closing of contacts 1 & 2 of timing relay No. 1 completes a 28V D.C. circuit, as shown in heavy line from the negative side of the rectifier, thru contacts 4 & 3 of the pulse relay, the coil of timing relay No. 1, and contacts 2 & 1 of timing relay No. 1

to common ground and the positive side of the rectifier. An interlock circuit is thus established for timing relay No. 1 which will hold until actuation of the pulse relay and opening of its contacts 3 & 4.

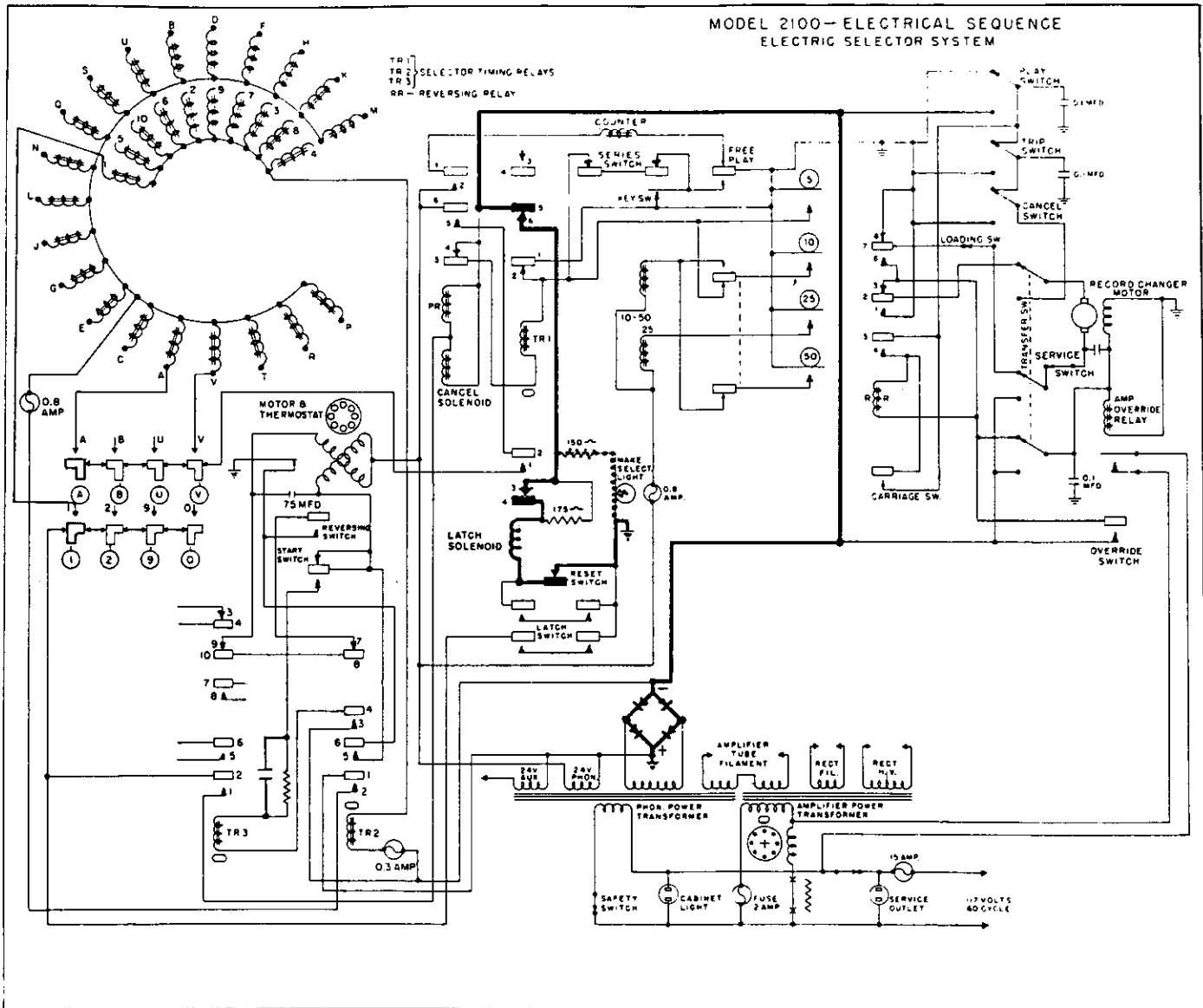


Fig. 40. PHASE 6 - LATCH SOLENOID AND MAKE SELECTION LAMP CIRCUITS

a. The closing of contacts 5 & 6 of timing relay No. 1 completes a 28V D.C. circuit as shown in heavy line from the negative side of the rectifier, thru contacts 5 & 6 of timing relay No. 1, contacts 3 & 4 of the latch solenoid switch, the coil of the latch solenoid, and the reset switch to common ground and the positive side of the rectifier. At the end of the plunger stroke the latch solenoid switch is engaged by the plunger linkage and actuated. Contacts 3 & 4 of the latch solenoid switch will open, however, the latch solenoid will remain energized, at reduced current flow, via the 175 ohm resistor. In this way continuous holding of the latch solenoid will not over-heat its coil.

b. When the latch solenoid is energized, as described in "a", its plunger operates linkage to provide latching action for both the number and letter buttons when either or both are pressed. The button switches are thus held firmly engaged during the selection phases.

c. At the same time contacts 5 & 6 of timing relay No. 1 also provide a 28V D.C. circuit shown in dotted line for the make selection lamp.

d. The closing of contacts 1 & 2 of the latch solenoid switch prepares a part of a 24V A.C. circuit to be used in following phases.

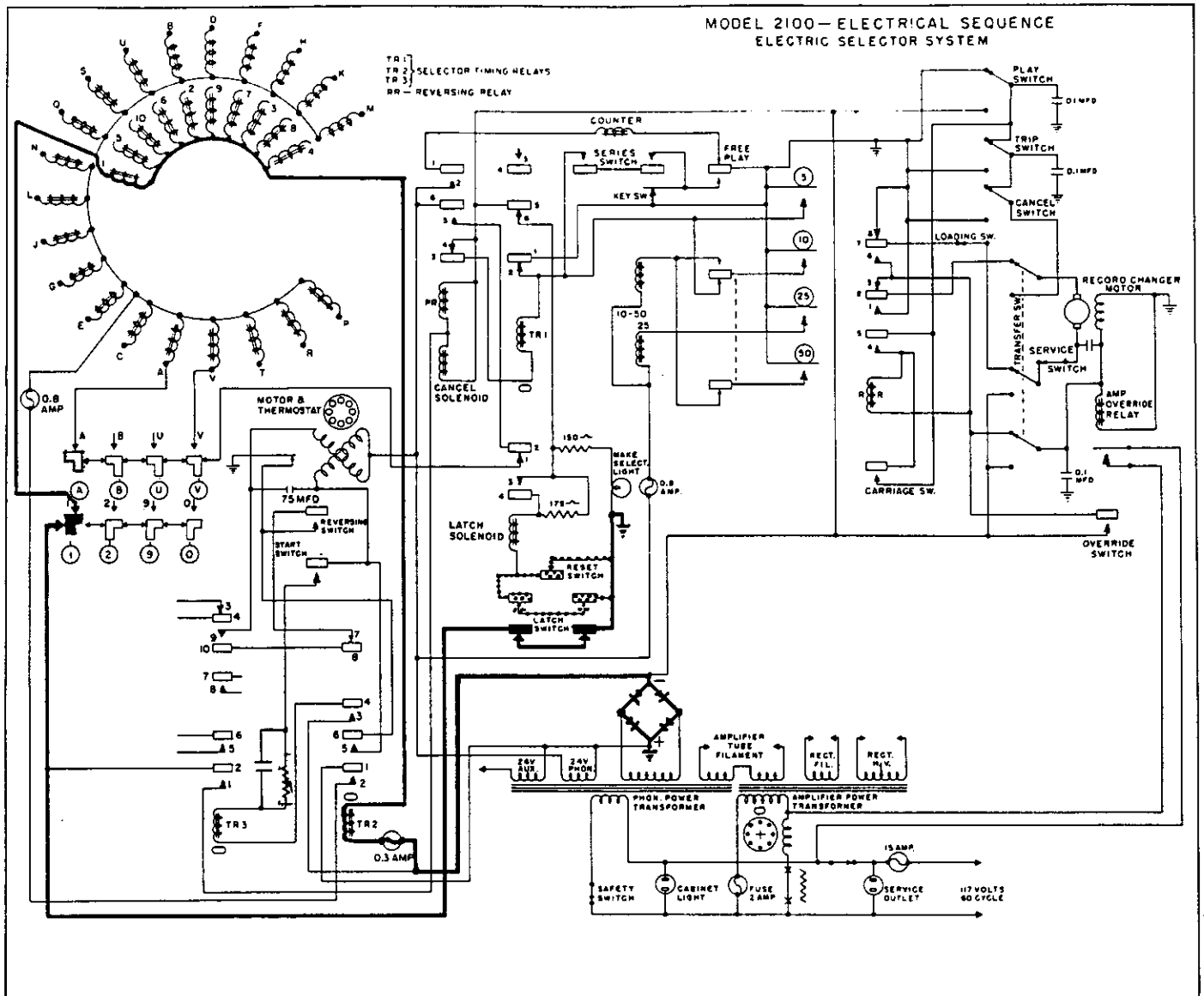


Fig. 41. PHASE 7 - NUMBER SOLENOID SELECTION

a. When both the number and the letter latch switches are closed, a 28V D.C. circuit is completed as shown in heavy line from the negative side of the 28V D.C. rectifier, thru the 0.3 Amp. protective fuse, the coil of timing relay No. 2, selected number solenoid No. 1, number button switch No. 1, and the number and letter latch switches, to common ground and the positive side of the 28V D.C. rectifier .

b. It should be noted at this time that the power circuits and stepper "hold-out" circuits, for the Model 2100 Stepper, have been by-passed to provide a clarified electrical sequence for the phonograph only. The electrical sequence for the Model 2100 Stepper will be treated separately.

c. As described in "a", the selected number solenoid and timing relay No. 2 are energized, however, timing relay No. 2 is delayed, due to the top shorting rings, to insure number solenoid function before the contacts of timing relay No. 2 go into action to start the selector motor.

d. The above circuits have been shown in solid line thru only one pair of latch switches, however, the second pair of latch switches provide another path, shown in dotted line. The purpose of the two paths is to prevent tampering with the sequence of selection by manipulation of the reset button.

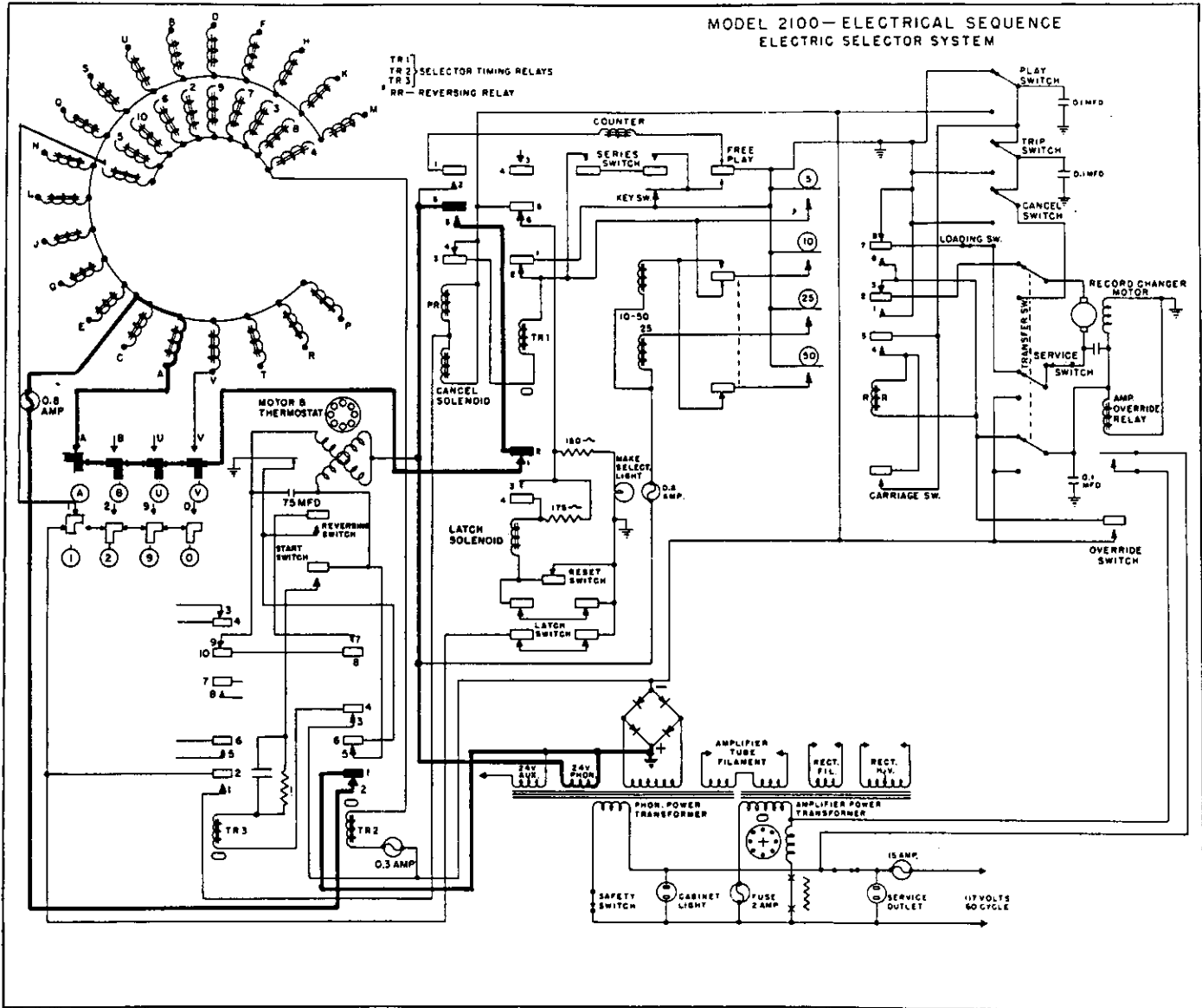


Fig. 42. PHASE 8 - PREPARATION OF 24V A.C. LETTER COIL CIRCUIT

a. As soon as timing relay No. 2 is actuated, its contacts 1 & 2, 5 & 6, and 3 & 4 close and contacts 7 & 8 open.

b. The closing of contacts 1 & 2 of timing relay No. 2 prepares a 24V A.C. circuit as shown in heavy line from the hot side of the 24V A.C. winding

to open contacts 6 & 5 of the pulse relay. From contact 5 the preparation continues thru contacts 2 & 1 of the latch solenoid switch, the letter button switches, letter coil A, the 0.8 Amp. protective fuse, and contacts 2 & 1 of timing relay No. 2 to common ground and the other side of the 24V A.C. source of power.

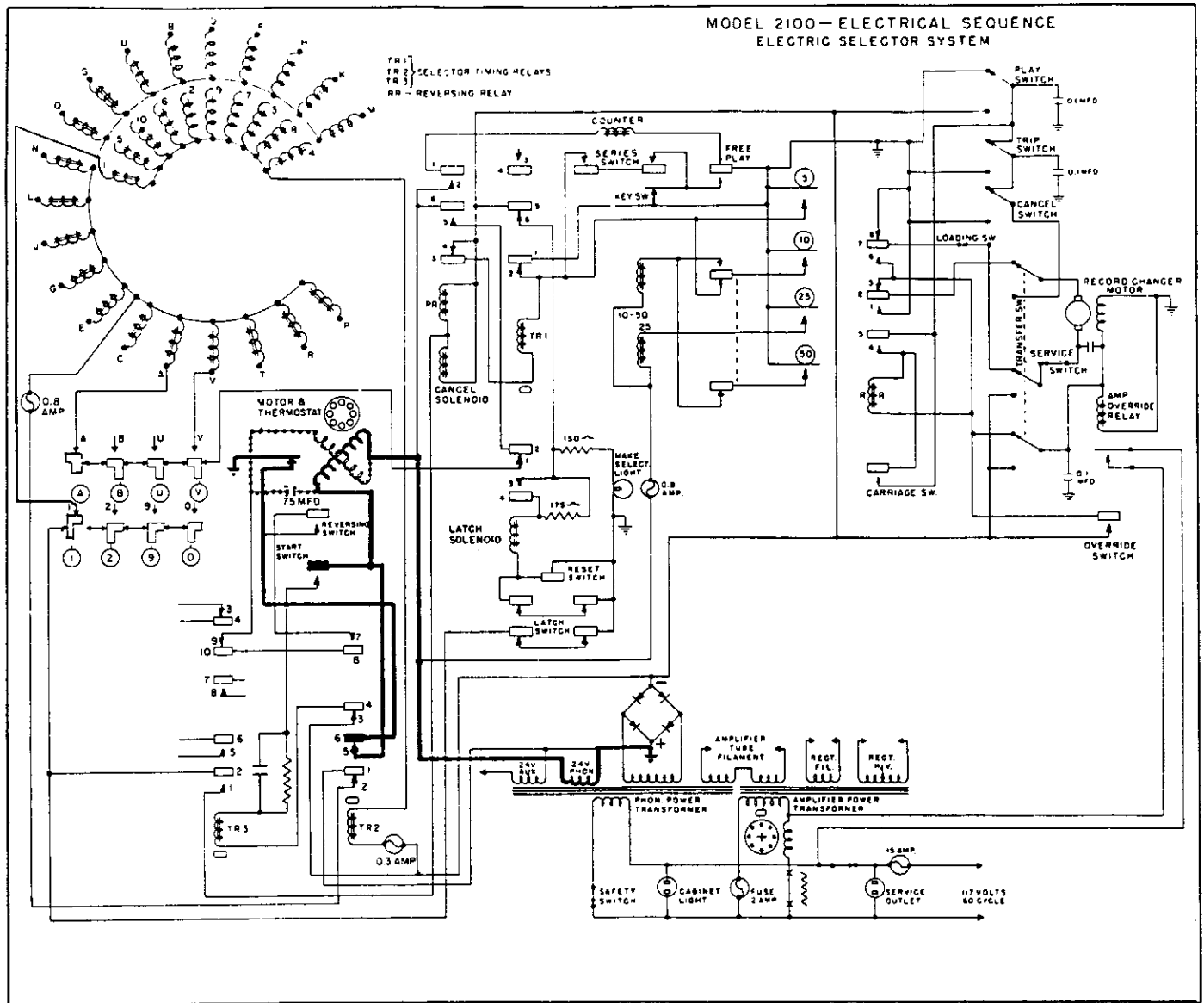


Fig. 43. PHASE 9 - SELECTOR MOTOR CIRCUIT

a. Closing of contacts 5 & 6 of timing relay No. 2 completes a 24V A.C. circuit as shown in heavy line from the hot side of the 24V A.C. winding through two of the field windings of the selector motor, contacts 5 & 6 of timing relay No. 2 and the motor thermostat switch to common ground and the other side of the 24V A.C. source of power. Concurrently, and shown in dotted line, A.C. current will flow through the 75 Mfd. capacitor and, under phase shifted con-

dition, energize the other two field coils of the motor. The result is clock-wise rotation to properly index the "rotating plate and rocker arm assembly" in accordance with the number solenoid selected as a stop.

b. Contacts 7 & 8 of timing relay No. 2 have opened to temporarily isolate a section of the counter-clockwise circuit for the selector motor.

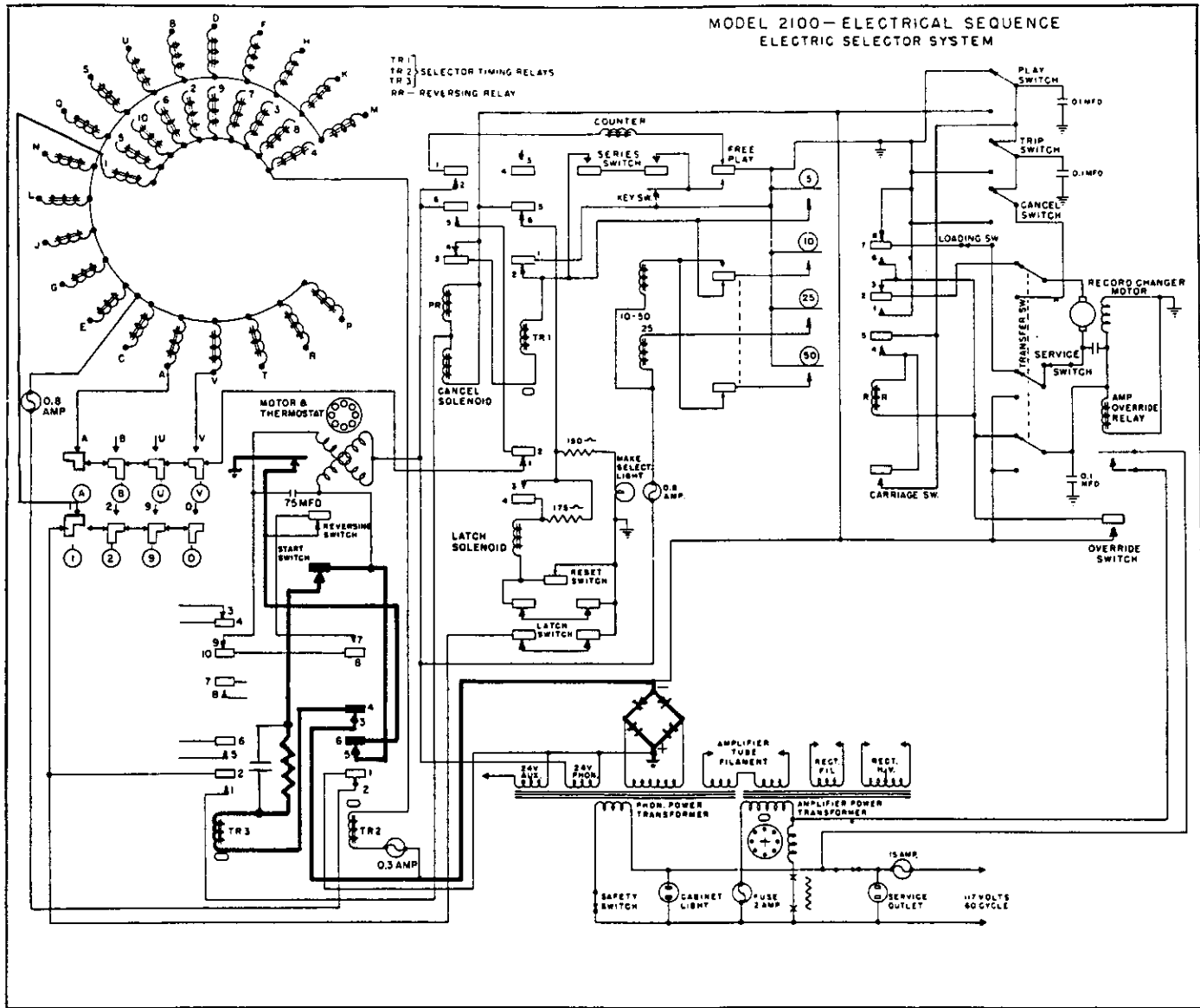


Fig. 44. PHASE 10 - TIMING RELAY NO. 3

a. When one of the 20 stop pins on the "rotating plate and rocker arm assembly" engages the selected number stop solenoid plunger, the number quadrant will be driven to its indexed stop position. At this point the start switch and the reverse switch will be actuated by the quadrant.

b. The reverse switch functions to prepare a section of a 24V A.C. counter-clockwise circuit for the selector motor.

c. Actuation of the start switch completes a

28V D.C. circuit, shown in solid line, from the negative side of the 28V D.C. rectifier, thru contacts 3 & 4 of timing relay No. 2, the coil of timing relay No. 3, the actuated contacts of the start switch, contacts 5 & 6 of timing relay No. 2, and the thermostat switch of the motor to common ground and the positive side of the 28V D.C. rectifier.

d. When timing relay No. 3 is energized, its contacts 1 & 2, and 7 & 8 close, and contacts 9 & 10 open. Contacts 3 & 4, and 5 & 6 may be disregarded as they are components of the stepper sequence.

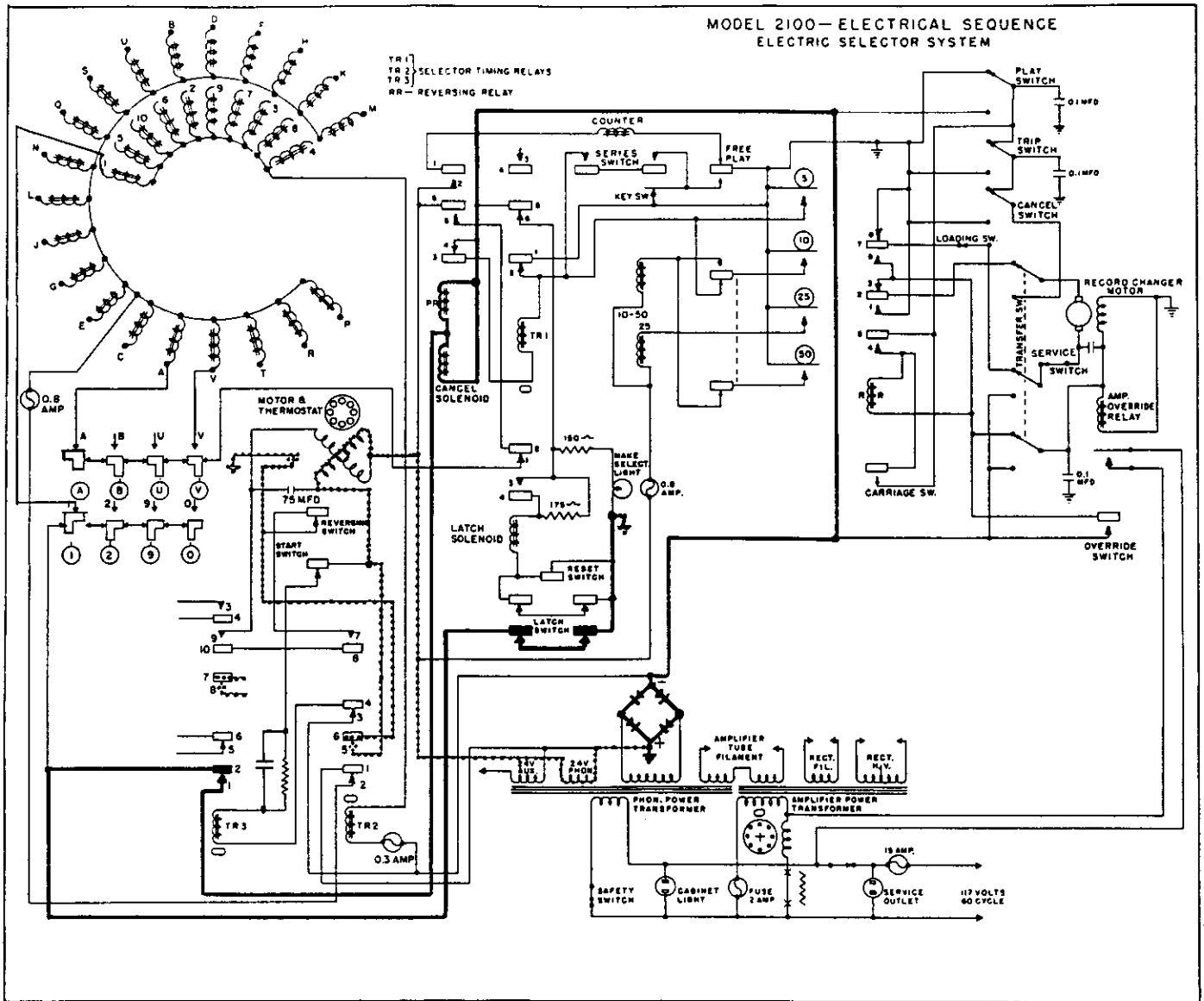


Fig. 45. PHASE 11 - TIMING RELAY NO. 3 FUNCTIONS

a. Closing of contacts 1 & 2 of timing relay No. 3 completes a 28V D.C. circuit as shown in heavy line, from the negative side of the 28V D.C. rectifier, thru the parallel connected cancel solenoid and pulse relay, contacts 1 & 2 of timing relay No. 3 and the number and letter latch switches to common ground and the positive side of the 28V D.C. rectifier.

b. The clockwise circuit for the selector drive motor, shown in dotted line is maintained in the same condition described in phase 9 until the following selection circuits have been completed.

c. The opening of contacts 9 & 10 of timing relay No. 3 isolates the counter-clockwise circuit for the selector motor.

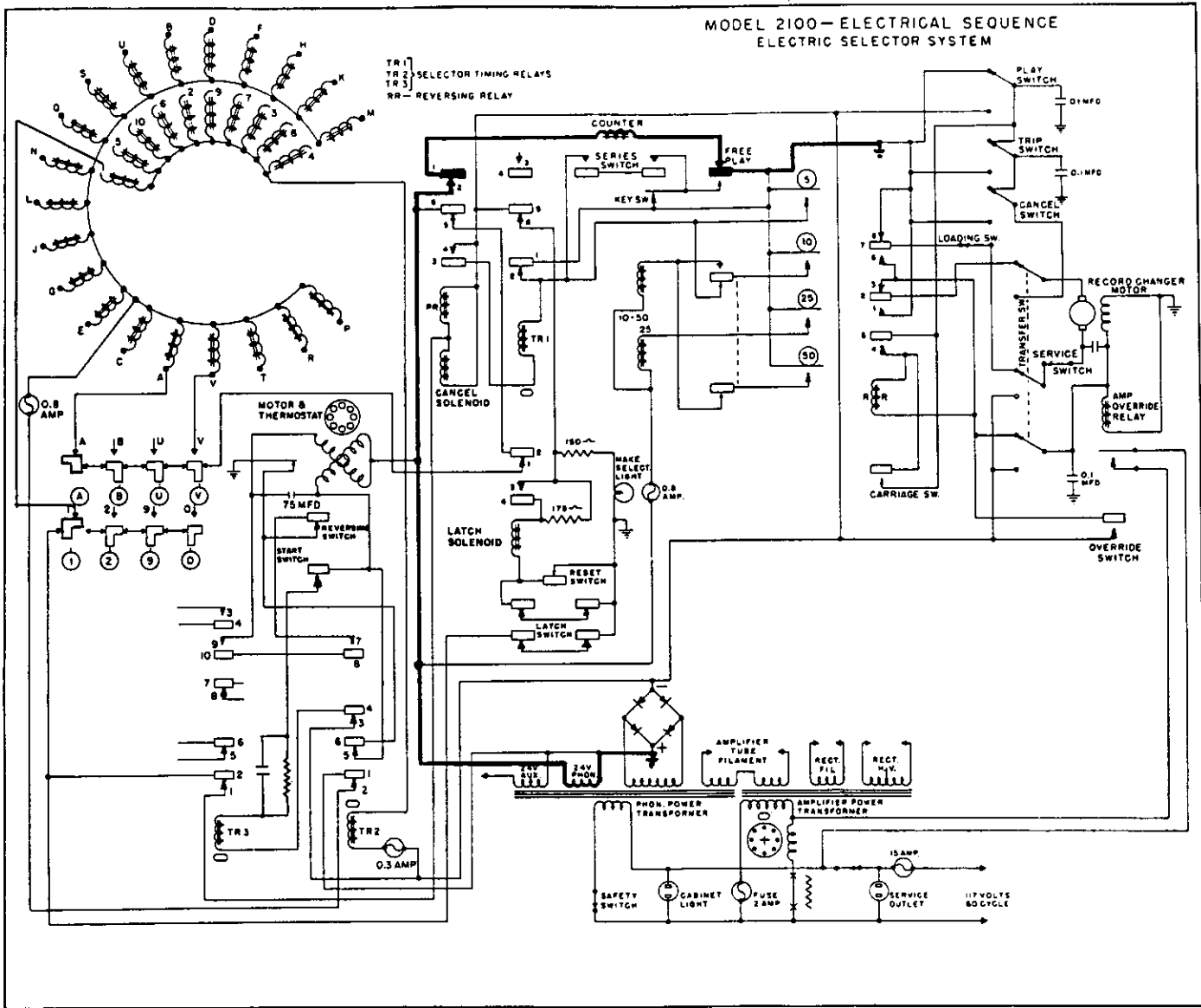


Fig. 46. PHASE 12 - CANCEL SOLENOID AND PULSE RELAY FUNCTIONS

a. When the cancel solenoid is energized, its function is mechanical to retard the accumulator one play each time a selection is made. However, when all credits have been cancelled, the cancel wheel opens the key switch to prevent further selection.

b. When the pulse relay is energized, as described in Phase "11, a", its contacts 1 & 2, and 5 & 6 close and contacts 3 & 4 open.

c. The closing of contacts 1 & 2 of the pulse relay completes a 24V A.C. circuit as shown in heavy

line from the hot side of the 24V A.C. winding, thru contacts 2 & 1 of the pulse relay, the coil of the electric counter, and the free-play switch to common ground and the other side of the 24V A.C. source of power. The electric counter is thus advanced one unit to record the perpetual count of selections.

d. Opening of contacts 3 & 4 of the pulse relay breaks the interlock circuit, of timing relay No. 1 described in Phase 5. Due to shorting rings at the bottom of its coil timing relay No. 1 will not disengage immediately.

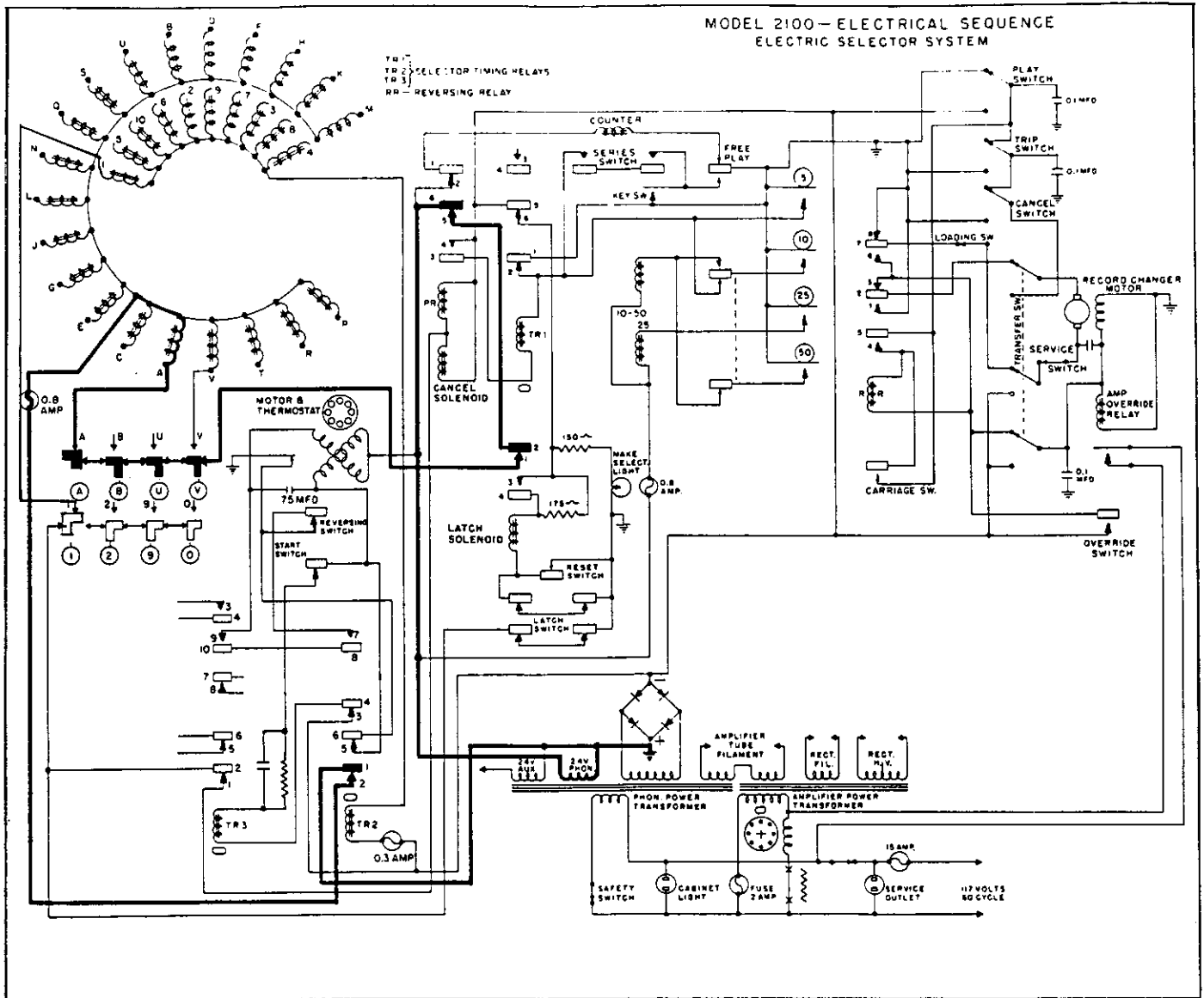


Fig. 47. PHASE 13 - PULSE RELAY FUNCTION

a. As previously described in Phases 9 and 11, the selector motor is holding the "rotating plate and rocker arm assembly" indexed to 20 latch pins No. 1, however, the letter solenoid "A" has been selected at the selector switch button and a 24V A.C. circuit has been prepared as described in Phase 8.

b. Closing of contacts 5 & 6 of the pulse relay completes the 24V A.C. circuit as shown in heavy line from the hot side of the 24V A.C. winding, thru contacts 6 & 5 of the pulse relay, contacts 2 & 1 of the latch solenoid switch, the series connected se-

lector button switches and letter switch "A", the coil of letter solenoid "A", the 0.8 Amp. protective fuse, and contacts 2 & 1 of timing relay No. 2, to common ground and the other side of the 24V A.C. source of power.

c. The selection pulse is thus held until the delayed release of timing relay No. 1 has occurred. The release of timing relay No. 1 will open the latch solenoid circuit described in Phase 6, to terminate the 28V D.C. selector pulse and also release timing relay No. 2 and the number solenoid energized in Phase 7.

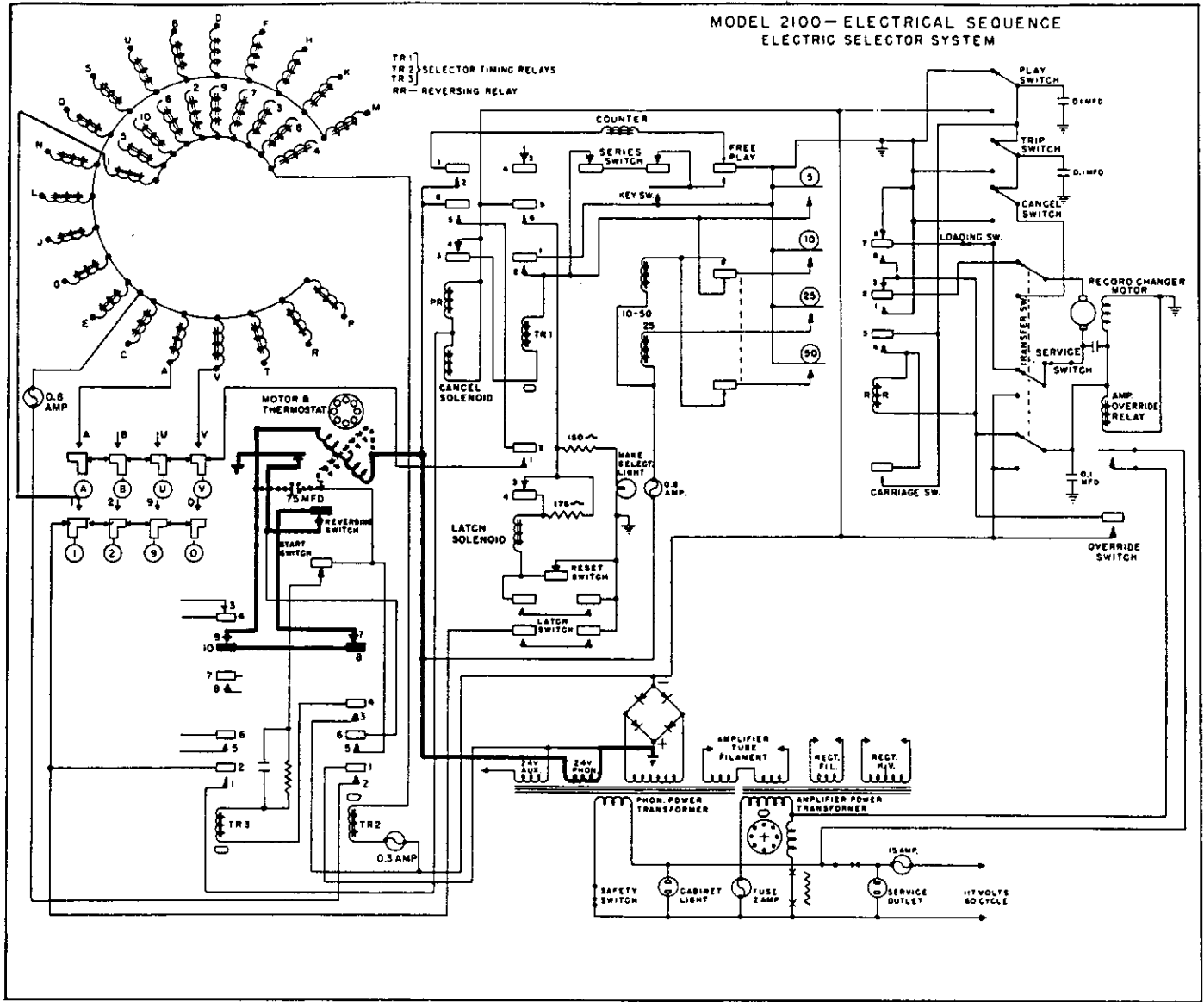


Fig. 48. PHASE 14 - SELECTOR MOTOR "COUNTER-CLOCKWISE" CIRCUIT

a. When timing relay No. 2 is released, its contacts 3 & 4 and 5 & 6 will open and contacts 7 & 8 will close. Contacts 3 & 4 and 5 & 6 open the circuit to timing relay No. 3 shown in Phase 10. Contacts 7 & 8 close to prepare the counter-clockwise selector motor circuit.

b. The final release of timing relay No. 3 closes its contacts 9 & 10 to complete a 24V A.C. circuit as shown in heavy line from the hot side of the 24V A.C. winding, through the two counter-clockwise field coils of the selector motor (see Phase 9), contacts 9 & 10 of timing relay No. 3, contacts 8 & 7 of timing relay No. 2, the actuated reverse switch, and the selector motor thermostat switch to common ground and the other side of the 24V A.C. source of power.

c. Shown in dotted line, the 75 Mfd. capacitor furnishes "phase shifted" current to the other two field coils of the selector motor to produce counter-clockwise rotation.

d. The counter-clockwise rotation will release the number quadrant and permit the reverse switch and the start switch to retract to their original condition as shown in Phase 1.

e. When no credits remain on the Playrak, the electrical and mechanical conditions revert to those represented in Phase 1. When there is one or more credits remaining on the Playrak the electrical and mechanical conditions of the electric selector system revert to those represented in Phase 6.

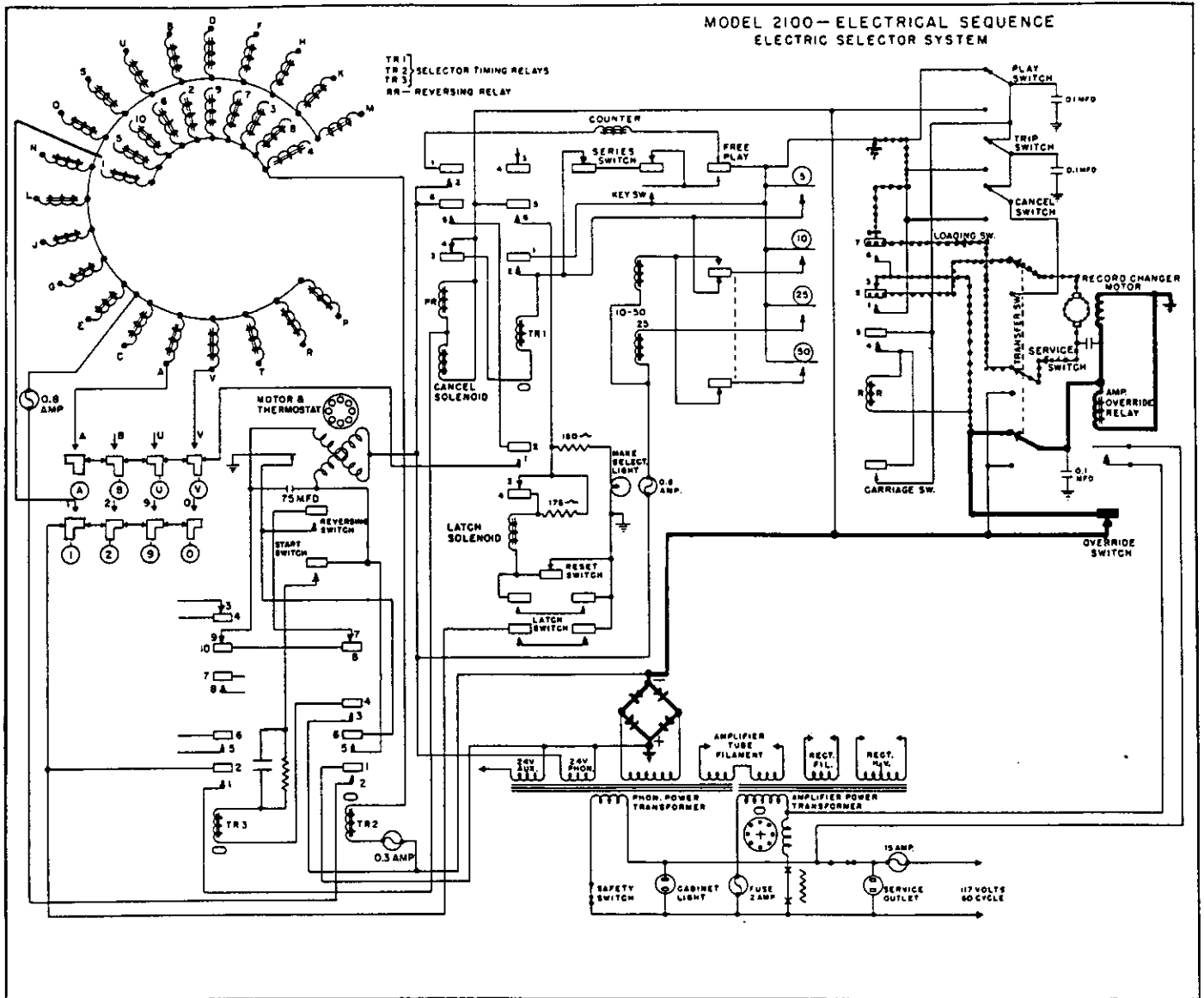


Fig. 49. PHASE 15 - SELECTOR LATCH PIN FUNCTION

a. When one or more selector latch pins are released, under their spring loading, the selector wobble ring is displaced. Displacement of the wobble ring will actuate one or more of the four over-ride switches located around the selector plate.

b. Closing of one or more of the over-ride switches completes a 28V D.C. circuit as shown in heavy line from the negative side of the rectifier thru the over-ride switch, one pole of the transfer switch and thru the coil of the "amplifier over-ride relay" and the field of the changer motor to common ground and the positive side of the 28V D.C. rectifier.

c. At the same time closing of the over-ride

switch completes a 28V D.C. circuit shown in dotted line from the negative side of the rectifier thru the over-ride switch, contacts 3 & 2 of the reversing relay, a second pole of the transfer switch, the armature of the changer motor, the service switch, the third pole of the transfer switch, the loading switch, and contacts 7 & 8 of the reversing relay to common ground and the positive side of the 28V D.C. rectifier.

d. The changer motor is thus energized and the cycle of operation of the record changer will start. The electrical and mechanical sequence of this cycle will be discussed in detail under Record Changer Operation.

4. ADJUSTMENTS

SELECTOR SWITCH ASSEMBLY, FIGS. 50 AND 51

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

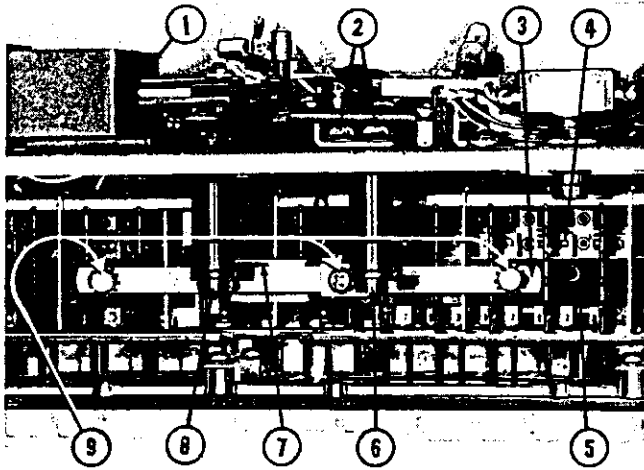


Fig. 50. SELECTOR SWITCH ADJUSTMENTS

- | | |
|---|-------|
| 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 | |

position to complete retracted position. Their respective latch bars (Items 5 and 7, Fig. 50) 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.

b. With the latch solenoid resting against the stop bracket loosen the two screws (Item 2, Fig. 51) and set the bracket to provide 1/32" clearance between the letter latch pin (Item 12, Fig. 51) and the letter pawl (Item 13, Fig. 51).

c. Both the letter latch pawl and the number latch pawl (Items 3 and 4, Fig. 51) have adjusting screws. These latch pawls should be adjusted to engage fully with their respective latch pins (Item 10 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.

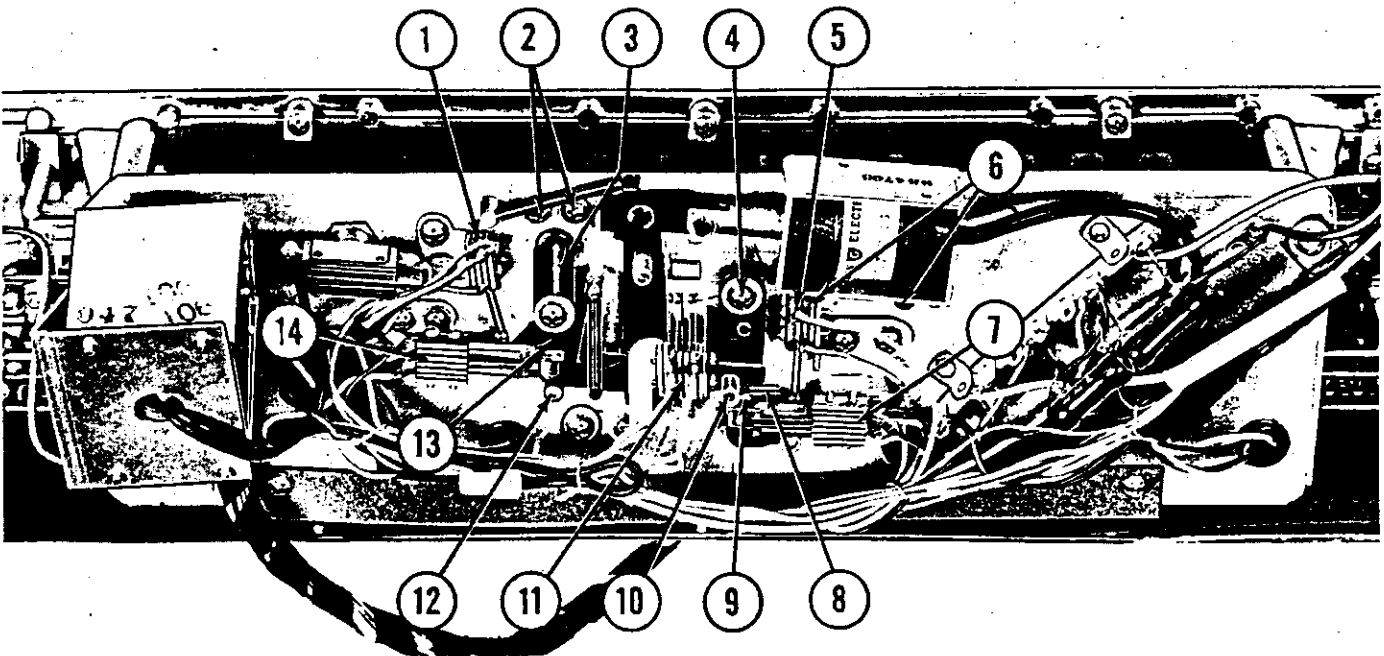


Fig. 51. SELECTOR SWITCH ADJUSTMENTS

- | | | | |
|--|----------|--|-------|
| 1. Series Switch, Letters | 64982 | 8. Clearance 1/32" | |
| 2. Stop Bracket, Latch Solenoid | 56628 | 9. Release Lever Tab (Lever, Stud, and Spacer Assembly) | 56713 |
| 3. Letter Latch | 65010 | 10. Latch Pin, Numbers (Lever, Stud and Spacer Assembly) | 56714 |
| 4. Number Latch, (Pawl, Stud, and Spacer Assembly) | 65745 | 11. Latch Solenoid Switch | 66113 |
| 5. Series Switch, Numbers | 64981 | 12. Latch Pin, Letters | 56712 |
| 6. Adjusting Screws, Latch Solenoid | 73533-22 | 13. Pawl, Letter Latch | 65010 |
| 7. Latch Switch, Numbers | 60518 | 14. Latch Switch, Letters | 60518 |

d. Adjustment of the release lever clearance (Item 8) is accomplished by the position of the latch solenoid (Item 6), however, it is recommended that the latch solenoid switch (Item 11) 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 9) 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.

ELECTRIC SELECTOR ASSEMBLY, FIGS. 52 AND 53

a. Over-ride Switch Setting.

The over-ride switch consists of four leaf type switches (Item 2, Fig. 52) mounted on the lower plate and spacer assembly (Item 5). One blade of each of these four switches is used for connection with the wobble ring by means of the four nylon spacers (Item 6). Upward movement of one or more latch pins raises the wobble ring which in turn will actuate one or more of the over-ride switches.

With the selector latch pins all latched (the non-selected position) the four over-ride switches should be set to provide freedom of movement of the wobble ring as it rests on the inner shoulders of the 200 latch pins. In this condition, the four switches should be open $1/32$ " to $1/16$ ".

When the selector is electrically connected with phonograph 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 latch pin is reset. Good wiping action of the switch contacts is essential. Make tests electrically by release of latch pins located half way between each two over-ride switches.

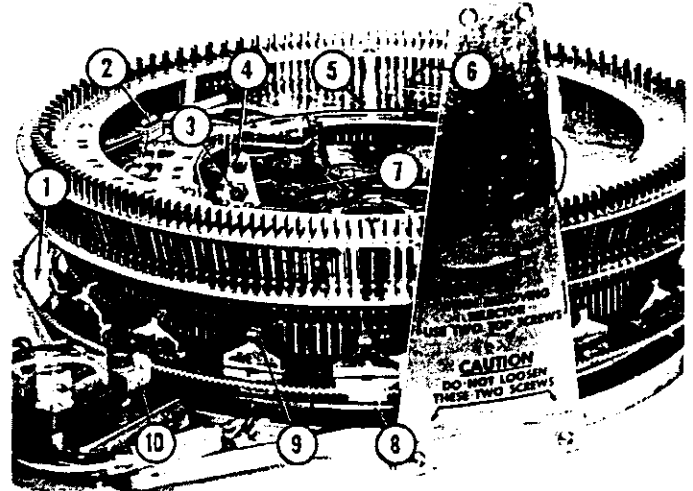


Fig. 52. ELECTRIC SELECTOR ADJUSTMENTS

1. Rotating Plate and Rocker Assembly	68245
2. Over-ride Switch	65952
3. Adjusting Screw, Start Switch	73515-38
4. Adjusting Screw, Reverse Switch	73515-36
5. Lower Plate and Spacer Assembly	68448
6. Nylon Spacer	68650
7. Start Switch	61596
8. Actuating Bar, Rocker Arm	
9. Hardened Bracket, Rocker Arm	69013
10. Nylon Gear, Selector Motor	68717

b. Forward Mechanical Stop of Number Quadrant - Item 2, Fig. 53.

To accomplish this setting, depress number solenoid No. 0 (Item 6, Fig. 53) and turn the rotating plate and rocker assembly (Item 1, Fig. 52) in a clockwise direction by turning the nylon gear of the selector drive motor (Item 10, Fig. 52). One of the twenty stop pins (Item 3, Fig. 53) will engage the depressed plunger of stop solenoid No. 0 and begin moving the number quadrant assembly (Item 1, Fig. 53). Continue rotation until the quadrant stops against the forward stop screw (Item 2, Fig. 53). At this point the hardened brackets at the top of the rockers (Item 9, Fig. 52) should all be aligned with twenty corresponding latch pins designated as No. "0" eg. A0, B0, C0 etc. Also the rocker actuating bars (Item 8, Fig. 52) must be aligned with their respective letter solenoid plungers at the forward stop position of both number stop "0" and number stop "1".

NOTE: It may be necessary in some cases to justify the above requirements to provide correct indexing under electrical operation.

c. Start Switch Setting. Item 7, Fig. 52

The start switch (Item 7, Fig. 52) should be set to actuate by the forward motion of the number

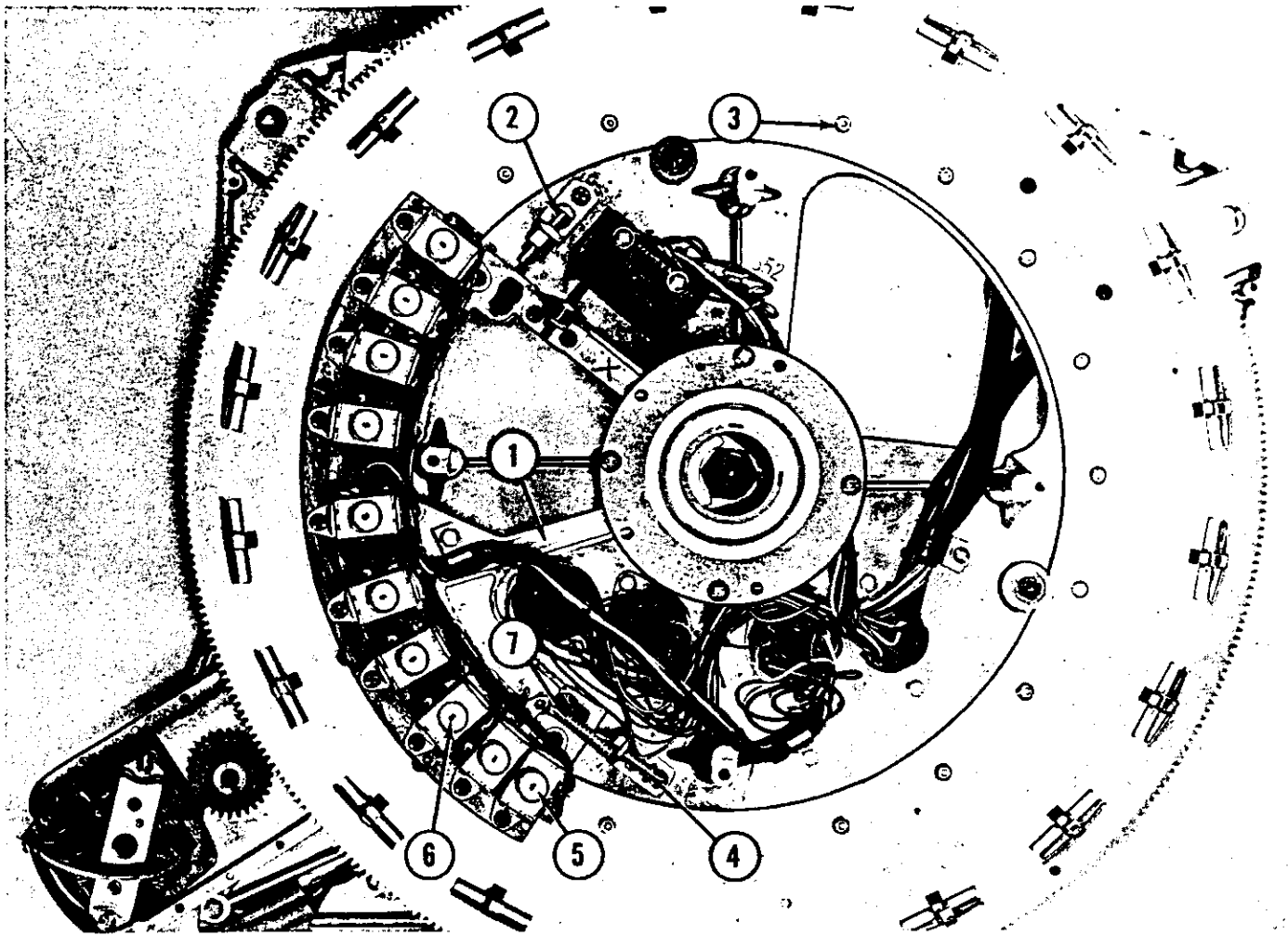


Fig. 53. ELECTRIC SELECTOR ADJUSTMENTS

1. Number Quadrant Assembly (Mounting Casting)	68793	5. Number Stop Solenoid No. 1	68804
2. Screw, Forward Stop	73793-125	6. Number Solenoid No. 0	68617
3. Stop Pin, Rotating Plate	68648	7. Spring, Retracting	62773
4. Back Stop	73575-95		

quadrant. Set the adjusting screw (Item 3, Fig. 52) to provide switch action at the forward stop adjustment, established in "b", with $1/32" \pm 1/64"$ over-travel.

NOTE: The over-travel of the start switch may be extended to $1/16"$ in phonographs that have been wired in accordance with Service Slant W-276 or in others that have been modified in accordance with W-276.

d. Back Mechanical Stop of Number Quadrant.

When the quadrant is released, the back stop (Item 4, Fig. 53) for the number quadrant should be set to provide $1/16"$ over-travel of the quadrant, after the start switch actuates. The spring (Item 7, Fig. 53) provides retracting action for the number quadrant.

e. Reverse Switch Setting. Item 4, Fig. 52

The reverse switch adjusting screw (Item 4, Fig. 52) should be set to provide over-travel in the

following manner: With the number quadrant against the back stop adjustment established in "d" turn the adjusting screw (Item 4, Fig. 52) clockwise until the switch is actuated and then counter-clockwise until the switch is again actuated. Continue the counter-clockwise adjustment $1/4$ turn of the adjusting screw after the switch actuates.

f. Adjustments for the selector crank will be covered after installation and alignment of the electric selector with the record changer.

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.

WURLITZER MODEL 2100 RECORD CHANGER

1. GENERAL DISCUSSION

The Wurlitzer Model 2100 record changer (Fig. 54) 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 2100

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 2100 Wurlitzer record changer is a precision-built mechanism, and although sturdily constructed, it should be handled like any other finely made instrument.

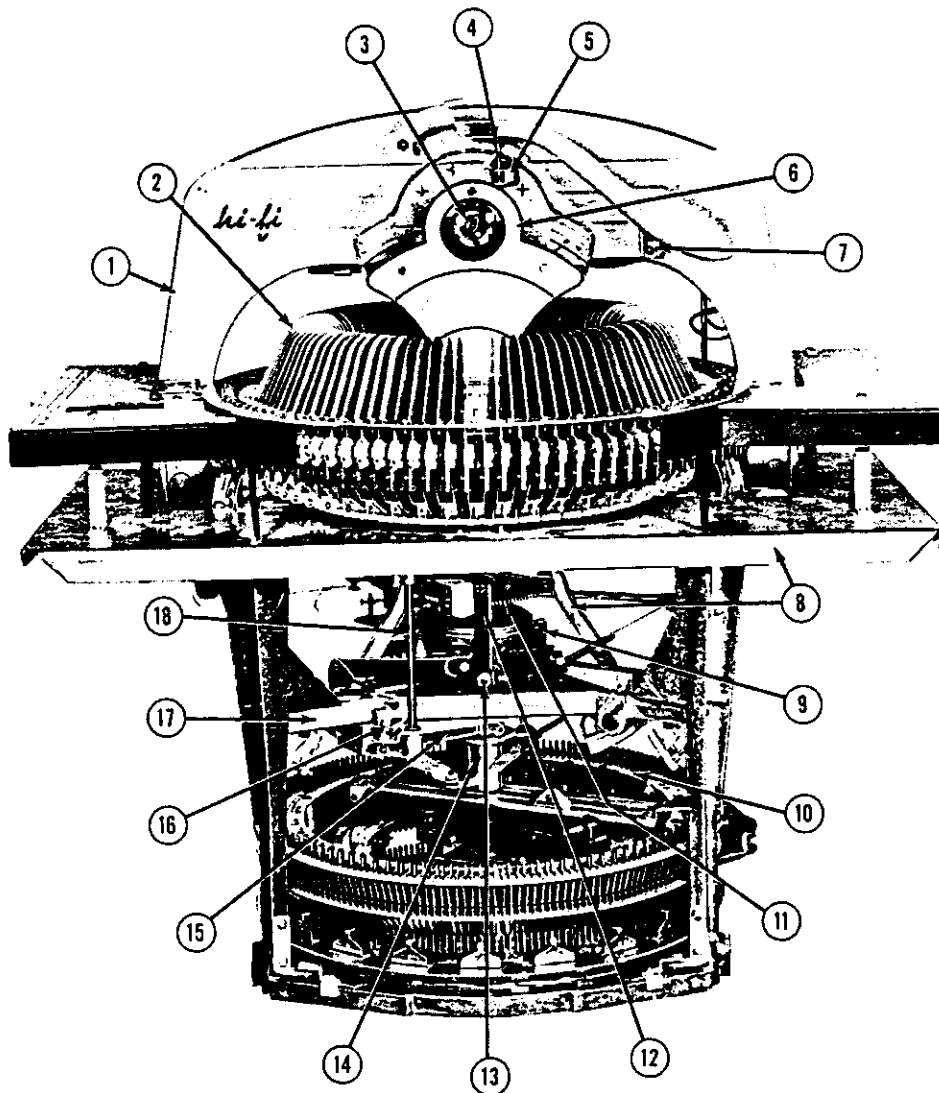


Fig. 54. MODEL 2100 RECORD CHANGER (FRONT VIEW)

1. Top Support Casting Assembly	68581	10. Electric Selector Assembly	68127
2. Record Carrier Assembly	68576	11. Gear and Ratchet Wheel Assembly	59732
3. Turntable and Shaft Assembly	68102	12. Link and Lever Assembly, Record Arms (Whiffletree)	59599
4. Feed-in Adjusting Screw (Pin, Tone Arm Stop)	64422	13. Cam Follower, Bearing	60991
5. Release Lever, Tone Arm	64530	14. Sleeve and Bushing Assembly, (Loading)	68483
6. Record Guide Assembly	68025	15. Stop Lever and Roller Assembly, (Loading)	68525
7. Mounting Casting, Tone Arm	64574	16. Switch, Loading	53648
8. Chassis Mounting Plate and Record Lift Arm Assembly	68459	17. Chassis Frame Assembly	68462
9. Main Cam, Bushing, and Pawl Assembly	69596	18. Release Lever and Shaft Assembly	68557

2. DESCRIPTION

Five major assemblies, or groups of assemblies make up the record changer, Figure 54. 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 8, the chassis mounting plate and record lift arm assembly. Item 17, the chassis frame assembly, includes the main shaft assembly, Item 12 and the electric selector assembly, Item 10. 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. 54 and 55) are as follows:

(1) Tone Arm Assembly.

A bracket on the right front side of the top support casting mounts the tone arm assembly (Item 7, Fig. 54). The complete tone arm assembly consists of the tone arm casting, mounting casting and

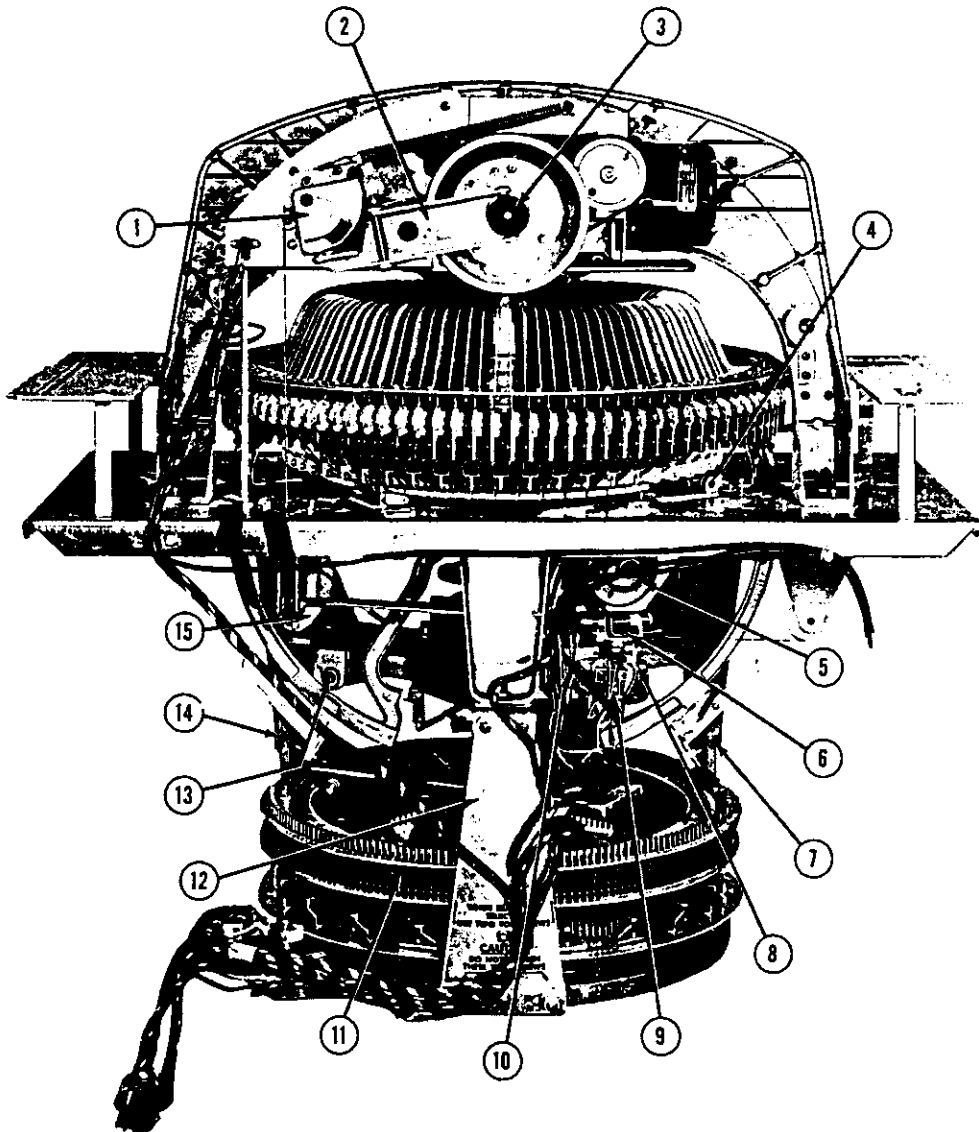


Fig. 55. MODEL 2100 RECORD CHANGER (REAR VIEW)

1. Cam, Record Clamp	59464	9. Mute and Play Switch and Bracket Assembly	65170
2. Arm and Roller Assembly, Turntable Release	59922	10. Transfer Switch and Bracket Assembly	59569
3. Plate, Record Clamp	63205	11. Electric Selector Assembly	68127
4. Back Stop Pawl Assembly	65890	12. Support Plate	68520
5. Motor, Record Changer	65625	13. Shaft and Cancel Arm Assembly	59632
6. Actuator Arm, Transfer Switch	59691	14. Support Casting, R.H.	67928
7. Support Casting, L.H.	68700	15. Lever Assembly, Record Clamp	59688
8. Actuator Arm, Mute and Play Switch	62761		

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. 54)

The tone arm release lever, (Item 5, Fig. 54) is mounted behind the tone arm on the upper right side of the support casting (Fig. 54). 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 (Item 6, Fig. 54) 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. 55)

The turntable motor and mounting bracket assembly is mounted on the left rear of the top support casting assembly (Fig. 55). The motor operates on 115 volt, 60 cycle current. Power is supplied to the turntable motor when over-ride relay has been actuated by over-ride switch action. See Page 31, Phase 15.

(6) Turntable Shaft and Record Clamp Assembly. (Figs. 54 and 55)

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 (Item 3, Fig. 55) is mounted on the rear end of the inner, record clamp shaft.

(7) Record Clamp Lever and Bracket Assembly.

The record clamp, arm and roller assembly (Item 2, Fig. 55) is mounted on the right of the back plate of the top support casting. The record clamp arm is pivoted on its mounting bracket to transfer action of the record clamp cam to the sliding shaft (Item 3) which operates the record clamps. The record clamp cam, (Item 1, Fig. 55) 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.

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. 55) 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. (Item 2, Fig. 54)

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 nuts or tapping plates where the segments join. The four segments are identified by the last number at the ends of the segment as A1-L1, L2-B1, M1-A2, B2-M2, A1-B1, A3-B3, A5-B5 etc. Each side of every record is identified on the carrier ring by a letter and a number such as A1. These numbers are silk screened on the carrier ring segments.

c. Chassis Mounting Plate and Record Lift Arm Assembly. (Item 8, Fig. 54)

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 lift 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. 55).

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 55. 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, even though selector latch pins are released.

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. 54 and 55).

(1) Link and Lever Assembly. (Item 12, Fig. 54)

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. (Item 15, Fig. 55)

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. (Item 13, Fig. 55)

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 lower cancel arm and cancel sleeve on the 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 (Items 6 and 8, Fig. 55) 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, (Item 10, Fig. 55) functions to change operation of the record changer from record handling operation to searching operation. The mute and play switch (Item 9, Fig. 55) 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, (Item 11, Fig. 54) main cam and bushing assembly, thrust bearing and spacers, and the main selector shaft 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 becomes 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, (Item 11, Fig. 54) 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 (Item 5, Fig. 55)

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 provided 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. 54)

The cancel action created by the cancel cam is transferred by the "shaft and cancel arm assembly" through the lower cancel arm and cancel sleeve to the selector crank. Cancel action is thus provided for the selector crank.

(9) Release Lever and Shaft Assembly. (Fig. 55)

The release lever and shaft assembly, (Item 18, Fig. 54) consists of a mounting bracket, the operating lever, a shaft and the actuating arm. It is used to turn the "sleeve and bushing assembly" (Item 14, Fig. 54) and allow the selector crank to raise above its searching position. The actuator arm also engages the loading switch (Item 16, Fig. 54) to intercept the changer motor circuit. In this way the record carrier may be turned freely for loading records and the record changer may not be started until the release lever has been returned to the play position. 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 released 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 back stop pawls (Item 4, Fig. 55) to properly index the record carrier for record handling.

f. Electric Selector Assembly. (Figs. 55 and 56)

The electric selector and its mounting casting (Item 11, Fig. 55) are mounted on the two support castings (Items 7 and 14) and the support plate (Item 12, Fig. 55). The components of the electric selector assembly (Fig. 56) and their respective functions are described under the heading "Electric Selector Assembly, Figs. 52 and 53", pages 33 and 34.

g. Junction Box and Stepper Unit. (Figs. 32, 33, and 34)

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 0.3 Amp. Fusetron for

protection of the number coils and timing relay No. 2. 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 letter coils. 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, 2 timing relays, 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.

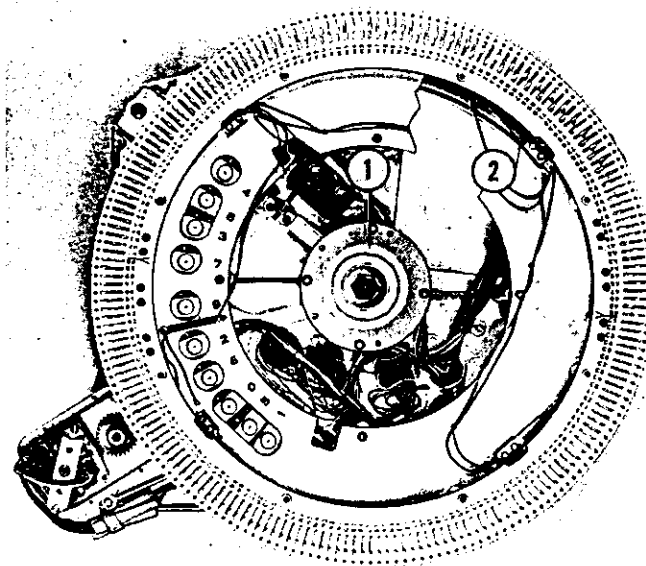


Fig. 56. ELECTRIC SELECTOR ASSEMBLY (SOLENOID ARRANGEMENT)

- | | |
|---------------------------|-------|
| 1. Contact Plate Assembly | 66186 |
| 2. Wobble Ring | 67927 |

3. OPERATION (Figs. 57 thru 64)

The model 2100 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. 57)

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.

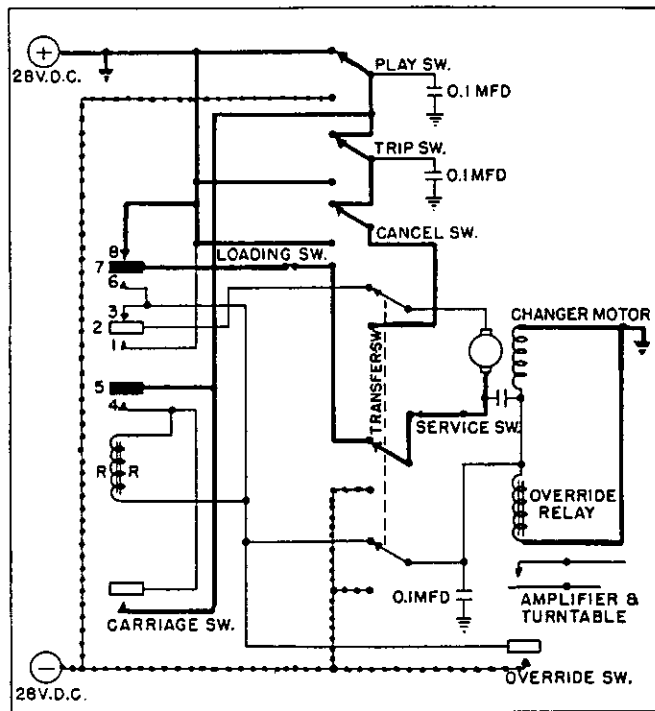


Fig. 57. PHASE 1

(1) Electrical Condition -- Phase 1.

The electrical condition of the record changer during the stand-by or (at rest) phase is shown in Figure 57. Common ground (or positive D.C. voltage) as shown in heavy line is present at one side of the motor armature, one side of the motor field, one side of the over-ride relay, one open contact of the transfer switch, one open contact of the reverse relay, and one open contact of the trip switch, cancel switch, and carriage switch. Negative D.C. voltage (or the hot side) is present as shown in dotted line, at one contact of the over-ride switch, two open contacts of the transfer switch and one open contact of the play switch. No action therefore will take place until the over-ride switch is closed as described under "Electric Selector System", page 31, and Figure 58.

(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 Relay. (Fig. 58)

When a coin is registered on the playrak 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 the over-ride relay and record changer motor as shown in heavy line.

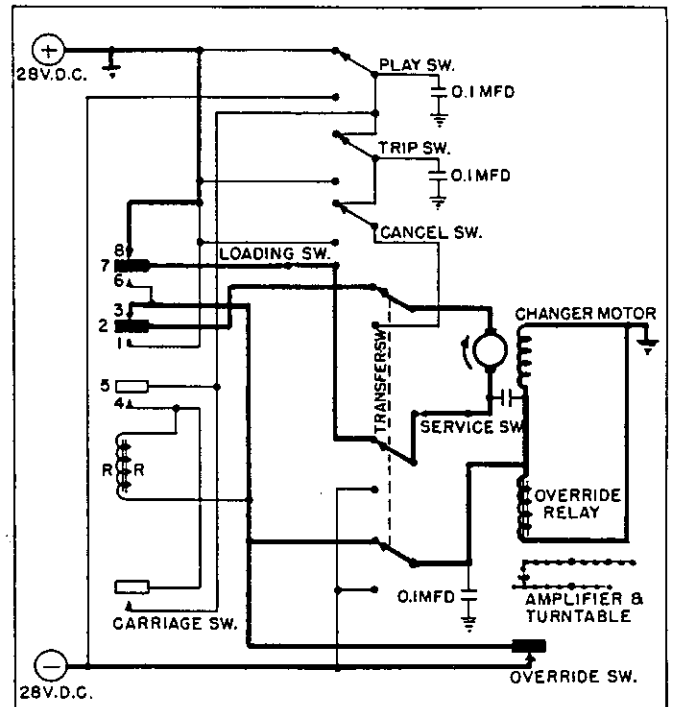


Fig. 58. PHASE 2

(1) Electrical Condition -- Phase 2.

When the over-ride relay is energized, 28V D.C. circuits are completed as shown in solid line to the changer motor armature and the changer motor field. Thus, the changer motor starts its clockwise operation to drive the record carrier and selector crank through the searching phase of the cycle, while its normally open contacts close, as shown in Fig. 58, completing the A.C. circuit to the turntable motor and the amplifier as shown in dotted line.

(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 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. 59)

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.

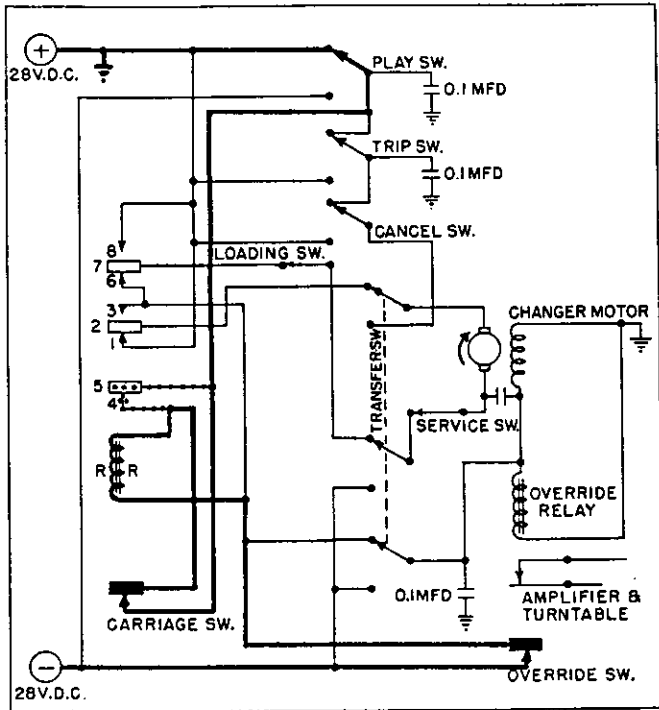


Fig. 59. PHASE 3

(1) Electrical Condition -- Phase 3.

The closing of the carriage switch completes a D.C. circuit to the reversing relay coil, as shown in solid line. The reversing relay has two single pole, double throw switches and one single pole, single throw switch. It functions as a pole changer for the armature of the record changer motor. As shown in heavy line the pole changing circuit is the principal electrical change as shown in Figure 60, solid line. The polarity of the armature has been reversed, however the motor field retains its original polarity as shown in dotted line and in Figure 58. The closing of contacts 4 & 5 of the reversing relay (Fig. 59, dotted line) prepare an interlock circuit to continue the reversing relay function after release of the carriage switch.

(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

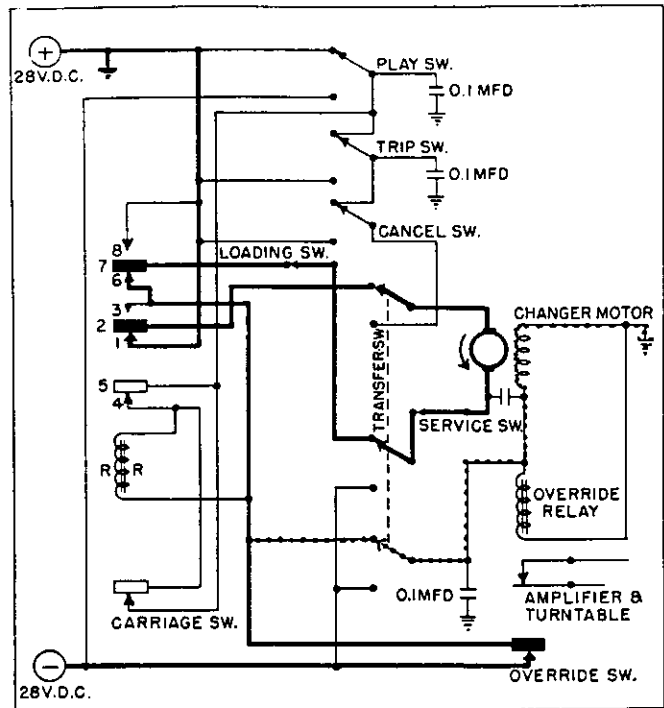


Fig. 60. PHASE 4

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. 61)

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 61 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. The field circuit is shown in dotted line and the armature cir-

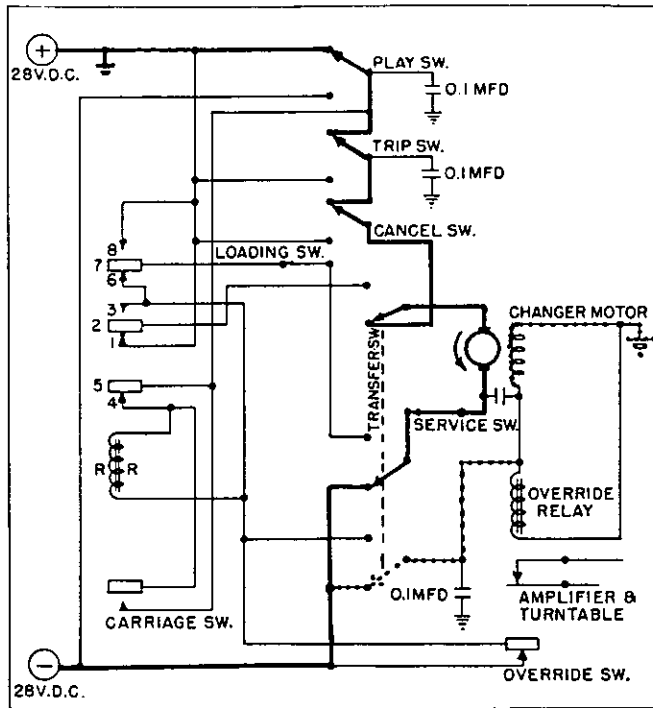


Fig. 61. PHASE 4

cuit in solid line with the same polarity as indicated in Fig. 60.

(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 Function. (Fig. 62)

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.

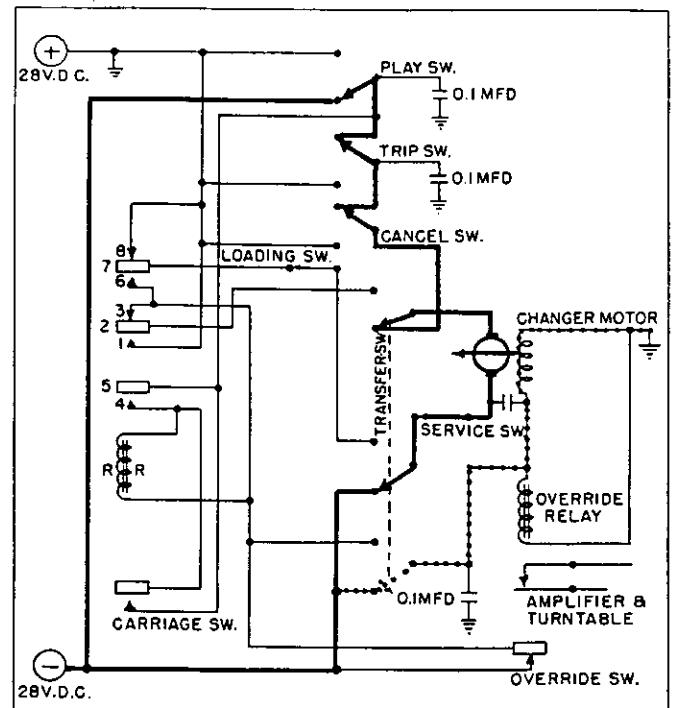


Fig. 62. PHASE 5

(1) Electrical Condition -- Phase 5.

Figure 62 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 as shown in dotted line. Not shown in solid or dotted lines, the over-ride relay 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. The interlock circuit for the reversing relay as established in Phase 3, Figure 59 will be released when the play switch actuates as described in this phase of operation.

(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. 63)

The function of the trip switch, as shown in heavy lines, Figure 63, 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 releases the play switch and then releases the trip switch.

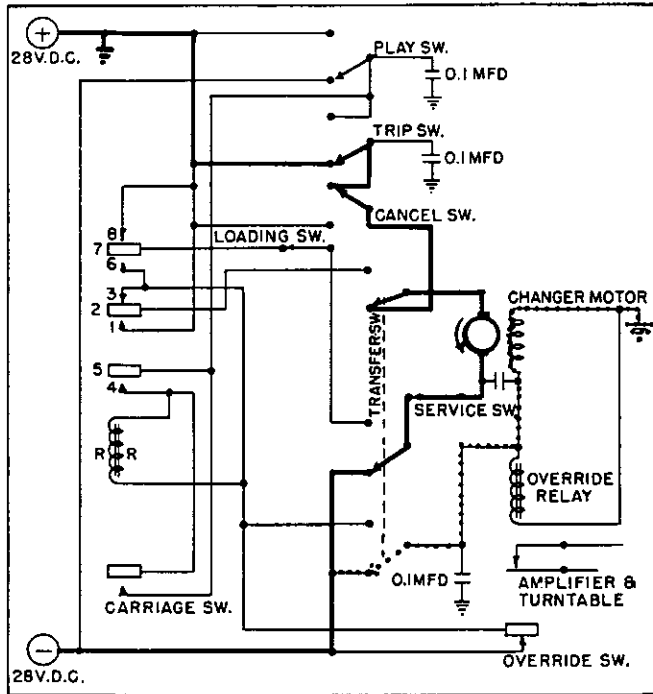


Fig. 63. PHASE 6

(1) Electrical Condition -- Phase 6.

An examination of Figure 63, 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. The over-ride relay, not shown in heavy lines, still remains energized due to the position of the transfer switch.

(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 leaves 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. With the exception of the reversing relay, the electrical condition is again as shown in Figure 61.

g. Phase 7 -- Return Functions of Main Cam.

(1) Electrical Condition -- Phase 7.

As described in Phase 6, the reversing relay has been released to its "at rest" position, the play switch and trip switch have been returned to their "at rest" position and the mechanism is being driven by the counter-clockwise rotation of the changer motor. Only the transfer switch remains to be reset.

(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, release the turntable clamp, lower the record into its holder in the record carrier, and retract both record lift arms to their original "at rest" position. The last function of the main cam, in the cycle of operation, is to reset the transfer switch to its "at rest" position.

h. Phase 8 -- Transfer Switch Function at Full Cycle. (Fig. 64)

As described in "g" all functions of the cycle of operation have been completed under the conditions shown in solid and dotted lines, Figure 64.

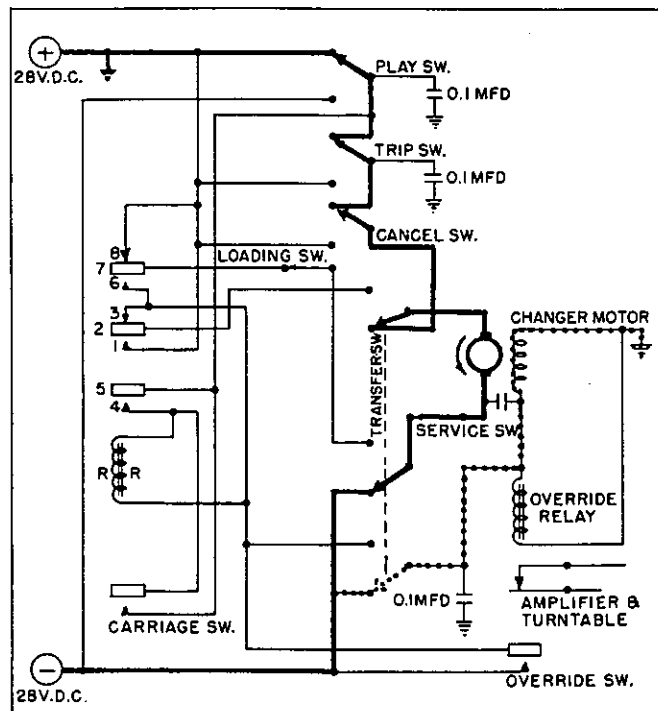


Fig. 64. PHASE 8

(1) Electrical Condition -- Phase 8.

In this full cycle condition the active circuits are now dependent on the position of the transfer switch. Therefore, when the transfer lobe on the main cam actuates the transfer switch all circuits will be open as shown in Phase 1, Fig. 57 and the mechanism will come to a stop.

(2) Mechanical Condition -- Phase 8.

At the completion of the cycle, the mechanism has returned to its "at rest" position. Should other latch pins be released, the over-ride switch will be closed as shown in Figure 58, and another cycle of operation will immediately start. Should no other latch pins be released, the mechanism will remain "at rest" until a selection has been made at the key-board of the selector switch assembly.

4. ADJUSTMENTS

Although each Wurlitzer Model 2100 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 paragraphs (a to g 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 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. 65)

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.

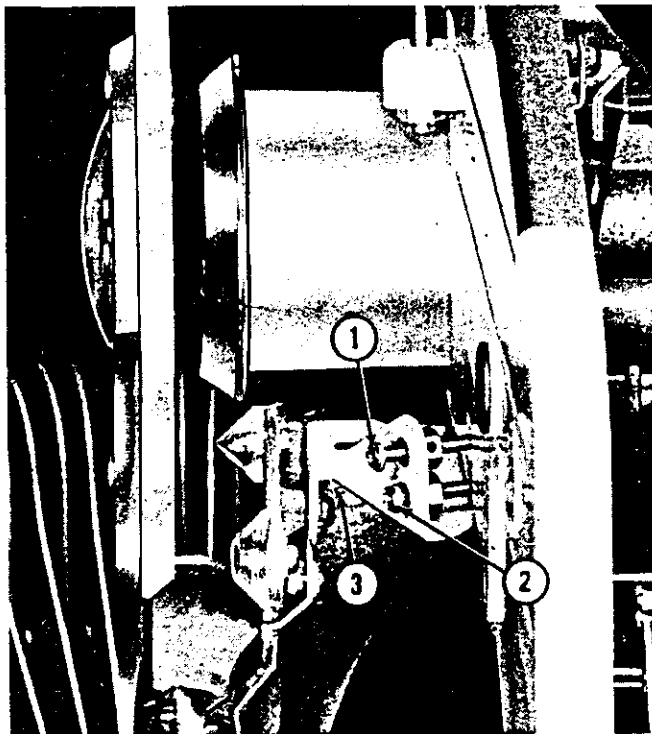


Fig. 65. SAFETY SWITCH AND RECORD GUIDE ADJUSTMENT

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

(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.

b. Over-ride Switches, Electric Selector. (Figs. 56 and 66)

When a selector latch pin (Item 5) 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 66. The wobble ring is out of view on the under side of the selector drum, however, it appears as Item 2, Fig. 56. 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.

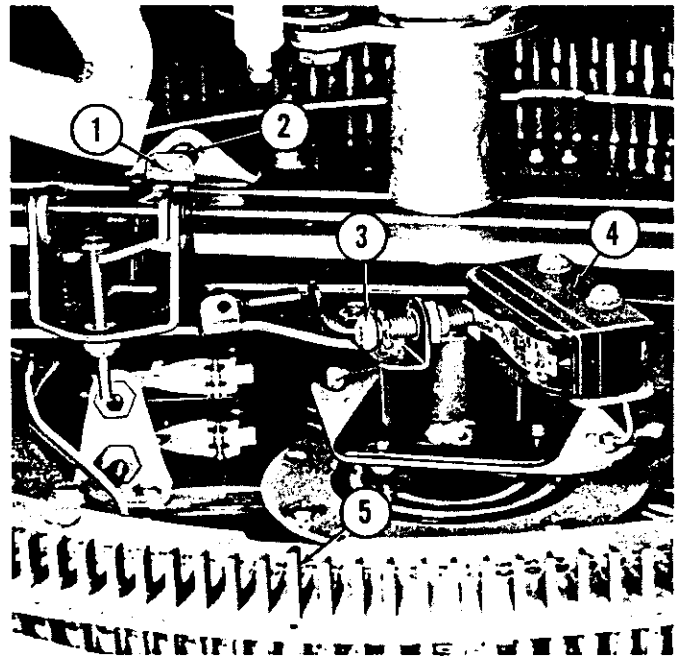


Fig. 66. CARRIAGE SWITCH ADJUSTMENTS

- | | |
|--|----------|
| 1. Stop Bracket, Selector Crank | 65906 |
| 2. Screw, Selector Crank Stop Adjustment | 65702 |
| 3. Adjusting Screw, Carriage Switch | 73502-95 |
| 4. Micro Switch, Carriage | 66002 |
| 5. Latch Pin, Selector | 67924 |

Check for proper over-ride switch action by using several different selector pins one at a time. Switch action may be readily 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. Also see paragraph 4, a, page 33.

c. Carriage Switch and Reversing Relay. (Fig. 66)

The carriage switch (Item 4) 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;

With the record carrier and selector crank approaching a selected latch pin, set the carriage switch actuating screw to produce switch action, when the corresponding back stop pawl drops into the proper tooth of the carrier ring. An over-travel tolerance of 1/64" to 1/32" of the tooth beyond the back-stop pawl, should be provided.

NOTE: This adjustment should be verified and, if necessary, justified at twelve different latch pins.

d. Transfer Switch Adjustment. (Fig. 67)

The transfer switch is mounted on the chassis casting and is located under the record changer motor at the rear of the phonograph. The transfer switch actuating arm has two adjusting screws, one 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 6, Fig. 67) is pivoted on the chassis casting and is operated by the lateral lobe (Item 4) on the main cam. An approved method for adjusting the transfer switch is described below:

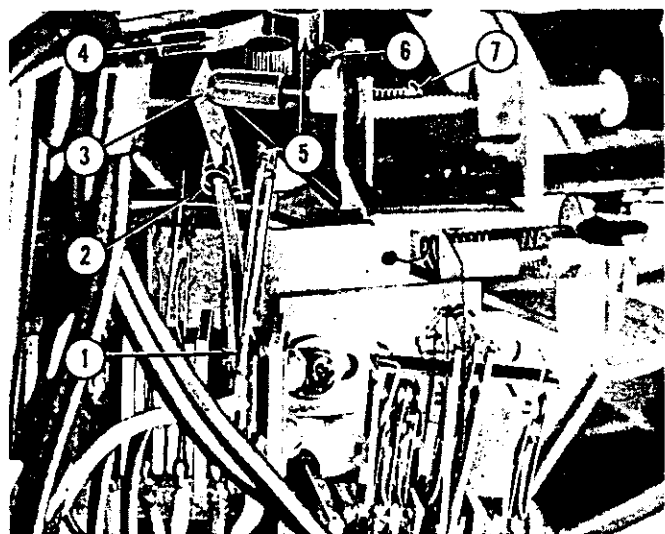


Fig. 67. TRANSFER SWITCH ADJUSTMENT

- | | |
|---|----------|
| 1. Transfer Switch | 59569 |
| 2. Over Center Spring | 59569-1 |
| 3. Position of Switch to Start Adjustment | |
| 4. Lobe, Transfer Switch | |
| 5. Roller, Actuating Arm | 56592 |
| 6. Actuating Arm, Transfer Switch | 59691 |
| 7. Adjusting Screw, Transfer Switch | 73574-31 |

(1) Advance the record changer cycle until the roller (Item 5) 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 7) 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 at 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 functions to terminate the cycle, and the mechanism is then in a position to again start the searching phase as described in Phase 2 or to stop as described in Phase 1. This position is generally referred to as the "at rest" position of the record changer.

e. Mute and Play Switch Adjustments. (Figs. 68, 69, and 70)

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 permit advance or delay in the action of the mute and play switch. Figure 68 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:

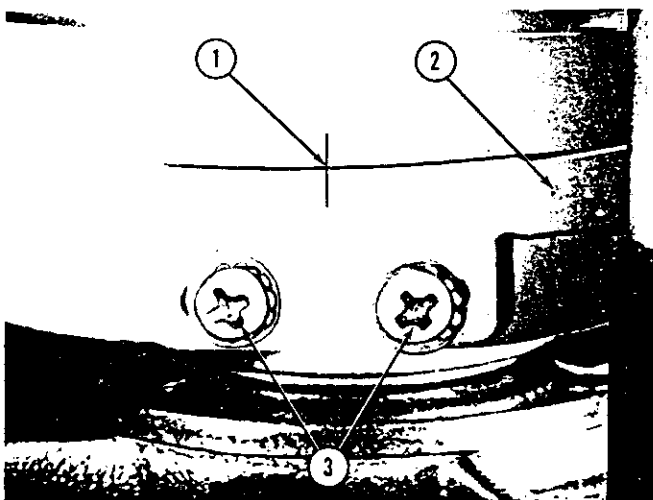


Fig. 68. MUTE AND PLAY SWITCH TIMING

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

(1) Set the mute and play cam lobe so that its timing mark (Item 1, Fig. 68) aligns with the mark on the main cam.

(2) With the roller (Item 3, Fig. 70) 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 2, Fig. 69) to provide 0 to 1/64" clearance between the roller and the cam as shown in Item 2, Fig. 70.

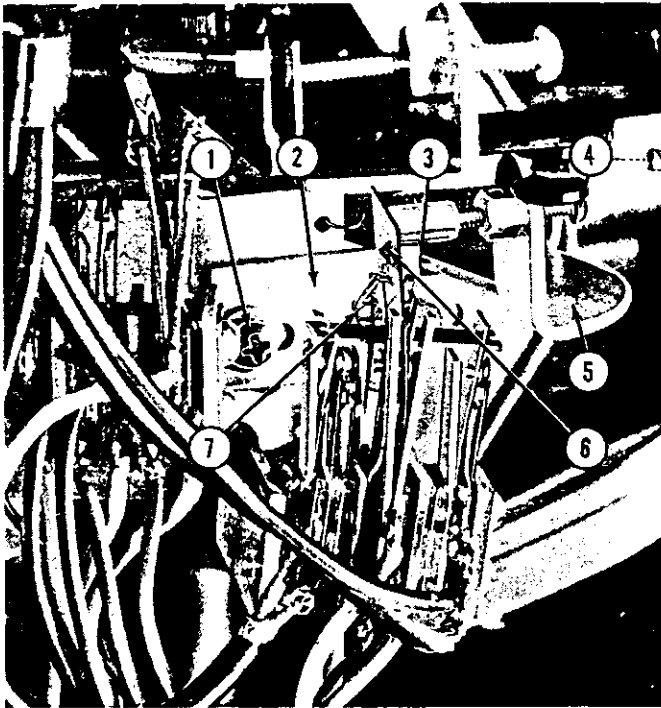


Fig. 69. STOP PLATE SETTING, MUTE AND PLAY SWITCH ACTUATING ARM

1. Locking Screw	73534-14
2. Stop Plate	62769
3. Stop Position	
4. Adjusting Screw	73574-31
5. Actuating Arm, Mute and Play Switch	62761
6. Switch Tab, Over-travel Measured at this Point	
7. Over-center Spring	59569-1

(3) Set the actuating screw of the mute and play switch actuating arm (Item 4, Fig. 69) 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, the

mute and play switch is stopping the mechanism in its play position, too early. In this case move the cam lobe (Item 2, Fig. 68) 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 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.

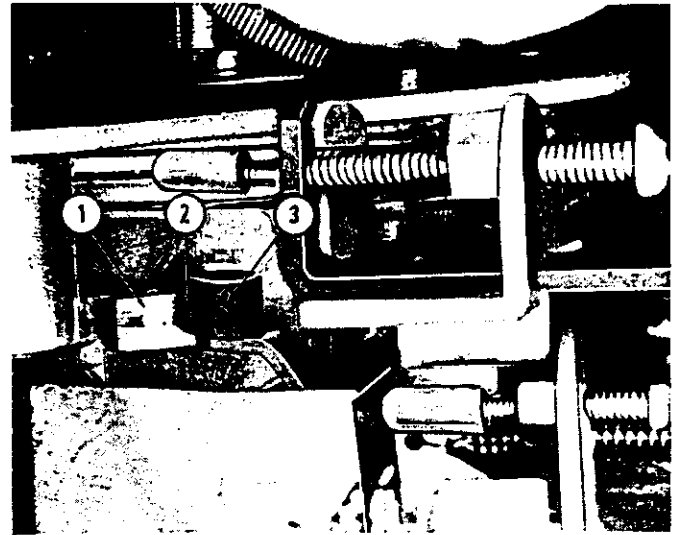


Fig. 70. STOP PLATE SETTING, MUTE AND PLAY SWITCH

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

f. Trip Switch.

The trip switch is located at the right rear of the support casting assembly. Examination of Figures 60 to 64 indicates the phases of the cycle of operation in which the trip switch has a specific function. For detailed instructions on trip switch adjustment and timing, see paragraph v, page 56.

g. Service Switch.

The service switch, shown at the rear of the junction box in Item 3, Fig. 32, serves as an aid in making adjustments at the back of the phonograph. It stops the changer motor at any phase of the cycle.

h. 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 18, Fig. 54) operates the loading switch and stops the changer motor only when it is in the searching phase of the cycle.

1. Record Lift Arm Roller Guides. (Figs. 71 and 72)

Mounted at the upper ends of the record lift arms are two guide tips, mounted on a pivot pin or shaft - (Item 4, Fig. 71). These guide tips are spring loaded by a spring (Item 10) 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. 72). One of these rollers is mounted on a stationary shaft, which is part of the bracket and pin assembly (Item 10, Fig. 72) and the other is mounted on an eccentric shaft (Item 11, Fig. 72). 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 4, Fig. 72) 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. The guide plate (Item 11, Fig. 71) serves as

spreader between record holders to insure clearance for the record guide tips as they raise and lower the record.

(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.

(2) Adjust the eccentric shaft (Item 11, Fig. 72) 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 4, Fig. 72) to guide the tips of the lift arm in 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.

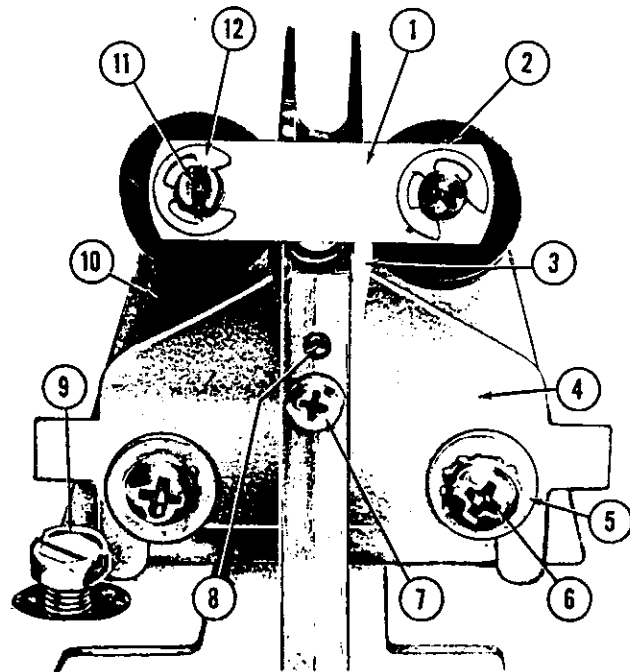
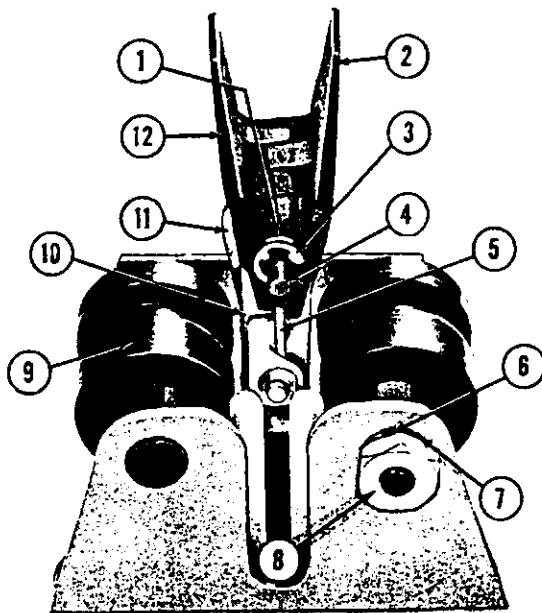


Fig. 71. BRACKET AND ROLLER ASSEMBLY, LIFT ARM GUIDE

	65857
1. Washer (2 Used)	65937
2. Guide Tip, R.H.	65730
3. Retaining Ring	73724-9
4. Shaft	65938
5. Stop, Guide Tips	65526
6. Washer	65937
7. Lock Washer	73605-5
8. Nut, 6-32 Hex.	73601-6
9. Roller, Lift Arm Guide (2 Used)	65939
10. Spring, Guide Tips	65812
11. Guide Plate	68290
12. Guide Tip, L.H.	65731

Fig. 72. BRACKET AND ROLLER ASSEMBLY, LIFT ARM GUIDE

1. Strap	65940
2. Spacer (2 Used)	65942
3. Guide Plate	68290
4. Plate, Adjustable, Lift Arm Guide	66182
5. Washer (4 Used)	49387
6. Screw, Adjusting	73533-34
7. Screw, 4-40 x 5/8"	73533-7
8. Roll Pin	73782-32
9. Adjusting Screw, Lift Arm Centering	73660-161
10. Bracket and Pin Assembly, Lift Arm Guide	65888
11. Stud, Eccentric, Lift Arm Guide	66181
12. Retaining Ring (2 Used)	73724-18

(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 $0^{\circ} - 54'$ 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.

j. Record Lift Arm Setting. (Fig. 73)

Each record lift arm is equipped with a bracket, stop nut and screw assembly (Item 1, Fig. 73). 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. 74) 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.

(2) Loosen the two screws (Item 4, Fig. 74) that hold each record stop bracket.

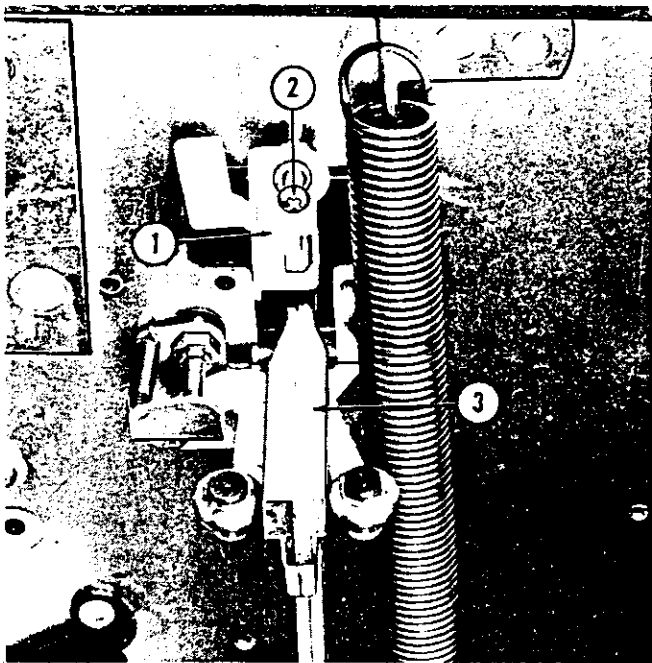


Fig. 73. RECORD LIFT ARM SETTING

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

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

(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 (Item 2, Fig. 73) 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.

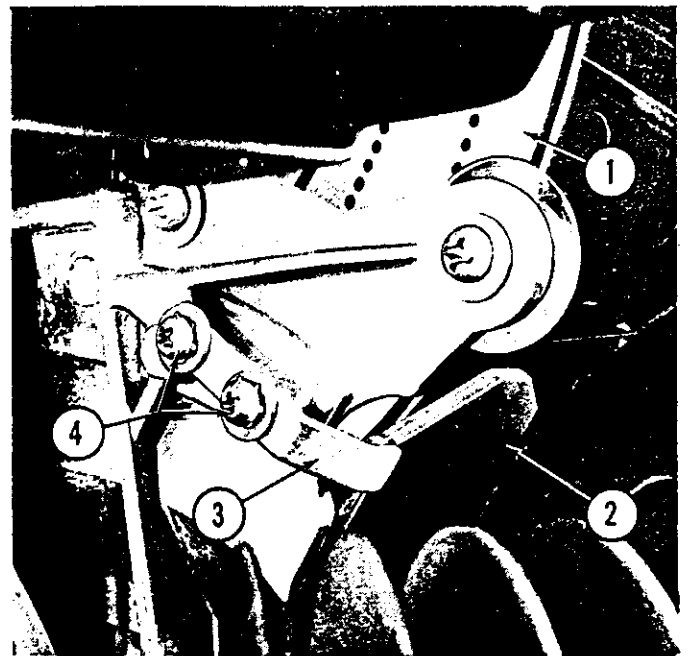


Fig. 74. RECORD STOP BRACKET ADJUSTMENT

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

k. Record Lift Arm Centering Adjustment. (Figs. 75 and 76)

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 is mounted on a fixed stud (Item 5, Fig. 75) 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 (Item 1) on the lower end of the lift arm.

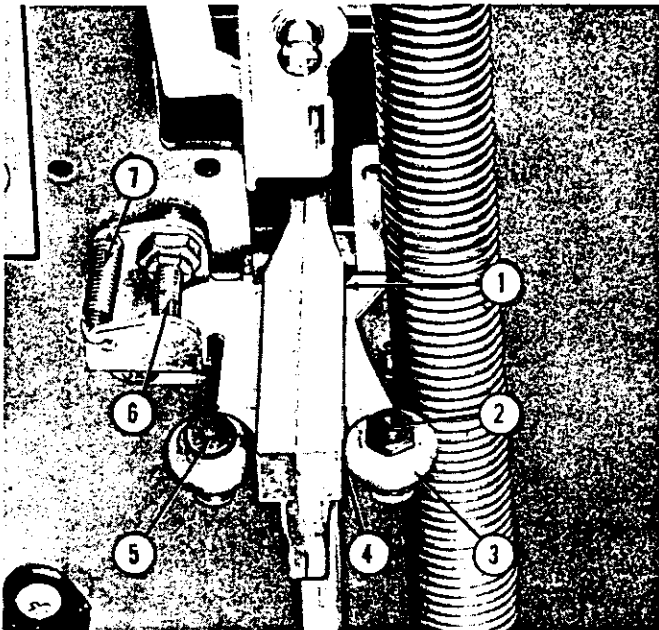


Fig. 75. RECORD LIFT ARM CENTERING ADJUSTMENTS

- | | |
|-----------------------------------|-----------|
| 1. Ramp, Record Lift Arm | |
| 2. Stud, Eccentric | 65986 |
| 3. Roller, Lift Arm Guide | 65989 |
| 4. Clearance .005" | |
| 5. Stud, Fixed (Shoulder Riveted) | 65985 |
| 6. Screw, Centering Adjustment | 73660-161 |
| 7. Spring | 65958 |

(1) With the ramp (Item 1) 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 (Item 4) between the ramp and the rollers.

(2) With a record clamped on the turntable and the corresponding lift arm in its raised position, (Fig. 76) set the adjusting screw (Item 6, Fig. 75) 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 76.

1. Setting for Loading Switch and Lever. (Figs. 77 and 78)

After assembly of the selector crank, the loading switch and release lever group may be adjusted. The main cam should be in its "at rest" phase of the cycle or a position where there is no cancel action on the sleeve and bushing assembly (Item 5, Fig. 77).

(1) In this position set the release lever (Item 2) against the stop pin (Item 14) and tighten the set screws in the hub of the release lever.

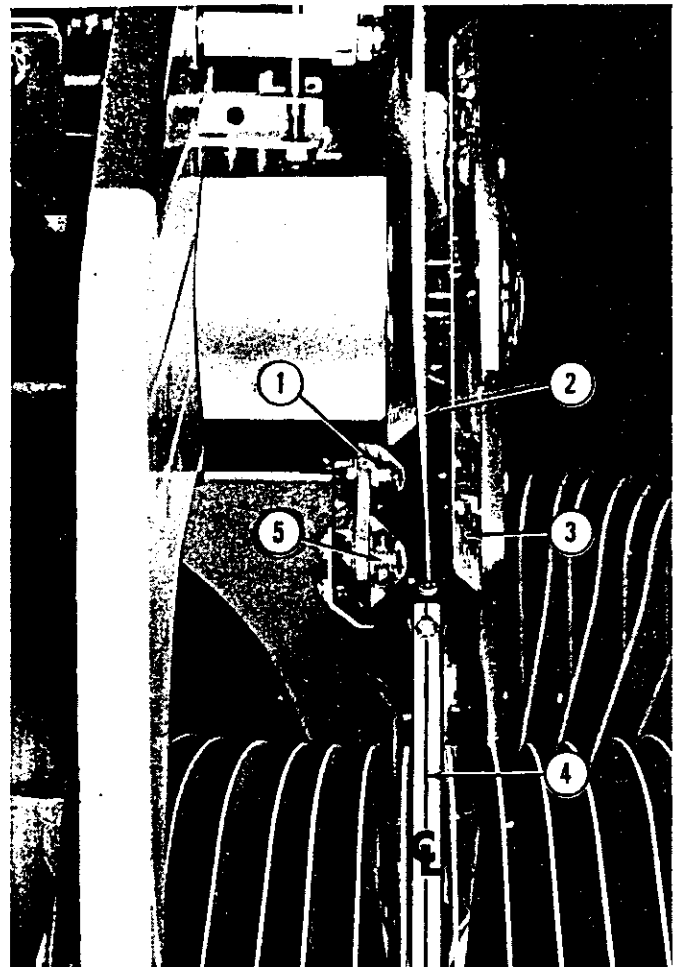


Fig. 76. RECORD LIFT ARM CENTERING ADJUSTMENTS

- | | |
|---------------------------------|-------|
| 1. Bumper, Inner, Record Guide | 59396 |
| 2. Record Disc on Turntable | |
| 3. Record Guide Plate | 59548 |
| 4. Center Line, Record Lift Arm | |
| 5. Bumper, Outer, Record Guide | 59743 |

(2) When the release lever is pulled forward to the loading position, the link (Item 7) should stop against the lower end of the shaft (Item 9) without pressure against the actuated switch handle (Item 12) and the rollers of the "stop lever and roller assembly" (Item 4) must be entirely off the cam surface of the flange on the "sleeve and bushing assembly" as shown at Item 4, Fig. 78. With the loading lever in the operating position as shown in Figure 77, the lever (Item 2) should be against the stop pin (Item 14). The loading switch should be actuated by the switch tab (Item 11) without pressure against the actuated switch handle (Item 12). The actuator arm and hub assembly is pinned to the shaft (Item 9) with a roll pin (Item 13). Adjustment will therefore be made at the hub of the release lever (Item 2) by means of the two allen set screws shown at Item 1. Over-center action of the "release lever and shaft assembly" is provided by the retracting spring (Item 6). When the release lever is in the operating position as shown in Figure 77 the rollers of the stop lever (Item 4) should be on the ramps of the flange as shown at Item 5, Fig. 77). When the release lever is in the

forward (released) position, the rollers of the stop arm should be off the ramps as shown at Item 4, Fig. 78.

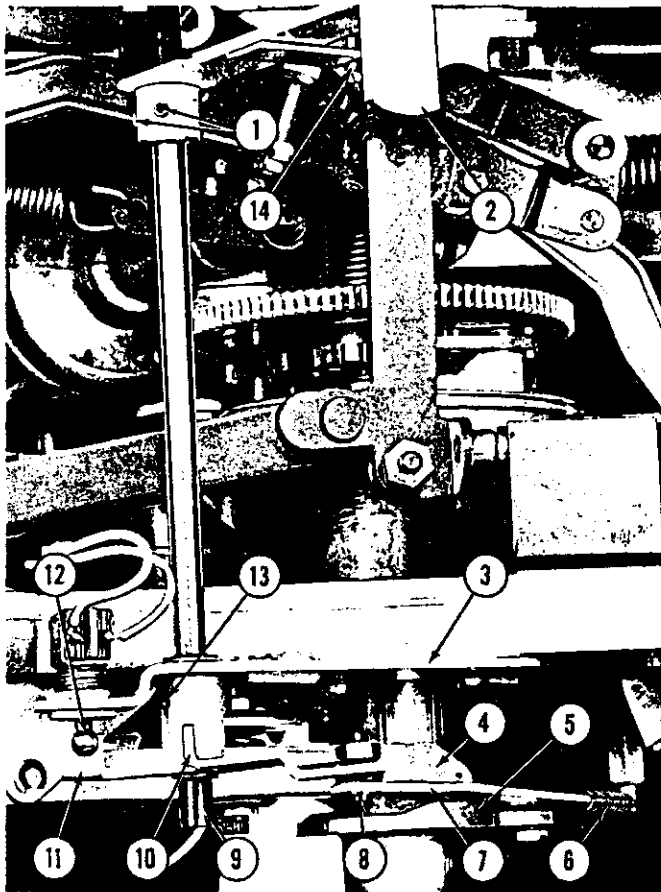


Fig. 77. LOADING SWITCH AND RELEASE LEVER ADJUSTMENT

1. Set Screws, Allen Hd.	73511-29
2. Release Lever and Shaft Assembly	68557
3. Mounting Bracket	65728
4. Stop Lever and Roller Assembly	68525
5. Sleeve and Bushing Assembly	68483
6. Spring, Retracting	68782
7. Link	68567
8. Retaining Ring	73724-18
9. Shaft	68558
10. Switch Tab, Loading, Actuator Arm and Hub Assembly	68559
11. Switch Tab, Operating	
12. Handle, Loading Switch	53648
13. Roll Pin, Actuator	73782-48
14. Stop Pin, Release Lever	65516

m. Selector Crank Clearance. (Figs. 78 and 79)

Aided by the "stop lever and roller assembly" (Item 2), the "sleeve and bushing assembly" (Item 4) has three functions:

(1) It rests directly on the selector crank and positions the tips of the selector crank vertically with relation to the selector latch pins.

(2) It is free to slide downward when actuated by the cancel arm to reset latch pins after selection has been made.

(3) It may be rotated about the selector shaft by means of the release lever as described in (1) to change its upward limit of travel.

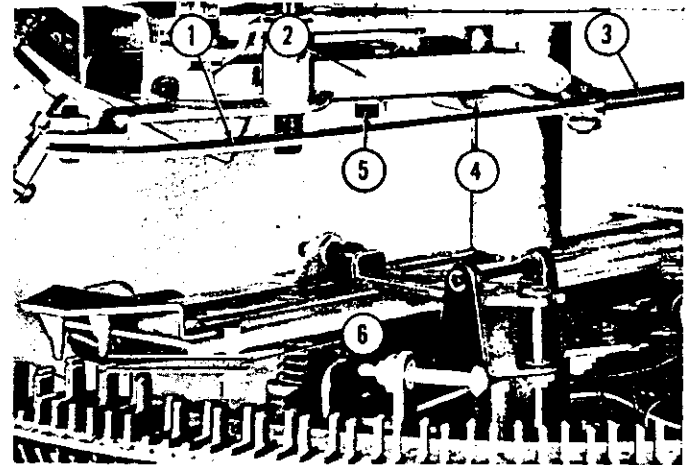


Fig. 78. RELEASE LEVER, LOADING POSITION

1. Link	68567
2. Stop Lever and Roller Assembly	68525
3. Retracting Spring	68782
4. Sleeve and Bushing Assembly	68483
5. Adjusting Screw, Stop Lever	73571-22
6. Clearance, Released Latch Pins	

Adjustment of the upward limit is provided by means of the adjusting screw (Item 5). The setting of this adjustment should be made with the release lever in its operating position as shown in Figure 77 with the rollers on the ramps of the flange as indicated at Item 5. With selector latch pins reset as shown in Fig. 79 the tips of the selector crank should clear the latch pins by $1/16''$ to $3/32''$ as indicated at Item 1, Figure 79. Assuming the electric selector to be properly aligned, this dimension should be constant for all selector latch pins when in their reset position. When the release lever is moved to the loading position as shown in Figure 78 the tips of the selector crank should be well clear of any released latch pins as shown at Item 6.

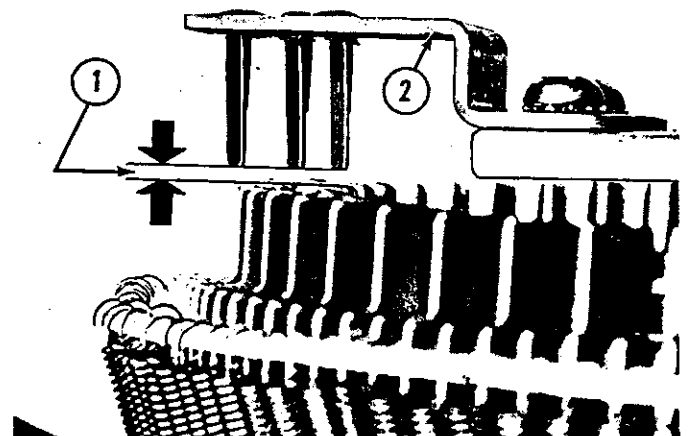


Fig. 79. SELECTOR CRANK CLEARANCE, ADJUSTMENT

1. Clearance, Tip to Latch Pins $1/16''$ to $3/32''$	
2. Tip and Mounting Bracket Assembly	68762

n. Cancel Lever Setting. (Fig. 80)

As stated in paragraph "o" the sleeve and bushing assembly is movable up and down. The lower end of the sleeve rests on the selector crank, which enables the sleeve and bushing to push the selector crank downward. Thus, when one of the tips of the "tip and mounting bracket assembly" (Item 2, Fig. 79) is engaged with a released selector latch pin, the selector crank and tip may be depressed by the cancel lever to reset the latch pin. An approved method for adjustment of the cancel lever (Item 1, Fig. 80) follows:

(1) With a latch pin released as shown at Item 6, advance the cycle of operation until the cancel cam is at its maximum point as shown at Item 3.

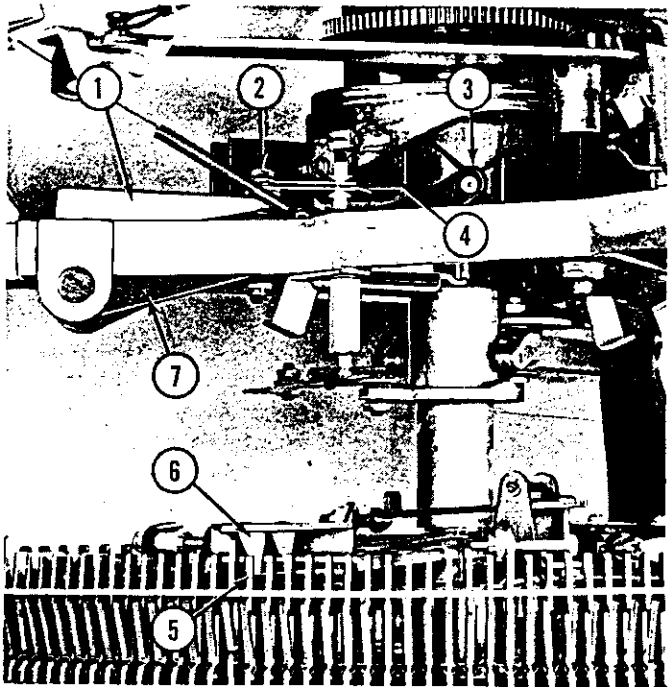


Fig. 80. CANCEL LEVER SETTING

- | | |
|--------------------------------|----------|
| 1. Cancel Lever | 59632 |
| 2. Adjusting Screw | 73571-23 |
| 3. Maximum Point of Actuation | |
| 4. 1/32" Dimension | |
| 5. Reset (Cancelled) Latch Pin | |
| 6. Selector Crank Tip | |
| 7. Lower Cancel Arm | 59661 |

(2) Adjust the screw (Item 2) which links the cancel lever (Item 1) with the lower cancel arm (Item 7) to provide 1/32" overtravel of cancel action, as measured under the head of the adjusting screw at Item 4. This adjustment has no effect on the adjustments described in paragraphs "l and m" above.

o. Record Lift Arms, Retracted Adjustment. (Fig. 81)

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. 81) 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 (Items 2 and 12, Fig. 71) 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:

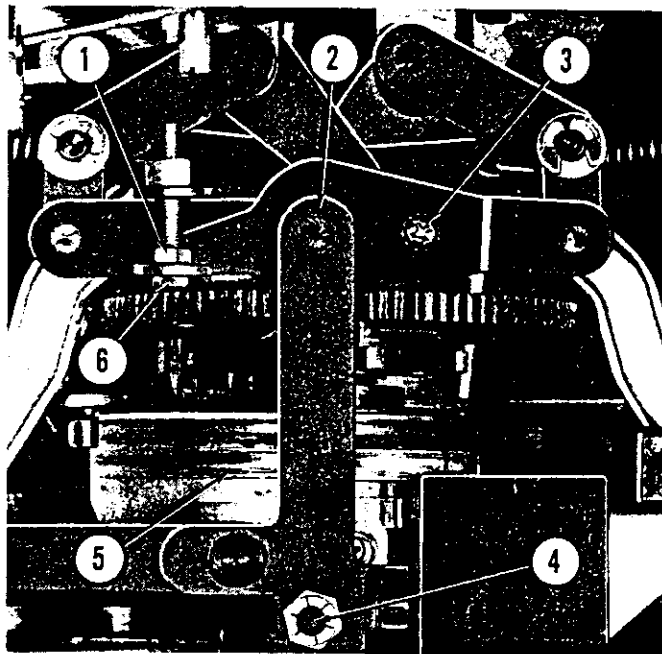


Fig. 81. RECORD LIFT ARM RETRACTED ADJUSTMENT

- | | |
|--|-----------|
| 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 | 73571-66 |
| 5. Main Cam Assembly | 69596 |
| 6. Adjusting Screw, Hex. Hd. | 73660-161 |

(1) Loosen the lock nut and clamping screw (Items 1 and 3, Fig. 81).

(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.

p. Back Stop Pawl Adjustments. (Figs. 82 and 83)

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 4, Fig. 55. 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 adjust-

ment of the back stop pawls, the record changer should be in normal operating condition.

(1) Loosen the two screws (Item 4, Fig. 83) that hold the back stop pawl and bracket assembly to the chassis mounting plate.

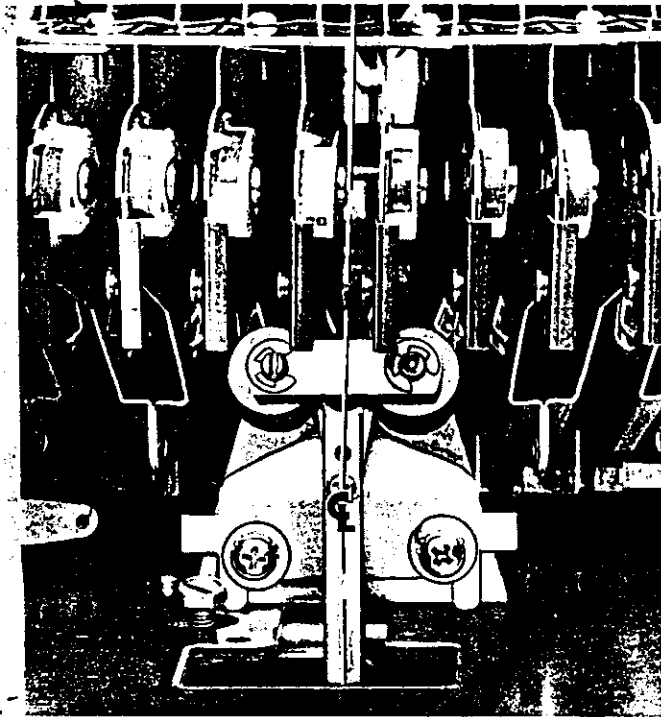


Fig. 82. CENTER LINE FOR BACK STOP PAWL SETTING

(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. 82.

(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. 83.

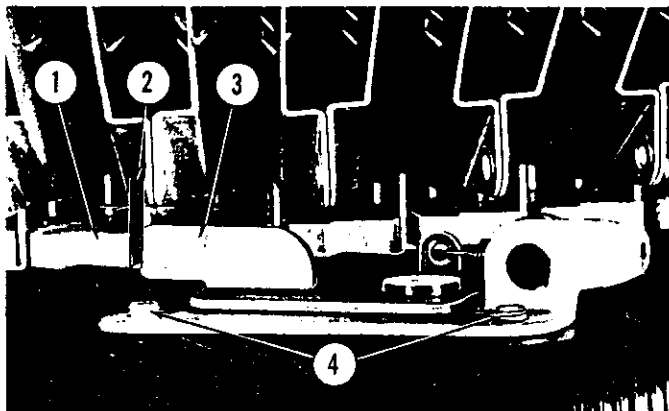


Fig. 83. BACK STOP PAWL SETTING

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

(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 $1/32$ ".

q. Selector Crank and Carriage Switch Settings. (Fig. 84)

The selector crank (Item 2, Fig. 84) is mounted on the "adjusting bracket and stop nut assembly" (Item 10) which is an integral part of the selector shaft assembly. The selector crank is mounted on pivots which enable it to move a limited amount laterally and vertically. The vertical "at rest" position of the selector crank is determined by adjustments of the stop lever as described in paragraph "m". The vertical actuated position of the selector crank is governed by the cancel lever setting, paragraph "n". The lateral adjustment for the selector crank may be accomplished as follows:

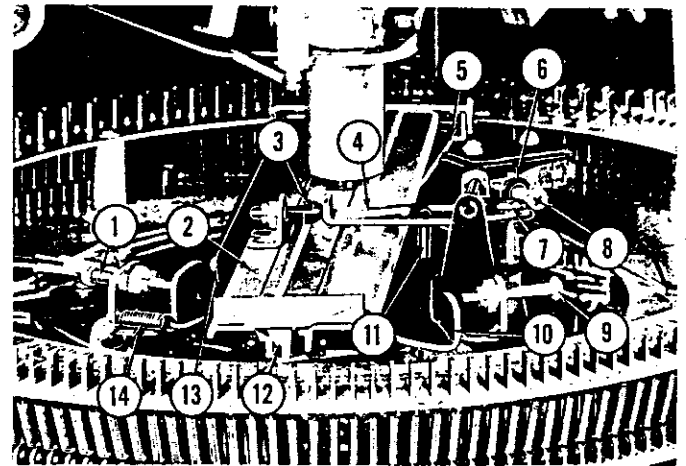


Fig. 84. SELECTOR CRANK AND CARRIAGE SWITCH SETTINGS

1. Adjusting Screw, Kick-Off	73503-95
2. Selector Crank and Stop Nut Assembly	68494
3. Adjusting Screw and Bearing Assembly	65702
4. Stop Bracket	68716
5. Mounting Plate and Stop Nut Assembly	68499
6. Switch Lever and Stop Nut Assembly	68562
7. Screw, 6-32 x 1-1/2, Stop Bracket	73790-78
8. Screw, 10-32 x 1", Switch Lever	73502-95
9. Screw, 8-32 x 1", Selector Crank Stop	73503-95
10. Adjusting Bracket and Stop Nut Assembly	68538
11. Spring, Stop Bracket	68774
12. Tip and Bracket Assembly	68762
13. Selector Shaft and Bracket Assembly	68464
14. Spring, Kick Off	68774

(1) With the service switch off, the record changer in the "at rest" position and with searching action manually produced one of the tips (Item 12) of the selector crank will engage a released latch pin. At this point adjust the stop bracket positioning screw

(Item 7) to provide alignment of the tab on the stop bracket (Item 4) with the ball bearing in the head of the adjusting screw (Item 3). The ball bearing must engage the tab on its flat surface as shown at Item 4.

(2) Without pressure against the released latch pin adjust the screw (Item 3) to make light contact with the tab of the stop bracket (Item 4).

(3) As previously treated under switch settings, paragraph "c" adjust the carriage switch screw (Item 8) in the end of the switch lever (Item 6) to provide carriage switch action at a point where continued searching action permits the correct back stop pawl to engage the correct tooth of the carrier casting. To insure engagement with any one of the 200 teeth overtravel of the tooth beyond the tip of the back stop pawl may be 1/64" to 1/32".

(4) As searching is manually continued the selector crank will continue to shift laterally on its pivot. Adjust the selector crank stop screw (Item 9) to stop the shifting action at a point where the tooth on the carrier casting has passed the tip of the back stop pawl 1/16" to 3/32".

NOTE: The same latch pin used for adjustment (3) must also be used for adjustment (4).

(5) Set the kick-off screw (Item 1) so that after the pin has been cancelled the selector crank will advance to a position that will allow the pin just cancelled and the next adjacent pin to be selected.

NOTE: All these settings (1) to (5) inclusive should be checked at twelve positions around the selector, care being taken to try six positions using one back stop pawl and six positions using the other back stop pawl.

r. Record Clamp Setting. (Figs. 85, 86, and 87)

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. 85) 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. 86), 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 follows:

(1) Advance the cycle of the record changer to the full extent of the record clamp cam rotation as shown in Figure 85, and at the same time, clamp record disc X42226 on the turntable.

(2) Loosen the lock nut (Item 1, Fig. 85) and adjust record clamp plate (Item 2) to provide 1/32" to 1/16" clearance as shown at Items 2 and 5

of Figure 86. Maintain the clearance described above, tighten the lock nut, and re-check the adjustment.

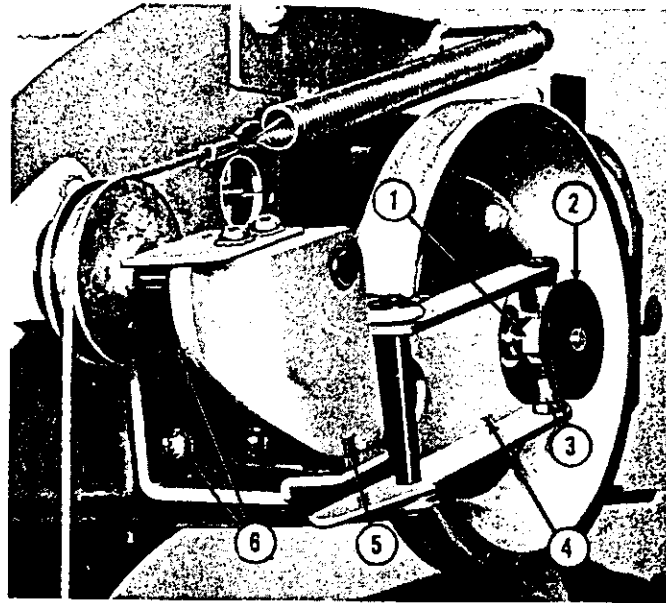


Fig. 85. RECORD CLAMP SETTING

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

(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. 87). In this position, the turntable pilot should be retracted beyond the forward surface of the turntable (Item 3) 1/32" to 1/16".

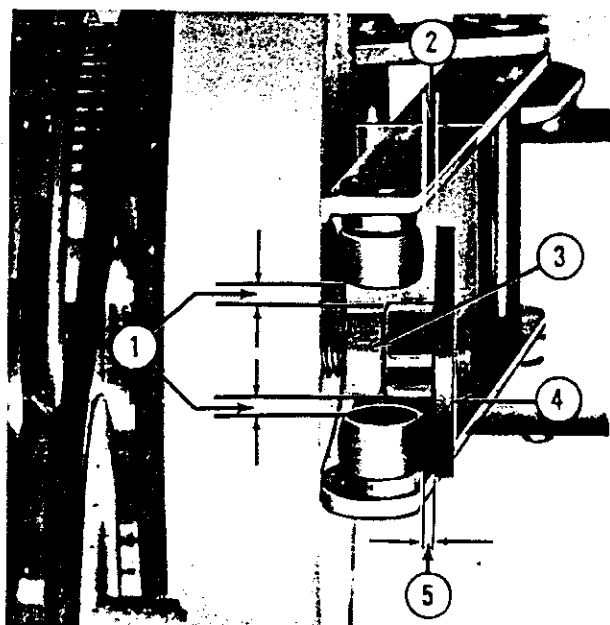


Fig. 86. RECORD CLAMP SETTING

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

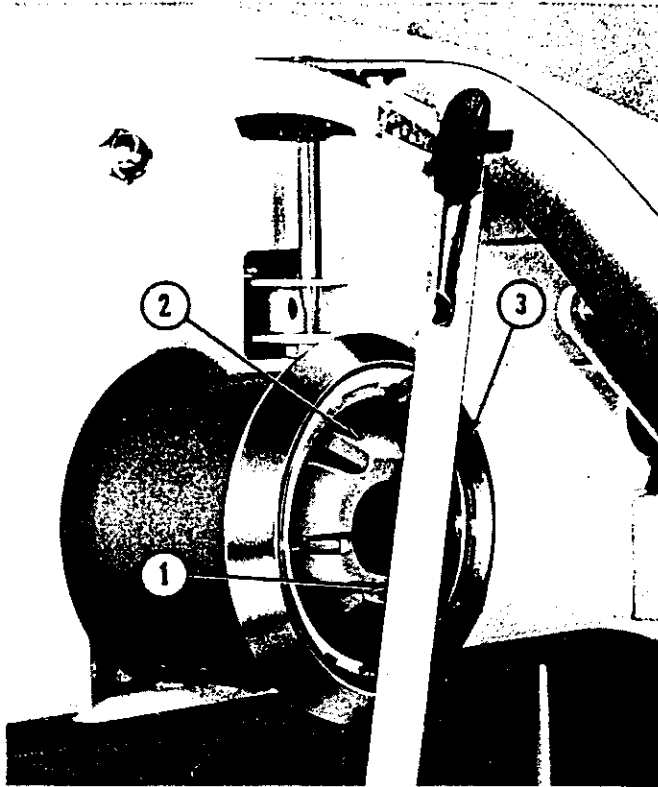


Fig. 87. RECORD CLAMP SETTING

- | | |
|---|-------|
| 1. Clearance, Turntable Pilot, 1/32" to 1/16" | |
| 2. Turntable Pilot | 59449 |
| 3. Turntable Assembly | 68031 |

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

s. Tone Arm Feed-in Adjustments. (Fig. 88)

There are two methods of making the tone arm feed-in adjustment. One of these methods utilizes record disc X42226 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 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. 86) and clamp 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. 88) should still be engaged with the feed-in screw (Item 2).

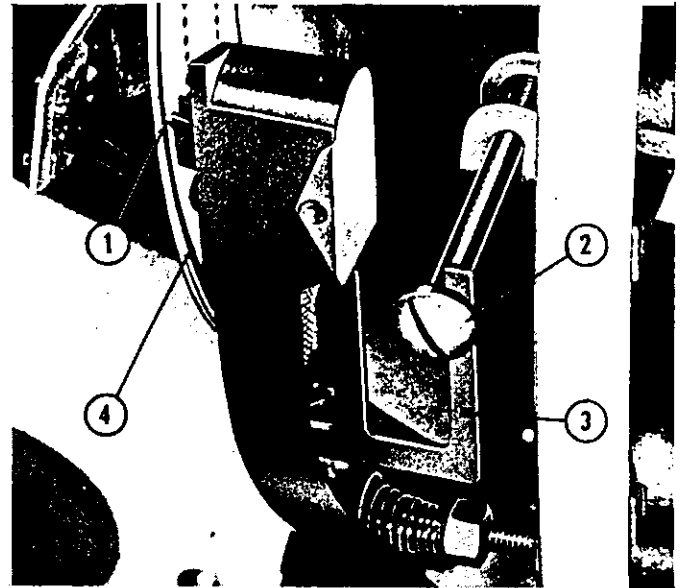


Fig. 88. TONE ARM FEED-IN ADJUSTMENT

- | | |
|-------------------------------------|-------|
| 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.

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

t. Tone Arm Latch Bracket Clearance. (Fig. 89)

When the tone arm is released for compliance with the record grooves, the clearance (Item 2, Fig. 89) 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 clearance of the bracket from the feed-in screw as described above.

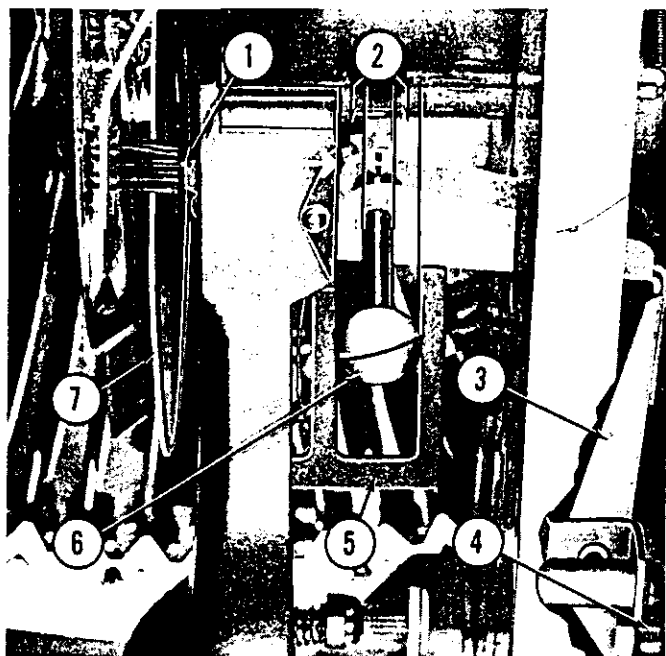


Fig. 89. TONE ARM LATCH BRACKET CLEARANCE

- | | |
|--------------------------------------|-------|
| 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 | |

u. Needle Pressure Adjustment. (Fig. 90)

The needle pressure adjustment is obtained by turning the needle pressure adjusting nut (Item 3, Fig. 90) 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 90, and may be accomplished in the following manner:

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

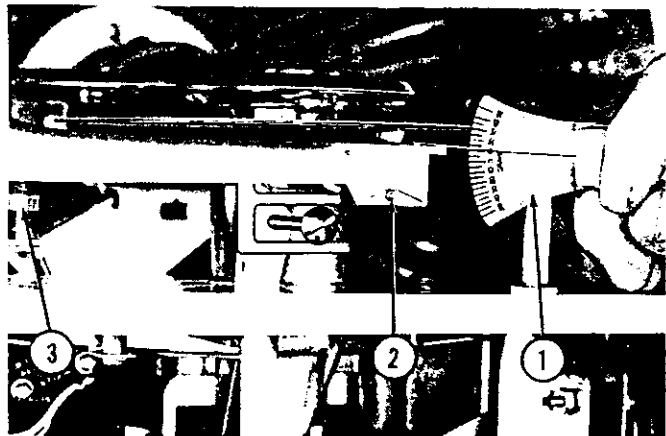


Fig. 90. NEEDLE PRESSURE ADJUSTMENT

- | | |
|---------------------------------------|---------|
| 1. Gram Scale | |
| 2. Tone Arm, Free for Compliance | 68100 |
| 3. Needle Pressure Adjusting Stop Nut | 73865-8 |

(2) Using a sensitive gram scale, as shown in Figure 90, 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.

v. Trip Switch Adjustment. (Fig. 91)

The trip switch is actuated by a bracket on the tone arm (Item 6, Fig. 91). 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:

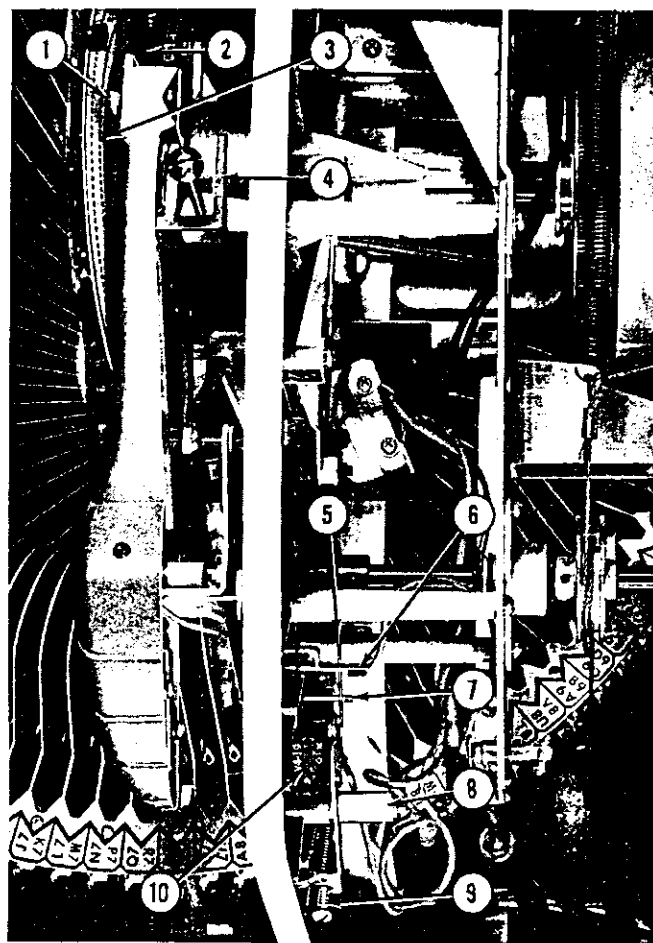


Fig. 91. TRIP SWITCH ADJUSTMENT

- | | |
|---|---------|
| 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 89.

(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 91.

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, 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 needles 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.

w. Tone Arm Balancing. (Fig. 92)

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 92. 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.

(2) Tie a short piece of fine thread around the tone arm and gimbal bracket as shown in Item 3, Figure 92. 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).

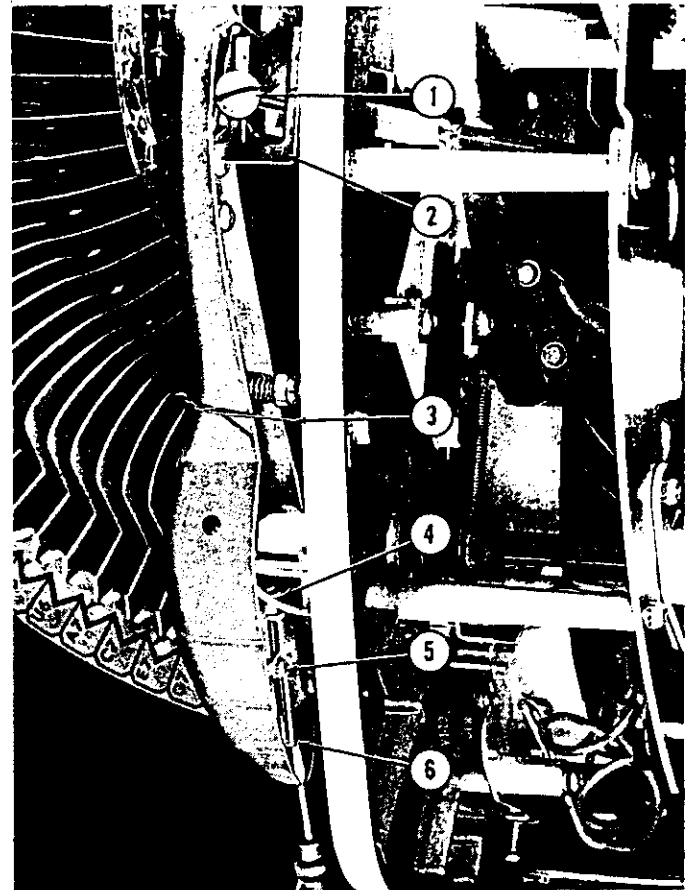


Fig. 92. TONE ARM BALANCING

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

(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.

x. Turntable Drive Gear Adjustments. (Fig. 93)

The turntable drive gears must operate freely at all times. The tension of the thrust spring (Item 4, Fig. 93) 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:

(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.

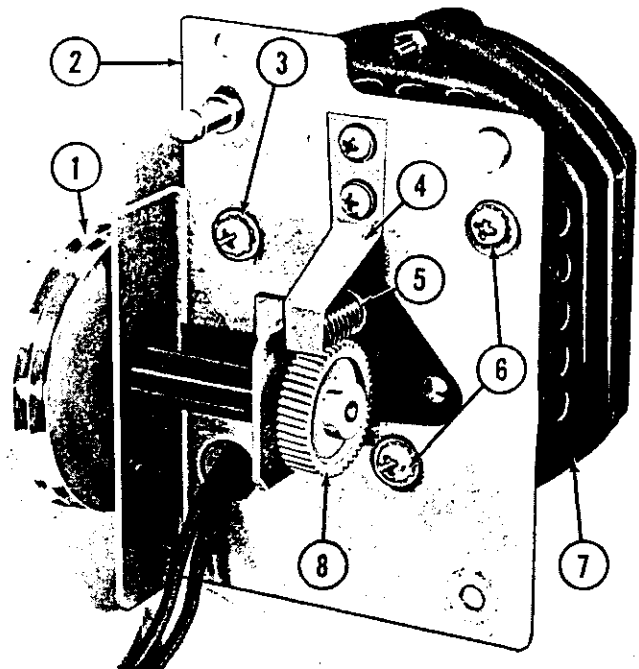


Fig. 93. TURNTABLE DRIVE GEAR ADJUSTMENT

- | | |
|--------------------------|----------|
| 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 |

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

y. Main Shaft Drive Gear and Pinion Adjustment. (Fig. 94)

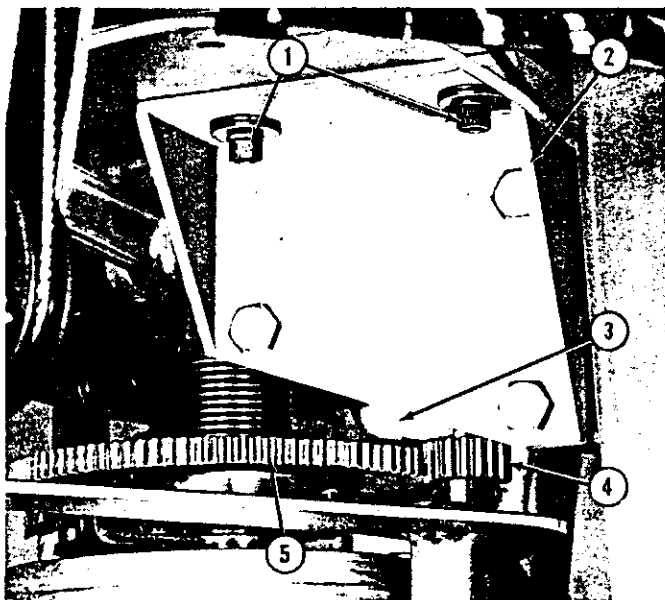


Fig. 94. MAIN SHAFT DRIVE GEAR AND PINION

- | | |
|--|----------|
| 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 |

The mounting bracket (Item 2, Fig. 94) 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 phase of operation.

z. Actuating Arm and Cable, Tone Arm and Turntable. (Fig. 95 and 96)

The cable that operates both the tone arm and the turntable should be set to operate the turntable cam (Item 3, Fig. 95) 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:

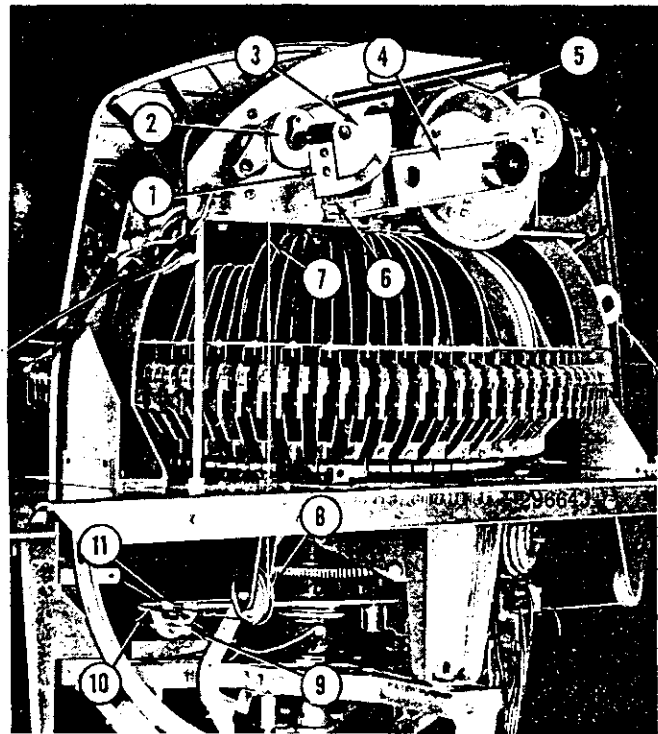


Fig. 95. ADJUSTMENT, ACTUATING ARM AND CABLE TONE ARM AND TURNTABLE.

- | | |
|--|----------|
| 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 |

(1) Pass the cable through the hole in the drive pulley (Item 2, Fig. 95) and form loops on the cable ends in accordance with measurements shown in Fig. 96.

(2) Using the set screw (Item 5, Fig. 96) lock the cable firmly in the pulley in accordance with the measurements (Items 6 and 7, Fig. 96).

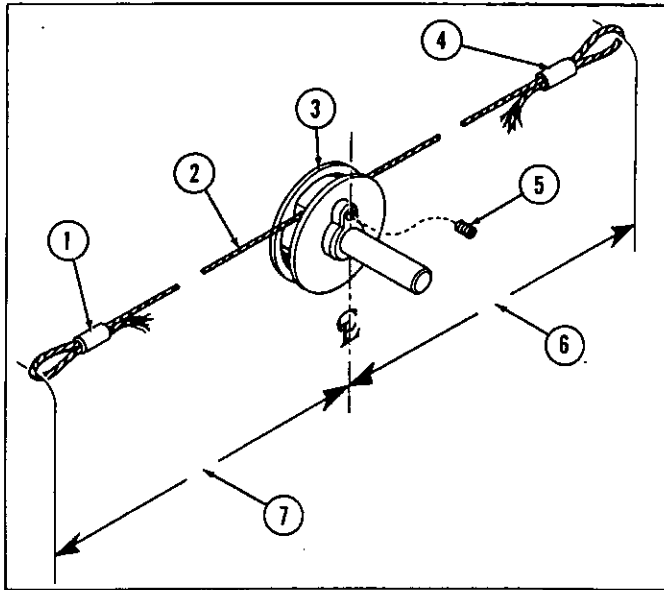


Fig. 96. TURNTABLE CABLE AND DRIVE PULLEY

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	

(3) Take out the two screws and remove the stop plate (Item 1, Fig. 95).

(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. 95). The cable should be dressed around the guide pulley as shown in Fig. 95.

(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. 95) as shown.

(6) Place the roller of the turntable release lever back of the cam as shown at Item 6, Figure 95, 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.

(7) Turn the adjusting screw (Item 9, Fig. 95) 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.

a.a. Record Guide and Safety Switch Adjustment. (Fig. 97)

The record guide assembly is mounted on a vertical pivot and is positioned by its adjusting screw (Item 4, Fig. 97) with relation to the record lift arms, right and left. A recommended adjustment procedure follows:

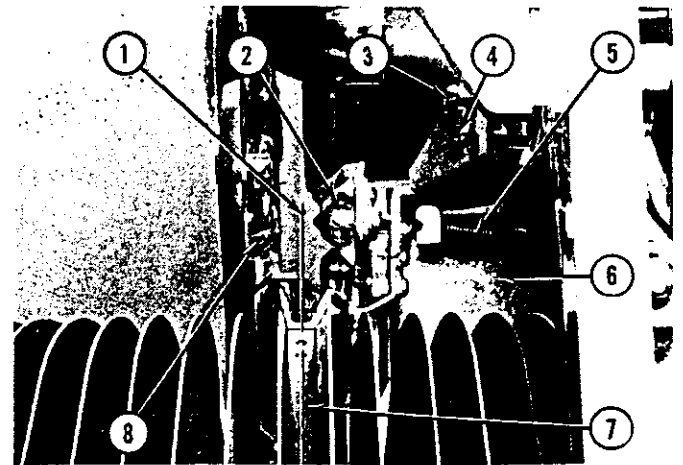


Fig. 97. RECORD GUIDE AND SAFETY SWITCH SETTINGS

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 i, j, and k, page 48, and the plastic guide plate is parallel, the angular variation of each lift arm will be 0°, 54 to the rear of parallel as stated in paragraph (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, page 45.

a.b. Tone Arm Brush Setting. (Figs. 98 and 99)

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:

(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 "brushholder arm" (Item 1, Fig. 98) 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 98.

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.

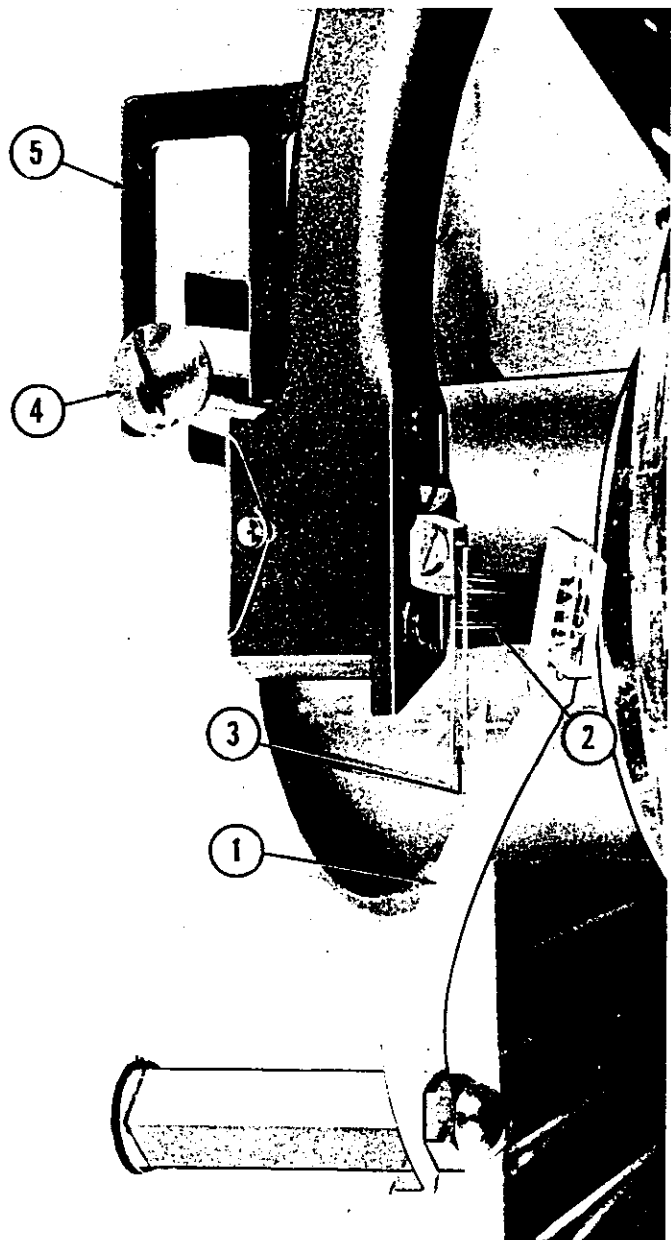


Fig. 98. TONE ARM BRUSH SETTING

- | | |
|---------------------------|-------|
| 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 |

(3) With the record changer mechanism in the "at rest position", turn the adjusting screw (Item 2, Fig. 99) 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.

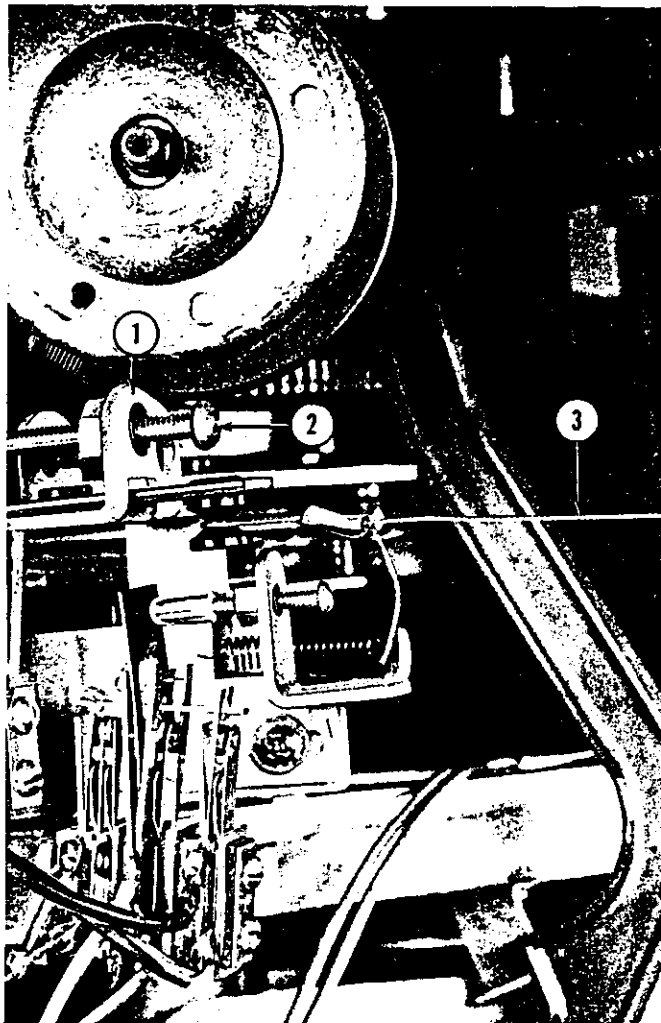


Fig. 99. TONE ARM BRUSH SETTING.

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

a. c. Shim Procedure for Assembling the Turntable Shaft. (Fig. 100)

After the thrust bearing group, Items 6, 7, and 8, Fig. 100, 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.

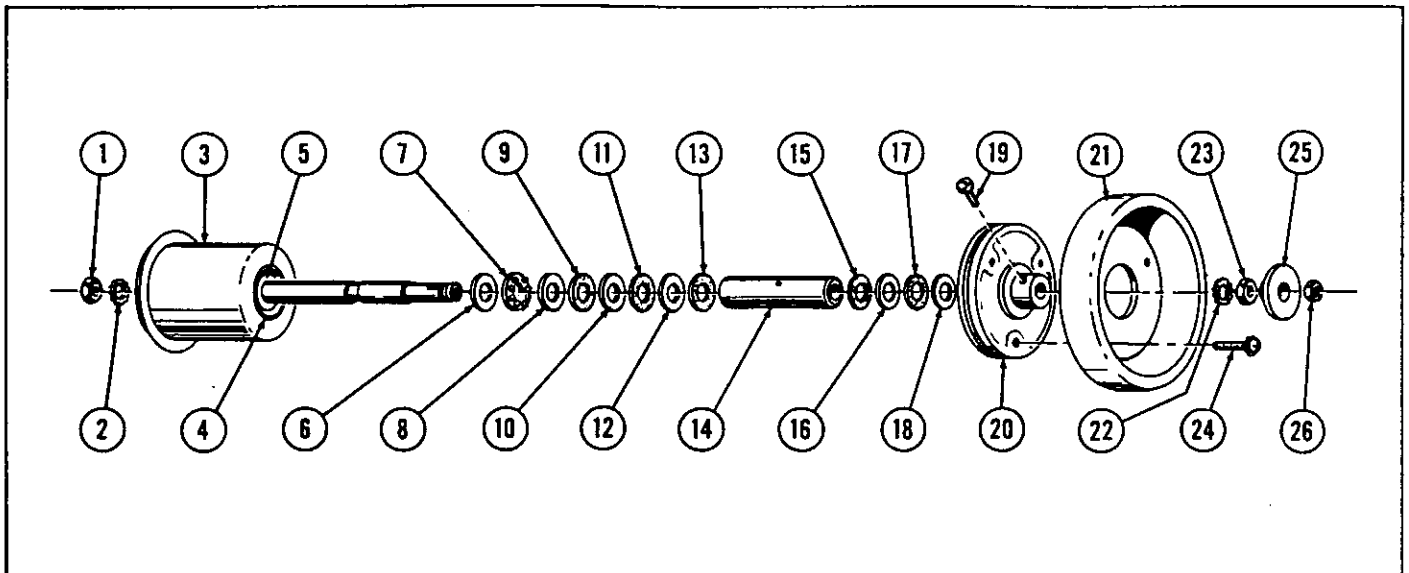


Fig. 100. SHIM PROCEDURE FOR ASSEMBLING THE TURNTABLE SHAFT

1. Nut	59470	14. Sleeve and Bushing Assembly	64520
2. Lockwasher	73607-12	15. Washer, Fiber	63732
3. Turntable and Shaft Assembly	68102	16. Washer, Metal Shim	63731
4. Oil Slinger	59571	17. Washer, Fiber	63732
5. Washer on Shoulder of Shaft	56530	18. Washer, on Shoulder of Shaft	56530
6. Washer	59864	19. Screw, Special	59399
7. Ball Race	59867	20. Pulley	64190
8. Washer	59864	21. Fly Wheel	59456
9. Washer, Fiber	63732	22. Lockwasher	73607-12
10. Washer, Actual Shim	63731	23. Nut	59470
11. Washer, Fiber	63732	24. Screws, Sems	73533-38
12. Washer, Actual Shim	63731	25. Plate, Record Clamp	63205
13. Washer, Fiber	63732	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:

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

a. Houghton Absorbed Oil, Type L3 (Part No. 54070) should be used at points where a non-fluid type of oil is required, such as:

Main Cam Working Surfaces (Cam Tracks)
 Gear and Pinions

Turntable Worm Gear and Pinion
 All Spring and Anchor Points

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. 55206A). 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 protective compound 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).

SOUND SYSTEM MODEL 2100

1. GENERAL DISCUSSION

The Wurlitzer Model 2100 Phonograph Sound System consists of a Dynatone Model 532 Amplifier with built in automatic level control and Zenith Cobra pick-up equipped low inertia tone arm, and a high speaker and cross over network mounted on a single wide angle baffle (See Fig. 101). The speaker compliment consists of two 12" woofers, one 12" mid-range, and one four inch tweeter together with appropriate cross over network.

The out-put of the Model 532 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).

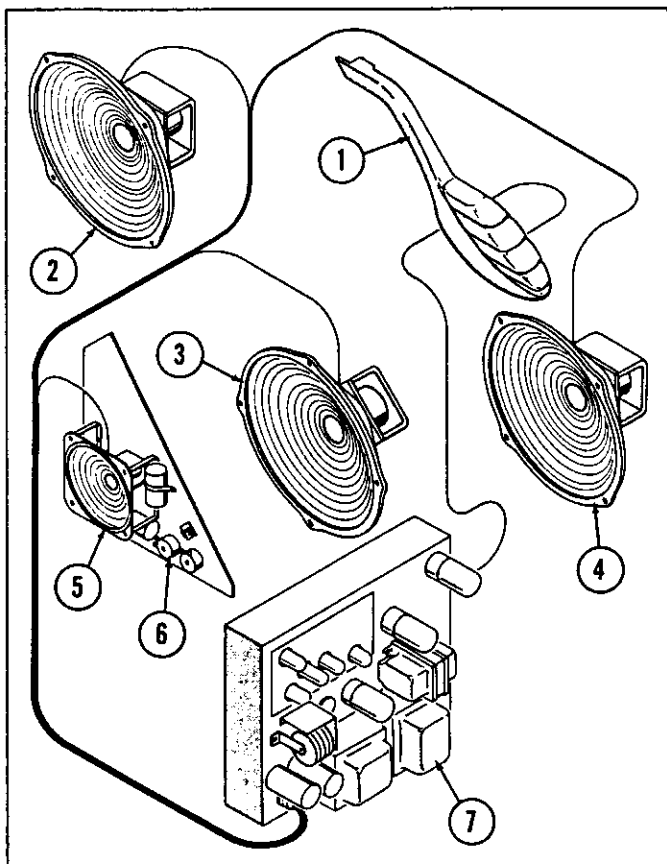


Fig. 101. SOUND SYSTEM - MODEL 2100

1. Tone Arm	68100
2. Speaker, 12", Red Dot, Low Range	62492
3. Speaker, 12", Blue Dot, Mid Range	62493
4. Speaker, 12", Red Dot, Low Range	62492
5. Speaker, 4", High Range	63650
6. Coil, Cross Over	62843
7. Amplifier	68115

2. DESCRIPTION

a. Tone Arm.

The low inertia tone arm is perfectly balanced as described on page 56, paragraph w. 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" 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 - 5U4GB	Dual Diode	Full Wave Rectifier

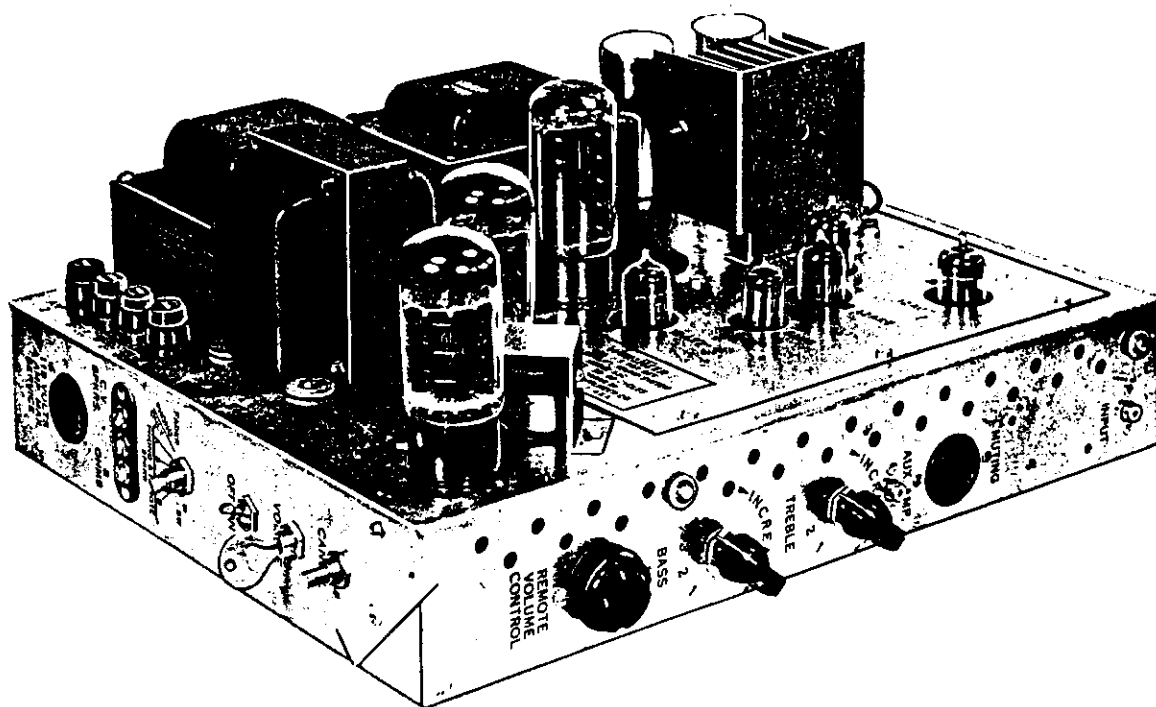


Fig. 102. MODEL 532 AMPLIFIER

3. THEORY OF OPERATION

a. Pick-up and Oscillator

The oscillator section of the 12AU7 (See Fig. 103) 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

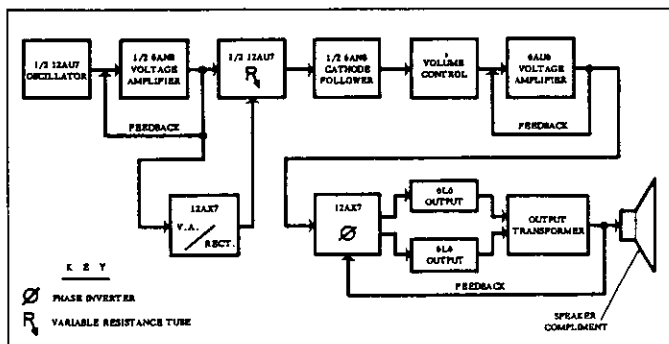


Fig. 103. MODEL 532 AMPLIFIER
BLOCK DIAGRAM FOR SIGNAL TRACING

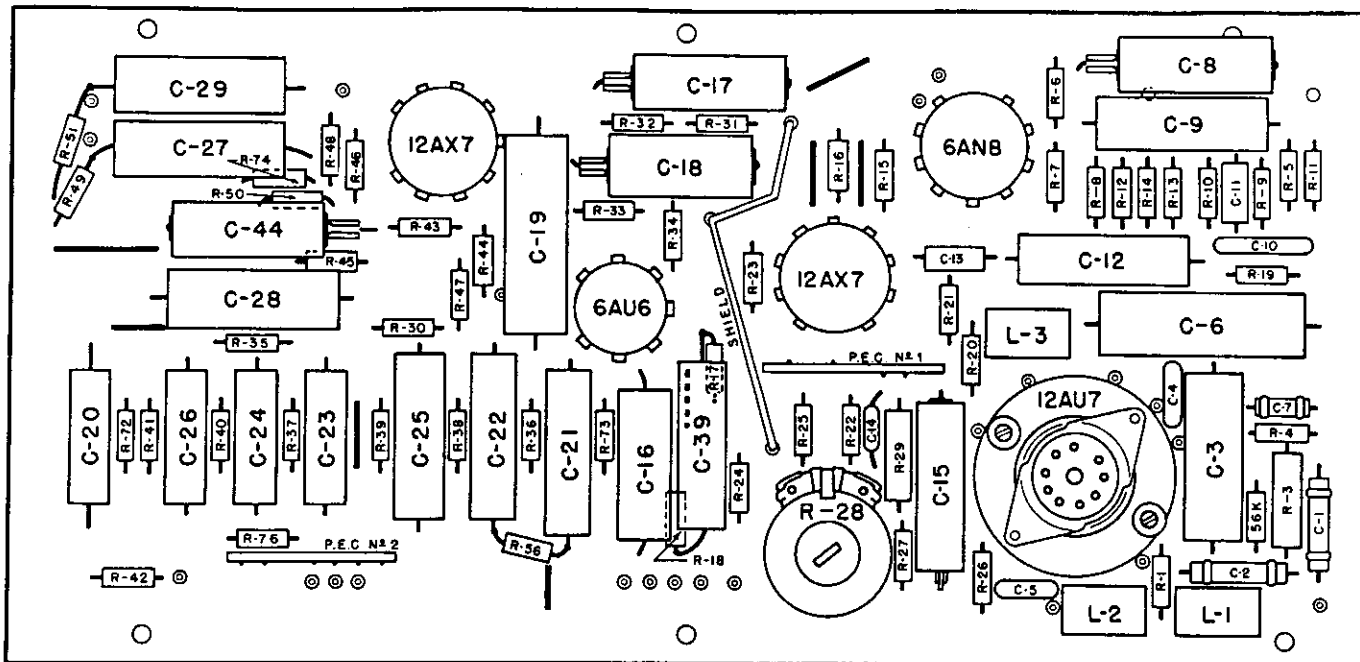
only the desirable audio frequencies (See schematic diagram page 69). This audio signal is then "high-pass" filtered and applied to the pentode section of the 6AN8 tube for amplification. The amplified signal is developed across a voltage divider where a portion is used for tone compensating feed back, 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 amplified section of the 12AX7 where it is 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 output 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



NOTE: FOR CODE VALUES SEE SCHEMATIC DIAGRAM 532 AMPLIFIER

Fig. 104. PRINTED CIRCUIT BOARD (TOP SIDE)

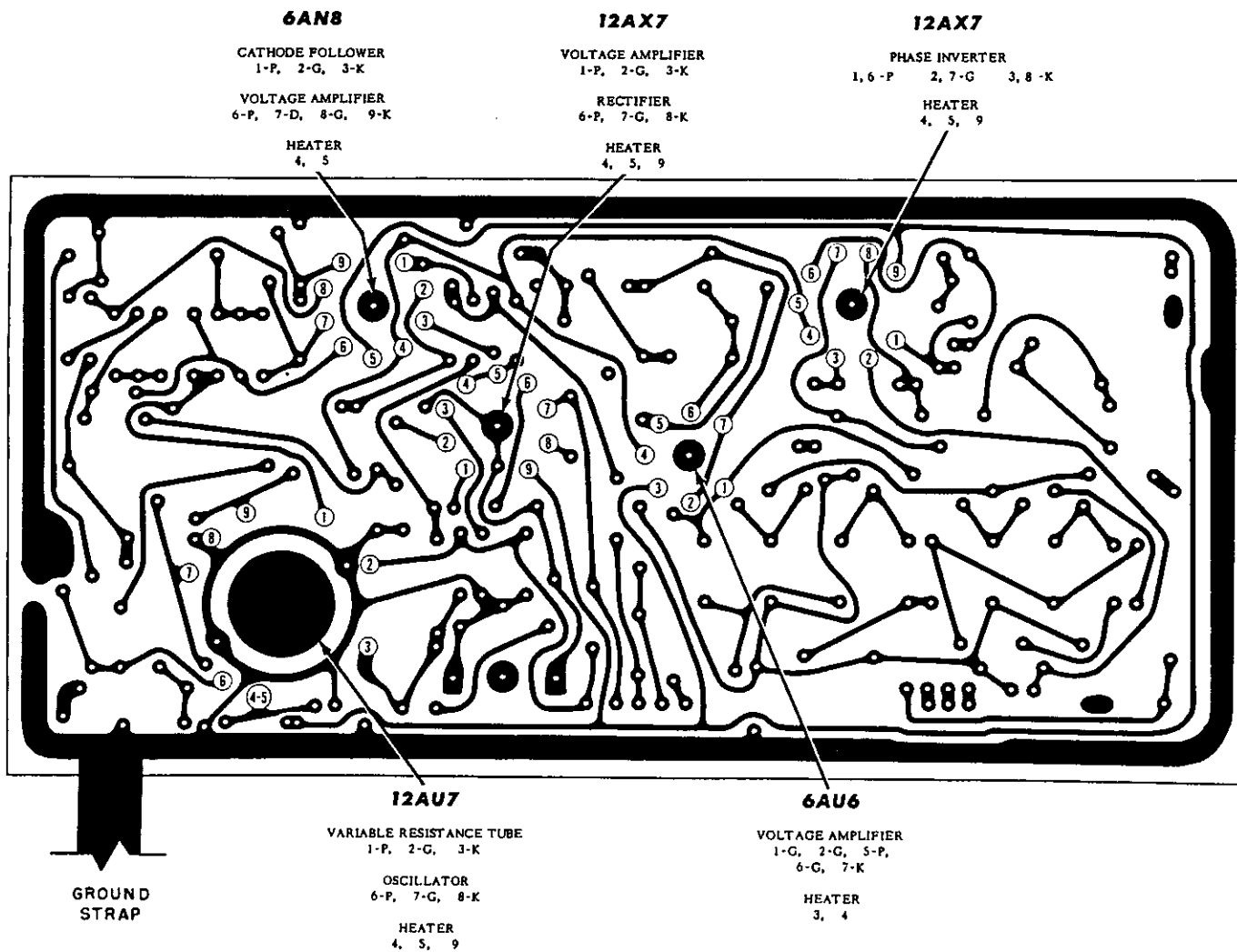


Fig. 105. PRINTED CIRCUIT BOARD (UNDER SIDE)

the out-put side of the transformer to compensate for various auxiliary speaker loads, in its damping effect, to permit maximum power output 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 (Page 47, Fig. 69). 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 output 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 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 output when the needle contacts the record and gradual increase of output until the predetermined volume control setting has been reached.

e. Filament Standby Voltage.

The current supply for 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 and in phase. 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 speaker to the Model 532 Amplifier. Detailed information regarding the use and control of auxiliary speakers follows:

a. Auxiliary speakers may be connected to the Model 532 amplifier at a terminal strip located on the back end of the amplifier and marked "8 Ohm," "GND," and "C.V." The amplifier output 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 "GND." The 8 Ohm output is not connected by the fader switch, and will therefore operate directly with phonograph volume. Speakers with 500 Ohm line transformers may be connected in parallel to terminals "GND" and "C.V." 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", 15 watts of the amplifier output will be delivered to the phonograph speaker network and the 8 Ohm line, if connected, and 8 watts will be delivered to the "C.V." line. One to three auxiliary speakers may be used.

(3) With the fader control set at "B" 8 watts of the amplifier output will be delivered to the phonograph speaker network, and the 8 Ohm line, if connected, and 16 watts will be delivered to the "C.V." line. One to five auxiliary speakers may be used.

(4) With the fader control set at "C" 3 watts of the amplifier output will be delivered to the phonograph speaker network, and the 8 Ohm line, if connected, and 21 watts will be delivered to the "C.V." line. One to eight auxiliary speakers may be used.

(5) With the fader control set at "D" 1 watt of the amplifier output will be delivered to the phonograph speaker network, and the 8 Ohm line if connected, and 23 watts will be delivered to the C.V. 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 "C.V." 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, 5117, and 5119 are provided with tapped transformers, with individual volume controls as mentioned in "Note" above. There are line transformers available for such other speakers as 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 output balance.

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

5. AUXILIARY AMPLIFIER (Fig. 106)

The group of auxiliary sound system components shown in Figure 106 is identified as Model 231. It consists of a Model 229 High Fidelity Power Amplifier of twenty watt capacity, together with installation fixtures and control units.

a. Instruction for installation and speaker connections are contained in the instruction sheet provided with the Model 231. Reference tables for various speaker combinations are printed on the side of the chassis pan of the Model 229 Amplifier.

b. Should additional sound distribution be required, the Model 532 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 High Fidelity Auxiliary Amplifier, separate volume control, input cables, and adapter cable for attachment to the Model 532 amplifier. (See Fig. 106). The Model 229 High Fidelity Auxiliary Amplifier is independently controlled by its own volume control which may be installed at the phonograph or at a remote station.

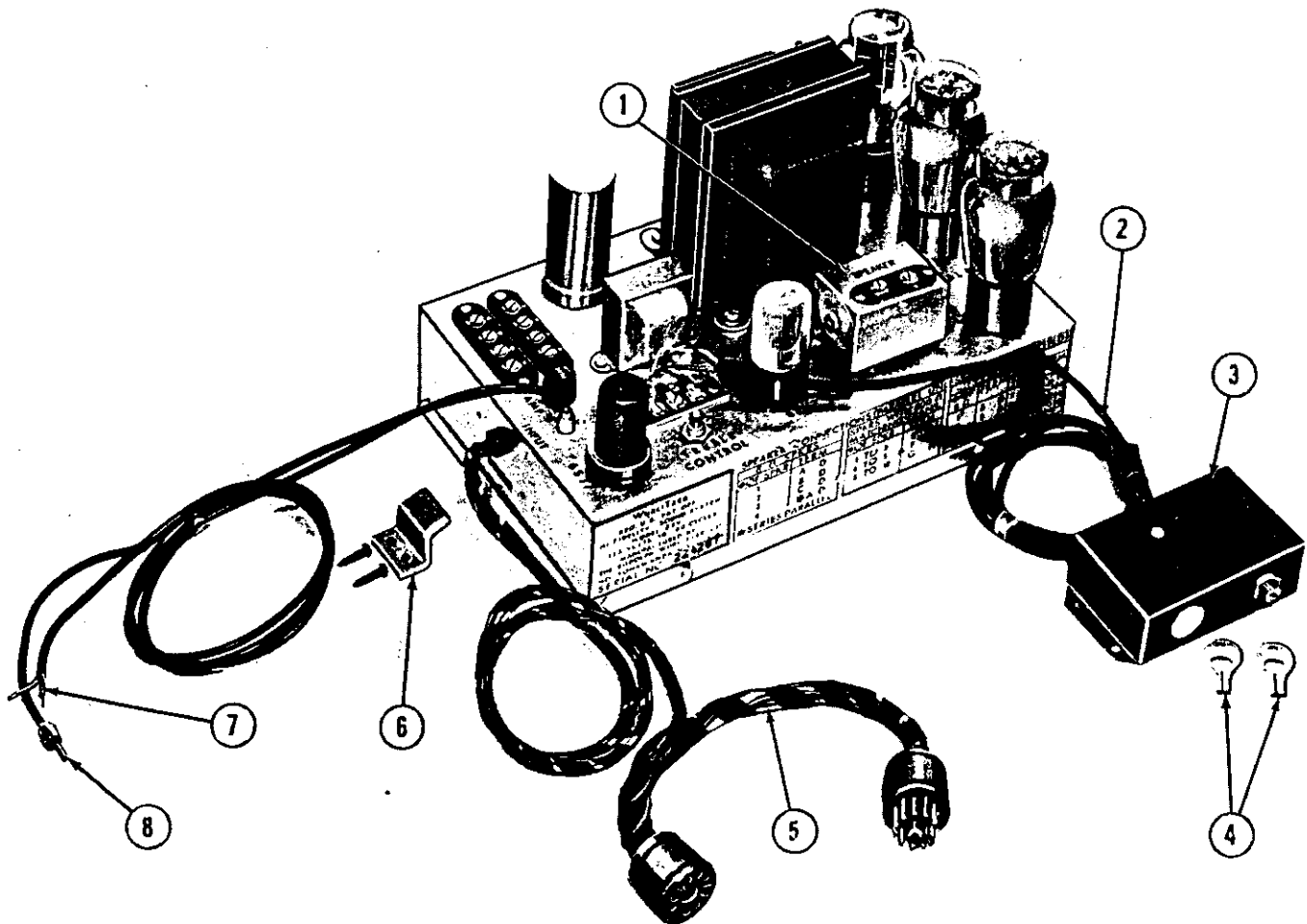


Fig. 106. MODEL 231 AUXILIARY AMPLIFIER EQUIPMENT

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 532	66202



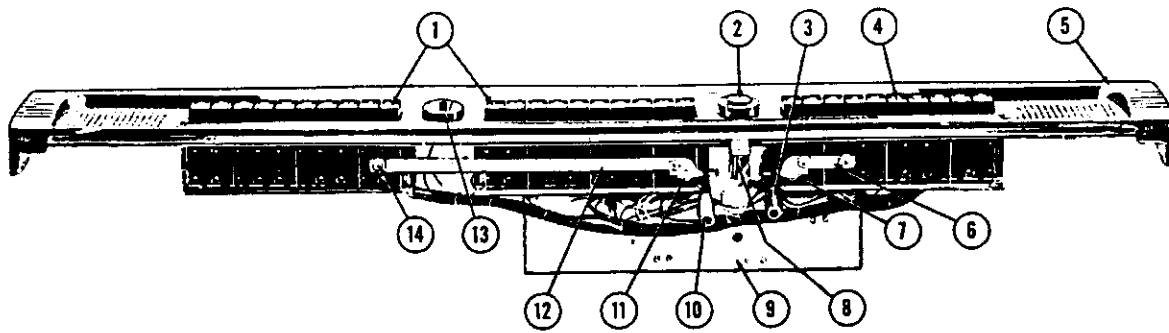


Fig. 4. SELECTOR SWITCH ASSEMBLY

68860

1. Switch and Button Assembly A to K 69354,	L to V 69355	8. Reset Switch	68574
2. Reset Button	68556	9. Mounting Plate, Switch, and Solenoid Assembly	69351
3. Shaft, Link, and Lever Assembly, Numbers	68405	10. Shaft, Link, and Lever Assembly, Letters	68406
4. Switch and Button Assembly, Numbers	69356	11. Adjustment Clip, Letters	68280
5. Program Selector Casting	68299	12. Connector Link, Letter Switches	68409
6. Connector Link, Numbers	68408	13. "Select" and Reset Casting	68320
7. Adjustment Clip, Numbers	61343	14. Adjustment to Synchronize Latch Bars	

will be latched "out" until selection has been completed or the "Reset Switch" used to release the latch solenoid. The reset switch permits the release of either a letter or a number button any time before selection has been completed by pressing both a letter and a number. The wiring of both the letter and the number switches is a continuous series circuit. Therefore all letter and number switches beyond the one selected, will be isolated from the source of power and only the selected switch may receive the selection pulse. Both the letter and the number latch linkage (Fig. 5) are accompanied by the conventional latch switches and series switches.

series switches open at this time to isolate the initial selection circuit until the electric selector system has completed the selection and released the selector switches for further selection. As the selection is made by manual operation of the selector buttons as described above, a 28 V.D.C. circuit is completed to timing relay No. 2 and a series connected number solenoid, as determined by the number button pressed. Following this relay circuit all selection circuits and associated functional circuits are electrically handled by the electric selector system.

d. The electric selector assembly, the junction box and stepper unit, and the power supply for the electric selector system are described on pages 13, 14, 15 and 16 of your MODEL 2100 SERVICE MANUAL, VOL. II.

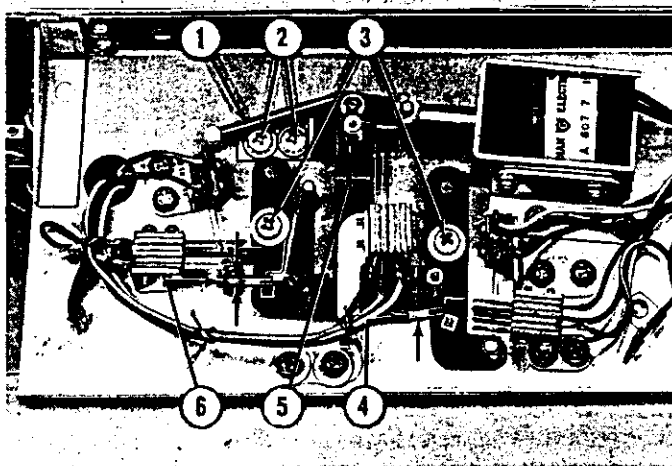


Fig. 5. SELECTOR SWITCH AND LATCH ADJUSTMENT

1. Spring, Retracting, Latch Solenoid	57130
2. Adjusting Screws, Stop Bracket	73533-34
3. Adjusting Screws	73533-34
4. Dimension 1/32" Clearance	
5. Release Lever, Stud, and Spacer Assembly	56713
6. Dimension 1/32" Clearance	

The latch switches are mechanically closed by their respective pawls and springs. The series switches are actuated by movement of the latch linkage when a letter button or a number button is depressed. The

2. OPERATION

A complete description of the electric selector system in operation, together with functional schematic diagrams in their sequence, is furnished on pages 16 through 30 of your MODEL 2100 SERVICE MANUAL, 312-S, VOL. II.

3. ADJUSTMENTS

Selector Switch Assembly, Figures 5, 6 and 7.

a. It is essential that both the letter and number button switches, as well as their latch bars, separate without friction, from their maximum depressed position to their complete retracted position. The respective latch bars of these switches must engage freely with all of the switch "push rods" and retract freely when the switch push rods are released. The two letter switch latch bars are joined together by the connector link (Item 12, Fig. 4) and coupled to the "shaft, link, and lever" assembly (Item 10, Fig. 4). This coupling point is adjustable by means of the

"adjustment clip" (Item 11, Fig. 4). The adjustment should provide minimum play consistent with freedom of operation. The adjustment screw at item 14 is provided for synchronization of the movement of the two letter latch bars. The number latch bar is coupled to its "shaft, link, and lever" assembly in like manner and should be adjusted at the screw (Item 7, Fig. 4) as described above.

b. Adjustment of the latch solenoid stop bracket should be made with the link and plunger retracted against the stop bracket by the latch solenoid retracting spring (Item 1, Fig. 5). Loosen the two bracket screws (Item 2) and move the bracket on its elongated mounting holes to provide $1/32$ " clearance between the tip of the trip lever and the adjacent surface of the pawl as indicated at items 4 and 6 in Figure 5. Check this requirement after tightening the stop bracket screws. If necessary, repeat the adjustment to obtain average clearance of $1/32$ ".

c. The adjusting screws in the number trip lever and the letter pawl (Item 3, Fig. 5) serve to take up back lash in the latch linkage. When the latch solenoid is manually held in its actuated position as shown in Figure 6, and a number and letter switch buttons are firmly depressed, the number pawl (Item 1, Fig. 7) and the letter pawl (Item 6, Fig. 7) should drop snugly into the number trip lever (Item 11, Fig. 7) and the letter trip lever (Item 5, Fig. 7) respectively.

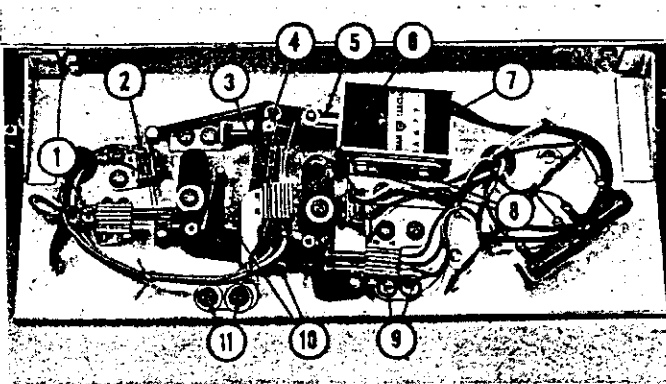


Fig. 6. SELECTOR SWITCH AND LATCH ADJUSTMENTS

- | | |
|--|----------|
| 1. Adjusting Screws, Latch Switch, Numbers | 73533-34 |
| 2. Switch, Series, Numbers | 66007 |
| 3. Switch, Bracket, and Brace Assembly, Latch Solenoid | 110148 |
| 4. Release Lever, Stud, and Spacer Assembly | 56713 |
| 5. Plunger | 60717-1 |
| 6. Switch, Series, Letters | 66011 |
| 7. Solenoid, Latch | 60717 |
| 8. Adjusting Screws, Latch Solenoid | 73533-34 |
| 9. Adjusting Screws, Latch Switch, Letters | 73533-34 |
| 10. Release Tabs of (Release Lever, Stud, and Spacer) | |
| 11. Adjusting Screws, Latch Solenoid Switch | 73533-34 |

d. Adjustment of the release lever clearance (Item 10, Fig. 6) is accomplished by proper positioning of the latch solenoid (Item 7, Fig. 6), however, it is recommended that the latch solenoid switch (Item 3) be loosened at its mounting bracket (Item 11) to prevent bending of its blades during the following procedure.

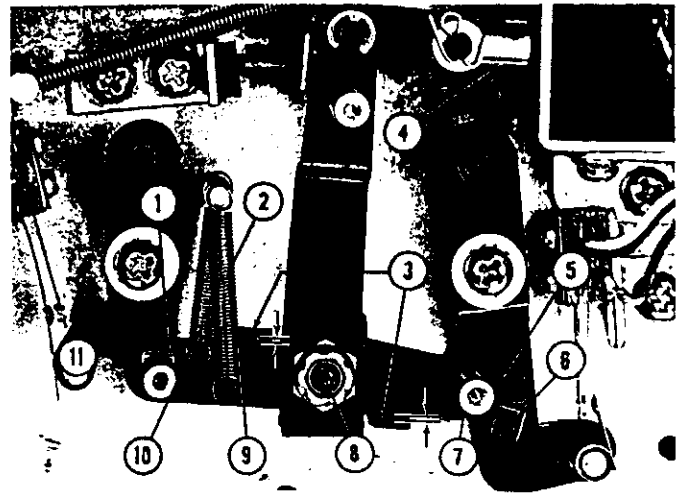


Fig. 7. SELECTOR SWITCH AND LATCH ADJUSTMENTS

- | | |
|---|-------|
| 1. Pawl, Stud, and Spacer Assembly, Numbers | 56712 |
| 2. Spring, Letter Latch | 57128 |
| 3. Release Tabs of Release Lever | 56713 |
| 4. Link and Plunger Assembly | 65948 |
| 5. Trip Lever, Stud, and Spacer Assembly, Letters | 56714 |
| 6. Pawl, Stud, and Spacer Assembly, Letters | 65009 |
| 7. Dimension $1/32$ " Release Tab to Trip Lever | |
| 8. Stop Nut, Levers, and Spacers, Mounting | 23879 |
| Spacer, Inner | 57790 |
| Spacer, Outer | 57791 |
| 9. Dimension $1/32$ " Release Tab to Pawl | |
| 10. Spring, Number Latch | 57129 |
| 11. Trip Lever and Spacer Assembly, Numbers | 65010 |

(1) The latch solenoid may now be moved on the elongated mounting holes in its bracket by loosening the two screws (Item 8). The latched position of the linkage should be established as described in (c) and the latch solenoid, with its link and plunger (Item 4, Fig. 7) held firmly bottomed in the solenoid, adjusted to provide clearance as shown at items 7 and 9 of Figure 7. The closest of the two release tabs (Items 3, Fig. 7) to its corresponding arm, should be $1/32$ " when the two pawls (Items 1 and 6) are fully engaged. It is important that both of the arms as well as the release arm, operate freely on their mounting stud (Item 8). The elastic stop nut at item 8 is adjustable for this purpose.

(2) The latch solenoid switch (Item 3, Fig. 6) 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 as shown in Figure 6. At the same time its normally open contacts should close and overtravel enough to provide good wiping action of the contacts.

e. The number and letter latch switches (Items 1 and 9, Fig. 6) are assembled and set to provide normally open contacts. This opening should be $1/32$ ". When the latch solenoid is actuated electrically under normal operation, or pre-set manually as described in "c", the adjusting screws indicated at items 1 and 9 should be slightly loosened and the switch brackets moved to produce good contact of the switch blades and sufficient overtravel to create wiping action of about $1/32$ ".

3. OPERATION

The Model 2150 record changer goes through a complete cycle each time a record is played. This mechanical cycle of operation begins with the phonograph in its normal "at rest" position and passes through nine distinct mechanical phases of operation until the mechanism returns to its original "at rest" position. All of the mechanical operation of the record changer depends upon the proper functions in 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 several mechanical phases of operation, which are based on the sequential functioning of the foregoing switches, are discussed in detail on pages 40 through 44 of your MODEL 2100 SERVICE MANUAL, 312-S, VOL. II.

4. ADJUSTMENTS

Although each Wurlitzer Model 2150 Phonograph is carefully adjusted at the factory, various factors such as rough handling during shipment may make it necessary to check some of the adjustments. Before making any mechanical adjustments it should be remembered that the mechanical operation of the phonograph depends primarily upon the proper functioning of a number of switches. Therefore, if the phonograph fails to function properly, check the setting of the various control switches before disturbing any inter-dependent mechanical adjustments. When it is certain that all switches are operating properly, it will be easier to locate the cause of mechanical malfunction.

Complete instructions for preliminary inspection and full adjustment procedures are provided on pages 45 through 61 of your MODEL 2100 SERVICE MANUAL, 312-S, VOL. II.

5. LUBRICATION

Lubrication of the record changer should be checked periodically to insure uninterrupted operation. A list of recommended oil and other lubricants, together with instructions for their use will be found on page 61 of your MODEL 2100 SERVICE MANUAL, 312-S, VOL. II.

MODEL 2150 SOUND SYSTEM

1. GENERAL DISCUSSION

The sound system of the Wurlitzer Model 2150 Phonograph consists of a Dynatone Model 532 Amplifier with built-in automatic level control and Zenith Cobra pick-up mounted in Wurlitzer's low inertia tone arm, and a high-fidelity wide angle speaker network mounted on a single flat baffle (See Fig. 10).

The out-put of the Model 532 Amplifier is provided with terminals and a ratio fader control to accommodate

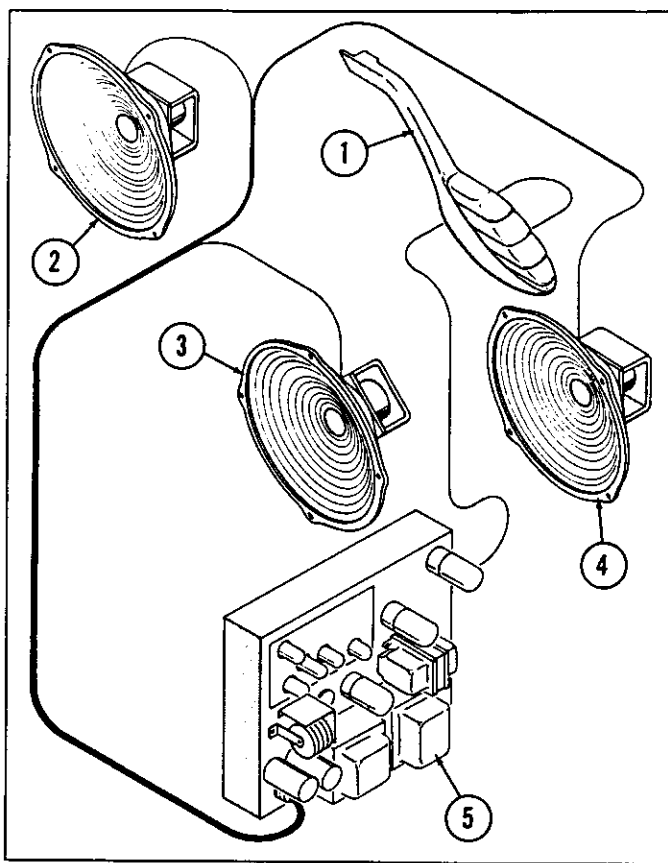


Fig. 10. SOUND SYSTEM - MODEL 2150

1. Tone Arm	68100
2. Speaker, 12" Red Dot, Low Range	62492
3. Speaker, 12" Blue Dot, Mid Range	62493
4. Speaker, 12" Red Dot, Low Range	62492
5. Amplifier	68115

auxiliary speaker installations. Remote volume control and cancel facilities are available through the installation of Kit No. 147 (Part No. 65337).

2. DESCRIPTION

A complete description of the Model 532 amplifier is provided on page 62 of your MODEL 2100 SERVICE MANUAL, 312-S, VOL. II.

3. THEORY OF OPERATION

The theory of operation of the Model 532 amplifier and printed circuit board lay-out and circuitry are provided on pages 63 and 64 of your MODEL 2100 SERVICE MANUAL, 312-S, VOL. II.

4. AUXILIARY SPEAKERS

Methods for connecting auxiliary speaker equipment, their use, and control are provided on pages 65 and 66 of your MODEL 2100 SERVICE MANUAL, 312-S, VOL. II.

5. AUXILIARY AMPLIFIER

Auxiliary amplifier equipment and its use is discussed on page 66 of your MODEL 2100 SERVICE MANUAL, 312-S, VOL. II.