SECTION 1
GENERAL

INTRODUCTION

SCOPE OF MANUAL

This booklet is written for the express purpose of guiding the repairman in the servicing of Revere Tape Recorders. When Revere Tape Recorders are brought in for servicing, a complete disassembly, inspection, repair and reassembly is recommended.

Such servicing should be done with a thorough understanding of this Service Manual in order to maintain the high quality workmanship originally built into each recorder. In the long run, this will reduce service call-backs and result in greatest customer satisfaction.

MODELS COVERED

This manual covers the following models of the Revere Tape Recorder:

T-100 (105-120 V, 60 cps)
TR-200 (105-120 V, 60 cps)
TS-300 (105-120 V, 50 cps)
TS-301 (210-240 V, 50 cps)

SPECIFICATIONS

POWER CONSUMPTION

Power consumption is 100 watts.

WEIGHT

Weight of the recorder is approximately 25 pounds.

RECORDING MEDIUM

Recorders are furnished with Tape No. 111, plastic backing, made by Minnesota Mining and Manufacturing Company. Any equivalent magnetic-recording tape having the following specifications may be substituted: paper or plastic base, 1/4 inch wide, magnetic-oxide coated, "A" wind, five-inch reel capacity.

TAPE SPEED

Recording or playback tape speed is 3.75 inches per second.

Playing time is one hour using a five inch reel with manual turnover (1/2 hour per side).

RAPID TAPE TRANSPORT

Rapid Forward Speed: approximately ten times normal playing speed, accomplished without disturbing or re-threading the tape.

Rewind: approximately 30 times normal playing speed; 600 feet of tape may be rewound in approximately one minute without disturbing or re-threading the tape.

INPUT CONNECTIONS

Two jacks on the rear of the recorder permit microphone input at 220,000 ohms (suitable for signals from minus 90 VU to minus 30 VU), and radio-phonograph input at one megohm (suitable for signals from minus 3 VU to plus 30 VU).

OUTPUT CONNECTIONS

Normal playback output is through a 5x7-inch elliptical, built-in, permanent magnet, dynamic speaker. Extension speaker jack on the back of the recorder permits output to any external speaker system having a 3.2 ohm impedance.

RECORD-PLAYBACK HEAD

Recorder is equipped with Shure Brothers, Inc. Model TR-5 head.

DRIVE MOTOR

Four pole, shaded-pole motor is rated at 1/80 horsepower.

MICROPHONE

Controlled reluctance dynamic microphone, rated 52 db below one-volt-per-dyne-per-square-centimeter is furnished.

RADIO ATTACHMENT CORD

Attachment cord with input plug and speaker clips permits connection of recorder to external input or output.

ERASURE

Erasure of saturated 400 cps signal by high frequency erase head exceeds 55 db.

MODELS T-100, TR-200,
TS-300, TS-301

FREQUENCY RESPONSE

POSITION TONE CONTROL	FREQUENCY RESPONSE
↑ Treble	±3 db, 100-7500 cps
Normal	±3 db, 60-6500 cps (-10 db at 50 and 7000 cps)
↓ Bass	±3 db, 50-3500 cps

DISTORTION

Amplifier distortion at low levels is less than 2 per cent total harmonic content. At 5 watts (maximum undistorted output) distortion is 8 per cent at 1000 cps.

Tape distortion at nominal recording level is less than 3 per cent; at maximum recording level, it is less than 10 per cent.

SIGNAL TO NOISE RATIO

Ratio exceeds 45 db at normal recording level.

TUBE COMPLEMENT

1 - 6SJ7
1 - 6K6-GT
1 - 6V6-GT
2 - 6J7
1 - 6X5-GT (Rectifier)

OPTIONAL ACCESSORIES

The following accessories are available as optional equipment:

Ear phone set (single ear type with special Revere plug).

Microphone extension cord (extends microphone lead 15 feet).

Microphone stand (Shure Brothers, Inc.).

CONTROLS AND INDICATORS

(Controls and indicators are illustrated in Figure 1.)

PILOT LAMP

Indicates power on-off condition.

FUNCTION SWITCH

Permits selection of recording, playback, rewind and stop operations.

RAPID FORWARD LEVER

Engages drive mechanism for rapid forward speed.

ON-OFF, VOLUME CONTROL

Turns recorder on and off; controls volume of input and output signals.

TONE CONTROL

Governs tone quality of output signal.

INSTANT STOP ARM

Starts and stops tape instantaneously.

RECORDING LEVEL INDICATOR

Dual-level neon indicator shows nominal recording level (two per cent distortion) and overload recording level (eight per cent distortion).

TIME-FOOTAGE INDICATOR

Shows elapsed time in terms of minutes and feet of tape.

RECORD SAFETY BUTTON

Prevents accidental erasures by controlling movement of Function switch to RECORD position.

OPERATING INSTRUCTIONS

Operating procedures are printed here for convenient reference. For complete detailed instructions, see Operating Instructions, a booklet furnished with every Revere Tape Recorder.

PRELIMINARY OPERATIONS

For all operations, place recorder in condition as follows:

(1) Turn Function switch to STOP.
(2) Turn On-Off switch to ON.
(3) Thread tape from left-hand reel through head slot to right-hand reel with dull side of tape against head (facing toward rear of recorder).

Recorder is now in readiness for any sequence of operations as described below.

TO RECORD

(4) Connect MICROPHONE or PHONO-RADIO jack (on back of recorder) to appropriate input signal source.

(5) Depress Record Safety button.
(6) Turn Function switch to RECORD position corresponding to type of input in use (MICROPHONE or PHONO-RADIO).
(6a) For machines equipped with an Instant Stop arm: A preliminary adjustment of the Volume control, using a sample signal, should be made while holding the recording tape at a standstill with the Instant Stop arm. For best recording level, adjust Volume control so that one-half section of the Recording Indicator glows for average input signal.
(7) Start recording.

NOTE

If Tape Recorder being serviced is not equipped with Instant Stop arm, immediately adjust Volume control so that approximately one-half of Recording Indicator glows on average signal.

TO REWIND

(4) Turn Function switch to REWIND.

TO PLAYBACK

(4) Turn Function switch to PLAY.
(4a) To reach a desired section of tape quickly, Rapid Forward lever may now be actuated, resulting in accelerated forward motion of tape.
(5) Adjust Volume control and Tone control.

TO SHUT-OFF

To cease any recorder operation, turn Function switch to STOP. Then turn ON-OFF switch to OFF.

NOTE

Always store recorder with Function switch in STOP position.

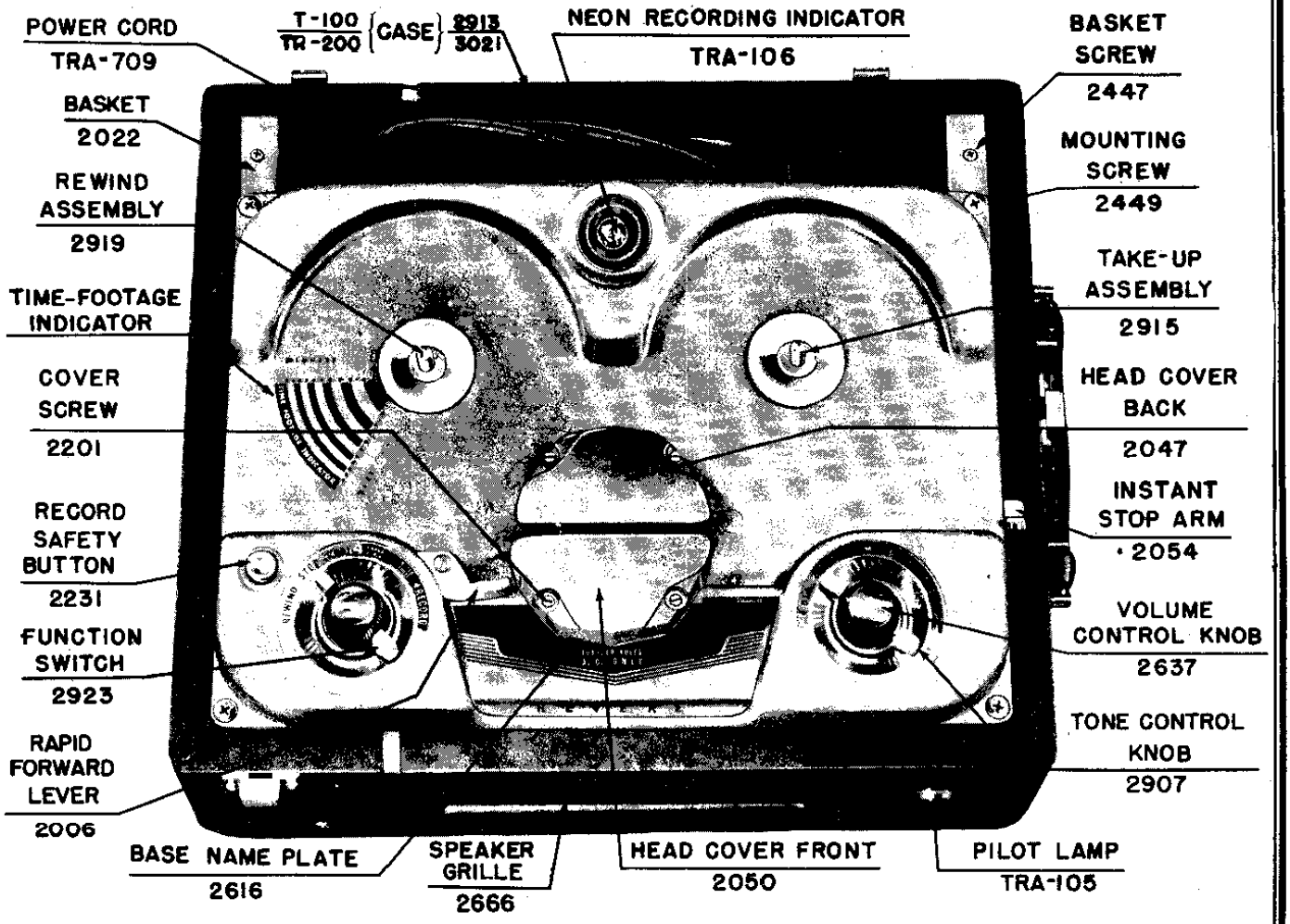

FIG. 1 - Revere Tape Recorder Controls and Indicators.

MODELS T-100, TR-200, TS-300, TS-301

SECTION 2
SERVICING MECHANICAL SYSTEM

TROUBLE SHOOTING

The following trouble-shooting methods are general guides to quick isolation of mechanical difficulties.

NOTE

All friction drive surfaces should be cleaned with carbon tetrachloride. Because of their precision tolerances and critical surface finishes, all worn mechanical parts should be replaced with new factory-supplied parts.

Trouble	Possible Cause	Remedy
A-Weak Volume.	(1) Dirty head.	Remove front head cover, clean head with carbon tetrachloride or alcohol.
	(2) Worn or missing pressure pad.	Replace pad (Fig. 2); fasten with household cement.
	(3) Wrong type of tape.	Use tape as specified in Section 1.
	(4) Reversed tape wind.	Use "A" type wind (dull side of tape facing head laminations, see Fig. 2).
B-No Erase.	(1) Erase pressure pad missing.	Replace pad (Fig. 2); fasten with household cement.
	(2) Defective electrical components.	See Section 3.
C-No Sound.	(1) Head plug and/or tubes out of socket.	Insert head plug in socket. Insert tubes in sockets.
	(2) Defective electrical components.	See Section 3.
D-Tape Slippage.	(1) Excessive take-up.	See Section 2, Take-up Assembly.
	(2) Oil on capstan or pressure roller.	Clean capstan and pressure roller with carbon tetrachloride.
	(3) Smooth driving surface on capstan.	Replace with new capstan (#2910).
	(4) Excessive drag on storage reel.	Adjust rewind brake as explained in Section 2, Rewind Brake Adjustment.
	(5) Insufficient tension of pressure roller against capstan.	Replace pressure roller spring (Fig. 11).
E-Drive Irregularities.	(1) Binding flywheel due to insufficient clearance between flywheel shaft and bearing.	Replace flywheel assembly (#2910, Fig. 7) and flywheel bearing (#2209, Fig. 11).
	(2) Irregularities in surface of rubber idler.	Replace idler.
	(3) Binding pressure-roller bearing.	Clean bearing surface. Replace pressure roller if necessary.
	(4) Smooth surface on flywheel rim.	Replace flywheel.
	(5) Oil on drive surfaces.	Clean capstan, pressure roller, flywheel, idler, motor pulley, take-up, and rewind pulley with carbon tetrachloride.
	(6) Excessive motor vibration.	Fan blade out of balance; replace. Tighten mounting screws. Replace defective motor.
F-Insufficient Take-up.	(1) Oil on clutch plate.	Clean with carbon tetrachloride.
	(2) Weak clutch spring.	Check for correct "free" length (21/32" to 23/32", Fig. 8).

Trouble	Possible Cause	Remedy
G-Slow Rapid-Forward Speed.	(1) Oil on clutch plate.	Clean with carbon tetrachloride.
	(2) Rewind brake out of adjustment.	Refer to Section 2, Rewind Brake Adjustment.
	(3) Insufficient clearance between reel and back head cover.	Adjust for sufficient clearance.
H-Tape Spill.	(1) Improper brake and cam adjustment.	Refer to Section 2, Knockout Cam and Brake Adjustments.
I-Defective Instant Stop Brake.	(1) Instant stop spring out of adjustment.	Refer to Fig. 11.
J-Slow Rewind.	(1) Take-up brake and cam out of adjustment.	Refer to Section 2, Knockout Brake and Cam Adjustments.
	(2) Eccentric out of adjustment.	Refer to Section 2, Eccentric Adjustment.

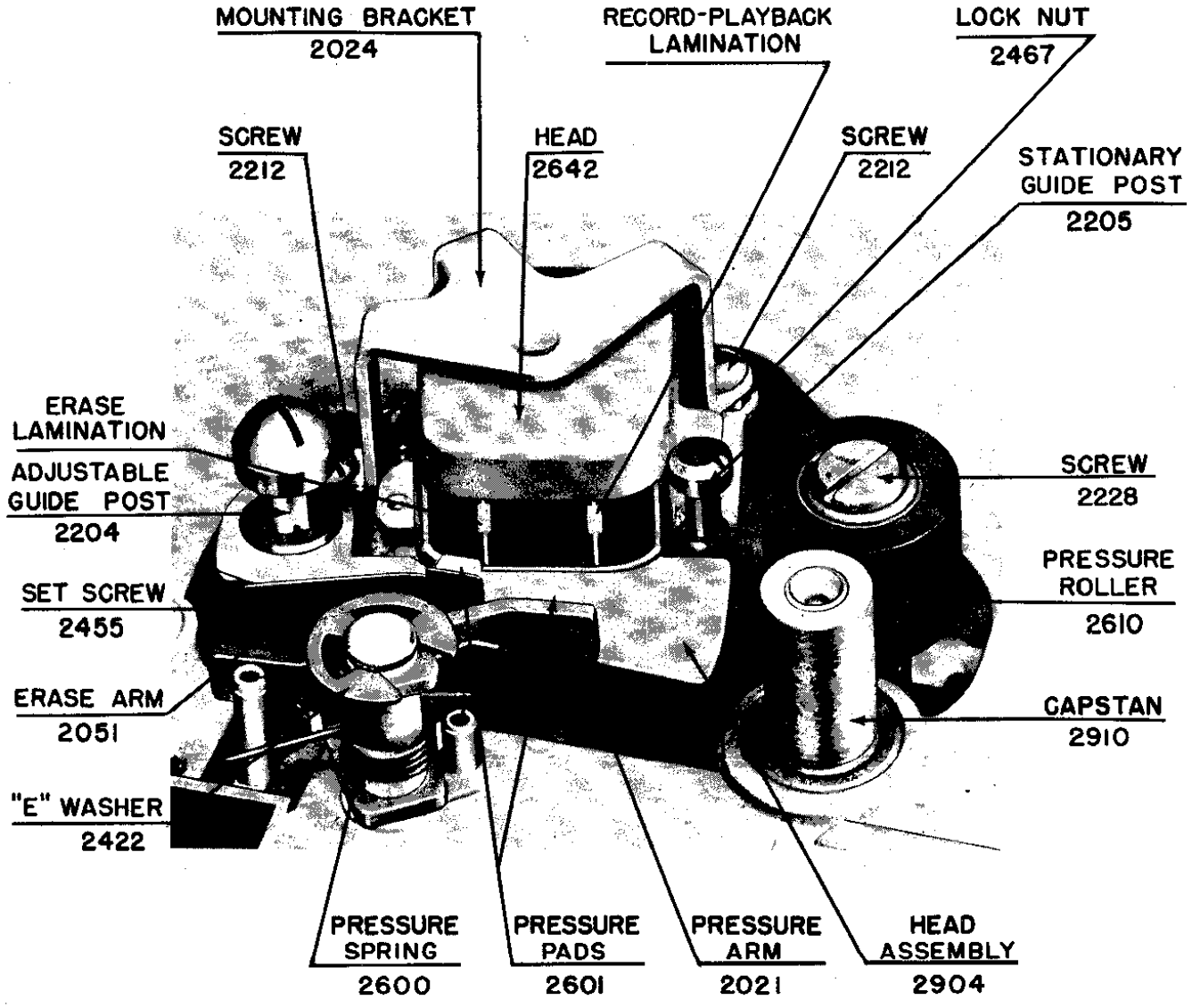

FIG. 2 - Recorder with Head Covers Removed Showing Head Mechanism.

MODELS T-100, TR-200,
TS-300, TS-301

REPAIR PROCEDURE

It is recommended that this section be thoroughly understood before any work is begun. Mechanical assemblies can then be easily serviced in the step-wise fashion indicated and with reference to the illustrations.

HEAD REPLACEMENT

If recording head has been proven defective, the following step-wise procedure should be followed:

(1) Remove head covers.

(2) Remove mounting bracket #2024 (note assembly of #2212 screws and #2467 lock nuts, see Fig. 2).

(3) Remove head wire leads from clips on under side of top casting and remove head plug from socket.

(4) Place Function switch in PLAY position and remove head wiring and plug through clearance in casting.

(5) Return Function switch to STOP position.

(6) The tape guide post #2204 will have to be re-aligned with the position of the head. This is accomplished by loosening set screw #2425 and adjusting the guide for maximum signal output using a 1000 cycle head alignment tape.

REMOVING RECORDER FROM CASE

(1) Place tape recorder on table or bench. Remove all literature and spare parts from basket. Remove basket screws (#2447) and mounting screws (#2449, see Fig. 1).

(2) Lift basket from case.

(3) Slide mechanism to rear of case (about 1/4 inch) and lift out.

REMOVING AMPLIFIER FROM MECHANISM

(1) Removal: Place machine face down in wooden rack (see Fig. 3). Remove only truss head screws shown in illus-

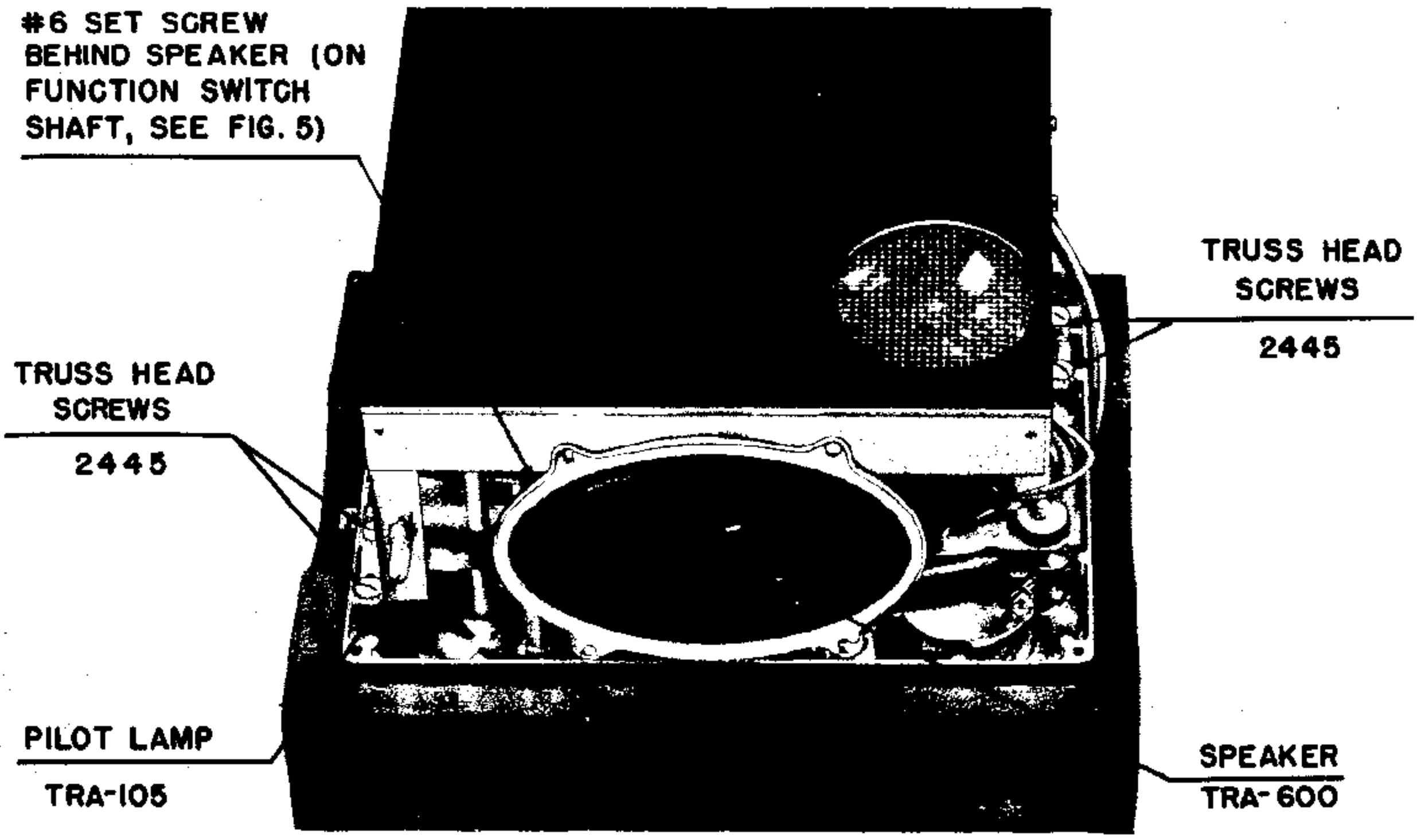

FIG. 3 - Bottom View of Recorder with Case Removed.

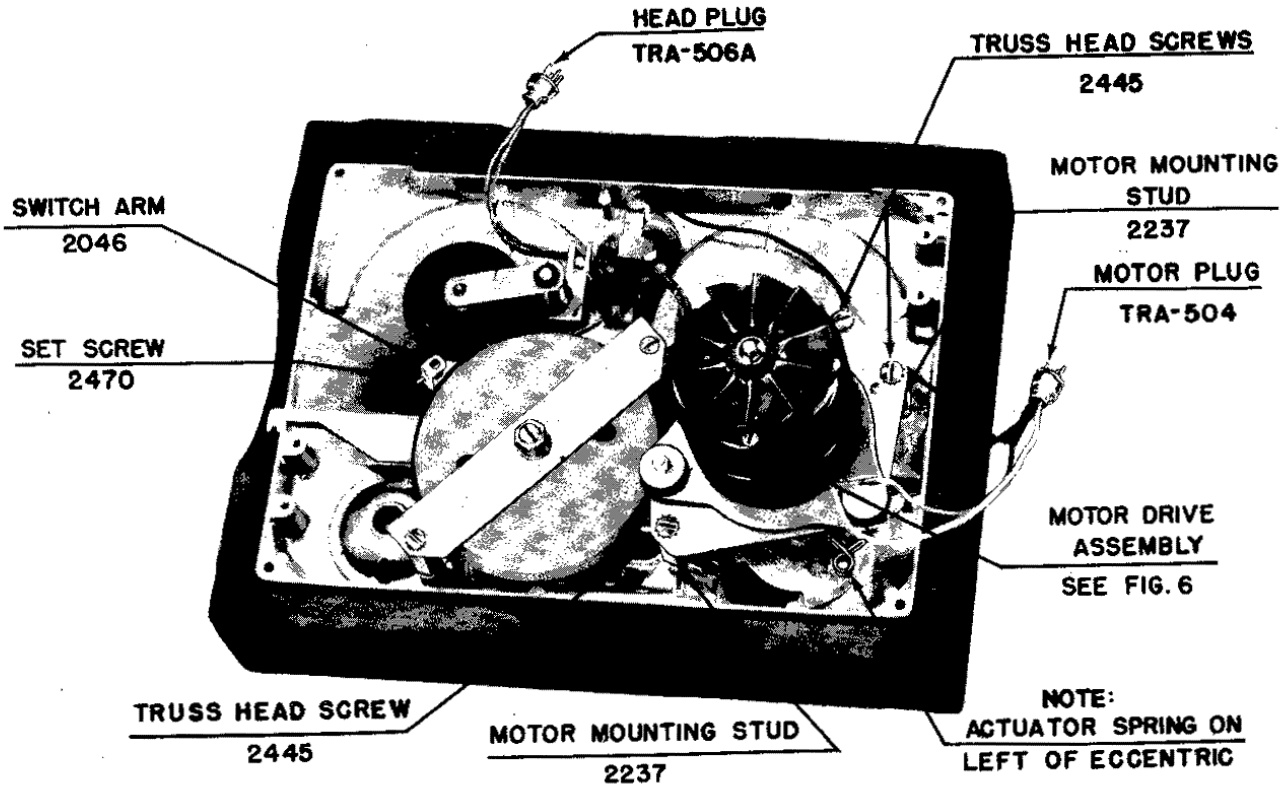

FIG. 4 - Bottom View of Recorder with Case and Amplifier Removed.

tration. Disconnect head and motor plugs from amplifier (see Fig. 4). Turn Function switch to REWIND position. Loosen set screw on switch arm (#2046). Return Function switch to STOP position. Remove amplifier from mechanism.

(2) Assembly (see Fig. 3): Place mechanism face down in wooden rack. Position amplifier above mechanism. Insert Function switch shaft through switch arm (#2046) and into boss in body casting (see Fig. 10). Turn Function switch to REWIND position; tighten switch-arm set screw against flat on switch shaft. Return Function switch to STOP position. Replace truss head screws (#2445) through amplifier mounting bracket. Replace head and motor plugs.

NOTE

Function switch should be in STOP position to remove pressure from rubber drive surfaces.

MOTOR DRIVE ASSEMBLY

NOTE

It is advisable that pulley spring (#2664) and eccentric (#2253) remain in their original positions.

Recorders built for 50 cycle operation have clip (#2053) mounted on right side of actuator (#2033) as viewed in Fig. 6.

(1) Disassembly: (See Fig. 4). Remove truss head screws (#2445). Lift motor free from motor mounting studs (#2237).

CAUTION

Do not damage fan blades.

(2) Inspection: (See Fig. 6). Check motor shaft for free rotation. Inspect idler wheel for wear. Check actuator (#2033) for free rotation on lower motor

bracket (#2901) bearing surface. Inspect motor pulley for wear.

(3) Repair: If motor shaft binds, tap motor with rawhide hammer. If this fails to allow free motor shaft rotation, replace motor.

Replace worn idler wheel. Replace worn motor pulley.

(4) Reassembly: Assemble motor assembly in sequence as shown in exploded view (Fig. 6). Check position of actuator spring (#2617) as noted in Fig. 4.

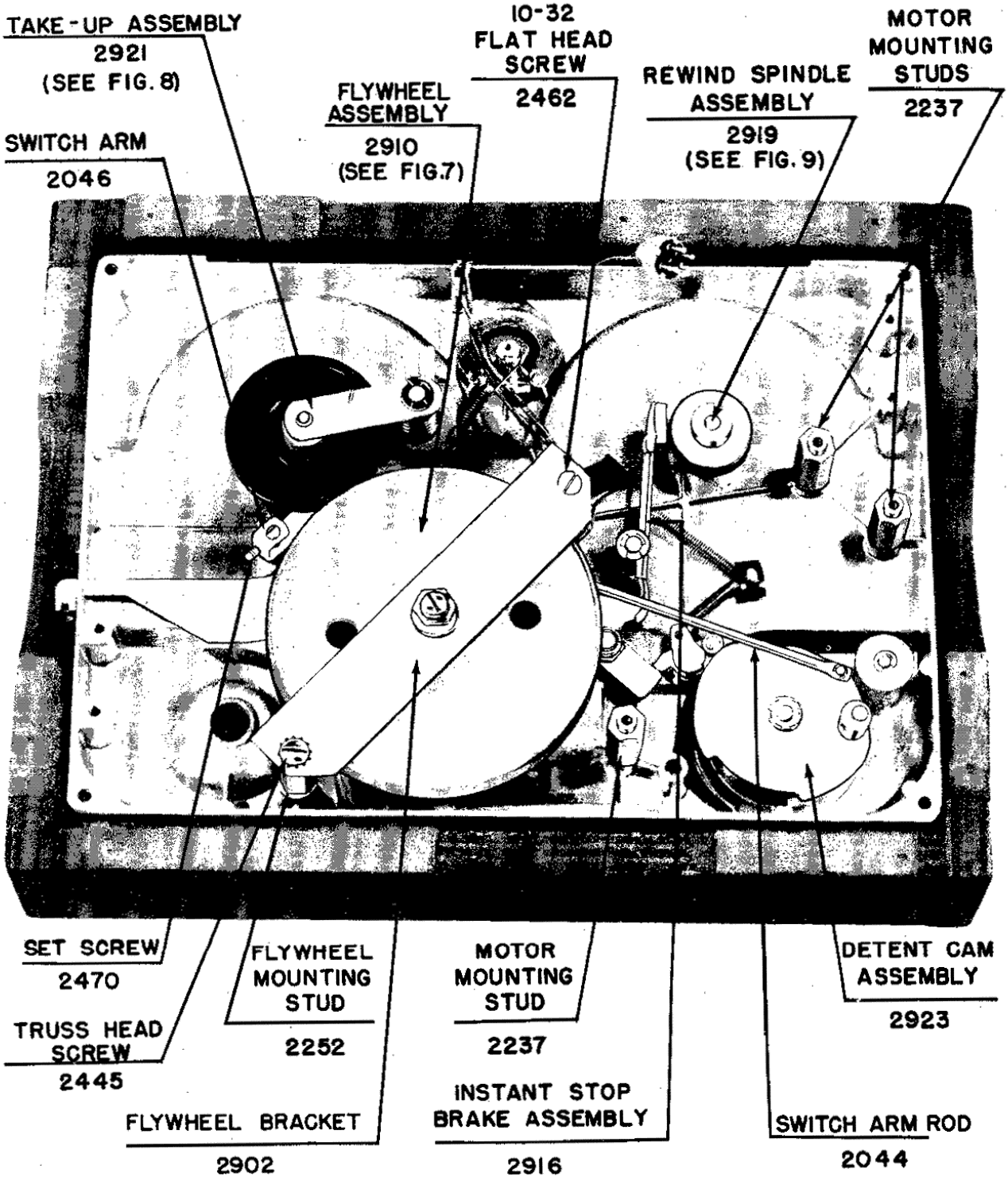

FIG. 5 - Bottom View of Recorder after Removing Motor Drive Assembly.

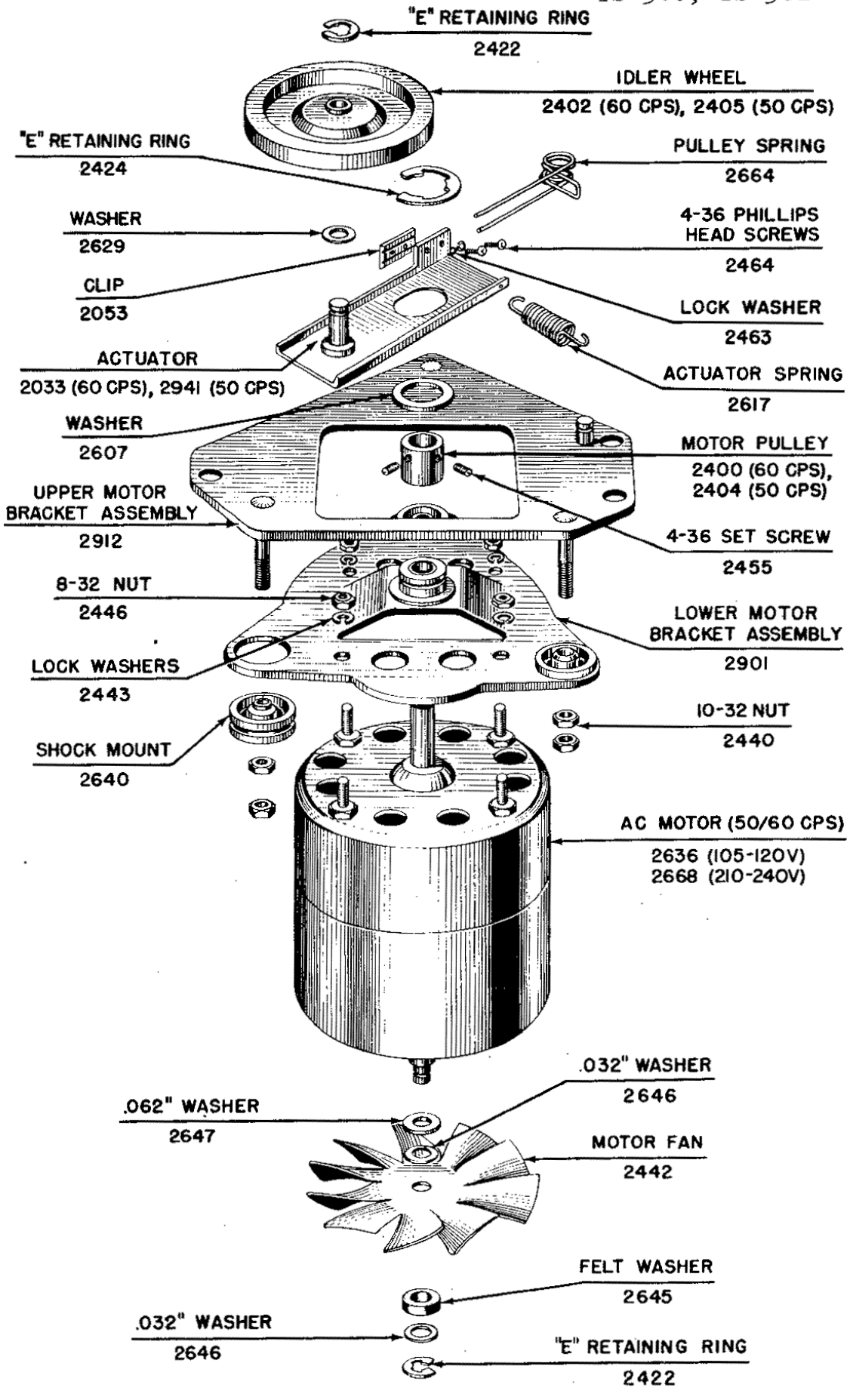

FIG. 6 - Exploded View, Motor Drive Assembly.

MODELS T-100,
TR-200, TS-300,
TS-301

FLYWHEEL ASSEMBLY

(1) Disassembly: (See Fig. 7.) Remove screws (#2462) and (#2445) from flywheel bracket. Lift bracket (#2902) from studs (#2252). Lift thrust ball (#2431) and thrust disc (#2042) from thrust socket.

(2) Inspection: Inspect thrust ball (#2431), thrust disc, (#2042) and flywheel (#2910) surfaces for burrs and wear.

(3) Repair: Replace worn parts. Capstan bearing (Fig. 11) should be replaced if capstan shaft circumference indicates wear.

(4) Reassembly: Lubricate thrust ball (#2431) and socket with Andox "B" Grease. Lubricate capstan shaft with Stan-Oil No. 75. Assemble parts in order shown in Fig. 7. Set thrust adjusting screw (#2229) to allow flywheel 3/64 inch vertical play along capstan shaft axis. Tighten loc.. nut (#2232).

TAKEUP ASSEMBLY

(1) Disassembly: (See Fig. 8.) Disconnect ends of arm spring (#2615). Remove "E" retaining rings (#2422 and #2423). Lift assemblies from stud (#2224) and spindle assembly (#2915).

(2) Inspection: Inspect take-up wheel (#2926) rubber surface, felt pad, and clutch plate (#2040) for wear. Check clutch spring (#2650) for correct free length (21/32 inch to 23/32 inch).

(3) Repair: Replace worn parts. Clean takeup pulley and clutch plate with carbon tetrachloride.

(4) Reassembly: Reassemble parts in specified relation (see Fig. 8). Be sure brake assembly (#2932) moves freely about stud (#2224). Clip arm spring (#2615) to arm assembly (#2917) and brake assembly (#2932).

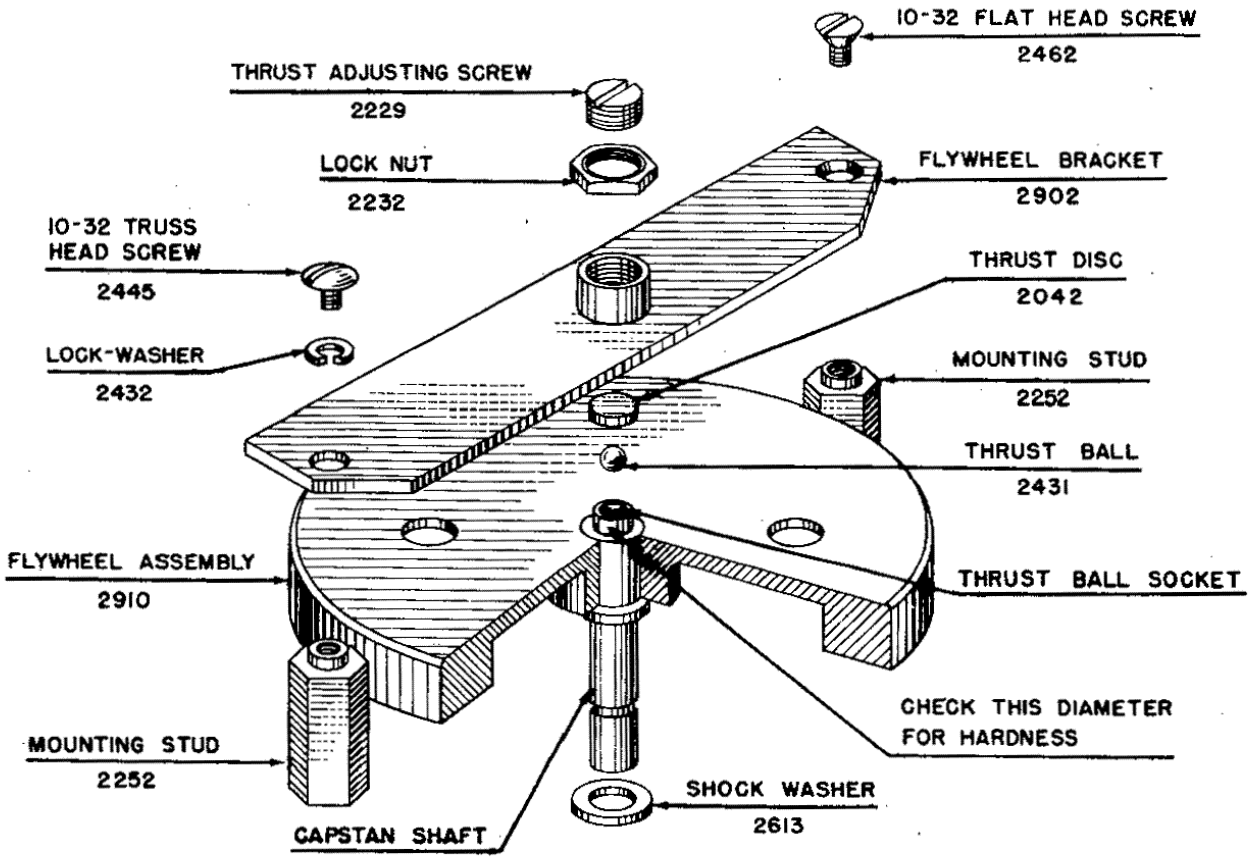

FIG. 7 - Exploded View, Flywheel Assembly.

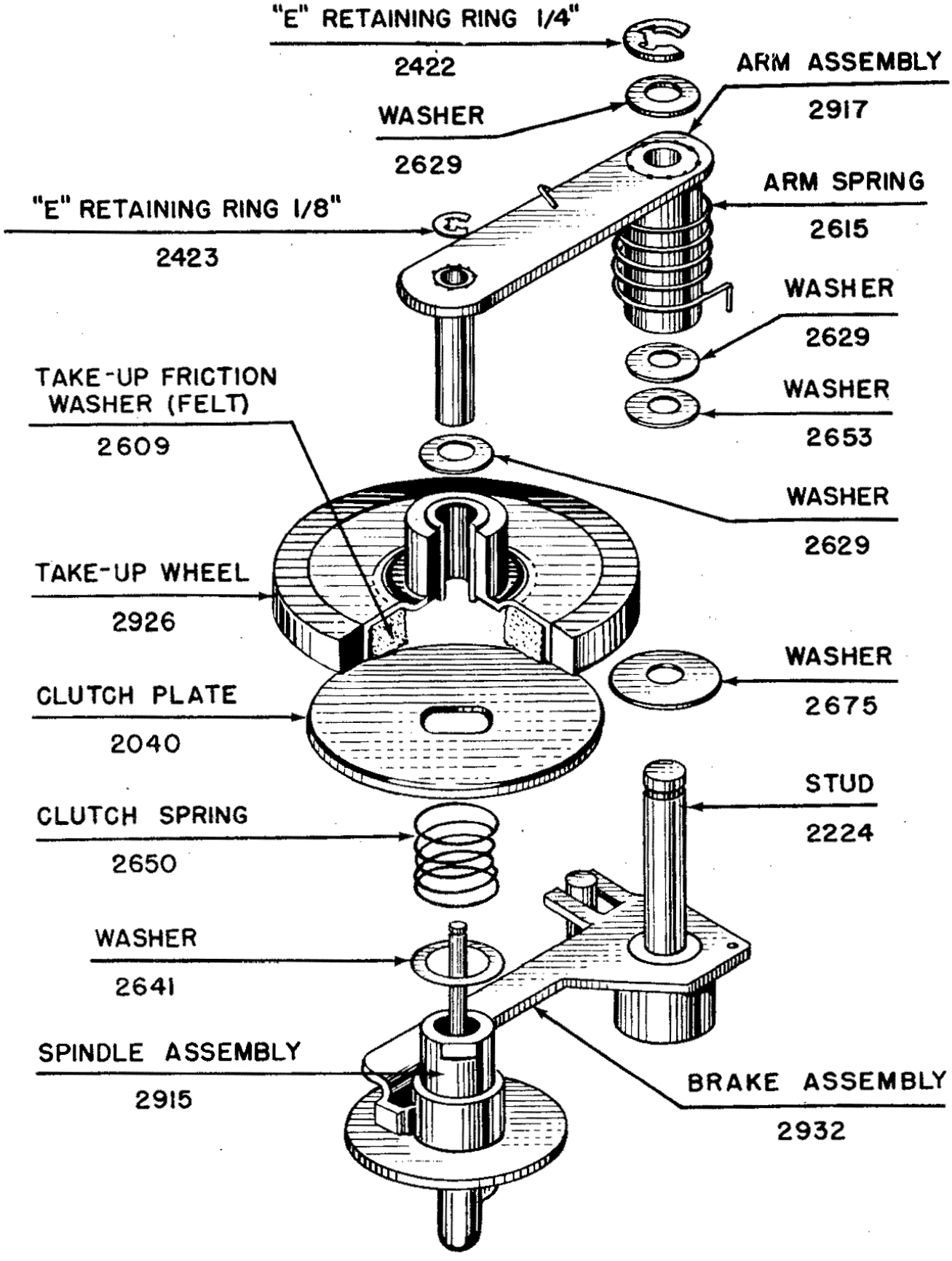

FIG. 8 - Exploded View, Takeup Spindle Assembly.

MODELS T-100, TR-200,
TS-300, TS-301

REWIND ASSEMBLY

(1) Disassembly: (See Fig. 9.) Loosen set screws (#2429). Lift rewind pulley assembly (#2403), karropak washer (#2654) and felt washer (#2658) from rewind shaft assembly (#2919). Slip rewind shaft assembly (#2919) out of bearing (#2612).

(2) Inspection: Check rewind pulley (#2403) surface, rewind shaft (#2919) and bearing (#2612) for wear.

(3) Repair: Replace worn parts.

(4) Reassembly: Grease rewind shaft (#2919) with ANDOX "B" Grease. Assemble as shown in Fig. 9. Tighten set screws (#2429) against flats of rewind shaft (#2919), allowing 1/64 inch play along axis of shaft.

KNOCKOUT CAM AND BRAKE ADJUSTMENTS

Fig. 10 illustrates further adjustments and checks which must be made. The following step-wise procedure is necessary.

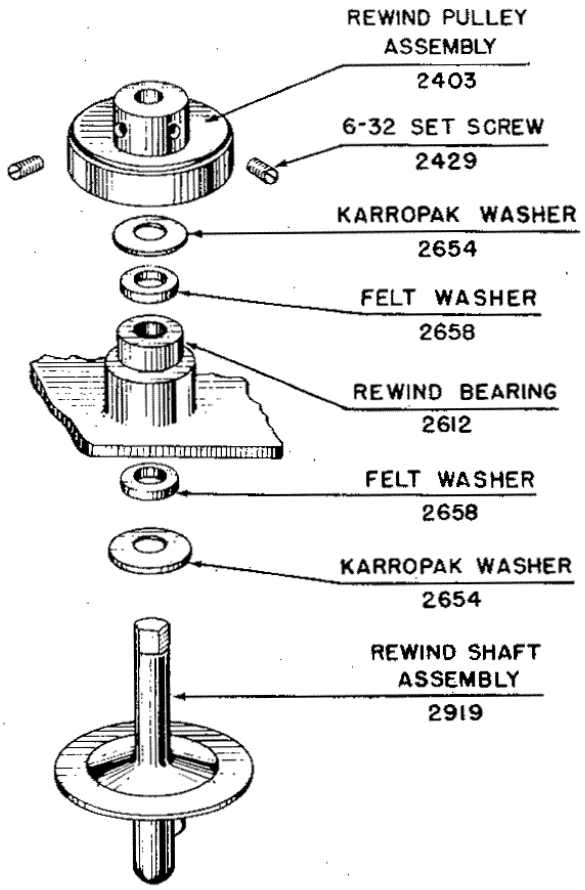

FIG. 9 - Rewind Assembly.

(1) With Function switch in REWIND position, be sure set screw is clamped against flat on Function switch shaft.

(2) With Function switch in PLAY position, adjust for 3/32 inch clearance between clutch knockout cam (#2933) and takeup arm assembly (#2917).

(3) With Function switch in REWIND position, adjust ear for .015 inch clearance between shoe of brake assembly (#2932) and shaft of takeup spindle assembly (#2915).

Upon completion of steps 1 through 3, the following steps indicate proper operation.

(4) With Function switch in PLAY and RECORD position, takeup wheel (#2926) should contact flywheel and takeup spindle assembly (#2915) should be disengaged from shoe of brake assembly (#2932).

(5) With Function switch in STOP position, brake assembly (#2932) should engage takeup spindle assembly (#2915) and takeup wheel should be disengaged from flywheel.

(6) With Function switch in REWIND position takeup wheel (#2926) should be disengaged from flywheel (#2910), and shoe of brake assembly (#2932) should be disengaged from takeup spindle assembly (#2915).

REWIND BRAKE ADJUSTMENT

Place Function switch in STOP position and adjust for 1/64 inch clearance between felt pad and shaft (see Fig. 11).

INSTANT STOP SPRING ADJUSTMENT

Place Function switch in PLAY position and adjust for 1/8 inch clearance as noted in Fig. 11.

ECCENTRIC ADJUSTMENT

Rotate eccentric (#2253, see Fig. 11) around its mounting pin to afford:

(1) Maximum power to rewind spindle with Function switch in REWIND position and,

(2) Maintain clearance between idler and motor pulley, with Function switch in STOP position.

NOTE

As viewed in Fig. 11, top flat surface of eccentric should be flush with end of its mounting pin.

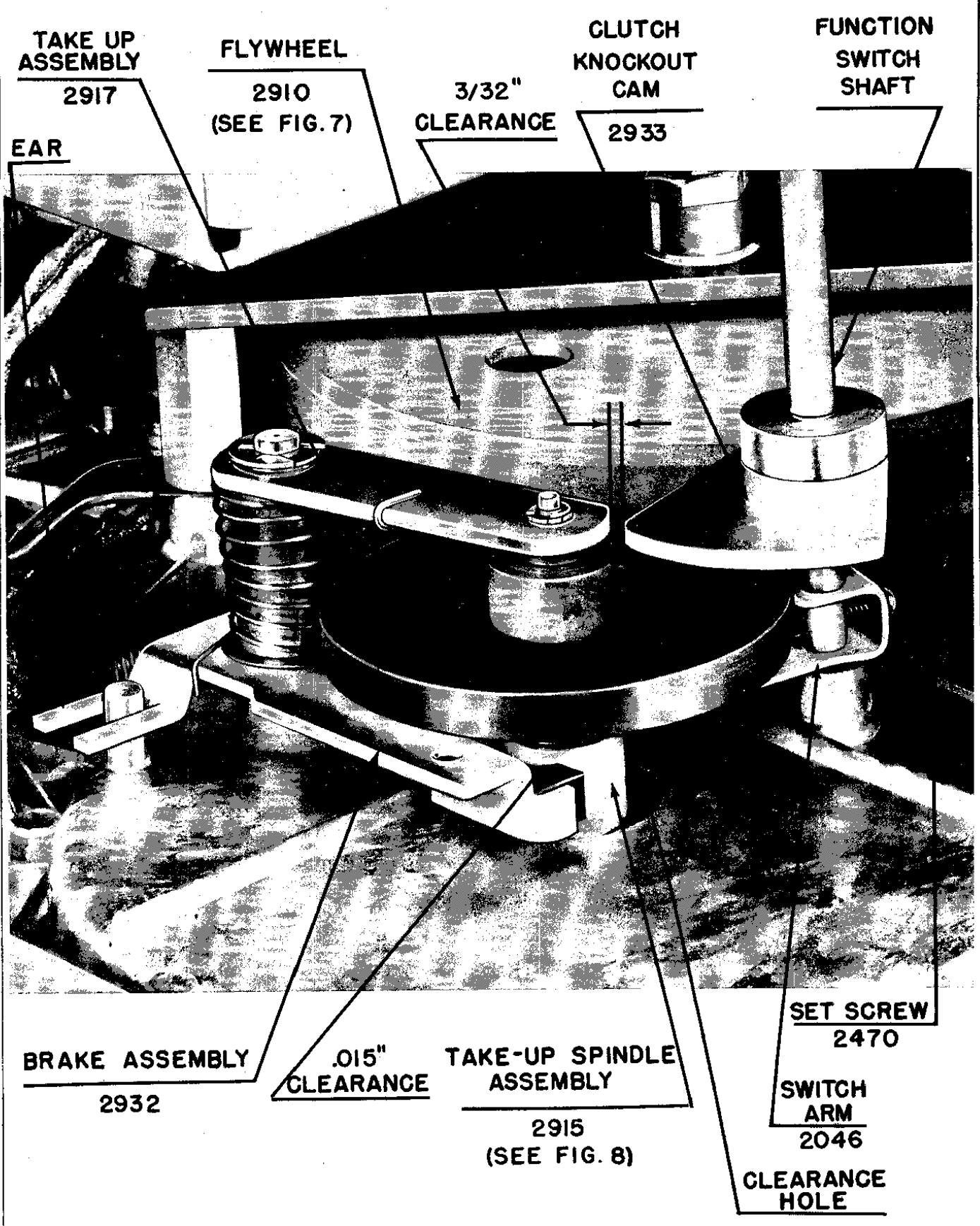

FIG. 10 - Knockout Cam and Brake Adjustments.

MODELS T-100, TR-200,
TS-300, TS-301

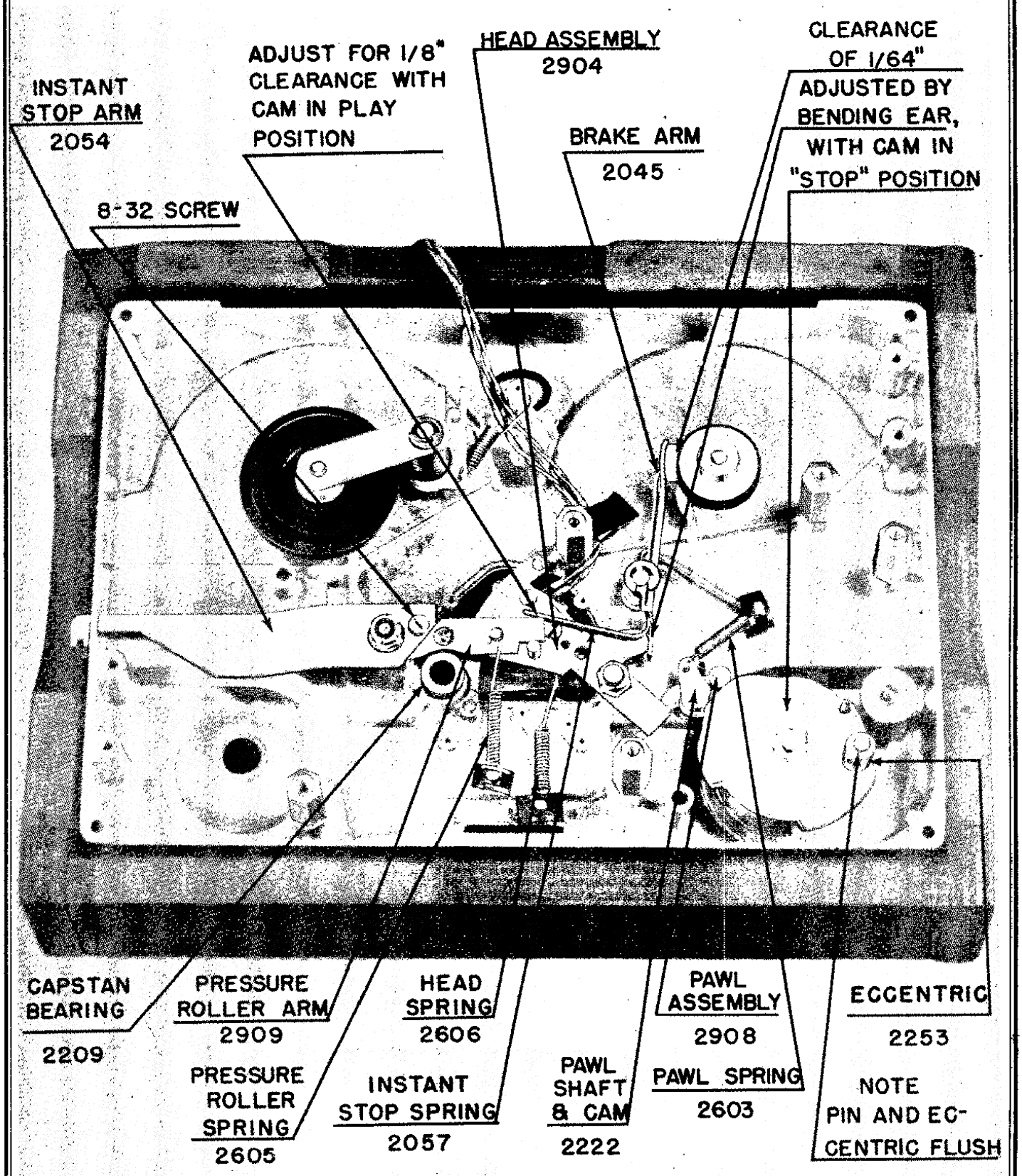

FIG. 11 - Bottom View of Recorder After Removing Flywheel Assembly.

MODIFICATIONS

Since the first Revere Tape Recorders were made, continued research has brought about improved features. The following paragraphs describe how any Revere Tape Recorder not already equipped with these improvements, can easily be modified to include them.

INSTANT STOP ARM

Recorders below Serial No. 15100 are not equipped with the Instant Stop arm; however, this feature can be added to these machines. Consult the factory for information.

MODIFIED CLUTCH BRAKE

An improved clutch-brake assembly can be installed on all machines below Serial No. 18600. Referring to Figure 12, procure and assemble parts as shown, enlarging clearance hole for takeup spindle assembly (see Fig. 10) to 1 inch diameter.

IMPROVED FLYWHEEL

Check shaft diameter noted in Figure 7. If this diameter is not "file hard", replace flywheel assembly (#2910) and capstan bearing (#2209).

MECHANICAL PARTS LIST

This parts list is tabulated with reference to the main mechanical groups. Individual parts listed are used only once except as otherwise stated.

ORDERING INFORMATION

To order any part listed below, specify part name and part number; preceed part number with "TR-". (Example: Top Mechanism Casting, TR-2001.)

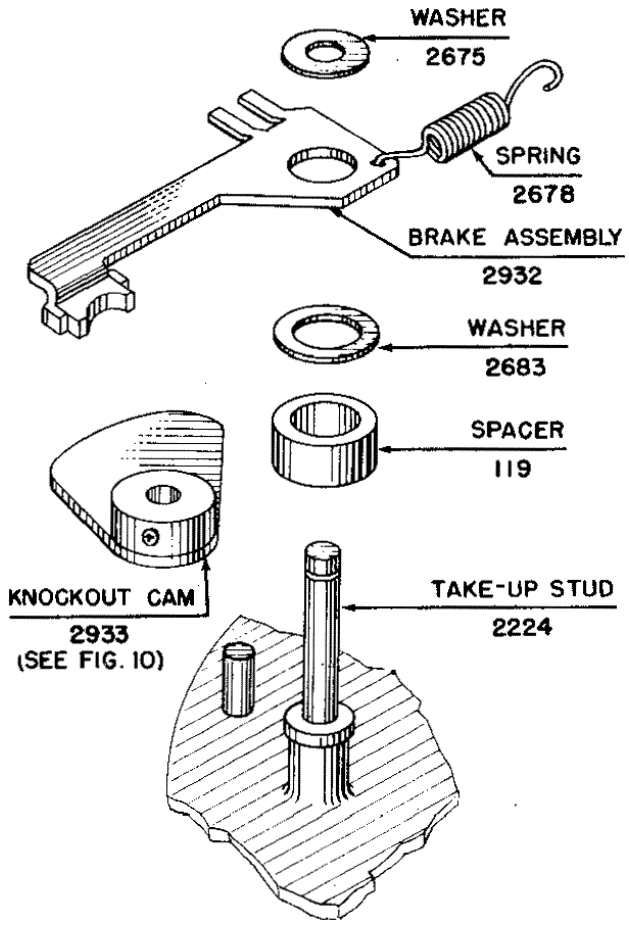

FIG. 12 - Clutch Brake Assembly.

MAIN CASTING GROUP (#2918)

2001	Top Mechanism Casting
2224	Take-up Swivel Stud
2612	Rewind Bearing
2239	Rapid Forward Brake Stud
2441	Rollpin
2675	Spacing Washer
2435	Rollpin
2458	Rollpin
2243	Rapid Forward Bushing
2209	Flywheel Bearing
2230	Pressure Roller Pivot Arm Stud
2227	Head Casting Pivot Arm Stud

HEAD ASSEMBLY GROUP (#2904)

2002	Head Casting
2024	Head Mounting Bracket
2026	Head Casting Guide
2031	Head Casting Pivot Arm
2055	Shim for Head Casting

MODELS T-100, TR-200,
TS-300, TS-301

2204	Adjustable Record Tape Guide Post
2205	Stationary Record Tape Guide Post
2241	#5-40 Screw, Head Guide
2421	Tape Guide Set Screw, #4-36
2433	#6-32 x 5/16" Flat Head Screw (three used)
2631	Head Casting Arm Washer
2632	Head Casting Arm Washer
2642	Record Head, Shure Bros. Inc. Model TR-5
2455	Adjustable Record Tape Guide Set Screw

DETENT CAM ASSEMBLY (#2923)

2030	Detent Cam
2214	Detent Cam Hub
2216	Detent Pin Pulley Shifter
2220	Detent Pin Pawl Lock
2439	Groove Pin, Cam
2460	Detent Cam Groove Pin
2900	Detent Assembly, Switch-Nut-Washer

PAWL GROUP

2006	Rapid Forward Lever
2222	Pawl Shaft and Cam
2603	Pawl Tension Spring
2633	Pawl Shaft Washer
2639	Rapid Forward Washer
2908	Pawl Assembly

MOTOR GROUP

2422	"E" Retaining Rings (two used)
2402	Idler Wheel, 60 cycle
2405	Idler Wheel, 50 cycle
2424	"E" Retaining Ring
2629	Spacer Washer
2053	Spring Retaining Clip
2033	Actuator Arm
2903	Actuator Arm Assembly, 60 cycle
2941	Actuator Arm Assembly, 50 cycle
2664	Pulley Actuator Spring
2464	#4-36 Phillips Head Screw (two used)
2463	Lock Washer (two used)
2617	Actuator Spring
2607	Spacer Washer (two used)
2400	Motor Pulley, 60 cycle
2404	Motor Pulley, 50 cycle
2912	Upper Motor Bracket Assembly
2455	Screw (two used)
2446	#8-32 Nuts (four used)
2443	Lock Washers (four used)
2901	Lower Motor Bracket Assembly
2636	Motor, 50-60 cycle, 105-120 V
2668	Motor, 50-60 cycle, 210-240 V
2440	#10-32 Nuts (six used)
2647	Spacer Washer
2646	Spacer Washers .032" (two used)

FLYWHEEL GROUP

2462	#10-32 Flat Head Screw
2229	Thrust Adjusting Screw
2232	Lock Nut
2902	Flywheel Bracket
2445	#10-32 Truss Head Screw
2432	Lock Washer
2252	Flywheel Mounting Stud (two used)
2042	Thrust Disc
2431	Thrust Ball
2910	Flywheel Assembly
2613	Shock Washer

TAKE UP SPINDLE GROUP

2422	"E" Retaining Ring 1/4"
2629	Spacer Washers (three used)
2917	Take-up Swivel Assembly
2423	"E" Retaining Ring 1/8"
2615	Take-up Pulley Spring
2653	Spacer Washer
2926	Take-up Wheel Assembly
2675	Spacer Washer
2040	Clutch Plate
2650	Clutch Spring
2641	Take-up Bearing Spring Washer
2915	Spindle Assembly
2932	Brake Assembly
2678	Brake Spring
2609	Take Up Friction Washer (Felt)

REWIND SPINDLE GROUP

2403	Rewind Pulley
2429	#6-32 Set Screw (two used)
2654	Karropak Washer (two used)
2658	Felt Spacer Washer (two used)
2919	Rewind Shaft Assembly (two used)

SECTION 3
SERVICING ELECTRICAL SYSTEM

Each unit is tested at the factory for noise, hum, sensitivity, frequency response, power output and erase. Shipment, misuse, wear, and aging, all contribute to the need of service. It is the intention of this section to acquaint the serviceman with the characteristics of a normal operating unit and possible defects, so that his servicing problems can be reduced.

PRELIMINARY CHECKS

(1) Be sure all tubes are firmly seated in their sockets.

(2) Check voltages for valves given in Fig. 13 using a vacuum-tube voltmeter. These may vary from those given due to circuit variables and loadings.

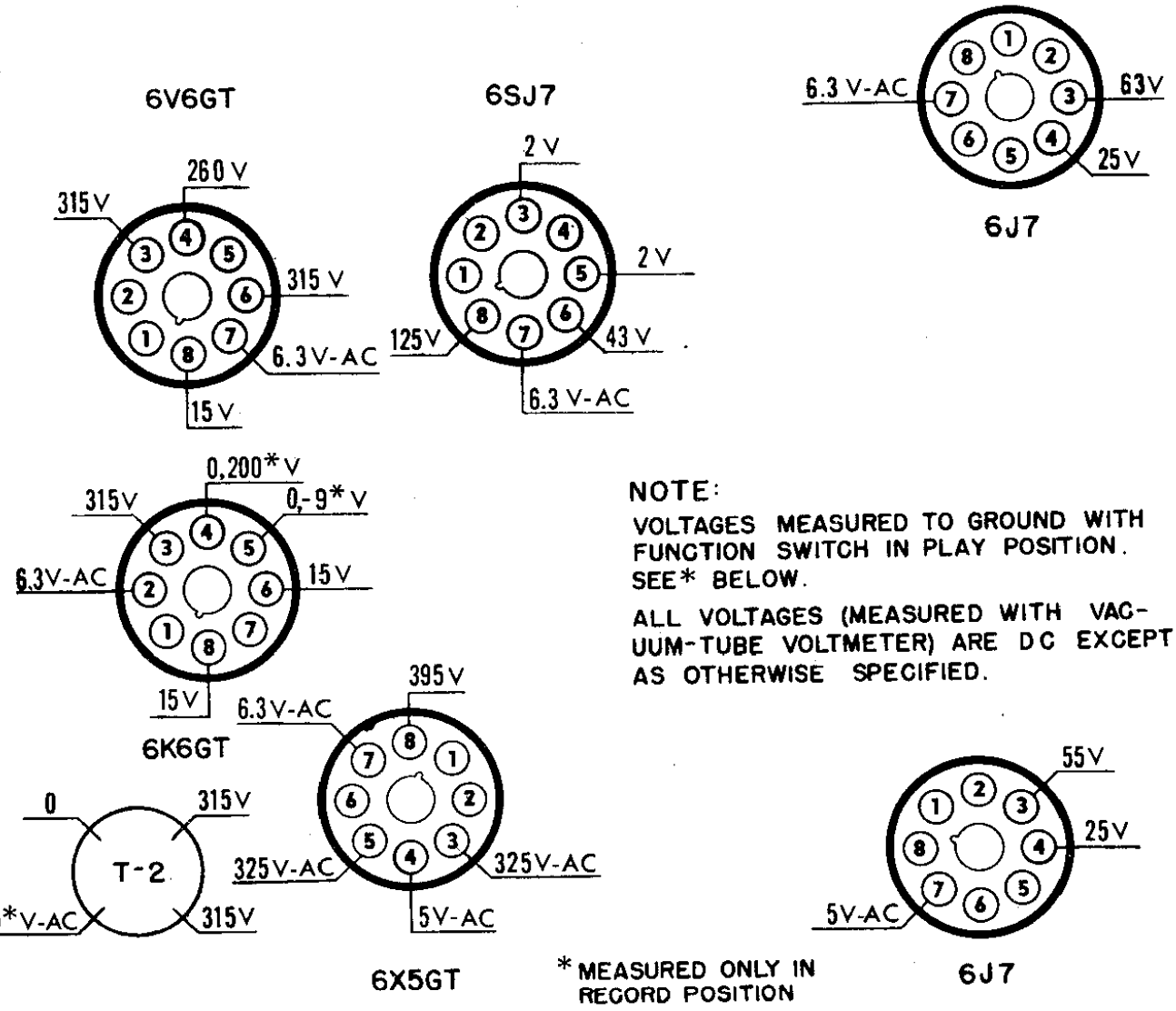

FIG. 13 - Socket-Pin Voltages.

MODELS T-100, TR-200,
TS-300, TS-301

NOTE

Neon lamp Recording-Level Indicator is biased with a DC potential in addition to audio-frequency signal voltage.

TEST TAPE

It is helpful to pre-record a tape with the following signals:

(1) Low intensity, 1000 cps for sensitivity checking.
(2) Nominal intensity, 120 and 5000 cps for frequency response.
(3) High intensity, 1000 cps for power output.
(4) Variable frequency for speaker rattle.

CONDENSERS-RESISTORS

Before checking condensers or resistors observe polarity of ohmmeter and allow tubes to cool.
(1) Condensers should be checked for DC leaks. (D.C. resistance should exceed 200 megohms.) Open condensers can only be checked by by-passing suspected condenser with a similar good one.
(2) Check for noisy resistors in input circuit by by-passing suspected resistor with .1 mfd condenser.

FUNCTION SWITCH

Control of major recorder operations is accomplished by operation of the Function switch.

FUNCTION SWITCH POSITIONS → / RECORDER COMPONENTS ↓	REWIND	STOP	PLAY	RECORD PHONO RADIO	RECORD MICROPHONE
Record-Playback Head (Fig. 14, 15) Connected to:			Amp. Input	Amp. Output	Amplifier Output
6K6 Tube (Erase)				X	X
1st 6J7 Tube; Compensating Network (Fig. 14)			X		
2nd 6J7 Tube; 6SJ7, 6V6, and 6X5 Tubes; Volume Control	X	X	X	X	X
Phono Jack	X	X		X	
Microphone Jack					X
Speaker	X	X	X	(Muted)	
Tone Control			X		

X = OPERATIVE CONDITION

Amplifier Operation Chart

CIRCUIT DIAGRAMS

A complete schematic circuit diagram is shown in Figure 16. In addition, Figures 14 and 15 show simplified circuits for the recorder head when the Function switch is in the PLAY and RECORD positions.

The coil L-1 is used for both recording and playing back signals on the tape. The .003 mfd. condenser, shunting L-1, resonates the coil thereby intensifying the higher audio frequencies. When the recorder is in RECORD position, L-2 is energized with a 25 kc erase signal. Frequency compensation occurs during playback only. See Fig. 14.

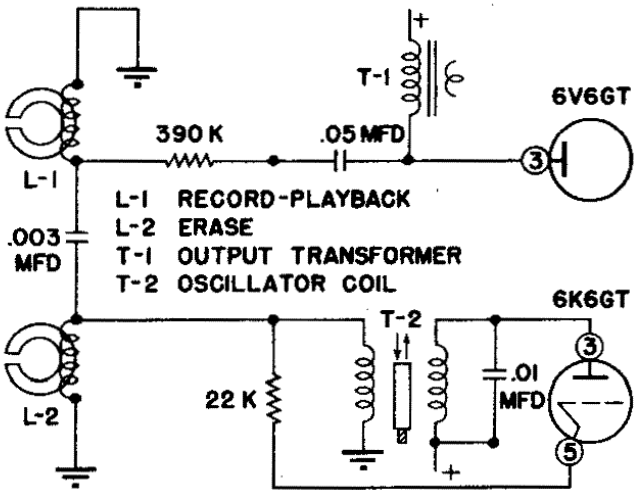

FIG. 15 - Recording Head Circuit.

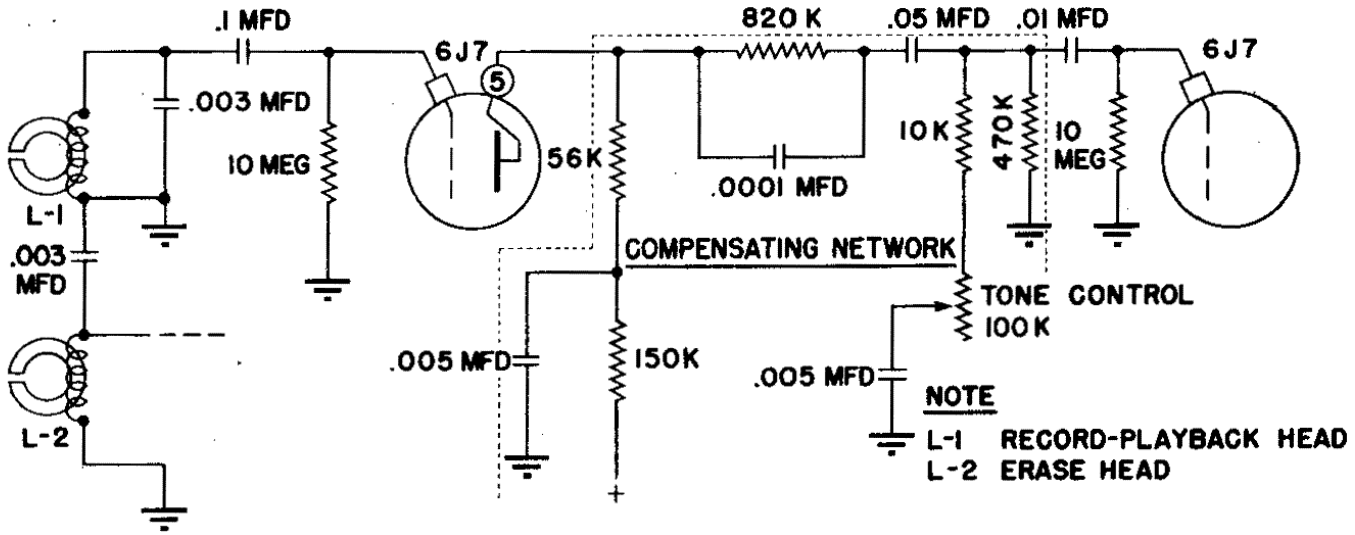

FIG. 14 - Simplified Playback Head Circuit.

TROUBLE SHOOTING

DEFECT	SYMPTOM	CHECK
A-Recorder Dead	(1) Pilot light and glass tubes dead with Off-On switch in ON position, motor inoperative.	Power cord or switch open.
	(2) Motor operates; glass tubes, pilot light dead.	Power-transformer primary or filament winding open.
	(3) Motor operates, glass tubes lighted.	Check 6X5 GT tube.
	(4) Burnt odor.	6X5 GT tube shorted (operate for 30 minutes after replacing tube to reveal transformer damage by excessive heating).
	(5) Burnt odor (AC unit connected to DC).	6X5 GT tube OK; check power switch and transformer primary for open.
	(6) Burnt odor (115 volt unit plugged into 230 volt supply).	6X5 GT tube shorted; electrolytic condenser, C-21, shorted; R-28 open; power-transformer primary open

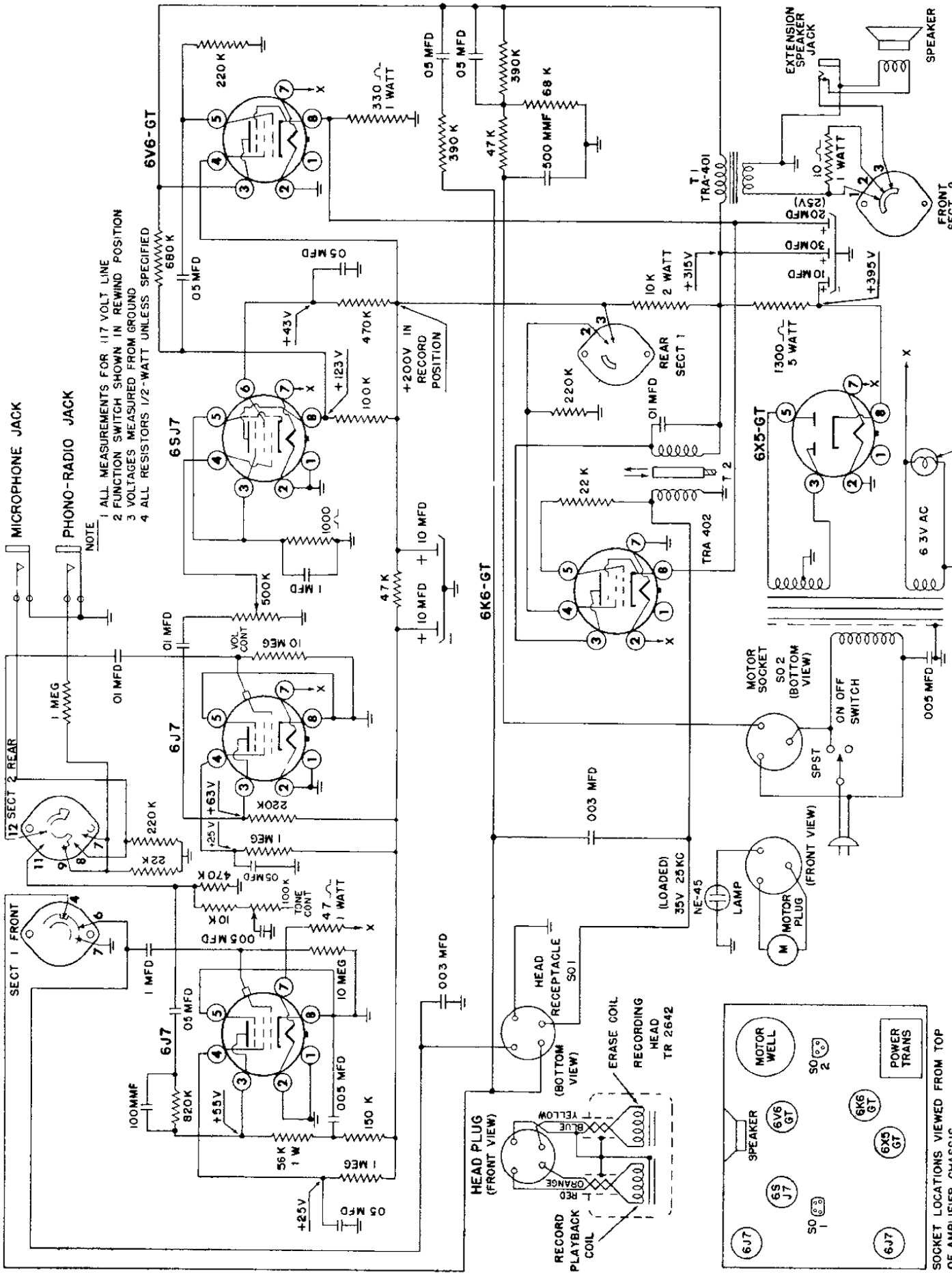

FIG 16 - Schematic Circuit Diagram

DEFECT	SYMPTOM	CHECK
		(operate 30 minutes after repairing if transformer appears OK).
	(7) No sound from speaker. Glass tubes and pilot light operating; Recording Level indicator inoperative.	Defective tubes; open primary in T-1; open secondary, power transformer; C-5, C-8, C-10 open.
	(8) Recording Level indicator operates; no sound from speaker in PLAYBACK or RECORD; Extension Speaker jack dead.	Contacts on Function switch open; T-1 secondary open (check with Extension Speaker jack contacts open).
B-Dead Playback Only	Appears to operate properly in RECORD position; no sound in PLAYBACK. Recording Level indicator operating.	1st stage 6J7 tube defective; contacts in Function switch open; R-2, R-13, R-14 open; C-2, C-15 open.
C-Weak Playback Only	Operates properly in RECORD.	Check items immediately above (B); C-1 open.
D-Weak or Distorted Record	OK in PLAYBACK on a pre-recorded tape.	Check C-7 for leakage (remove head plug and check for DC Voltage on R-26). Erase not operating (check for 35 volts AC across secondary of T-2). Replace head plug; check for AC across both sides C-14.
E-Weak or Dead RECORD-PHONO	OK in MICROPHONE RECORD position.	Open phono circuit through switch, R-1, R-4, or radio attachment cord open.
F-Weak or Dead RECORD MICROPHONE	OK in PHONO RECORD.	Open microphone circuit through switch. Microphone or its cord defective.
G-Recording Level Indicator Inoperative	Records and plays properly but Recording Level indicator not operating.	Loose or defective indicator lamp. C-7 open.
H-Recording Level Indicator Always Glows	Not affected by Volume control.	Defective C-7.
I-Recording Level Indicator Glows on PLAYBACK Only	Affected by Volume control. Weak or distorted playback (parasitic oscillation).	Open C-13.
J-Tone Control Inoperative	No control of tone in PLAYBACK.	Open Tone control R-31. Open C-12. NOTE: Tone control operates only on PLAYBACK.
K-Records with Background Hum	Playback-hum high; lower on pre-recorded tape.	C-21 defective; cathode to filament leakage in 2nd stage 6J7, 6SJ7, 6V6 GT, or 6K6 GT tubes.
L-Hum On PLAYBACK Only	Falls off with decrease in Volume control level.	Cathode to filament leakage in 6J7 tube.
M-Microphonic	Dies out when volume level is reduced.	Tap 1st Stage, 6J7 tube, for indication. (Retain 1st stage microphonic tube as replacement in 2nd stage.)
N-Loss of High Frequencies in PLAYBACK	Pre-recording "boomy".	Check C-17.
O-Loss of Low Frequency in PLAYBACK	Pre-recording "tinny".	R-31, C-11, or C-12 open.
P-Noisy in PLAYBACK	(1) "Shot effect"; high frequency hiss.	R-13 noisy, R-31, C-11, or C-12 open.
	(2) Low frequency "rumble".	R-2 or R-14 noisy.
Q-No Erase	Records over previous recordings without erasing.	Defective 6K6 GT tube. First, remove head plug from SO-1 and check for AC voltage across secondary of T-2; replace head plug; check voltage again. C-9 open or shorted; T-2 shorted or R-5 open. NOTE: Adjust T-2 for 35 volts AC across L-2.

ELECTRICAL PARTS LIST

The electrical system parts list is keyed to the figures throughout this manual; circuit symbols as tabulated in this list represent the components similarly labelled in the figures. (For resistor and condenser locations, see Fig. 17.)

When ordering parts for the electrical system, specify circuit symbol (if one is given in the parts list), part number and part description. (Example: R1, TRA 302, 1 megohm, 20%, 1/2 watt.)

CIRCUIT SYMBOL	PART NO.	DESCRIPTION
	RESISTORS	
R1, R2, R3	TRA 302	1 megohm, 20%, 1/2 watt
R4, R5	TRA 309	22,000 ohm, 20%, 1/2 watt
R6, R7, R8, R9	TRA 305	220,000 ohm, 20%, 1/2 watt

CIRCUIT SYMBOL	PART NO.	DESCRIPTION
	RESISTORS - Continued	
R10, R11	TRA 300	10 megohm, 20%, 1/2 watt
R12	TRA 313	820,000 ohm, 10%, 1/2 watt
R13	TRA 318	56,000 ohm, 10%, 1 watt
R14	TRA 315	150,000 ohm, 10%, 1/2 watt
R15, R16	TRA 321	470,000 ohm, 20%, 1/2 watt
R17	TRA 307	10,000 ohm, 20%, 1/2 watt
R18, R19	TRA 317	47,000 ohm, 20%, 1/2 watt
R20	TRA 322	1,000 ohm, 20%, 1/2 watt
R21	TRA 308	10 ohm, 20%, 1 watt
R22	TRA 303	68,000 ohm, 20%, 1/2 watt
R23	TRA 312	330 ohm, 20%, 1 watt
R24, R26	TRA 301	390,000 ohm, 20%, 1/2 watt
R25	TRA 316	68,000 ohm, 10%, 1/2 watt
R27	TRA 311	10,000 ohm, 10%, 2 watt
R28	TRA 319	1,300 ohm, 10%, 5 watt
R29	TRA 304	4.7 ohm, 10%, 1/2 watt
R30	TRA 306	100,000 ohm, 20%, 1/2 watt
R31	TRA 320	Volume-Tone control
	CONDENSERS	
C1, C2, C3, C4, C5, C6, C7	TRA 203	.05 mfd, 400v, paper tubular
C8, C9, C10	TRA 205	.01 mfd, 400v, paper tubular
C11, C12	TRA 207	.005 mfd, 600v, paper tubular
C13, C14	TRA 204	.003 mfd, 600v, paper tubular
C15, C16	TRA 202	.1 mfd, 200v, paper tubular
C17	TRA 208	100 mmf, 10%, 500v mica
C18	TRA 209	500 mmf, 20%, 400v ceramic
C19	TRA 206	005 mfd, 1000v, paper tubular
C20	TRA 200	15-15 mfd, 350v, electrolytic
C21	TRA 201	10-30-25 mfd, 450-350-25v, electrolytic
	MISCELLANEOUS	
S1	TRA 511	Function Switch
T1	TRA 401	Output Transformer
T2	TRA 402	Oscillator Coil
	TRA 105	Pilot Lamp (#47)
	TRA 106	NE 45 Neon Recording Indicator Lamp
	TRA 400	Power Transformer, 105-120 volts
	TRA 403	Power Transformer, 210-240 volts
	TRA 512	Speaker Plug (Male)
	TRA 600	5x7 Speaker
	TRA 709	Power Cord Assembly
	TRA 801	Trimount Stud
	TRA 900	Chassis Assembly
	TRA 901	Radio Attachment Cord
	TRA 904	Microphone
	TRA 905	Microphone Extension Cord Jack (Female)
	TRA 906	Microphone Plug (Male)
	TRA 100	6V6 GT Vacuum Tube
	TRA 101	6X5 GT Vacuum Tube
	TRA 102	6J7 Vacuum Tube
	TRA 103	6K6 GT Vacuum Tube
	TRA 104	6SJ7 Vacuum Tube

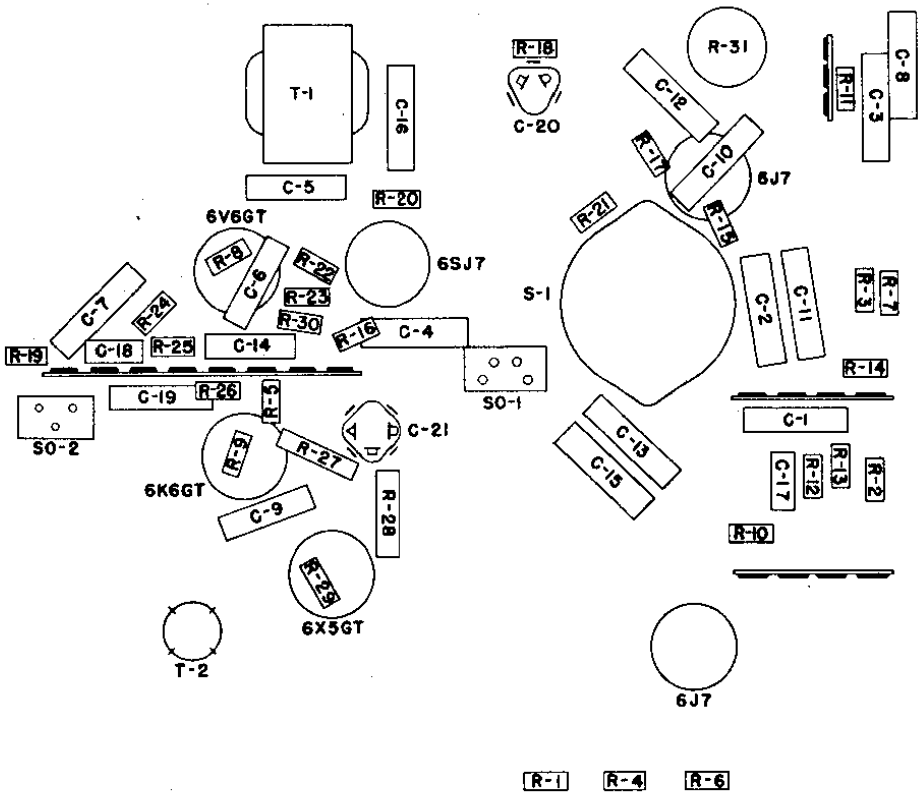

FIG. 17 - Electrical Component Locations, Bottom View of Amplifier.