BELL SYSTEM PRACTICES
Station Installation and Maintenance

SECTION C55.618
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AT&T Co Provisional

2A TELEPHONE ANSWERING SET
MAINTENANCE AND SUPPLIES

1. GENERAL

1.01 This section provides maintenance and supply information on the 2A telephone answering set.

1.02 Work actually done on the subscriber's premise is limited to verification and analysis of the trouble, readily made adjustments, and replacement of easily accessible parts which are normally available through the supplies organization.

1.03 Disassembly of the 2A telephone answering set should be undertaken only with supervisory approval.

1.04 The associated telephone set should be maintained in the standard manner as covered in the related Bell System Practice.

1.05 The effect of a subscriber's power supply failure is as follows:

(1) The 2A telephone answering set will not operate.

(2) Normal telephone service will not be affected if the OFF-ON knob is in the OFF position.

(3) There will be an audible incoming signal in case of an incoming call when the OFF-ON knob is in the ON position.

1.06 Cover removal procedure is covered in Section C55.617, 2A Telephone Answering Set—Installation and Connections.

1.07 The 2A telephone answering set is made up of three major components. They are the 152A amplifier, the 10A recorder, and the power and control unit.

1.08 The complete operating sequence of the 2A telephone answering set should have a final check made on every maintenance visit. The test procedure is covered in Section C55.616, 2A Telephone Answering Sets—Installation and Connections. If the set fails to perform satisfactorily and maintenance procedures included in this section do not remedy the fault, the set should be replaced.

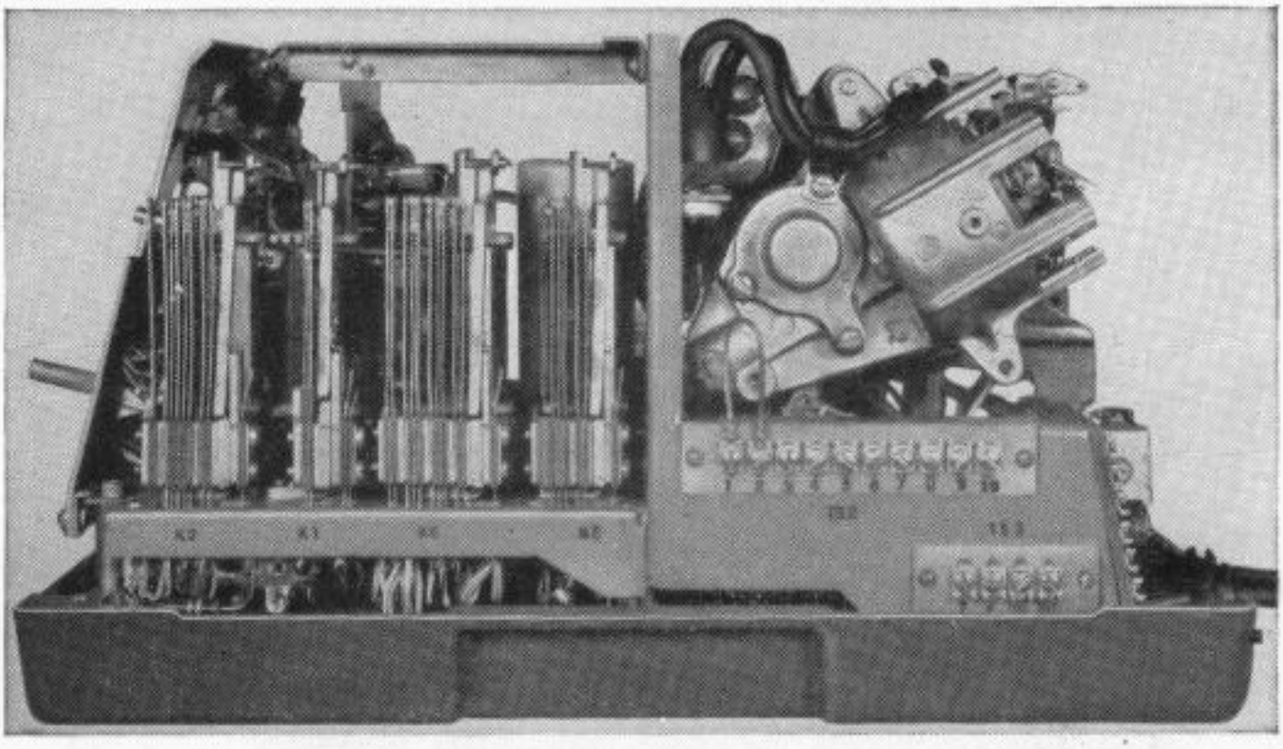


Fig. 1—2A Telephone Answering Set— Right Side

Caution: The OFF-ON knob should be turned OFF when working on a 2A telephone answering set with the cover removed. Care must be used because the power supply voltage (115 volt, 60 cycle) is on contact 2 lower of the K5 relay and 75-volts dc is on several relay contacts and windings.

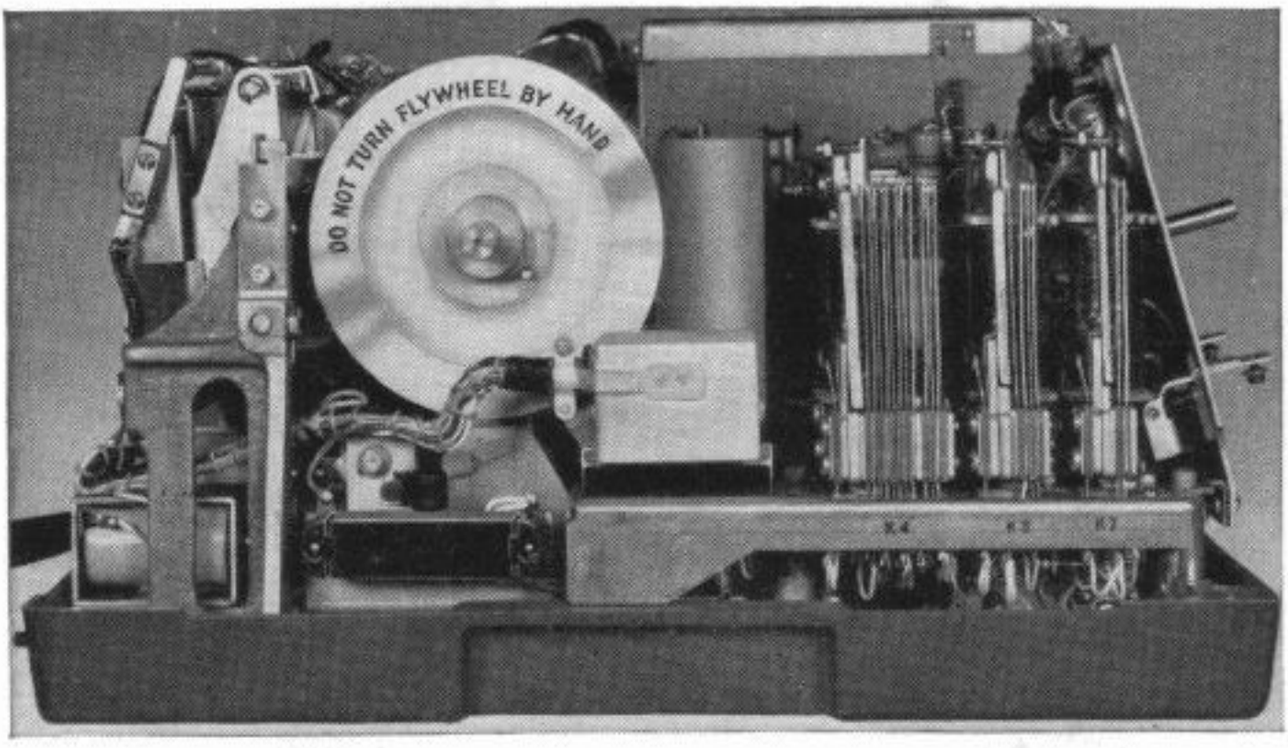


Fig. 2—2A Telephone Answering Set—Left Side

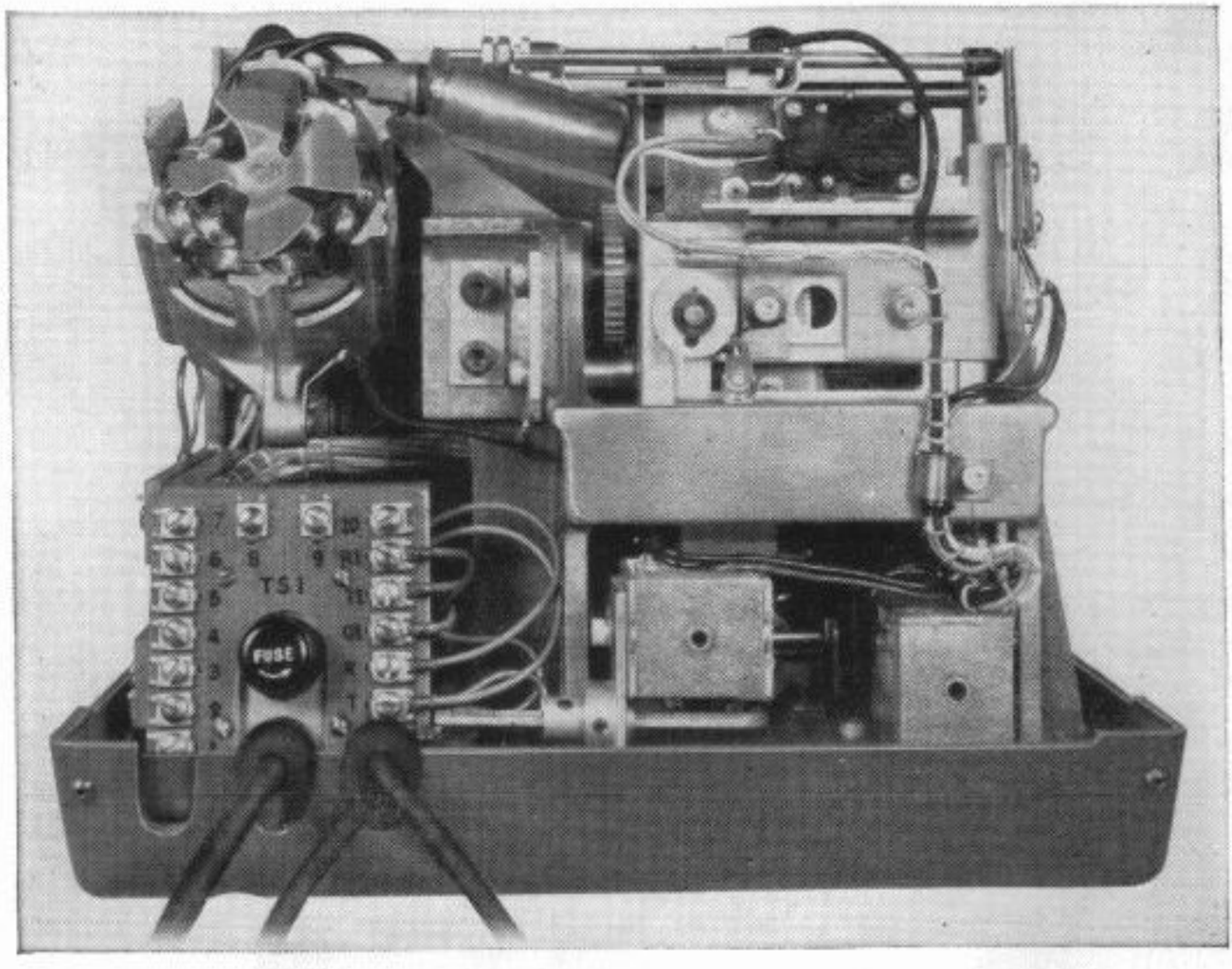


Fig. 3—2A Telephone Answering Set—Rear

2. AMPLIFIER

2.01 The 152A amplifier (plug in type) is used in the 2A telephone answering set. See Fig. 4.

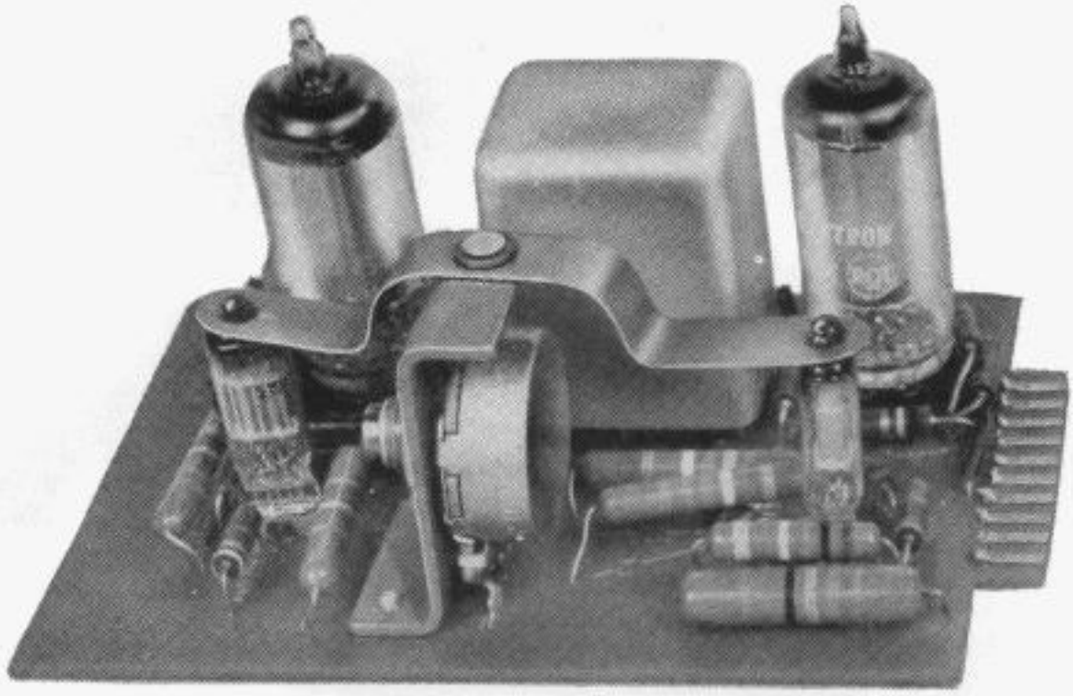


Fig. 4—152A Amplifier

2.02 The entire amplifier may be removed from the 2A chassis for testing, repair, or replacement as follows:

(1) **Turn power off** before the 152A amplifier is removed or replaced.

(2) Loosen the screws shown in Fig. 5 and remove amplifier brace assembly.

(3) Grasp the 152A amplifier as shown in Fig. 6 and rock slightly from side to side while exerting an upward pull.

Caution: Care must be exercised while placing or removing the 152A amplifier to avoid damaging the metal contacts on its plug end. Do not rock the amplifier front to back to avoid damage to jack (J4).

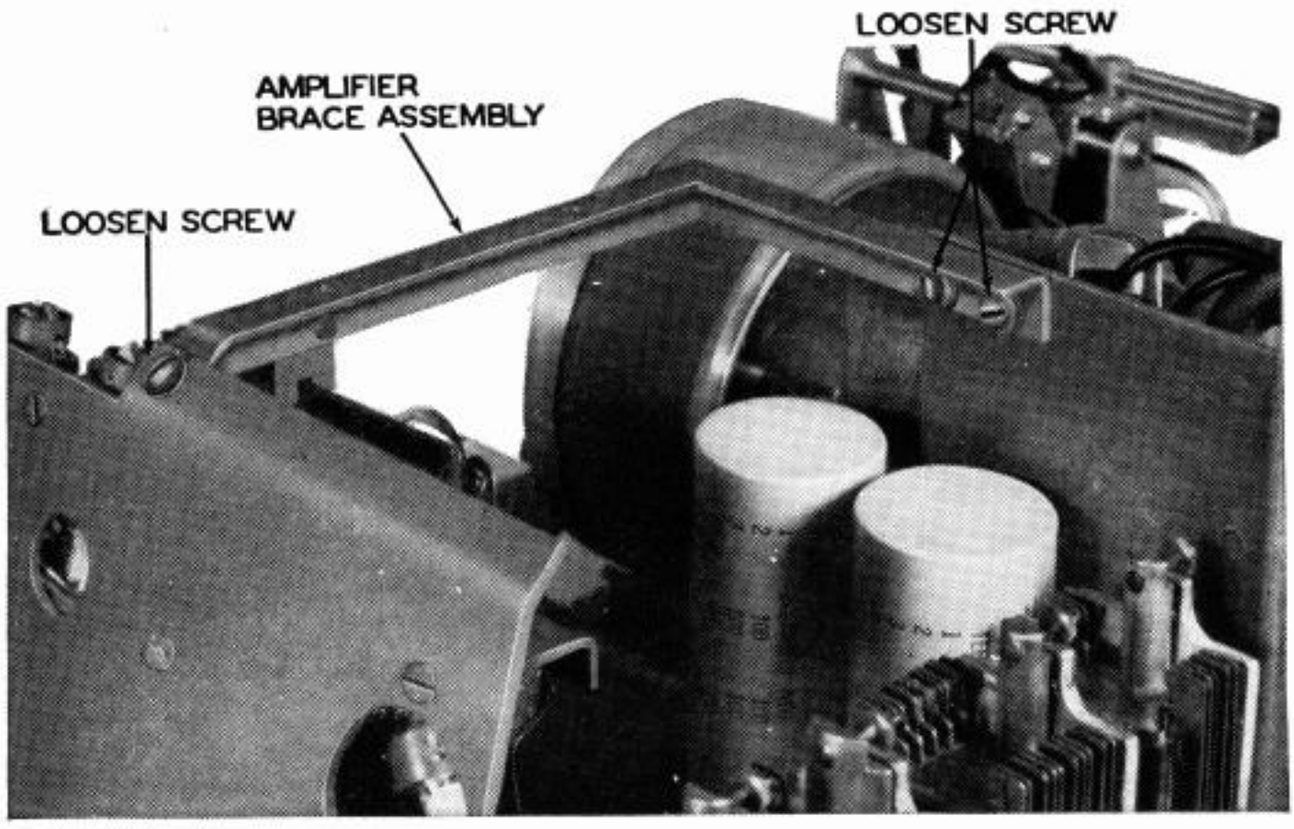


Fig. 5—Amplifier Brace Assembly

2.03 The 152A amplifier uses two CK512AX and two 3V4 vacuum tubes. In case of amplifier failure the tubes should be replaced one at a time because they give no visual indication when they are functioning. The power **must be turned off before** a tube is removed or replaced.

2.04 When removing the CK512AX vacuum tubes the following steps should be followed:

(1) Grasp both ends of the spring (tube retainer) that hold the CK512AX tubes in place, lift the ends until they clear the tips of the tubes then rotate the spring until it will not touch the tubes when it is released.

(2) Grasp the CK512AX tube to be removed and withdraw it gently from its socket.

Caution: Be certain that the two CK512AX tubes are inserted in their sockets so that the red mark on the tube base coincides with the molded dot on the socket.

2.05 If replacing the vacuum tubes does not clear the trouble, then the 152A amplifier should be replaced.

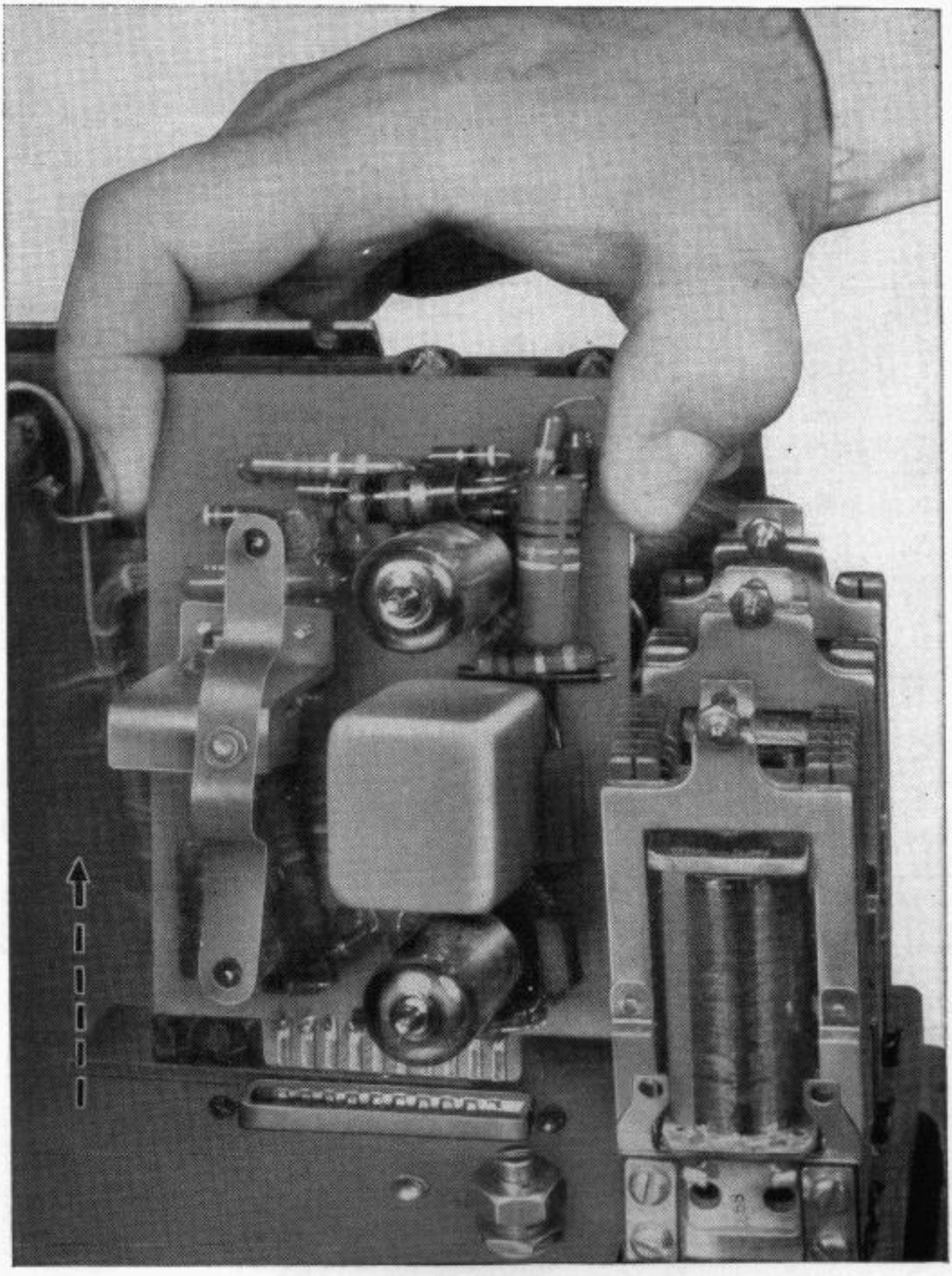


Fig. 6—152A Amplifier Removal

2.06 The 152A amplifier schematic is shown in Fig. 7. The output transformer is not part of the 152A amplifier but is located on the power and control unit.

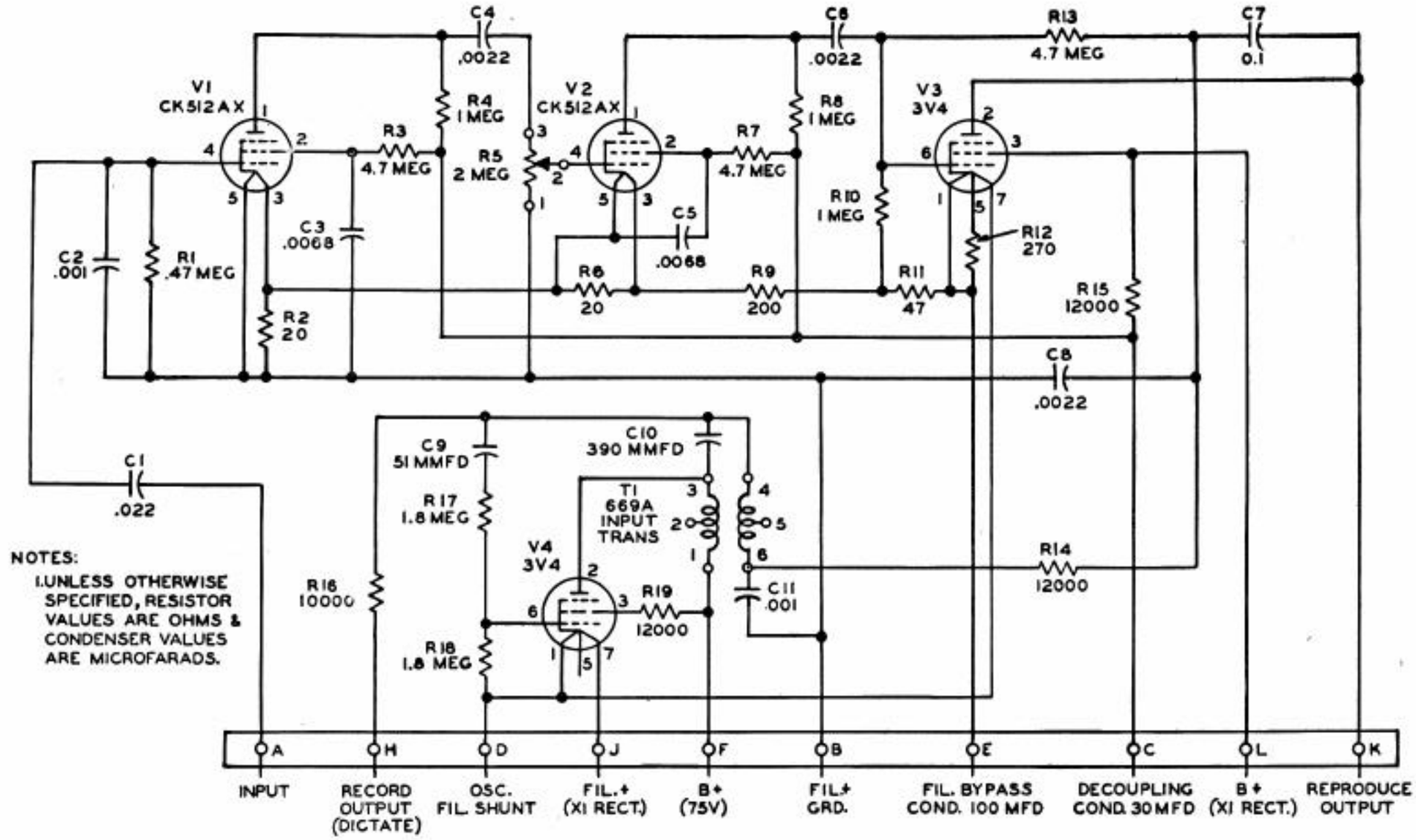


Fig. 7—Schematic of 152A Amplifier

3. LAMP, FLASHER, AND FUSE REPLACEMENT

3.01 **Caution: Do not try to rotate the announcement drum or flywheel by hand because of the danger of stripping the gears. Avoid touching the magnetic recording band on the announcement drum or allowing dirt or other foreign material to fall on it. If loose matter is observed on the band, wipe off lightly with a clean KS-2423 twill jean cloth or other approved lint-free cloth.**

3.02 The K2 switchboard lamps used for E1 (ON-OFF), E2 (DICTATE) and E3 (ready) lamps are removed by grasping the wooden base of the lamp and pulling upward out of the lamp socket. See Fig. 8.

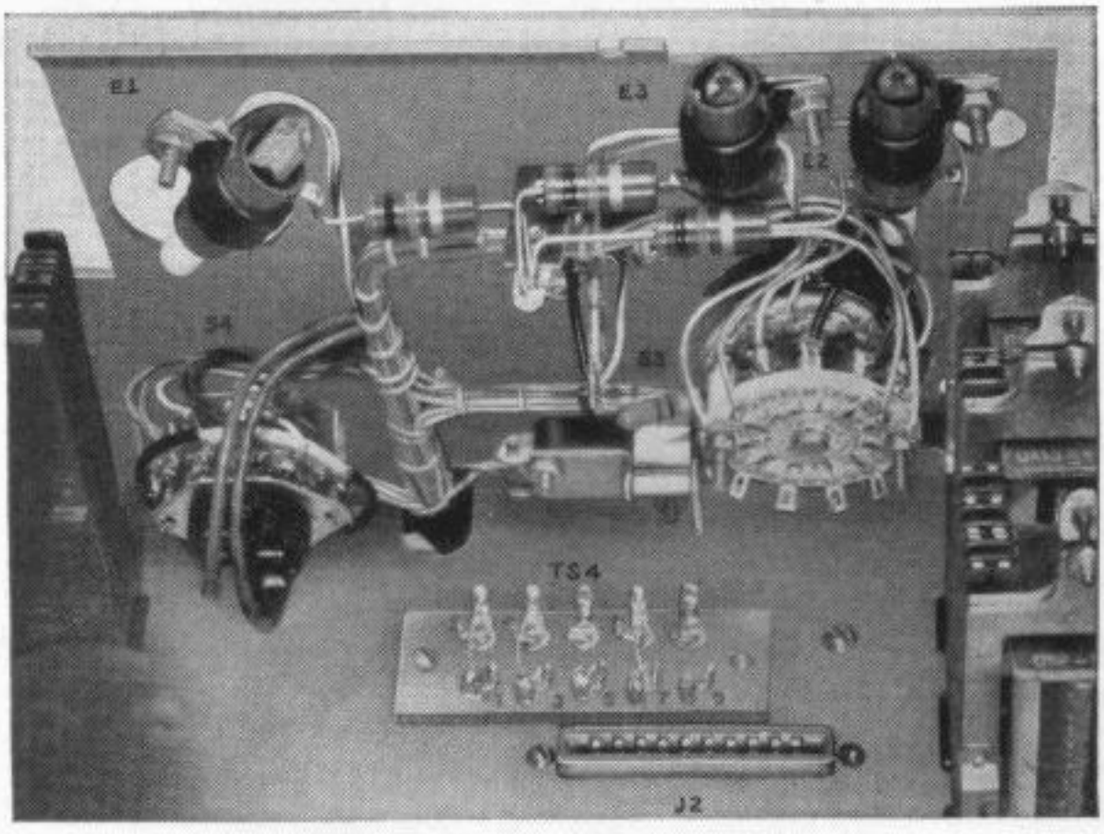


Fig. 8—2A Telephone Answering Set—Back of Front Panel Showing Lamps, OFF-ON, and Function Switches

3.03 When replacing these K2-type switchboard lamps, enough of the white plastic band should be removed with a knife or other sharp instrument so that the light will be directed at the panel. The lamps must be replaced carefully so that the metal sides of the lamps are against the metal spring contacts of the lamp sockets.

3.04 Remove the No. 627 Tungsol Thermal Flasher by grasping firmly and pulling straight out from the side of the answering set. See Figs. 2 and 9.

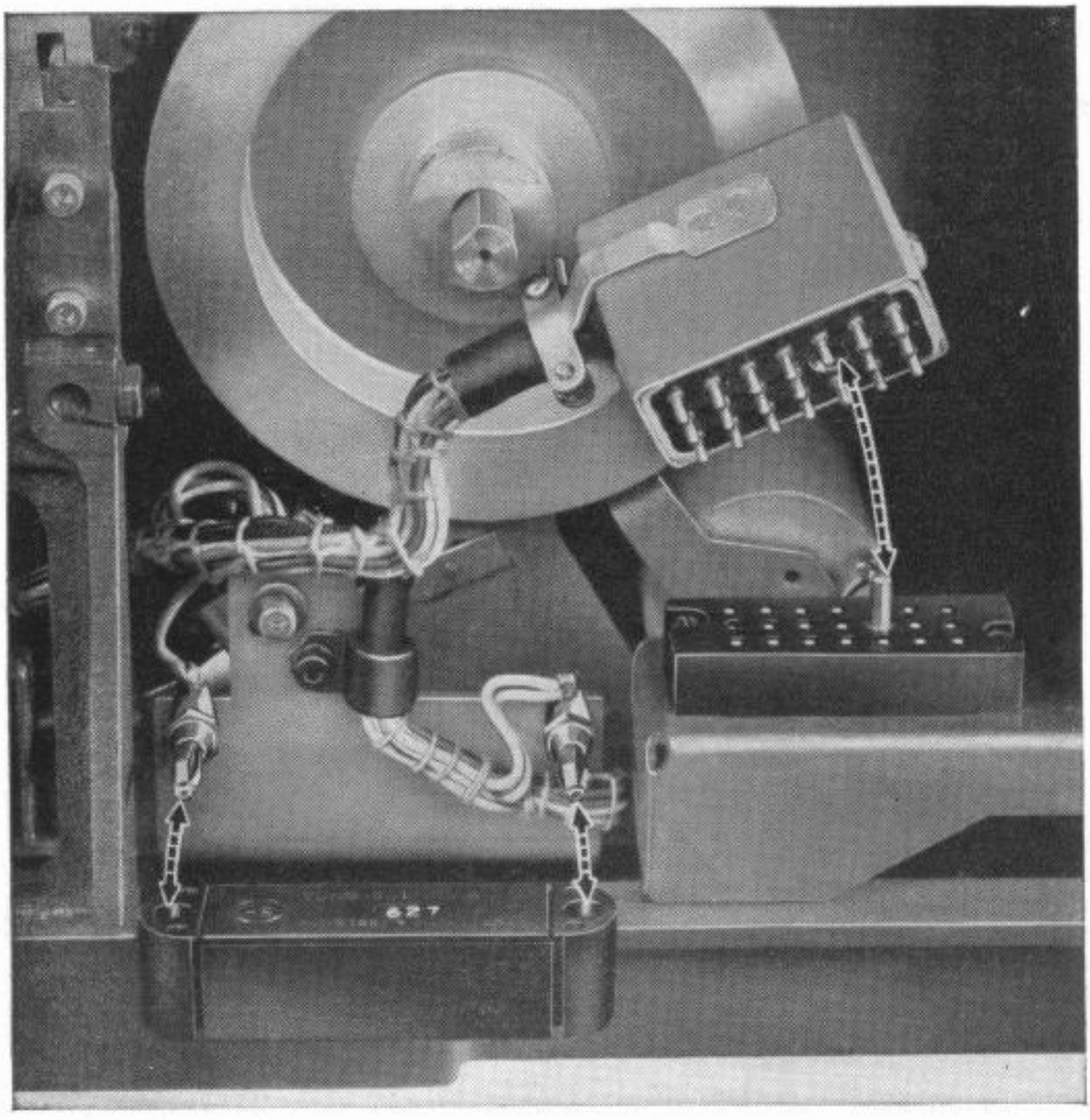


Fig. 9—2A Telephone Answering Set—Showing Tungsol Thermal Flasher No. 627 Removed and Jack and Plug Connection Between 10A Recorder and the Power and Control Unit

3.05 The F1 fuse is mounted in a KS-5842, L2, fuse holder located in the center of TS1 terminal strip. This fuse can be replaced easily by turning the top of the fuse holder counterclockwise about an eighth of a turn and withdrawing the top from the rest of the fuse holder.

4. TOOLS AND SPARE PARTS

4.01 The following special tools are required for maintenance of the 2A telephone answering set:

(a) Hexagonal key (Allen) wrenches 1/16, 5/64 and 5/32 inches, respectively, across the flats.

(b) Contact burnishing tools: 373D tool (burnishing blade holder) 374A, 374B, and 374C tool (burnishing blades).

(c) Cloth, KS-2423 twill jean.

4.02 The following list contains all the spare parts that are required for field substitution:

Index	Ordering Information and Description
Amplifier	**Amplifier, 152A.**
Buttons	**LP-19B954, Button.** STOP button.
	LP-19B955, Button. START button.
Cover	**LP-19B593, Cover Assembly.** Cover for 2A telephone answering set.
Flasher	**Flasher, Tungsol, No. 627.** Flasher control for DICTATE light.
Fuse	**Fuse, 3AGC, 1 Amp., 250 Volt.** F1 power supply fuse.
Fuse Holder	**Holder, Fuse, KS-5842, L2.** Power supply fuse holder.
Lamp	**Lamp, Switchboard, K2.** E1 (OFF-ON), E2 (DICTATE), and E3 (ready).
Knobs	**Knob, Control, KS-14941.** OFF-ON switch control knob.
	Knob, Control, KS-14942. Function switch control knob.

Index	Ordering Information and Description
Screws	**P-181250, Screw.** .138-32 x 5/16 BH steel machine screw used to secure amplifier assembly.
	P-290738, Screw. .112-40 x 1/4 hex socket head steel cap screw in indicator assembly of DICTATE flashing light.
	P-290746, Screw. .164-32 x 3/8 hex socket head steel set screw used in rear corners of chassis to secure cover.
	Screw, Machine BH Brass 4-40 x 1/4. Used in terminal strip lugs on TS1, TS2, TS3.
	Screw, Cap, Hex Socket Head Steel .112-40 x 3/16. Used for holding S5 switch mounting in 2A telephone answering sets **with** A preceding serial number.
	Screw, Cap, Hex Socket Head Steel .112-40 x 5/16. Used in tube of adjustable mechanical stop in 2A telephone answering sets **without** A preceding serial number.
	Screw, Set, Hex Socket Steel .138-32 x 3/16. Used in tube of adjustable mechanical stop of 2A telephone answering sets **with** A preceding serial number.
	Screw, Set, Hex Socket Steel .164-32 x 1/4. Used in function and OFF-ON knobs.
Tubes	**Tube, Vacuum, CK512AX.**
	Tube, Vacuum, 3V4. Used in 152A amplifier.
Washers	**Washer, Lock, Spring Steel, No. 4.** Used with hex head cap screw for holding S5 switch mounting in sets **with** A serial numbers.
	Washer, Brass, No. 4. Used with preceding washer.

5. CIRCUIT DESCRIPTION

Normal Telephone Service

5.01 With the OFF-ON knob (S4 switch) in the OFF position the telephone set associated with the 2A telephone answering set is connected to the CO or PBX line as follows: From line to TS1 terminal R, through S4 switch (front) terminals 8 to 7 and 4 to 5, to TS1 terminal R1, through associated telephone set to TS1 terminal T1, S4 switch (front) terminals 2 to 1 and 10 to 11, to TS1 terminal T, back to the other side of the line. Terminal G on TS1 is closed through S1 switch (rear) terminals 9 to 8 to TS1 terminal G1.

Announcement Dictate

5.02 (1) Turn OFF-ON knob (S4 switch) to ON.

(2) Turn function selector knob (S1 switch) to ANNOUNCEMENT DICTATE position.

(3) START switch S2 operated momentarily by operator.

5.03 K2 relay operates: ground through S1 switch (front of section 1) terminals 12 to 9, S2 START switch contacts, normal K5 relay 1T to 3T, R15 resistance, K2 relay winding, normal K5 relay 6T to 5T to 75-volts dc.

5.04 K2 relay locks up: from 75-volts dc through normal K5 relay 5T to 6T, K2 relay winding, operated K2 relay 4T to 3T, normal K3 relay 3B to 2B, jack 13 of J1 receptacle to 10A recorder plug, adjustable limit switch contacts, 10A recorder plug to jack 14 of J1 receptacle, S3 STOP switch contacts, S1 switch (front of section 1) terminals 5 to 8 to ground.

5.05 K5 relay operates: ground through operated K2 relay 2B to 1B, K5 relay winding to 48-volts dc.

5.06 Motor is energized: 110-volts ac from power plug PG1, F1 fuse, power section of ON-OFF switch S4, operated K5 relay 1B to 2B, J4 receptacle, through motor winding, J4 receptacle to other side of power of PG1 plug.

5.07 K2 relay locking path transferred: the R14 resistance is inserted to limit the holding current, 75-volts dc through R14 resistance, K2 relay winding, operated K2 relay 4T to 3T, normal K3 relay 3B to 2B, jack 13 of J1 receptacle to 10A recorder plug, adjustable limit switch contacts, 10A recorder plug to jack 14 of J1 receptacle. S3 STOP switch contacts, S1 switch (front of section 1) terminals 5 to 8 to ground.

5.08 Amplifier is energized: 75-volts dc through operated K5 relay 5T to 4T, jack F of J2 receptacle through 152A amplifier circuit, to jack B of J2 receptacle to ground.

5.09 Drum pawl solenoid operates: 48-volts dc through operated K2 relay 6B to 7B, jack 1 of J1 receptacle to 10A recorder plug, through drum pawl solenoid winding, 10A recorder plug to jack 0 of J1 receptacle to ground.

5.10 The drum pawl solenoid pulls the drum pawl from the notch in the rim of the recording drum, allowing the motor to turn the drum, and moves the recording head carriage in a direction parallel to the drum axis.

5.11 K5 relay locks up when the drum pawl motion closes the drum index switch, 48-volts dc through K5 relay winding, jacks 8 of J1 receptacle, 10A recorder plug, drum index switch, 10A recorder plug, jack 0 of J1 receptacle to ground.

5.12 K4 relay operates: 48-volts dc through operated K2 relay 4B to 3B, K4 relay winding, S1 switch (front of section 2) terminals 1 to 4 to ground.

5.13 Record reproduce head connected to the output of the 152A amplifier: grounded shield to jack 19 of J1 receptacle to 10A recorder plug, through record-reproduce head winding, plug of 10A recorder to jack 17 of J1 receptacle, operated K4 relay 7B to 6B and 9B to 10B, jack H of J2 receptacle, to output of the 152A amplifier.

5.14 Shunt resistance R4 is removed from across the 152A amplifier tube filament when 1B to 2B of R4 relay open. Amplifier tube filament circuit is connected to jacks D and J of J2 receptacle.

5.15 Adjustable limit switch solenoid operates: 48-volts dc through operated K4 relay 6T to 7T, jack 2 of J1 receptacle to 10A recorder plug, through adjustable limit switch solenoid winding, 10A recorder plug to jack 0 of J1 receptacle to ground. This solenoid lifts the holding mechanism, allowing the adjustable limit switch to return to its minimum position by its return spring.

5.16 DC erase coil energized: 48-volts dc through operated K4 relay 4T to 5T, normal K6 relay 1B to 2B, jack 3 of J1 receptacle to 10A recorder plug, through erase coil winding, 10A recorder plug to jack 0 of J1 receptacle to ground. 48-volts dc through the erase coil saturates the magnetic medium on the recording band on approximate one complete revolution of the recording drum, removing the previous message.

5.17 Timing switch is closed after approximately 1.5 seconds of drum rotation by the lateral movement of the head carriage.

5.18 K6 relay operates approximately 3.5 seconds after the start switch has been momentarily operated. Drum pulsing switch is engaged a second time by a pin attached to the drum, this momentarily places ground through jack 0 of J1 receptacle to 10A recorder plug, timing switch contacts, drum pulsing switch contacts, 10A recorder plug to jack 4 of J1 receptacle, K6 relay winding, operated K2 relay 2T to 1T and 3B to 4B to 48-volts dc.

5.19 K6 relay locks up from ground on its own contacts: 7B to 6B, through its own winding, operated K2 relay 2T to 1T and 3B to 4B to 48-volts dc.

5.20 The erase coil is de-energized when the K6 relay contacts 2B to 1B open and remove the 48-volts dc from the erase coil winding.

5.21 Associated telephone set is connected to the 152A amplifier input: 75-volts dc from ground to operated K5 relay 5T to 4T, R1 resistance, R3 resistance, operated K6 relay 10T to 11T, operated K4 relay 9T to 8T, S4 switch (front) terminals 3 to 2, to TS1 terminal T1, through associated telephone set, TS1 terminal R1, S4 switch (front) terminals 5 to 6, S1 switch (rear of section 2) terminals 9 to 6, R7 potentiometer, operated K4 relay 3B to 4B, jack A of J2 receptacle through 152A amplifier to jack B of J2 receptacle to ground.

5.22 The DICTATE lamp E2 lights: 48-volts dc through R11 resistance E2 DICTATE lamp, operated K6 relay 4T to 5T, jack 6 of J1 receptacle to 10A recorder plug, through flasher, 10A recorder plug to jack 7 of J1 receptacle, S1 switch (front of section 2) terminals 1 to 4 to ground. Flasher does not operate at this time because of insufficient current since the flasher switch is not operated.

5.23 The subscriber can now dictate an announcement.

5.24 The head carriage pushes the adjustable limit switch towards its maximum travel position, during the recording of the announcement.

5.25 DICTATE lamp E2 flashes. The flasher switch is operated by the head carriage mechanism movement approximately 5 seconds before the end of the announcement dictate time. This time limitation is adjustable. 48-volts dc through R12 resistance, jack 9 of J1 receptacle, 10A recorder plug, flasher switch, flasher, 10A recorder plug, jack 7 of J1 receptacle, S1 switch (front of section 2) terminals 1 to 4 to ground.

5.26 The dictate function will terminate either by the subscriber's operation of the STOP switch S3 or by the operation of the adjustable limit switch when the head carriage mechanism is moved to its maximum travel position against the adjustable mechanical stop. The release sequence is as follows:

(1) Relays K2, K4, and K6 release.

(2) Release of adjustable limit switch solenoid allows a spring to clamp the adjustable limit switch in the position it occupies at the time of operation of the STOP switch.

(3) Release of the drum pawl solenoid disengages the head carriage from the lead screw and allows it to return to zero announcement position by its return spring.

(4) Release of the drum pawl solenoid removes the constraint on the drum pawl. When the notch in the rim of the recording drum reaches the drum pawl position, the drum pawl then engages the slot, this mechanical action releases the drum index switch.

(5) K5 relay releases and stops the motor.

Announcement Check

5.27 (1) Turn OFF-ON knob (S4 switch) to ON.

(2) Turn function selector knob (S1 switch) to ANNOUNCEMENT CHECK position.

(3) START switch S2 operated momentarily by operator.

5.28 K2 start relay operates: ground through S1 switch (front of section 1) terminals 12 to 10, S2 START switch contacts, normal K5 relay 1T to 3T, R15 resistance, K2 relay winding, normal K5 relay 6T to 5T to 75-volts dc.

5.29 K2 relay locks up: 75-volts dc through normal K5 relay 5T to 6T, K2 relay winding, operated K2 relay 4T to 3T, normal K3 relay 3B to 2B, jack 13 of J1 receptacle to 10A recorder plug, adjustable limit switch contacts, 10A recorder plug to jack 14 of J1 receptacle, S3 STOP switch contacts, S1 switch (front of section 1) terminals 6 to 8 to ground.

5.30 K5 relay operates: ground through operated K2 relay 2B to 1B, K5 relay winding to 48-volts dc.

5.31 Motor is energized: 110-volts ac from power plug PG1, F1 fuse, power section of OFF-ON switch S4, operated K5 relay contacts 1B to 2B, J4 receptacle, through motor winding, J4 receptacle to other side of power of PG1 plug.

5.32 K2 relay locking path transferred: the R14 resistance is inserted to limit the holding current, 75-volts dc through R14 resistance, K2 relay winding, operated K2 relay 4T to 3T, normal K3 relay 3B to 2B, jack 13 of J1 receptacle to 10A recorder plug, adjustable limit switch contacts, 10A recorder plug to jack 14 of J1 receptacle. S3 STOP switch contacts, S1 switch (front of section 1) terminals 6 to 8 to ground.

5.33 Amplifier is energized: 75-volts dc through operated K5 relay 5T to 4T, jack F of J2 receptacle through 152A amplifier circuit to jack B of J2 receptacle to ground.

5.34 Drum pawl solenoid operates: 48-volts dc through operated K2 relay 6B to 7B, jack 1 of J1 receptacle to 10A recorder plug, through drum pawl solenoid winding, 10A recorder plug to jack 0 of J1 receptacle to ground.

5.35 The drum pawl solenoid pulls the drum pawl from the notch in the rim of the recording drum, allowing the motor to turn the drum and moves the recording head carriage in a direction parallel to the drum axis.

5.36 K5 relay locks up when the drum pawl motion closes the drum index switch: 48-volts dc through K5 relay winding, jack 8 of J1 receptacle, 10A recorder plug, drum index switch, 10A recorder plug, jack 0 of J1 receptacle to ground.

5.37 After approximately 3.5 seconds of drum rotation the record-reproduce head should reach the recorded announcement, and is connected to the associated telephone set.

(1) The record-reproduce head is connected to the T2 transformer input: grounded shield jack 19 of J1 receptacle to 10A recorder plug through record-reproduce head winding, 10A recorder plug to jack 17 of J1 receptacle, normal K4 relay 7B to 8B and 5B to 4B, jack A of J2 receptacle through 152A amplifier, to jack K of J2 receptacle, T2 transformer terminal R, through T2 transformer winding and terminal BK, C1-4 condenser to ground.

(2) The associated telephone set is connected to the T2 transformer output: T2 transformer winding to terminal 3, R8 resistance, S1 switch (rear of section 2) terminals 7 to 9, S4 switch (front) terminals 6 to 5, TS1 terminal R1 through associated telephone set, to TS1 terminal T1, S4 switch (front) terminals 2 to 3, C1-2 condenser through ground to T2 transformer terminal 4.

(3) Now the subscriber can hear the announcement which was previously recorded on the magnetic band.

5.38 The announcement check function will terminate either by the subscriber's operation of the STOP switch S3 or by the operation of the adjustable limit switch by the head carriage arm movement. The release sequence is as follows:

(1) Relays K2 and K6 release.

(2) Release of drum pawl solenoid disengages the head carriage from the lead screw and the return spring moves the carriage back to zero announcement position.

(3) Release of the drum pawl solenoid also removes the constraint on the drum pawl. When the notch in the rim of the recording drum reaches the drum pawl position, the pawl then engages the notch. This mechanical action releases the drum index switch.

(4) K5 relay releases and stops the motor.

Automatic Answer

5.39 (1) Turn OFF-ON knob (S4 switch) to ON.

(2) Turn function selector knob (S1 switch) to AUTOMATIC ANSWER.

5.40 Ready lamp E3 lights: 48-volts dc through R10 resistance, E3 lamp, S1 switch (front of section 2) terminals 7 to 8, jack 10 of J1 receptacle to 10A recorder plug, drum index switch contacts, 10A recorder plug to jack 0 of J1 receptacle to ground.

5.41 In AUTOMATIC ANSWER position the control circuits are arranged to give an audible signal on an incoming call as follows:

(1) Answering sets are wired so that the ringer of the associated telephone set will not be rung.

(2) K1 relay vibrates: Ringing current is impressed from the CO or PBX line to TS1 terminal R, through S4 switch (front) terminals 8 to 9, through K1 relay windings, C6 condenser, S4 switch (rear) terminals 10 to 9, to TS1 terminal G which is externally connected to TS1 terminal T or local ground.

(3) If the wiring option placing a strap between terminals G and G1 on TS1 is used, both telephone set ringer and K1 relay will respond to the 20-cycle ringing current: ringing current from CO or PBX line to TS1 terminal R, S4 switch (front) terminals 8 to 9, S1 switch (rear of section 2) terminals 8 to 9, S4 switch (front) terminals 6 to 5, TS1 terminal R1, through ringer circuit of associated telephone set to G1 strapped to TS1 terminal G, which is externally connected to TS1 terminal T or to local ground.

5.42 As soon as the line is seized by the winding of the K7 relay (calling party control) under control of K6 relay, CO ringing will be tripped, the E3 ready lamp will be extinguished and the audible signal will stop operating.

5.43 K2 relay operates: 75-volts dc through normal K5 relay 5T to 6T, K2 relay winding, normal K2 relay 4T to 5T, R13 thermistor, operated K1 relay 1T to 2T, jack 12 of J1 receptacle to 10A recorder plug, telephone ground switch, 10A recorder plug to jack 11 of J1 receptacle, through S1 switch (front of section 1) terminals 3 to 4 to ground.

5.44 K2 relay locks: 75-volts dc through normal K5 relay 5T to 6T, K2 relay winding, operated K2 relay 4T to 3T, normal K3 relay 3B to 2B, jack 13 of J1 receptacle to 10A recorder plug, adjustable limit switch contacts, 10A recorder plug to jack 14 of J1 receptacle, TS4 terminals 7 to 8, S1 switch (front of section 1) terminals 7 to 8 to ground.

5.45 K5 relay operates: ground through operated K2 relay 2B to 1B, K5 relay winding to 48-volts dc.

5.46 Drum pawl solenoid operates: 48-volts dc through operated K2 relay 6B to 7B, jack 1 of J1 receptacle to 10A recorder plug, through drum pawl solenoid winding, 10A recorder plug to jack 0 of J1 receptacle to ground.

5.47 Recording head contacts the recording drum band: the drum pawl solenoid pulls the drum pawl from the notch in the rim of the recording drum, allowing the motor to turn the drum and moves the recording head carriage in a direction parallel to the drum axis.

5.48 K2 relay locking path transferred: the R14 resistance is inserted to limit the holding current, 75-volts dc R14 resistance, K2 relay winding, operated K2 relay 4T to 3T, normal K3 relay 3B to 2B, jack 13 of J1 receptacle to 10A recorder plug. Adjustable limit switch contacts, 10A recorder plug to jack 14 of J1 receptacle, TS4 terminals 7 to 8, S1 switch (front of section 1) terminals 7 to 8 to ground.

5.49 Amplifier is energized: 75-volts dc to operated K5 relay 5T to 4T, jack F of J2 receptacle through 152A amplifier circuit, to jack B of J2 receptacle to ground.

5.50 E3 ready lamp is extinguished when drum index switch is operated mechanically by drum pawl.

5.51 Motor is energized: 110-volts ac from power plug PG1, F1 fuse, power section of ON-OFF switch S4, operated K5 relay 1B to 2B, J4 receptacle, through motor winding J4 receptacle to other side of PG1 plug, drum and lead screw operate.

5.52 K5 relay locks up when the drum pawl motion closes the drum index switch: 48-volt dc through K5 relay winding, jack 8 of J1 receptacle, 10A recorder plug, drum index switch, 10A recorder plug, jack 0 of J1 receptacle to ground.

5.53 Timing switch is closed after approximately 1.5 seconds of drum rotation by the lateral movement of the head carriage.

5.54 K6 relay operates approximately 3.5 seconds after the start of drum rotation when drum pulsing switch is engaged a second time by a pin attached to the drum: ground on jack 0 of J1 receptacle to 10A recorder plug, timing switch contacts, drum pulsing switch contacts, 10A recorder plug to jack 4 of J1 receptacle, K6 relay winding, operated K2 relay 2T to 1T and 3B to 4B to 48-volts dc.

5.55 K6 relay locks up: ground on its own contacts 7B to 6B, through its own winding, operated K2 relay 2T to 1T and 3B to 4B to 48-volts dc.

5.56 K7 relay operates: CO or PBX line battery to TS1 terminal R, S4 switch (front) terminals 8 to 9, S1 switch (rear of section 1) terminals 3 to 4, normal K3 relay 3T to 2T, K7 relay winding, operated K6 relay 4B to 3B, S1 switch (rear of section 1) terminals 9 to 8, S4 switch (front) terminals 12 to 11, to TS1 terminal T, to other side of CO or PBX line.

5.57 K7 relay locks up: CO or PBX line battery to TS1 terminal R, S4 switch (front) terminals 8 to 9, S1 switch (rear of section 1) terminals 3 to 4, operated K7 relay 2T to 1T, K7 relay winding, operated K6 relay 4B to 3B, S1 switch (rear of section 1) terminals 9 to 8, S4 switch (front) terminals 12 to 11, TS1 terminal T, to other side of CO or PBX line.

5.58 K3 relay operates about 1.5 seconds after K6 relay operates: 48-volts dc through operated K6 relay 10B to 9B, R16 resistance, K3 relay winding, S1 switch (front of section 1) terminals 11 to 12 to ground.

5.59 Record-reproduce head is connected to 152A amplifier input: grounded shield to jack 19 of J1 receptacle to 10A recorder plug, through record-reproduce head winding, 10A recorder plug to jack 17 of J1 receptacle, K4 relay 7B to 8B and 5B to 4B, jack A of J2 receptacle to 152A amplifier input.

5.60 Amplifier output is connected to T2 transformer primary winding, reproduce output of 152A amplifier to jack K of J2 receptacle, T2 transformer terminal R, through T2 transformer winding to terminal BK, C1-4 condenser to ground.

5.61 T2 transformer output winding is connected to CO or PBX line, T2 transformer terminal 1, through its output winding to terminal 2, TS4 terminals 3 to 4, operated K6 relay 2T to 1T, TS4 terminal 6, TS2 terminals 2 to 1, S1 switch (rear of section 1) terminals 9 to 8, S4 switch (front) terminals 12 to 11, TS1 terminal T, to one side of CO or PBX line to calling party, back to other side of CO or PBX line to TS1 terminal R, S4 switch (front) terminals 8 to 9, S1 switch (rear of section 1) terminals 3 to 4, TS4 terminals 2 to 1, C5 condenser, back to terminal 1 of T2 transformer.

5.62 The AUTOMATIC ANSWER function will terminate either by the operation of the adjustable limit switch or by the calling party disconnect. The latter is the case in most step-by-step; panel, and manual central offices. The release sequences are as follows:

(a) When the calling party disconnects, the K7 relay releases, because the CO or PBX battery is momentarily opened which holds K7 relay operated.

(1) K2, K3, and K6 relays release.

(2) Release of drum pawl solenoid disengages the head carriage from the lead screw and the return spring moves the carriage back to zero announcement position.

(3) Release of the drum pawl solenoid also removes the constraint on the drum pawl. When the notch in the rim of the recording drum reaches the drum pawl position, the pawl engages this notch. This mechanical action releases the drum index switch.

(4) K5 relay releases and stops the motor.

(5) Ready lamp E3 relights.

(6) 2A telephone answering set is ready to answer the next incoming call.

(b) The adjustable limit switch is operated by the head-carriage arm movement at the end of the message.

(1) K2, K3, K6, and K7 relays release.

(2) The sequence described in (a) (2) to (6) above follows.

6. ADJUSTMENT PROCEDURE FOR ANNOUNCEMENT MESSAGE LENGTH AND DICTATE FLASHING LIGHT CONTROL

6.01 The adjustable limit switch controls the maximum announcement length. The adjustable mechanical stop is marked in steps of 15, 30, 45, and 60 seconds. The maximum message length may be adjusted to 30 seconds in manufacture and **should not be changed in the field without specific authorization.**

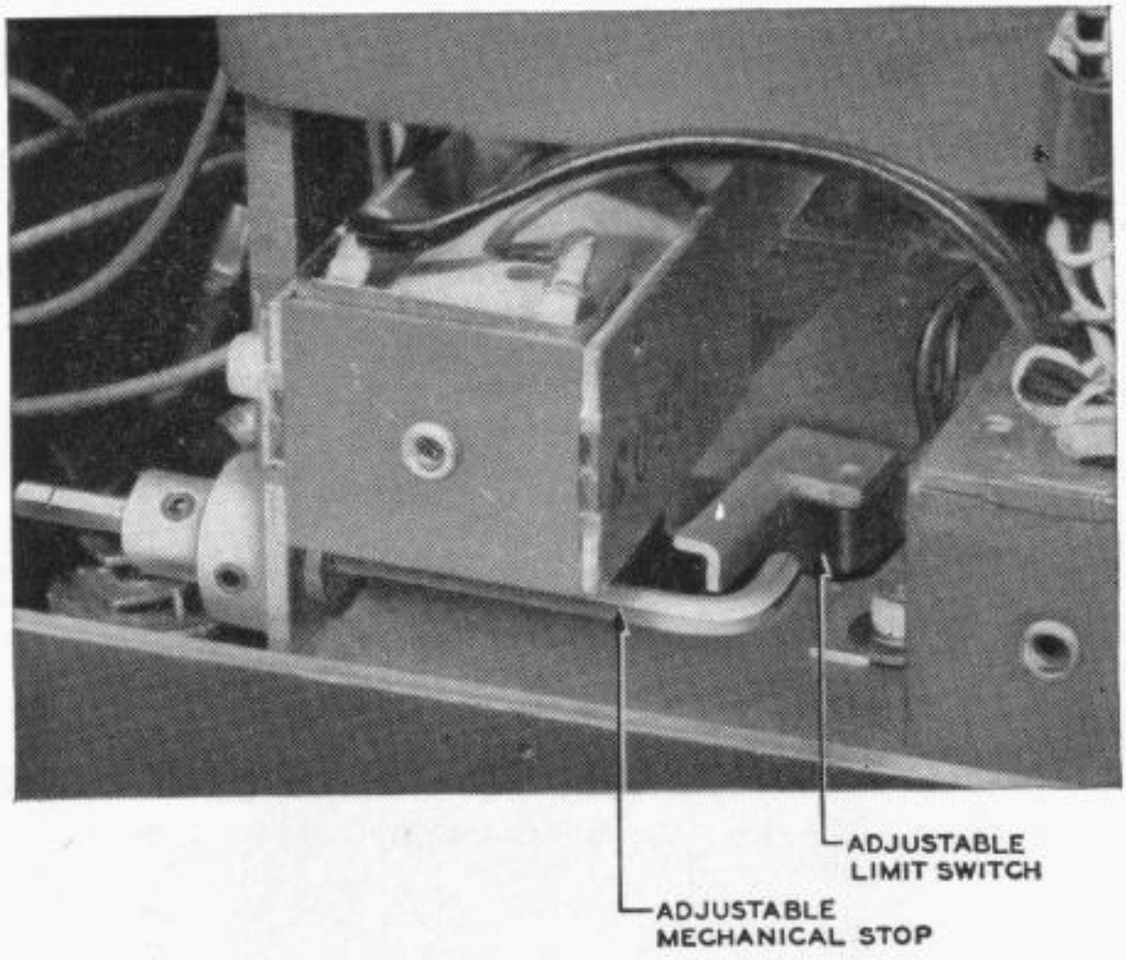


Fig. 10—2A Telephone Answering Set—Showing Adjustable Mechanical Stop Just Before It Engages the Adjustable Limit Switch

6.02 To adjust the maximum announcement length the following steps should be taken. See Fig. 11.

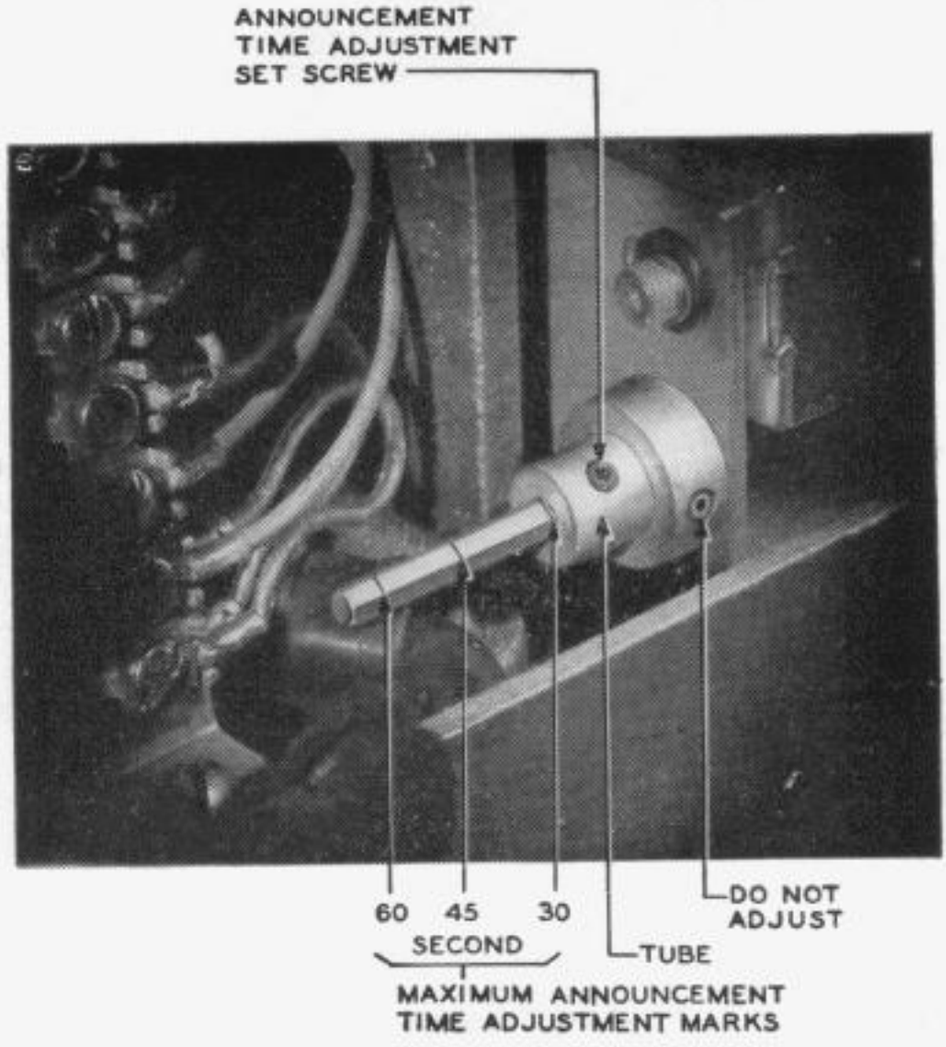


Fig. 11—2A Telephone Answering Set—Showing Adjustable Mechanical Stop, Hex Head Set Screw, and Tube

(1) Loosen hex head set screw in the tube.

(2) Slide the adjustable mechanical stop until the desired time interval is obtained. Sliding the adjustable mechanical stop to the right lengthens the maximum message and to the left shortens it. Do not permit the adjustable mechanical stop to rotate as it is being slid to the new position. If it rotates it will not engage the adjustable limit switch. See Fig. 10.

(3) Tighten hex head set screw in tube.

(4) The flashing dictate light control must be readjusted **after** the position of the adjustable mechanical stop is changed.

6.03 The flashing dictate light control shall be adjusted to give a minimum of 5 seconds of flashing before the adjustable limit switch operates. This adjustment is made as follows:

(a) 2A telephone answering sets **with** letter A preceding the serial number.

(1) Loosen the two hex socket cap screws holding flasher switch mounting. See Fig. 12.

(2) Move the mounting bracket that holds the S5 switch to the right to lengthen the period during which the dictate lamp flashes on and off, and to the left to shorten it.

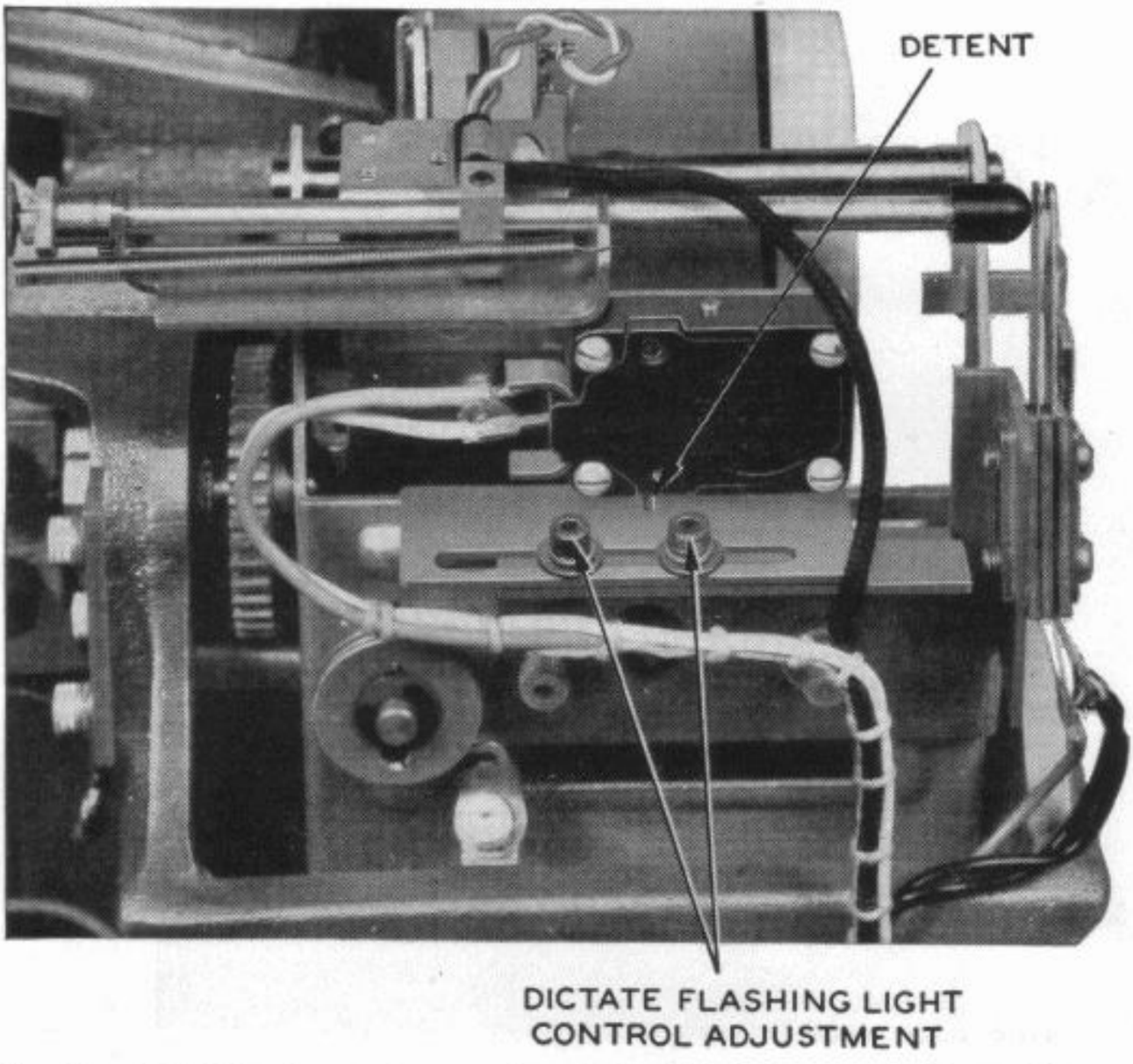


Fig. 12—2A Telephone Answering Set (With Letter A Preceding Serial Number)—Showing Flasher Switch and Mounting Bracket

(3) The detent (see Fig. 12) must be located so that it rests between the teeth of the rack which is under the bracket. This position is required to insure adequate clearance between the flasher switch and its operating bracket. Each tooth in the rack causes a change of about 5 seconds in the flashing time.

(4) Tighten the two hex socket cap screws which secure the flasher switch mounting.

(b) The 2A telephone answering set **without** the letter A preceding the serial number.

(1) Operate the 2A telephone answering set in its dictate function and allow the set to run until it stops itself by the operation of the adjustable limit switch.

(2) Loosen the hex socket set screw in the flashing dictate light indicator assembly. See Fig. 13.

(3) Move the head carriage to the right by grasping the carriage return line tie post (see Fig. 13) until its movement is stopped by the adjustable automatic stop.

(4) While the head carriage is in this position put slight pressure on the head carriage where the cable clamp is fastened so that the recording head just touches the announcement drum. This pressure will hold the head carriage in position.

(5) While maintaining this pressure move the dictate flashing light indicator assembly so that the arrow on the head carriage points at the mark on the indicator for the length of the flashing time required.

(6) Tighten the hex socket set screw in the dictate flashing light control indicator assembly.

(c) The DICTATE flashing light (E2) starts to flash when the current through a No. 627 Tungsol Thermal Flasher is increased by operation of the flasher switch. See Fig. 9.

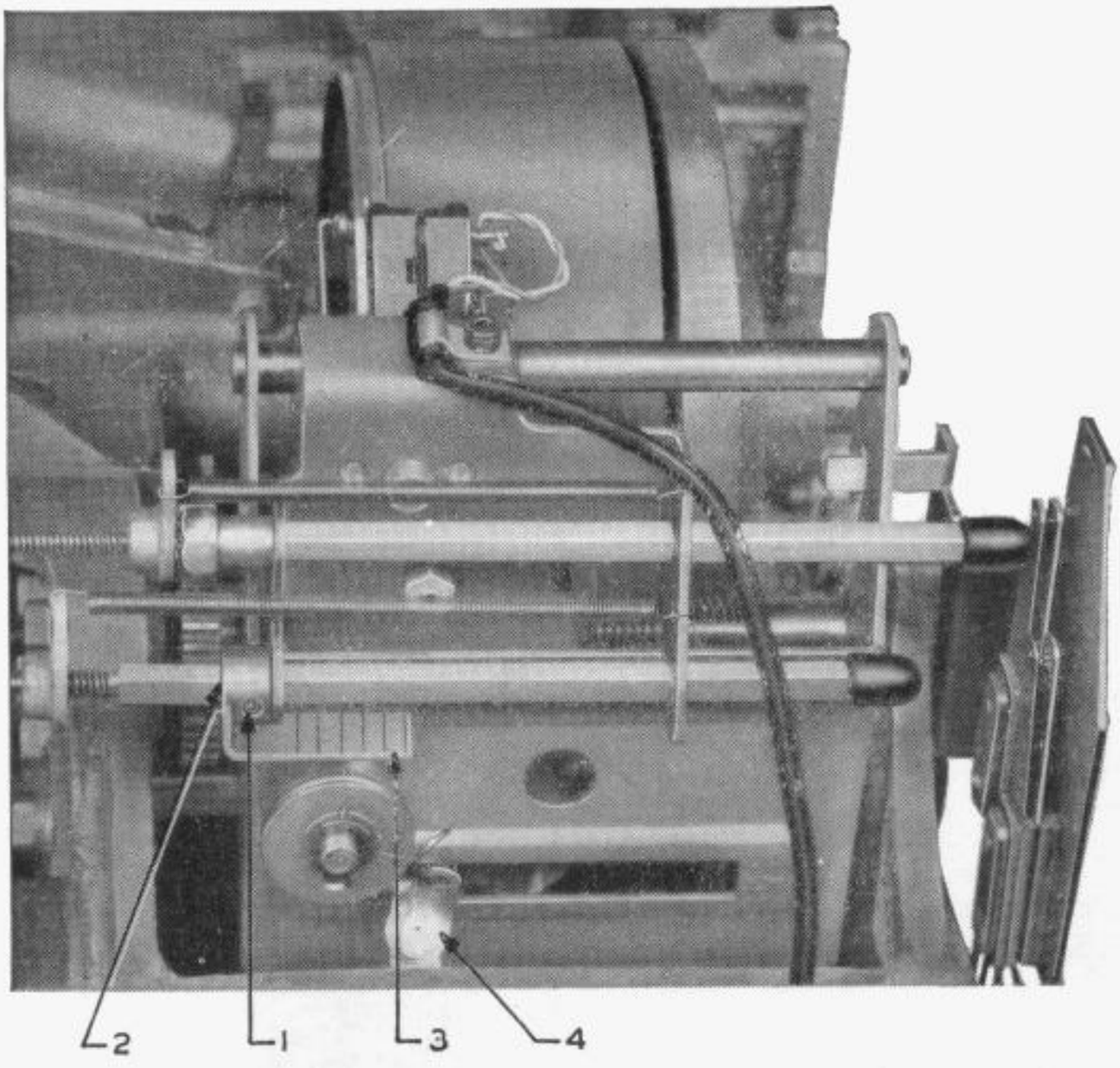


Fig. 13—2A Telephone Answering Set—Showing the Dictate Flashing Light Indicator Assembly (Without Letter A Preceding Serial Number)

1 — Hex Socket Screw in Indicator Assembly

2 — Dictate Flashing Light Indicator Assembly

3 — Indicator Marking Dictate Flashing Light Control in 5-second Intervals (Maximum 30 Seconds Flashing)

4 — Carriage Return Line Tie Post

Caution: The minimum flashing time shall be 5 seconds but may be varied in any degree to the maximum of 30 seconds. See Figs. 13 and 14.

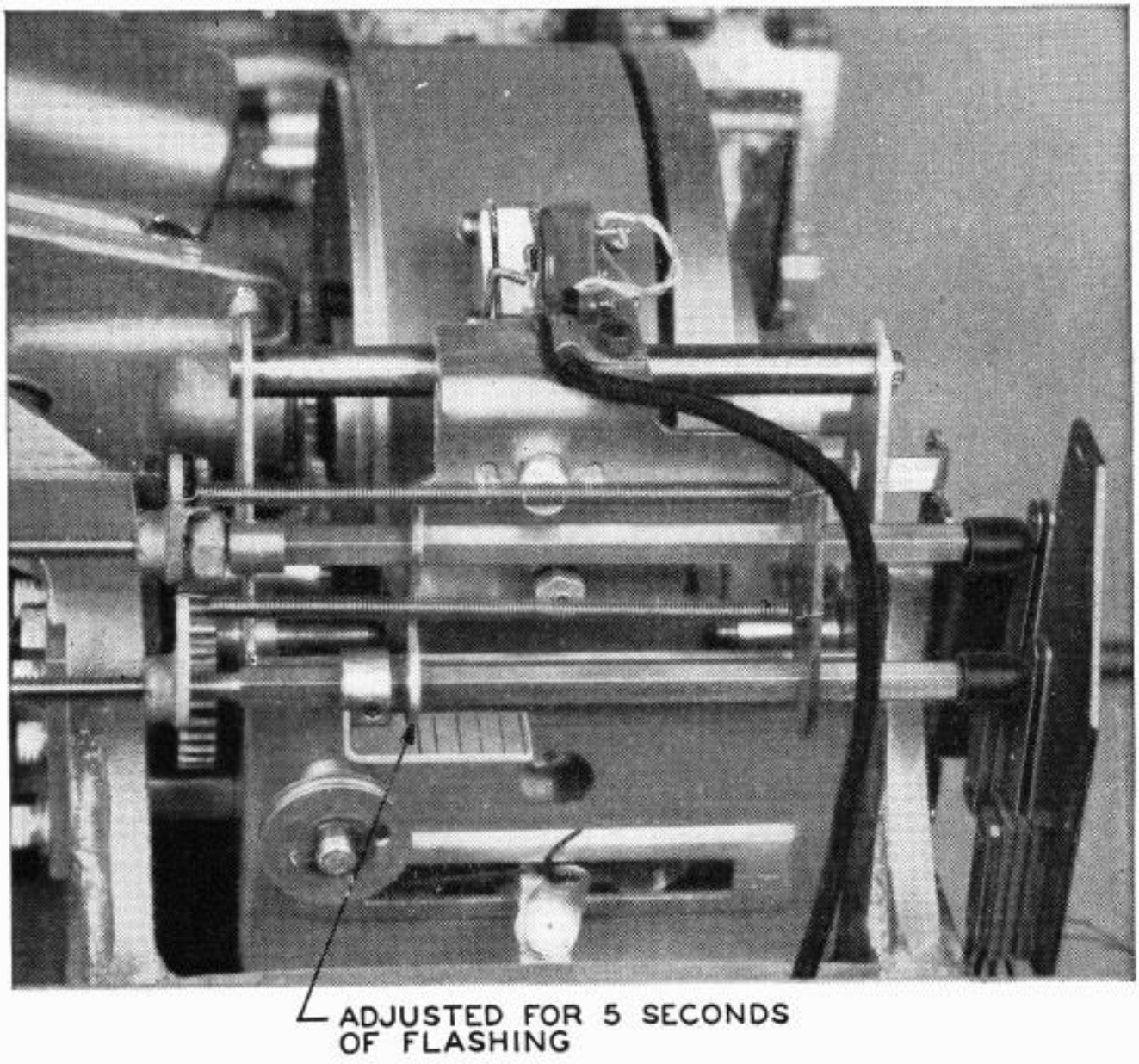


Fig. 14—2A Telephone Answering Set—Dictate Flashing Light Indicator Assembly Fully Operated—Adjusted for 5 Seconds of Flashing

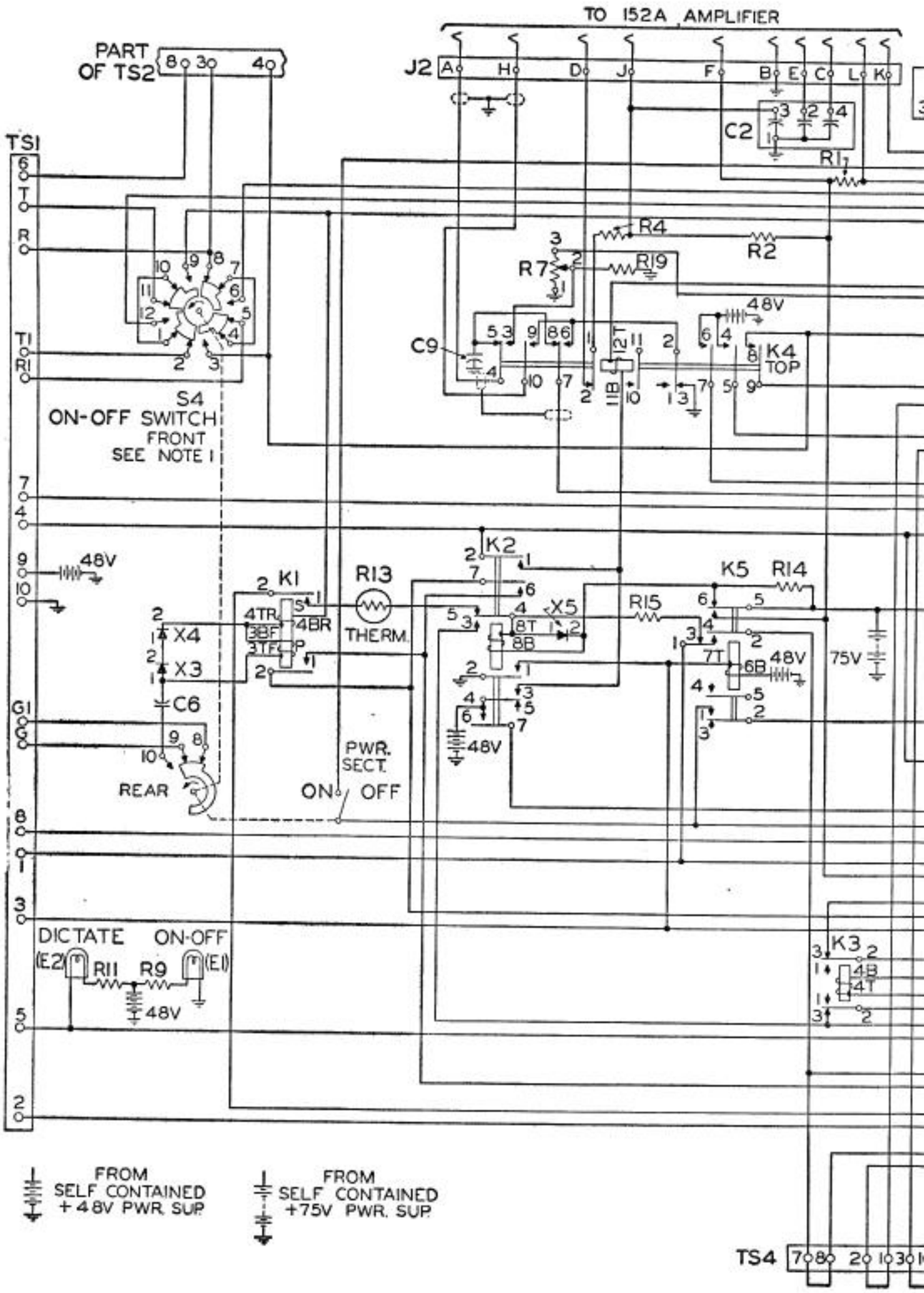
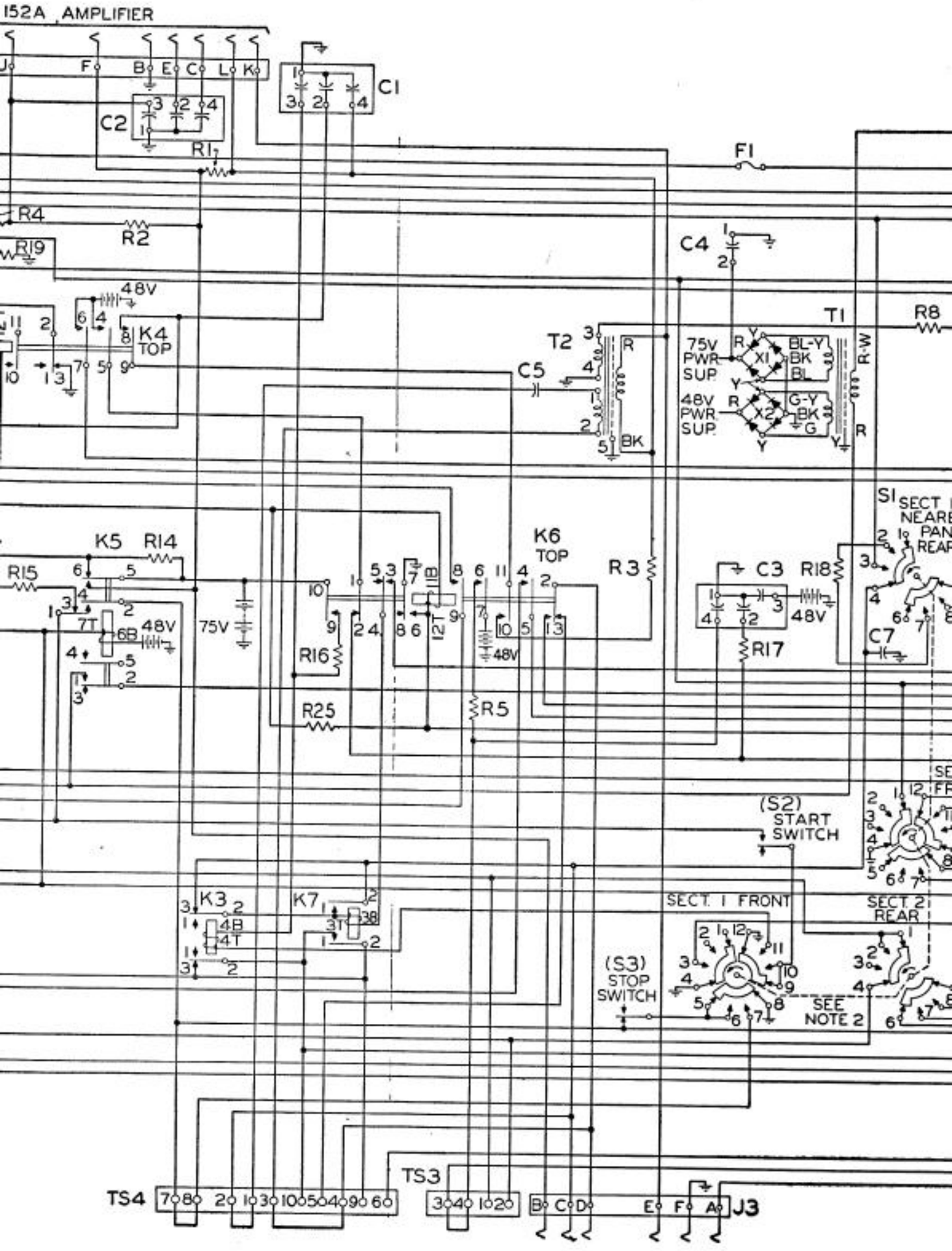
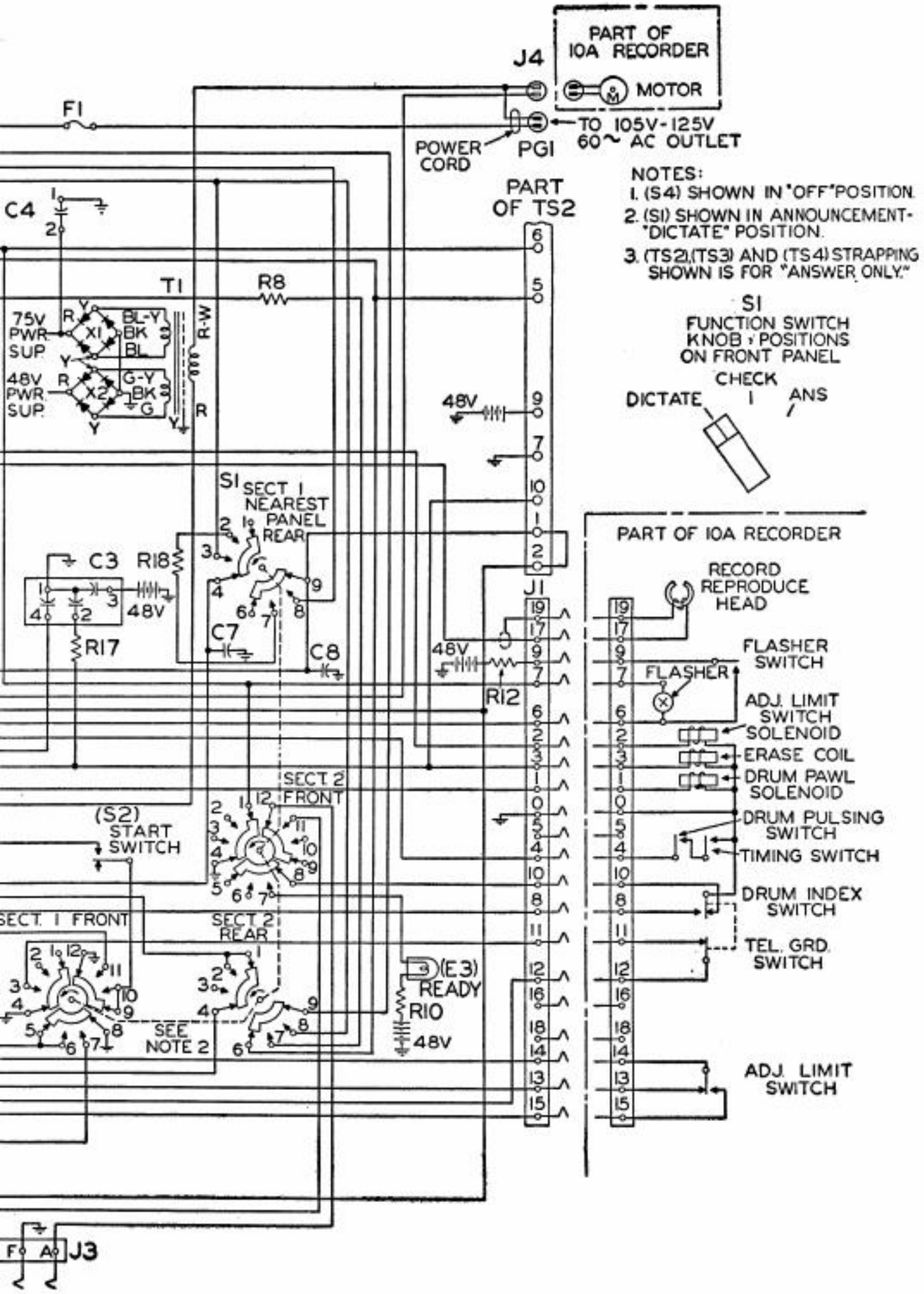


Fig. 15—2A Telephone Answering



Telephone Answering Set Schematic (With Letter A Preceding Serial N



A Preceding Serial Number)