TOLL GRADE TALKING BATTERY SUPPLY CIRCUITS USING PARALLEL WOUND "G" TYPE SUPERVISORY RELAY AND 8-A RESISTANCE LAMPS

1. GENERAL:

1.1 This section describes the 48 volt repeating coil battery supply circuits using parallel wound "G" type supervisory relays and 8-A tungsten resistance lamps that are employed for toll switching trunks, recording-completing trunks, toll subscribers' lines and similar circuits requiring 48-volt talking battery supply in manual, panel, step-by-step and toll offices.

1.2 The outstanding improvements obtained by the use of the G type relay and 8-A lamps are the improvement in transmission efficiency and the reduction in noise due to telephone plant sources as well as that caused by induction from external sources.

1.3 The improvement in transmission efficiency results from the new circuits causing a smaller loss at the lower frequencies than that produced by the older circuits. Also, the general transmission conditions are somewhat improved by the increase in battery supply on the longer loops which result from the tendency of the tungsten lamp resistance to decrease as the current through the filament decreases. While there is a reduction in battery supply for the shorter loops this is accompanied by a reduction in transmitter burning and side tone, the net result being beneficial.

1.4 The high impedance, parallel wound, "G" type relay used in the new circuits in conjunction with a 4 m.f. condenser, constitutes an effective method for suppressing noise from the battery supply circuit. The noise which reaches the subscriber's receiver will be materially reduced from that which would exist with the former standard toll talking battery supply circuit.

1.5 In former standard circuits unbalances existed in the repeating coil and through the use of the B-15 supervisory relay, the latter not being balanced by other equipment. These unbalances have been practically eliminated in the new circuits through the use of a "G" type parallel wound supervisory relay and the 94-E, 94-F, 95-E and 95-F type battery supply repeating coils. Such unbalances as may remain due to variations in the lamps and relay windings are almost negligible in causing metallic circuit noise.

2. EQUIPMENT FEATURES:

General:

2.1 The new supervisory relay for toll talking battery supply circuits is of the G type with two equal-turn parallel windings of 10 ohms each. One winding is connected through an 8-A resistance lamp to battery and the other through a similar lamp to ground. The opposite ends of these windings are connected across the condenser which joins two windings of the repeating coil. This arrangement is shown schematically on Drawing 705-1267.

2.2 The same relay structure is used for manual, panel and step-by-step circuits. The relay adjustments are not the same, however, for dial and manual circuits. Separate code numbers are assigned to relays having different adjustments.

8-A Resistance Lamp and KS-6140 Socket:

2.3 The 8-A resistance lamp is of the tubular type and it mounts in an Edison screw-base porcelain socket as shown in Fig. 1. The lamp has a tungsten filament with the current-resistance characteristics shown in Drawing 38-Y-2503. With a current of approximately 0.150 ampere which will be obtained on a conductor loop resistance of about 100 ohms, the filament re-

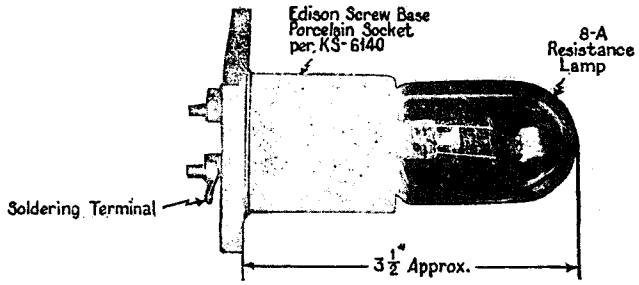

Fig. 1.

sistance is 40 ohms which is the same as that of the fixed resistance which it replaces. With shorter loops the resistance exceeds 40 ohms, and with longer loops it is of lower value. Transmitter burning and sidetone are consequently reduced on shorter loops by the substitution of lamps for resistances and greater protection is afforded the equipment in the circuit under trouble conditions. Current flow to the station set is on the other hand increased on longer loops resulting in a battery supply gain.

Mounting of Relays and Lamps:

2.4 The new balanced supervisory relay is mounted with the remainder of the trunk relay equipment on relay rack bays, or in the case of step-by-step installations, on selector mounting plates.

2.5 The socket for the 8-A resistance lamp is mounted on metal plates on 1¾-inch centers both horizontally and vertically. The lamp when screwed in the socket projects beyond the mounting plate approximately 3½ inches or about the same as the common cover for E type relays. The lamp is thus designed for mounting on relay racks and is placed on the trunk unit near the repeating coil where this proves economical, as for example, in manual toll switching trunks. Where it is not practicable or advantageous to mount the lamps with the repeating coils, the lamps are mounted near the battery supply fuses either near the top of the fuse bay or in a separate bay provided for this purpose.

3. SIGNALING CHARACTERISTICS:

3.1 The particular supervision ranges which may be obtained in the various circuits are conditioned by the adjustments specified for the relays. Separate codes are issued covering different adjustment values. Factors affecting the specification of a particular adjustment relate to items such as allowances for frame vibration, operation on busy-back condition, operate and release conditions involving earth potentials and non-operate conditions as required in the recording-completing trunks used in the panel system.

4. DRAWINGS:

4.1 The following drawings are attached to this section:

Title	Number
Manual Office-Schematic of Toll Switching Trunk....	705-1267
8-A Resistance Lamp—Current-Resistance Characteristics	38-Y-2503

(This section consists of excerpts from D. & R. Bulletin No. 418.)

AMERICAN TELEPHONE & TELEGRAPH CO.
Department of
Development and Research

MANUAL OFFICE

SCHEMATIC OF TOLL SWITCHING TRUNK

Showing use of Parallel Wound Supervisory Relay and Resistance Lamps in Toll Talking Battery Supply Circuit.

705 - 1267
Information

Engineer
Draftsman
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Changed Title, Notes ① & ② and G Type relay convention.
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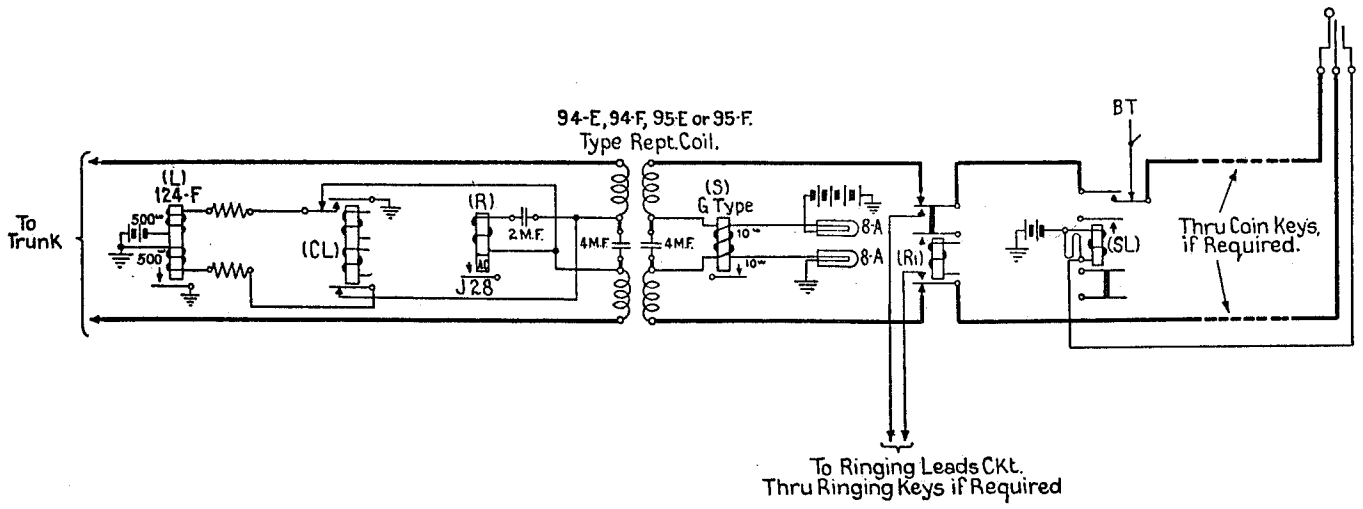
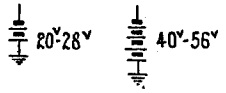
ISSUE 2

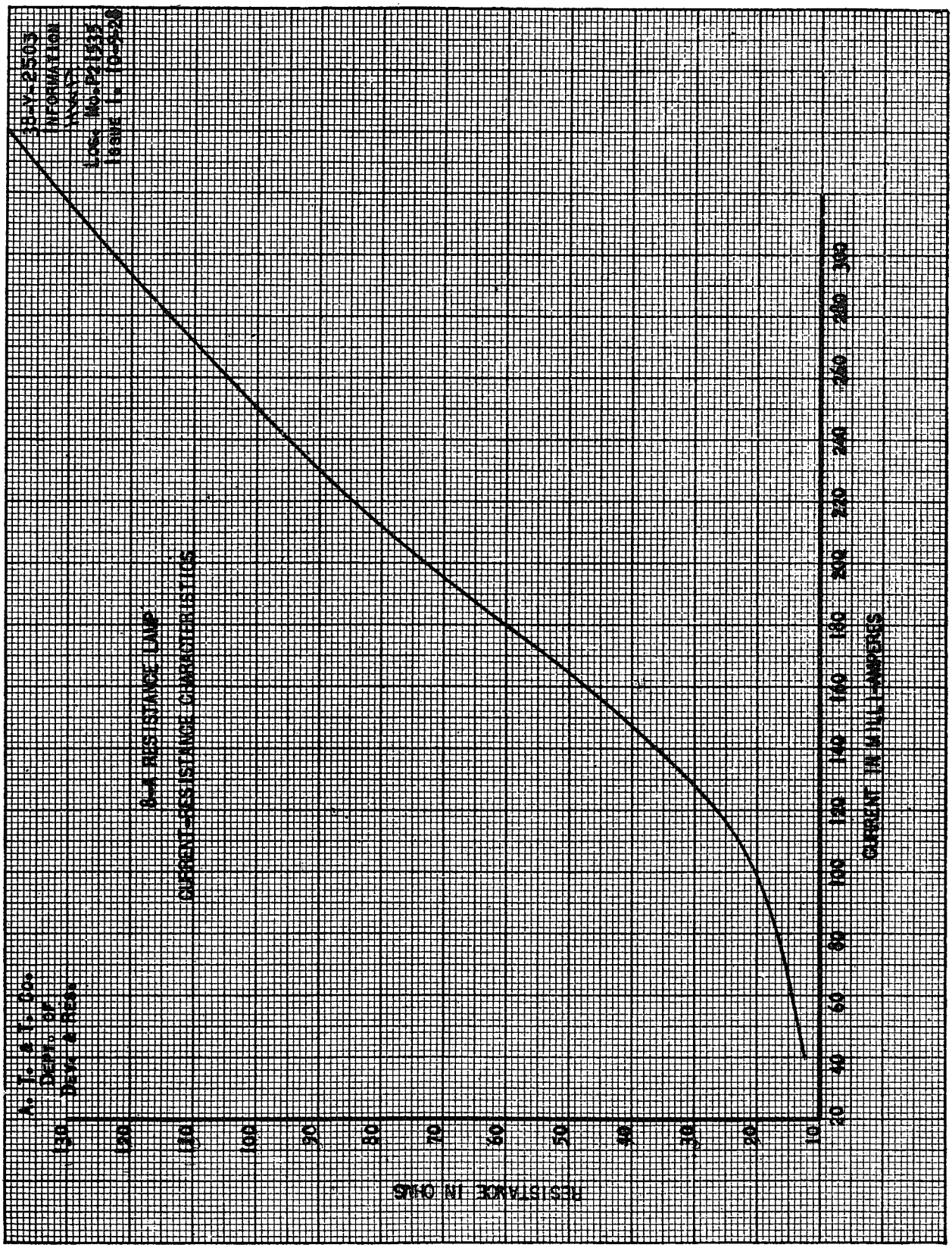


- NOTES -

① This schematic is intended to represent a typical manual office trunk arranged for toll talking battery Supply.

② The parallel wound supervisory relay and 8-A resistance lamps may be employed similarly in step by step and panel dial systems trunks arranged for toll talking battery supply.




CURRENT-RESISTANCE CHARACTERISTICS
3-A RESISTANCE LAMP
CURRENT IN MILLIAMPERES
RESISTANCE IN OHMS