SUBSCRIBER-OPERATED TIME ANNOUNCEMENT SYSTEMS

ANNOUNCEMENT SYSTEMS NO. 2B AND 2C

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1. GENERAL

1.01 This section provides information regarding the transmission features of the Announcement Systems No. 2B and No. 2C which are designed for installation on subscribers' premises in connection with subscriber-operated time announcement service. The facilities of the No. 2B system are arranged for operating in conjunction with announcement machines owned by the subscriber; whereas, the No. 2C system provides all the facilities required for manual operation of a time announcement bureau by the subscriber. Both arrangements contemplate that the subscriber will have a number of subscriber loops and that calls to these lines will be made in the usual way over exchange plant facilities. Announcements would be made simultaneously on all lines on which an incoming call is waiting. The volume input into each of the lines outgoing from the announcement bureau is approximately equal to the average volume input into a subscriber line at regular subscribers' stations.

2. MACHINE ANNOUNCEMENT SYSTEM—NO 2B

General

2.01 Figure 1 shows a transmission schematic of Announcement System No. 2B. In this system, each line to the central office is terminated on the customer's premises in a line circuit consisting of a repeating coil, a 1600-ohm series resistance, a protective device, and signaling equipment. The repeating coil and 1600-ohm resistance form a pad which when bridged across a common distributing bus of 8 ohms or less prevents communication between subscribers connected simultaneously to the announcement system and permits the connection of from 1 to 50 lines to the bus without material changes in speech volume delivered to each line. The protective device prevents excessive click voltages that might be generated in the subscriber's equipment from reaching the calling subscriber. The amplifier and the announcement machine associated with this system are owned and maintained by the subscriber. A manual, single line announcement arrangement is provided on an optional basis by the telephone company for emergency use.

Volume

2.02 The speech volume at the output of the subscriber's machine amplifier into its 8-ohm output load should preferably be 24 $\pm$3 vu. Higher values would increase the speech levels impressed on the subscriber loops and introduce the possibility of crosstalk whereas substantially lower volumes would penalize the transmission on limiting connections.

2.03 The speech volume transmitted into the subscriber lines as measured across T-R, shown in Fig. 1, should preferably be -7 $\pm$5 vu. The $\pm$5 includes the $\pm$3 db variation allowed the announcement machines together with the allowance for differences in the impedances of the connecting subscribers' circuits and for impedance variations caused by different numbers of lines being connected simultaneously to the common distributing bus.

Crosstalk

2.04 For a transmitting volume -7 $\pm$5 vu across T-R of the subscriber lines, up to 40 percent of the pairs in a given color group in a cable which is entirely of the staggered twist type may be employed for the subscriber lines in this service without causing excessive crosstalk into adjacent circuits. Because of its high crosstalk coupling, nonstaggered twist cable will not, in general, be satisfactory for this service. Under certain conditions, short lengths of nonstaggered twist cable may be satisfactory but it would not be advisable to use this construction until full consideration based on

the latest information has been given the possibility of excessive crosstalk.

2.05 It is essential that the switching arrangements in the common announcing paths in the subscriber's equipment shall not permit any of the lines to be connected together except through a common impedance bridged across the junction of these lines of no greater than 8 ohms. When this impedance is 8 ohms or less, the attenuation between zero loop subscribers in the same office simultaneously connected to the announcement network will be at least 60 db. This loss is sufficient to prevent any connected subscriber from interfering with or talking to any other subscriber.

Protection

2.06 The protective unit (the 105A coupling unit) is connected as shown in Fig. 1. This feature reduces the possibility of acoustic clicks being transmitted over the line circuits. Under normal operating conditions, the volume loss caused by this device will be of the order of 1 db and noticeable distortion will not be introduced. The leads to this unit should be as short as possible.

2.07 The 105A coupling unit as normally used for telephotograph service is connected into the circuit as a unit ratio repeating coil, 1-2 being the terminals of one winding and 3-4 being the terminals of the other. Because of the improved transmission-frequency characteristic of this unit when connected across the line with the primary and secondary windings in series, it is connected in this manner in the announcement system as shown in Fig. 1. This device tends to limit the amount of energy which may be transmitted to the line. Tests on a line circuit similar to that shown in Fig. 1 have shown that abnormal acoustic disturbances are reduced about 15 db by the addition of this unit.

Transmission-Frequency Characteristic

2.08 The transmission-frequency characteristics of the line circuit pads with and without the coupling unit attached are shown in Fig. 2. The measurements were made in the manner indicated on the drawing. The loss shown is the ratio in db between the power dissipated across the 8-ohm bus to the power received by the line. The line impedance here was chosen as 1000 ohms. This loss, however, does not vary more than 2 db with line impedances from 600 ohms to 1600 ohms.

Transmission Test Requirements

2.09 The apparatus in the line circuits when measured individually between 600 ohms with a standard transmission measuring set at a frequency of 1000 cycles per second sending into TT-RR and receiving on T-R (Fig. 1) should have a transmission loss between 7.4 and 8.7 db with the leads of the 105A coupling unit disconnected. With the coupling unit attached, this loss should be between 7.7 and 10.3 db measuring with a sending power of 1 milliwatt. Wider limits have been set on this last measurement because some variations between individual units measured at 1000 cycles are to be expected.

Emergency Feature

2.10 The emergency equipment, when provided, will be the standard 101-type key equipment connected so that after the common emergency key has been operated calls may be answered individually by operating the line keys. The calling subscriber cannot talk to the attendant doing the announcing since the attendant's receiver is not connected in the subset. With this arrangement, transmission from attendant to subscriber is about the same as that of an individual line station located on the subscriber's premises.

3. MANUAL ANNOUNCEMENT SYSTEM—NO. 2C

General

3.01 Figure 2 shows the transmission schematic of Announcement System No. 2C. In this system, the announcement equipment as well as the line circuits are owned and maintained by the telephone company.

3.02 The line circuits are similar to those used in the machine announcement system except that the 105A coupling unit has been omitted. The output capacity of the amplifier furnished by the telephone company for this service when connected as shown in Fig. 3 will not be high enough to permit abnormal acoustic disturbances, which may be introduced into the input circuit, reaching calling subscribers through the connecting network.

3.03 The amplifier operates from the 110-volt, 60-cycle commercial supply on the customer's premises.

Volume Indicator Meter

3.04 In order to insure that a suitable volume of speech will be impressed on the trunks outgoing from the announcement bureau, a Weston Type 30 volume indicator meter, Model 802, KS-8207 has been provided as a guide to the attendant doing the announcing. The pad associated with this meter, as shown in Fig. 3, has been designed so that when the speech volume output from the amplifier causes the pointer on the meter to swing to about midscale (−3 vu) satisfactory speech volume will be delivered to each line.

3.05 Because of the special pad arrangement associated with this vu meter, it would not be convenient to calibrate the meter in the manner in which it is usually calibrated when associated with a volume indicator. However, the accuracy of the meter and its associated pad may be checked by bridging this arrangement across a 600-ohm resistance into which 1 milliwatt at a frequency of 1000 cycles per second is being sent. Under these conditions the vu meter should read −8 vu.

Amplifier

3.06 The amplifier used with the manual announcement system is the 103B described in P.E.L. 2929. This amplifier consists of a 109B amplifier panel mounted in a metal cabinet together with a "standby" power arrangement for the heater-type vacuum tubes and an arrangement for mounting and connecting a 152A repeating coil into the input circuit of the amplifier. In general, this repeating coil will not be required for the announcement system. It should be used, however, in case the run from the 120E repeating coil in the circuit of the 635A transmitter is 1000 feet or more or in case it is carried in cabling with other telephone circuits.

3.07 In general, no routine maintenance is specified other than the replacement of vacuum tubes.

3.08 The 109B amplifier panel of the 103B amplifier set should ***not*** be modified for increased power output as it is desirable to limit the output to 12 watts for this announcement service.

Transmission Test Requirements

3.09 The gain of the 103B amplifier with the potentiometer on the maximum setting together with the associated line circuit should be 30 ±2 db between 600-ohm impedances from terminals 3-6 of the amplifier input and the output terminals T-R of any one of the line circuits shown in Fig. 3. The sending power should be 30 db below 1 milliwatt. In order to simplify this measurement, the sending leads of the measuring set can be clipped across the terminals 3-6 of the amplifier and the emergency key thrown to open up the leads to the transmitter circuit. The leads to the measuring set can be clipped across terminals 2-5 of the 94E repeating coil associated with any one of the line circuits, provided the (CT) relay of that line circuit is not operated.

3.10 The pads in the line circuits when measured between 600-ohm impedances with a standard transmission measuring set sending 1 milliwatt into TT-RR and receiving across 2-5 of the 94E repeating coil with the (CT) relay not operated should have a transmission loss between 7.4 and 8.7 db.

Transmission-Frequency Characteristics

3.11 The transmission-frequency characteristic of the line circuit is shown in Fig. 2. This characteristic is somewhat more uniform over the frequency range than that of the line circuits used in the machine announcement system which have 105A units attached.

Volume

3.12 With the circuit as shown in Fig. 3 and the potentiometer of the 103B amplifier turned back about 1/4 turn from the maximum setting, the meter should read about −3 vu on the speech of a normal talker speaking about 6 inches away from the transmitter. The amplifier gain should be adjusted for the announcer so that when she is speaking 6 to 8 inches from the transmitter the volume indicator will read −3 ±3 vu on all announcements.

3.13 This distance of 6 to 8 inches was selected on the basis of experience as the most satisfactory compromise distance from the lips of a normal talker to the transmitter. If a smaller distance is chosen, it becomes more difficult for the talker to maintain a constant volume on the

telephone circuit because a small change in talking distance results in a relatively large change in output volume. If the distance is increased beyond 8 inches, the room noise and reverberation become more noticeable as the gain of the system is increased to bring up the speech volume on the telephone circuit. To some extent the distance should be modified depending on the natural volume of the talker. Rather than talk at an unnatural volume, weak talkers should adopt a closer talking distance with respect to the transmitter and loud talkers should choose a more distant position.

3.14 When the reading of the volume indicator is -3 ± 3 vu, the pad in each line circuit will then provide a transmitting volume at the output of the line circuit (T-R) of -6 ± 5 vu, which includes allowances for changes in impedance of the connecting subscriber's circuit and variation in transmission caused by the different lines connected simultaneously to the announcement bureau.

3.15 The speech volume impressed on the line by the announcement bureau may be checked at the central office by means of a volume indicator bridged across one of the announcement lines which has been terminated at the central office in a 600-ohm resistance. The volume indicator should read -6 ± 5 vu minus the 1000-cycle transmission loss of the announcement line as measured between 600-ohm resistance terminations.

Crosstalk

3.16 With a volume of about -6 vu on the line, circuits up to 35 percent of the pairs in a given color group in a cable, which is entirely of the staggered twist type, can be connected to the announcement bureau without causing excessive crosstalk into adjacent circuits.

3.17 The attenuation between zero loop subscribers in the same office connected simultaneously to the announcement network will be at least 58 db under normal operation. This loss is sufficient to prevent any connected subscriber from talking to or interfering with any other subscriber.

Emergency Features

3.18 In the emergency equipment provided with the Manual Announcement System a local battery set is used. An emergency key is located near the key equipment which, when operated, permits calls to be answered individually by operating the line keys. As in the 2B system, the subscriber cannot talk to the attendant whereas transmission from attendant to subscriber is about the same as that of an individual line local battery station located at this point. The attendant should talk close to the transmitter as in a normal telephone conversation.

ANNOUNCEMENT SYSTEM NO. 2B
MACHINE OPERATION

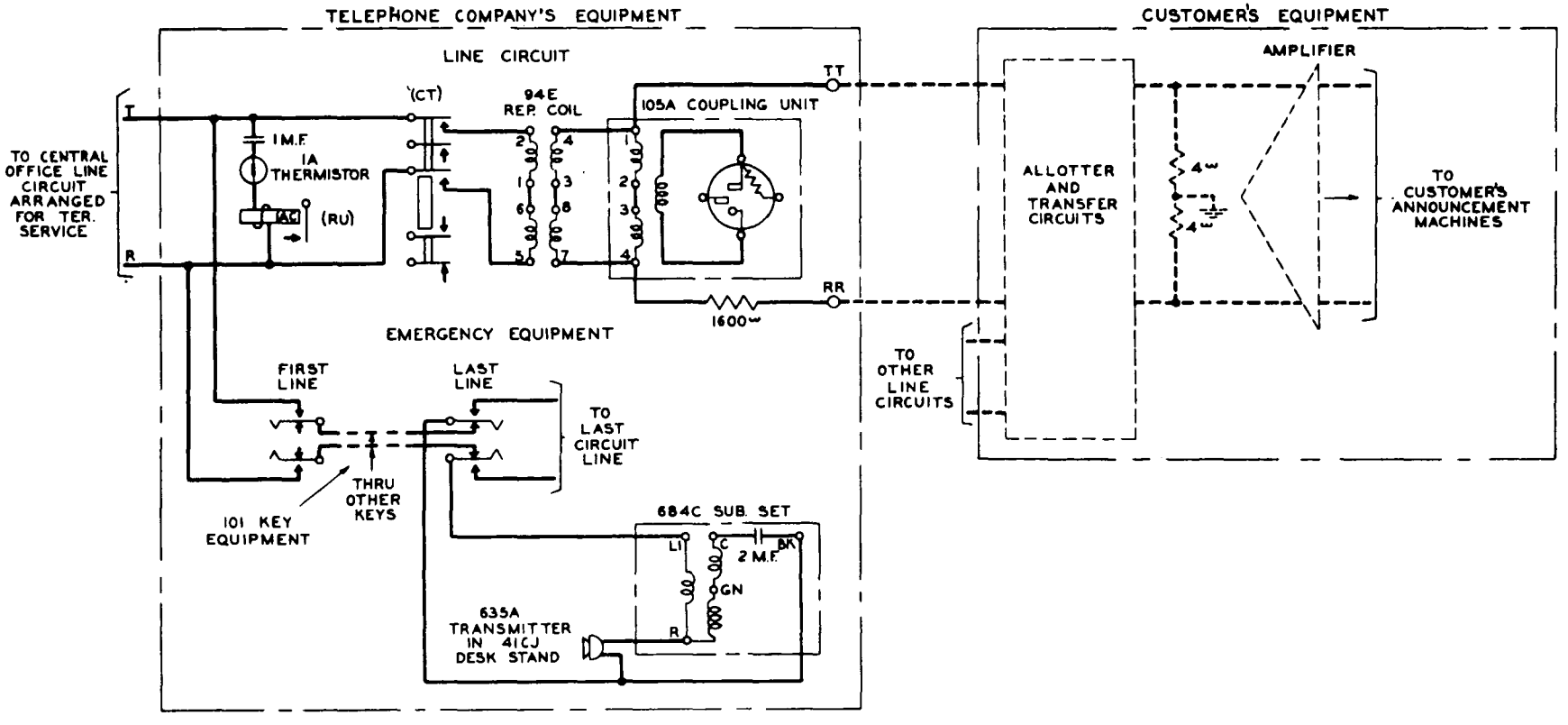

Fig. 1—Announcement System No. 2B—Machine Operation

ANNOUNCEMENT SYSTEM NO. 2C
MANUAL OPERATION

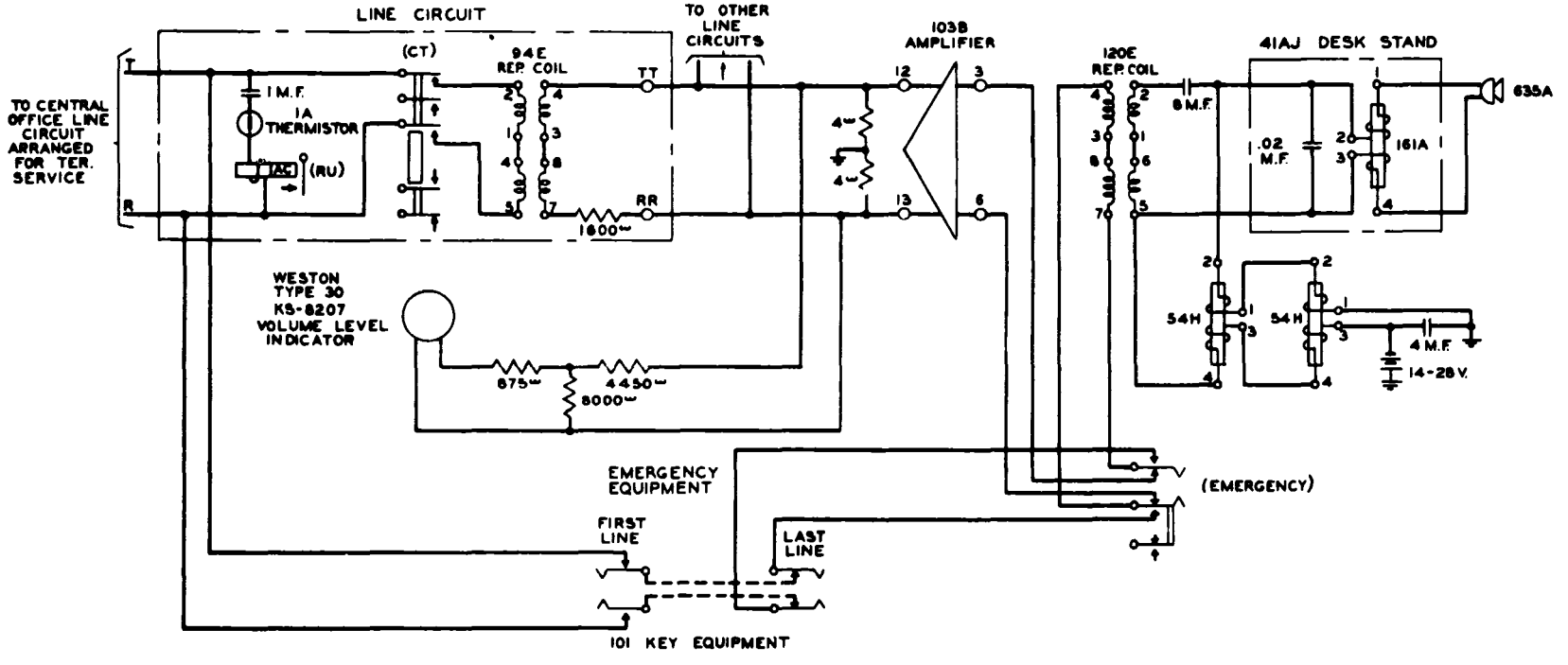

Fig. 2— Announcement System No. 2C—Manual Operation

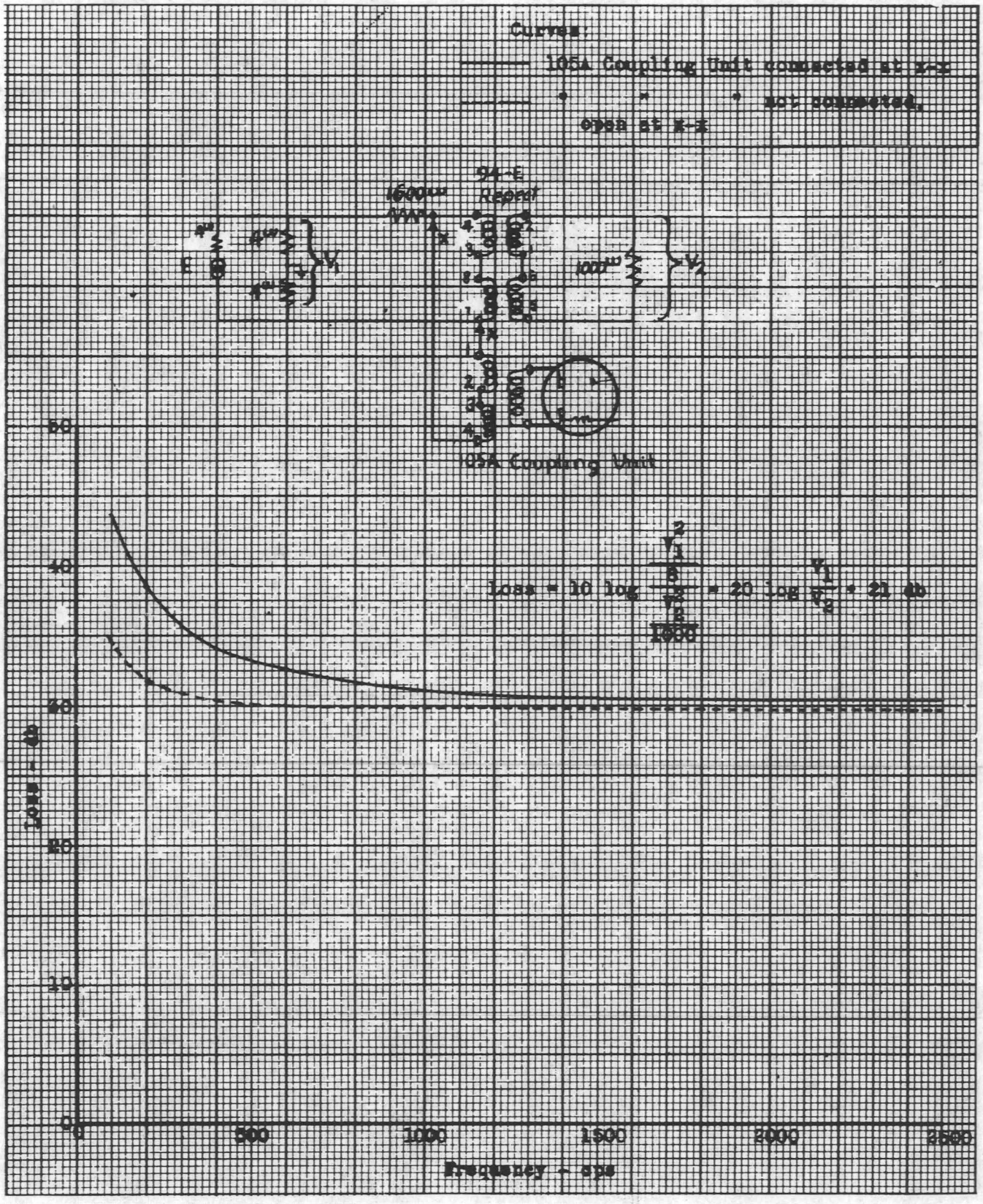

Fig. 3—Transmission-Frequency Characteristic—Line Circuit