COMMON BATTERY ANTI-SIDETONE STATIONS

1. GENERAL

1.01 This section covers the general transmission features of the common battery sidetone and anti-sidetone station sets. The essential apparatus differences between these two types of sets are also discussed.

1.02 Sidetone is the transmission and reproduction of sounds through a local path from the transmitter to the receiver of the same telephone station. Sidetone can be reduced by the design of the station set.

1.03 There are two standard types of common battery station circuits, namely, the sidetone set and the anti-sidetone set. A sidetone telephone set is one which does not include a balancing winding on the induction coil together with a balancing network for the purpose of reducing sidetone. An anti-sidetone telephone set is one which includes a balancing winding on the induction coil and a balancing network for the purpose of reducing sidetone.

1.04 With sidetone sets, the "sidetone reduction connection" may be used on short loops, as discussed in 2.07. This should not be confused with the anti-sidetone sets defined above.

1.05 Material improvements in transmitting and receiving performances are obtainable with anti-sidetone sets. Room noise picked up by the transmitter and reproduced in the receiver through the sidetone path tends to mask the incoming speech. The loudness with which the telephone user talks into the transmitter is influenced to a great extent by the loudness of the sidetone. The reduction in sidetone afforded by the anti-sidetone sets, results in a receiving improvement because of the reduction in the room noise reproduced in the receiver and a transmitting gain inasmuch as it influences the telephone user to talk more nearly at a normal volume. As the volume transmitting and receiving circuit efficiencies of the anti-sidetone set are approximately the same as those of the sidetone set, the transmission improvements are due entirely to the effect of reduced sidetone as mentioned above.

2. CIRCUITS

2.01 In Figures 1, 2 and 3, which show the station transmission circuits drawn in simple schematic form, the ringer and switchhook contacts have been omitted, since these do not enter into the following explanations.

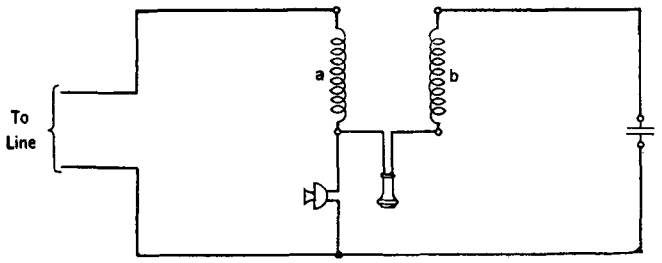

Fig. 1

2.02 Fig. 1 shows the common battery sidetone circuit. The voice currents produced by the transmitter divide between two paths, one through winding "a" of the induction coil and out over the line to the receiving station, and the other through the receiver, the winding "b" of the induction coil and the condenser. The current thus flowing in winding "a" causes an induced current in the winding "b" and vice versa. The effect of the resultant current flowing in the receiver circuit is sidetone.

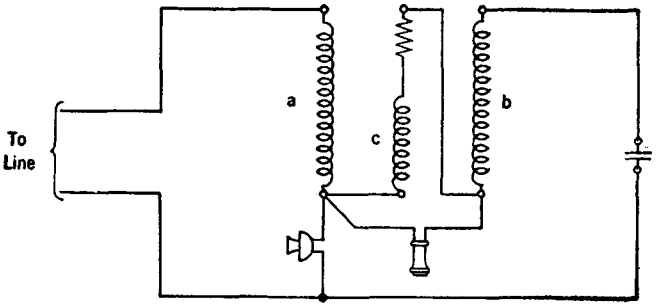

Fig. 2

2.03 The circuit of the anti-sidetone set shown in Fig. 2 is obtained from the circuit shown in Fig. 1 by shunting around the receiver a third winding of the induction coil and a balancing network. In practice the network consists of a resistance and is combined with the third winding by using small gauge wire.

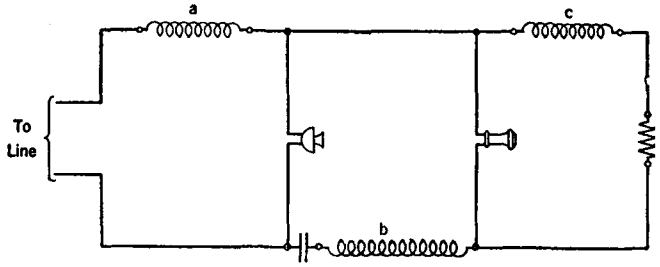

Fig. 3

2.04 In Fig. 3 the anti-sidetone circuit is redrawn so as to show its operation more clearly.

2.05 As in the case of the sidetone circuit the currents produced by the transmitter divide between windings "a" and "b." The current in winding "b" divides between the paths through the receiver and through the winding "c." Currents are induced in windings "a," "b" and "c." The design of the set is such that the current flowing in the receiver due to winding "c" opposes that due to winding "b." Thus, under ideal conditions, zero current in the receiver, that is, zero sidetone, may be obtained by the proper design of the induction coil windings and network. The line conditions encountered in service differ widely, of course, and as it is practicable only to use a single network, a compromise value giving lowest average sidetone for the conditions encountered in service is used.

2.06 When receiving, the circuits operate as follows: With the sidetone circuit (Fig. 1), the incoming current divides between the transmitter and winding "b." In addition, current flowing in winding "a" causes an induced current in winding "b." The resultant of the two currents through winding "b" actuates the receiver. In the anti-sidetone circuit, the incoming current from the line divides between the transmitter and the winding "b" and the current in "b" again divides between the receiver and winding "c." Currents are induced in windings "a," "b" and "c." Again under ideal conditions, by proper design of the circuit, the currents in winding "c" can be made equal and opposite, that is, no current flows in winding "c" and the network; and consequently the balancing network produces no loss in volume receiving efficiency.

2.07 The "sidetone reduction connection" of the sidetone sets is usually obtained by interchanging the connection of the red and yellow cord connectors or wires at the set terminals. The use of this connection is confined to sidetone sets, since interchanging these connections on anti-sidetone sets results in a large transmission loss and an impaired sidetone balance.

2.08 Detailed diagrams of connections for sidetone stations, anti-sidetone stations and sidetone reduction connections for sidetone stations are shown in Division C40.

3. APPARATUS

3.01 The anti-sidetone set differs from the sidetone set in the following respects:

(a) It employs an induction coil having three windings instead of two, one of which includes the balancing network and functions to reduce the sidetone in the receiver of the set.

(b) Separate ringing and transmission condensers are used.

(c) An additional switchhook contact spring is required on desk stands, wall sets, coin collectors, etc. No additional contact springs are required for hand telephone sets.

(d) A fourth conductor is required in the cord from the desk stand or hand set mounting to the subscriber set.

(e) The switch cord for desk stands requires two additional conductors.

3.02 In the conversion of existing sets to anti-sidetone, existing apparatus and piece parts are being reused whereever possible. For instance, induction coils of the 20 and 46 types are converted by adding the third winding and associated terminals. Existing ringers, relays, etc., which require no change for anti-sidetone operation, are reused without modification.

3.03 For convenience in associating new equipment with the old, a coding scheme has been developed whereby 100 is added to existing code numbers to form those of the equivalent anti-sidetone equipment, the code letters remaining the same except for occasional necessary changes. Thus, for example, the 534-A set when converted becomes 634-A and the 46-B induction coil becomes the 146-B induction coil.

3.04 The condenser in the transmission circuit is of 2 mf. capacity and the ringing condenser is of 1 or 1/2 mf. capacity, depending on the type of ringer or relay with which it is associated. The separate ringing condenser tends toward better and more uniform signaling conditions and improves pretrip conditions.

3.05 For portable telephones associated with anti-sidetone sets, a four contact plug and associated cord have been developed. For use with this plug, four conductor jacks have also been made available.

3.06 In the past it has, in general, been the practice to connect one or more extension telephones to a common subscriber set. Where an anti-sidetone set is installed, however, this method of connection cannot be used for the reason that the transmitters at all stations would be permanently bridged to each other. For extensions, therefore, it is necessary to use a separate subscriber set for each extension station.