

Equipping the Rural Telephone Lines

By G. A. JOY AND J. B. THEISS.

The various circuits employing the grounding key solve the question of silent signaling very nicely where metallic lines are in use, but it is quite evident that this scheme cannot be utilized on a ground return system. In exchanges of this class the desired results are accomplished by equipping the instruments with hand generators capable of generating either pulsating or alternating current, and a key so wired as to enable the subscriber at will to switch either the one or the other out on the line. The pulsating current is used in signaling the exchange, and the alternating current for calling the various subscribers on the line by means of the usual coded ring. With this arrangement one subscriber, upon signaling another, will "throw" the drop at the switchboard. The operator can very readily distinguish a code ring from a regular call, and in the case of a ring for a party on the same line, will simply restore the drop and not plug in on the line at all. To aid the operator in distinguishing the coded signals it is common practice to terminate a line of the kind just described in a combined ringer and drop. The one inherent disadvantage of the combined ringer and drop is that it takes up more of the available switchboard space than the ordinary drop does. However, as an operator is not able to care for as many rural lines as regular subscribers' lines, it will be found that with the standard type of switchboard there is sufficient room for all the equipment that an operator can properly handle.

In Fig. 3 are shown the circuits of the telephone instruments and the switchboard end of the line for a system such as has just been described. It will be noted by referring to this circuit that all the subscriber has to do to call central is to turn the generator crank. This operation puts pulsating current on the line, and thus energizes the coil of the drop, thereby actuating its armature and releasing the shutter. Since the pulsating current flows in but one direction, it will not affect the bells of the subscribers' instruments, as this current tends to pull the bell armature in but one direction. However, should the armature of the bell be in a neutral, or such other position so as to cause the pulsating current upon traversing the coils of the ringer to attract its armature in one direction or the other, then the bell would give one stroke, which might be sufficient in many cases to attract the attention of some gossip-loving person. To avoid this condition a light biasing spring may be placed on the ringer, to hold the armature in its proper position.

When a subscriber desires to call a party on the same line he will depress the key *K* and ring, thereby ringing the various bells on the line as well as actuating the drop at the exchange. It is understood, of course, that the scheme just described is applicable to a metallic as well as a grounded line, but that it is not quite as desirable as the grounding key system for the former, since the subscribers cannot signal between parties on the line without attracting the attention of the operator, and so tending to reduce the number of rural lines an operator can handle.

By referring to the circuits thus far shown and described it will be noted that a condenser has been placed in the receiver circuit of all the subscribers' sets. Nothing has been said thus far concerning the use of this condenser, and as we are about to describe a system in which the condenser in the subscriber's set is used for an entirely different purpose it seems advisable to cite the functions of the former condenser before advancing into this new system. The condenser as shown is not needed for the satisfactory operation of the telephone, but is simply inserted in the circuit to guard against trouble. Thus, it is not uncommon for a subscriber on one of these rural lines to forget to hang up his receiver, or possibly some inquisitive person might have his receiver to his ear waiting for any news that might chance to come his way. With conditions established as just cited it would be impossible for the operator to ring any

of the subscribers on the line if the condensers were omitted, as the low resistance of the receiver would shunt the greater part of the generator current and thus rob the ringers of the necessary current to actuate the taper. However, with the condenser in circuit conditions are quite different. The condenser acts as a high resistance to the low frequency ringing current and thus forces it through the ringer coils. Consequently, in case any subscriber carelessly neglects to hang up his receiver he will not tie up the entire line, as the operator is

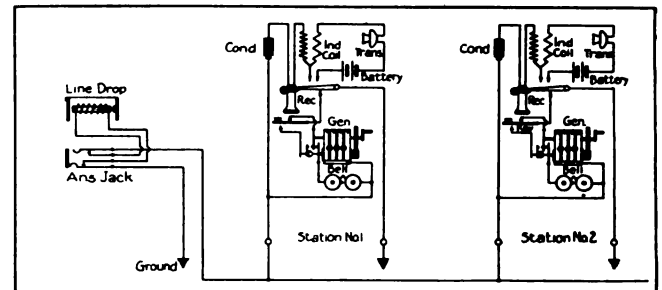


Fig. 3.—Circuit Showing the Use of the Pulsating and Alternating Current Generator in Subscribers' Sets.

in a position to signal any party desired. While this condenser acts as a very high resistance to low frequency currents, the resistance offered to the high frequency voice currents is inappreciable. The condensers used for this purpose are of low capacity, ranging from $3/5$ to $1/2$ microfarad. Experience leads practically all managers who have tried it to the opinion that the use of this condenser as indicated is very beneficial. Even though the initial expense of the set is slightly increased, its adoption will more than pay for itself, as it will save the line-man many a trip into the country, and so will naturally reduce the cost of maintenance.

The Influence of Operators on Collections*

By Miss Rosa Gist.

Local operators do not always realize that they may help or hinder in the collection of telephone bills.

They help by answering calls promptly; being pleasant to the public generally; avoiding disconnections; re-establishing interrupted connections when possible without irritating subscribers; when a telephone has been rung through error, by waiting to explain to subscriber that the ringing was a mistake instead of plugging out and leaving some other girl to bear the brunt of the subscriber's temper if he answers a call which he terms a "false alarm." A large percentage of our complaints on rental bills is caused by incorrect ringing and disconnections.

While, to the local operator, each item mentioned may seem a small thing, yet quite a lot of valuable time of the collectors is taken up in listening to complaints caused by failure to prevent the occurrence of small things.

Toll operators' first aid in collections comes in the proper recording of tickets. About 75 per cent of our disputed calls are those for which claims are made that they should have been paid at the other end. By always asking a subscriber if he will pay for a message or if he wishes it paid at the terminating station and by getting the proper O. K. on all reversed calls, the number of disputed bills ought to be reduced.

Another aid to collections would result from a complete record of toll service. If service is satisfactory this may be indicated on the back of the ticket by the letters "O. K." If

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