June 17, 1941. R. H. BADGLEY 2,246,119

TELEPHONE PARTY LINE WORKING

Filed Aug. 29, 1940

FIG. 1

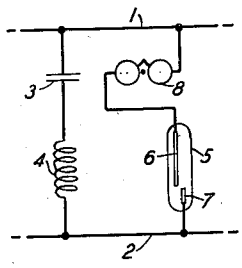


FIG. 2

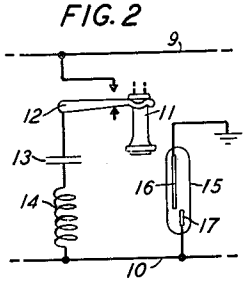
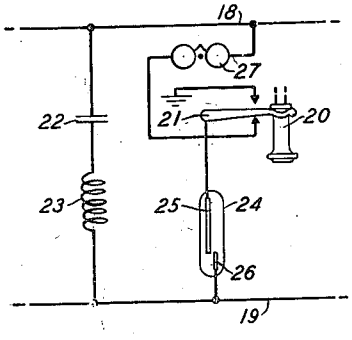


FIG. 3



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TELEPHONE PARTY LINE WORKING

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5 Claims. (Cl. 179—87)

This invention relates to signaling systems and particularly to multiparty line telephone systems.

The object of this invention is to provide economical and reliable means for selective party line ringing and for selective party line substation identification.

In accordance with one feature of this invention a highly selective relay device is placed at each substation on a party line for the purpose of bringing the call bell into connection with the line.

In accordance with a specific embodiment of this invention a trigger tube comprising a pair of electrodes sealed in a glass envelope and immersed in an inert gas responsive to a single frequency current is provided. A particular frequency current transmitted over this line will therefore cause such trigger tube at only one of the substations to respond and in responding this tube will connect signaling means to the line. This signaling means may be in the form of a call bell or it may be in the form of a station identification circuit.

In accordance with another feature of the invention a tuned reed trigger tube is provided at each of the substations on a multiparty line each of which is tuned to a particular frequency characterizing such station. This trigger tube may be under switchhook control so that while the switchhook is in its normal position the substation call bell will be connected to the line through the action of the trigger tube and while the switchhook is in its operated position as when the substation is in use, an identification circuit will be connected to the line by the action of the trigger tube.

In accordance with another feature of the invention a simple ground connection may be made to the line in response to the transmission of a particular frequency current. Since only a particular one of a plurality of these trigger tubes will be connected to the line when a substation is in use, then if the particular frequency associated with such substation is transmitted the trigger tube will respond by grounding the line momentarily and will signal back the information that the substation using the line is the proper one.

The drawing consists of a single sheet having three figures, each in the form of a circuit diagram. Fig. 1 shows part of a telephone line and indicates how selective ringing on the line may be accomplished through the use of a gas tube having a movable element responsive to a predetermined frequency. Fig. 2 shows part of a telephone line and indicates how station identification may be accomplished by means of a gas tube having a movable element responsive to a particular frequency. Fig. 3 shows part of a telephone line and indicates both how selective ringing and station identification may be accomplished by means of a single tube having a movable element responsive to a particular frequency.

In Fig. 1 conductors 1 and 2 represent the two conductors of a telephone line. Across this line is bridged a circuit containing a condenser 3 and a coil 4 which is associated with the gas tube 5. The gas tube 5 comprises an envelope into which are sealed two electrodes 6 and 7. These electrodes are immersed in an inert gas. Electrode 6 is in the form of a magnetic reed having one end free to vibrate. This free end is positioned at such a distance from the stationary electrode 7 that under ordinary conditions any current which energizes the coil 4 will not flow in parallel through the ringer 8 and the tube 5. However, if the tuned reed 6 is properly proportioned for use at this station the alternating current through the coil 4 will set the reed 6 into vibration, whereby the gap between the reed 6 and the stationary electrode 7 is shortened and the tube breaks down. Thereupon the ringing current which has also been applied to the line, flows also from line 1 through the ringer 8, the tube 5 to the line 2, and the ringer 8 responds.

A plurality of arrangements of this kind may be used on a telephone party line, each of the tubes containing reeds tuned to different frequencies whereby only a single ringer on the line will respond when a particular frequency is applied to such a line.

In Fig. 2 the conductors 9 and 10 represent a telephone line. When the receiver 11 is taken from the hook 12 a circuit is established from the line 9 through the condenser 13 and the coil 14. The coil 14 is associated with the tube 15. Therefore, when an arrangement of this kind is used on a party line the operator at the central office by applying a particular frequency to the telephone line may cause the tube 15 to respond if this is the proper substation. If the operator applies the proper frequency alternating current to the line, then through the energization of coil 14 the tube 15 will set its movable reed 16 into vibration and the gap between the reed 16 and the stationary electrode 17 will be shortened. Direct current voltage of the correct value in accordance with well-known

practice will have been applied between conductor 10 and ground, and will cause the tube to break down and conduct current from conductor 10 to ground when the gap is shortened.

Since a plurality of arrangements of this kind may be used on a telephone line the particular substation which has its receiver off its hook may be readily identified.

In Fig. 3 the conductors 18 and 19 represent a telephone line. With the receiver 20 on its hook 21 an arrangement similar to that shown in Fig. 1 is obtained, so that when ringing current of the proper frequency is applied to the line a current flows through the condenser 22 and coil 23 to energize the gas tube 24 whereby the movable reed 25 shortens the gap to the stationary electrode 26 and causes a current flow from the line 18 through the ringer 27, the receiver hook 21, tube 24 to line 19.

When the receiver 20 is removed from the hook 21 then an arrangement similar to that shown in Fig. 2 is obtained. The operator at the central office may verify this substation by applying a corresponding current to the line which, flowing through the coil 23, will energize the tube 24 and cause a direct current to flow from conductor 19 to ground through the tube 24.

What is claimed is:

1. In a telephone system, a party line having a plurality of subscriber stations connected thereto, a relay at each said station responsive to a different frequency alternating current, said relay comprising a trigger tube having as one electrode thereof a magnetic reed positioned to reduce the gap between said reed and another electrode sufficiently during vibration of said reed to cause ionization of said tube, said reed being tuned to respond to a stimulus provided by said particular frequency alternating current, and signaling means connected to said line by said relay.

2. In a telephone system, a party line having a plurality of subscriber stations connected thereto, a relay at each said station responsive to a different frequency alternating current, said relay comprising a trigger tube having as one electrode thereof a magnetic reed positioned to reduce the gap between said reed and another electrode sufficiently during vibration of said reed to cause ionization of said tube, said reed being tuned to respond to a stimulus provided by said particular frequency alternating current, and a call bell connected to said line by said relay.

3. In a telephone system, a party line having a plurality of subscriber stations connected thereto, a relay at each said station responsive to a different frequency alternating current, said relay comprising a trigger tube having as one electrode thereof a magnetic reed positioned to reduce the gap between said reed and another electrode sufficiently during vibration of said reed to cause ionization of said tube, said reed being tuned to respond to a stimulus provided by said particular frequency alterating current, and a signaling circuit connected to said line by said relay.

4. In a telephone system, a party line having a plurality of subscriber stations connected thereto, a relay at each said station responsive to a different frequency alternating current, said relay comprising a trigger tube having as one electrode thereof a magnetic reed positioned to reduce the gap between said reed and another electrode sufficiently during vibration of said reed to cause ionization of said tube, said reed being tuned to respond to a stimulus provided by said particular frequency alterating current, means for connecting said relay to said line when said substation is in use and a signaling circuit connected to said line by said relay.

5. In a telephone system, a party line having a plurality of subscriber stations connected thereto, a relay at each said station responsive to a different frequency alternating current, said relay comprising a trigger tube having as one electrode thereof a magnetic reed positioned to reduce the gap between said reed and another electrode sufficiently during vibration of said reed to cause ionization of said tube, said reed being tuned to respond to a stimulus provided by said particular frequency alterating current, switching means at each said station for placing a call bell under control of said relay when said station is not in use and a station identification circuit under control of said relay when said station is in use and said call bell and station identification circuit.

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