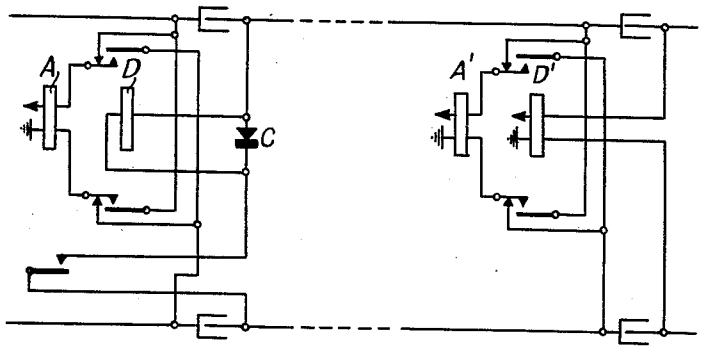
May 2, 1933. W. SAVILLE 1,906,338

TELEPHONE SYSTEM

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Inventor
Willie Saville
Mc Watters & Drew
Atty.

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WILLIE SAVILLE, OF LIVERPOOL, ENGLAND, ASSIGNOR TO ASSOCIATED TELEPHONE & TELEGRAPH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

TELEPHONE SYSTEM

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The present invention relates to telephone systems and is more particularly concerned with so-called impulse repeaters for use in automatically operated systems. The normal functions of a repeater of this class are to repeat impulses forwards for setting automatic switches and also to repeat back supervisory signals, for instance a reversal of current over the speaking leads when the wanted party replies. It is also common in such repeaters to make use of the well-known transmission circuit in which condensers are included in the speaking leads and on either side are connected the so-called front and back bridges. It has been usual for the back bridge, that is to say the bridge on the side of the called party, to comprise an electro-polarizer relay, for instance of the shunt field type, in series with a non-polarized relay of comparatively high impedance which is necessary to prevent the speech currents being unduly shunted out. As a result of this arrangement it has generally been considered necessary to alter the conditions during actual impulse sending so that the high impedance is cut out in order that satisfactory impulsing may take place. The object of the present invention is to provide a simplified and less expensive arrangement without appreciably reducing transmission efficiency.

According to one feature of the invention a rectifier is connected across the high impedance supervisory relay in such a direction that during the transmission of impulses for setting up a connection the relay is substantially short-circuited.

According to another feature of the invention, during the transmission of impulses for setting up a connection the impedance of the outgoing circuit is reduced by shunting the bridged supervisory relay with a rectifier.

A further feature of the invention is the provision of an impulse repeater in which a reversal of current over the outgoing speaking leads for supervisory purposes is adapted to effect the operation of a neutral relay connected across said leads which is prevented from operating with current flow in the opposite direction by means of a rectifier connected in parallel with its winding.

The invention will be better understood from the following description of one method of carrying it into effect which should be taken in conjunction with the accompanying drawing. This drawing shows in diagrammatic form sufficient of the elements of an impulse repeater to enable the invention to be understood. A represents the line relay of the repeater and D the back bridge relay which is shunted by the rectifier couple C. At the distant end of the trunk line the incoming line relay is represented by A′ and the back bridge relay by D′.

When the repeater is taken into use, the line relay A closes a circuit over the junction line for line relay A′ at the distant end and the current flow is then in such a direction as to pass through the rectifier C so that relay D is substantially short-circuited and thus does not operate. When the wanted party replies, relay D′ is energized and reverses the current flow over the junction so that the current passing through the rectifier C then drops to a negligible value and relay D is thus able to operate to give the usual supervisory signals by repeating the reversal back in the direction of the calling party.

It will be seen that since the impedance is extremely low during impulsing conditions it is not necessary to provide any special arrangements for reducing this impedance when a train of impulses is to be transmitted. This has the additional advantage of ensuring that all the impulses of the train shall be identical, whereas when, as is usually the case, the circuit conditions are altered on the arrival of the first impulse it is likely that this impulse will differ from those which follow so that there is a danger of faulty operation.

It should be mentioned also that the relay D may be a non-polarized relay of ordinary type since the effect of the rectifier couple is to give it the characteristics of a polarized relay. The operation of the relay in these circumstances is very reliable and it may be made to carry a comparatively heavy load of contact springs thereby obviating the need for the use of a relief relay which has gen-

erally been necessary with the rather more delicate shunt field relay.

The arrangement according to the invention therefore offers considerable advantages as regards reduction in both the cost and the amount of apparatus at a repeater while at the same time this saving is effected without any appreciable loss of transmission efficiency.

What I claim as new and desire to secure by Letters Patent is:

1. In an impulse repeater, an incoming and an outgoing line, a supervisory relay bridged across said outgoing line when the repeater is seized over said incoming line, and a rectifier connected in multiple with said relay to shunt the relay during impulsing.

2. In an impulse repeater, an incoming and an outgoing line, a high impedance supervisory relay bridged across said outgoing line when the repeater is seized over said incoming line, and means for reducing the impedance of the bridge during impulsing, said means comprising a rectifier connected in multiple with said relay so as to shunt the relay.

3. In an impulse repeater, an incoming and an outgoing line, a supervisory relay bridged across said outgoing line when the repeater is seized over said incoming line, and a rectifier connected in multiple with said relay in such a direction that it passes current during impulsing to shunt said relay and prevent its operation and prevents the passage of current when battery is reversed over said outgoing line to allow said relay to operate.

4. In an impulse repeater, an incoming and an outgoing line, a repeating relay bridged across said incoming line in series with a battery, a supervisory relay, means controlled by said repeating relay for bridging said supervisory relay across said outgoing line and for repeating impulses thereover, a rectifier so connected that it shunts said supervisory relay during impulsing and allows it to operate when current is reversed over said outgoing line, and means controlled by said supervisory relay for reversing the current in said incoming line.

5. In an impulse repeater, an incoming and an outgoing line, a low impedance bridge including a rectifier and impulsing contacts completed across said outgoing line when the repeater is seized over said incoming line, said rectifier freely passing current during impulsing, and a relay connected in multiple with said rectifier, said relay being operated when the current in said outgoing line is reversed so that said rectifier does not pass current.

6. In an impulse repeater, an incoming and an outgoing line, a low impedance bridge including a rectifier completed across said outgoing line when said repeater is seized over said incoming line and effective during impulsing, and a high impedance bridge including a supervisory relay effective when the current in said outgoing line is reversed.

In testimony whereof I affix my signature.

WILLIE SAVILLE.