W. FINN.

TELEGRAPHY.

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1,174,029. Patented Feb. 29, 1916.

Fig 1.

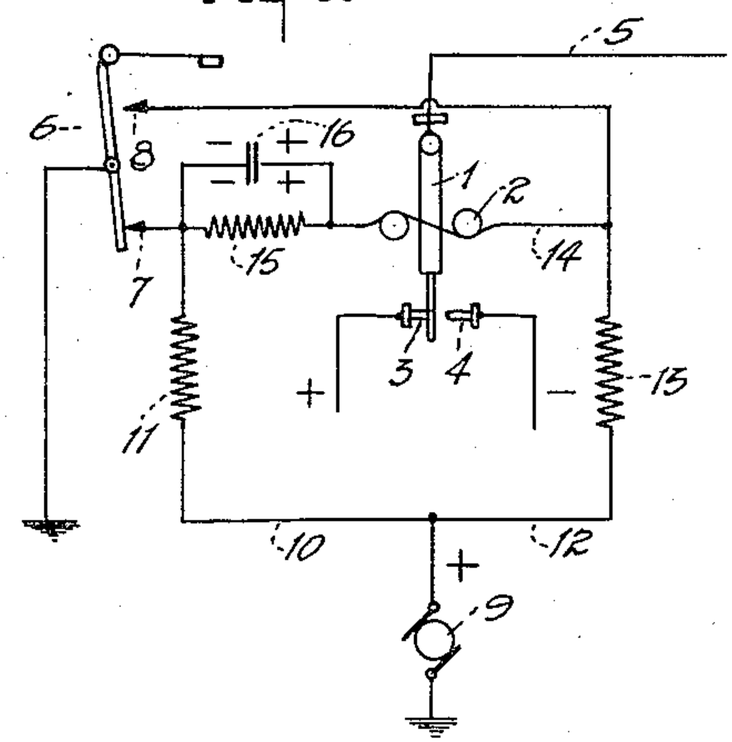
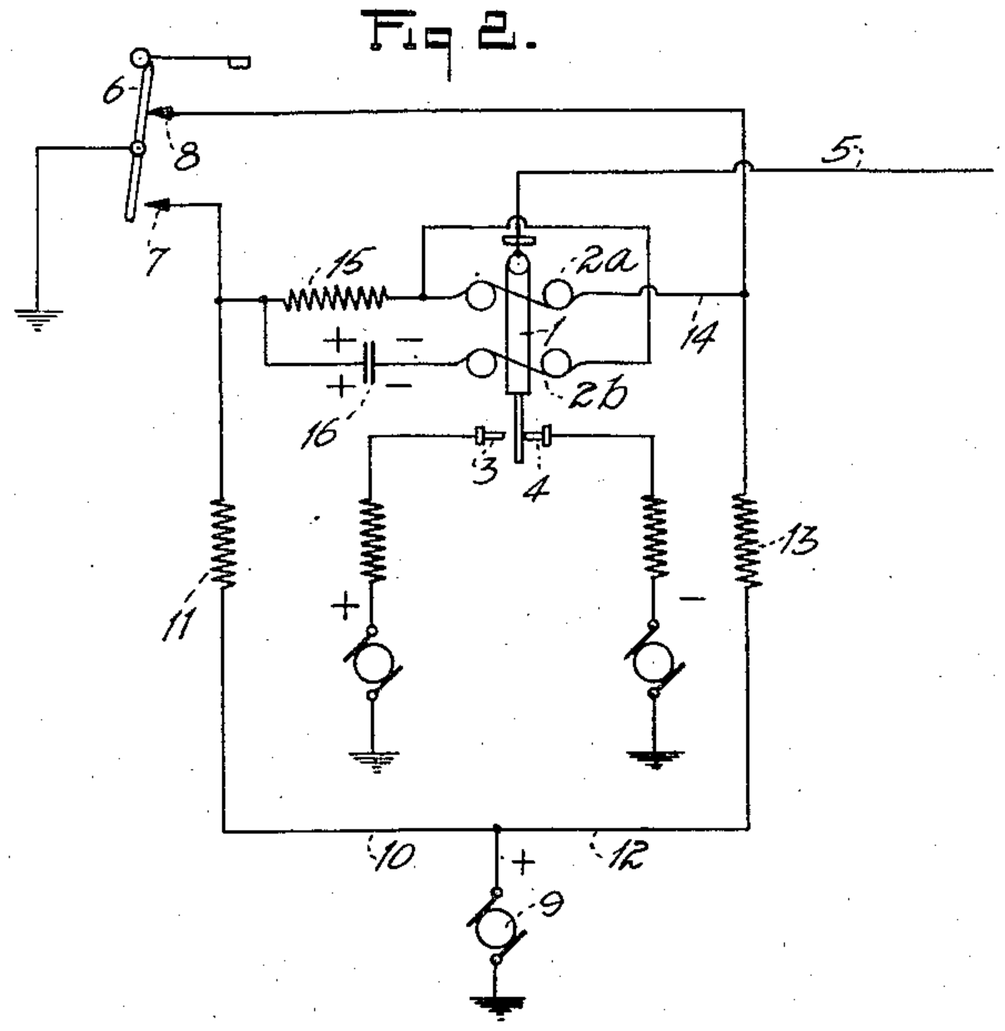


Fig 2.



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TELEGRAPHY.

1,174,029. Specification of Letters Patent. Patented Feb. 29, 1916.

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To all whom it may concern:

Be it known that I, WILLIAM FINN, citizen of the United States of America, and a resident of Bloomfield, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Telegraphy, of which the following is a specification.

My invention relates to improvements in telegraph apparatus, particularly telegraph transmitting apparatus, and comprises a transmitting relay adapted to be interposed between a transmitting key or transmitting contacts of a machine transmitter, and the line circuit, said relay arranged to be operated by the discharge of a condenser so that more rapid movement of its armature may be obtained than would otherwise be practicable, and so that the periods of contact of the armature with its contact stops may be longer relatively than would otherwise be practicable.

The object of my invention is to improve telegraph transmitting apparatus and, in particular, to produce a transmitting apparatus giving sharper signals and in which the armature maintains contact with its contact stop for a longer portion of the period of transmission than has heretofore been thought practicable; and to increase the permissible speed of transmission.

I will now proceed to describe my invention with reference to the accompanying drawings and will then point out the novel features in claims.

Figure 1 shows more or less diagrammatically one form of transmitting relay and circuits embodying my invention, in connection with a transmitting key; and Fig. 2 is a similar view illustrating an alternative form of the relay.

Referring first to Fig. 1, numeral 1 designates the polarized armature and 2 the magnet coils of a polar relay, and 3 and 4 designate the contact stops of that relay, which contact stops, as indicated, are connected to sources of current supply of opposite sign. 5 designates the line circuit into which this relay is to transmit. 6 designates a transmitting key (in this case the movable contact member of a machine transmitter, such for example as the well known Wheatstone transmitter) and 7 and 8 designate contact stops for the key 6. 9 designates a generator, one pole of which is grounded, the local circuits for the relay being connected to the other pole of that generator. One of these local circuits comprises a conductor 10 connected to contact stop 7 of the transmitting key and containing a resistance 11. Another of these local circuits comprises a conductor 12 connected to contact point 8 of the transmitter and containing a resistance 13; resistances 11 and 13 being, in general, substantially equal. The magnet coils 2 of the relay are in a conductor 14 bridged across conductors 10 and 12 and containing a resistance 15; and a condenser 16 is shunted across the terminals of the resistance 15.

With the parts in the position shown, the condenser 16 is accumulating, or has accumulated, a charge of a direction to cause the armature 1 to move to the right when key 6 breaks contact with its contact point 7; when this occurs the condenser then discharges, in a direction to move the armature 1 quickly to the right with force sufficient to insure solidity of contact with contact stop 4 and to hold it there. This movement of the armature 1 in general is completed before the transmitter key 6 has made contact with its stop 8; the operation of the relay, therefore, anticipating the completion of the operation of the transmitting key. When key 6 makes contact with its stop 8, a current is established from generator 9 through conductor 10, resistances 11 and 15, and magnet coils 2 and thence through contact 8 to ground or the other return, and condenser 16 recharges with a charge of opposite polarity to that which it held previously; this charging current in its passage through the magnet coils 2, acting to hold the armature of the relay to the right. When key 6 leaves contact point 8, the condenser 16 again discharges, the discharge (being in the direction opposite to that which occurred when key 6 left contact point 7) moving the armature 1 to the left and holding it there. It will be seen that the relay merely repeats the signals of the transmitter key 6; however, the movement of the armature of this relay, being effect-

ed by the discharge of a condenser in a circuit of very little retardation, is very rapid indeed and is not affected by imperfect mechanical adjustments such as usually impair the signals and limit the speed of operation of a direct mechanically-operated transmitting key. In fact, the movements of the armature of the relay in general are completed materially before the completion of the corresponding movements of the transmitting key 6, even though that key be actuated by a very rapidly operating mechanical transmitter. Moreover, adjustment of the operation of the relay (which adjustment may be effected by regulation of resistances 11, 13 and 15 and by regulation of the condenser 16, as well as by adjustment of the relay contact stops and other well known relay adjustment devices) is effected much more rapidly than is adjustment of a mechanical transmitter. Another advantage of this transmitting relay is that, owing to the great rapidity of movement of the armature, and the consequent very prompt breaking of contact between the armature and its contact stops, a closer adjustment of the contact stops to the armature is practicable than would be practicable in the case of the contact stops 7 and 8 with respect to the mechanically-actuated transmitter key 6.

It will be apparent that the complete absence of lag of the transmitter relay 1 with respect to the transmitter key 6, the extremely rapid movement of the armature 1 of that relay, and the close adjustment of the stops 3 and 4 which such rapid movement of the armature permits, are all factors tending to prolong the period of contact of the armature with one stop or the other, as compared with the permissible period of contact of the transmitter key 6 with one or the other of its stops, and therefore are factors tending to increase greatly the speed of transmission.

Fig. 2 shows an arrangement similar to that of Fig. 1, except that instead of having one magnet coil 2 only, the relay has two magnet coils 2^a and 2^b respectively, the discharge of the condenser 16 taking place through the coils 2^b, the current through coils 2^a serving to hold the armature positively in the position to which it has been moved by the discharge of the condenser, until the key 6 again operates. It will be apparent from Fig. 1, however, that in the operation of the apparatus there shown, after the condenser has discharged and moved the armature, and after the key 6 has made contact with one or the other of its contact stops, there is a similar holding current passing through the coil 2. The separation of the magnet coils of the relay into two coils 2^a and 2^b therefore represents merely a construction which may be convenient for the purpose of regulating the relative actions of the holding current and the condenser discharge upon the armature. In actual operation the arrangement of Figs. 1 and 2 are substantially identical.

What I claim is:

1. A transmitting arrangement for telegraph lines comprising transmitting means having two contacts arranged to be closed alternately, a source of current supply having one pole connected to both said contacts, and a polar relay having a magnet circuit bridged across the conductors leading from said generator to said two contacts of said transmitter, such bridged circuit containing a resistance and a condenser shunted around that resistance, the arrangement being such that when one of said transmitter contacts is broken, the condenser discharges and energizes the magnet of the relay to reverse the position of the armature, such condenser recharging with current of opposite polarity when the opposite transmitter contact is closed.

2. A transmitting arrangement for telegraph lines comprising transmitting means having two contacts arranged to be closed alternately, a polar relay, a source of current supply, a condenser, and circuits connecting said source of current supply and said condenser to magnet coils of said relay and to the said transmitting contacts, arranged to cause the condenser to discharge through the magnet coils of said relay, and thereby to operate said relay, when one of said transmitter contacts is broken, and in anticipation of the closing of the other transmitter contact.

3. A transmitting arrangement for telegraph lines comprising transmitting means having two contacts arranged to be closed alternately, a source of current supply having one pole connected to both said contacts, and the other pole connected to return, a polar relay having a magnet circuit bridged across the conductors leading from said generator to said two contacts of said transmitter, such bridged circuit containing a resistance and a condenser shunted around that resistance, and resistances interposed, in the circuits connecting the generator with the contacts of said transmitting means, between said generator and bridged circuit, the transmitting contacts being arranged to connect said generator to return.

4. A transmitting arrangement for telegraph lines comprising transmitting means having two contacts arranged to be closed alternately, a source of current supply having one pole connected to both said contacts, and the other pole connected to return, a polar relay having a magnet circuit bridged across the conductor leading from said gen-

erator to said two contacts of said transmitter, such bridged circuit containing a resistance, and having also another magnet circuit constituting a shunt with respect to such resistance and containing a condenser, the transmitting contacts being arranged to connect said generator to return.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM FINN.

Witnesses:
H. M. MARBLE,
PAUL H. FRANKE.