April 14, 1942. A. WEAVER 2,279,360

IMPULSE TRANSMITTER

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FIG. 1

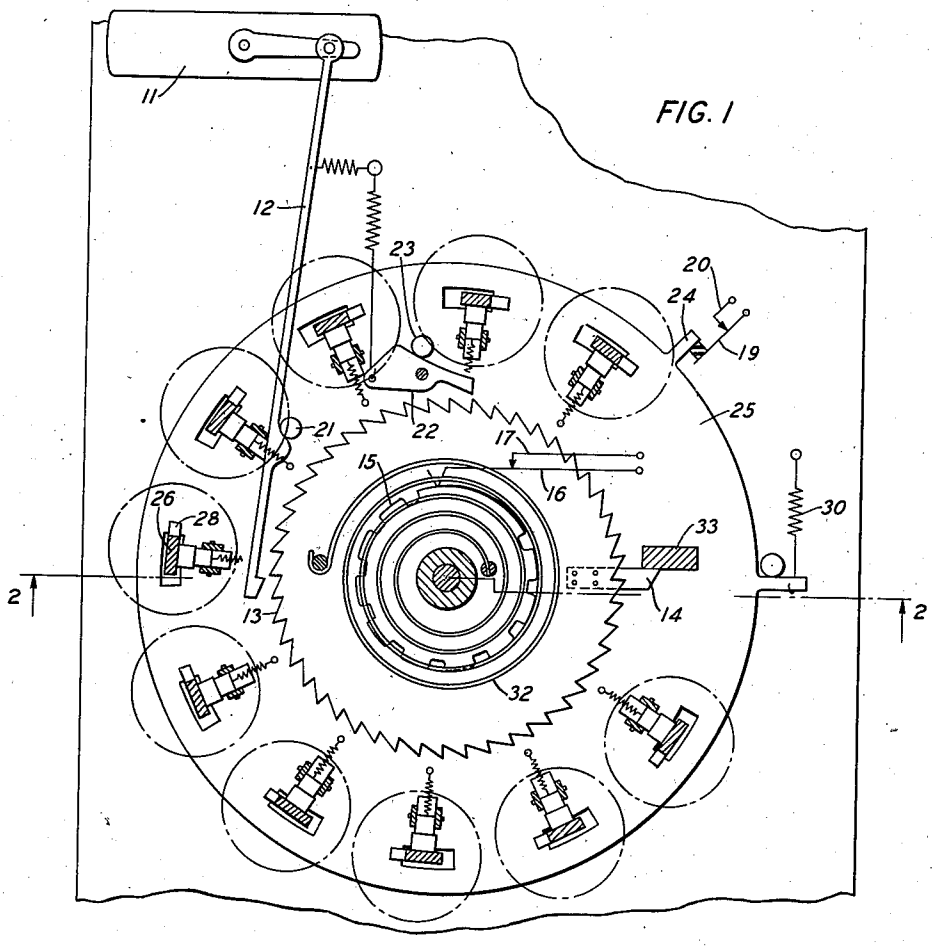

FIG. 2

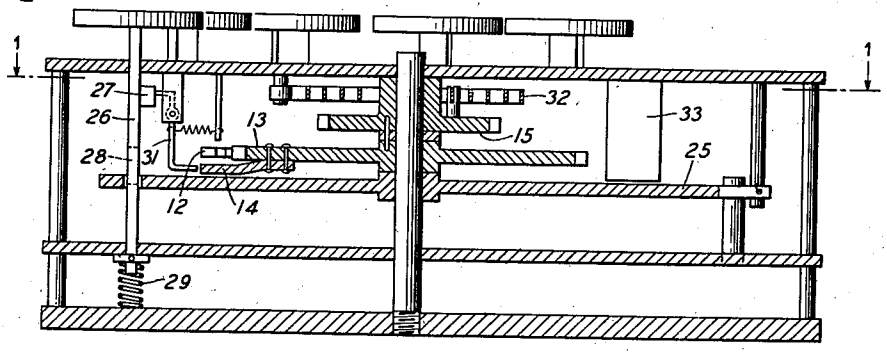

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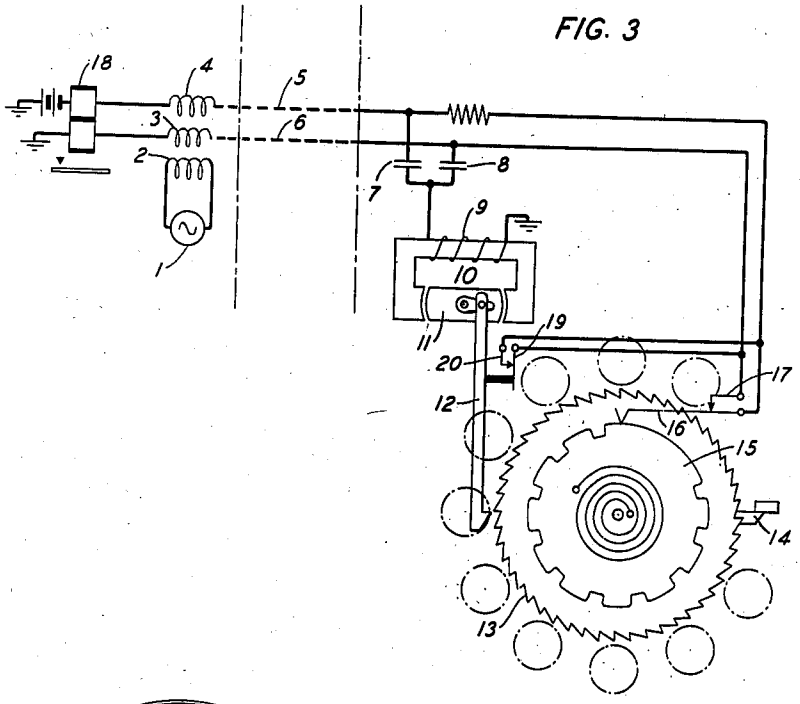
FIG. 3



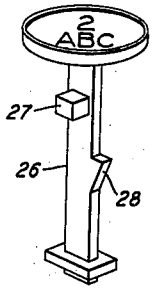


FIG. 4

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UNITED STATES PATENT OFFICE

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IMPULSE TRANSMITTER

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Application October 9, 1940, Serial No. 360,414

4 Claims. (Cl. 177—380)

This invention relates to telephone systems and particularly to signaling devices for use therein.

The object of the invention is to provide means whereby the signaling pulses from a substation dial may be rendered accurate as to length and spacing and independent of subscriber manipulation.

A feature of the invention is remote control of the speed of operation of the dial. In accordance with this feature the dial, instead of being controlled by a local spring motor and mechanical governor arrangements, is driven by an alternating current of controlled frequency transmitted from the central office whereby uniform speed is attained.

Another feature of the invention is the use of the two conductors of the telephone line in parallel for driving the dial and the two conductors of the line in series for transmitting the signals.

Another feature of the invention is an arrangement whereby power is transmitted from the central office for operating a substation dial while the dial is simultaneously sending signals to the central office over the same conductors.

The drawings consist of two sheets containing four figures.

Fig. 1 is a schematic diagram showing the mechanical arrangements of a substation dial;

Fig. 2 is a cross-sectional view of the same taken on the line 2—2 of Fig. 1;

Fig. 3 is a schematic circuit diagram illustrating the manner in which the substation dial operates; and

Fig. 4 is a perspective view of a single dial key illustrating the camming and locking arrangements.

Considering first the manner of operation as illustrated by Fig. 3, it will be noted that a pair of dot-and-dash lines are used to indicate the circuit arrrangements at the central office and at the substation. The circuit to the left of the first broken line shows the central office arrangements. The circuit between the two broken lines shows the line circuit and the circuit to the right of the second broken line shows the substation arrangement. At the central office a source 1 represents alternating current of controlled frequency. By means of a transformer having a primary winding 2 and two secondary windings 3 and 4, the alternating current is transmitted over the lines 5 and 6 and thence in parallel through the condensers 7 and 8 to the winding 9 of a vibratory motor 10. The armature 11 of the motor is so constructed and arranged that it will cause a vibratory movement of the the latch 12 in synchronism with the alternating current from source 1. When a button has been pressed, as will be hereinafter described, the latch 12 is allowed to come into engagement with the ratchet 13 until the stop 14 engages a depressed key and stops the movement. During this time the impulse wheel 15 is rotated and the spring 16 in cooperation with the spring 17 sends impulses over the line to operate the relay 18 at the central office. It will be made clear hereinafter how the springs 19 and 20 which normally shunt the springs 16 and 17 are caused to open during the time over which the latch 12 engages the ratchet 13 so that impulses in the form of short openings of the line circuit are sent to operate the relay 18 at this time. When the stop member 14 engages a depressed key, the latch 12 is moved from engagement with the ratchet 13 and the springs 19 and 20 come into the position shown so that the action of springs 16 and 17 during the return movement of the member 15 is ineffective.

It should be noted that circuit arrangements for establishing the connection at the central office, as shown, only during the dialing period, as indicated by the dotted portions of the line conductors to the left of the first dot and dash line, will be provided but since such arrangements form no part of the present invention they are not illustrated in these drawings.

The action of the dial is more fully illustrated in Figs. 1, 2 and 4. In Fig. 1 the armature 11 of the vibratory motor 10 only is illustrated. The latch 12 is shown held away from engagement with ratchet 13 by a pin 21. Retaining pawl 22 is likewise held out of engagement with the ratchet 13 by a pin 23. The springs 19 and 20 illustrated in Fig. 3 as being controlled by the latch 12 are illustrated in Fig. 1 as being controlled by a projection 24 from the plate 25. The action of both is the same.

When dialing is to take place, then a key such as that shown in Fig. 4 is depressed. This key has on its stem 26 a latching projection 27 and a camming surface 28. Upon the depression of the key against the pressure of a spring 29, the camming surface 28 operates to move the plate 25 a short distance in a clockwise direction against the pressure of a return spring 30. Pins 21 and 23 are fixed to plate 25 so that the movement of these pins allows both the latch 12 and the retaining pawl 22 to engage the ratchet 13. The ratchet 13 will now be driven at a uniform rate in a clockwise direction.

When the key or stem 26 was depressed then a latch 31 was rotated in a counter-clockwise direction so that its upper end moved over the member 27 of the key and held the key in its downwardly depressed position. As the ratchet 13 is moved in a clockwise direction, the stop member 14 moves until it engages the lower portion of the latch member 31 whereupon this latch member is rotated into the position shown in Fig. 2 and the key on the stem 26 is allowed to restore to its normal position. Upon this movement of the key, the plate 25 is returned under the tension of spring 30 to its normal position whereupon pins 21 and 23 disengage the latch 12 and the retaining pawl 14 from engagement with the ratchet 13. Thereupon the impulse wheel 15 and the ratchet 13 are returned to normal under the driving force of spring 32. In the normal position the stop member 14 will engage a cooperating stop member 33 and the dial will remain in the position illustrated until another key is depressed.

It should be noted that the invention here is illustrated practically in a schematic form which may be altered in many ways in building a commercial piece of apparatus without departing from the spirit of the invention.

What is claimed is:

1. In a signaling system, a two-conductor line terminating at one end in a signal receiving device and at the other end in a signal transmitting device, a source of alternating current at the receiving end of said line and a synchronous alternating current motor at the transmitting end of said line, said source of current being connected in a ground return circuit to said motor over the two conductors of said line in parallel, and means for driving said signal transmitting device by said motor.

2. In a signaling system, a two-conductor line terminating at one end in a signal receiving device and at the other end in a signal transmitting device, a source of alternating current at the receiving end of the line and a synchronous alternating current motor at the transmitting end of the said line, said source of current being connected in a ground return circuit to said motor over the two conductors of said line in parallel, and means for driving said signal transmitting device by said motor, said device transmitting signals consisting of interruptions of a circuit including the two conductors of said line in series.

3. In a signaling system, a two-conductor line terminating at one end in a signal receiving device and at the other end in a signal transmitting device, a source of alternating current at the receiving end of the line and a synchronous alternating current motor at the transmitting end of the said line, a circuit for linking said motor to said source of current, including the two conductors of said line in parallel, means for variably setting said transmitting device for the transmission of various signals, and means responsive to the setting of said device for operatively associating said device with said motor whereby said device is driven by said motor through a distance corresponding to the setting of said device.

4. In a signaling system, a two-conductor line terminating at one end in a signal receiving device and at the other end in a signal transmitting device, a source of alternating current at the receiving end of the said line and a synchronous alternating current motor at the transmitting end of said line, a circuit for linking said motor to said source of current including the two conductors of said line in parallel, means for variably setting said transmitting device for the transmission of signals, means responsive to the setting of said device for operatively associating said device with said motor whereby said device is driven by said motor through a distance corresponding to the setting of said device, a pair of contacts controlled by said device for interrupting a signaling circuit including the two conductors of said line in series and another pair of contacts for shunting said first pair of contacts at all times excepting while said device is being driven by said motor.

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