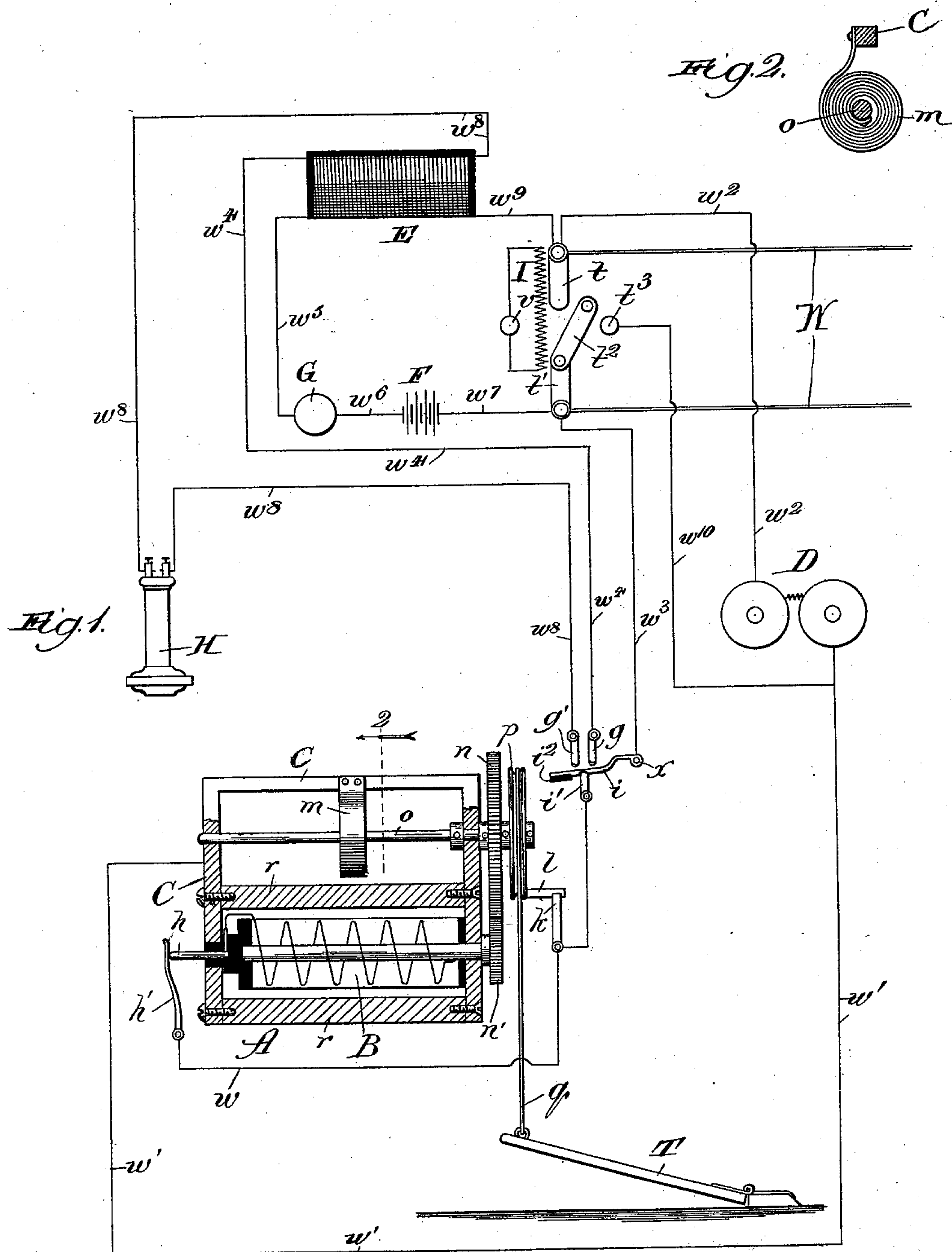


(No Model.)

J. D. PRICE.
ELECTRIC SIGNALING APPARATUS.

No. 534,405.

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UNITED STATES PATENT OFFICE.

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ELECTRIC SIGNALING APPARATUS.

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To all whom it may concern:

Be it known that I, JONATHAN D. PRICE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Electric Signaling Apparatus, of which the following is a specification.

My invention relates to an improvement in the class of electric signaling apparatus involving an electro-magnet signaling device in a circuit containing an electric generator and a local-battery circuit containing an induction-coil, and transmitter; a receiver and secondary winding of the induction-coil being in circuit with the main line; whereby closing the circuit containing the signaling device enables it to be actuated, and closing that containing the receiver opens the signal-circuit.

I intend my improvement for use in any electric signaling-apparatus connection that would be included in the class referred to, which also includes the telephone as now commonly constructed. In fact, I have designed my improvement with special reference to the telephone for its application; and the description hereinafter contained is therefore confined to that particular connection for my improvement, though it is to be clearly understood that it is not necessarily limited thereto.

According to the construction in common use of the Bell telephone, the bell is rung by operating a crank for turning the shaft of the magneto-armature and the turning of the crank automatically breaks the short circuit around the armature while the weight of the pendent receiving-instrument on the protruding hook of a spring-lever maintains closed the circuit between the main line and the magneto and bell; and to cut out the bell and cut into the main line the induction-coil and receiver, and close the battery circuit, the latter is released from the spring-lever to permit it to make the necessary contact. The use of the telephone requires the operations of turning the crank and taking down the receiver; and these must be followed by hanging the receiver back into position to prevent exhaustion of the local battery and enable "ringing off," which is the final operation. Thus, the manipulation of this telephone in-

volves four operations, each two of which properly require the use of a separate hand; and an operator with but one hand is, obviously, greatly inconvenienced. Moreover, the arrangement of necessity requires the constant engagement, during the use of the telephone, of one hand in manipulating the receiver; and when the other hand is occupied, as is frequently the case, in holding a writing-implement, it is inconvenient to have to use that hand for ringing the bell.

The primary object of my improvement is to provide means whereby a single operation by the hand, foot or other member of the body of the user of a telephone to actuate the signal, shall automatically thereafter cut it out and close the receiver-circuit, the receiving instrument being, if desired, in permanent position convenient for application to it of the ear; and whereby releasing the primary actuating medium shall automatically close the circuit through the signal, sound the signal to ring-off and open the receiver.

The accompanying drawings illustrate my improvement by a diagrammatic view in Figure 1; and Fig. 2 is a section taken at the line 2 on Fig. 1 and viewed in the direction of the arrow.

A is an electric generator of the variety known as the "magneto" in a telephone, (though it may be of other variety) and comprising the field-magnets *r, r*, and the rotary armature *B*, all supported in a metallic frame *C*.

As the primary actuating means, I prefer to provide a treadle *T* connected by a belt *q* with a wheel *p* rigidly fastened on the protruding end of a shaft *o* journaled in the frame *C* and carrying also a gear-wheel *n* meshing with a pinion *n'* on the armature-shaft *B*, and a coiled spring *m* having one end fastened to the shaft and the other end fastened to the frame. From the wheel *p* near its periphery projects a horizontal stop or pin adapted, by a back and forth partial rotation of the wheel, to make contact with springs *k* and *i*. The wire-winding on the armature *B* has one end connected with an insulated pin *h* and the other end in contact with the metal armature-shaft and, through the latter, with the frame *C*; and a spring *h'* bears against

the pin h and is connected by a wire w with the contact-spring k , from which it is continued to a contact-spring i' .

D is a calling-signal device, which may be of the ordinary electro-magnet and bell variety, having the coils of the magnet connected by the wire w' with the frame C and by a wire w^2 to a terminal t .

The spring i is in the form of a tongue or lever, fastened at x at one end and carrying at its opposite end an insulating strip i^2 ; the tongue being normally in contact with the spring i' and connected by a wire w^3 with a terminal t' having pivoted upon it a switch-finger t^2 adapted to be turned to engage, at will, the terminal t or a contact t^3 connected by a wire w^{10} with the frame C through the wire w' .

A contact-spring g is connected by a wire w^4 with the primary winding of an induction-coil E, the opposite end thereof being connected by a wire w^5 with one pole of the local battery F through a transmitter G by the wire w^6 ; and the battery is connected, from its opposite pole, by a wire w^7 , with the terminal t' . A contact-spring g' is connected by a wire w^8 through the receiver H, of usual or any suitable construction, and which may be pendent, as indicated, or in rigid position, with one end of the secondary, or finer wire, winding of the induction-coil E, the opposite end thereof being connected by a wire w^9 with the terminal t .

The operation is as follows: By applying the foot to press down on the treadle T, the belt q turns the wheel p , against the resistance of the spring m , through a partial revolution, and, by the action of the wheel n on the pinion n' , rotates the armature B, thus generating a current which passes through the calling-device D and into the main-line through the terminals t and t' . The pressure on the treadle, moreover, effects separation of the pin l from the contact k and carries the pin against the insulated strip i^2 on the tongue i , forcing the latter out of contact with the spring i' and thereby cutting out the generator A and calling-device D and closing the connections between the tongue i and contact g and between the tongue and contact g' , thus closing the circuit through the battery F, transmitter G and primary winding of the induction-coil E, and also the circuit from the terminals t and t' through the receiver H and secondary winding of the induction-coil. Thus the one operation of a primary actuating device, such as the treadle T, serves to ring the bell of the signaling instrument D, then to cut it out of circuit and close the circuit containing the receiver and the local-battery circuit; and by releasing the treadle, the recoil of the spring m reverses the motion of the wheel p , to permit separation of the tongue i from the contacts g, g' , and produce contact of the pin l with the spring k , and by the corresponding turning of the gear n in engagement with the pinion n' , the armature B is rotated to gen-

erate the current for sounding the bell D to "ring-off." As will, therefore, be apparent, the pressure on the primary actuating means causes, in succession, operation of the call, opening of the generator and call circuits and closure of the battery and receiver circuits, thus automatically preparing the telephone for use; while the removal of the pressure is followed, in succession, by opening of the battery and receiver circuits, closing the call-bell circuit, ringing off by the call-bell, and closure of the short circuit around the armature to prepare it for the next call.

Should it be desired, as it frequently is, to leave the instrument without ringing-off, the switch t^2 , which is normally between the contact t^3 and terminal t , is turned upon the contact t^3 ; but this obviously does not prevent a call being signaled to the bell, because the lever t^2 closes a short-circuit on the generator A and not on the bell-device. Moreover this switch is useful where, in a signaling apparatus, no local-battery circuit and induction-coil are provided.

In case of an electrical storm, or other atmospheric electric disturbance, the switch t^2 should be turned into contact with the terminal t . This cuts out the entire instrument and enables the supercharged wire to discharge across the switch and ground-wire v connected with a suitable lightning-arrester I.

Where the apparatus is of the variety containing no "magneto," but other form of generator, and no separate transmitter, local-battery circuit nor induction-coil, my improvement is also applicable; and I desire to include it in such connection.

Moreover it is within the spirit of my invention to arrange the parts so that pressure on the treadle will merely effect "ringing up" and release of the pressure merely "ringing off," leaving the switching to be done by hand, or separately; or to cause merely the switching to be done by operating the treadle, leaving the "ringing up" and "ringing off" operations to be performed by hand, or separately, and I desire to be understood as including the same in my invention.

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

1. In an electric signaling apparatus a signaling-device in circuit with an electric-current generator, and a receiving instrument on the main line, contact making and breaking means between the signaling-device circuit and the main-line circuit, and primary actuating means controllably connected with said contact making and breaking means and operating by pressure in one direction successively to break the shunt around the generator, excite the generator to operate the signal, open the generator and signal circuit and close the receiver-circuit, and by release of the pressure successively to open the receiver-circuit, close the signal-circuit and actuate the signal, substantially as described.

2. In an electric signaling apparatus a signaling-device in circuit with an electric-current generator, a local-battery circuit containing an induction-coil, and a transmitter and a receiving instrument on the main line, contact making and breaking means between the signaling-device circuit and the local-battery and main-line circuits, and primary actuating means controllably connected with said contact making and breaking means and operating by pressure in one direction successively to break the shunt around the generator-armature, excite the generator to operate the signal, open the generator and signal circuit and close the battery and receiver circuits, and by release of the pressure successively to open the battery and receiver circuits, close the signal-circuit, and actuate the signal, substantially as described.

3. In an electric signaling apparatus a signaling-device in circuit with an electric-current generator, and a receiver on the main line, contact-making and breaking means between the signaling device circuit and the main-line circuit, primary actuating means controllably connected with said contact making and breaking means and operating by pressure in one direction successively to break the shunt around the generator-armature and excite the generator, to operate the signal, open the generator and signal circuit and close the receiver circuit, and by release of the pressure successively to open the receiver circuit, close the circuit of the signal and actuate the latter, a branch w^{10} of the signal-circuit and a switch in the main-line circuit adjustable into contact with said branch, substantially as described.

4. In an electric signaling apparatus a signaling-device in circuit with an electric-current generator, and a receiving instrument on the main line, contact making and breaking means between the signaling-device circuit and the main-line circuit, and primary actuating means controllably connected with said contact making and breaking means and operating by pressure in one direction to break the shunt around the generator and excite it to operate the signal-circuit, and by release of the pressure to close the signal-circuit and actuate the signal, substantially as described.

5. In an electric signaling apparatus a signaling-device in circuit with the electric-current generator of the apparatus and a receiving instrument on the main-line, contact making and breaking means for the main-line circuit, and primary actuating means controllably connected with said contact making and breaking means and operating by pressure in one direction to close the receiver-circuit and by release of the pressure to open said receiver-circuit, substantially as described.

6. In combination, a frame C supporting an electric generator A having a spring-con-

trolled movable armature and a contact-wheel p , a primary actuating device operatively connected with said wheel, a signaling-device D in circuit with said generator, a receiver in the main-line circuit, and a circuit making and breaking device i in the path of said contact-wheel between the main-line and generator circuits, substantially as described.

7. In combination, a frame C supporting an electric generator A having a rotary armature B carrying a pinion n' on the shaft, a spring-controlled shaft o journaled in the frame and carrying a gear-wheel n and a wheel p provided with a finger l , a primary actuating device, such as the treadle T, connected with the wheel p , a signaling device D in circuit with said generator, a battery F having an induction-coil E and a transmitter G in its normally open circuit, a receiver in the main-line circuit and a circuit making and breaking device i in the path of said finger between said signaling device circuit and the local-battery circuit and the main-line circuits, substantially as described.

8. In combination, a frame C supporting an electric generator A having a spring-controlled rotary armature and a contact-wheel p , a primary actuating device operatively connected with said wheel, a signaling-device D in circuit with said generator, a battery F having an induction-coil E and a transmitter G in its normally open circuit, provided with contact-terminals g and g' , and a spring contact-finger i adjacent to said terminals in the battery-circuit and normally connecting therewith the generator-circuit and having an insulated end extending into the path of said contact-wheel, substantially as described.

9. In combination, a frame C supporting an electric generator A having a rotary armature B carrying a pinion n' on its shaft, a spring-controlled shaft o journaled in the frame and carrying a gear-wheel n and a wheel p provided with a finger l , a primary actuating device, such as the treadle T, connected with the wheel p , a signaling device D connected with the frame by a wire w' having a branch w^{10} , a wire w extending between a contact h' engaging the armature-shaft and contacts k and i' , a battery F having an induction-coil E and a receiver H in its circuit and provided with terminals g and g' , a spring-finger i extending between the said terminals and the contact i' and into the path of the finger l , terminals t and t' having an interposed switch t^2 and connected, respectively, with the induction-coil and signaling device and a pole of the battery and said spring-finger, and a ground-wire v , the whole being constructed and arranged to operate substantially as described.

JONATHAN D. PRICE.

In presence of—

M. J. FROST,

W. W. WILLIAMS.