

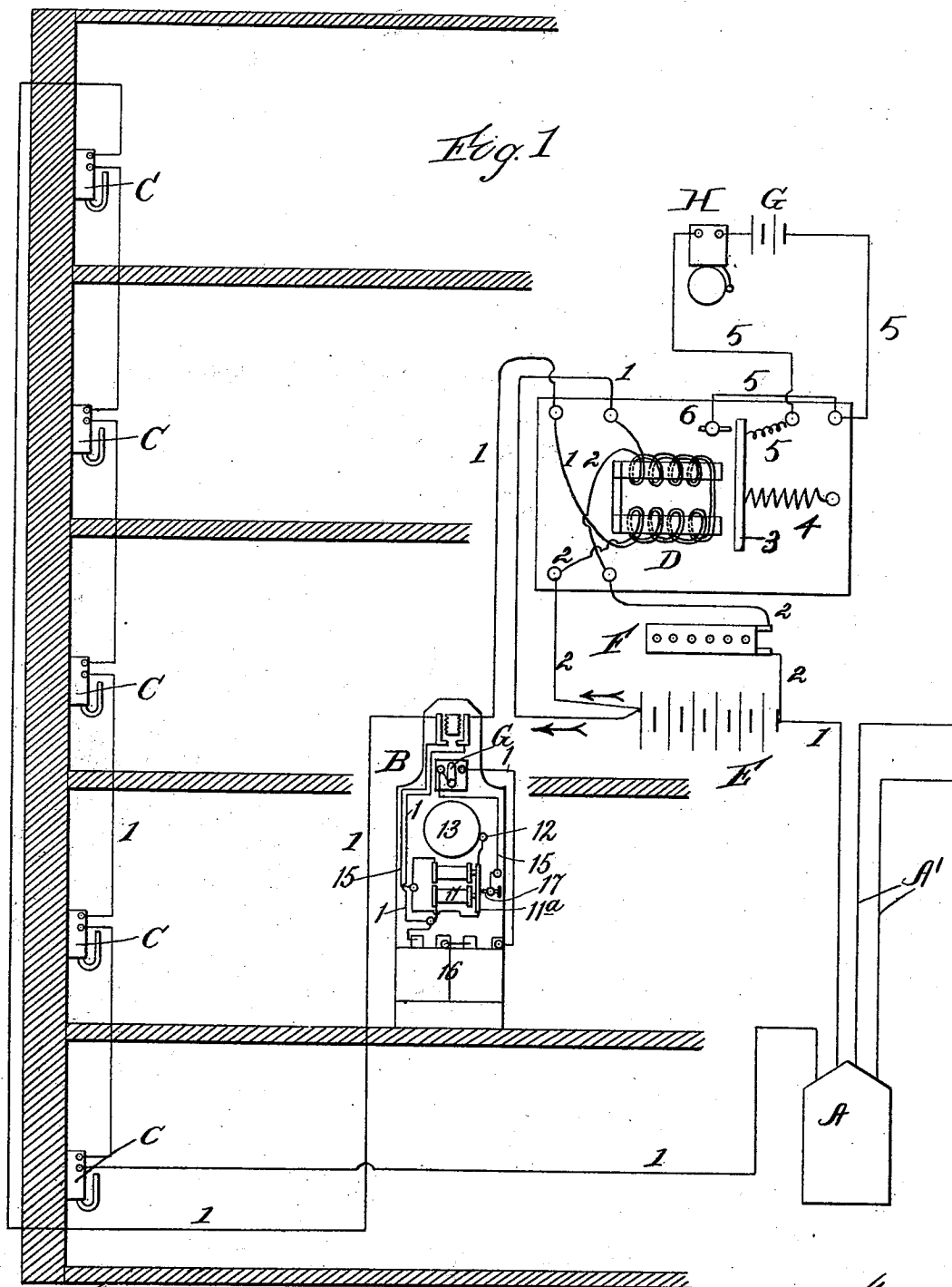
(No Model.)

2 Sheets—Sheet 1.

C. A. ROLFE.
ELECTRIC SIGNALING SYSTEM.

No. 544,123.

Patented Aug. 6, 1895.



Witnesses:

Arthur F. Humand.
Rola M. Wagner.

Inventor:

Chas. A. Rolfe.
by Chas. G. Page, Atty.

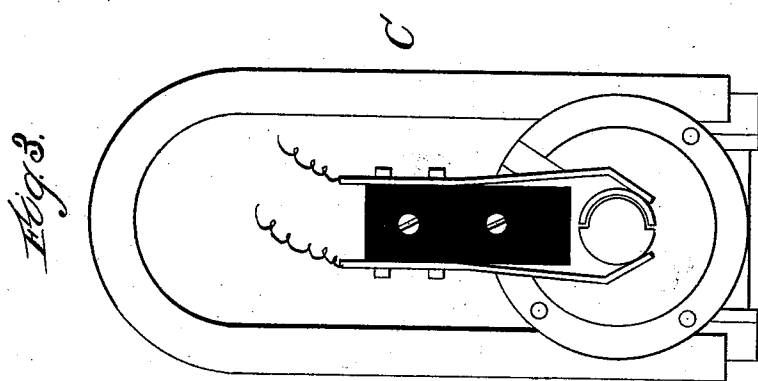
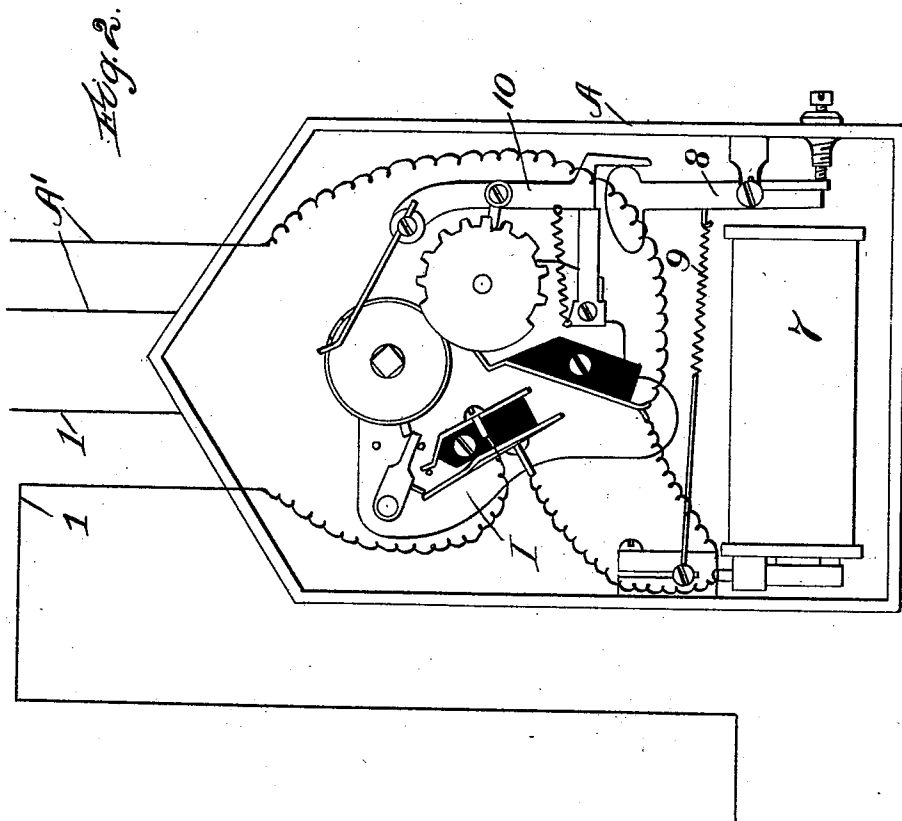
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UNITED STATES PATENT OFFICE.

CHARLES A. ROLFE, OF CHICAGO, ILLINOIS.

ELECTRIC SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 544,123, dated August 6, 1895.

Application filed January 8, 1895. Serial No. 534,213. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. ROLFE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electric Signaling Systems, of which the following is a specification.

My invention relates to electric signaling systems comprising a signal-transmitting mechanism from which signals are sent over a main line to a main or central station and an auxiliary or house circuit including means for liberating the signal-transmitting mechanism, so that the latter, which is normally "wound up," may, when thus released, "run down," and while so doing transmit signals over the main line.

In an electric signaling system characterized by my invention the auxiliary circuit also includes one of the windings of a differential relay, and in conjunction therewith I provide a circuit which I term a "balancing-circuit," and which includes the other winding of said relay. The balancing-circuit and the auxiliary circuit both include a battery from which the current divides between the auxiliary and balancing circuits and passes through the windings of the differential relay in opposite directions. The balancing-circuit also includes a rheostat which can be adjusted so as to cause the current to be divided equally between the two circuits. By this arrangement one circuit can be made to balance the other, and as the battery is constantly on both circuits such balance will be maintained so long as the circuits remain intact. Should, however, either one of the lines forming such circuits become broken, or should a resistance be added to either line—for example, by a crossing wire—the balance will then be destroyed, and hence the relay will no longer remain neutral but will attract its armature. In connection with the differential relay I provide an alarm which will operate when the armature is attracted and actuated by the relay-magnet, thereby giving notice of the fact that the system is out of order.

In the accompanying drawings, Figure 1 illustrates a system embodying my invention, and also illustrates a portion of a building. Fig. 2 shows a signal-transmitting mechanism

in elevation. Fig. 3 is a like view of one of a series of magneto-generators preferably employed.

The street-box A contains a signal-transmitting mechanism from which signals are sent over the main line A', and a magneto-releasing device for liberating the signal-transmitting mechanism. The signal-transmitting mechanism and magneto-releasing device shown in Fig. 2 correspond with the signal-transmitting mechanism and magneto-releasing device embodied in Letters Patent of the United States No. 534,671, granted to me February 6, 1895. The magneto-releasing device is included in the house or auxiliary circuit 1, and said circuit further includes a local or house alarm B and one or more magneto-generators C, as in my said patent, it being also understood that the alarm B, as shown, is identical in arrangement with the alarm shown in my said patent, and that the switch therein included is simply for the purpose of opening or closing the local-alarm circuit, whereby the ringing of the bell can be stopped when so desired, and hence that further description of details appears unnecessary. The auxiliary circuit 1 further includes one of the windings of a differential relay D, and it further includes a constant battery E, which latter, as in my said patent, serves to maintain the alarm B inoperative so long as the auxiliary circuit 1 is closed. The other winding of the differential relay is included in a circuit 2, which I prefer designating as the "balancing-circuit." This balancing-circuit 2 further includes a rheostat F and the battery E. The rheostat F is adjusted, and the lines or wires of circuits 1 and 2 are arranged so that the current flowing from battery E, as indicated by arrows, will be divided equally between said circuits, and will pass in opposite directions through the windings of the differential relay—that is to say, the current through one winding will flow in a direction opposite to the direction of the current through the other winding. The currents thus passing through the relay will neutralize one another, and hence the armature 3 of the relay will be normally held away from the relay-magnet by a spring 4. In connection with the differential relay, I provide a short local-alarm circuit 5,

which includes a battery G and an alarm H. The circuit 5 is normally open, and it so remains as long as armature 3 is in its back position, as shown. By properly adjusting the rheostat the current from battery E will be divided equally between circuits 1 and 2, and hence one will balance the other. Should, however, such balance be destroyed, either by a break in either circuit or by the accidental putting in of a resistance, or by cutting out any portion of the resistance, the neutral condition of the relay will be destroyed, and a current passing through one or the other, as the case may be, of the windings of the relay, will energize the magnet thereof and cause it to attract its armature 3; and thereupon said armature will close upon contact-point 6 of circuit 5, and thereby close said circuit. This will cause alarm H to sound, it being seen that under such conditions the said closed circuit will include and be completed by the armature of the relay.

The magnetic releasing device illustrated in Fig. 2 comprises an electromagnet 7 and an armature 8 which is normally held away from the magnet by a spring 9. Battery E has not sufficient strength to energize magnet 7 to an extent to cause it to operate the armature. Said battery is, however, sufficient to maintain the alarm B inactive so long as auxiliary circuit 1 is closed. When, however, any one of the magneto-generators C is operated an impulse of high electromotive force will be sent over the circuit and this will energize the magnet to an extent to cause it to attract and operate the armature, which latter when thus operated will move a dog or latch 10 and thereby release the signal-transmitting mechanism. Said signal-transmitting mechanism includes a make-and-break device I for alternately making and breaking the auxiliary circuit while the signal-transmitting mechanism is running down, whereby during such operation the signal-transmitting mechanism while sending signals over main line A' to the main or central station will also repeat back to the alarm B. Should the battery E give out or become broken the alarm B will sound and alarm H will remain inactive. In this way I provide for all contingencies and greatly improve the system described in my said patent. Further details of the signal-transmitting mechanism and the magneto-generators C need not be described, since any other known or desired construction of such devices adapted for service in the system herein embodied can be employed, though I prefer to use constructions illustrated and described in my patent aforesaid.

The local or house alarm B can be of varied construction without departing from the spirit of my invention, the principle involved being illustrated by the arrangement shown in Fig. 1. In said arrangement the armature 11^a, allotted to magnet 11, is provided with a clapper 12 for ringing the bell 13. This bell-magnet 11 is included in the aforesaid nor-

mally-closed auxiliary circuit indicated by lines or wires 1 and is normally energized to an extent to hold the armature closed. Said armature is also comprised within a normally-open circuit indicated by lines or wires 15 and including the local bell-battery 16. So long as circuit 1 is closed the alarm B will be silent. When, however, said circuit is open the bell of the alarm B will be rung. Thus when armature 11^a is released, as the result of a break in circuit 1, the magnet 11 will be de-energized and will release the armature 11^a, and hence so long as said circuit remains open the armature will be free to operate for the purpose of ringing the bell in accordance with the way in which electric alarm-bells are usually sounded. The release of the armature permits its spring to throw it into contact with a back-stop 17 in circuit 15. Such contact closes the circuit 15, which includes the magnet 11 and the battery 16, and hence the magnet will then be supplied from said battery for the purpose of operating the armature. The local alarm also comprises a switch G, arranged in the circuit 15, whereby the ringing of the bell can be stopped, although the circuit 1 may be open.

The auxiliary circuit 1, including the magnet 7 of the signal-box, the magneto generator or generators, the alarm-magnet, and the local battery, is normally closed. The current over such circuit is suitable for maintaining the local alarm inactive, but it is not of sufficient strength to release the signal-transmitting mechanism, and hence, although it will energize the magnet 7, it will not energize the same to an extent to cause it to draw said armature against the spring-resistance. A slight operation, however, of any one of the magneto-generators will send over the line or circuit 1 a quick impulse of high electromotive force, and this, in supplementing the energy derived from the local battery E, which is constantly included in said circuit, will energize magnet 7 to an extent to cause the release of the signal-transmitting mechanism. Upon such release of the signal-transmitting mechanism it will automatically start up and send signals over the main line as usual, and while so doing will, by reason of the make-and-break device I hereinbefore described, repeat back to the local alarm B, so as to notify the occupant of a house who may have operated the magneto-generator as aforesaid of the fact that the street-box is at work, it being observed that the make-and-break periods are sufficiently slow to permit the bell to thus sound.

A ring on the part of the alarm in circuit 5 will not be objectionable, and, to the contrary, it will give evidence of the fact that it is in order.

The alarm-bell at B will be operated precisely as set forth in my said patent. Should battery E break the alarm-bell at B will ring and give evidence of such fact, but the bell at H will not sound, since no current will then

pass over the relay-coils. If the main line becomes broken both bells will ring, but should a resistance be thrown in or taken out of the line the relay-bell at H will respond, but the bell at B will not necessarily respond. The important functions of the bell at B are therefore to take care of the battery E and to respond when the signal-transmitting mechanism is operated, while, on the other hand, the bell at H can be so sensitive as to respond to and announce any variation in the resistance of the main line.

What I claim as my invention is—

An electric signaling system comprising a signal transmitting mechanism from which alarm signals are transmitted over the main line; an auxiliary circuit including means for

starting the signal transmitting mechanism and also including one of the windings of a differential relay; a balancing circuit including the other winding of said relay; a battery from which the current divides between the two circuits and passes through the relay windings in opposite directions; a rheostat arranged in the balancing circuit as a means for dividing the current equally between said two circuits; and an alarm controlled by the differential relay and operating when the circuits are out of balance, substantially as set forth.

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Witnesses:

CHARLES G. PAGE,
RETA M. WAGNER.