

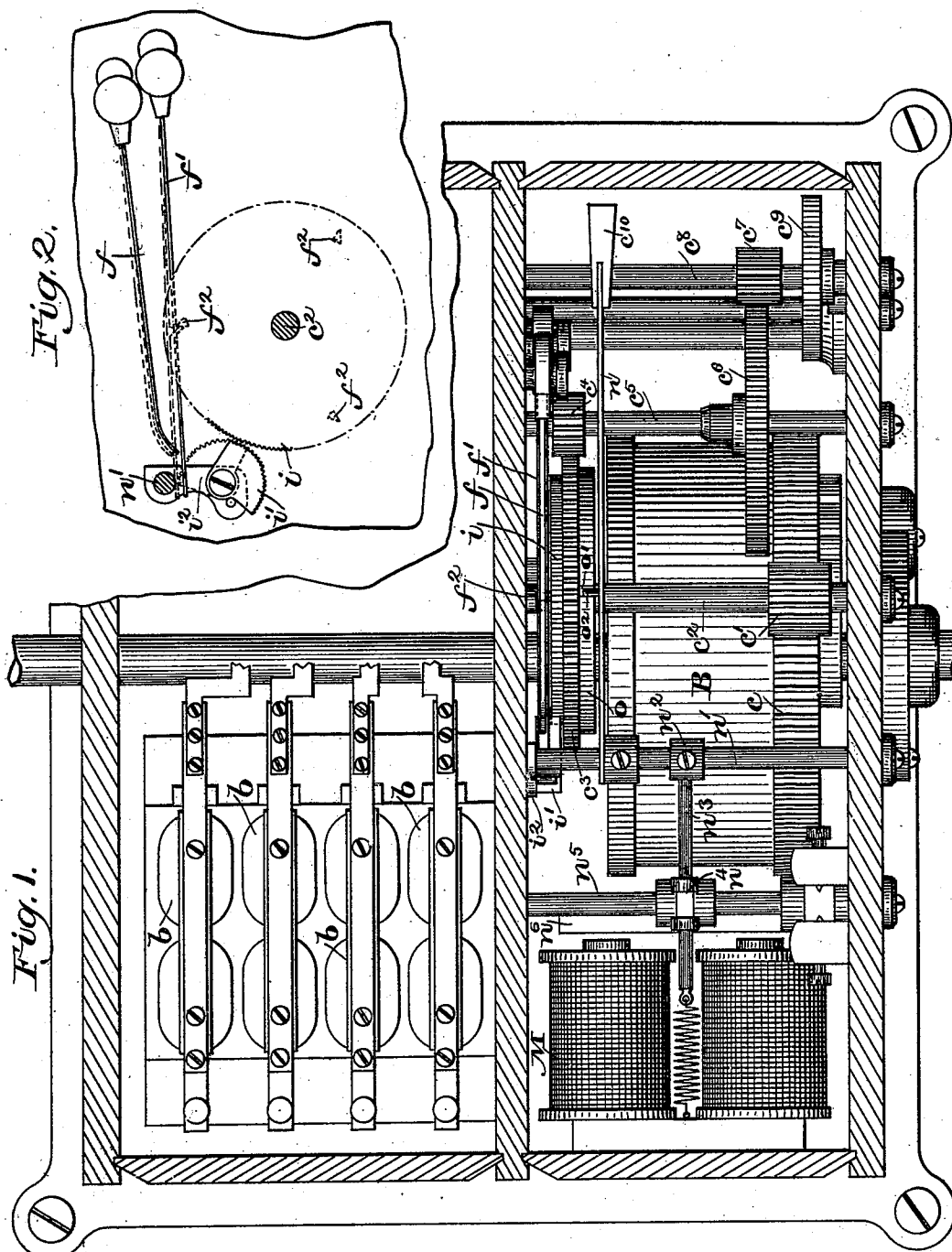
(No Model.)

2 Sheets—Sheet 1.

B. J. NOYES.
ELECTRIC SIGNALING APPARATUS.

No. 578.114.

Patented Mar. 2, 1897.



Witnesses

Harry O. Robinson.
To H. Davis

Inventor

Bernice J. Hayes

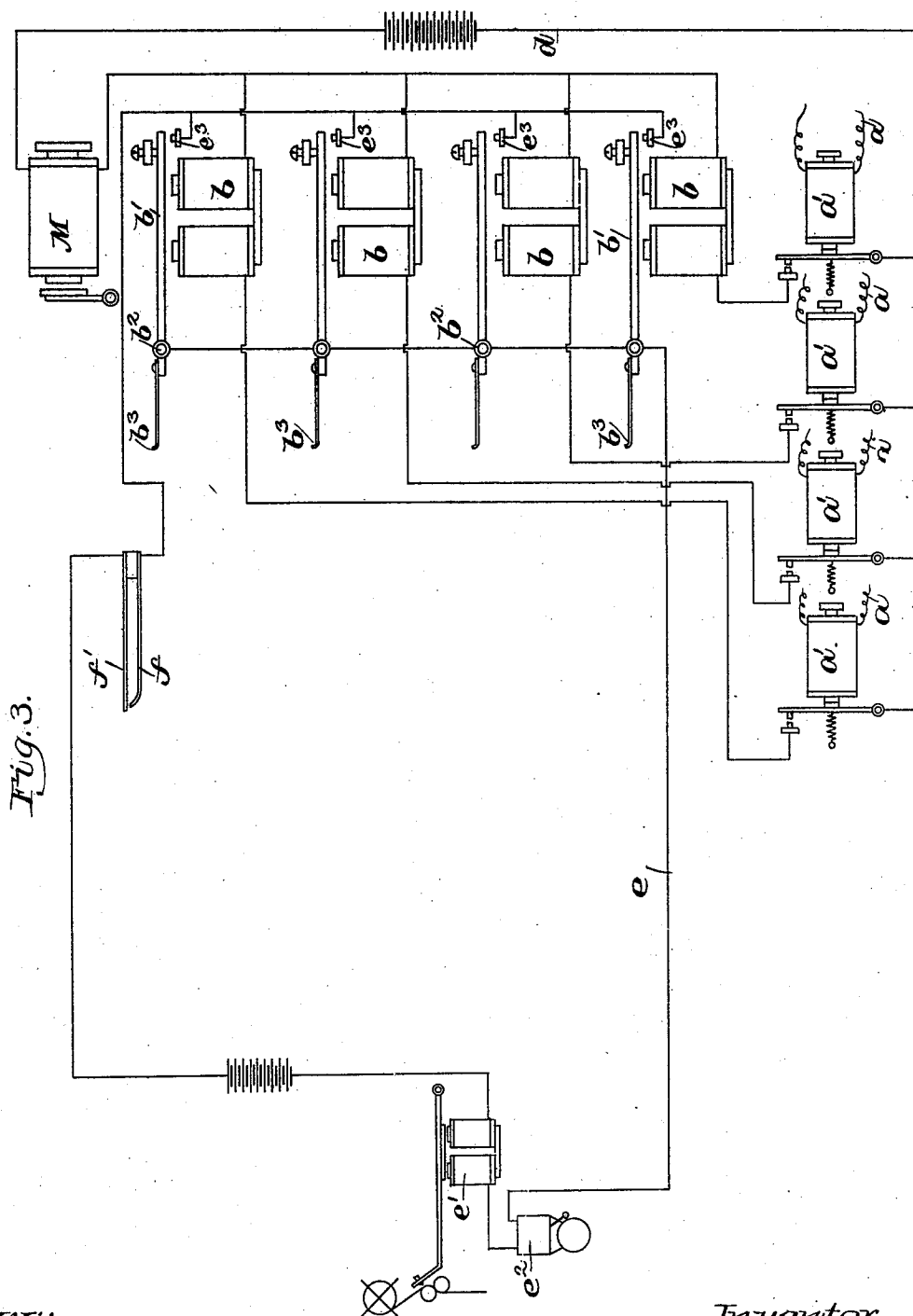
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UNITED STATES PATENT OFFICE.

BERNICE J. NOYES, OF BOSTON, MASSACHUSETTS.

ELECTRIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 578,114, dated March 2, 1897.

Application filed July 11, 1896. Serial No. 598,839. (No model.)

To all whom it may concern:

Be it known that I, BERNICE J. NOYES, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Electric Signaling Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In police-signal systems it is customary to provide the signal-boxes with multiple-signal transmitters constructed and arranged to transmit several unimportant and certain important or special signals or calls, the unimportant signals or calls indicating "on duty" and the important or special calls indicating "telephone" or "wagon," and all of these signals or calls have been received at a central station, at which point means have been provided for audibly distinguishing the important from the unimportant calls. This differentiation was produced by employing an alarm arranged to be operated only upon the reception of the important calls, the unimportant calls being received silently.

The stable where the wagon is kept which is to be sent to the boxes calling for it is usually located a short distance from the central station, and it has been connected with said central station by means of electric signaling apparatus which comprises a multiple-signal transmitter located at the central station and a receiver at the stable, and whenever a wagon-call was received at the central station the attendant in charge would set and operate the multiple-signal transmitter and thereby transmit such signal to the stable. In thus receiving the wagon-call at the central station and then retransmitting it manually to the stable by operating the multiple-signal transmitter frequent mistakes arise by reason of carelessness or excitement of the attendant in charge, and in consequence the wrong signal is transmitted and the wagon sent to the wrong box.

It is the principal object of this invention to so construct and arrange the component parts of the system that the wagon-call is sent directly from the signal-box on the street to the stable automatically through the central station, so that while the call is duly received at the central station it goes to the stable without attention on the part of the attend-

ant in charge of such station. As a result the mistakes above referred to are obviated and the call reaches the stable much quicker than if it waited in the central station until it could be retransmitted by the attendant in charge.

The on-duty calls are transmitted to the central station like the wagon-calls, but are not automatically repeated or sent to the stable.

In carrying out this invention the signal-transmitters in the signal-boxes on the street are adapted to send, in addition to the regular signaling impulses, a differentiating impulse with some calls and not with others—viz., with the wagon-call and not with the on-duty calls—and a signal-receiving instrument—such, for instance, as a message-recorder—is employed at the central station to receive all the calls, and the stable is connected with the central station by an auxiliary or local circuit, and an automatic switch is provided at said station which is so constructed and arranged as to be actuated by means of the differentiating impulses only which will be transmitted by the signal-transmitters at the signal-boxes. Such a differentiating impulse is shown in the present instance as an impulse of long duration as contrasted with an impulse of short duration, yet it may be any other kind of an impulse which differs from the regular signal impulses, and when the switch is operated the auxiliary or local circuit is brought into operative condition, *i. e.*, into condition to be operated, to in turn operate any signal-receiving instrument in the stable that may be included therein or connected therewith. A circuit-operating device is provided for operating said auxiliary circuit when it is thus brought into operative condition, which is operated by the main signaling-circuit, and in case there should be several main signaling-circuits connected with a single central station to which a single auxiliary or local stable-circuit is connected there will be an equal number of circuit-operating devices for said auxiliary circuit.

The wagon-call only will be accompanied by the differentiating impulse which will precede it, and thus set or operate the switch, after which the signal transmitted from the box will be repeated automatically from the central station over the auxiliary circuit to the

stable, although it will also be duly recorded on a message-recording instrument at the central station. A restoring device is provided for restoring said switch, which is adapted to be operated mechanically at the end of the signal to instantly restore the switch.

The message-recording instrument employed at the central station will comprise a paper-moving train of wheelwork and paper-marking devices, and for simplicity said paper-moving train may be utilized as a motor mechanism for operating or setting the automatic switch and for restoring it, said mechanism being inclosed by an electromagnet.

Figure 1 shows in plan view a message-recording instrument having an automatic switch for an auxiliary circuit, means for operating or setting it and for restoring it, and four circuit-operating devices for said auxiliary circuit, being an apparatus or instrument by which my invention may be carried out; Fig. 2, a detail of the automatic switch, and Fig. 3 a diagram of the circuits to be referred to.

The signaling-circuits a , four being herein shown, lead from or connect with the central station, they each having included therein a receiving-relay a' .

Each signaling-circuit will have, as usual, as many street signal-boxes as desired, and each street signal-box will contain a multiple-signal transmitter adapted to send several calls, some of which will be accompanied by a differentiating impulse, which will be herein referred to as an impulse of long duration as contrasted with an impulse of short duration. Such a signal-box is old and forms in itself no part of my present invention.

At the central station a message-recording instrument is shown, adapted to receive all the signals transmitted from the boxes of all the circuits. This message-recording instrument, as herein shown, comprises a motor mechanism adapted to operate the paper-feeding devices, and hence herein called the "paper-moving train," and a number of paper-marking devices, one for each circuit connected with the instrument, they each having as an operating member an electromagnet, (represented at b ,) which when energized attracts an armature b' , pivoted at b^2 and carrying a recording-pen b^3 .

The paper-moving train consists, essentially, of a drum B , containing the usual main-spring of the motor, a gear c , formed on or secured to said drum, which engages a pinion c' , secured to a shaft c^2 , carrying a toothed wheel c^3 , which engages a pinion c^4 , secured to a shaft c^5 , carrying a toothed wheel c^6 , which engages a pinion c^7 , secured to a shaft c^8 , carrying the escape-wheel c^9 .

On the escape-wheel shaft c^8 a projection c^{10} is secured, which is engaged by a releasing-lever n , which is secured to a rock-shaft n' , which has secured to it a downwardly-extended projection n^2 , engaged by an arm n^3 , extended from a short arm n^4 , secured to

a shaft n^5 , carrying the armature n^6 of the main starting-magnet M .

As the message-recording instrument is designed to be placed in a local or normally open circuit, the armature of the starting-magnet is normally retracted.

When the armature is attracted, the arm n^3 , by engaging the short arm n^2 on the rock-shaft, rocks said shaft, and thereby raises the releasing-lever n .

It is herein designed that the motor shall run a certain length of time each time it is released, and hence it has a stop-wheel o , provided with notches o' , and the releasing-lever n has projecting from it a pin o^2 , which enters any one of said notches that may be brought into position beneath it. The stop-wheel herein represented has three such notches, and hence it moves one-third of a revolution each time the train is released.

A message-recording instrument constructed substantially in the manner so far described is old, and hence in itself forms no part of my present invention, and in lieu of it any other well-known form or construction of message-recording instrument may be employed. In such a message-recording instrument the starting-magnet M is included in a local circuit d , having in one side of the battery several branch wires, each including one of the recording-pen magnets b and the armature of one of the main receiving-relays, so that said starting-magnet M is adapted to respond to the action of any one of the main receiving-relays, while the recording-pen magnets are operated, respectively, by the main receiving-relays.

An auxiliary circuit or stable-circuit e leads from the central station containing the message-recording instrument to the stable where the wagon is kept, and over this circuit the wagon-calls are automatically repeated. This auxiliary circuit e contains any suitable signal-receiving instrument, such, for instance, as a recorder e' or bell e^2 , or both, as may be desired, or, in fact, any other kind of a signal-receiving instrument. This auxiliary circuit e has a number of operating devices for it, corresponding to the number of signaling-circuits connected to the central station, there being four such circuit-operating devices herein shown. For simplicity the armatures b' of the recording-pen magnets serve as the actuators of these circuit-operating devices, they closing upon a contact e^3 when their magnets are energized, and said circuit-operating devices $b' e^3$ are herein shown as arranged in multiple arc in order that any one of them may operate the auxiliary circuit e . It will be seen that these circuit-operating devices will operate each and every time the recording-pen magnets operate, but as it is only desired that the auxiliary circuit e shall be operated upon the reception of a wagon-call, or that call having a distinguishing or differentiating impulse preceding it, a switch is provided for said auxiliary circuit

which is normally open and which is adapted to be closed by or upon reception of said distinguishing impulse only. This switch is represented at $f f'$, and when it is closed the auxiliary or stable circuit will be closed at such point, so that it may be then operated by any one of the circuit-operating devices $b' e^3$ to transmit a wagon-call.

As the differentiating impulse which it is herein intended to use is one of long duration as contrasted with an impulse of short duration, means are provided for closing the switch $f f'$, which requires for its operation a long interval of time.

By referring to Figs. 1 and 2 a wheel i , having a serrated or toothed edge, is secured to one of the shafts of the train, as, for instance, it may be secured to the shaft c^2 , and a sector i' , also having a serrated or toothed edge, is loosely connected to a short arm i^2 , projecting downwardly from the rock-shaft i' , said sector being arranged to be moved into and out of engagement with said serrated wheel i whenever the shaft n' is rocked, and while it is thus in engagement with said toothed wheel i it is turned on its pivot by said wheel, and if such engagement continues for a sufficiently long interval of time said sector will be moved into engagement with the lower spring f' of the switch and by lifting said member will thus close the switch. As the lower spring or member of the switch is thus raised the sector becomes a prop to hold it in such elevated position, while the spring itself acts upon the sector to frictionally hold said sector from returning to its normal position by gravity as soon as the rock-shaft n' is restored. Thus the switch will be closed and held closed until the pressure of the spring f' upon the sector is removed, and this is done at the end of the signal. To do this, I have herein placed upon the wheel i three pins f^2 , (see dotted lines, Fig. 2,) one of which engages the projection on the spring f' and by slightly raising said spring farther than it is raised by the sector the pressure is relieved. Thus when a wagon-call is transmitted from one of the boxes the main receiving-relay of one of the circuits operates, causing the starting-magnet M to operate and release the train, and so throw the sector into engagement with the toothed wheel, and also causing one of the recording-pen magnets to operate, closing the auxiliary or stable circuit at $b' e^3$.

As the wagon-call is preceded by a long break or impulse of long duration, the sector will continue to engage the toothed wheel until the switch $f f'$ is closed, and then the call will follow, and will be automatically transmitted to the stable by the circuit-operating device $b' e^3$, operating the auxiliary or stable circuit, while the switch $f f'$ is thus closed, and as soon as the call has been sent one of the pins f^2 will operate as a restoring device in order that the sector may return to its normal position.

I do not desire to limit my invention to any

particular construction of operating device for the switch $f f'$, as I desire to include within the spirit and scope of this invention any device for operating this switch when operated or controlled by a differentiating impulse, or by an impulse differing from the regular signaling impulses, when combined with or provided with a restoring device whereby the switch may be instantly restored as soon as the wagon-call has been received.

I claim—

1. In an electric signaling apparatus, a main signaling-circuit, signal-transmitting devices for operating said circuit adapted to transmit a differentiating impulse with some signals and not others, and a signal-receiving instrument for receiving all the signals, combined with an auxiliary circuit, a signal-receiving instrument operated by it, an automatic switch for controlling the operative condition of said auxiliary circuit, means for operating said switch controlled by the differentiating impulses, a restoring device for said switch, and means for operating said auxiliary circuit operated by the main signaling-circuit, substantially as described.

2. In an electric signaling apparatus, a main signaling-circuit, signal-transmitting devices for operating said circuit adapted to transmit a differentiating impulse with some signals and not others, and a signal-receiving instrument for receiving all the signals, combined with an auxiliary circuit, a signal-receiving instrument operated by it, an automatic switch for controlling the operative condition of said auxiliary circuit, means for operating said switch controlled by the differentiating impulses, a train-controlled restoring device for said switch, and means for operating said auxiliary circuit operated by the main signaling-circuit, substantially as described.

3. In an electric signaling apparatus, a main signaling-circuit, signal-transmitting devices for operating said circuit adapted to transmit a differentiating impulse with some signals and not others, and a signal-receiving instrument for receiving all the signals, combined with an auxiliary circuit, a signal-receiving instrument operated by it, a circuit-closing switch for said auxiliary circuit, an operating device for said circuit-closing switch operated by the differentiating impulses, a restoring device for said switch, and a circuit-closing device for said auxiliary circuit operated by the main signaling-circuit, substantially as described.

4. In an electric signaling apparatus, a main signaling-circuit, signal-transmitting devices for operating said circuit for short and long intervals of time, producing impulses of short and long duration, and a signal-receiving instrument for receiving all the signals, combined with an auxiliary circuit, a signal-receiving instrument operated by it, an automatic switch for controlling the operative condition of said auxiliary circuit, means for op-

erating said switch controlled by the impulses of long duration only, a restoring device for said switch and means for operating said auxiliary circuit operated by said main signaling-circuit, substantially as described.

5 5. In an electric signaling apparatus, a main signaling-circuit, signal-transmitting devices for operating said circuit and adapted to transmit a differentiating impulse with some
10 signals and not others, a message-recording instrument for receiving all the signals having a paper-moving train and paper-marking devices, combined with an auxiliary circuit, a signal-receiving instrument operated by it,
15 an automatic switch for controlling the operative condition of said circuit, means for operating said switch controlled by the paper-moving train, and a restoring device for said
20 train, and means for operating said auxiliary circuit operated by the main signaling-circuit, substantially as described.

6. In an electric signaling apparatus, a main signaling-circuit, signal-transmitting devices
25 for operating said circuit for short and long intervals of time, producing impulses of short and long duration, and a message-recording instrument for receiving all the signals, having as a cooperative part of it a paper-moving
30 train and paper-marking devices, combined with an auxiliary circuit, a signal-receiving instrument operated by it, a switch for controlling the operative condition of said circuit, an operating device for said switch oper-
35 ated by said paper-moving train and controlled by the main signaling-circuit, and a restoring device for said switch also operated by said paper-moving train, and means for operating said auxiliary circuit operated by
40 the main signaling-circuit, substantially as described.

7. In an electric signaling apparatus, a main signaling-circuit, signal-transmitting devices for operating said circuit for short and long
45 intervals of time, producing impulses of short and long duration, and a message-recording instrument for receiving all the signals, having as a cooperative part of it a paper-moving train and paper-marking devices, combined
50 with an auxiliary circuit, a signal-receiving instrument operated by it, a circuit-closing switch for said auxiliary circuit, an operating device therefor, operated by the paper-moving train which requires for its operation a long
55 interval of time, to be thereby operated by the impulse of long duration only, a restoring device for said switch, and a circuit-closing device for said auxiliary circuit operated by the main signaling-circuit, substantially as
60 described.

8. In an electric signaling apparatus, a number of main signaling-circuits, signal-transmitting devices for operating them adapted to transmit a differentiating impulse with
65 some signals and not with others, and a signal-receiving instrument with which all of said signaling-circuits are connected, con-

structed and arranged to receive all the signals, combined with an auxiliary circuit, a signal-receiving instrument operated by it, a switch for controlling the operative condition
70 of said auxiliary circuit, means for operating said switch controlled by the differentiating impulse of any one of the signal-transmitting devices of any circuit, and a number of circuit-operating devices for said auxiliary circuit,
75 corresponding to the number of signaling-circuits, and adapted to be operated by said signaling-circuits, substantially as described.

9. In an electric signaling apparatus, a number of main signaling-circuits, signal-transmitting devices for operating them adapted to transmit a differentiating impulse with
80 some signals and not with others, and a signal-receiving instrument with which all of said signaling-circuits are connected, constructed and arranged to receive all the signals, combined with an auxiliary circuit, a signal-receiving instrument operated by it, a
85 switch for controlling the operative condition of said auxiliary circuit, means for operating said switch controlled by the differentiating impulse of any one of the signal-transmitting devices of any circuit, a restoring device for said switch, and a number of circuit-
90 operating devices for said auxiliary circuit, corresponding to the number of signaling-circuits, and adapted to be operated by said signaling-circuits, substantially as described.

10. In an electric signaling apparatus, a number of main signaling-circuits, signal-transmitting devices for operating said circuits adapted to transmit a differentiating
95 impulse with some signals and not with others, and a message-recording instrument having a paper-moving train and a number of paper-marking devices corresponding to the number of signaling-circuits, each paper-marking device having an electromagnet as an operating
100 member which is connected with or operated by one of the signaling-circuits, combined with an auxiliary circuit, a signal-receiving instrument operated by it, a number of circuit-operating devices for said auxiliary circuit
105 corresponding to the number of main signaling-circuits, the armature-levers of the electromagnets of the paper-marking devices forming the actuators for said circuit-operating devices, and a switch for controlling the
110 operative condition of said auxiliary circuit, substantially as described.

11. In an electric signaling apparatus, a number of main signaling-circuits, signal-transmitting devices for operating said circuits adapted to transmit a differentiating
115 impulse with some signals and not with others, and a message-recording instrument having a paper-moving train and a number of paper-marking devices corresponding to the number of signaling-circuits, each paper-marking device having an electromagnet as an operating
120 member which is connected with or operated by one of the signaling-circuits, com-

bined with an auxiliary circuit, a signal-receiving instrument operated by it, a number of circuit-operating devices for said auxiliary circuit corresponding to the number of main
5 signaling-circuits, the armature-levers of the electromagnets of the paper-marking devices forming the actuators for said circuit-operating devices, and a switch for controlling the operative condition of said auxiliary circuit,
10 and means for operating it automatically con-

trolled by said differentiating impulses, and means for restoring it, substantially as described.

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

BERNICE J. NOYES.

Witnesses:

F. H. DAVIS,

HARRY V. ROBINSON.