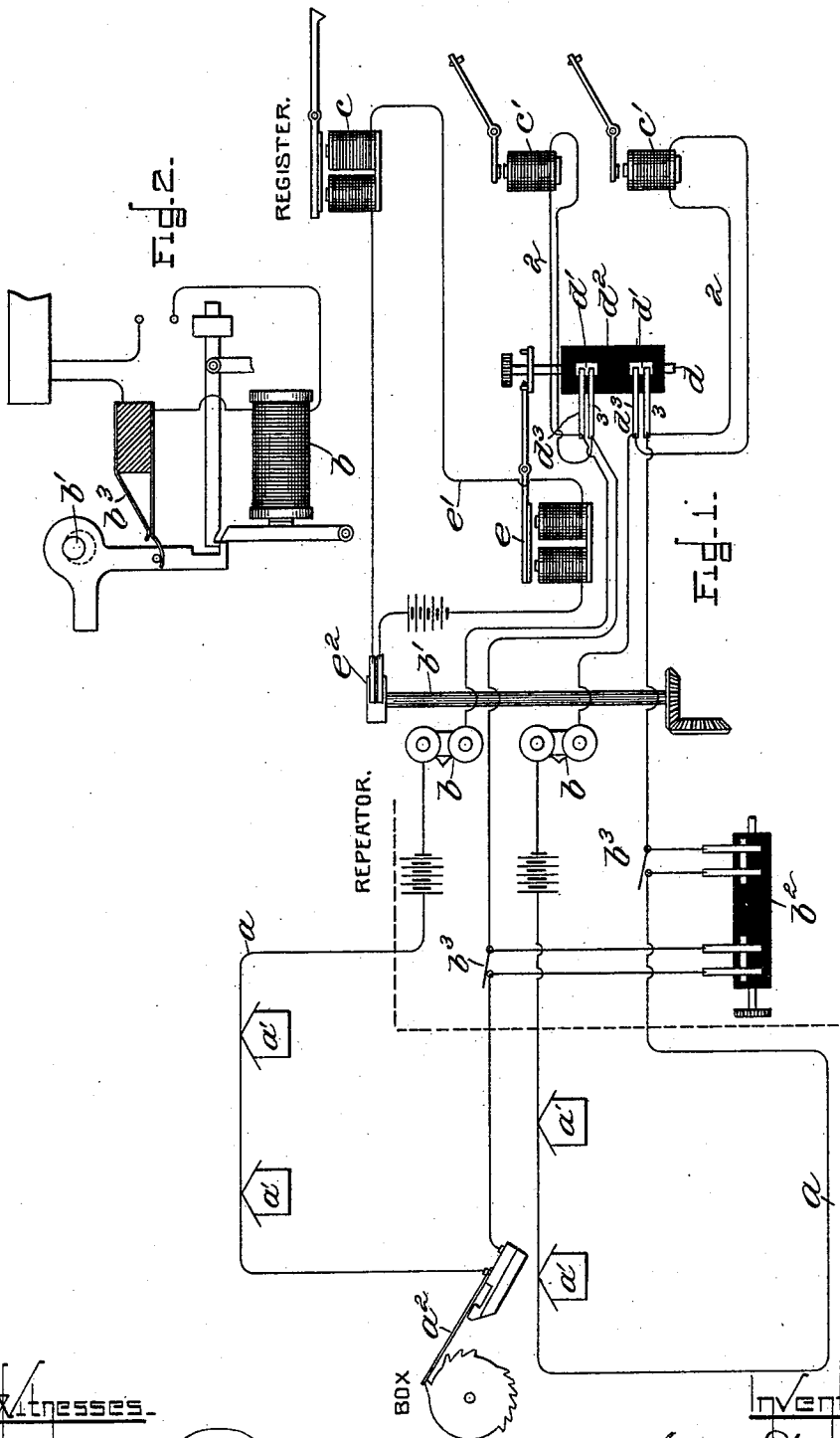


(No Model.)

A. D. WHEELER.
ELECTRIC SIGNALING APPARATUS.

No. 583,423.

Patented May 25, 1897.



Witnesses.

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Inventory

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UNITED STATES PATENT OFFICE.

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ELECTRIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 583,423, dated May 25, 1897.

Application filed February 2, 1897. Serial No. 621,708. (No model.)

To all whom it may concern:

Be it known that I, ALDEN D. WHEELER, of Hyde Park, county of Norfolk, 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 and figures on the drawings representing like parts.

In fire-alarm-telegraph systems as usually constructed several circuits, each having several signal-boxes, are connected at a central station, commonly called the "fire-alarm headquarters," with an instrument or apparatus commonly known as a "repeater," and by said repeater a signal from any one of the box-circuits will be repeated over all the other box-circuits, and at said central station receiving instruments of different kinds have been provided for recording or visually indicating the signals.

It is oftentimes desirable to have a record not only of the reception of the signals but also of their retransmission over the other box-circuits, and that such record shall be of a nature that it can be preserved for reference; and this invention has for its object to construct a register or recording instrument adapted to record signals on a moving strip of paper and to so arrange said register or recording instrument in connection with the box-circuits and other apparatus at the central station that any incoming signal from any box-circuit will be recorded and the retransmission of said signal over all the other circuits will also be recorded; and the invention also has provision for indicating on the strip of paper which box-circuit has been operated by the incoming signal and also which box-circuits have been operated in repeating said signal. By the employment of such a recording instrument or apparatus at the central station the operator in charge can tell by a glance at the record the incoming signal received, the particular box-circuit that was operated by said incoming signal, and also the box-circuits which were operated to repeat said signal, and such record of both the reception and retransmission of the signal may be preserved.

In carrying out this invention an ordinary telegraph-repeater—such, for instance, as the repeater made and sold by the Gamewell Fire-Alarm Company, of New York, N. Y.—will be connected with the several box-circuits leading to the central station, such repeater having, say, for instance, a number of signal-receiving magnets corresponding to the number of box-circuits, a locking shaft or device by which the armatures of all of the signal-receiving magnets will be locked except the armature of the magnet of the box-circuit over which the incoming signal is being transmitted, and having also a number of repeating circuit-controllers corresponding to the number of box-circuits by which the incoming signal is repeated over all the box-circuits except the box-circuit over which it is being transmitted, and having also a set of shunt-switches, one for each repeating circuit-controller, which are operated by said locking shaft or device, the shunt-switches of all the repeating circuit-controllers being opened by said device except the shunt-switch of the repeating circuit-controller of the box-circuit over which the incoming signal is being transmitted, that particular shunt-switch remaining closed. In connection with said box-circuits and with said repeater a register or recording instrument of the Morse type of any well-known multiple-pen construction will be employed, it having, say, for instance, a normally-wound paper-moving train, a starting-magnet for it, and several pen or printing magnets for marking or recording signals on the moving strip of paper, there being as many pen or printing magnets as there are box-circuits connected with the central station.

The pen or printing magnets of the register or recording instrument are or may be connected with said box-circuits in such manner as to respond to changes produced by the box-number circuit-controllers of the signal-boxes and also by the repeating circuit-controllers, so that when a signal is sent from any box the pen or printing magnet corresponding to or connected with or operated by that particular box-circuit will respond to the action of said box-number circuit-controller and the

remaining pen or printing magnets will respond to the action of the repeating circuit-controllers of the other box-circuits, and hence not only will the incoming signal be recorded on the moving strip of paper, but also the re-transmission of said signal over the other box-circuits.

The recording instrument which I prefer to use is one ordinarily called an "open-circuit" recorder—that is to say, its pen or printing magnets are adapted to be included in normally open circuits and to act upon closures of said circuits to print or mark the tape—and to apply such an open-circuit recording instrument to the use herein referred to in connection with a number of normally-closed box-circuits I connect the circuit of each pen or printing magnet directly with a normally-closed box-circuit and then provide a shunt-switch for each pen or printing magnet which is normally closed, thereby short-circuiting said pen or printing magnets, so that their armatures normally remain retracted. Means are provided for opening all of said shunt-switches simultaneously, so that all of the pen or printing magnets of the recording instrument will be included in and so as to be responsive to changes in the box-circuits. The means for opening said shunt-switches may consist of a shaft driven by a suitable motor, which, when turned, say, half a revolution, will open all of the shunt-switches, and when turned the other half-revolution will close said shunt-switches, and such device or apparatus for thus operating the shunt-switches will be controlled by the first impulse of any one of the box-number circuit-controllers of any box-circuit. The device or apparatus for thus operating the shunt-circuits may be made as a separate and independent mechanism or it may be made as a part of the repeater—*i. e.*, as a shaft added to the mechanism of the repeater. As the first impulse of the box-number circuit-controller is utilized in opening the shunt-switches and starting the repeater, the recording instrument will not record that particular impulse on the moving strip of paper, although the repeating circuit-controllers will operate and the recording instrument will record the first impulse of all the other box-circuits. On the strip of paper will appear a record of the incoming signal and also of the repeated signals, and the record of the incoming signal will appear minus the first impulse, and hence a visual indication is obtained for distinguishing the incoming signal from the repeated signals on the strip of paper.

Figure 1 shows in diagram a number of box-circuits having signal-boxes, a portion of a repeater, an open-circuit recording instrument, and means for connecting said recording instrument in circuit to respond to changes in all the box-circuits; and Fig. 2, a detail showing one of the receiving-magnets of the repeater, its shunt-switch, and locking-shaft.

The box-circuits a , two being herein shown

for illustration, each have several signal-boxes a' , containing each a box-number circuit-controller a^2 . These box-circuits lead to a central station. A repeater is located at said central station, parts only of which are herein shown for illustration, as such an instrument is well known in the art.

b represents the signal-receiving magnets of the repeater; b' , the locking-shaft by which the armatures of all said signal-receiving magnets will be locked, except the armature of the magnet of the operating box-circuit; b^2 , the repeating-cylinder, which forms the actuating member of the repeating circuit-controllers; b^3 , shunt-switches for the repeating circuit-controllers, which are operated by said locking-shaft or by means controlled by it to open all of said shunt-switches except the one for the repeating circuit-controller of the operating box-circuit. All of these devices or elements are common in fire-alarm systems as now constructed.

A multiple-pen register or recording instrument is provided which may be of any usual or suitable construction, it being herein shown as having a starting-magnet c for the paper-moving train and two pen or printing magnets c' . This recording instrument will have as many printing-magnets as there are box-circuits.

The pen or printing magnets c' are each connected by wires 2 with the box-circuits, and a shunt-switch 3 is provided for each pen or printing magnet, which is normally closed, so that the box-circuit will be normally closed and the pen or printing magnets short-circuited and their armatures normally retracted. As a means of opening all of said shunt-circuits 3 simultaneously, so that all of the pen or printing magnets will be connected with their respective box-circuits at the same time, I have provided a shaft or cylinder d , made similar to the repeating-cylinder of the repeater—that is, it is made with conducting and insulating portions d' d^2 for the contact-pens d^3 , which constitute the shunt-switches. When the shaft or cylinder d is in its normal position, all of the pens d^3 will rest upon the conducting portion d' thereof and the box-circuits thereby closed at such point and the pen or printing magnets of the recording instrument short-circuited, but when said shaft is turned, say, half of a revolution, the contact-pens will be brought into engagement with the insulating portion d^2 and the shunt-switches thereby opened.

The shaft or cylinder d is operated by an independent motor mechanism, which may be of any suitable construction—as, for instance, it may be a normally-wound motor adapted to be let off by the armature of an electromagnet e , contained in a local circuit e' , and when let off to turn said shaft or cylinder d sufficiently to open the shunt-switches and subsequently close them.

The local circuit of the electromagnet e is operated by a circuit-controller e^2 , consisting

of a disk on one of the shafts of the repeater—as, for instance, upon the locking-shaft, with which a contact-pen coöperates.

In lieu of providing an independent motor mechanism for operating said shaft or cylinder *d* for controlling the shunt-switches of the pen or printing magnets of the recording instruments, said shaft or cylinder may be driven by or will form a part of the repeater, and the construction in some respects may be thus simplified.

The starting-magnet of the recording instrument is preferably also included in said local circuit *e'*.

I do not desire to limit my invention to the employment of an open-circuit recording instrument, but prefer to employ such form.

With the construction and arrangement thus described upon the reception of the first impulse from any box-number circuit-controller of any box-circuit the repeater is started, its locking-shaft operated to lock the armatures of all the signal-receiving magnets except the one connected in the operating box-circuit, and to also open all of the shunt-switches of the repeating circuit-controller except the one for the repeating circuit-controller of the operating box-circuit, and at the same time the recording instrument is started by its starting-magnet and the shaft or cylinder *d* is turned by the motor mechanism provided for it, which is let off by the electromagnet *e*, and said shaft or cylinder *d* upon being turned opens all of the shunt-switches of the pen-magnets of the recording instrument, thereby including said magnets in their respective box-circuits. The repeating-cylinder of the repeater normally rests with its insulated portion beneath the contact-pens, which in conjunction with said cylinder form the repeating circuit-controllers, and hence the box-circuits are normally open at such points, and as soon as the shunt-switches for said repeating circuit-controllers have been opened by the first impulse, as above described, all of the box-circuits will be opened at the repeating-cylinder except the operating box-circuit, and this circuit is open at the box sending the signal. The box-circuits being thus all opened, the armatures of all the pen or printing magnets will remain retracted, but during the time the operating box-circuit is held open by the first impulse, the repeating-cylinder revolves, momentarily closing all of the box-circuits except the operating box-circuit, and therefore operating all of the pen or printing magnets of the recording instrument except the particular pen or printing magnet corresponding to the operating box-circuit, and marking the tape accordingly. It will be seen that the first impulse of the incoming signal, as thus described, does not operate the pen or printing magnet connected with said operating box-circuit, because said circuit is held open at the box. It will therefore be understood that the incoming signal will be recorded on

the moving strip of paper with the record of its first impulse omitted, while all the other signals will be recorded with a record for all of their impulses, and hence on the tape the signals are easily distinguishable—that is, the incoming signal is distinguished from the repeated signals by the omission of its first impulse.

By the devices and arrangements herein shown I am able to connect an ordinary open-circuit recording instrument in a closed circuit having a box-number circuit-controller of the open-wheel variety and to record the impulse produced by said signal-wheel by dots.

I claim—

1. In an electric signaling apparatus, a number of box-circuits each having one or more box-number circuit-controllers, a repeater connected with said box-circuits having a number of signal-receiving magnets, one for each box-circuit, and a number of repeating circuit-controllers, one for each box-circuit, means controlled by any one of said signal-receiving magnets for rendering the remaining magnets non-responsive to changes in the box-circuits in which they are connected, and also for rendering operative all of said repeating circuit-controllers except the one connected with the operating box-circuit, and a recording instrument having a number of pen-magnets corresponding to the number of box-circuits, and means controlled by any box-number circuit-controller in any box-circuit for simultaneously rendering all of said pen-magnets responsive to the action of any circuit-controllers in their respective box-circuits, substantially as described.

2. In an electric signaling apparatus, several box-circuits having box-number circuit-controllers, a repeater connected therewith having a number of signal-receiving magnets and repeating circuit-controllers corresponding to the number of box-circuits, and means controlled by any one of said signal-receiving magnets for locking out the remaining magnets and for rendering operative all of the repeating circuit-controllers excepting the one connected with the operating box-circuit, and a recording instrument having several pen-magnets, one for each box-circuit, each responsive to the action of any box-number circuit-controller or to the repeating circuit-controller in said circuit, according to which ever circuit-controller is operating the circuit, substantially as described.

3. In an electric signaling apparatus, wherein several box-circuits, each having several box-number circuit-controllers are connected with a repeater having a signal-receiving magnet, and a repeating circuit-controller for each box-circuit, and means controlled by any one of the signal-receiving magnets for locking out the remaining magnets and also for rendering operative all of the repeating circuit-controllers excepting the one connected with the operating box-circuit, a recording instrument having several pen-magnets cor-

responding to the number of box-circuits, and means for connecting them simultaneously with all of said box-circuits to respond to the action of the circuit-controllers which are operating said circuits, substantially as described.

4. In an electric signaling apparatus, a recording instrument having several pen-magnets connected with a corresponding number of box-circuits containing box-number circuit-controllers, a shunt-switch for each pen-magnet, a device for simultaneously opening all of said shunt-switches controlled by the first impulse of any box-number circuit-controller of any box-circuit, the remaining impulses of which operate the pen-magnet corresponding to that box-circuit, and a repeating circuit-controller for each box-circuit, and means for simultaneously operating all of said repeating circuit-controllers excepting the one connected in the operating box-circuit, the remaining pen-magnets being responsive to the action of said repeating cir-

cuit-controllers, and means for closing said shunt-switches on the completion of the signal, substantially as described.

5. In an electric signaling apparatus, a number of normally-closed box-circuits, each having box-number circuit-controllers, a normally-open-circuit multiple-pen recording instrument connected therewith, shunt-switches for the pen-magnets of said recording instrument, means for opening all of said shunt-switches upon the occurrence of the first impulse of any one of the box-number circuit-controllers to thereby include said recording instrument in circuit with all of the box-circuits, substantially as described.

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

ALDEN D. WHEELER.

Witnesses:

B. J. NOYES,
HARRY O. ROBINSON.