(No Model.) 2 Sheets—Sheet 1

H. F. EATON.

MUNICIPAL SIGNAL SYSTEM.

No. 588,965. Patented Aug. 31, 1897.

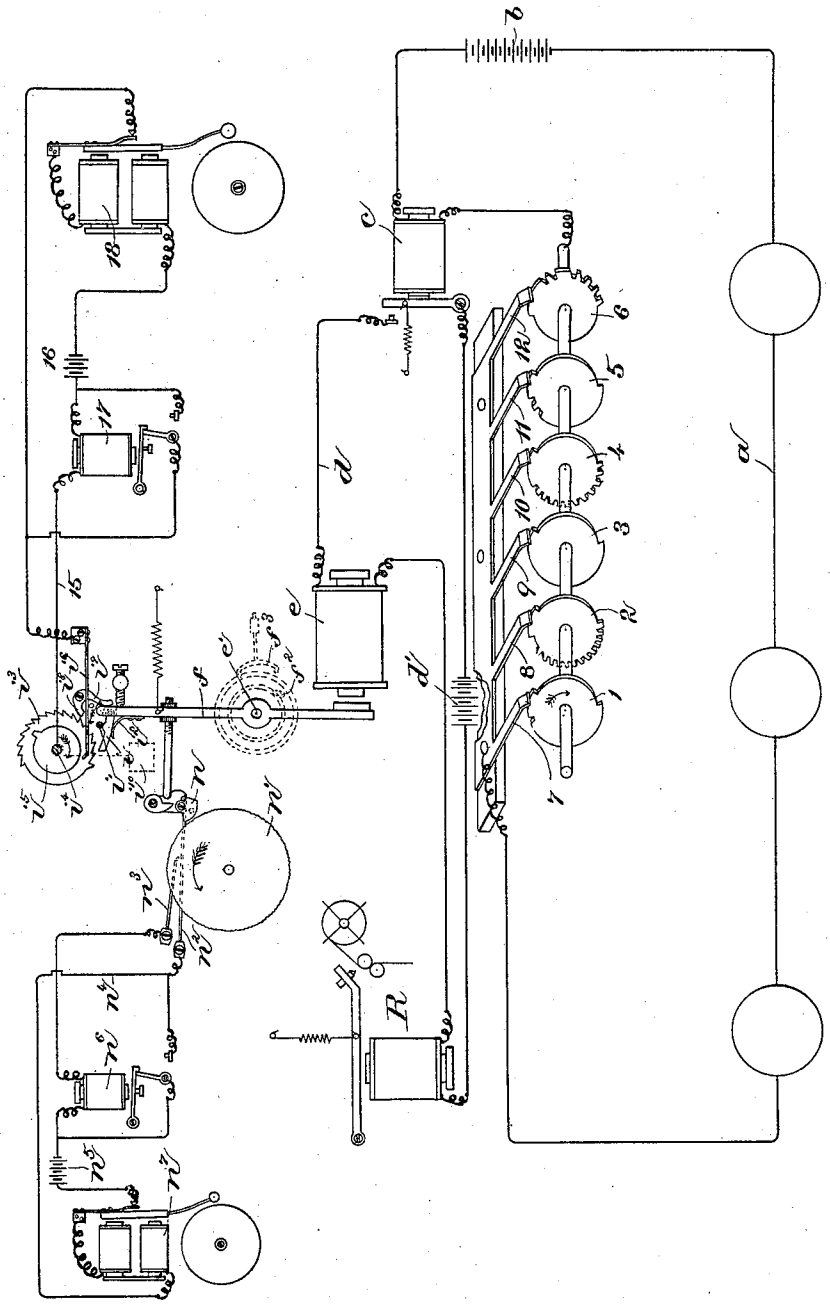


Fig. 1.

Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

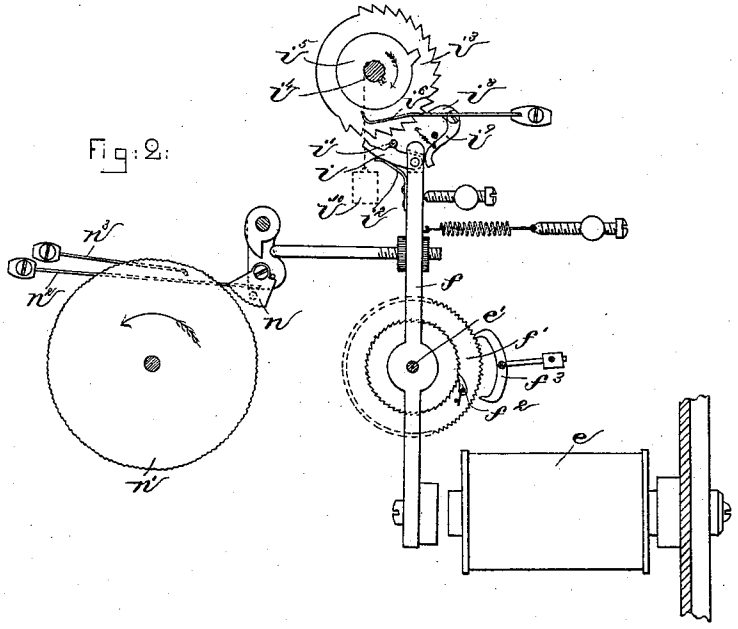
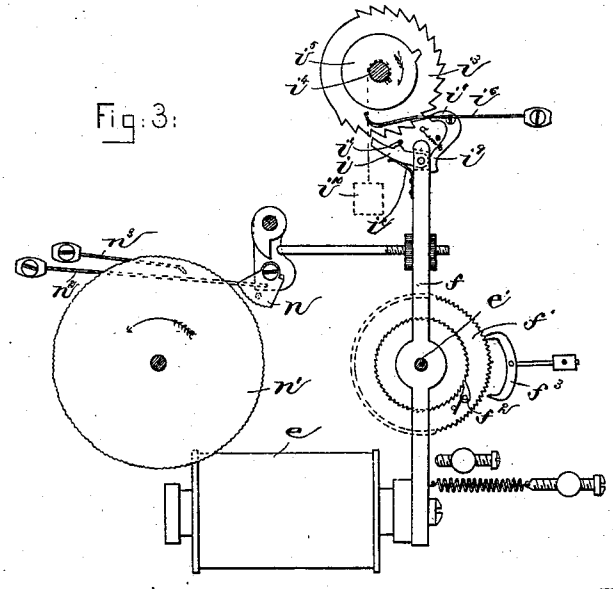


Fig. 3.



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UNITED STATES PATENT OFFICE.

HOWARD F. EATON, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO MULFORD M. DUNN, OF BOSTON, MASSACHUSETTS.

MUNICIPAL SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 588,965, dated August 31, 1897.

Application filed November 24, 1888. Renewed February 1, 1897. Serial No. 621,552. (No model.)

To all whom it may concern:

Be it known that I, HOWARD F. EATON, of Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in Municipal Signal Systems, 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 a municipal telegraph system such, for instance, as shown and described in United States Patent No. 359,687, dated March 22, 1887, the special and patrol signals are transmitted from the signal-boxes and received at the central station and an audible alarm or indicating-signal is provided at the central station, which is responsive to some of the signals and not others—as, for instance, responsive to the special signals only. Suitable means are shown for carrying out the invention. In other patents other means than that shown in the aforesaid patent are shown for the attainment of the same end.

This invention has for its object to provide a different form of apparatus at the central station than any now known to me, adapted to call into operation or to operate an audible alarm or indicating-signal for some of the signals and not others—as, for instance, for the special signals.

In accordance with this invention the signals are transmitted by changes in the condition of the circuit, as by interruptions, and those signals that it is desired the alarm shall respond an additional number of changes are effected. The signals are received at the central station upon any suitable or well-known form of register or other receiving instrument, and a step-by-step device is also employed at the central station, which is affected by the changes in the circuit and which upon a given number of changes or impulses calls into operation the audible alarm or indicating-signal. Means are also provided at the central station for detecting a broken wire, as will be described.

Figure 1 shows in diagram a signal-transmitter at one of the boxes and the receiving instruments at the central station; Fig. 2, an enlarged detail of the apparatus at the central station, which is operative to operate or call into operation the audible alarm upon the reception of a certain number of impulses; and Fig. 3, a similar view of the apparatus, showing an operating-electromagnet as designed for a closed circuit.

The main electric circuit *a* includes the main battery *b* and the receiving-relay *c* at the central station and several signal-boxes, each containing a signal-transmitter of any usual or suitable construction, the one herein shown comprising a series of break-wheels 1 2 3 4 5 6 and a series of contact-pens 7 8 9 10 11 12, and as elements not shown a selecting-cylinder and pointer, all substantially as represented in United States Patent No. 320,032, dated June 16, 1885.

The signal-wheels are differently formed to transmit a different number of impulses for the different signals.

For the regular patrol-signals signal-wheels 1, 3, 5, and 6 are used, the wheel 6 representing the box-number, and for the special signals, as wagon and telephone, the wheels 2 and 4 are used, these wheels having thereon many notches, so that the condition of the circuit may be changed many times in succession.

The "wagon" wheel 4 is herein shown as provided with twelve notches and a cut-away portion which corresponds to the projecting portion of the box-number wheel, and the "telephone" wheel 2 has eleven notches preceded by a short dash as a distinctive character.

As the signals are transmitted from the boxes the armature of the receiving-relay *c* responds, closing a local circuit *d*, including a local battery *d'* and an electromagnet of the register R and the electromagnet *e*.

The armature of the electromagnet *e* is fastened to one end of a bar *f*, fixed to a shaft *e'*, a ratchet-wheel being also secured to said shaft *e'*, the teeth of which ratchet coöperate with a pawl f^2, loosely connected to the stud of an escape-wheel *f'*, having in engagement with it an escapement f^3.

By means of the escapement the armature may be quickly attracted, but resumes its normal position slowly.

The bar *f* has loosely connected with it at

its upper end a push-pawl i, which is normally pressed against a guide-pin i' by a spring i^2.

The pawl has on its under side a cam or projection which comes in contact with the guide-pin as the armature f is moved, so as to move the pawl on its pivot.

The pawl when moved forward, as by the attraction of the armature, engages the teeth of a ratchet-wheel i^3, fixed to a shaft i^4. A signal or circuit wheel i^5 is also secured to the shaft i^4, which, when the shaft has been revolved a determinate distance, makes contact with the pen i^6. A pawl i^8, having an extended shank portion i^9, is adapted under the action of its spring to engage the teeth of the ratchet-wheel i^3 to insure forward motion only of the ratchet-wheel when the pawl is in engagement; but when the armature is retracted from the poles of the magnet e the upper end of the bar f strikes the shank portion i^9 and disengages the pawl from the ratchet-wheel i^3. A cord (see dotted lines) passes around the shaft i^4, to which is attached a weight i^{10}, so that when the ratchet-wheel is disengaged by the pawl i^8 it will be restored to its normal position.

In operation when a wagon-signal is transmitted twelve impulses are transmitted in succession, and the bar f will be moved upon the occurrence of the first impulse, so that its pawl i will engage and move the ratchet-wheel i^3 forward one step. The time which elapses between the several impulses is not sufficient for the armature to resume its normal position, and hence vibrates in a limited field before the poles for the several impulses, and each impulse feeds the ratchet-wheel i^3 forward one step. The box-number follows this series of short impulses, but a sufficient interval of time elapses previous to the box-number for the armature to return to its normal position, and causes the upper end of the bar f to disengage the pawl i^9. When the ratchet-wheel i^3 has been moved upward a definite distance step by step, the circuit-wheel i^5 closes a local circuit 15, containing the local battery 16, the magnet 17 for an annunciator-drop, and the magnet 18 for a bell, so that a bell will be sounded for all signals which have as a part of them a large series of short impulses. The bell 18 herein shown constitutes one form of a special indicating device actuated by the series of short impulses. I have also herein shown a creeper comprising a segment n and milled wheel n', said segment operating to lift the pen n^2 in contact with the pen n^3, as upon the occurrence of a long dash, such as might be caused by a broken wire, to thereby close the local circuit n^4, containing the local battery n^5, the magnets n^6 of an annunciator-drop, and the magnet n^7 of a bell.

I do not desire to limit my invention to the precise construction herein shown for carrying out this invention, as it may be changed in many ways and yet accomplish the result which forms the essential feature of this invention.

In Fig. 3 the armature of the electromagnet e is shown upon the opposite side of the bar f, so that the said magnet may be included directly in the main circuit in contradistinction to being placed in a local circuit, as shown in Fig. 2.

I do not claim the creeper herein shown.

I claim—

1. In a municipal telegraph system comprising a central station and several substations connected by an electric circuit, a multiple-signal transmitter at each substation constructed and arranged to transmit a series of impulses constituting the substation-number and adapted at times to transmit another long series of short successive impulses, combined with a register to receive the signals transmitted by said transmitters, and a special indicating device unaffected by one of the series of impulses but affected by the long series of short successive impulses, substantially as described.

2. In a municipal telegraph system comprising a central station and several substations connected by an electric circuit, a multiple-signal transmitter at each substation constructed and arranged to transmit a series of impulses constituting the substation-number and adapted at times to transmit an additional long series of impulses, combined with a register to receive the signals transmitted by said transmitters, and a special indicating device unaffected by the series of impulses constituting the substation-number but affected by the additional long series of short successive impulses when the latter are transmitted in conjunction with the substation-number, substantially as described.

3. In a municipal telegraph system comprising a central station and several substations connected by an electric circuit, the multiple-signal transmitters at the substations for transmitting in conjunction with some of the signals several regular impulses, combined with a register for the signals, the electromagnetically-movable circuit-wheel i^5, a bell, the circuit of which is controlled by said wheel i^5, the creeper n, wheel n', and the bell controlled by it, substantially as described.

4. In a municipal telegraph system comprising a central station and several substations connected by an electric circuit, multiple-signal transmitters at the substations constructed and arranged for producing in conjunction with some of the signals a large number of impulses in succession, combined with a register for receiving the signals, and with an electromagnetically-movable circuit-changing device comprising the magnet e, its armature, and bar f, a pawl carried by it, the escapement for retarding the movement of the bar f, and the ratchet-toothed wheel and circuit-wheel i^5, and bell in circuit controlled by said circuit-wheel, substantially as described.

5. The electromagnetically-movable circuit-changing device, comprising the magnet *e*, its armature and bar *f*, a pawl carried by it, the circuit-wheel i^5, and the ratchet-toothed wheel and its back-stop having the extended shank i^9, substantially as described.

6. The electromagnetically-movable circuit-changing device, comprising the magnet *e*, its armature and bar *f*, a pawl carried by it, the escapement for retarding the movement of the bar *f* and the ratchet-toothed wheel and circuit-wheel i^5, substantially as described.

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

HOWARD F. EATON.

Witnesses:

JAS. H. CHURCHILL,

FREDERICK L. EMERY.