

J. C. WILSON.
MUNICIPAL SIGNAL APPARATUS.

No. 344,467.

Patented June 29, 1886.

Fig: 1.

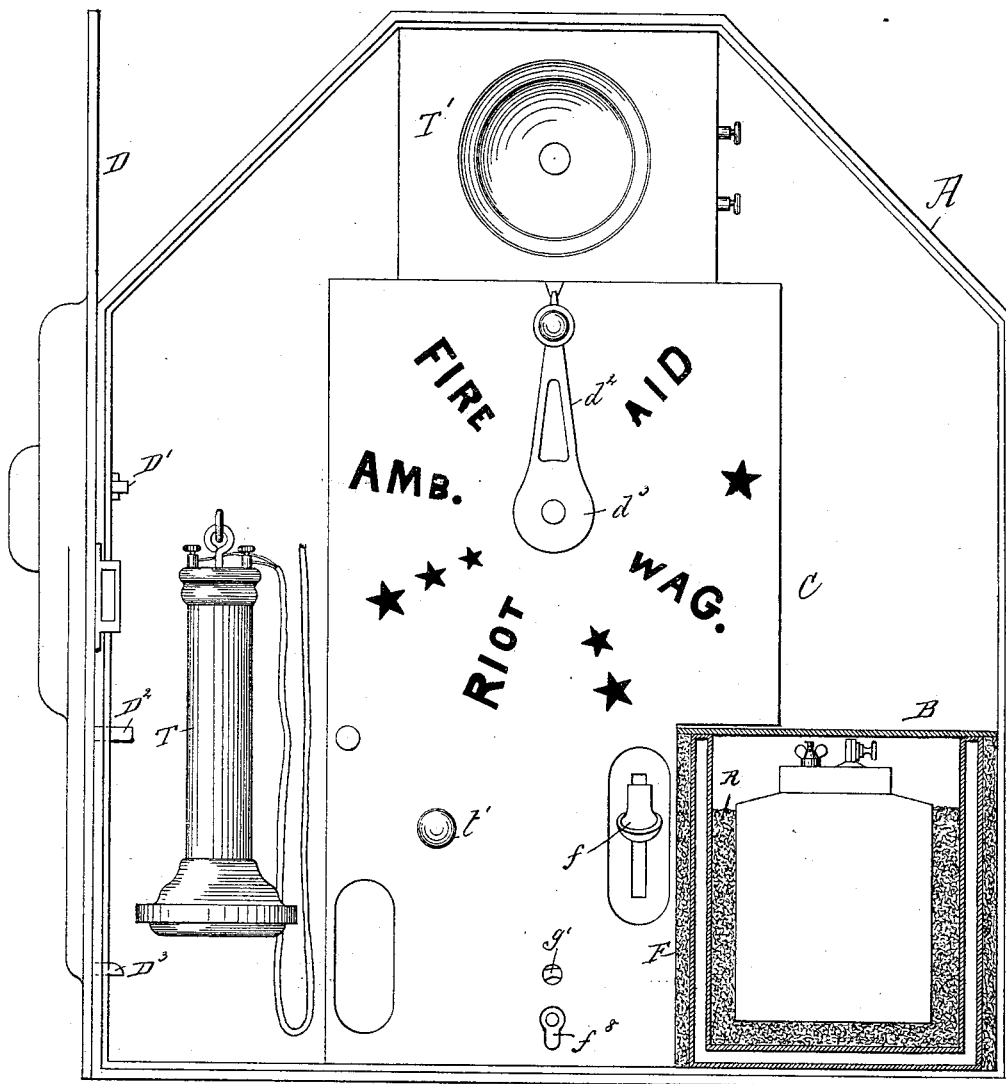
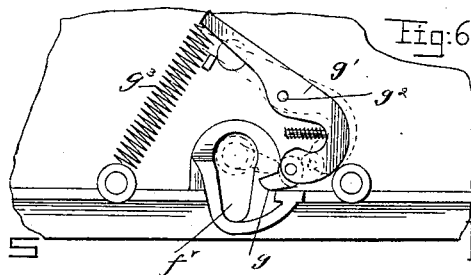


Fig: 6.



Witnesses

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Fig: 2.

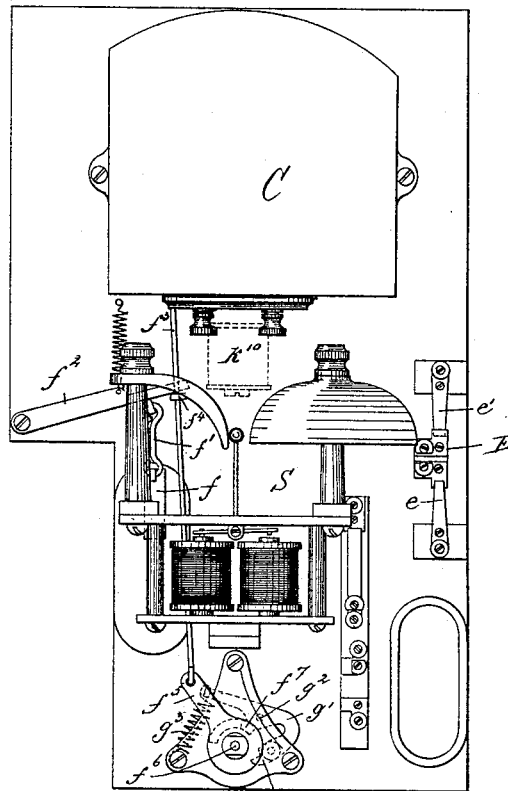


Fig: 3.

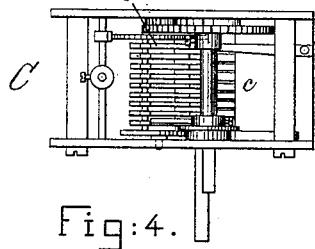
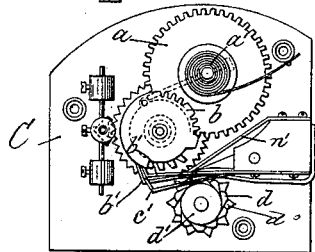


Fig: 4.



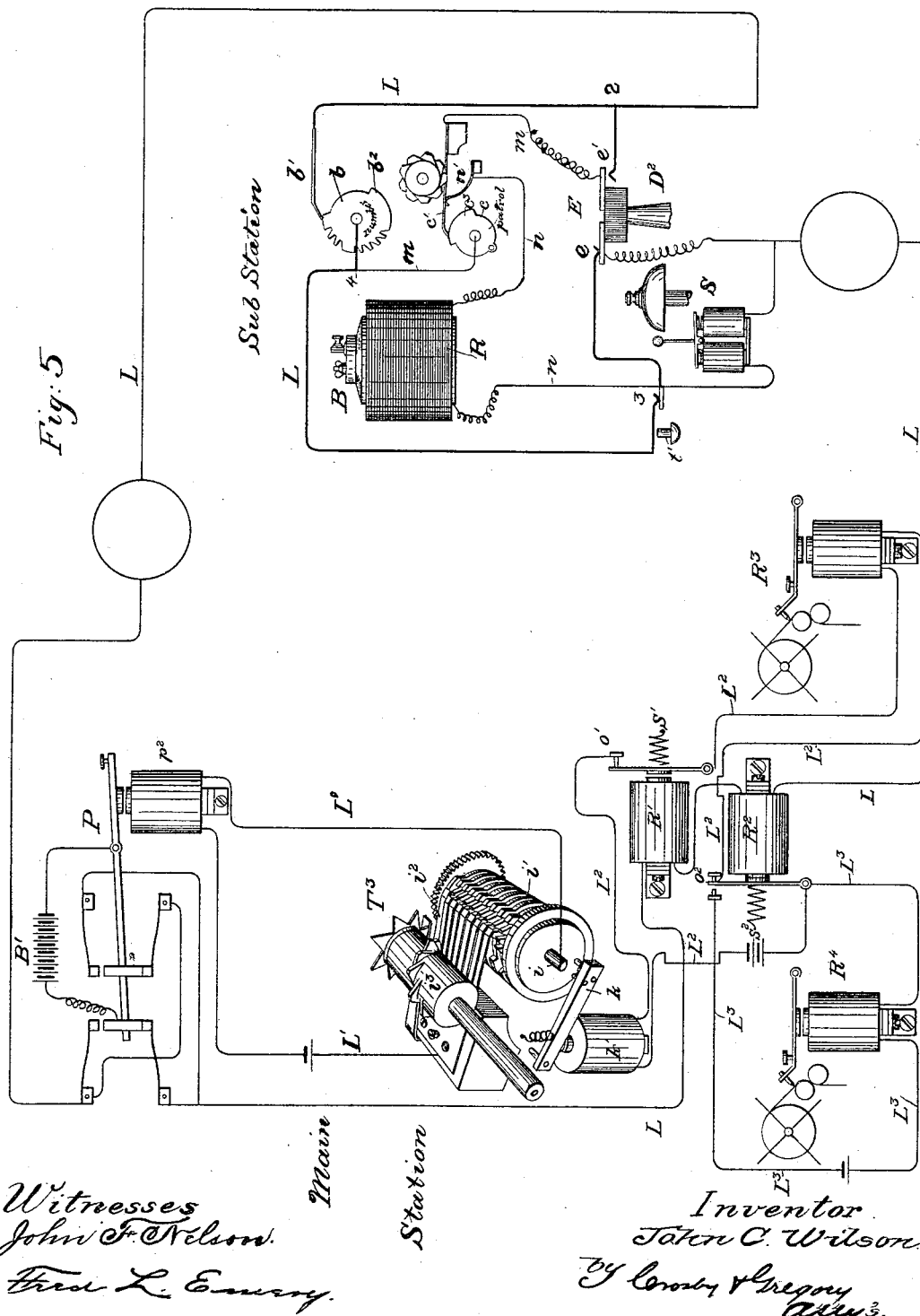
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UNITED STATES PATENT OFFICE.

JOHN C. WILSON, OF BOSTON, MASSACHUSETTS.

MUNICIPAL SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 344,467, dated June 29, 1886.

Application filed April 20, 1885. Serial No. 162,779. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. WILSON, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Municipal Signal Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a municipal telegraph or signaling apparatus of the kind shown in Letters Patent No. 288,536, November 13, 1884, and application No. 118,981, filed by me January 28, 1884. In the said patent and application apparatus is shown and described comprising instruments at the headquarters or police station-houses and signal-boxes or sub-stations in the street, the said instruments at the main and sub stations including multiple signaling devices, by which any desired one of a series of definite signals can be sent in either direction, the multiple-signal transmitter at the main station being controlled by the operator at the said main station as to the character of the signal to be transmitted by it, but being called into operation by the person who is to receive the signal at the sub-station. The signal-boxes at the sub-stations each, when operated, transmits a signal, usually a number, characterizing the said box or station, and thus indicating the locality at which a citizen is in need of police assistance, or where the want, indicated by a special signal, is to be supplied. The multiple-signal device by which the special-want signal is transmitted is inclosed within the box and inaccessible, except to a policeman or other specially-authorized person provided with a suitable key for opening the box, which is also provided with means for operating it without opening the door, in which case only the number or box signal can be transmitted, it being intended that such signal may be transmitted by citizens who require police aid of any kind. One of the signals to be sent by the policeman is merely to indicate his presence at the box, and thus show that he is properly attending to his duty and will be called, for distinction, the "patrol" or "on-duty" signal; and the present invention consists partly in a novel arrangement of the circuits and appliances, whereby the patrol-

signal is received at the main station upon separate instruments from those which receive the citizens' calls or the special-want signals, that require immediate attention from the main office. The multiple-signal device is controlled by a pointer, in connection with a dial, upon which the different signals are indicated, the placing of the pointer opposite one of the said signals on the dial setting the apparatus in proper condition to transmit the corresponding signal, and the closing of the box-door automatically restores the said multiple-transmitting apparatus to its normal condition, so that only the citizens' call or box-number can be transmitted when the box-door is closed. In the present invention appliances are provided by which, when the door is opened by the policeman without moving the pointer, the box or transmitting apparatus is automatically placed in condition to transmit the patrol-signal, which, as before stated, is received upon a different instrument from the other signals, current changes of different character being employed from those by which the other signals or "want-calls" are transmitted. As shown, in this instance the citizens' and special signals are transmitted by total interruptions in the current, while the patrol signals are transmitted by alternately weakening and strengthening the current without totally interrupting the same, and a weakening of the current also operates to set the transmitter at the main station in operation, so that whatever signal it has been previously set for by the operator at the main station is transmitted to the sub-stations. In order to enable the signals to be transmitted from the sub-stations by weakening of the current, and also to enable the operator at the sub-station to weaken the current for the purpose of causing the signal to be transmitted from the main station, each box is provided with resistance of sufficient amount to produce the desired weakening of the current when the said resistance is in the circuit, and when the pointer of the box is in its normal position, (which is the position for the patrol-signal,) and the box-door is opened, this resistance will be included in the circuit during the transmission of the signal by the break-wheel, which will operate to intermittingly shunt or cut out the said resistance and thus

transmit the signal by alternately weak and strong currents. The boxes are also shown as provided with telephonic transmitting and receiving instruments, and the local battery for the telephone-transmitter has wound upon it a conductor of high resistance, which is the resistance employed for weakening the current, and the heating effect of the current in the said conductor is thus utilized to prevent the battery from becoming too cold or from freezing.

Figure 1 is a front elevation of a signal-box embodying this invention, being shown with the door open, and with the pointer in its normal position, so that the patrol-signal will be transmitted if the box is operated without further change. Fig. 2 is a rear elevation of the signal transmitting and receiving apparatus contained in the box; Figs. 3 and 4, a plan view and front elevation, respectively, of the multiple-signal-transmitting device of the box, the front parts of the frame-work being removed in Fig. 4; and Fig. 5, a diagram showing the circuit and arrangement of the instruments therein at the main and sub stations; Fig. 6, a detail to be referred to.

The box A (see Fig. 1) is of suitable size and shape to contain the signal transmitting and receiving apparatus C, and the telephone-receiver T, and transmitter T', and the local battery B for the latter, the said box having a door, D, provided with a suitable lock, so that when closed it can only be opened by an authorized person provided with a suitable key, it being intended that the policemen shall have such keys, and that they shall open each box and operate the same at definite times while on duty.

The signal-transmitting apparatus C (best shown in Figs. 2, 3, 4) consists, essentially, of a motor, *a*, which, when actuated by its spring or actuator *a'*, when properly wound by the pull or box-operating device, operates a break-wheel, *b*, which, in connection with its co-operating spring *b'*, (see Fig. 5,) will operate to produce a series of interruptions in the current in the usual manner, the said break-wheels being different at each box in the circuit, and each being adapted to transmit a signal characterizing the box or station in the manner of the well-known fire-alarm-telegraph apparatus. The signal-transmitting apparatus C also includes a multiple-signal device operated by the same motor, *a*, in conjunction with the said break-wheel *b*, to send any desired one of a series of special signals in connection with the number or box signal of the wheel *b*, to thus indicate a want or the nature of the assistance needed at the box. This multiple-signal apparatus may be of any suitable character, many different devices for this purpose having been invented by me, and shown and described in other patents and applications for Letters Patent.

The multiple-signal device shown in the present invention is substantially the same as shown in application No. 130,347, filed by me

May 5, 1884, consisting of a series of break-wheels, *c*, mounted on the same shaft with the break-wheel *b*, and moving simultaneously therewith, and a series of co-operating springs, *c'*, normally disengaged from the surface of the corresponding wheels, but adapted to be pressed into engagement each with its corresponding break-wheel by projections, *d*, of a shaft or cylinder, *d'*, provided with a pointer, *d''*, (see Fig. 1,) co-operating with a dial having indicated on it the various different signals that are to be transmitted, said cylinder *d'* constituting a signal selecting device, the movement of the pointer *d''* to any of the said signals on the dial bringing a corresponding one of the projections *d* (which are distributed around the shaft *d'* to correspond with the different signals of the dial) into position to press the corresponding spring against one of the break-wheels *c*, which will produce a signal that will be understood at the main office as meaning the same as that indicated on the dial by the pointer, the signal usually consisting of a combination of long and short interruptions in the current—such, for instance, as employed in the Morse alphabet. A star-wheel, *d'''*, in connection with a suitable spring-dog, arrests and holds the shaft *d'* in correct angular position for each signal. The pointer *d''* is automatically placed by the closing of the door in a definite position, which may be done, as shown in Fig. 1, by a cam, *d''*, on the said pointer, and a projection, *D'*, on the door, as described in the patent hereinbefore referred to. The box is also provided with a receiving-signal instrument, *s*, (see Fig. 2,) consisting of a magnet with a polarized armature operating a bell-hammer, and thus signaling by taps upon a bell, the instrument being operated by reversals in polarity of the current produced by the signal-transmitter at the main station. The box also contains a conductor of considerable resistance, (shown at R, Figs. 1 and 5,) preferably consisting of wire of high resistance wound around the local battery B, so that the heating effect of the current in the said conductor will be utilized to prevent the freezing of the battery B. When the apparatus is to be used in a warm climate, the resistance may be in a compact coil, as shown in dotted lines at R⁰, Fig. 2. The box is provided with a circuit-changing device or switch, E, operated by a projection, *D''*, on the door of the box, the said switch or circuit-changing device operating when the box-door is closed to shunt the magnet of the signal S and to open-circuit the resistance R, so that the main circuit passes directly through the break-wheel and spring *b b'*, which operate to alternately break and close the said circuit in the usual manner. The motor *a* is provided with two pulls or operating devices for winding its spring *a'*, so as to permit the said spring to actuate the motor to produce one turn in the break-wheel. One of the said box-operating devices consists of a slide, *f*, having a handle or finger-piece (see Fig. 1)

connected by a link, f' , (see Fig. 2,) with an arm, f'' , forked to embrace a rod, f''' , and to engage a projection, f^4 , thereon, the said rod being connected with the winding-shaft. One end of the spring a' is attached to the said shaft, which is connected with the main wheel of the motor by a ratchet and pawl, as commonly practiced in signal-boxes employed for fire-alarm and district-signaling purposes. The rod f''' is also connected with an arm, f^5 , (see Fig. 2,) turning around a stud, f^6 , and provided with a projection, f^7 , to be engaged by the bit of a key inserted through a key-hole, f^8 , (see Fig. 1,) which is accessible when the box-door is closed, it being intended that responsible citizens shall be provided with keys for entering the key-hole f^8 and operating the box-motor. A dog or pawl, g , is provided to engage the bit of the key after it has entered the key-hole and been turned therein, thus preventing the removal of the key, which is held until the arrival of the policeman, when it may be removed and retained to indicate the person operating the box in case it has been operated needlessly. The dog g is supported on a lever, g' , (see Fig. 6,) one arm of which is engaged by a projection, D^2 , on the door, turning it on its pivot g'' , so as to retain the dog g in the path of the key, as described; but when the door is opened a spring, g^3 , turns the said lever sufficiently to withdraw the dog from the path of the key-bit, leaving the key free to be removed.

The circuit and operation will be best understood by referring to Fig. 5, which shows at the part marked "Main Station" the receiving and transmitting instruments at the main office, and at the part marked "Sub-Station" the apparatus of one of the boxes, the mechanical construction of which has been already described. The main-line circuit L (shown in heavier lines than the branch and local circuits) includes at the main station the main battery B' , the poles of which are connected with the line by a pole-changing instrument, P , of usual construction, by which the position of the said battery in the main line is reversed, the said pole-changer being of any well-known construction, and being operated by an electro-magnet, p^2 , in a local circuit, L' , containing a multiple signal-transmitting device, T^3 , which may be of similar construction to the one previously described in connection with the box, including a shaft, i , acted upon by a suitable motor, tending to rotate the same, and provided with a series of break-wheels, i' , and corresponding springs, i'' , normally disengaged from the break-wheels, but adapted to be pressed into engagement therewith, one at a time, by a shaft or drum, i^3 , having projections which in their different angular positions act on the different springs i'' , it being understood that the shaft i^3 will be provided with a pointer co-operating with a dial, to indicate the different signals that will be transmitted in the different positions of the said pointer. The motor of the

shaft i is adapted to turn the same for a large number of revolutions, and the movement of the said shaft is controlled by a detent k , operated by an electro-magnet, k' , in a local circuit, L^2 , controlled by the joint action of two relays, R' R^2 , in the main line L , the former of which relays will for distinction be called the "weaker" relay, having the stronger retractor, S' , so that it releases its armature-lever upon a definite reduction in the strength of the current, while the latter relay, R^2 , is not caused to release its armature upon such weakening of the current, but will release it upon the total interruption of the same. The local circuit L^2 of the detent-magnet k' includes the armature-lever and the front stop, o^2 , of the stronger relay, R^2 , and the armature-lever and back stop, o' , of the weaker relay, R' , so that when the latter relay is operated while the former is unaffected, as by the before-mentioned weakening in the current, the local circuit L^2 will be closed at the back stop, o' , and the detent-magnet k' energized, causing the release of the multiple-signal-transmitting devices T^3 , which will then operate to transmit the signal for which it has been previously set by the operator turning the shaft i . When, however, both relays R' R^2 are affected simultaneously by the total interruption of the current, the local circuit L^2 is broken by the relay R^2 , so that no effect is produced upon the detent-magnet by the retraction of the armature of the relay R' , and the transmitter T^3 consequently is not set in operation by the total interruption of the current in the main-line circuit L . The local circuit L^2 also contains a signal-receiving instrument or register, R^3 , which will thus respond to reductions in the current-strength in the main line, but will not respond to total interruptions therein. The relay R^2 controls a local circuit, L^3 , in the usual manner, operating a receiving-instrument or register, R^4 , which thus responds to total interruptions in the main-line current, but not to the reductions in current-strength that effect the operation of the register R^3 and transmitter T^3 . Normally, when the box-door is closed at the sub-station the main-line circuit includes the spring b' and break-wheel b , by which the number or box signal is transmitted, and also includes the circuit-closer c , which, when the door is shut, is closed by the projection D^2 , as shown in Fig. 5, thus shunting the magnet of the signal S , so that there is practically no resistance in the line at the boxes when they are closed. In this condition, when the motor a is operated by means of a key inserted in the key-hole f , as previously described, the wheel b , in revolving, will alternately break and close the circuit in the usual manner, producing movements of the armature of the relay R^2 , and thus producing signals which are recorded in the register R^4 , while the other apparatus at the main station, included in the local circuit L^2 , is not affected. The break-wheel c and spring c' , constituting the multi-

ple-signal apparatus of the box, are included in a branch circuit, m , around the break-wheel b and its spring b' , the said branch circuit being opened by a circuit-closer, e' , when the box-door is closed, the said circuit-closer e' , as well as the one e , previously mentioned, being part of the circuit-changer E , that is operated by the projection D^2 on the box-door. The resistance R , which, when included in the circuit by a suitable switch, produces a sufficient weakening in the current to cause the relay R' to release its armature, is itself included in a branch, n , from the main circuit, terminating in a spring, n' , which herein constitutes a switch, the said switch being so located as to be engaged by the spring e' of the multiple-signaling device, by which the patrol or on-duty signal is transmitted, the said spring n' being touched by the spring e' when the pointer d^2 , forming part of or rigidly connected with the signal-selecting cylinder, (see Fig. 1,) is in its normal position. When the box-door is opened, the circuit-changing device E is moved, opening the circuit-closer e and closing the one e' . The opening of the circuit-closer e throws the magnet of the signal S into circuit, and the resistance of the said magnet is very small compared to the resistance R , so that when the said magnet alone is in circuit the current is not sufficiently weakened to produce any appreciable effect on the relays therein. When the parts are in this position—namely, with the box-door open and the circuit-closer e' closed—there are two circuits from the point 2 to the point 3—one over the main line, as before described, through the break-wheel b b' and spring, without appreciable resistance, and the other through the branch m , which is again branched at the point of contact between the springs n' and e' , the branch m from the wheel c being without resistance, while the branch n contains the resistance R . With the parts in this position, when the operator sets the motor of the box in action by the pull f , (see Fig. 1,) the wheels b c (which it will be understood are on the same axis, although shown separately for convenience in Fig. 5) will revolve simultaneously, and the spring b' will first pass off from the wheel b at the long notch b^2 thereon, while the spring e' is still on the long raised portion e^3 of the wheel c . The current will not at this time be affected, as it will pass from the point 2 to the point 4 over the branch m , instead of over the main line. As soon, however, as the raised portion e^3 of the wheel c passes from beneath the spring e' , the branch m will be opened, and then when a notch of the wheel b passes beneath the spring b' , both branches will be opened between the points 2 4, and the current will pass from the point 2 over the portion of the branch m connected with the spring e' , thence to the spring n' , and through the branch n , including the resistance R , thus causing the current to be weakened and the armature of the relay R' to be retracted, clos-

ing the local circuit L^2 at o' , and causing the register R^3 to operate; and also causing the release of the transmitting device T^3 at the main station. When the raised portions of the wheel b between the notches touch the spring b' , the resistance R will be short-circuited by the main line L and the current restored to its full strength, and thus each notch of the wheel b produces a weakening of the current affecting the register R^3 , just as when the box-door is closed it produces a total interruption in the current operating the registers R^4 . The transmitter T^3 operates through the pole-changer P to reverse the polarity of the current without opening the circuit, such reversals affecting the polarized signal S , but not affecting the relays R' R^2 , so that the patrol signal may be received on the register R^3 at the same time that the signal is being transmitted outward to the operator at the box or sub-station. When the pointer d^2 , operating the signal-selecting cylinder, is moved from the normal position, for the purpose of sending any of the special-want signals indicated on the dial, Fig. 1, the spring e' , that co-operates with the wheel c of the patrol-signal will be disengaged from the said wheel, and by the same movement will also be disengaged from the spring or switch n' , so that the resistance R will remain in open circuit and the signals will be transmitted by breaking and closing the circuit first between the particular spring e' and wheel c that have been placed in contact by the movement of the shaft d' , and then between the break-wheel b and spring b' , the notched raised portions of the wheels c corresponding with the long notch b^2 of the break-wheel b , so that the circuit is left wholly under control of the wheel c , while the said portion of the wheel b having the long notch b^2 is passing the spring b' , the circuit then being completed through the branch m , and the surface of the wheel c is cut away in the part corresponding to the notched part of the wheel b . The circuit-breaker t , operated by a button, t' , (see Fig. 1,) may be employed to open the main circuit between the points 3 and 4, and thus throw the resistance R into circuit if the operator at the box desires to set the transmitter at the main station in operation without operating the box to transmit the patrol signal. The local circuit L^3 will preferably contain an audible-signal instrument, so as to attract the attention of the attendant whenever the register R^4 is operated, receiving a citizen's or special-want call. The local battery B will preferably have outside of the conductor R a jacket or covering that is a poor conductor of heat—such, for instance, as layers of felt. (Shown at F, Fig. 1.)

In some cases it may be necessary to have more than one receiving-station in the circuit where one or both sets of signals may be received; and it may also be desirable in some cases to have the alarm-signals received at several different localities at the same time; and

it can readily be seen that under this system any number of receiving-instruments may be easily looped into the circuit for this purpose.

I deem myself to be the first to employ a switch to co-operate with a transmitting-instrument and two or more receiving-instruments, substantially as herein described, to determine the transmission of the signal that it may be received on one or another receiving-instrument, and I have shown, as I prefer, the said switch as under the control of the signaling-selecting cylinder.

I have herein described an apparatus by which to transmit signals from a distant station, and to record the same, the method of operation, also described, being such that the more important signals, indicating wants, may not be confounded with the signals of minor importance, such as patrol or on-duty signals; but the said method is not herein claimed, as it has been made the subject-matter of another application, Serial No. 195,950.

Herein I have shown two independently-actuated recorders, both of which are operative, and in the said application above referred to I have shown a recording device combined with an alarm, whereby the occurrence of a more important signal demanding immediate attention is accompanied by an alarm.

I claim—

1. In an electric circuit, a signal-transmitting apparatus having a switch co-operating therewith and under the control of the operator, combined with two or more message-receiving instruments connected with the same circuit and independent of each other, to receive the signals produced by the signal-transmitting apparatus, the position of the said switch determining which message-receiving instrument shall receive the signal transmitted, substantially as described.

2. In an electric circuit, a signal-transmitting apparatus constructed and arranged, substantially as described, to transmit signals either by total interruptions in the current or by changes in the current-strength, combined with the switch *n'*, and means, substantially as described, controlled by the operator to operate the said switch, the position of the latter determining by which way the signal should be transmitted, as set forth.

3. In an electric circuit, a signal-transmitting apparatus constructed and arranged, substantially as described, to transmit signals either by total interruptions in the current or by changes in the current-strength, two message-receiving instruments connected with said circuit and independent of each other, to independently respond to signals produced by the said transmitting apparatus by the different ways, combined with a controlling-switch, substantially as described, forming a co-operative part of the signal-transmitting apparatus, the position of the said switch determining by which way the signal shall be transmitted, as set forth.

4. The combination, substantially as here-

inbefore set forth, of an electric circuit having a signal-transmitter and a switch under the control of the operator, co-operating therewith, at one station, two independent message-receiving instruments at another station, each actuated by a distinct and different change in the said circuit, which change is determined by the position of the said switch co-operating with the signal-transmitter, and a pole-changing transmitter, also at the last-named station and operating substantially as described, and a polarized receiving-instrument at the first-named station operated by the said pole-changing transmitter, all as set forth.

5. In a system for transmitting signals from a sub-station to a central office, a signal-transmitting apparatus, a dial, and co-operating pointer, each located at the sub-station, two or more independent message receiving or recording instruments at the central station, connected in circuit with the signal-transmitting apparatus, the said signal-transmitting apparatus including as a co-operative part of it a switch controlled as to its position by the pointer, to determine at will which of the said message-receiving instruments shall operate, substantially as described.

6. In an electric-circuit, a signal-box containing signal-transmitting apparatus, consisting of a series of signaling-surfaces, springs co-operating therewith, and a signal-selecting cylinder in the main circuit, and a resistance in a branch circuit, combined with means, substantially as described, controlled by the signal-selecting cylinder, to introduce the resistance into the main circuit and remove it therefrom, all as set forth.

7. In a signal-transmitting apparatus, a main electric-circuit, a break-wheel therein, a multiple-signal-transmitting device, substantially as described, in a branch circuit around the said break-wheel, and a resistance in a branch circuit around the multiple-signaling device, combined with a circuit-breaker located at the junction of said branch circuits and the main line, and operating substantially as described, to control the said branch circuits, as set forth.

8. A signal-box containing a break-wheel or equivalent in the main circuit, and a co-operating multiple-transmitting device, substantially as described, and a circuit-breaker in a branch circuit, said circuit-breaker being controlled by the door of the box or station, and operating when closed to cause a signal characteristic of the box or station, together with one of a series of auxiliary signals characteristic of the multiple-signal-transmitting device, to be transmitted, and operating when open to cause a signal characteristic of the box or station only to be transmitted, substantially as described.

9. An electric circuit containing automatic signal-transmitting instruments, substantially as described, adapted to transmit signals by changes of current-strength and also by total interruptions thereof, and message-receiving

instruments and their receiving electro-magnets, adjusted to respond to the signals produced by the changes of current-strength, and to those produced by total interruptions of the
5 said current, and receiving electro-magnets adjusted to respond only to signals produced by total interruptions of the said current, substantially as described.

10 An electric circuit containing automatic signal-transmitting instruments, substantially as described, adapted to transmit signals by changes of current-strength, and also by total interruptions thereof, and two
15 message-receiving instruments and their receiving electro-magnets, adjusted to respond to the signals produced by the changes of current-strength, and to those produced by total interruptions of the said current, and one or
20 more signal-receiving electro-magnets adjusted to respond only to signals produced by total interruptions of the current, combined with a battery-reversing instrument and polarized receiving-instruments in the same circuit, substantially as described.

11. In an electric circuit, two independent 25 message-receiving instruments at one station, each actuated by a distinct and different change in the circuit, a signal-transmitting apparatus constructed and arranged, substantially as described, to transmit signals by two different 30 and distinct changes in the circuit, and having a dial and co-operating pointer concealed by the door at another station, the said pointer being normally set to send a signal by one change in the circuit to be received upon one 35 message-receiving instrument when the dial is concealed, but accessible when the dial is exposed, to be operated to send a signal by another change in the circuit, to be received, respectively, upon either instrument at the 40 will of the operator, all as set forth.

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

JOHN C. WILSON.

Witnesses:

B. J. NOYES,

G. W. GREGORY.