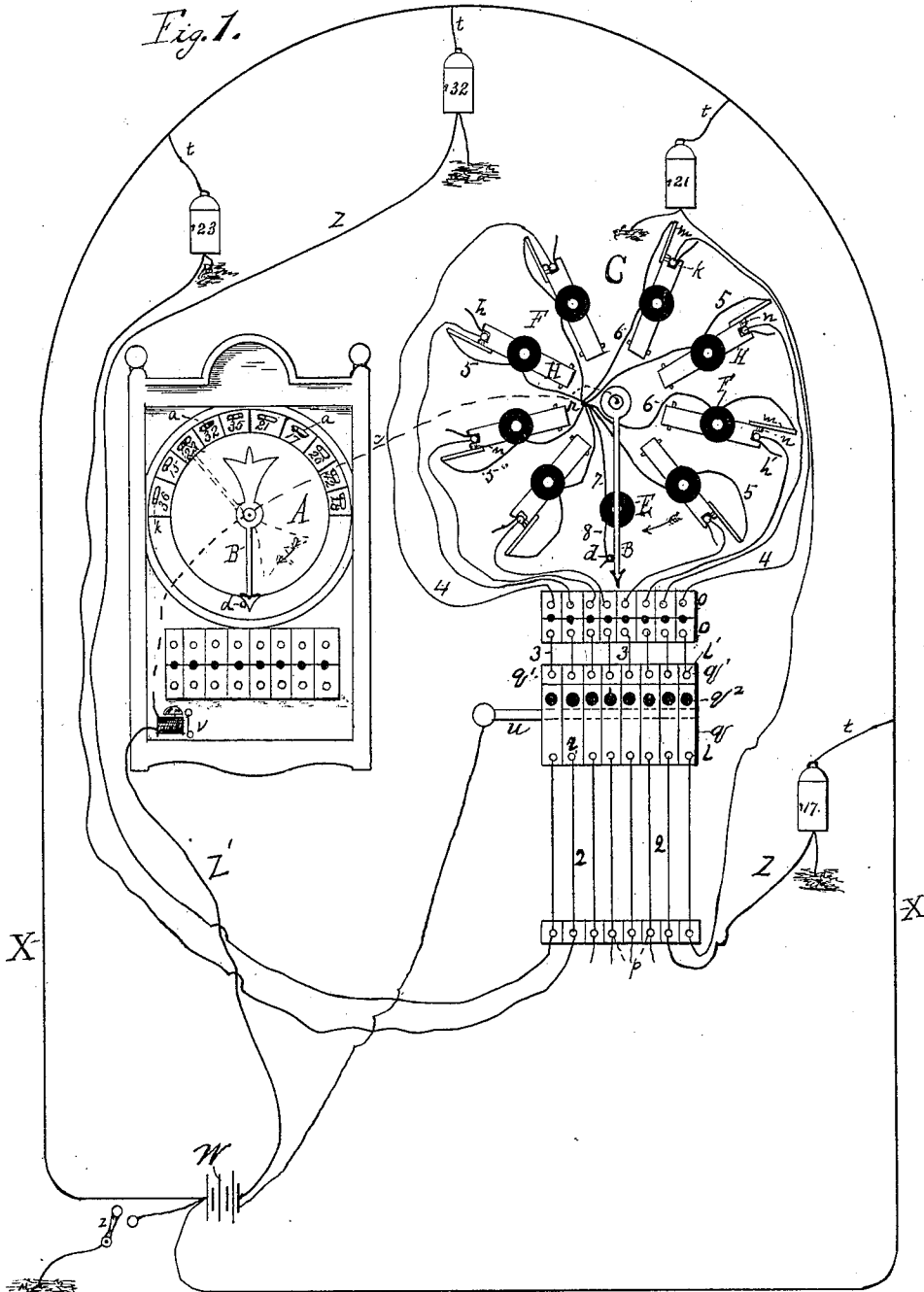


L. H. McCULLOUGH.

SIGNALING APPARATUS FOR POLICE TELEGRAPHS.

No. 350,634.

Patented Oct. 12, 1886.



Witnesses:
 E. C. Brown.
 D. P. Wright.

Inventor:
 Lewis H. McCullough,
 by his attorney,
 G. H. Jackson.

(No Model.)

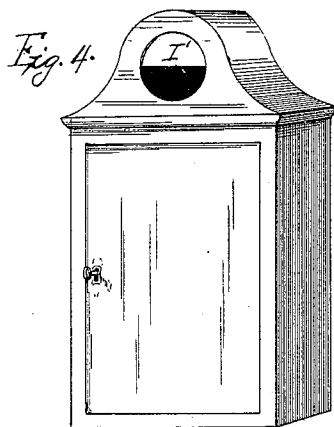
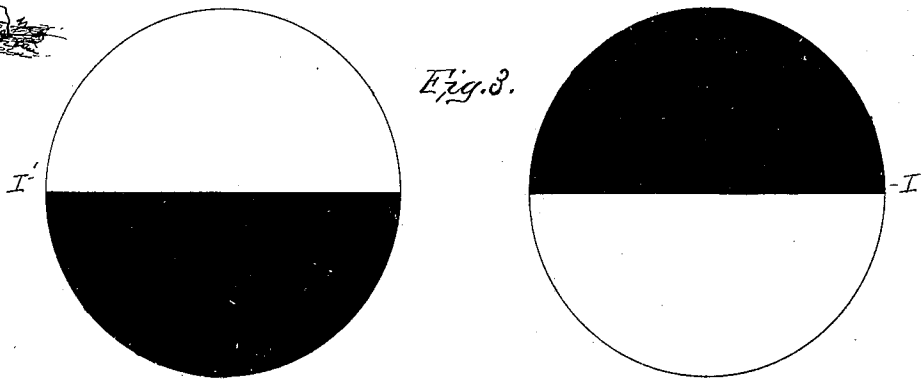
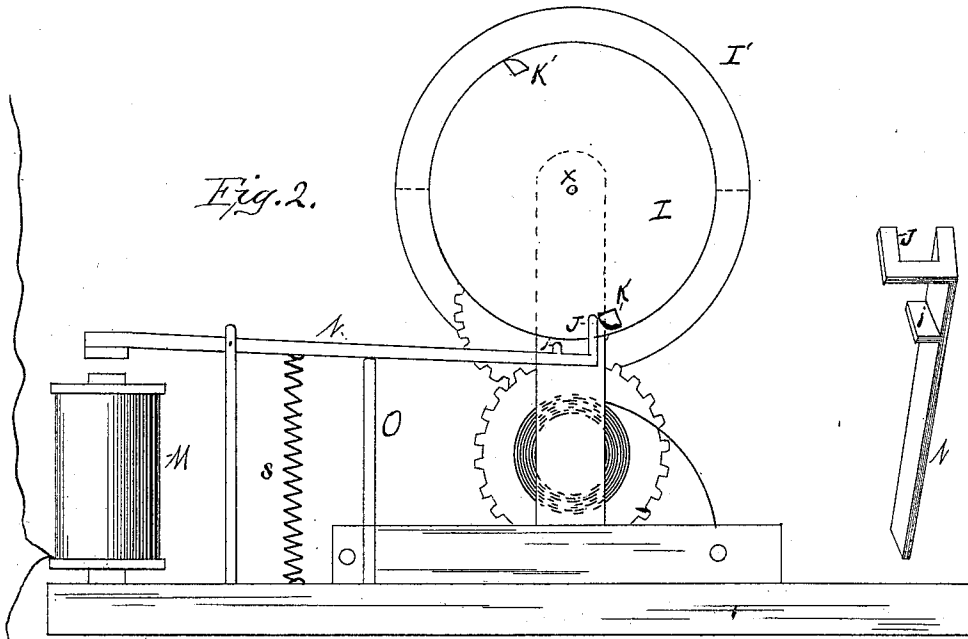
3 Sheets—Sheet 2.

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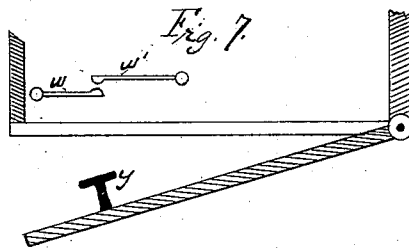
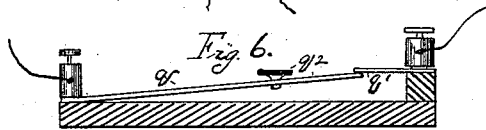
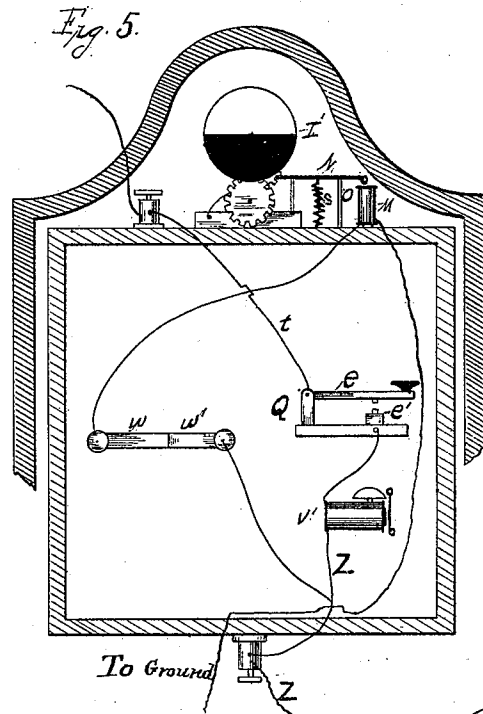
Inventor:
Lewis H. McCullough,
 by his attorney,
G. H. Stockbridge

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UNITED STATES PATENT OFFICE.

LEWIS H. McCULLOUGH, OF RICHMOND, INDIANA, ASSIGNOR TO THE RICHMOND FIRE ALARM COMPANY, OF SAME PLACE.

SIGNALING APPARATUS FOR POLICE-TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 350,634, dated October 12, 1886.

Application filed January 19, 1886. Serial No. 189,053. (No model.)

To all whom it may concern:

Be it known that I, LEWIS H. McCULLOUGH, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Signaling Apparatus for Police-Telegraphs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide means for signaling from the police headquarters of a city or large town to policemen or patrolmen on their beats. It often happens in places where police arrangements exist that crimes are first reported to headquarters and from there to the force at large, or that portion of it which is stationed near the place where a crime has been committed. Besides this, other causes may arise which would make it important or desirable to call the attention of the police in haste. At present there are no means for making the communication to the force with sufficient promptness.

I am aware that so-called "police-telegraph systems" have been invented and are in use; but such systems are designed, in their most perfect form, only to furnish means whereby an officer can first call up the police headquarters by signaling, and afterward communicate therewith at will. Such a system, in combination with a fire-telegraph system, was patented to me on the 27th day of October, 1885.

I am not aware that any one has yet succeeded in accomplishing the object contemplated by my present invention.

My device is here shown in connection with the police-telegraph system illustrated in my patent already referred to; but it is evident that it may be applied to other systems, the essentials being that annunciators should be placed at all or a part of the signal-boxes, and that means should be provided for operating the annunciators from a central station.

The signal which I employ is a visual signal, preferably at every police-alarm box, and when once operated it remains in sight until an officer has responded and learned what is wanted at headquarters.

In the drawings which accompany and form a part of this specification, Figure 1 represents my system as a whole. Fig. 2 is an enlarged view of my annunciator apparatus. Fig. 3 shows an annunciator-disk in two positions. Fig. 4 shows in perspective a signal-box with my annunciator applied to it. Fig. 5 shows a portion of a signal-box, together with the electrical connections within the same, and Figs. 6 and 7 are detail views.

Referring more particularly to Fig. 1, W is a battery for operating my police-telegraph system, and X is a loop which runs out from and back to the same pole of the battery. Z is a wire that leads from the opposite pole of the battery and passes through a tap-bell, *v*, as shown, to the hand or pointer B of a central-office apparatus located at police headquarters. This apparatus is mounted on a suitable frame, and is shown in Fig. 1 in two parts, A and C, on different sides of the drawings. In point of fact, A is a dial-face somewhat reduced in size, which is designed to be placed over or in front of the electro-magnetic apparatus shown at C. The dotted line *c*, between the hands B at the left and right of Fig. 1, is designed to indicate that the said hands are identical, as well as to show more clearly to the eye the electrical connections. The hand B is normally held from rotating in the direction of the arrow by a conducting stop *d*, which is attached to the armature of the magnet E in such a manner as to be normally held out into the path of the hand when the said magnet is not energized. The circuit passes from the stop *d* through the magnet E to a point, *r*, where it divides and goes through all the magnets F to the different signal-boxes, as will be fully explained hereinafter. The dial A is provided with a series of slots, *a*, each of which is substantially at right angles to that radius of the dial which passes through its center. The armatures H of the magnets F have extensions *k*, which project into the slots *a*, and normally lie therein, with their ends flush, or nearly so, with the dial-face. Whenever any magnet F is energized, it thrusts forward the extension *k* of its armature into the path of the hand B. The extension *k* of every armature is normally pressed by a spring, *h*, into that end of its slot

a which is first reached by the hand B in its rotation. In pressing the extension *k* into that end of the slot the spring *h* also presses it against a platinum point, *n*, on a conducting-arm, *m*, which is attached to the frame of the dial.

It should be stated that the circuit which I employ is an open one, and that a circuit-closer is located in every signal-box for operating the system. For convenience I have numbered the different signal-boxes in the drawings as they are numbered in fire-telegraph systems, and in practice it is my design to employ the ordinary fire-telegraph signal-boxes for my police-telegraph purposes. In my patented system, as has been said already, the two classes of telegraph are, in fact, combined. Ordinarily the circuit-closer for the police-telegraph will be a multiple transmitting-instrument capable of sending automatically any one of a number of predetermined signals. Inasmuch, however, as my present invention contemplates an interchange of messages between the signal-box and police headquarters, I have thought it best to show in this application simply an open-circuit key at every signal-box. Tracing the circuit now from that pole of the battery to which the loop is connected, it passes through X in two directions, and by wires *t t* to one terminal, *e*, of the open-circuit key in each box. (See Fig. 5.) From the other terminal, *e'*, the circuit continues by wires Z Z to binding-posts *p*, located at the central office, by wires 2 to binding-posts *l*, to springs *g*, and plates *g'* to binding-posts *l'*, by wires 3 to insulated plates *o o*, and their connecting-plugs, by wires 4 to extension *k*, to platinum points *n*, to conducting-arms *m*, by wires 5 to magnets F, by wires 6 to a common point, *v*, by wire 7 to releasing magnet E, by wire 8 to conducting-stop *d*, to hand or pointer B, and by wire Z' through the tap-bell *v* to the opposite pole of the battery. It will be observed that the magnet E is common to all the box-circuits, while the magnets F are each in the circuit of a different box. On the operation of the key of the circuit-closer in any signal-box, then the magnet E will always be energized; but only that magnet F will be energized which is connected with the particular box that is operated. Suppose, for example, that the circuit-closer of box 23 (in this case a key) is operated. At the first closure of the circuit the magnet E will withdraw the stop or detent *d* and release the hand or pointer B, while the magnet F, which is connected with box 23, will cause its extension *k* to project into the path of the hand and stop its rotation. At the same time a tap will be sounded on the bell *v*. Now, the driving-spring (not shown) for the hand B is made considerably stronger than the springs *h h*, in consequence whereof the extension *k* will be pushed away from the platinum point *n* to the opposite end of the slot *a*, thereby breaking the circuit of all the box-magnets. The circuit of magnet E is broken when the hand leaves the stop *d*. After the hand has reached the ex-

tension *k*, connected with box 23, and pushed it away from the point *n*, there is no circuit for any other box, whereas that box will have a complete circuit, including the tap-bell *v*, whenever its own circuit-closer acts. Thus every closure of the circuit at the box except the first will sound a tap on the bell through a circuit which passes directly from one of the extensions *k k* through the hand B, and back to battery, over the course already described. The tension of the driving-spring is made such that the hand B will be carried to the extension *k* farthest around the dial before an operator transmitting with ordinary rapidity from the box would close the circuit a second time. If preferred, it might be understood that the first tap at headquarters was intended simply to call attention to the fact that some one desired to send a message, the pointer indicating at the same time at which box the operator was stationed. This will, in fact, be the usual course of procedure.

The operator at the box will call the central office by a single tap in the manner above indicated, and will transmit his message only after the central office has responded to his call, in a manner to be described hereinafter.

It is evident that in case two boxes should be operated at the same time the hand would be mechanically obstructed from passing to the extension *k* which was farthest around the dial until the nearest extension *k* had been pushed back after the receipt of its box-signal. The extension *k* will be held in its forward position by the force of the spring *h* pushing it against the end of the hand B. After the signal has been sent in the extension *k* will be restored by hand, or by automatic mechanism, as desired. The plates *o o*, springs *g*, and plates *g'* are each insulated from the others of its class, although the upper and lower plates, *o o*, are connected by plugs, except when the latter are removed for testing purposes.

There are as many binding-posts *p'* and as many magnets F as there are signal-boxes in the system, and the number of signal-boxes will usually correspond to the number of slots in the dial, less one, although the dial may be constructed to have several more slots than there are signal-boxes, to provide for future needs or contingencies.

The signal-boxes are placed in different parts of a city or village, and each connected with one of the magnets F and with the magnet E. The magnets F and E being operated simultaneously, the end of extension *k* will always be out, in position to engage the hand B as soon as it comes along.

It will be seen that the signal-boxes 17 21, &c., are each connected in two directions with one pole of the battery—a feature by virtue of which no box is cut out unless the circuit is broken on both sides thereof. An accidental closure of the circuit—as by the falling of a loose wire across both X and Z, or by the contact of both those wires simultaneously with telephone or telegraph wires or other ground-

ed conductors—will sound one stroke on the tap-bell *v* and cause the hand B to point to that number on the dial face which corresponds to the number of the precinct where the disturbance has taken place. If the central office gets no response on answering the call at the bell, it will indicate that a derangement of the circuit exists, which derangement will be located by the pointer. This being the case, it will not be difficult, either by night or by day, to take proper measures for removing the disturbing cause.

Fig. 5 shows the circuit connections within a signal-box. It will be seen that the box-circuit includes the tap-bell *v'* and the open-circuit key Q, of which *e* is the hand-lever and *e'* the anvil.

Fig. 6 represents a section of the transmitting apparatus at police headquarters. *q* is a spring normally in contact with the plate *q'*, but capable of being pressed out of contact therewith by a force applied to the button *q''*. This apparatus constitutes, essentially, a multiple closed-circuit telegraph-key, one of them being connected, as already described, with every box-circuit. Under the springs *q* is a bar, *u*, which is connected by a wire, *u'*, with the pole of the battery opposite the loop. By depressing any spring *q* it can be brought into contact with the bar *u* after breaking contact with *q'*.

The method of carrying on communication between a box and police headquarters is as follows: Suppose a policeman desires to report to headquarters over my above-described signaling system. He first operates the key at his box by depressing it upon the anvil and holding it depressed. This action sounds one tap on his own bell, and also on the bell at police headquarters. At the same time it throws the pointer to the number which indicates the box where the calling-operator is stationed. The operator at headquarters then depresses the key which is in the circuit of that particular box, and immediately releases it, whereby the circuit of that box is first opened (it being remembered that the policeman is still holding his key down at the box) and then closed. The act of closing the circuit again sounds the tap-bells and indicates to the policeman that his call has been received. Thereupon the policeman operates his key to send whatever message he desires in accordance with a predetermined code. Having sent his communication, he turns his key so as to keep the circuit of the box closed until the central office has had an opportunity to send a return-message in the same manner as the response to the call was sent. Of course the policeman can, if he chooses, complete his communication to headquarters before he adjusts the box apparatus for receiving messages; but in any case the operation of the parts is the same.

When an automatic transmitting-instrument is employed, the full message will first be sent from the box, and in that case the first tap on the bell at headquarters will be read as a part

of the message. The box-key and tap-bell will be located in a shunt around the automatic transmitter.

The above description, taken in connection with the drawings, sets forth a system by means of which communication can be had between a policeman at his box and police headquarters, provided a call is first made by means of a circuit-closer at the box. Heretofore I have described no means whereby an officer at police headquarters can make known to a patrolman on his beat that he desires to communicate a message. This is the apparatus which forms the greater part of my present invention, and which I will now proceed to describe.

I provide an earth-connection for that pole of the battery to which the loop is joined, as is shown in Fig. 1. This earth-connection is normally open, but is provided with a switch, Z, by means of which it can be closed at will. There is also an earth-connection at every box, which is closed when the door of the box is shut, and broken by the opening of the box-door. The ground-circuit at the box includes an electro-magnet, M. (Shown most clearly in Fig. 2 of the drawings.) The switch at headquarters being normally open, the electro-magnet, which is in the switch-circuit, will usually be dormant, and its armature N will be on its back stop O. S is the spring which holds it in its retracted position. The armature is provided with a detent, J, against which rests one of two stops, K K', which are diametrically opposite each other on the back of a disk, I. The disk I, which is preferably made of brass, is mounted on a shaft, *x*, and, together with the larger disk I', tends to rotate thereon in the direction of the arrow, under the influence of the clock-work shown at the bottom of the figure. By looking at the perspective view shown at the right of Fig. 2 it will be seen that the detent J is provided with a slot or opening large enough to let either of the stops K K' through, and that there is a second detent, *j*, which will come into the path of either stop after it has passed through the said slot or opening. The action of this part of the apparatus is as follows: On the closure of the circuit the magnet M is energized, attracts its armature, and lifts the outer end thereof far enough to remove the detent J from the path of stop K and allow it to pass through against the detent *j*. This arrests the rotation of the disks until the circuit is again opened, whereupon the disks make a half-rotation, being stopped by the contact of the stop K' with the detent J. A second closing and opening of the circuit will restore the disks to their original positions. Now the disk I' is located behind a glass-covered opening in the top of a signal-box. One half of the disk is painted one color—say the same color as the box—and the other half another color—say a luminous white. I shall usually make the upper half of the disk the same color as the box, and shall also paint the lower half of the glass to

correspond. The normal position of the disk being that shown at the right of Fig. 3, the signal-box, together with those parts of the disk and the glass which strike the eye of an observer, will present one uniform color. This will be understood by policemen and other initiated persons to mean that no call has been made from headquarters to the policeman on that beat. When, however, the upper half of the glass shows the white portion of the disk behind it, the officer concerned will at once understand that he is expected to report at the box. The stops K K' are so arranged with reference to the painted portions of the disk I' that only the darker portion thereof will show through the glass when the stop K is resting against the detent J, and only the lighter portion after the stop K' has assumed that position.

The manner in which the half-rotation of the disk is accomplished will now be described in detail. The first operation is that of closing the switch Z, located in the ground-circuit, and the next step is to press the button of the key which is in the circuit of the box to be called. The former action completes a ground-circuit at one end of the battery, but leaves it open at the other end between the springs *q* and the bar *u*. In order to make a complete circuit from ground to ground, then it is necessary to press one or more of the springs *q* into contact with the bar. By so doing an operator will cause the disk I' to be moved forward a short distance, and on releasing the spring to break the ground-circuit the disk will complete its half-rotation in the manner described above. After the communication is ended and the door of the box is closed the switch Z, will be opened to guard against an accidental operation of an annunciator. The same key is employed in opening the ground-circuit to accomplish the setting of the annunciator in any given box, as is used in communicating over the metallic circuit described in the earlier part of this specification. To prevent the operation of the key in communicating with the person called from actuating the annunciator apparatus, I arrange the connections of the ground-circuit at the box so that that circuit will be broken when the box-door is opened. I show simple means for accomplishing this in Fig. 7 of the drawings. The spring *w* tends to fly away from the spring *w'*, and the two are held together for closing the ground-circuit only when the box-door is shut. The immediate means for keeping them together consists of an arm or post, *y*, on the inside of the door.

It will be observed that the earth-circuit is used only for the purpose of operating the an-

nunciator from the central station. It serves, however, so far as the apparatus of each signal-box is concerned, as a lightning-arrester, which will shunt any excessive charge harmlessly from line to ground.

While I have described my particular annunciator in detail, it is evident that it would be no substantial departure from the spirit of my invention to use an annunciator constructed differently from mine, provided it were adapted to serve the same purpose.

I prefer to employ a visual signal or annunciator in place of an audible signal, as it can be manipulated more quietly and at the same time will not fail to be noticed by an officer whose duty it is to look for it.

To avoid confusion I have illustrated only a police-telegraph system; but it is my design to combine it in practice with a fire-telegraph system, as is fully set forth in my patent of October 27, 1885.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a police-telegraph system, the combination, with a battery at a central station having an open ground connected with one pole and a switch in the said ground, a series of signal-boxes connected with the other pole, each having a normally-closed ground and an electro-magnetic signal therein, of means whereby the signal in any desired box can be operated, to the exclusion of the rest, substantially as and for the purpose set forth.

2. In a police-telegraph system, the combination of a battery at a central station having an open ground connected with one pole and a switch in said ground, a multiple key connected with a series of branches, including signal-boxes, extending from the other battery-pole, and an electro-magnetic annunciator in each signal-box, provided with suitable stops, whereby any given annunciator can be operated at will, substantially as and for the purpose set forth.

3. The combination, with an electric battery and a series of signal-boxes in multiple arc between the poles thereof, of a receiving-instrument, and of an open-circuit transmitter in each signal-box, and a receiving-instrument and a series of closed-circuit transmitters at a central station, substantially as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

LEWIS H. McCULLOUGH.

Witnesses:

WM. HARKER,
GEO. C. McCULLOUGH.