

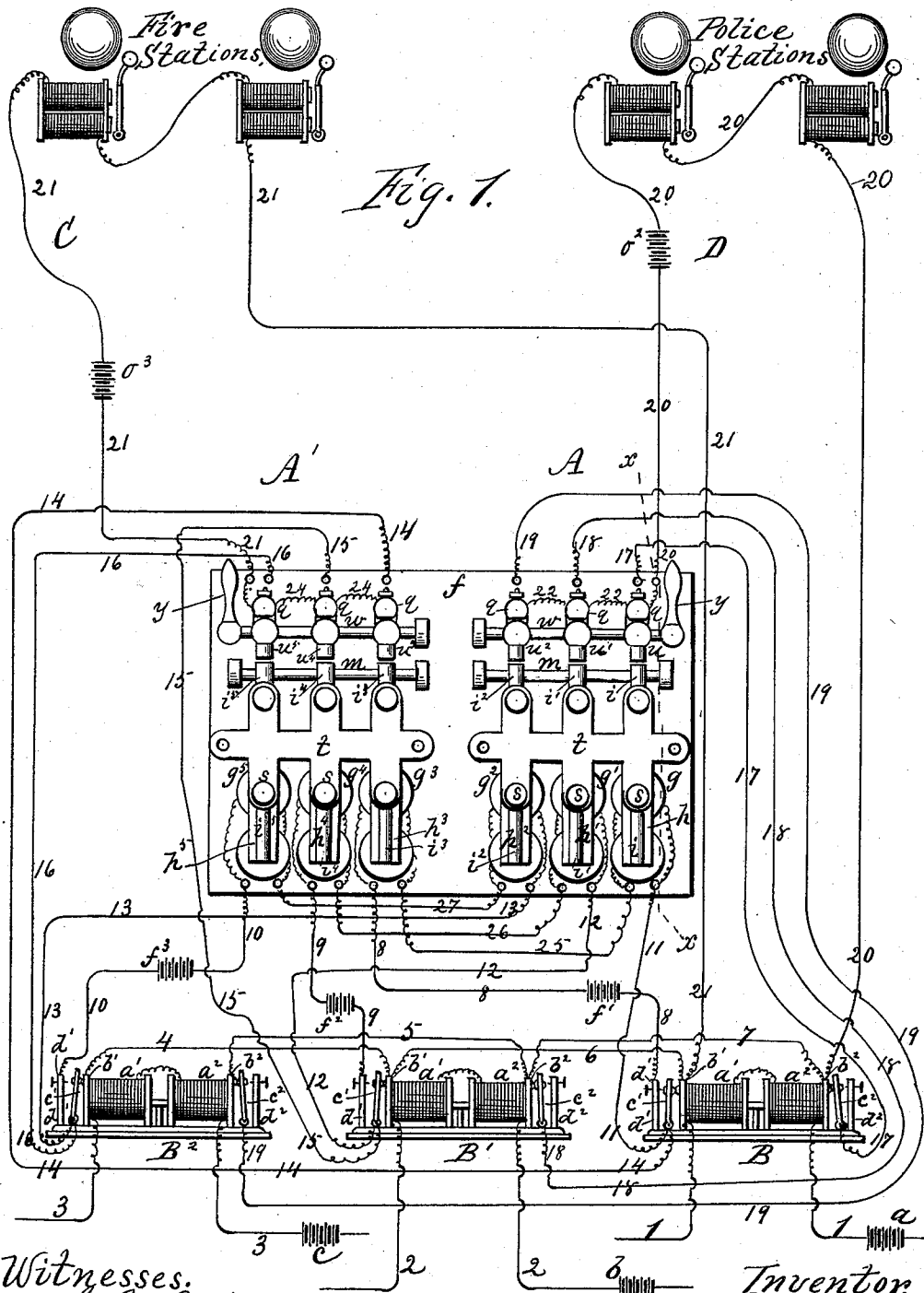
(No Model.)

2 Sheets—Sheet 1.

W. W. HIBBARD.
ELECTRIC SWITCH.

No. 571,119.

Patented Nov. 10, 1896.



Witnesses:
H. L. Osborne
Geo. B. Selden.

Inventor:
Wm. W. Hibbard,
per R. F. Osgood,
Atty.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

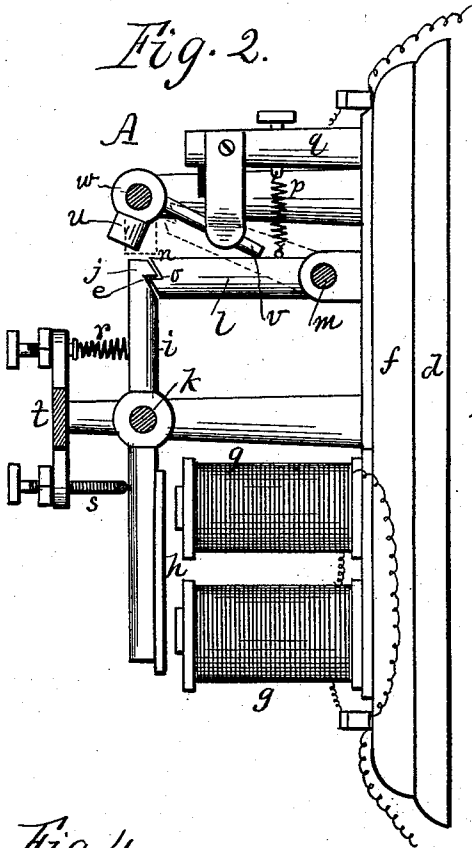


Fig. 3.

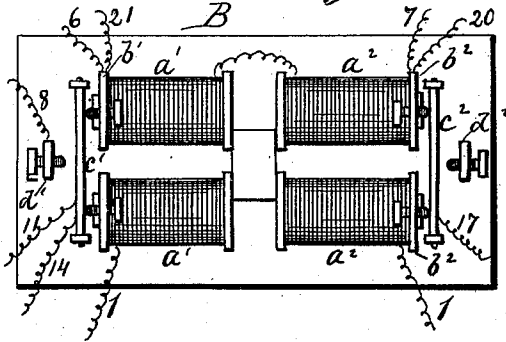


Fig. 5.

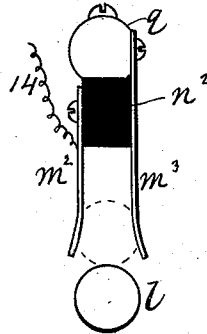
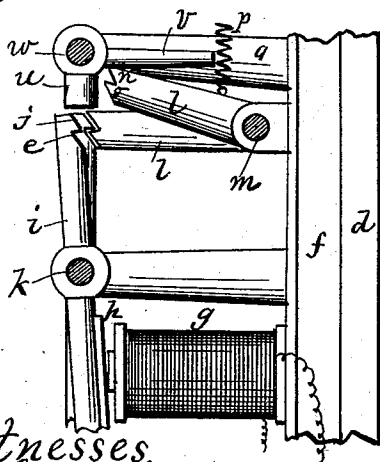


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM W. HIBBARD, OF ROCHESTER, NEW YORK.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 571,119, dated November 10, 1896.

Application filed November 21, 1893. Serial No. 491,581. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. HIBBARD, of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Electric Switches; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying this application.

My improvement relates to electric switches; and it consists of an arrangement by which signals sent over any number of separate main circuits may be transmitted to a side circuit without one interfering with another.

The invention is applicable to any purpose where several main circuits and a side circuit are used, but for convenience of illustration I have shown a system embracing both a fire and police department.

In the drawings, Figure 1 is a diagram showing a face view of the system. Fig. 2 is an enlarged cross-section of the central-office apparatus in line *xx* of Fig. 1. Fig. 3 is a plan view of one of the relays. Fig. 4 is a view similar to Fig. 2, but showing a different position of the working parts. Fig. 5 is a diagram showing an end view of one of the stationary arms, the spring-tongues connected therewith, and the swinging circuit-closer.

In this system a central office is employed in which are located the batteries and all the working parts except the signal-boxes on the main lines.

In the drawings, A A' indicate the central-office apparatus forming the switch, and B B' B² the several relays operating in connection therewith. Each of these relays has a separate main circuit connected therewith, (marked, respectively, 1 1, 2 2, and 3 3,) these circuits being provided, respectively, with batteries *a*, *b*, and *c* or other sources of electricity.

C and D are two separate side circuits connected with the central-office apparatus, circuit C embracing the several stations of the fire department and circuit D those of the police department. The central-office apparatus which connects with these two separate side circuits is made in two separate parts, each distinct from the other, and marked, respectively, A and A'.

Each of the parts A A' of the central-office apparatus is constructed as follows:

d is a metallic base, and *f* an insulated plate, common to both parts, and to which the operating mechanism is attached.

g g' g² g³ g⁴ g⁵ are a series of electromagnets arranged at intervals apart, so as to have no connection with each other. They may be made single or double.

h h' h² h³ h⁴ h⁵ are a corresponding series of armatures arranged in line with said magnets, and attached, respectively, to arms *i i' i² i³ i⁴ i⁵*, which turn freely on two shafts *k k'* of the two parts of the central-office apparatus, so that said arms will rock forward and back. When the lower ends of the arms are drawn in by the magnets, the upper ends are thrown outward. The upper ends of the arms are provided with inclines *j* and with shoulders *e* for the dogs to connect with, as will presently be described.

l l' l² l³ l⁴ l⁵ are a series of arms, forming circuit-closers, attached and turning loosely on two shafts *m m'*. Their outer ends are provided with inclines *n* and catches *o* for engagement with the corresponding inclines and shoulders on the upper ends of the armature-arms. When the circuit-closers are forced down, they engage with and are held by the armature-arms. When released by the operation of the magnets, the circuit-closers are drawn up by springs *p p*, attached to projecting arms *q q*. The armature-arms are forced forward to engage with the circuit-closers by springs *r r*, connected with cross-heads *t t*, and the reaction of the lower ends of the arms is gaged by set-screws *s s*.

Fig. 2 shows one of the circuit-closers in the depressed and locked position, and Fig. 4 shows the same in the raised and unlocked position.

u u u u u are a series of stops arranged in line over the ends of the armature-arms *i i'*, &c., and attached to two shafts *w w*, provided with handles *y y*, by which they can be operated manually. They may be operated by any other suitable means. These stops are provided with a corresponding series of pins *v v v v v*, which project inward and rest on top of the circuit-closers. When the stops are turned outward, as shown in full lines, Fig.

2, the pins force the circuit-closers down into connection with the armature-arms, and when released again the stops fall over the ends of the circuit-closers, thus locking them in place, as shown by the dotted lines in the same figure, and holding them in that position till released by the action of the magnets, as will be more fully described.

Each of the relays consists of two pairs of magnets $a' a' a^2 a^2$, two sets of uprights $b' b^2$, two swinging armatures $c' c^2$, one at each end of the relay, and two contact-posts $d' d^2$, as shown in Figs. 1 and 3.

The connections are as follows:

1 1, 2 2, and 3 3 are the main lines, connected, respectively, with the several relays and provided with batteries a , b , and c , as before described.

4, 5, 6, and 7 are wires connecting the uprights $b' b^2$ of the several relays, as shown in Fig. 1.

8, 9, and 10 are wires connecting the posts $d' d' d'$ of the relays with the magnets $q^3 q^4 q^5$ of the central office, by means of suitable binding-posts, said wires being provided with separate batteries f' , f^2 , and f^3 .

11, 12, and 13 are wires connecting the armatures $c' c' c'$ of the relays with the central-office magnets g , g' , and g^2 .

14, 15, and 16 are other wires leading from the relay-armatures $c' c' c'$ to the arms $q^3 q^4 q^5$, where they connect with spring-tongues $m^2 m^2 m^2$, attached to said arms by means of insulating-blocks $n^2 n^2 n^2$, Fig. 5. These tongues each form one of a pair, consisting of $m^2 m^3$, attached one to the insulating-block and the other direct to the support q^3 . Each pair of said tongues form electrodes.

17, 18, and 19 are wires connecting the armatures $c^2 c^2 c^2$ of the relays with the tongues of the arms $q' q' q^2$ in the same manner as above described.

20 is a wire extending from upright b^2 of the relay B through the several stations of the police department, operating the magnets of the same, and connected at the opposite end directly with the arm q , said arm being connected with all the other arms by wires 22, said wires being provided with an independent battery o^2 .

21 is a similar wire extending from upright b' of relay B through the several stations of the fire department, operating the magnets of the same, and connected at the opposite end directly with the arm q^5 , said arm being connected with all the other arms on that side by wires 24.

Wire 21 is provided with a battery o^3 .

25 is a wire connecting magnet g with magnet g^3 .

26 is a wire connecting magnet g' with magnet g^4 , and 27 is a wire connecting magnet g^2 with magnet g^5 .

The operation is such that if a signal is sent over any one of the main lines the electromagnet at the central office connected with

that particular line will be energized, the armature connected with it will be attracted, the arm to which the armature is attached will be thrown open, releasing the dog held by the arm, and the signal or impulse will be carried through the side circuit to any station or stations on the side circuit. At the same time all the other armatures connected with the other main circuits will remain locked till the signal through the first circuit has been transmitted and its electromagnet has been demagnetized. To illustrate this, suppose the signal to come through the main line 1 1, connected with the relay B. Said main line is normally closed and any breaking of its circuit by operating a signal-box causes armatures $c' c^2$ to be drawn in connection with the posts $d' d^2$. The current is now from battery f' through wire 8, upright d' , armature c' , wire 11, electromagnets g , (energizing same,) wire 25, electromagnets g^3 , (energizing same,) wire 8, back to battery f' . The energizing of magnets g and g^3 attracts armatures h and h^3 , releases the circuit-closers l and l^3 , which are then drawn up by springs $p p$ into contact with two of the sets of electrodes m^2 and m^3 . Under these conditions and with the circuit through the main line 1 1 closed again the current from relay B will be from battery o^2 through wire 20, arm q , tongue m^3 , circuit-closer l , (then raised in connection with the electrodes,) electrode m^2 , wire 17, armature c^2 , upright b^2 , wire 20, to and through the magnets at the police station, wire 20, back to battery o^2 . This completes one circuit, which is to the police department. Any signal through the main line 1 1 will be repeated to the police stations. The above describes the action through magnets g . The action caused by magnet g^3 , which is operated at the same time, is as follows: from battery o^3 through wire 21, wires 24, arm q^3 , electrode m^3 , arm l^3 , electrode m^2 , wire 14, armature c' , upright b' , wire 21, through the magnets at the fire-department station C, wire 21, back to battery o^3 . The same signal from main line 1 1 is thus transmitted to both the fire and police departments.

In the normal condition of the apparatus the stops u all stand outward away from the arms i , as shown by full lines, Fig. 2. Therefore any one of the circuit-closers l is free to rise when released by the action of the electromagnet which controls it; but the moment said circuit-closer is released and drawn up it strikes pin v , turns shaft w , to which the stops are attached, and turns the stops all down to the vertical position, as shown by dotted lines in the same figure. In this position the stops rest over the ends of all the circuit-closers l , except the one operated on, and locks them all in place. If any signal comes over any of the other main lines while in this condition, such signal cannot be transmitted to the side station, for the reason that in or-

der to make a connection with the side circuits the circuit-closers must be thrown up in contact with the electrodes $m^2 m^3$.

The above illustrates the action through one set of the main lines and one of the relays, the signal being sent to two side circuits. The same action is produced through any other of the main lines and relays by the use of the auxiliary wires before described.

It is not at all necessary that two side circuits, such as fire and police, should be used.

The invention is equally applicable to a single side circuit, such as fire, in which case a single series only of the electromagnets, armatures, and other working parts forming the central-office apparatus is required.

Although the above describes the connection of the apparatus with a fire and police system, I do not limit my invention to such use. It is equally applicable to other uses where two or more separate main circuits act in conjunction with one or more side circuits.

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

1. In combination with an electromagnet of a side circuit, an armature provided with an arm projecting beyond the pivot, an arm forming a circuit-closer with which the armature-arm engages and locks, and a swinging stop so arranged as to fall over and lock the circuit-closer in place, as herein shown and described.

2. In combination with an electromagnet, an armature provided with an arm projecting beyond the pivot, an arm forming a circuit-closer with which the armature-arm engages, a swinging stop so arranged as to lock the circuit-closer down, and a contact-arm provided with electrodes with which the circuit-closer connects when raised, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

W. W. HIBBARD.

Witnesses:

R. F. OSGOOD,
C. R. OSGOOD.