(No Model.) 2 Sheets—Sheet 1.

J. W. LATTIG.

ELECTRIC SIGNAL APPARATUS.

No. 502,626. Patented Aug. 1, 1893.

Fig. 1.

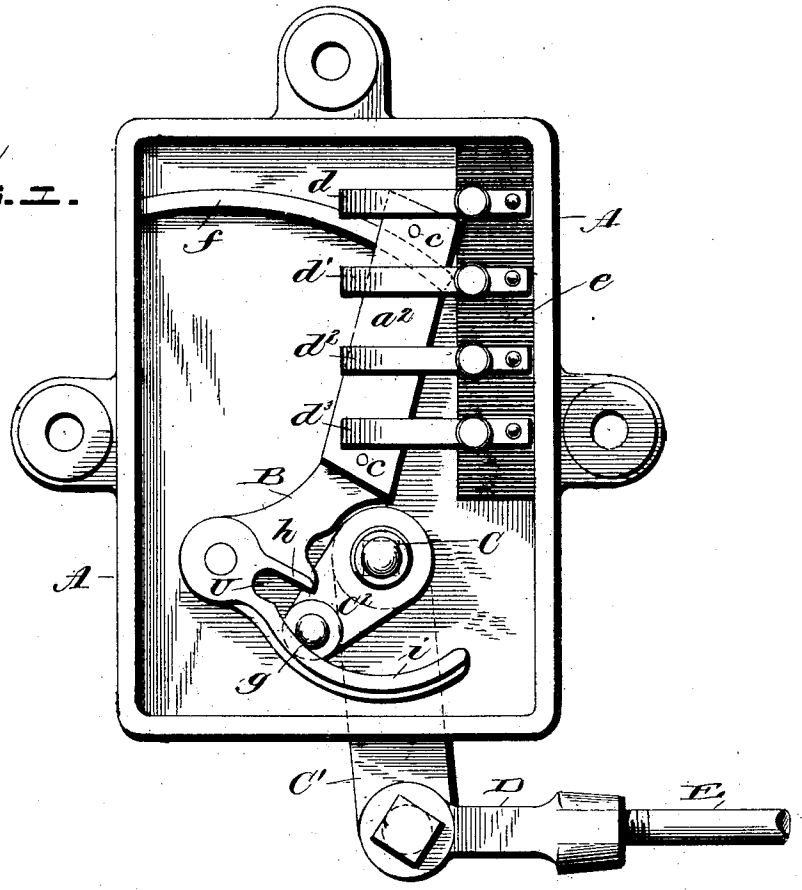
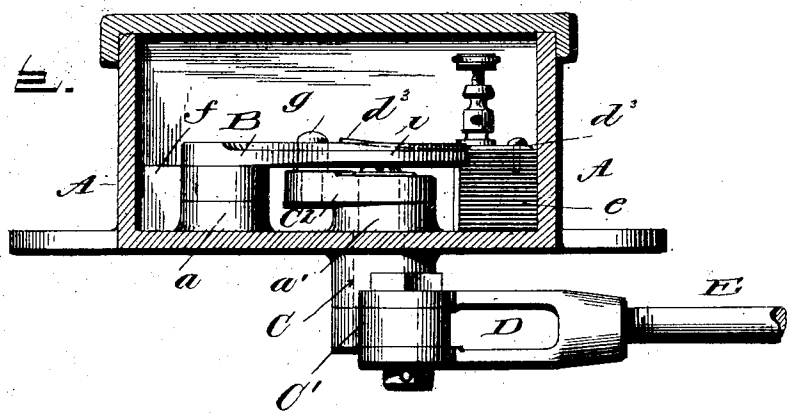


Fig. 2.



Witnesses:

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Estella Duke

Inventor

Jacob William Lattig

by Marcellus Bailey

his Attorney

(No Model.) 2 Sheets—Sheet 2.

J. W. LATTIG.

ELECTRIC SIGNAL APPARATUS.

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Fig. 3.

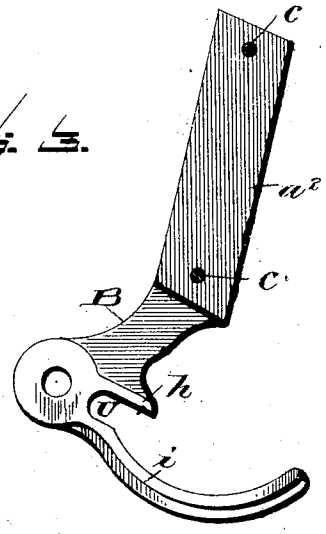


Fig. 4.

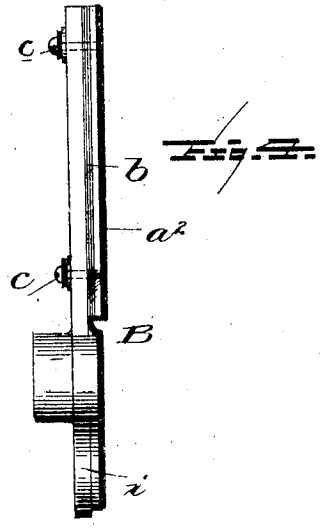
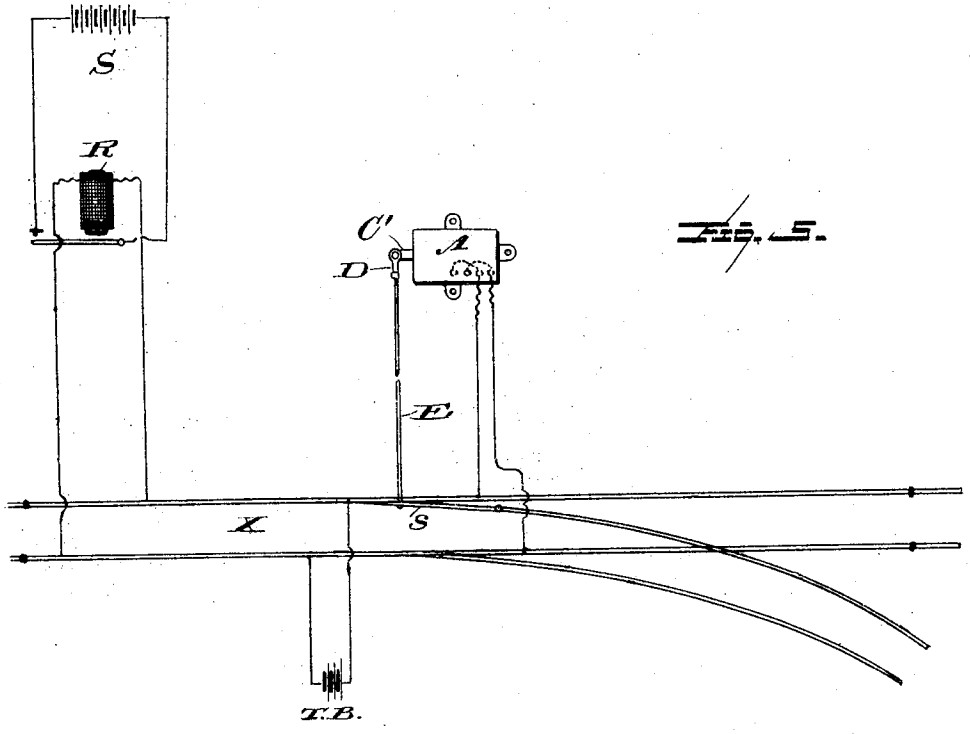


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

JACOB WILLIAM LATTIG, OF EASTON, PENNSYLVANIA.

ELECTRIC SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 502,626, dated August 1, 1893.

Application filed June 14, 1893. Serial No. 477,571. (No model.)

To all whom it may concern:

Be it known that I, JACOB WILLIAM LATTIG, of Easton, in the State of Pennsylvania, have invented a certain new and useful Improvement in Electric Signal Apparatus, of which the following is a specification.

My invention has been designed particularly with reference to the needs of an automatic block system for railways, which involves the use of track sections electrically insulated from each other. In such a system each track section usually forms part of a constantly closed electric circuit including a relay or other instrumentality for controlling the connections by which the signal appropriate to that section is operated or controlled, as shown and described for example in my Letters Patent No. 496,786 or No. 496,787, of May 2, 1893. When the track section is clear the signal stands at "safety;" as soon however as a train passes onto the section the track circuit is completed through the path of lower resistance afforded by the wheels and axles of the cars, and the relay is cut out, in which event the signal goes to "danger," and stays there until the train quits the section, at which time the track circuit is restored through the relay and the signal thereby is automatically returned to "safety."

It quite often is the case that there may be one or more switches on a track section for shunting trains; and it is of course desirable and indeed necessary to a complete automatic block system, that all the switches included in any one section should be in their normal position, for a train entering that section when the signal stands at safety. Otherwise the train might run into an open switch without warning. To this end I connect to the switch—or each switch if there be more than one—a short circuiting instrument or apparatus, which whenever the switch to which it is connected is in the least out of normal position, will short circuit the track battery, or in other words will act precisely as though a train or a pair of wheels and their connecting axle were on the section. It is requisite in such an instrument that its short circuiting or shunting action should follow almost the slightest movement of the switch from its normal position; that the remainder of the movement of the switch should not affect or operate to change the relations of the contacts thus brought into action; and that upon the return movement of the switch the short circuiting action of the instrument should not cease until the switch has practically been again set in normal position. The instrument also to be fully available for practical use should be strong, free from complication, and certain of operation. These objects are realized in the instrument which I have devised and which I shall now proceed to describe by reference to the accompanying drawings in which—

Figure 1 is a plan of the instrument with the cover removed from the box or case, to expose the working parts therein. Fig. 2 is an end elevation of the same with the end of the box removed. Fig. 3 is a plan and Fig. 4 is an edge view of the contact lever. Fig. 5 is a diagram showing the instrument connected up in circuit with a track section, and block system appliances therefor.

A is the box or case containing the working parts. It has on its bottom a bearing at a for the contact lever B, and a tubular bearing at a' for the spindle C, which extends through the bottom of the box, and has fastened on its outer end the crank arm C′. On the inner end of the spindle is made fast the smaller crank arm C^2 for engaging and operating the contact lever. To the outer crank arm C′ is connected through the medium of the shank D jointed to the arm, the connecting rod E, which at its other end is secured to or connected with the switch points s (Fig. 4) so as to be actuated by them.

The contact lever B has on its upper face a strip a of conducting metal—preferably metal which does not oxidize readily—backed by a bed or layer b of insulating material and held to the body of the lever by insulating screws c. The conducting face a of the contact lever plays back and forth under and out from under spring contact strips d, d', d^2, d^3, secured to an insulating base e. Two of these strips d, d^2, are connected to one pole of the battery to be short circuited, and the other two d', d^3, to the other pole of said battery, the object of using a plurality of contact strips being to insure certainty of electrical contact between the lever and the strips. The contact lever at its outer end rests upon

and is upheld by a curved rail *f* projecting up from the bottom of the box. This end of the lever during its movement is supported in this way and prevented from undue depression, thus insuring absolute certainty of contact between the lever and the contact strips. The movement of the contact lever is derived from a pin or roller stud *g* on the small crank arm C^2, which acts for this purpose upon the prongs *h*, *i*, of a peculiarly shaped jaw U with which the lever is provided at a point near its fulcrum. The prong *h* is short and straight throughout its length; and it is the one which is acted on to move the lever in a direction to open the contacts. The prong *i* for a short portion of its length (the portion of its length nearest the bight of the jaw U) is straight and parallel with the prong *h;* beyond that point it is curved in the arc of a circle struck from the axis C, with a radius C, *g*. This prong serves to close the contacts, the movement of the lever for this purpose being effected by the action of the pin *g* upon the short straight portion of its length; the pin *g* as soon as it reaches the curved portion of this prong can continue its movement indefinitely without further actuating the lever, at the same time, through the intermediary of this curved portion, preserving its operative connection with the lever.

The position of the parts shown in Fig. 1 is that assumed by them when the switch has been moved from normal position. This movement of the switch has pulled on the rod E with the effect of causing the pin *g* to swing to the right. In this movement it has been carried out from the jaw proper U, and in so moving has by its action on the short straight face of the prong *i*, caused the contact lever to move so as to at once close the contacts. A very slight movement of the switch has effected this result. The remainder of its movement can take place without further disturbance of the parts, the pin *g* during this portion of its movement traveling over the curved portion of the prong *i*. Upon the return movement of the crank pin *g* (due to the return of the switch to normal position) it will not move the contact lever until it nearly reaches the end of its movement. At this time it will strike against the prong *h*, and thereby will throw the contact lever out from under the contact springs, thus opening the contacts and allowing the track battery to reach the relay or other device under control.

This switch mechanism comprising essentially the contact strips, the jawed lever, and the crank arm, constructed and having the mode of operation hereinbefore described, I term for want of a better term a snap switch. It is a switch in which the contact lever is positively operated in each direction. The throw of that lever in one direction takes place immediately upon the commencement of the movement in one direction of the crank arm, the lever remaining unaffected during the remainder of the movement of the crank arm; and the throw of the lever in the other direction takes place during the return movement of the crank arm, but only when the crank arm has very nearly completed that movement. It is a switch which has these peculiar movements that I intend by the term "snap switch"—the aim being to put the snap switch from normal the instant the track switch starts from normal, and to maintain that abnormal position of the snap switch practically so long as the track switch is removed from its normal position.

One of the uses to which the instrument can be put is represented in Fig. 4. In this figure X is an insulated track section; T, B is the track battery; R is a relay in circuit with the battery—the circuit being completed through the rails of the track section; S is a circuit completed through contacts controlled by the track relay R, and intended to control the operating of a signal; *s* is a switch; and A is my improved short circuiting or shunting instrument electrically connected through its contact strips to the track circuit, and mechanically connected in the manner hereinbefore indicated to the switch points. The track circuit is a constantly closed circuit which normally includes the relay—the arrangement being such that the signal when the track is clear will stand at safety as described in my Letters Patent hereinbefore referred to. The switch instrument A also is so adjusted that its contacts can open when the switch is in normal position. Under this arrangement whenever the switch points are moved appreciably from normal the instrument A will at once be operated to close its contacts thus short circuiting the track battery, and cutting out the relay in the same way and with the same effect as though a train were on the section.

Having now described my invention and the manner in which the same is or may be carried into effect, what I claim as new, and desire to secure by Letters Patent, is—

1. The snap switch consisting of the contact strips and the lever-operating crank arm, in combination with the contact lever provided with the jaw U bounded on the one side by the prong *i* having a short straight portion which is operated on by the crank arm to throw the lever immediately upon commencement of the outward movement of said arm, and a curved portion beyond said straight portion over which the arm travels without further affecting the lever, and on the other side by the prong *h* upon which the crank arm acts only when it has nearly completed its inward or return movement.

2. In combination, the jawed contact lever, the crank arm for operating the same, the contact strips beneath which the lever moves, and the guide rail for supporting and upholding the outer or free end of the lever, substan-

tially as and for the purposes hereinbefore set forth.

3. The box A, the spindle C with its outer and inner crank arms C', C^2, the pivoted jawed contact lever, the contact strips beneath which said lever moves, and the guide rail for supporting the free end of the lever—these parts being constructed and arranged together for joint operation substantially as hereinbefore shown and described.

4. The combination substantially as hereinbefore set forth, of an insulated track section, a track circuit completed through the rails of said section, a snap switch interposed in said circuit, a track switch, and connections whereby the snap switch is operated by or from the track switch immediately the latter starts to move from its normal position.

5. The combination of the insulated track section; the constantly closed track circuit completed through the rails of the section and including a relay; the track switch; a snap switch interposed in the track circuit; and connections between the track switch and snap switch whereby the latter is caused to close the track circuit through it and thus cut out the relay whenever and as soon as the track switch begins to move from its normal position, substantially as and for the purposes hereinbefore set forth.

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

JACOB WILLIAM LATTIG.

Witnesses:

MORRIS KIRKPATRICK,

H. D. MAXWELL.