

(No Model.)

C. HOFFMANN.
AUTOMATIC CUT-OUT.

No. 502,518.

Patented Aug. 1, 1893.

Fig. 1.

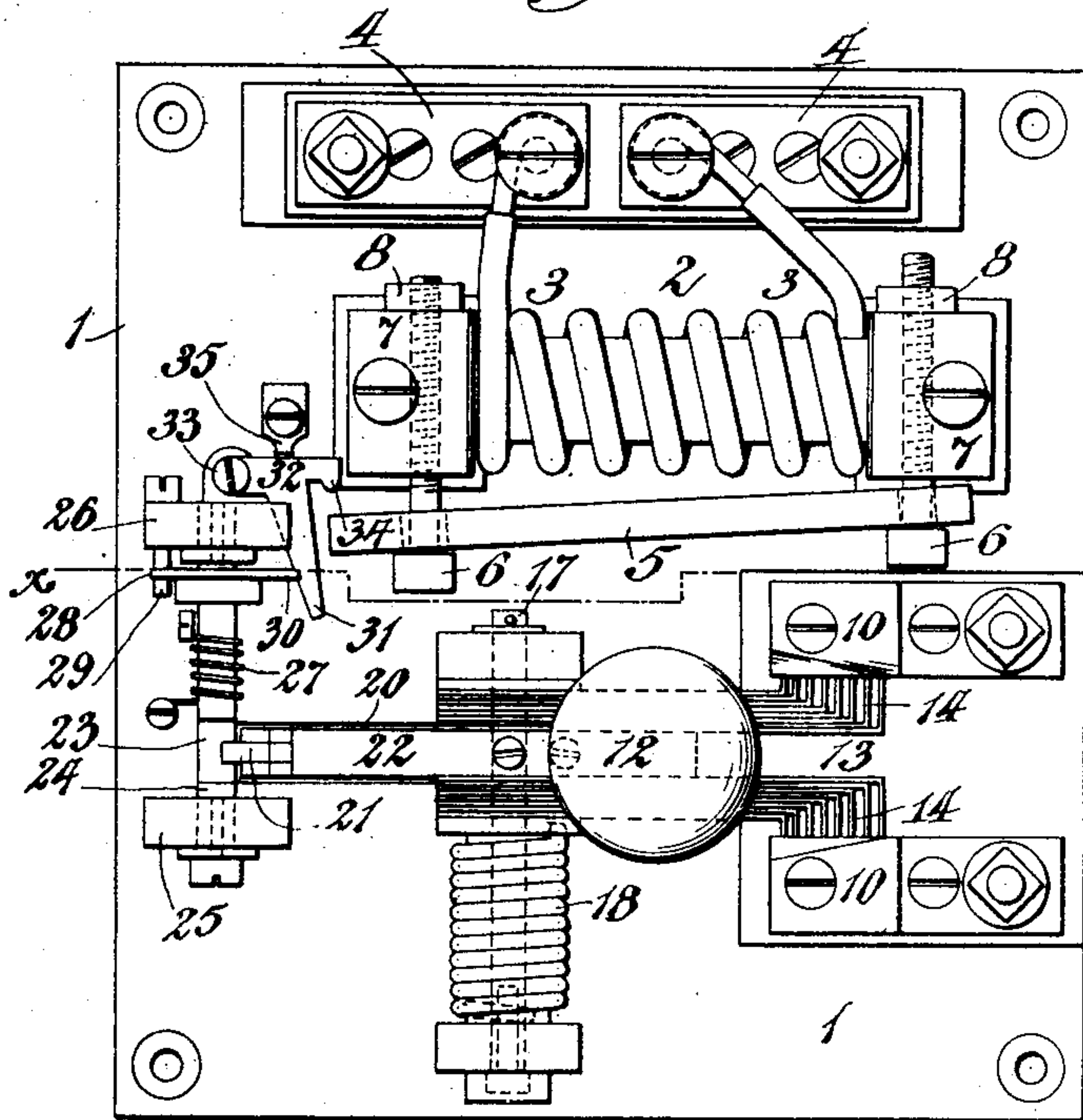


Fig. 2.

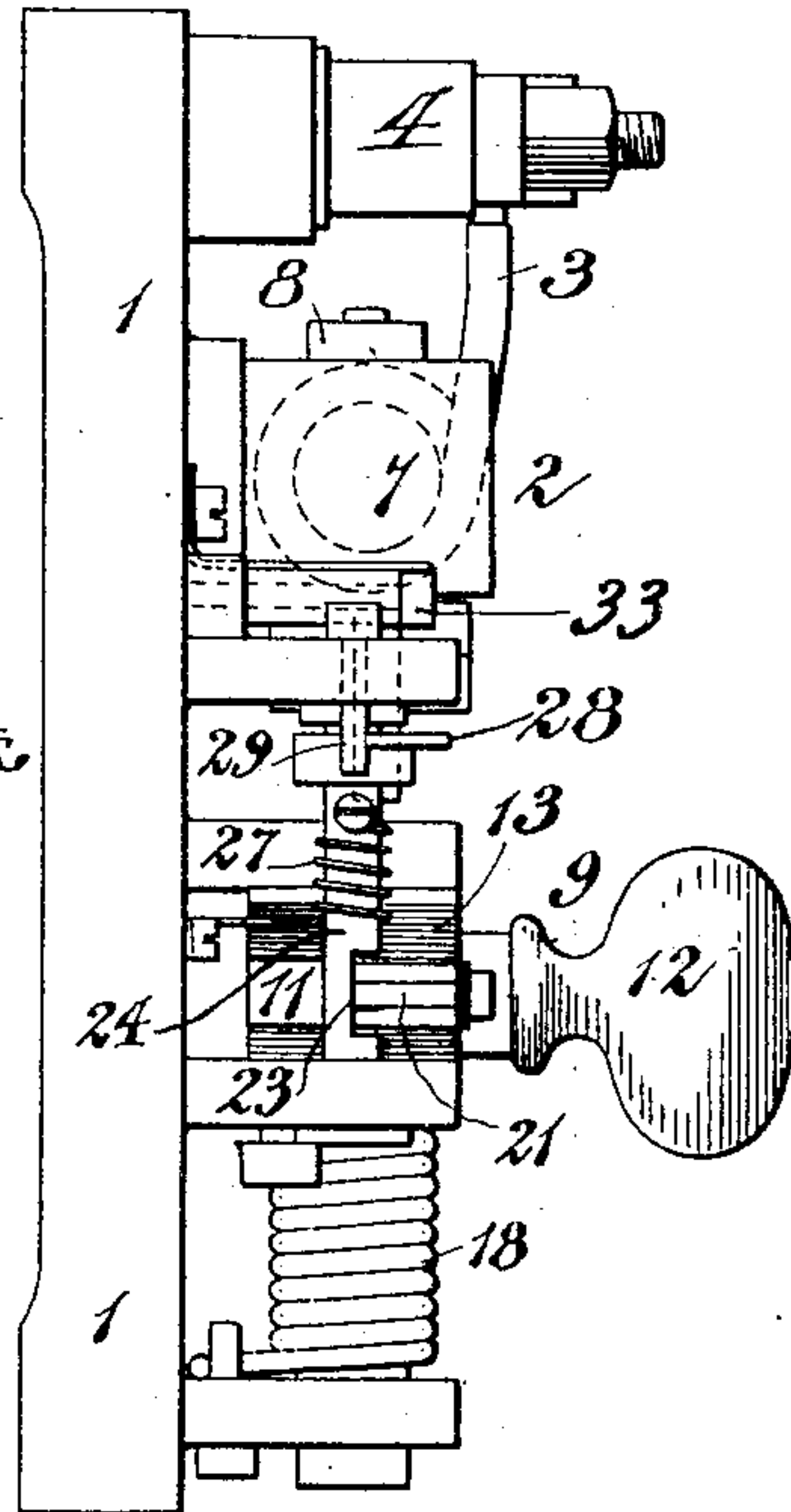


Fig. 3.

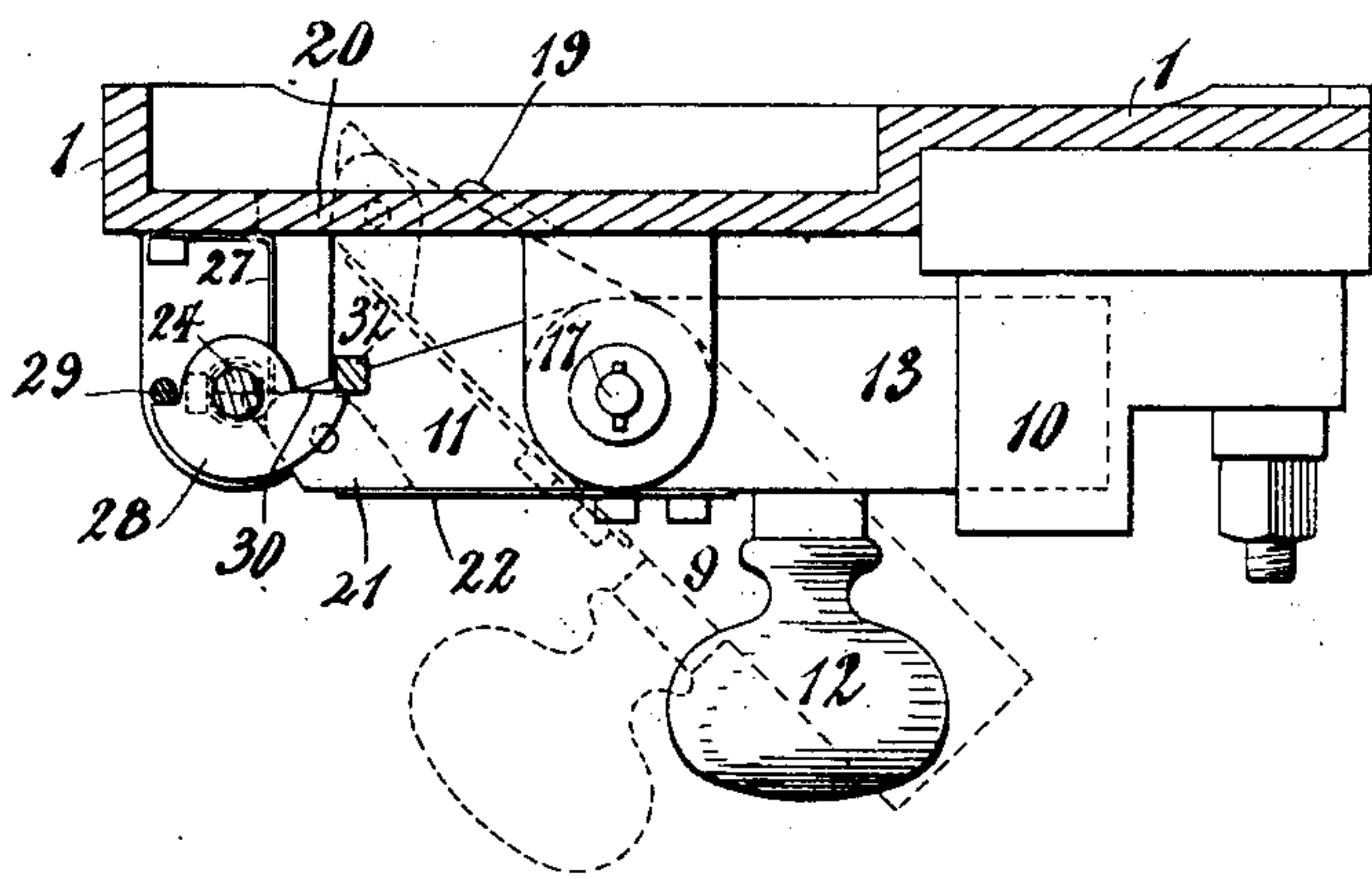
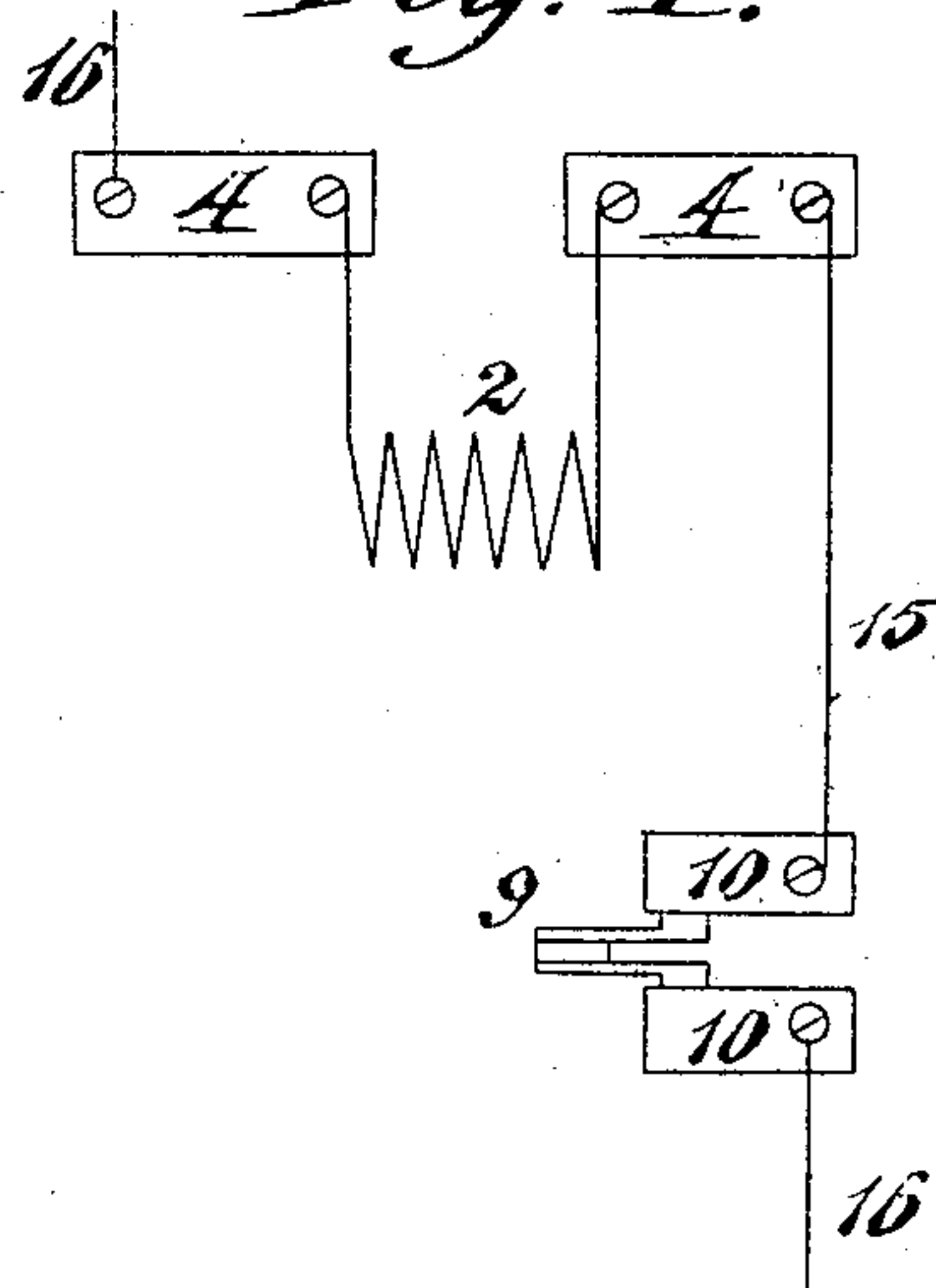


Fig. 4.



WITNESSES:

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CARL HOFFMANN, OF BERLIN, GERMANY, ASSIGNOR TO SIEMENS & HALSKE,
OF SAME PLACE.

AUTOMATIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 502,518, dated August 1, 1893.

Application filed April 11, 1893. Serial No. 469,889. (No model.)

To all whom it may concern:

Be it known that I, CARL HOFFMANN, a subject of the Emperor of Germany, residing at the city of Berlin, in the Empire of Germany, have invented new and useful Improvements in Automatic Cut-Outs, of which the following is a specification.

This invention relates to automatic cut-out devices designed to prevent injury to electric lamps or other electrically operated devices or apparatus, should the electric current be suddenly intensified or increased in electro motive force beyond a safe normal working limit.

The invention consists in a cut-out, comprising an electro magnet, a switch lever with contacts, and latch devices interposed between the magnet and lever in a manner causing an excessive current to attract the armature of the electro-magnet, and thereby trip the latch devices and release the switch lever, which then automatically tilts to break or open the electric circuit.

The invention also includes certain novel features of construction and combinations of parts of the automatic cut-out device.

The invention will first be described and then will be particularly defined in claims hereinafter set forth.

Reference is to be had to the accompanying drawings, forming a part of this specification, and in which similar reference numerals indicate like parts in all the views.

Figure 1 is a front elevation of my improved automatic cut-out device. Fig. 2 is a side elevation thereof. Fig. 3 is a horizontal sectional view taken on the line *x, x*, in Fig. 1, and Fig. 4 is a diagram illustrating the electric circuits.

To any suitable base 1, or other support, is held an electro-magnet 2 having its core encircled by a wire coil 3 of relatively large conductivity and connected to two contact or binding plates or posts 4, 4, insulated from the base. The magnet armature 5 is perforated to receive screws 6, 6, which have heads on which the armature rests by gravity, when not energized. These screws are preferably fitted to internal threads cut in the pole pieces 7, 7 of the magnet, and carry nuts 8, 8 outside the pole pieces. By adjusting the screws 6 and locking them when adjusted by their nuts 8, the range of movement, or the

distance to which the armature may drop from the pole pieces, may be regulated at will in order to set the cut-out in advance to have its switch lever 9 automatically carried from the contacts 10, 10, which are insulated from the base 1, when an electric current having a greater electro motive force than is required to safely operate the lamp or other device, influences the electro-magnet, and as hereinafter more fully explained.

As shown most clearly in Figs. 1 and 3 of the drawings, the switch lever 9 is made with a solid body portion 11, which carries a knob 12 of insulating material by pressing which the lever is reset by hand to close the circuit. At each side of the part 11, is secured a series of suitable thin metal strips or plates 13, preferably eight in number and in the construction shown, having outbent separated extremities 14 which bear against the adjacent contact 10. When the lever is set to close the circuit, its contact plate portions 14, 14 bear on the opposite contacts 10, 10, one of which is connected by an intermediate wire 15 with one of the posts 4, while the ends of the line wire 16 are connected to the other outer post and contact 4, 10, and as will be understood more clearly from Fig. 4 of the drawings.

The switch lever 9 rocks upon a shaft or spindle 17, which is sustained in bearings on the base 1 and supports a suitable spring 18, the opposite ends of which are respectively connected to the lever and one of the shaft bearings, and whereby the spring normally tends to rock the switch lever away from the contacts 10 and into the position shown in dotted lines in Fig. 3 of the drawings, and against any suitable buffer 19 fitted at the end of the base slot 20 into which the latching end of the lever is carried by the spring. The slot and buffer 20, 19 are shown by dotted lines in Fig. 3 of the drawings.

At the extremity of the body portion 11 of the switch lever, is pivoted a trip plate 21, which is fitted to tilt or swing in one direction only, and is brought to normal position against a retaining shoulder on the lever by a spring 22 fastened to the lever. The trip plate 21 projects a little beyond the lever part 11, in order that it may properly engage the flattened or cut-away portion 23 of a shaft or spindle 24, which is journaled in bearings 25,

26 on the base 1. Said shaft 24 has fixed to it one end of a spring 27 which is coiled around the shaft, and at its other end is fixed to the base 1. The spring normally turns the shaft 5 to carry a shoulder of a stop plate 28, which is fixed to the shaft, against a pin or detent 29 on the shaft bearing 26. An opposite shoulder 30 on the plate 28 is adapted to stop or retain the long arm 31 of an elbow lever trip 10 latch device 32, which is pivoted to the base 1 by a screw 33, and has a short arm 34 so located as to be struck by the armature 5 of the electro-magnet 2, when the magnet is energized and draws the armature to its pole 7, 7.

15 The latch 32 may take its normal position by gravity, but I prefer to hold it into engagement with the shoulder 30 of plate 28 by a light spring 35.

The operation of the cut-out device is very 20 simple and effective, and as follows: When the switch lever 9 is pushed inward at its knob 12, the projecting ends of its trip plate 21 will rise against the overlying shaft 24, which will tilt the trip plate against the influence of the spring 22, which, as the trip 25 plate rises above the shaft throws the plate against its stop shoulder in proper position to engage the cut-away part 23 of the shaft, which engagement is effected about at the 30 time the comb-like ends 14, 14 of the lever come into full connection with the base contacts 10, 10, and the electric circuit thus will be closed through the contacts 4, 4; 10, 10, the electro-magnet 2, the wire 15, and the line 16 35 (see Fig. 4 of the drawings). Before the lever 9 has been thus adjusted to close the circuit, the spring 27 held the shaft 24 normally with the latch plate 28 bearing on the stop 29, and with its shoulder 30 overlapping the 40 arm 31 of the elbow lever 32, as shown in Figs. 1 and 2 of the drawings. When a normal current of proper electro motive force is passing through the cut-out, the magnet armature 5 will not be effected thereby, but, if 45 the current should at any time be excessive, the armature will be attracted, and in moving to the poles 7 will strike the arm 34 of lever 32, and thereby trip its arm 31 from under the shoulder 30 of the latch plate 28, and 50 thus permit the spring 18 of the switch lever 9 to turn the shaft 24 by the pressure of the lever trip plate 21 on the flat portion 23 of the shaft, which by turning allows the switch lever to take the position shown by dotted 55 lines in Fig. 3 of the drawings with its contact plates 14 withdrawn from the contacts 10, to open the circuit and cut out the current from the lamps or other electrically operated devices in the line circuit. As the 60 lever trip plate 21 had escaped downward past the shaft 24, the spring 27, which had received increased tension by the partial turn of the shaft just given by the trip plate, will return the shaft to normal position with its 65 plate 28 stopped against the pin 29, and holding the plate shoulder 30 in proper position to again engage the trip lever 32, im-

mediately the electric current is readjusted or lessened in force sufficiently to allow the armature 5 to drop from the pole 7 of the 70 electro-magnet, which action will notify the attendant that the switch lever 9 may again with safety be pressed down to the contacts 10, 10, to close the circuit, and as the lever is thus actuated the trip plate 21 tilts and rises 75 above the cut-away part 23 of the shaft 24, without affecting the other latch devices of the cut-out.

It will be noticed that by adjusting the supports 6 of the loosely held armature 5, 80 the extent of separation of the armature from the poles 7 of the electro-magnet may be adjusted in order to control to a nicety the degree of intensity or electro motive force of an electric current allowed to flow along 85 the line wire in a complete or closed circuit.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An automatic cut-out comprising a spring actuated switch lever having a spring- 90 held trip plate, contacts from which the lever is thrown by its spring, a cut-away shaft carrying a latch plate, a spring normally rotating the shaft and latch plate to a stop, a trip device adapted to engage the latch plate, and 95 an electro magnet disengaging the trip device by its energized armature, substantially as described.

2. In an automatic electrical cut-out, the combination, with an electro-magnet having 100 an armature 5, contacts 10, 10, a switch lever adapted to said contacts and having a spring pressed trip-plate 21, a shaft 24 having a cut-away portion 23, and a spring 27; and a latch plate 28 having a shoulder 30; a stop 29 for 105 the plate 28, and a trip lever 32 adapted to the plate 28 and the armature, substantially as shown and described.

3. In a cut-out device of the character described, the electro magnet having adjustable screws or pins in its pole pieces, and an armature loose on said screws or pins, substantially as described. 110

4. In a cut-out device of the character described, the electro magnet having in its 115 pole pieces adjustable screws or pins provided with locking nuts; and having an armature loose on said screws or pins, substantially as described.

5. In a cut-out device of the character described, the switch lever provided at one end with contacts formed of series of laminated plates 13, having comblike extremities 14, and provided at the other end with a stop 120 shoulder, a pivoted trip plate 21, a spring 22, retaining said trip plate in normal position, and a detent for said trip plate substantially as described. 125

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

CARL HOFFMANN.

Witnesses:

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