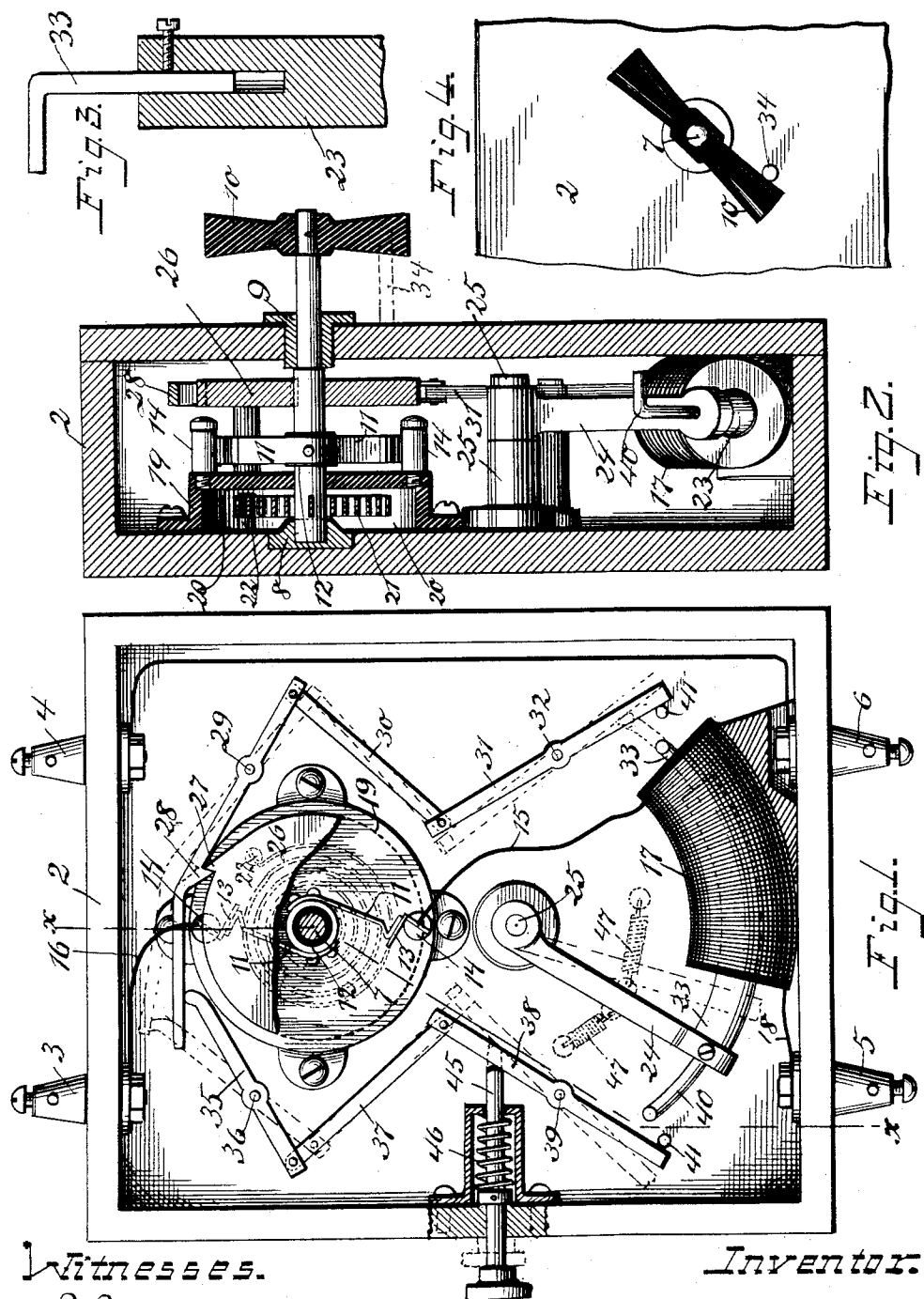


(No Model.)

E. A. MANSHIP.
AUTOMATIC ELECTRIC CUT-OUT.

No. 471,997.

Patented Mar. 29, 1892.



Witnesses.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC ELECTRIC CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 471,997, dated March 29, 1892.

Application filed June 30, 1891. Serial No. 397,987. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. MANSHIP, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a certain Improved Automatic Electric Cut-Out, of which the following is a specification.

My invention relates to means for automatically breaking electric circuits at times when the current exceeds or falls below the limit of safety.

The object of the invention is to provide a cut-out or circuit-breaker of a simple, strong, and durable construction and the action of which may be accurately and delicately adjusted.

To this end my invention consists in the combination, with a suitable switch, of means for retaining the same in a closed position, a solenoid and core therefor, and means whereby the movement of said core as governed by the intensity of the current in the solenoid is caused to operate said retaining device to release said switch, whereby upon the stoppage of current or upon a dangerous rise of current the circuit is positively broken.

Further, the invention consists in various other constructions and combinations herein-after described, and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a front elevation showing a device embodying my invention, the face or cover of the containing-box being removed. Fig. 2 is a sectional view thereof on the line X X of Fig. 1. Figs. 3 and 4 are details.

As shown, the cut-out device is inclosed in a suitable box 2, upon which the binding-posts 3, 4, 5, and 6 are arranged and adapted to receive the ends of the wires making up the working circuit, including a motor, electric lamps, or other translating devices. In the upper part of the box I provide the snap-switch, made up of the shaft 7, secured in the bearings 8 and 9 and having the hard-rubber T-handle 10. The contact brushes or strips 11 are secured on the rings 12, which are preferably insulated from the shaft 7, as shown. The contact-brushes are adapted to close upon the spring points or plates 13, secured on the binding-posts 14, adapted to receive

the ends of the connecting-wires 15 and 16. The latter wire passes to the post 3 and the former to the solenoid 17, arranged in the lower part of the box. The other end of the solenoid-coil is connected to the post 5 by the strand 18. The cut-out switch is arranged on the insulated block 19, fastened on the back of the box and having the recess 20, within which the spring 21 is contained. This spring has one end fastened on the shaft 7 and its other end secured on the stationary post 22, so that the constant tendency is to rotate the shaft 7 to carry the contact-brushes 11 away from their stationary contacts on the posts 14. The core 23 is adapted to reciprocate with the solenoid, has a curved form corresponding to the shape thereof, and is secured on the ends of the pivot-arm 24. This arm is pivoted on the stationary post 25, extending back of the box. Upon the shaft 7 I secure the disk 26, provided with the tooth or projection 27, adapted to engage the jaw 28, pivoted at 29. The position of the pivot 29 is such that when these two parts are in engagement the contact-strips 11 are pressed upon their respective plates 13, thereby maintaining a closed circuit through the box and the solenoid. From the lower end of the pawl-lever 28 the link 30 extends to the upper end of the lever 31, pivoted at 32 and extending down into close proximity to the end of the solenoid. When the current becomes very strong and rises to a point above the maximum current which it is safe to carry in the motor or other device, the core 23 is drawn so far into the solenoid that the end thereof or the brass extension 33 thereon projects from the solenoid and strikes the lever 31 and, throwing the same outward, raises the dog or pawl 28 from engagement with the tooth 27, thereby releasing the disk 26, whereupon the current is immediately broken by the spring acting to separate the contacts. The fixed stop 34 is provided to prevent the contact-brushes 11 from rotating so far that they would strike the other sides of the points 13. It is obvious that any other stop may be employed to limit the throw of the disk 26 to less than one-half a revolution. The upper end of the lever 28 is extended over the top of the switch and into position to be engaged by the lever 35, pivoted at 36 and connected

by the link 37 to the lever 38, pivoted at 39 and corresponding to the lever 31. By throwing down the lever 38 the upper end of the lever 35 may be raised to disengage the pawl 28 from the disk 26. The lever 38 may be provided in a position to be engaged by the arm 24; but I preferably remove the same a short distance therefrom and provide the brass wire extension 40, adapted to engage the lower end of the lever 38. Such engagement will take place when the current is cut off outside of the box, whereupon the core, which has formerly been held within the solenoid, will, owing to the cutting out of the current from the solenoid, suddenly swing out and against the lever 38, thereby operating the lever 35 to disengage the pawl 28 from the disk.

It is sometimes desirable to break the circuit without awaiting the action of the box. For this purpose I provide the push-button and spring 45, adapted to engage the upper end of the lever 38 and to be pushed in to throw the same down. The coiled spring 46 is adapted to normally hold the push-button out of engagement with the lever 38. After the snap-switch has been released it may be reclosed by means of the handle 10, provided on the outside of the box. During the time that current flows through the solenoid it will be seen that the core and the lever 24 will vibrate slightly as the core is drawn in or partially released by the fluctuation of the current. The tripping-points may be accurately determined by a preliminary test of the device prior to its actual use and the loading of the arm 24 or the shortening of the core, so that the end thereof will strike the lever 31 more or less quickly as the current-strength or voltage increases. The same result may be attained by the employment of adjustable extensions 33 and 40, arranged, as shown in Fig. 3, so that they may be let into or drawn out from the ends of the core, as required, to determine the accurate operation of the device.

For use upon floors or cars which are subject to heavy vibrations or jars I preferably provide a cut-out block having light quieting-springs 47 (indicated in dotted lines in Fig. 1) and secured to the swinging arm 24, which in a great measure prevent the vibration of the arm.

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

1. In an automatic cut-out, the combination, with a solenoid, of a core therefor, an electric

switch, means for holding the same in a closed position, levers arranged to trip said switch to release the same, and means whereby said core acting in one direction engages one of said levers to trip said switch and acting in the other direction engaging the other lever to trip the switch, whereby said switch is opened by a maximum current in said solenoid or a loss of current therein, substantially as described.

2. In an electric cut-out, the combination, with the shaft 7, of contact-brushes carried thereby, stationary contacts with which said brushes are adapted to engage, means for rotating said shaft, a disk thereon, a pawl engaging the same, levers in connection therewith and by means of which said pawl is tripped, a curved solenoid 17, included in the circuit of said contact-points, a similarly-curved core 23, a swinging arm 24 for rigidly supporting said core, said levers adapted to be engaged by the ends of said core, and a stop for limiting the rotative movement of said shaft 7, substantially as and for the purpose specified.

3. In an electric cut-out, the combination, with an electric snap-switch, of a spring in connection therewith, a disk adapted to move therewith, a pawl-lever 28, adapted to engage the same, levers 31 and 38, connected therewith, a solenoid, a core, a swinging arm adapted to support the same, and extension-pieces 33 and 40, adapted to engage said levers 31 and 38 when said core is moved into its extreme positions, substantially as and for the purpose specified.

4. In an electric cut-out, the combination, with the snap-switch arranged on the shaft, of the spring thereon, the disk 26, secured on said shaft, a pawl adapted to engage said disk, levers in connection with said pawl, a solenoid, a core therefor adapted to engage said lever to trip said pawl, and a push device whereby said levers may be operated and said pawl disengaged, substantially as described.

5. In an electric cut-out, the combination, with an electric switch, of a pawl adapted to hold the same in a closed position, a solenoid, a core therefor, and adjustable extensions thereon, substantially as described, and for the purpose specified.

In testimony whereof I have hereunto set my hand this 25th day of June, 1891.

EDWARD A. MANSHIP.

In presence of—
C. G. HAWLEY,
F. S. LYON.