

(No Model.)

W. S. HILL.  
MULTIPLE THERMAL CUT-OUT.

No. 495,038.

Patented Apr. 11, 1893.

Fig. 1.

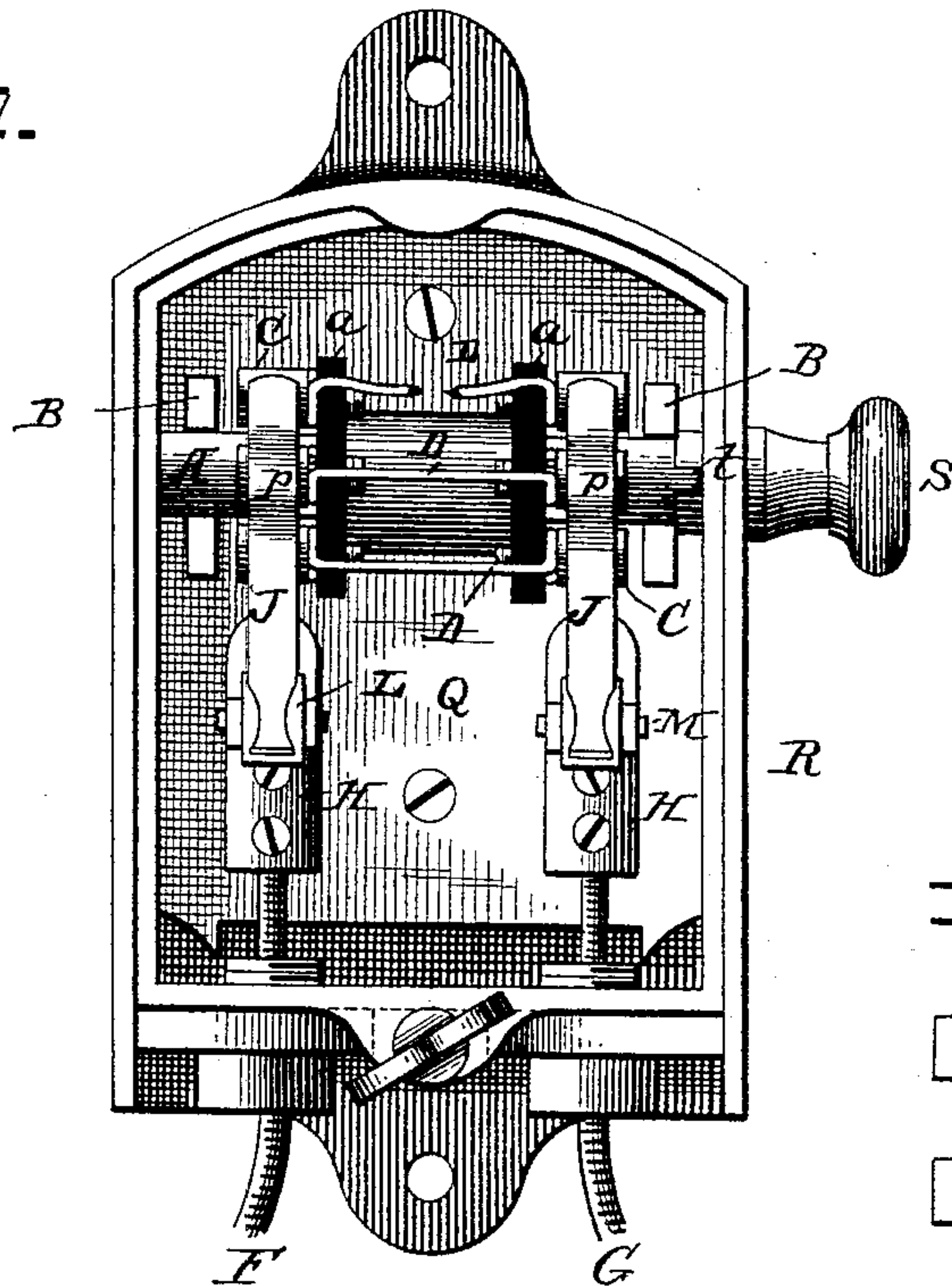


Fig. 4.

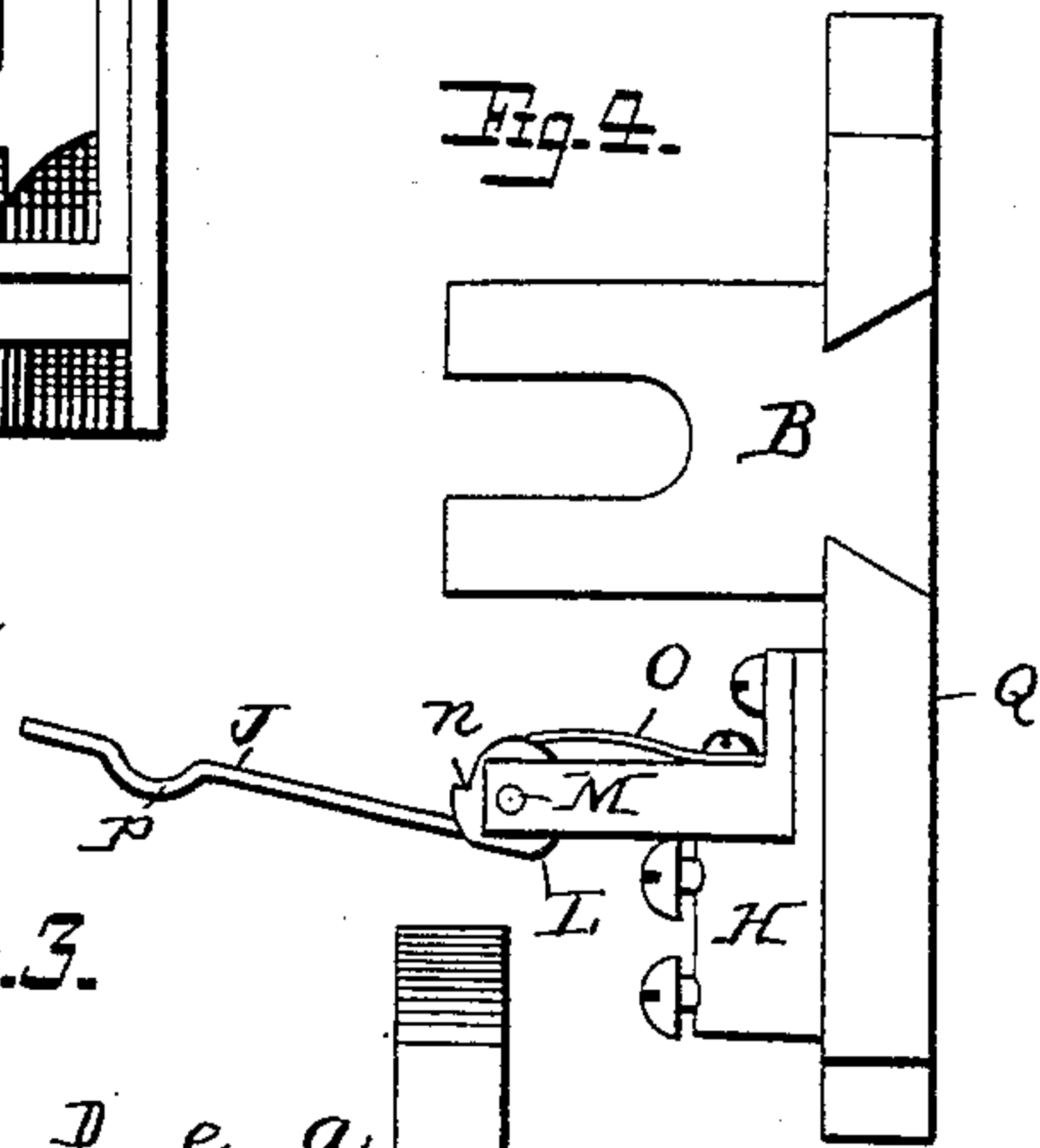


Fig. 2.

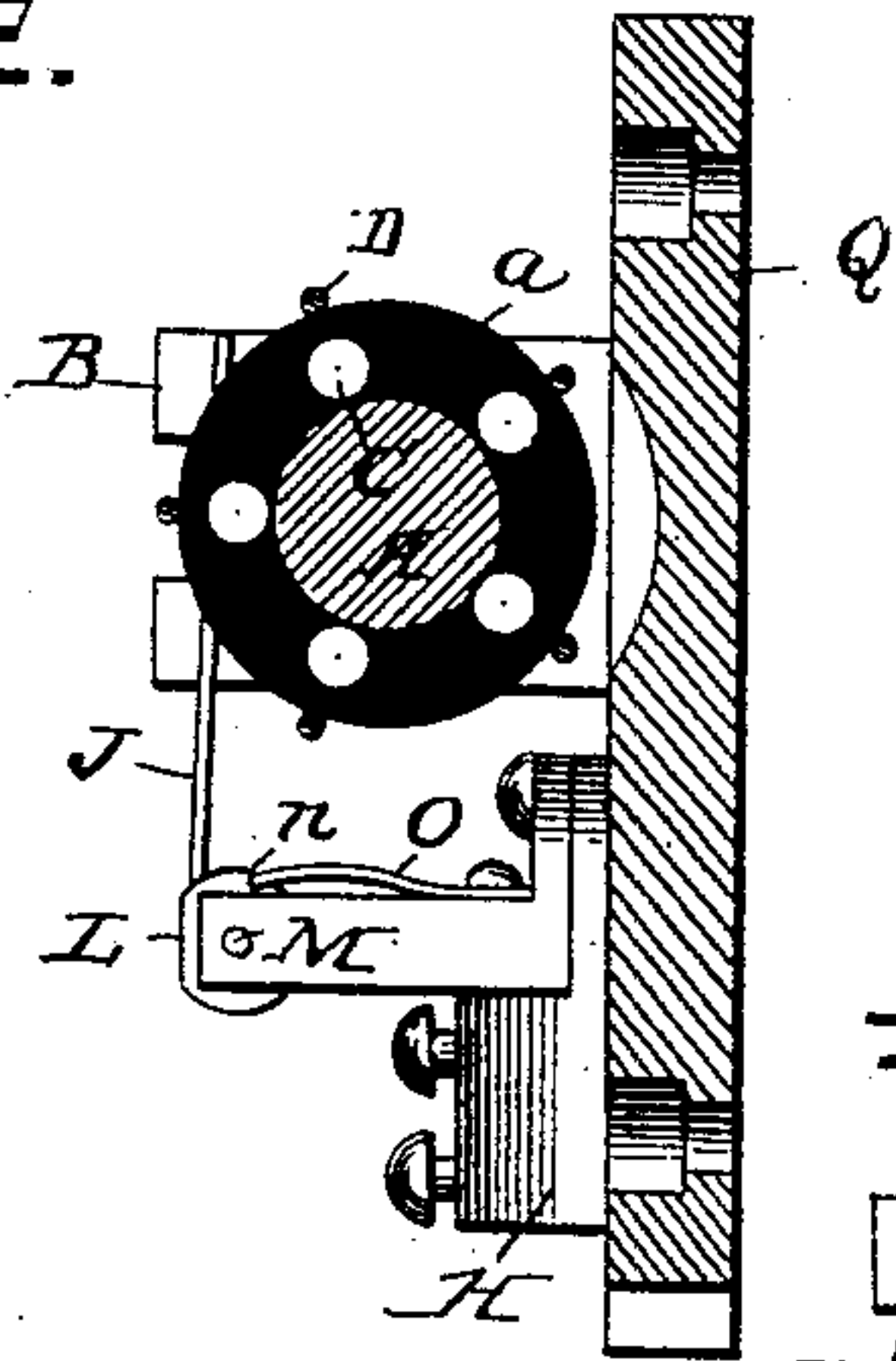


Fig. 3.

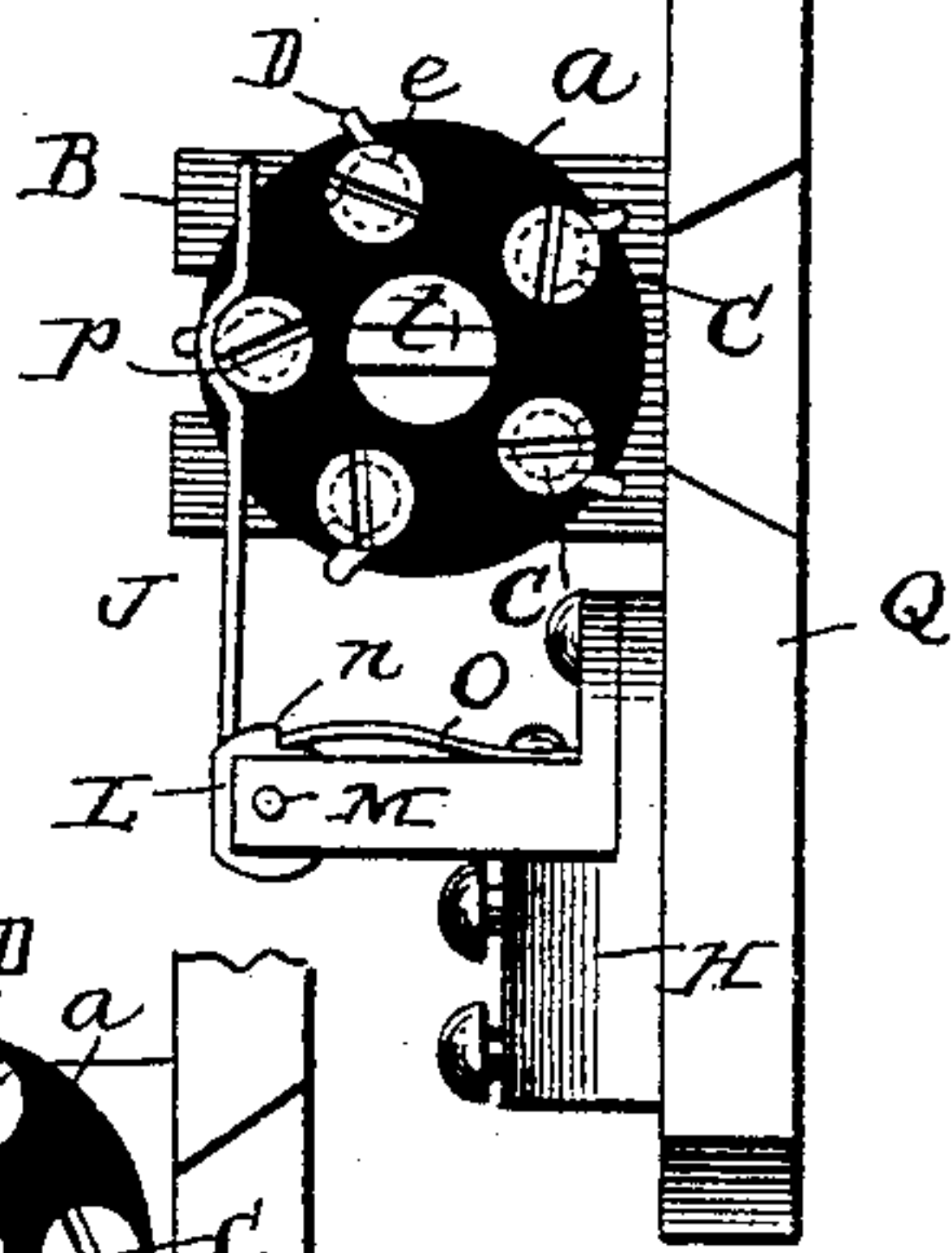
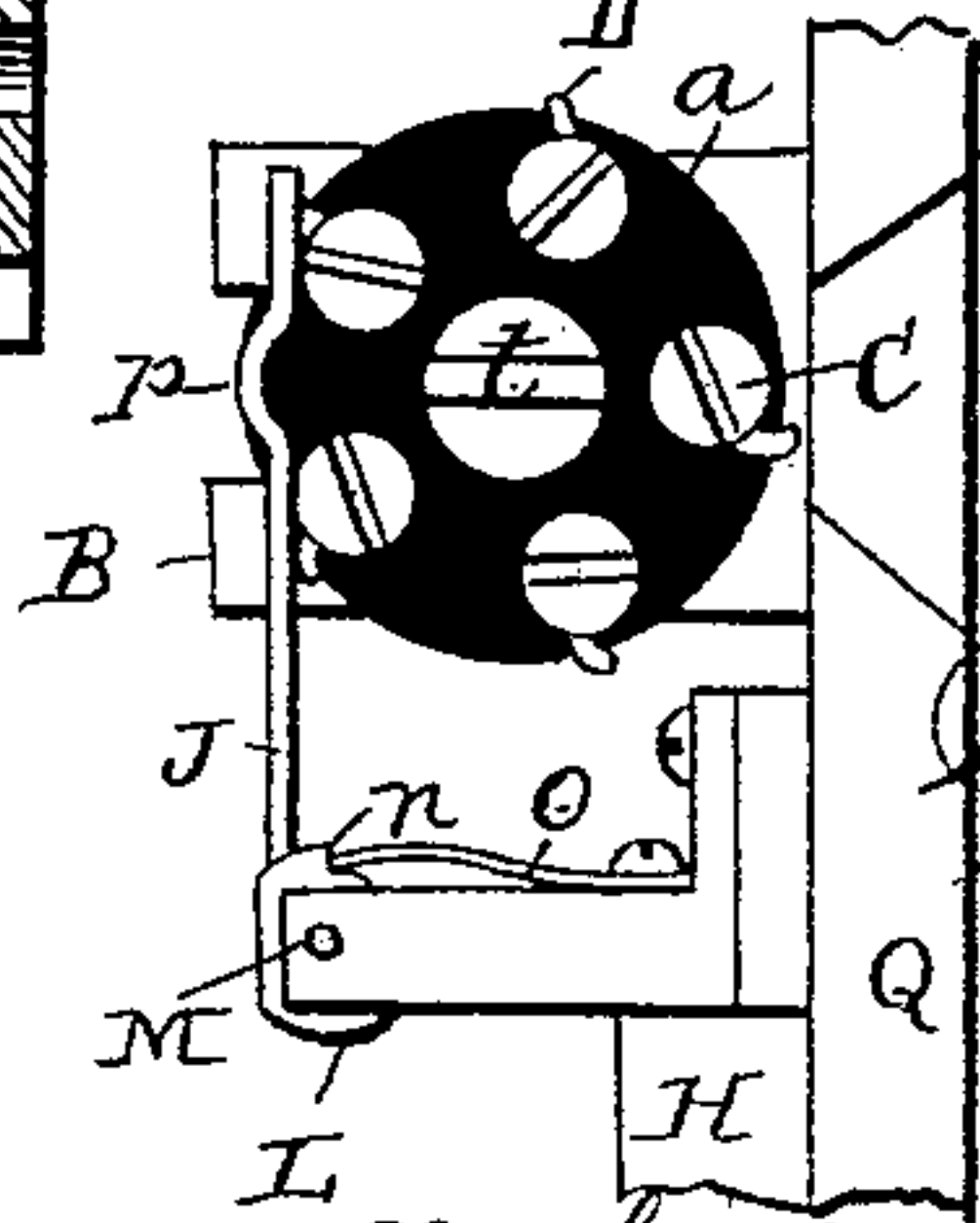


Fig. 5.



Witnesses  
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By his Attorneys  
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# UNITED STATES PATENT OFFICE.

WARREN S. HILL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

## MULTIPLE THERMAL CUT-OUT.

SPECIFICATION forming part of Letters Patent No. 495,038, dated April 11, 1893.

Application filed August 10, 1889. Renewed June 2, 1890. Serial No. 354,005. (No model.)

*To all whom it may concern:*

Be it known that I, WARREN S. HILL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Multiple Cut-Outs, of which the following is a specification.

In the constantly increasing use of electricity where currents of varying power and intensity are passed through wires which are liable to come in contact with inflammable material, or which are connected with delicate mechanism which is liable to be injured or destroyed by too powerful a current, it has been found necessary to use what are known as fusible cut outs, or safety switches, in which the circuit is broken whenever the intensity of the current reaches a certain point. In devices where a single link or piece of fusible material has been used which must be entirely removed from the circuit before another could be substituted in its place the current must be turned off the wire to be repaired, or the operator must run the risk of touching the ends of the wire to be repaired, thus completing the circuit through his body and receive the full force of the current with all its attendant dangers. To obviate these defects, as well as to avoid delay in getting another cut out with which to replace the one that has been destroyed, I have invented a multiple safety device having a series of cut outs and in which the one that has been destroyed can be removed and a new one put in its place in an instant and without exposing the person of the operator or turning off the current.

My invention therefore relates to safety devices for electrical wires in which such cut outs are used, and it consists in uniting a series of such cut outs in a single device whereby the one in use may be removed and another substituted instantly and without danger and in making the carrier or support for the cut outs detachable from the bearings.

In the accompanying drawings which form a part of the specification and in which the same letters of reference indicate corresponding parts in each of the figures; Figure 1, is a front plan view of my device with the lid or cover removed. Fig. 2, is a vertical sectional

view of the same without the case. Fig. 3, is a side view with the handle for operating it, removed, and without the case. Fig. 4, is a detached view of the supports and terminals; and Fig. 5 is a side view showing the position of the cut-out when the terminals are in engagement with two of the fusible links instead of one.

Without limiting myself to the specific construction and arrangements of the various parts comprising my invention as herein set forth I have shown and described it as consisting of a carrier in the form of a spool, the shaft A of which is suitably journaled in supports B, B, and having its ends *a, a*, composed of fiber or other insulating material. In each of these ends are ranged the screws C, C, or other means of attachment for the links of fusible material, D, D. The links are formed with the small eyes *e, e*, at the ends through which the screws pass to clamp them tightly against the ends of the spools, and thus insure contact between the ends of the links and the heads of the screws. The spool may be moved to bring any pair of opposite screws C into contact with two terminals to complete a circuit through any one of the fusible links D. These terminals may be variously arranged. As shown contact or connection is made between the heads of the screws and the positive and negative ends of the wires F and G respectively by means of yielding or flexible terminals in the form of arms J J pivoted to brackets H H. The arms are formed or provided with semi-cylindrical bearings L, L, at one end which fit within the notched or slotted ends of the brackets through which are passed the pivot pins M, M. Each of the cylinders is provided with a notch or recess *n* within which one end of a spring O engages with a flat surface formed by the notch and forces the opposite end of the arm against the pin or screw head at the end of the spool thus forming a good electrical connection and at the same time permitting of the movement of the pins into or out of contact with the end of the arm. The end of each of the arms which is in contact with the pin or screw is preferably provided with a slight curve or depression *p* which acts as a slight stop or catch in bringing a new screw



head into contact with the arm thus indicating when they are in the right place. By making the ends of the arms extend slightly beyond the curves, the pins can be moved in either direction without disarranging the device, and by having the opposite ends of the arms provided with the cylindrical bearings, they can be turned on their pivots so as to permit of the spool being taken out of its bearings and a new one put in its place, and then turning the arms down onto the pins again, the springs exerting no force until they engage with the flat portion of the bearing. In this manner the spool is readily removed, and if desired, the destroyed or defective links removed and replaced by new ones, and the spool again inserted or an entirely new spool put in.

For convenience and protection, I secure the sockets H, H, upon the same board or backing Q, to which the supports B, B, are secured, and place them all within a box or casing R, which may be located at any convenient point. When the device is thus placed within the box it is more convenient to operate the spool by means of a handle S which projects through one side of the casing and to permit the ready detachment of the spool may be coupled to the latter by any suitable coupling. As shown it engages with one end of the shaft of the spool, the inner end of the handle being slotted and the end of the shaft being provided with a rib or projection *t* to fit in the slot and cause it to be rotated with the handle, and still permit of the removal of the spool from its bearings. As the handle is so secured to the casing that it is permanently retained in place, all that is necessary to remove the spool is to turn the arms J, J, back out of the way, rotate the handle until the slot stands parallel with the slotted bearings in the supports B, B, and lift out the spool. Another spool may then be put in its place, the arms turned back into engagement with it, and the device is ready for use, or a non-fusible connection may be put in, when it is desired that the circuit be not broken by the action of the current. In the drawings I have shown five links, although it is evident that more or less may be used, and if desired the pins or screw heads may be so arranged in relation the ends of the arms J, J, that two of the links may be placed in the circuit by rotating the spool until each arm is in engagement with two of the pins as shown in Fig. 5.

As an extra precaution against danger in operating the device without turning off the current, the outer end of the handle may be covered with any insulating material, or the entire handle be made out of it, although the shaft of the spool as well as the supports B, B, and back Q are all preferably made out of wood or other non-conducting material.

It will be seen that my invention embodies a rotary fuse-holder which is provided with attachments for a number of fuses, and is

journaled in open bearings in which it is retained by contact arms pivoted on the base, and spring-pressed into engagement with the fuse attachments on the holder. Furthermore the contact arms also serve to make successive connection with the fuses as the holder is revolved, and are shifted into and out of engagement with the holder, being retained in either position by a spring actuating device, consisting, in the form herein shown, of a cam carried by the arm and a spring engaging therewith.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. In a multiple safety device for electrical circuits, the combination with slotted supports, of a spool journaled therein having a series of fusible links arranged thereon, and removable terminals one end of each of which engages with the spool to retain it in position and make connections with the links, and the opposite ends are connected with the lines of the circuit, substantially as described.

2. In a multiple safety device for electrical circuits, the combination with a casing having a handle permanently secured thereto the inner end of which is slotted, of slotted supports, a spool journaled therein the shaft of which is provided with a rib on one end, fusible links on the spool and terminals for engaging therewith, substantially as described.

3. In a multiple safety device for electrical circuits, the combination with the supports, of a spool journaled therein having a series of fusible links arranged thereon, and yielding terminals the free end of each of which is provided with a curved stop or catch and projects beyond the fusible links whereby the spool may be rotated in either direction, substantially as described.

4. In a multiple safety device for electrical circuits, the combination with the supports, of a spool having a series of fusible links arranged thereon and terminals adapted to engage with more than one of said links at the same time, substantially as described.

5. In a multiple safety device for electrical circuits, the combination with a removable spool having fusible links arranged thereon, of terminals pivoted to engage with said links with their free ends and having cylindrical bearings, at their opposite ends each bearing provided with a flat surface, and springs engaging with said bearings whereby the springs actuate the terminals only when bearing against the flat surfaces, substantially as described.

6. A safety switch for electrical circuits consisting of a spool provided with a series of fusible links, one end of the shaft of said spool being provided with a rib or projection supports for the shaft having slotted bearings, pivoted arms one end of each of which is provided with a semi-cylindrical bearing having a notch, a spring for engaging with the bearing within said notch, and a handle for



rotating the spool the inner end of which is slotted to receive the projection upon the end of the spool shaft, substantially as set forth.

5 7. A safety device for electric circuits, comprising a base or support, a fuse-holder engaging therewith and having fuse attachments, pivoted contact arms on the base shift-able into and out of engagement with the fuse attachments on the holder so as to retain the  
10 holder in engagement with the support or release it, and springs acting on the pivoted arms and holding the same in and out of engagement with the holder.

15 8. A safety device for electric circuits comprising a base or support, a fuse-holder engaging therewith, and having fuse attachments, pivoted contact arms on the base, shift-able into and out of engagement with the fuse attachments on the holder, and carrying cams,

and springs bearing against said cams and holding the arms in and out of engagement with the holder. 20

9. A multiple safety device, comprising a base or support having open bearings, a handle journaled in the support, a rotary fuse-  
25 holder removably supported in such bearings and detachably engaging with the handle and having a series of fuse attachments and connections engaging successively with the fuse attachments as the holder is revolved. 30

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WARREN S. HILL.

Witnesses:

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