No. 699,045. Patented Apr. 29, 1902.

J. T. WATSON.

SAFETY FUSE BOX.

(Application filed July 8, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

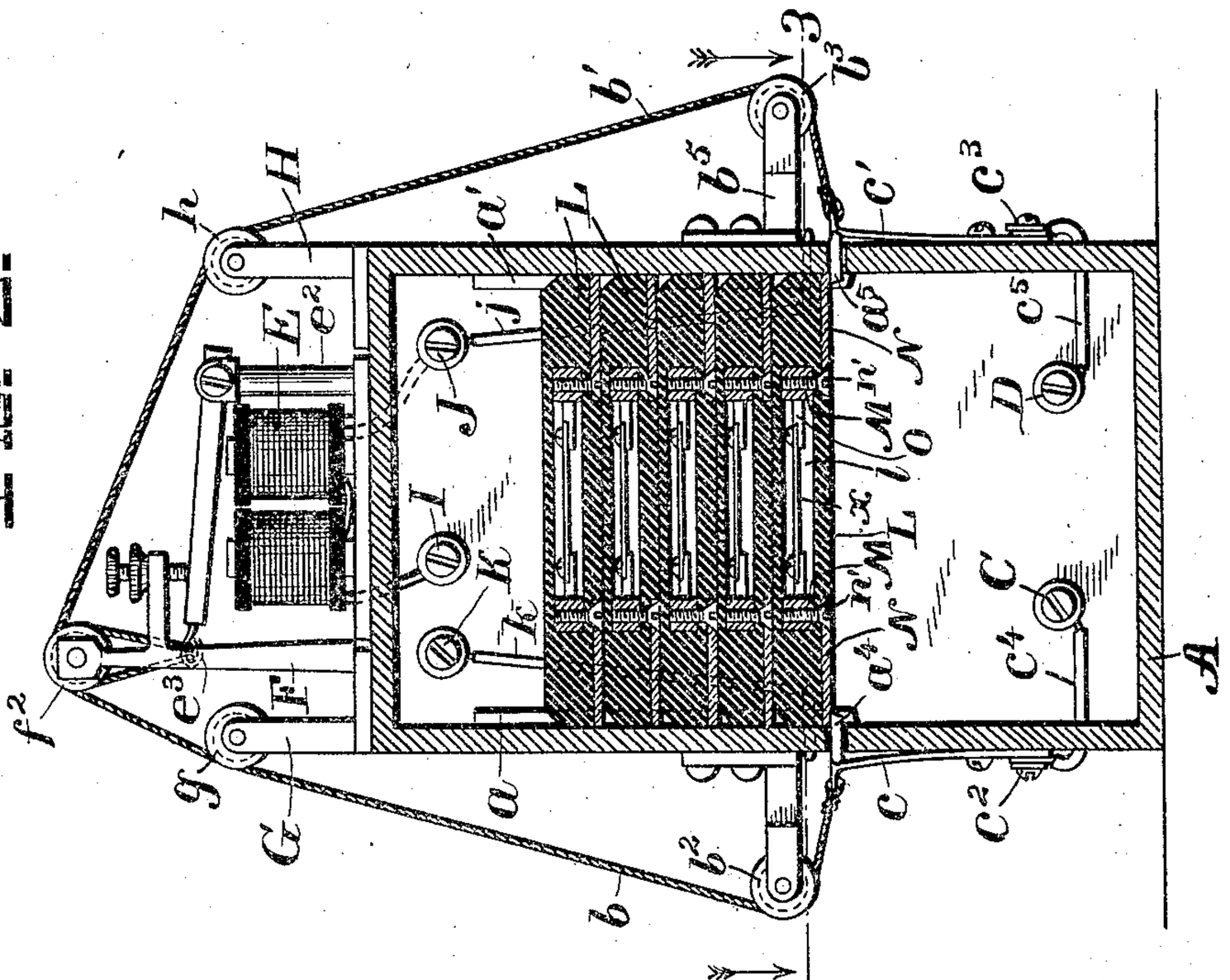
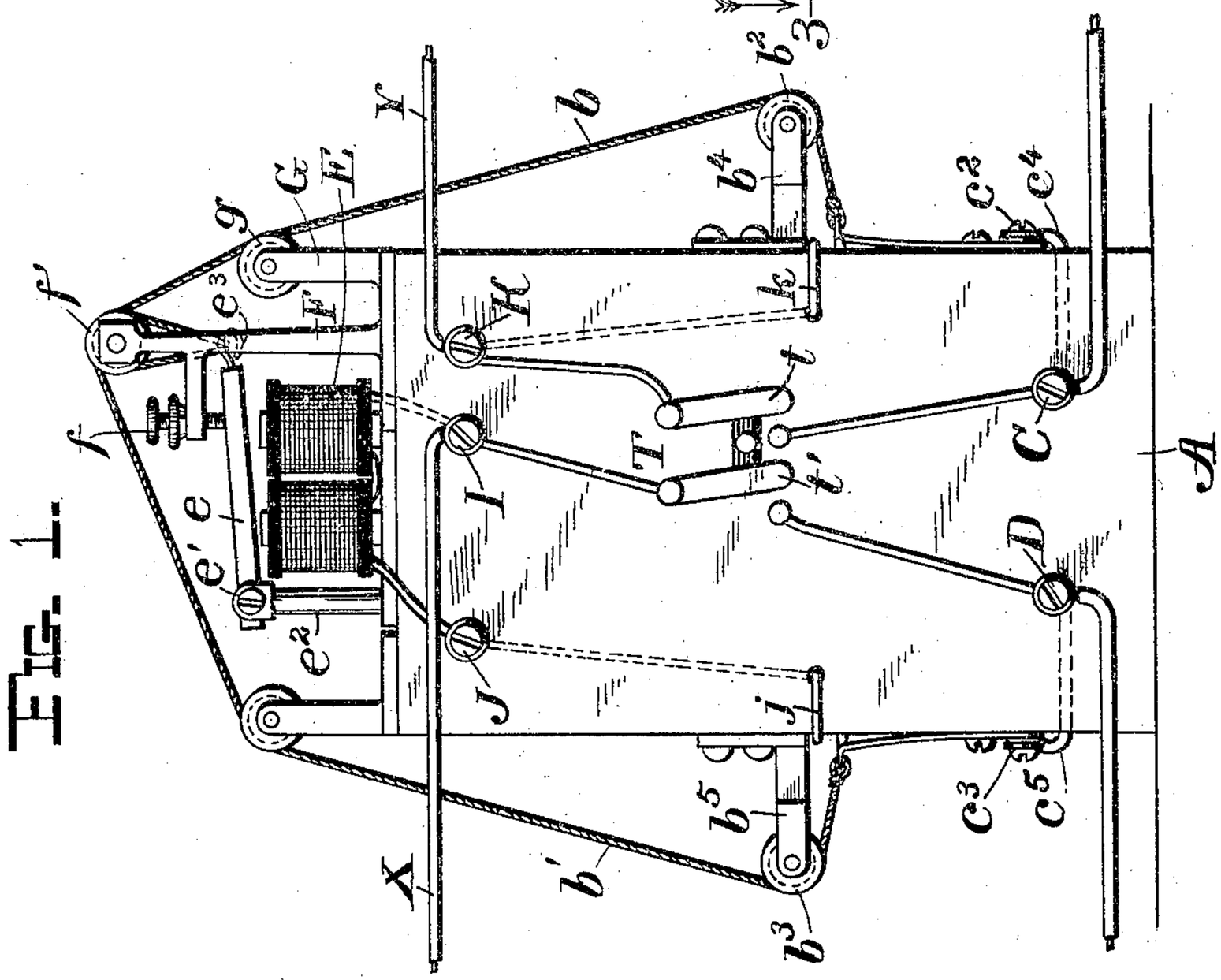


Fig. 1.



Witnesses
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FIG. 3.

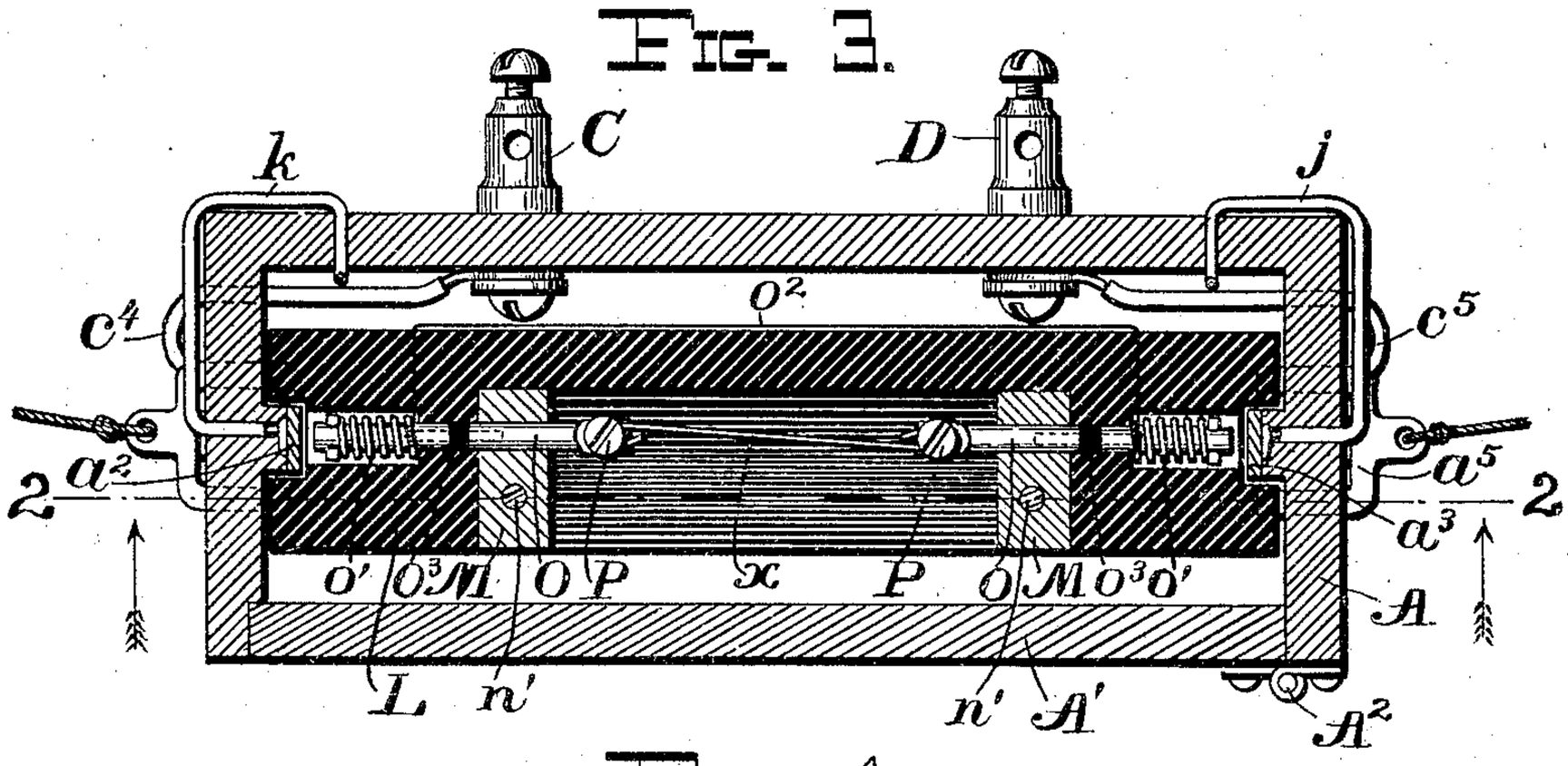


FIG. 4.

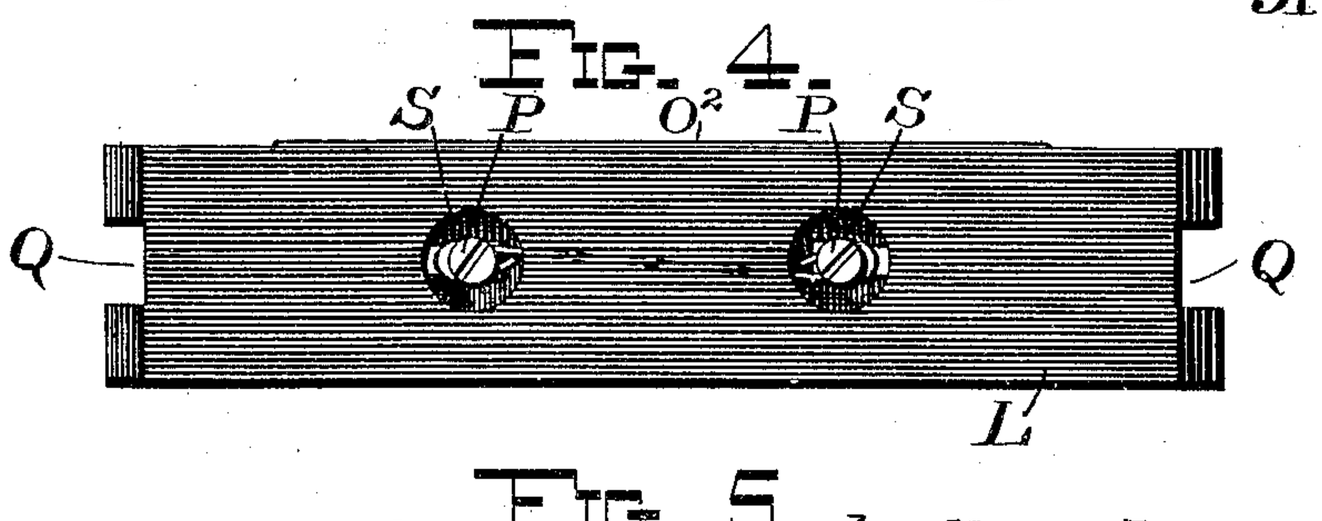


FIG. 5.

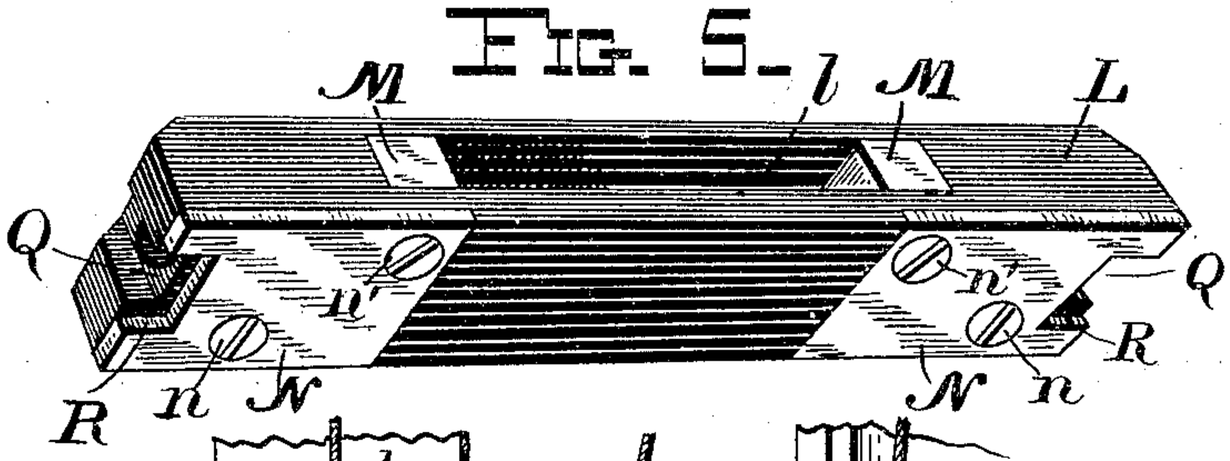


FIG. 6.

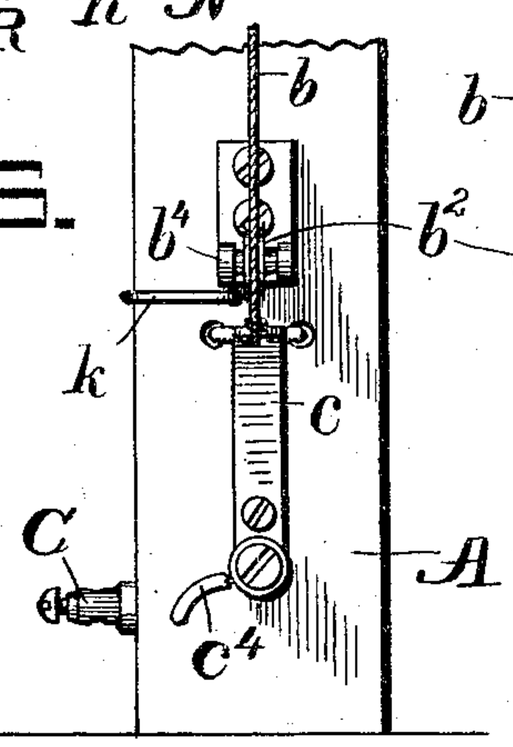
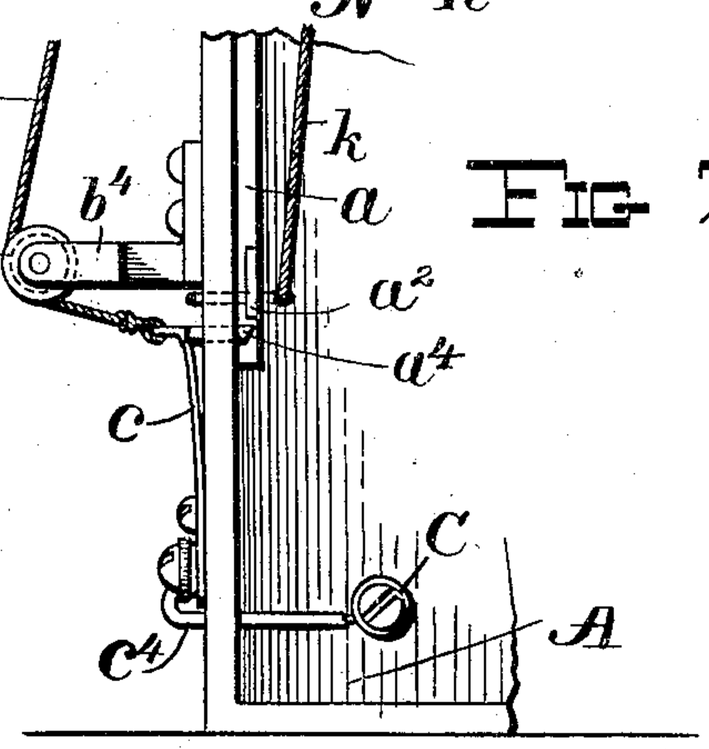


FIG. 7.



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UNITED STATES PATENT OFFICE.

JAMES T. WATSON, OF SCRANTON, PENNSYLVANIA.

SAFETY FUSE-BOX.

SPECIFICATION forming part of Letters Patent No. 699,045, dated April 29, 1902.

Application filed July 8, 1901. Serial No. 67,484. (No model.)

To all whom it may concern:

Be it known that I, JAMES T. WATSON, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Safety Fuse-Boxes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in safety fuse-boxes, and has for its object to provide a device for automatically inserting fuses in an electric circuit successively, so that as fast as one fuse blows out another fuse is inserted without interrupting the circuit for any appreciable time.

In order to more fully describe my said invention, reference will be had to the accompanying drawings, wherein—

Figure 1 represents a back elevation of the device. Fig. 2 represents a central vertical section on the line 2 2, Fig. 3, looking in the direction of the arrows. Fig. 3 represents a horizontal section on the line 3 3, Fig. 2, looking in the direction of the arrows. Fig. 4 is a plan view of one of the fuse-holders. Fig. 5 is a perspective view of the same. Fig. 6 is a side elevation of a portion of the device, and Fig. 7 is a front elevation of a portion of the device.

The same letters are used to designate similar parts throughout the several views.

A represents an inclosing case, preferably made of some insulating material. Within this case A are mounted a pair of vertically-disposed guides a a', one upon each side of the case, and are also composed of insulating material. Secured upon each of these guides, at the bottom thereof, are a pair of metallic plates a^2 a^3, and below these plates are a pair of stops a^4 a^5, to each of which are connected the cords b b', passing over the pulleys b^2 b^3, repectively, carried in the brackets b^4 b^5, respectively, secured to the side of the case A. The stops a^4 a^5 are carried upon the upper ends of the springs c c', each of said springs being provided with a screw c^2 c^3, to which are connected the wires c^4 c^5, respectively, connecting the same to the binding-posts C D, respectively.

Upon the top of the case A is mounted the electromagnet E, provided with the armature e, pivoted at e' to the upright e^2.

f is an adjustable stop-screw threaded in the standard F, adapted to set and limit the upward swing of the armature e.

In the upper part of the standard F are mounted a pair of pulleys f' f^2, over which pass the cords b b', the ends of these cords b and b' being both secured to the hook e^3 upon the end of the armature e.

G H are standards in the upper portions of which are mounted the pulleys g h, respectively, over which the cords b b' respectively pass.

One terminal of the wire coil upon the electromagnet E is connected to the binding-post I, and the remaining terminal is connected to the binding-post J, this binding-post J being connected to the metallic plate a^3 by the wire j. The opposite metallic plate a^2, mounted in the side of the case A, is connected by the wire k to the binding-post K.

Within the case and running crosswise between the sides of the same are adapted to be placed a plurality of fuse-holders L, free to slide vertically. These fuse-holders are made of any suitable insulating material and are piled one upon another, the bottom holder in the pile resting upon and being supported by the stops a^4 a^5. Referring particularly to Figs. 3, 4, and 5, it will be seen that these fuse-holders L are provided with a longitudinal slot l, and at each end of these slots are provided the rectangular metallic blocks M M.

Upon the bottom of each of the blocks or holders L and at the ends thereof are provided metallic plates N N, secured in place by the screws n n', the screws n' passing into the blocks M, forming an electrical contact therewith. Passing through these metallic blocks M M are metallic studs or pins O, disposed longitudinally of the holder L, and are so located that when the fuse-holder is in position with its metallic plates N N resting upon the stops a^4 a^5 the outer ends of these pins O are in a direct line with the metallic plates a^2 a^3 of the guides a a' of the case. These rods or pins O are provided with a coiled spring o', which normally tends to throw said pins outward against said metallic plates; but this is prevented as long as the fuse x remains in-

tact between the screws P P, as the fuse is placed in the holder under a slight tension, opposing the action of the springs o' o'. The two springs are electrically connected together by the small wire o^2, which runs behind the holder and enters perforations near the ends of the holder and are there soldered to the springs. The pins O are made in two sections insulated from one another by the coupling o^3, which may be of hard rubber, fiber, or other suitable material threaded into the two metallic sections, thus forming an insulating-coupling. Each of these holders or blocks L is adapted to be placed in position between the guides a a', and for this purpose the end of each holder has a groove Q cut into it, the groove R in the metallic plate N being made larger in order not to touch the metallic plate a^2 a^3 in said guides a a'. The upper edges of these holders are beveled off also to allow the stops a^4 a^5 to pass to grip the bottom of the next holder when the bottom holder is released. In order to facilitate the insertion of fuses in these holders L, a pair of holes S S are made in the upper side thereof, opposite the screws P P, to allow a screw-driver or the like to be inserted.

The operation of the device is as follows, assuming that the device is to be employed in the circuit with an alternating current: The wires are connected to the binding-posts C D. When used with an alternating current, an auxiliary source of direct current must be employed to operate the magnetically-operated mechanism. For ordinary purposes a battery of cells of any suitable type may be connected to the wires X Y, connected to the binding-posts I K. The connections being now made for an alternating current, the course of said alternating current is as follows, assuming that the current enters at C: From here it flows through the wire c^4, spring c, and stops a^4 into the metallic plate N, through the screw n', through the fuse x, screw n', plate N, stops a^5, spring c', wire c^5, and out through the binding-post D. Until the current rises high enough to blow the fuse this circuit remains unbroken, the entire current passing through the fuse of the lower holder L; but when the current increases beyond certain limits then the fuse will blow out, breaking the alternating-current circuit, and will allow the pins O O to be sprung outward by their springs and form contact with the metallic plates a^2 a^3. This completes the circuit, with the local or auxiliary circuit as follows: Starting with the binding-post I, the current passes through the electromagnet E, through the binding-post J, wire j, metallic plate a^3, pin O, spring o', wire o^2, to the spring o' and pin O upon the other end of the fuse-holder L, out through the plate a^2, wire k, and connects with the binding-post terminal K. When the circuit is thus completed, the electromagnet E is energized, attracting its armature e. As the armature e is connected to the cords b b', it draws the same in over the pulleys f' f^2, which cords in turn impart their motion to the springs c c', causing the stops a^4 and a^5 to be drawn outwardly, thereby releasing the lowest or burned-out fuse-holder and allowing it to drop by the force of gravity out of place, permitting the next holder above to take its place automatically. As the lowest holder leaves the guides the contact is broken between the metallic plates a^2 a^3 and the pins O of the fuse-holder, allowing the armature of the electromagnet to return to its original position, at the same time allowing the spring-stops a^4 a^5 to return to their original positions. The new fuse-holder as it drops into position will not complete the local circuit until the fuse blows out, as the fuse while in position holds these pins in their innermost position against the tension of their springs, and consequently out of contact with the metallic plates a^2 a^3.

When the device is used in circuit with a direct current, the magnet E may be so wound as to receive the current from the line instead of from an auxiliary or local circuit. In this case the line connections are made simply with the binding-posts C D, and the double-pole switch T is closed, thereby connecting the binding-posts I D and K C. Ordinarily the line-current will flow through the device exactly as traced with the alternating current until the fuse blows out. Then the current from the line starting at the binding-post C will flow through the blade t of the switch T, binding-post K, wire k, metallic plate a^2, pin O, spring o', wire o^2, spring o', pin O, plate a^3, wire j, binding-post J, electromagnet E, binding-post I, the other side t' of switch T, and out through binding-post D, or vice versa, according to the direction of flow of the current. The lowest fuse-holder L will then automatically drop out and allow the succeeding one to automatically drop into its place, as described in connection with the separate auxiliary or local circuit. By such a device it is obvious that as soon as one fuse blows out the holder can be refitted with a new fuse and placed upon the top of the pile without disturbing the other holders.

The device is preferably completely inclosed while in action and is provided with a door A', hinged at A^2 to the inclosing case A.

While I have shown my invention as embodied in the form herein shown, it is obvious to any one skilled in the art that many modifications may be made in my invention without departing from the spirit thereof, it being understood that I do not limit myself to the precise form of apparatus shown.

Having thus described my said invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a safety fuse-box, the combination with an inclosing case, a pair of stops connected in the line-circuit mounted therein, an electromagnet adapted to actuate said stops, and a pair of contacts connected in said mag-

net-circuit carried by said case; of a plurality of separate fuse-holders mounted in said case, conducting-plates normally in engagement with said stops, and pins electrically connected together, and slidably mounted in said holders, adapted to engage said contacts in said case when the fuse is blown out, substantially as described.

2. In a safety fuse-box, the combination with an inclosing case, a pair of stops connected in the line-circuit mounted therein, an electromagnet adapted to actuate said stops, and a pair of contacts connected in such magnet-circuit carried by said case; of a plurality of separate fuse-holders, a fuse within each of said holders, sliding pins each connected to said fuse, insulated ends upon said pins, springs in connection with said insulated ends, electrical connection between said springs, said portions being adapted to complete the magnet-circuit through said contacts in said case when the fuse blows out, and conducting-plates upon the under sides of said holders adapted to rest upon said stops, through which the line-current passes to the fuse, whereby when the fuse is blown out, the circuit is completed through the magnet, withdrawing said stops, causing the blown-out fuse-holder to be ejected, allowing the next holder to drop into place, substantially as described.

3. In a safety fuse-box, the combination with an inclosing case, a pair of stops connected in the line-circuit mounted therein, an electromagnet adapted to actuate said stops, and a pair of contacts connected in said magnet-circuit, carried by said case; of a plurality of fuse-holders each independently movable in said case, said holders being adapted to rest upon said stops, fuses carried by said holders, each fuse being adapted to be thrown into the circuit when its holder rests upon said stops, and sliding pins adapted to engage the electrical contacts of said case when the fuse blows out, to complete the circuit through the magnet, causing the same to withdraw the stops, allowing the next fuse-holder to drop into place, substantially as described.

4. In a safety fuse-box, the combination with an inclosing case, a pair of stops connected in the line-circuit mounted therein, an electromagnet adapted to actuate said stops, and a pair of contacts connected in said magnet-circuit, also carried by said case; of a plurality of fuse-holders mounted in said case, plates upon the under side of each said holders, adapted to rest upon said stops, and fuses in connection with said plates, and spring-actuated pins carried by said holders, whereby when said fuse blows out, said pins are sprung into contact with said electrical contacts, closing the magnet-circuit, causing said magnet to withdraw said stops and allow the succeeding holder to drop into place, substantially as described.

5. A safety fuse-holder, comprising an insulating-base, conducting-plates upon each end of said base, sliding pins adapted to carry a fuse mounted in said base, in electrical connection with said conducting-plates, insulated couplings carried by said pins, springs normally tending to throw said pins outwardly, and electrical connection between said springs, whereby when said fuse is blown out, said springs are thrown outwardly, substantially as described.

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

JAMES T. WATSON.

Witnesses:

J. ALBERT CRANE,

H. W. HUFF.