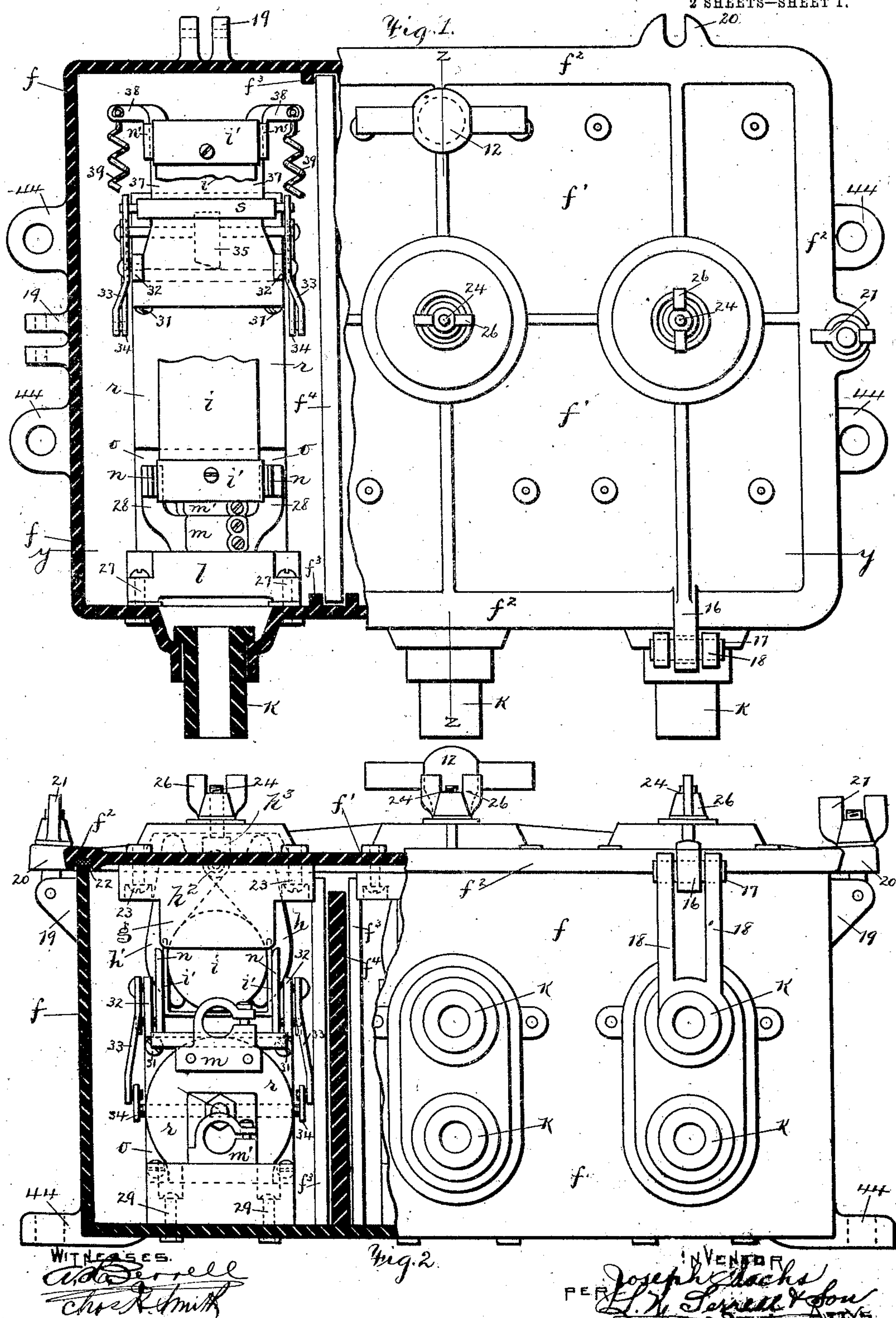


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UNITED STATES PATENT OFFICE.

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FUSE-BLOCK.

No. 826,383.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH SACHS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented an Improvement in Fuse-Blocks, of which the following is a specification.

My invention relates to fuse-blocks, and particularly to fuse switch-blocks and to the method of establishing an electric circuit in connection therewith.

Heretofore difficulty has been experienced in connecting fuses between live terminals; and the object of my invention is the production of a fuse switch-block in which the fuse devices may be placed in electrically-open-circuited contacts while the line-terminals of the block are electrically alive and in which contacts by a further movement of the fuse devices other devices are actuated for closing the circuit between the live line-terminals through the fuses.

In carrying out my invention I employ a base and a movable part connected thereto, either swinging or sliding, a fuse device, a clamp or engaging device for the fuse device secured in said movable part and actuated exteriorly thereof, contacts to receive the terminals of the fuse device, which contacts are adapted to be electrically open-circuited when the fuse device is placed therein, line terminals or connections, one of which is permanently connected electrically to one of said contacts, a reservoir containing an oil-bath, a circuit-breaker in said reservoir, electrical connections between the said circuit-breaker and the other of said contacts and line-terminals, and means connected to the said circuit-breaker and actuated by the movement of the said fuse and its support for closing and opening the circuit-breaker to make and break the circuit between the line-terminals through the fuse device.

In the drawings, Figure 1 is a front elevation and partial section of my improved fuse-block. Fig. 2 is an inverted plan and partial section on line *y y*, Fig. 1; and Fig. 3 is a sectional elevation on line *z z*, Fig. 1.

In these drawings, which illustrate my present invention, *f* represents a box or base which may be conveniently made of any good insulating material and five sides of which are preferably closed. The base *f* is provided with a movable part *f'*, which may be so constructed as to be closed by a sliding movement, but is preferably provided with lugs 16, which are pivoted at 17 to suitable lugs 18 on the base *f*, so that the movable part is hinged to the casing. The movable part *f'* is provided with a peripheral flange *f''*, the under side of which is recessed and adapted to fit over the edges of the sides of the base *f*. A suitable gasket 22 may be employed in the said recess to form a tight joint between the movable part and the sides of the base, and the interior of the base may be provided with ribs *f'''* and partitions *f''''*, dividing the same into independent compartments.

The box or base is also provided with lugs 19 and the movable part *f'* with projections 20, by which, through the means of thumb-screws 21, the movable part may be made secure to the box or base. Blocks *g g'*, of insulating material, such as porcelain, are secured to the inner surface of the movable part in suitable positions by means of screws 23. I also prefer to employ a series of exteriorly-actuated clamping devices adapted to engage and normally to secure the fuses in position to the movable part, each clamping device comprising a pair of fingers *h h'*, adapted at one end to engage a fuse device and at the other end pivotally mounted on a pin *h''*, passing through a yoke *h'''*, provided with a screw-threaded stem 24, which extends through a suitable opening in the movable part *f'*, and exteriorly of this movable part *f'* the screw-threaded stem 24 is fitted with a clamp-screw 26. I also employ a spring 25, coiled around a portion of pin *h''* and at its free ends engaging the said fingers *h h'*, the function of the spring being to force the outer ends of the fingers apart to disengage the fuse, whereas, on the other hand, the fuse may be clamped to the movable part *f'* against the blocks *g g'* by overcoming the action of the spring 25 in drawing the yoke *h'''* toward the movable part *f'* by means of the thumb-screw 26, as is fully described in Letters Patent No. 742,499, granted to me October 27, 1903.

One side of the base *f* is provided with suitable openings to receive the insulating-bushings *k*, through which the line-wires pass. Adjacent to one of said openings a block *l* is secured to the case by means of screws 27. To the block *l* a line-terminal *m* is secured in any convenient manner. This line-terminal *m* is provided with an arm or projection 28,

to which is secured the contact n , which is adapted to receive one of the terminals i' of the fuse device i . The contact n may be of any convenient kind, but is preferably a clip contact the arms of which are sufficiently long to almost reach the side of the block g when the movable part is secured in place, and the block g is provided with a recess in which one of the terminals i' of the fuse device is received and the sides of which are sufficiently deep to cause the said terminal of the fuse device to contact therewith when the parts are closed.

The back or bottom of the base f is provided with a block of insulating material o , secured thereto by means of screws 29. A reservoir r , preferably circular in cross-section, is secured to the block o or, as shown, may be integral therewith. A line-terminal m' is also secured to the block o by the screws 30 in such a position as to be in line with the opening adapted to receive a line-wire. The reservoir r is provided with a cover r' , which is secured to the reservoir by any suitable means—as, for instance, the screws 31. The cover of the reservoir is provided with the arms 32, to the ends of which bell-crank levers 33 are pivoted. One end of both of the links 34 is pivoted to the ends of the long arms of the bell-crank levers, the other ends of the links 34 being pivoted to the plunger-rod 35, which latter passes through the cover of the reservoir and is adapted to slide in suitable bearings 36, provided on the cover thereof. The short arms of the bell-crank levers carry the roller s , against which the fuse device i is adapted to bear in the operation of the parts. The reservoir-cover is also provided with a projecting arm 37, to which the contact n' is secured, the contact n' being adapted to receive the second terminal i' of the fuse device i . Arms 38 extend from the projecting arm 37 beyond the contact n' and are adapted to receive one end of each of the springs 39, the other ends of which are secured in eyes in suitable webs on the bell-crank levers 33.

The reservoir contains a circuit-breaker which comprises a contact 40, secured to the plunger 35 and adjacent to the end thereof, and a double contact 41, secured in the bottom of the reservoir, the outer and inner members of the contact 41 being adapted to receive, respectively, the contact 40 and the end of the plunger 35, and said contacts are of circular form like concentric and oppositely-placed cup devices. The contact 41 is connected with the terminal m' by a bolt 42 and arm 43. The casing is provided with lugs 44 to connect the same in position to a suitable support.

In the position shown in the drawing the circuit is closed between the line-terminals through the fuse device by means of the circuit-breaker comprising the contacts 40 and

41 in the reservoir r , in which a suitable bath of oil may be employed; electrical connection being from one line-terminal through contacts 40 41, plunger 35, projecting arm 37, contact n' , fuse device i , and contact n to the other terminal.

When the movable part is open or released, the normal position of the plunger 35 is such, due to the action of the springs 39, that the connection between the contacts 40 and 41 will be broken, and the same action of the springs swings the bell-crank levers 33 on their pivots in the arms 32, thereby moving the roller s nearer the movable part. After the fuse device i has been secured against the blocks g g' by the pivoted fingers h h' the movable part f' may be swung closed, in doing which the terminals i' of the fuse device first come into connection with the contacts n n' ; but before the movable part is positioned and after the terminals of the fuse device have entered the contacts n n' the fuse device bears upon the roller s , and the further movement of closing the movable part overcomes the action of the springs, distends the same, and swings the bell-crank levers on their pivots, thereby lowering the plunger sufficiently to finally close the circuit through the contacts 40 and 41, the contacts n and n' being absolutely electrically inert when the terminals of the fuse device are received therein.

It is to be understood that the strength of each spring 39 is sufficient upon the fuse device being removed from the terminals n n' to operate the circuit-breaker within the oil bath; but, on the other hand, the strength of any pair of these springs 39 is not sufficient to overcome the friction by which the fuse devices are held within their terminals should any or all of the other fuse devices be disconnected by the removal of the movable part f' .

It will be apparent that in removing the fuse device, whether the same is disrupted or not, the reverse operation is performed, which movement first separates the plungers 7 from the socket-contacts c , Figs. 1 to 3, inclusive, and separates the contacts 40 41, Fig. 6, and the fuse device is thereafter removed from electrically-open-circuited contacts, while the line-terminals of the box may be electrically alive.

In the drawings I have shown a three-pole box or base; but my invention is equally applicable to boxes of any number of poles. I do not limit myself to the precise construction illustrated, as other equivalent forms may be equally advantageous. It is also to be understood that any one of the fuse-clamping devices may be actuated exteriorly of the movable part to hold or release the fuse device independently of all the others, and consequently that all or any of the fuse devices may be moved, together with the movable part, which implies that one or any

number of the fuse devices may be removed with the movable part and the other fuse devices retained in position to maintain the electrical continuity of their respective circuits.

I claim as my invention—

1. In a fuse-block, the combination with a base, a movable part connected thereto, and a multiplicity of fuse devices, of means for independently securing the said fuse devices to the movable part and which means are adapted to be actuated exteriorly of the said movable part, means for receiving the terminals of the fuse-devices and at least one of which means is adapted to be electrically open-circuited when the fuse-device terminals are received therein, and means actuated by a movement of said movable part and fuse devices for making and breaking the electric circuits through the fuse-block by way of the fuse devices.

2. In a fuse-block, the combination with a base, a movable part connected thereto and a multiplicity of fuse devices, of means for independently securing said fuse devices to the movable part and which means are adapted to be actuated exteriorly of said movable part, means for receiving the line-terminals, means for receiving the terminals of said fuse devices at least one of which means is adapted to be electrically open-circuited when the said fuse-device terminals are received therein, and means actuated by a movement of said movable part and fuse devices for making and breaking the electric circuits through the fuse-block by way of the fuse devices.

3. In a fuse-block, the combination with a base and movable part hinged thereto, of blocks secured to said movable part, a fuse device, a clamp in said movable part adapted to engage the said fuse device to hold the same against said blocks, means for receiving the terminals of said fuse device at least one of which means is adapted to be electrically open-circuited when the said fuse-device terminals are received therein, line-terminals, electrical connections and means actuated by a movement of the said movable part and fuse device for making and breaking the circuit between the said line-terminals through the fuse device.

4. In a fuse-block, the combination with a base and a movable part hinged thereto, of blocks secured to said movable part, a fuse device, a clamp in said movable part adapted to engage the said fuse device to hold the same against said blocks, metallic contacts for receiving the terminals of said fuse device at least one of which contacts is adapted to be electrically open-circuited when the said fuse-device terminals are received therein, line-terminals, electrical connections and means actuated by a movement of said movable part and fuse device in its clamped position for making and breaking the circuit be-

tween the said line-terminals through the fuse device.

5. In a fuse-block, the combination with a base and a movable part hinged thereto, of blocks secured to said movable part, a fuse device, a clamp in said movable part adapted to engage the said fuse device to hold the same against the said blocks, means for operating said clamp exteriorly of the said movable part, means for contacting with the terminals of the said fuse device, at least one of which means is adapted to be electrically open-circuited when the said fuse-device terminals are received therein, line-terminals, electrical connections and means actuated by a movement of the said movable part and fuse device in its clamped position, for making and breaking the electric circuit between the said line-terminals through the fuse device.

6. In a fuse-block, the combination with a base, a movable part connected thereto, and means for securing the same in position, of a fuse device, a clamp for said fuse device adjustably secured to said movable part, means for receiving the terminals of the said fuse device at least one of which means is adapted to be electrically open-circuited when the fuse-device terminals are received therein, line-terminals, electrical connections, and means actuated by a movement of the said movable part and fuse device whereby the circuit is completed between the line-terminals through the fuse device.

7. In a fuse-block, the combination with a base, a movable part connected thereto, and means for securing the same in position, of a fuse device, a clamp for said fuse device adjustably secured in said movable part, metallic contacts secured in said base and adapted to receive the terminals of the fuse device, at least one of which contacts is electrically open-circuited when the fuse-device terminals are received therein, line-terminals secured to said base, one of which is permanently in electrical connection with one of said contacts, and means between the other line-terminal and the other contact and actuated by a movement of said movable part and fuse device for making and breaking the electric circuit between the line-terminals through the fuse device.

8. In a fuse-block, the combination with a base, a movable part connected thereto, and means for securing the same in position, of a fuse device, a clamp for said fuse device adjustably secured in said movable part, metallic contacts secured in said base and adapted to receive the fuse-device terminals, at least one of which contacts is electrically open-circuited when the fuse-device terminals are received therein, line-terminals secured in said base, one of which is permanently and electrically connected with one of said contacts, an oil-reservoir secured in said base, a circuit-breaker in said reservoir, electrical connec-

tions between said circuit-breaker and the other line-terminal, means for electrically connecting the said circuit-breaker to the other of said contacts, and means actuated
 5 by a movement of said movable part and fuse device for closing and opening the electric circuit-breaker to make and break the circuit between the line-terminals through the fuse.

10 9. In a fuse-block, the combination with a base, a movable part connected thereto and means for securing the same in position; of a fuse device, a support for the said fuse device adjustably secured in the said movable part
 15 and adapted to be actuated exteriorly thereof, metallic contacts secured in said base and adapted to receive the fuse-device terminals, at least one of which contacts is electrically open-circuited when the fuse-device terminals are received therein, line-terminals secured in said base, one of which is permanently and electrically connected with one of
 20 said contacts, a reservoir adapted to contain an oil-bath and secured in said base, contacts secured in said reservoir, electrical connections between the said contacts and the other line-terminal, a plunger, a plunger-contact secured thereto, bell-crank levers pivoted to projections on said reservoir, links connect-
 25 ing one end of the bell-crank levers and the top of said plunger, springs connecting the

bell-crank levers with fixed points, electrical connections between the plunger and the other fuse-device-terminal contact, and a roller between the other ends of the said bell- 35 crank levers and upon which the fuse device is adapted to bear so that after the fuse-device terminals have passed into the contacts a further movement of the movable part and fuse device actuates the parts to cause the
 40 plunger to descend to close the contacts within the reservoir to complete the electric circuit between the line-terminals through the fuse device.

10. In a fuse-block, the combination with a 45 base, a movable part connected thereto and a fuse device, of means for securing the said fuse device to the movable part, means for receiving the terminals of the fuse device at least one of which is adapted to be electric- 50 ally open-circuited when the fuse-device terminals are received therein, and means actuated by a movement of the said movable part and fuse device for making and breaking the electric circuit through the fuse-block by 55 way of the fuse device.

Signed by me this 13th day of June, 1902.

JOSEPH SACHS

Witnesses:

GEO. T. PINCKNEY,
 S. T. HAVILAND.