

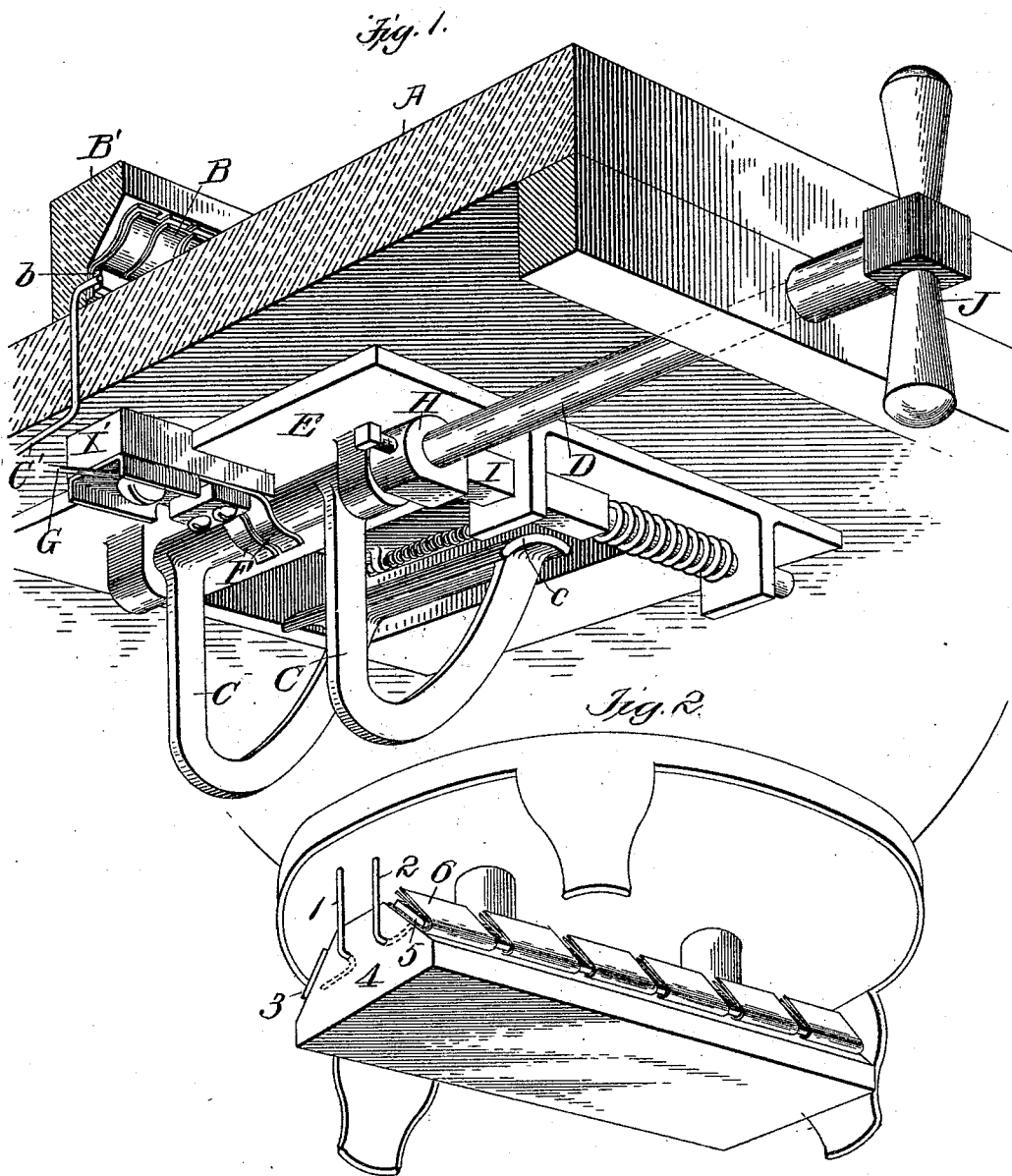
(No Model.)

2 Sheets—Sheet 1.

E. RUEBEL.
ELECTRICAL SWITCH.

No. 517,664.

Patented Apr. 3, 1894.



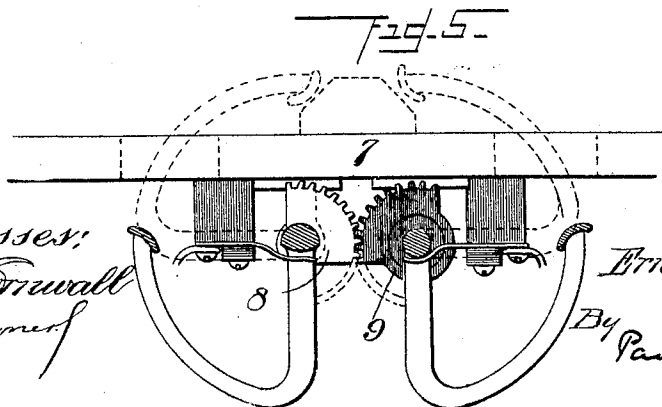
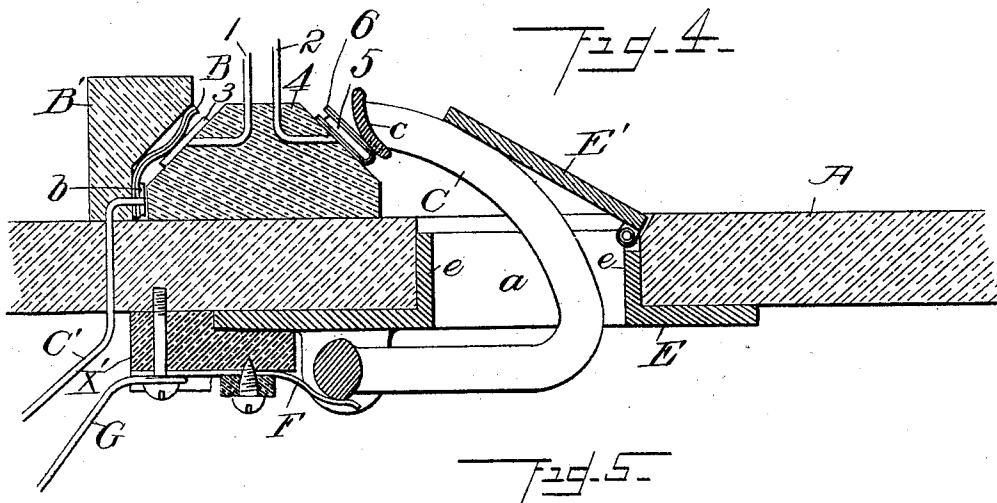
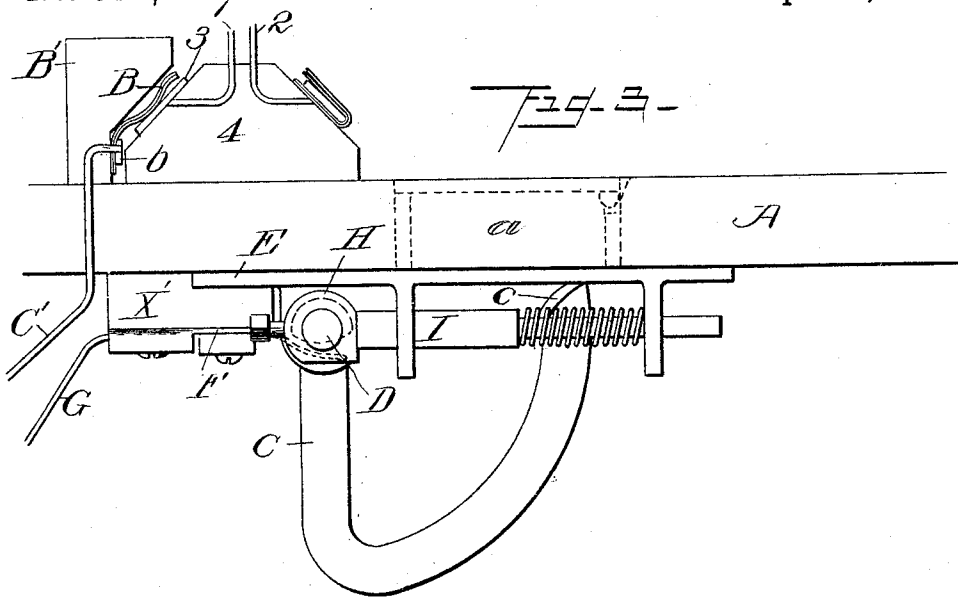
Witnesses
J. R. Cornwall
Hugh Wagner.

Inventor
Ernest Ruebel
By Paul Bakerell
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UNITED STATES PATENT OFFICE.

ERNST RUEBEL, OF ST. LOUIS, MISSOURI, ASSIGNOR TO HIMSELF, SHERMAN B. PIKE, AND WILLIAM N. MATTHEWS, OF SAME PLACE.

ELECTRICAL SWITCH.

SPECIFICATION forming part of Letters Patent No. 517,664, dated April 3, 1894.

Application filed September 9, 1893. Serial No. 485,163. (No model.)

To all whom it may concern:

Be it known that I, ERNST RUEBEL, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Electrical Switches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a perspective view, looking at the under side of my improved switch, showing the stationary contacts on top of the insulation slab, turned at right-angles to their correct position to more clearly show the same.

Fig. 2 represents a perspective view of the under side of a cooking utensil, illustrating the terminals of electrodes of an electrical heater with which my improved switch is adapted to co-operate and make contact. Fig.

3 is a diagrammatical view in side elevation, showing the switch in its lowermost position and the contacts broken. Fig. 4 is a similar view in cross-section, illustrating the switch in its operative position and in electrical contact with the terminals of the electrodes. Fig. 5 is a modification.

My invention relates to electrical switches and is designed particularly for use in connection with the terminals of electrodes in electrical cooking utensils, and consists, generally stated, in pivotally mounting upon a suitable insulation support, a swinging arm, which arm when in its inoperative position breaks the circuit, but which, when raised, makes contact with the terminal of an electrode, thus completing the circuit.

Another feature resides in the means for holding the swinging arm in each of its extreme positions, which means, also, assists in making and breaking the circuit, so that quick contact can be made, and sparks or an arc, which might otherwise be formed, are reduced to a minimum.

Another feature of invention resides in the peculiar construction and arrangement of the terminals of the electrodes, which are adapted to co-operate with the swinging arm and the stationary contact points, as will hereinafter be described.

Other minor features reside in the peculiar

construction of the switch and the arrangement and combination of the several parts.

Referring to the drawings, A indicates a slab of insulation material, formed with an opening *a*, through which the swinging arm is adapted to pass. Located to one side of the opening is a projection *B'* on one side of which, that side nearest the opening, is arranged a series of contact springs *B*, which are electrically connected, preferably at their lower ends, by a conduction strip *b*, which strip has connected thereto a wire *C'*, which has its end grounded or connected to a battery to complete the circuit, when the device is in electrical operation.

C indicates a swinging contact arm which is mounted on a shaft *D*, which shaft has suitable bearings in the ears or projections extending from a frame plate *E*. This swinging contact arm is preferably in the form shown—*i. e.*, two radially-extending portions, which are turned concentric to the axis, which concentric portions have their outer ends connected by a cross-piece *c*, which is adapted to contact with one terminal of an electrode, as will hereinafter appear. The axis of this swinging contact arm is preferably in the form of a cam or a construction such as will present different faces to a contact spring *F*, mounted upon an insulation block *X'* and electrically connected with wire *G*, which contact spring is in electrical connection with the axis of the swinging contact arm only when the same is in one of its extreme positions, such as is illustrated in Fig. 4. This contact spring *F* is preferably split, as is shown in Fig. 1, in order to make a better contact with the cam axle.

In order to retain the swinging contact arm in each of its extreme positions, and, at the same time, afford a means for quickly making and breaking the circuit through the spring *F* and the cam axle of the arm, I mount upon the rod *D* a collar *H*, which is formed with two squared faces, which are adapted to operate in connection with a spring-impelled bolt *I*, mounted in guide-ways on the frame-plate *E*. These squared faces on the collar *H* are preferably made adjustable through the medium of a set screw, and are adapted to

turn with the rod D, which is operated by suitable insulation handles J on its outer end.

The frame-plate E is preferably formed with flanges e, which extend up into the opening 5 a in the insulation frame or slab A, which flanges form a support for a spring-closed trap-door E', which is preferably countersunk in the slab A to make a neat appearance, and which when the swinging contact arm is in 10 its lowermost position, as shown in Fig. 3, is closed, but when the arm is forced up by turning the handle J, this trap-door is raised, it of course opening in the right direction, to permit the passage of the swinging contact arm.

15 In Fig. 2, I have illustrated a preferred form of contact terminals which, in this instance, are shown as being applied to the bottom of a cooking utensil, and which are connected to the different electrodes by suitable 20 wires, 1 and 2. The wire 1, which is preferably connected to the negative electrode, leads to a metallic strip 3, placed longitudinally on an insulation block 4 arranged on the bottom of the utensil, which contact 3 is adapted to 25 co-operate with the spring contacts B, which are electrically connected with the wire C'. The wire 2 is preferably connected to the positive electrode and to an electrical conduction strip 5, which conduction strip is 30 clasped by U-shaped contact springs 6, which are preferably arranged in a series, as shown. With these contact springs 6 the swinging contact arm is adapted to operate and make connection.

35 The operation of the device as above set forth is as follows: Assuming the parts to be in a position illustrated in Figs. 1 and 3, and the wires C' and G connected in any suitable circuit, in which circuit, preferably between 40 the initial source and the contact spring F on the wire G, I insert a fuse block, not shown, and the insulation block 4 with its terminals is placed in juxtaposition to the projection B', so that its contact strip 3 will be in electrical 45 contact with the springs B. The handle J is then turned so as to force the swinging contact arm through the opening a, as shown in Fig. 4, until its cross-piece c comes in contact with the spring 6. This movement of the arm 50 will cause the radially-increased portion on the axle of the arm to come in contact with the spring F (which spring has heretofore been out of contact, by reason of the radially-reduced portion being presented thereto), thus 55 making the circuit, whose course is as follows: From a suitable source of supply or generation, the current passes through a fuse-block introduced in the wire G, thence through said wire to spring F, which, being in contact with 60 the radially-increased portion on the axle of the swinging arm, will conduct the current to said arm through which it will be transmitted to spring 6, conduction strip 5, and wire 2, to the positive electrode. After passing 65 through the refractory or resistance material which is interposed between the two electrodes, it reaches the negative electrode,

whence it is conducted, through wire 1, contact 3, spring contacts B, to wire C', which is either grounded or connected to the battery 70 or other source of supply, in order to complete the circuit.

As stated before, upon moving the rod D to actuate the swinging contact arm, the collar 75 H, with the two squared faces, will be moved therewith. From the position illustrated in Figs. 1 and 3, the handle J would be turned to the left, which would cause the apex of the collar H to force the bolt I backward, and, in so-doing, present for an instant only 80 a dead center, which when approached or passed through the impellant action of the spring behind the bolt I will cause said bolt to quickly find a seat on either of the squared faces, thus compelling the swinging contact 85 arm to move with accelerated speed from one of its extreme positions to the other, thus obviating to a considerable extent the presence of sparks or the formation of an arc between the spring F and the axle of the swinging 90 contact arm, when said axle is either approaching said spring or moving therefrom, as the case may be.

In Fig. 5, I have illustrated a modification 95 in which I have illustrated the adaptation of two swinging contact arms and the means for causing said arms to move in opposite directions to make their contacts. In this figure, 7 indicates an insulation slab similar to the slab A and provided with openings for 100 the passage of the two swinging contact arms. These two arms are mounted upon suitable supports on the under side of a slab 7 and are geared together by two segments 8 and 9, one of which, in this instance being illus- 105 trated at 9, being fiber, or other insulation material, or it may be mounted upon an insulation collar on the axle of the arm. One of the arms, that shown at the left, is similar in construction and operation to the one illus- 110 trated in Figs. 1, 3, and 4, with the exception that instead of moving to the left it moves to the right in making contact. The circuit is also made and broken by a spring co-operating with a cam-like axle upon which this arm 115 is mounted. The other arm, that illustrated to the right, preferably has a spring bearing upon its axle, which spring is in electrical connection with a wire corresponding to the wire C' in the other form. When either of 120 the shafts or axles upon which these arms are mounted is rotated, motion will be communicated to the other arm, which will move in an opposite direction, and the two arms will pass through the slab 8 until they make electrical 125 connection with suitable contact points, which, when done, will complete the circuit.

I am aware that certain minor changes in arrangement and construction of the several parts of my device can be made and substituted for those herein shown and described 130 without in the least departing from the nature and principle of my invention.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. In an electrical switch, the combination with a swinging contact arm formed with an axle of irregular shape, of a spring contact located in juxtaposition to said axle and adapted to contact therewith when said axle is in certain of its positions, and rigidly mounted contacts B, with which said swinging arm is adapted to co-operate and make circuit when the spring contacts are in electrical contact with the irregularly shaped axle, substantially as described.

2. In an electrical switch, the combination with a swinging contact arm formed with an axle of irregular shape, of a spring contact located in juxtaposition to said axle and adapted to contact therewith when said axle is in certain of its positions, a shaft for moving said swinging contact arm, a collar on the shaft formed with squared faces, a spring impelled bolt for co-operating with the squared faces on the collar, and rigidly mounted contacts B with which the swinging arm co-operates when the bolt engages one of the squared faces on the collar, substantially as described.

3. In an electrical switch, the combination with a swinging contact arm formed with a cam-shaped axle, of a split contact spring located in juxtaposition to said axle to engage the same when in certain of its positions, a shaft for moving said arm and axle, a collar mounted on the shaft formed with two squared faces forming an apex, a spring impelled bolt having a squared face for engaging and co-operating with the squared faces of the collar whereby the apex is caused to pass the spring impelled bolt and present a dead center for a short time only, and causing the arm to assume either of its extreme positions with accelerated speed, and contacts B with which said arm is adapted to co-operate when in one of its positions and when the split spring is engaging the cam-shaped axle thereof, substantially as described.

4. In an electrical switch, the combination with an insulation slab provided with an opening, of a trap-door normally closing said opening, a swinging arm mounted below said opening and adapted to be swung up there-

through beyond the trap-door, and suitable contacts located above said trap-door with which the swinging arm is adapted to co-operate, substantially as described.

5. In an electrical switch, the combination with an insulation slab, of a series of spring contacts mounted thereabove, a strip for electrically connecting said contacts, terminals of electrodes which are adapted to be so arranged that one of said terminals will be in electrical connection with said contact springs, and a swinging contact arm, mounted on the under side of the slab, which is adapted to pass through an opening in the slab and make contact with the other electrode terminal, substantially as described.

6. In an electrical switch, the combination with an insulation slab having spring contacts rigidly mounted thereon, of an insulation piece 4, provided with contacts 3 and 6, said latter contacts being in the form of U-shaped springs clasping a conducting strip, a swinging arm mounted on the under side of the slab, which is electrically disconnected when in its lowered position from the source of supply, and means for raising said arm through an opening in the slab so that it will contact with the U-shaped spring and, at the same time, be thrown into electrical connection with the source of supply, substantially as described.

7. In an electrical switch, the combination with an insulation slab formed with an opening, of a trap-door normally closing said opening, a swinging contact arm mounted on the under-side of the slab and adapted to be forced up through the opening beyond the trap-door, means for retaining said arm in each of its positions above and below the trap-door, and a rigidly mounted contact located to one side of the opening and on top of the slab, with which the swinging arm is adapted to co-operate, substantially as described.

In testimony whereof I hereunto affix my signature, in presence of two witnesses, this 1st day of September, 1893.

ERNST RUEBEL.

Witnesses:

F. R. CORNWALL,
HUGH K. WAGNER.