J. K. LUX.

OPERATING MEANS FOR ROTARY ELECTRIC SWITCHES.

APPLICATION FILED DEC. 4, 1906.

977,810. Patented Dec. 6, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

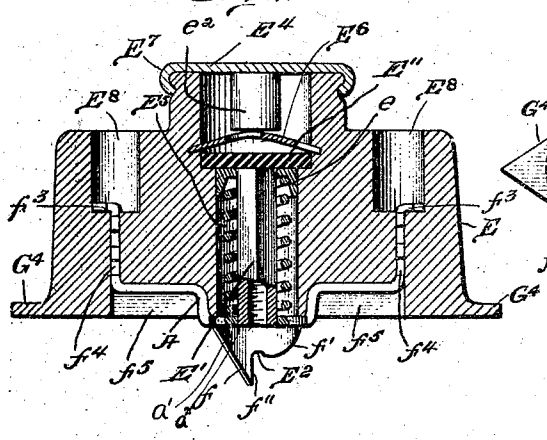


Fig. 2.

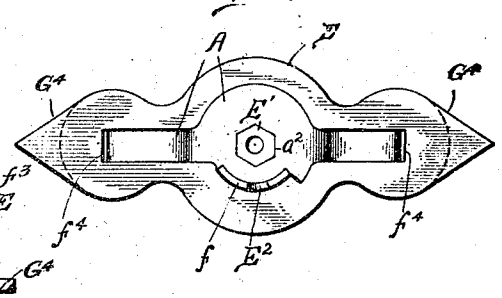


Fig. 3.

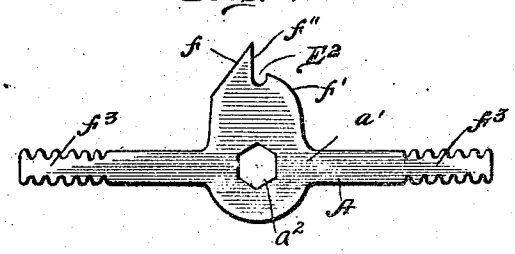


Fig. 4.

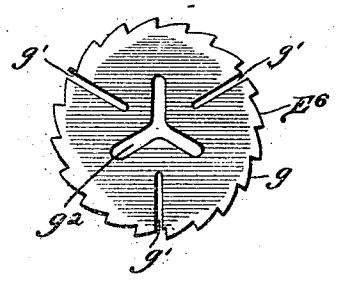


Fig. 5.

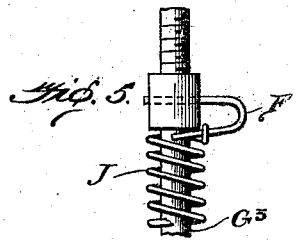
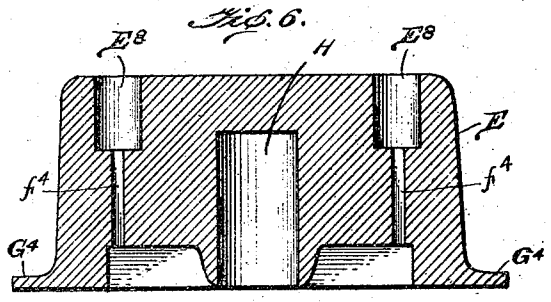


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 7.

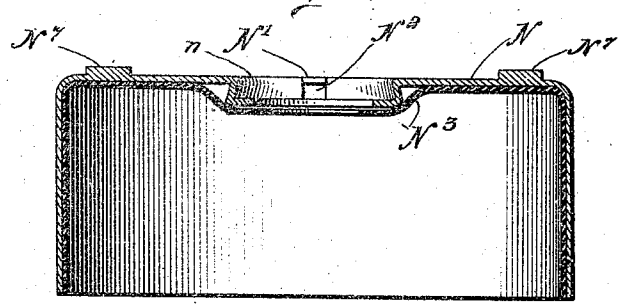


Fig. 8.

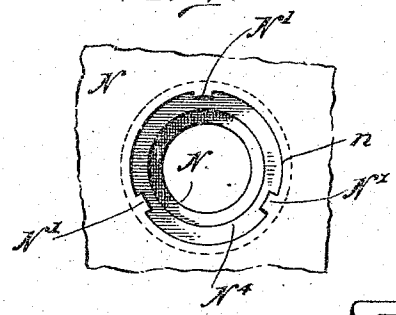


Fig. 9.

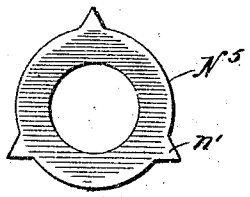
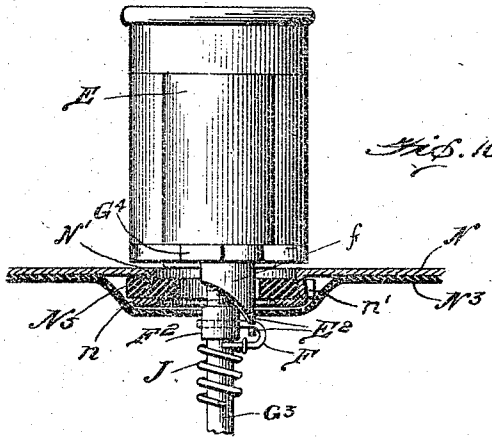


Fig. 10.



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UNITED STATES PATENT OFFICE.

JULIUS K. LUX, OF WASHINGTON, DISTRICT OF COLUMBIA.

OPERATING MEANS FOR ROTARY ELECTRIC SWITCHES.

977,810. Specification of Letters Patent. Patented Dec. 6, 1910.

Application filed December 4, 1906. Serial No. 346,196.

To all whom it may concern:

Be it known that I, JULIUS K. LUX, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Operating Means for Rotary Electric Switches, of which the following is a specification, reference being had therein to the accompanying drawing.

My present invention relates to improvements in operating means for rotary electric switches, and has special reference to a handle and switch operating means especially constructed and insulated to obviate the difficulties in the insulation of the parts and the manufacture and wearing qualities of the devices in present use. In order to produce the desired results, I form a handle preferably from a plastic material by molding with a central opening or cavity for the reception of the usual spindle engaging plunger, a novel means being provided for securing the said plunger within the handle and also for assisting in strengthening the handle. This securing means may be attached when the handle material is being molded or by heating the handle after molding and then pressing the fastening into the plastic or warm handle. The said parts will then be held in position by the plastic material. The said fastening means is inserted through apertures formed for such purpose, said apertures being formed upon opposite sides of the plunger cavity and preferably between it and the exterior of the handle, so that the fastening will sit astride the cavity. The fastening means may with the handle part be heated and the two joined together while warm, the extremities of the said means being inserted in the yielding material of the handle. The most desirable manner of securing said means to the handle, however, is to mold the handle, and then while the handle and securing means are warm the said means is pressed into place. After cooling the handle has the part embedded or secured therein.

It is evident that many ways of attaching the retaining means may be used without departing from the spirit of my invention.

In the preferred form of handle, the cavity extends through the handle, and after the fastening means for the plunger has been attached and the handle cooled, the plunger and its related parts are inserted through the top of the handle, and held in place by means of an expansible retaining means, which in conjunction with insulated disk E^{11} and a spring closure at the upper end of the cavity hold the plunger in position. The lower extremity of the fastening means is also provided with an aperture for the reception of the lower portion of the plunger, and with means E^2 for engaging the snap-switch mechanism, said means sitting astride the projection F attached to the spindle G^3. These various features are set forth in detail in the accompanying drawings, description and claims.

In the accompanying drawings:—Figure 1 is a longitudinal section through the complete handle. Fig. 2 is a bottom plan view thereof. Fig. 3 is a plan view of the lower fastening means before bending. Fig. 4 is a plan view of the expansible retaining disk. Fig. 5 is a detail view of the upper end of the spindle and spring connecting means. Fig. 6 is a longitudinal section of a modified form of handle. Fig. 7 is a longitudinal section through the cover. Fig. 8 is a top plan view of a portion thereof, illustrating the means of holding the insulating disk in place. Fig. 9 is a plan view of said disk, and Fig. 10 is a sectional view of a portion of the cover, showing the handle in operable position.

Referring in detail, to the drawings:—G^3 designates the spindle and J the spring of a snap switch. In the spindle, is secured one extremity of the bail or spring connection F, while the other extremity thereof is in engagement with the upper end of the spring J.

My improved handle or operating means E, is made of a composition which is plastic when heated, and is when molded formed with the central cavity or channel E^5, which in Fig. 1 terminates in the enlarged upper end, while in Fig. 6, it is simply a cavity or socket H. The recesses f^5, are also formed simultaneously with the central cavity, as are also the vertical channels f^4, which terminate in the enlarged bores E^8, the purpose of which will presently appear.

The handle brace and plunger fastening device A, is made from a single piece of sheet metal, the blank of which is clearly illustrated in Fig. 3. It is preferably heated and inserted into the handle, which is also heated to about the same temperature, the said part A assuming the position as clearly shown in Fig. 1. The device, may, however,

be molded in place when the handle is molded, or it may be inserted while the handle is cool, by passing the ends through the channels f^4, and bending the terminals laterally, as at f^5, in the enlarged bores E^8. When the material of the handle is soft as from the reheating above indicated the toothed extremities fit snugly in the material, and as the material cools and hardens, it adheres to said extremities and assists in retaining the device in place. The flat or horizontal portion of the device A lies in the channels f^5, while the central enlarged portion a' caps the lower end of the central cavity of the handle, and the hexagonal opening a^2 receives the lower end of the plunger E'.

Formed integral with the enlarged portion a' of the device A, is the downwardly projecting prong or tooth f, having at one side a long inclined surface to produce a slip-drive of the spindle in one direction and at the other side a perpendicular edge to produce a positive drive of said spindle in the opposite direction and terminating in the recess or rounded notch E^2, which latter is adapted to sit astride the bail F, which is guided into said notch by means of the rounded abutment f'. By this means when the handle is revolved, the spindle and spring are revolved to operate the switch. And the handle E and the indicating means G^4 are positioned relatively to the movable contact.

I would have it understood, that the device A may be attached to the handle with or without heating any of the parts when the same is pressed in the handle, the parts having been heated, there may or may not be any channels to receive the device, and when there are none the toothed extremities form their respective channels and are engaged and embedded by contraction and hardening of the yielding or the homogeneous mass of the handle.

In the construction shown in Fig. 1, after the device A has been attached and the handle has cooled, the plunger E', and its spring and the disk e are placed in the reduced end of the cavity, the same being capped by the disk E^{11}, of insulation; and to hold and retain the parts in place, I employ the expansible disk E^6 and the cap E^4. This expansible disk E^6 consists of a concavo-convex plate having saw-teeth g upon its periphery or circumferential edge, as clearly shown in Fig. 4, the radiating slots or grooves g', being provided to allow for the expansion and contraction of the disk, while in order to properly insert and lock the disk in the handle, I provide the central Y-shaped opening g^2, for the reception of a screw driver or other tool.

To secure the disk E^6 in place, the same is inserted into the enlarged end of the cavity, the disk when contracted fitting the cavity until it rests upon the disk E^{11}, at which time, a suitable tool is inserted in the Y-shaped opening. The tool is now revolved under pressure thereby revolving and pressing the disk down and expanding the same so that the saw-teeth cut into the walls of the cavity and form a circular or annular channel for its periphery. To reinforce the expansible disk and also to lock it against movement, I employ the cap E^4, whose crimped edge E^7, engages the body of the projecting knob or boss of the handle, and is held in place thereon, the cylindrical head e^2, carried by the cap, abutting against the upper face of the expansible disk and thus holding the same seated.

In the modified form of handle shown in Fig. 6, I insert the plunger and its parts in the cavity H, before attaching the device A, the upper end of the cavity assuming the functions of the expansible disk and cap E^4. This form is adapted for use when the molded material is of suitable resiliency to retain the part A when cooled with or without riveting.

In Figs. 7, 8 and 9, I have illustrated a means whereby the said handle and its parts are insulated from the cap or cover N, the cover being provided with the inner lining N^3, of insulation, and a means whereby the insulation disk N^5, is held in place, the openings through the disk and lining being smaller than that of the cover so that the metallic parts projecting through the cover will thus be insulated therefrom.

To properly seat and hold the disk N^5, I provide the countersunk receptacle n, dovetailed in cross section, and centrally of the cover; and I cut from its walls the prongs N', thus providing the openings N^2, so that as the disk N^5 is snapped within the receptacle n, its circumferential prongs or points n', enter the openings N^2, while the prongs N', project over the edge and the body of the disk, and thus assist in holding the disk seated.

Upon the body of the cover, are provided indicating marks as N^7, the points G^4, of the handle pointing toward the same to indicate whether the switch is "on" or "off". The insulation part N^5 may be softened in any suitable manner, as by moisture or heat, to make it yield when applying it to the cover, or to make it lock or set in place when applied.

I claim,—

1. In an axially movable circuit controlling device, an operating means with a cavity adjacent its axis, a plunger in said cavity, fastening means for said plunger, and means for holding said fastening means, said fastening means comprising a portion within the handle which is caused to yield to lock with said handle.

2. The method of engaging an expansible retainer to a handle of a circuit controlling device consisting in inserting said retainer then expanding such retainer by pressing and revolving the same simultaneously so the periphery of the retainer forms its seating groove in the body of the handle to which it is attached.

3. An operating means for an axially movable circuit controlling device comprising a handle having a cavity adjacent its axis, a plunger in the cavity, a plunger plate secured to the inner side of the handle across the adjacent end of said cavity and slidably interlocked with the plunger to rotate the latter, and retaining means for the plunger including an expansible disk in the cavity across the outer end of the plunger and having its edges embedded in the walls of the cavity.

4. An operating means for axially movable circuit controlling devices comprising a body portion having an opening therethrough, a plunger mounted in the opening, and an expansible disk bridging the opening at the outer end of the plunger to retain the latter in position.

5. In an axially movable circuit controlling device, an operating spindle, a spring engaging said spindle, a handle, a plunger therein in engagement with the spindle, and a retainer for the plunger engaging the handle and provided with a device to sit astride the connection between the spring and spindle.

6. In an axially movable circuit controlling device, an operating member having an aperture therethrough enlarged at its outer end, a plunger playing in the aperture, an insulating body in the enlarged end of the aperture, a spring disk holding the insulating body in place, and a cover for the outer end of the aperture.

7. In an axially movable circuit controlling device, an operating member having an opening, an insulator seated in the opening, a retainer for the insulator, and a cover for the outer end of the opening.

8. In an axially movable circuit controlling device, a cover having an opening, an insulator in the opening and interlocked with the cover and also provided with an opening, a spindle, an operating handle for the spindle, and slip drive connections between the operating handle and spindle and having portions thereof extending through the opening in the insulator.

9. In an axially movable circuit controlling device, an operating spindle, a projection carried thereby, a handle, a plunger mounted therein adapted to engage the spindle, and means sitting astride the plunger and engaging the handle to hold the plunger in the handle and provided with means to sit astride the spindle projection for the purpose set forth.

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

JULIUS K. LUX.

Witnesses:

JOHN L. FLETCHER,

GEO. M. BOND.