Oct. 18, 1932. L. A. M. PHELAN 1,883,241

ELECTRICAL SWITCH

Filed April 28, 1928

Fig. 1

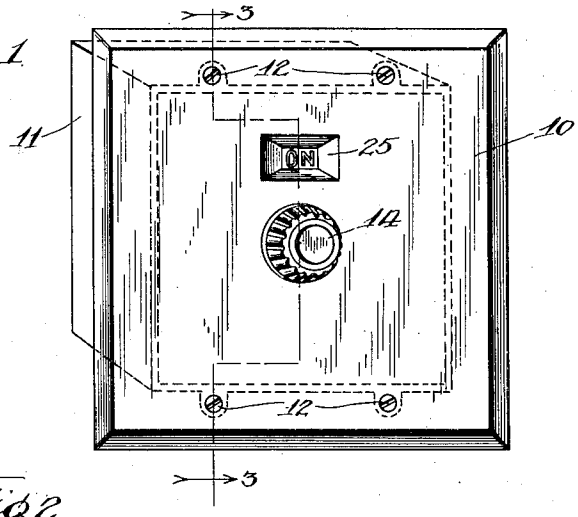


Fig. 2

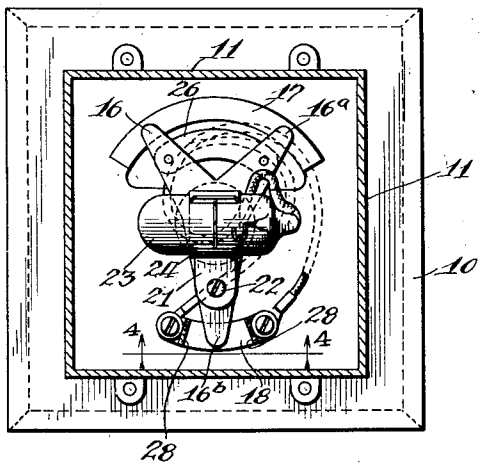


Fig. 3

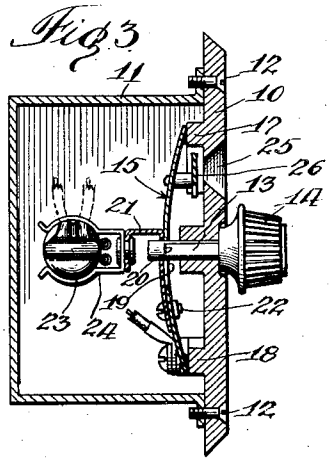
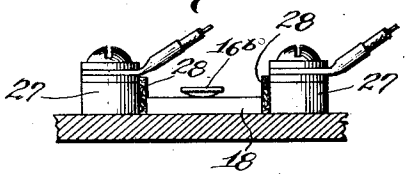


Fig. 4



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UNITED STATES PATENT OFFICE

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ELECTRICAL SWITCH

Application filed April 28, 1928. Serial No. 273,504.

This invention relates to electrical switches and has special reference to manually operated electrical switches employing tiltable fluid contact-making-and-breaking means.

More particularly, this invention has reference to an electrical switch comprising an actuating member having a tiltable fluid contact making-and-breaking member mounted thereon, said actuating member being operated by and being readily detachable from an operating handle, which latter is suitably mounted on a support.

One of the objects of this invention is to provide a manually operated electrical switch having simple operating parts which may be readily assembled or disassembled.

A further object of this invention is to provide a manually operated electrical switch having operating parts which are so constructed and arranged as to eliminate noises in the operation thereof.

A further object of this invention is to provide a manually operated electrical switch wherein the actuating member provides a tensioning means for holding the unit in an assembled relation without the necessity of the usual securing means, and for holding the switch against rotation unless manually forced.

Other objects will hereinafter be described, and for a better understanding of the characteristic scope and features of this invention, reference may be had to the accompanying drawing and following specification, in which drawing:

Figure 1 is a perspective view of the device of this invention as mounted on an ordinary outlet box;

Fig. 2 is a vertical sectional view showing the operating mechanism in elevation;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Figure 1; and

Fig. 4 is an enlarged fragmentary view showing the cushioning means for limiting the movement of the actuating member.

Referring now more particularly to the drawing, a mounting plate or face plate 10 is secured to an ordinary outlet box 11 as by means of screws 12 passing therethrough and engaging ears as are usually provided on such outlet boxes. A shaft 13 is suitably journalled in the mounting plate 10 and is rotatable therein. An operating handle 14 is fixedly secured to one end of the shaft 13 on the outside side of the mounting plate 10. An actuating member 15 is mounted on the other end of the shaft 13 and is rotatable therewith in a manner which will hereinafter be more fully described. The actuating member 15 is preferably formed of a spring material and is substantially spider-shaped, that is, a plurality of arms 16, 16*a* and 16*b* radiate from a central body portion. There are preferably three arms and the ends of the arms are provided with beaded portions for engaging projecting portions 17 and 18, which latter are preferably formed integrally on the inside side of the mounting plate 10. The arms 16 and 16*a* engage the projection 17 and the arm 16*b* engages the projection 18.

The shaft 13 has mutilated portions thereon, that is, diametrically opposite sides of the shaft are flattened to engage the reduced portion of a key hole slot 19, a shoulder 20 being formed at the junction between the flattened portions of the shaft and the rounded portion at the end, thereby providing a stop against which the actuator 15 rests.

In the assembly of the actuating member 15 to the shaft 13 the rounded end portion of the latter is inserted through the enlarged portion of the key-hole slot 19 until the flat portion engages the slot, whereafter the shaft is moved upwardly into the reduced portion of the slot. The shaft is thereafter locked in this position by means of a U-shaped bracket member 21 having an aperture for fitting over the rounded end portion of the shaft, the bracket being suitably secured to the actuator as by means of the screw and nut 22. In this manner it will be apparent that the actuating member 15 may have slidable movement longitudinally of the shaft 13. The actuating member 15 is formed preferably as stated, of a resilient material and is bowed, the ends 16, 16*a* and 16*b* exerting a pressure against their respective projections 17 and 18 which action urges the shaft 13 in a direction toward the inside of the conduit box 11. It

will thus be seen that the operating handle 14, fixed to the shaft 13, is urged against the face of the recess in the supporting plate 10 and the assembly is held in a secure relation with the support 10 without the usual securing means. Further, the actuating member, in exerting a tension on the shaft and operating handle 13 and 14, respectively, holds the unit against rotation unless manually forced.

A tiltable fluid contactor switch 23 is mounted in a clip 24 which latter is, in turn, secured to the U-shaped bracket 21 in any suitable manner. The contactor 23 is of the usual type comprising a sealed container having a pair of spaced cooperating electrodes disposed at one end thereof and a body of current conducting fluid, such as mercury, disposed therein to bridge or to flow away from the electrodes thereby making or breaking, respectively, an electrical circuit therethrough. In the operation of the switch, when it is desired to make an electrical circuit therethrough, the operating handle 14 is partially rotated to tilt the contactor tube 23 in a direction such that the current conducting fluid bridges the electrodes. Conversely, when it is desired to open the circuit therethrough, the operating handle 14 is turned in the reverse direction to cause the current conducting fluid to flow away from the electrodes. In order to ascertain whether the switch is in an "off" or "on" position, a window 25 is formed in the face plate 10 and an indicating member 26 is mounted in any suitable manner to the actuator 15 in alignment with the window 25. When the operating handle 14 is partially rotated in one direction, the printed word "On" will appear at the window and when rotated partially in the opposite direction, the word "Off" will appear at the window.

It has thus far been recited that by means of the resilient actuating member 15 pressing against portions of the face plate 10, the operating members of the unit are held in a firm and secure relation on the face plate 10. These operating members will never become loose from operation thereof because of the take-up afforded by the resilient member 15 and will thereby provide a noiseless construction. In order to augment this desirable result, the stop members 27, preferably formed integrally with the face plate 10 and for limiting the movement of the actuator 15, is provided with felt pad members 28 on the inside sides thereof. These stop members 27 are preferably enlarged heads formed on each side of the reduced face portion of the projection 18 on which the arm 16b slidably rides. It has been a desirable practice to cut away a portion of the projection 18 adjacent the stops 27 and insert a portion of the felt pad members 28 therein and glue the latter members to the sides of the stop members 27. When the operating handle 14 is rotated in either direction, the arm 16b will engage one of the felt pads 28 at the limit of its movement. It will thus be apparent that no matter how carelessly the switch member is actuated, no noise will be heard.

As a result of this invention by use of a contactor tube, noise is eliminated. Further, by means of supplying cushioning members for limiting the movement of the actuating member, the operation of the device will be noiseless. These desirable results are still further augmented by the fact that the actuating member 15 constantly urges the movable parts in a secure relation with each other and no noise can be detected by reason of loose fitting parts. Also, it will be apparent that only the slightest degree of mechanical skill is necessary to assemble or disassemble the operating mechanism of the device, which assembly or disassembly can be made in a minimum amount of time.

While but a single embodiment of this invention is herein shown and described, it is to be understood that various modifications thereof will be apparent to those skilled in the art without departing from the spirit and scope of this invention, and therefore, the same is to be limited only by the scope of the prior art and the appended claims.

I claim:

1. In a device of the character described, a support, a manually operable member rotatably mounted thereon, an actuating member operated by said manually operable member, and a switch member mounted on said actuating member, said actuating member holding said manually operable member in a secure relation with said support and holding said switch member against rotation unless manually forced.

2. In a device of the character described, a support, a manually operable member rotatably mounted thereon, an actuating member mounted on and operated by said manually operable member, and a switch member mounted on said actuating member, said actuating member holding said manually operable member in a secure relation with said support and holding said switch member against rotation unless manually forced.

3. In a device of the character described, a support, a manually operable member rotatably mounted thereon, a resilient actuating member fixedly mounted on said manually operable member, and a switch member mounted on said actuating member, said actuating member exerting a tension on and thereby holding said manually operable member in a secure relation with said support and against rotation unless manually forced.

4. In a device of the character described, a support, a manually operable member rotatably mounted thereon, a resilient actuat-

ing member fixedly mounted on said manually operable member, and a switch member mounted on said actuating member, said actuating member engaging said support and exerting a tension on said manually operable member thereby holding the latter member against rotation unless manually forced and in a secure relation with said support.

5. In a device of the character described, a support, a manually operable member rotatably mounted thereon, a resilient actuating member operated by said manually operable member, a tiltable fluid contact making-and-breaking member mounted on said actuating member, said actuating member having a three point engagement with said support and exerting a pressure thereagainst to hold said contact member against rotation unless manually forced.

6. In a device of the character described, a support, a manually operable shaft rotatably mounted therein, a resilient actuating member slidable along said shaft and rotatable therewith, and a tiltable fluid contact making-and-breaking member mounted on said actuating member, said actuating member having three arms extending therefrom in engagement with said support and exerting a pressure thereagainst for holding said contact member against free rotation unless manually forced and for holding said shaft in a secure relation with said support.

7. In a device of the character described, a support, a shaft rotatably mounted therein and having a mutilated portion, a resilient actuating member having a key-hole slot thereon slidably mounted on said shaft and rotatable therewith, the reduced portion of said slot engaging the mutilated portion of said shaft, a member for locking said actuating member in the aforementioned relation, a tiltable fluid contact making-and-breaking member mounted on said locking member, said resilient actuating member exerting a pressure against said support for holding said contact member against rotation unless manually forced.

8. In a device of the character described, a support, a manually operable member rotatably mounted thereon, an actuating member operated by said manually rotatable member and engaging said support, a tiltable fluid contact making-and-breaking member mounted on said actuating member, and cushioning members on said support for limiting the movement of said actuating member.

9. In a device of the character described, a support, a substantially star-shaped resilient actuating member pressing against said support, a tiltable contact making-and-breaking member mounted on said actuating member, and cushioning members on said support for limiting the movement of said actuating member.

10. In a device of the character described, a support, a shaft rotatably mounted on said support, an actuating member rotatable with said shaft and frictionally engaging said support, a tiltable contact making-and-breaking member mounted on said actuating member, and cushioning members for limiting the movement of said actuating member.

11. In a device of the character described, a support, actuating means constituting a resilient member rotatable on said support, and a mercury electric switch mounted on said actuating means, said actuating means resiliently pressing against said support and holding said switch member against rotation unless manually forced.

12. In a device of the character described, a support, a resilient actuating member in frictional engagement with said support and rotatable thereon, and a mercury electric switch mounted on said actuating member, said actuating member resiliently pressing against said support and holding said switch member against rotation unless manually forced.

In witness whereof, I have hereunto subscribed my name.

LOUIS A. M. PHELAN.