May 19, 1936. G. A. JOHNSON 2,041,414

ELECTRIC SWITCH

Filed Feb. 20, 1934

Fig. 1.

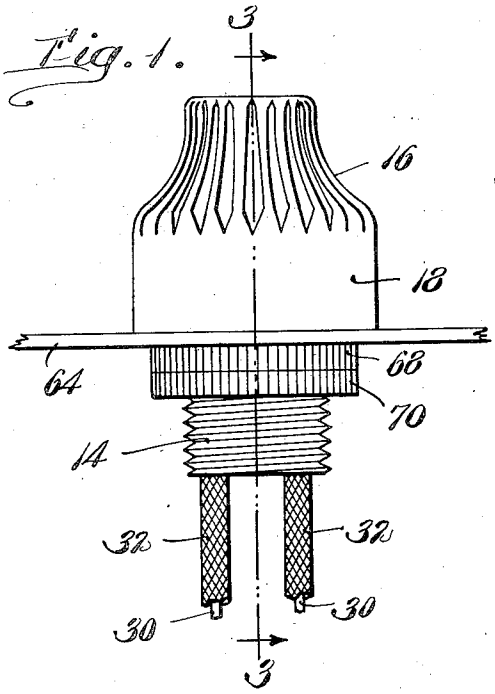


Fig. 2.

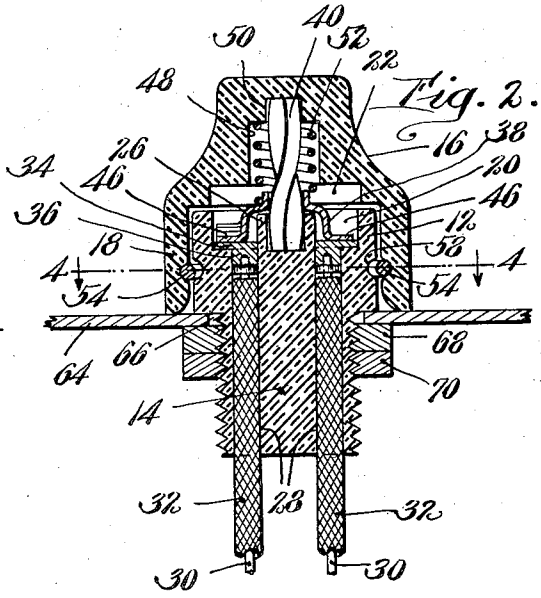


Fig. 3.

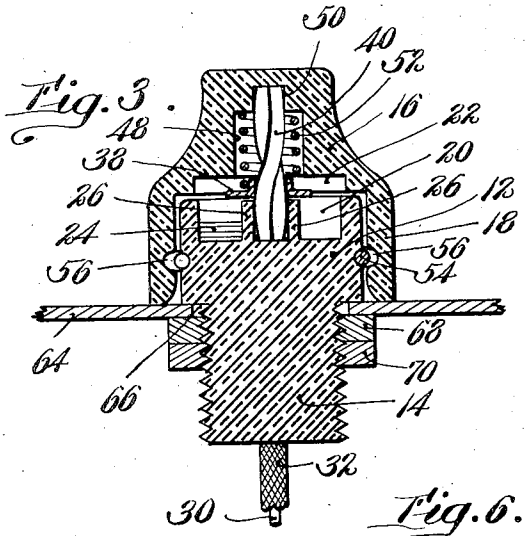


Fig. 5.

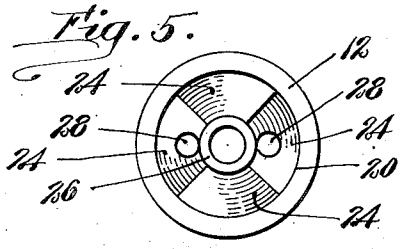


Fig. 4.

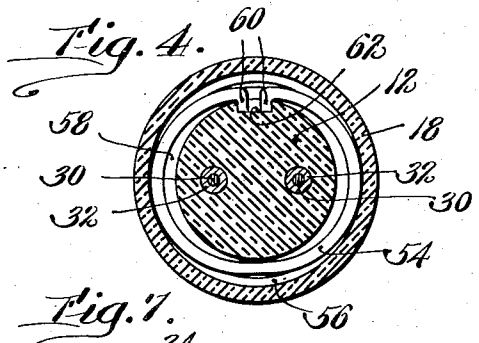


Fig. 6.



Fig. 7.



Fig. 8.

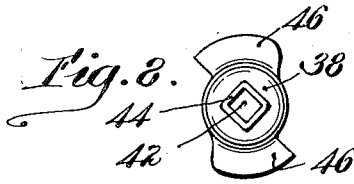
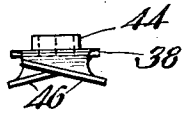


Fig. 9.



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Patented May 19, 1936 2,041,414

UNITED STATES PATENT OFFICE

2,041,414

ELECTRIC SWITCH

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Application February 20, 1934, Serial No. 712,165

15 Claims. (Cl. 200—63)

This invention relates to electric switches and more especially to a switch of the rotary type which, while adapted for general use in electric fixtures, is herein exemplified in a canopy switch.

One of the objects of the invention is the provision of a switch construction which is capable of being embodied in a very small and compact structure adapted for mounting in a restricted space and for use as a canopy switch.

Another object of the invention is the provision of a structure which is simple embodying a minimum number of parts but which is efficient.

An additional object is the provision of a switch which may be easily and rapidly assembled without requiring the use of screws, rivets and similar fastening devices and which can be manufactured at a very low cost.

Further objects of the invention will be in part obvious and in part hereinafter described.

In its preferred form, my invention contemplates a switch comprising a recessed insulating base, a hollow cap or finger piece rotatably mounted on and enclosing said base and a switch structure within said base adapted for operation by the rotation of said cap or finger piece. Preferably, the switch structure comprises a pair of fixed contacts mounted in the recess in said base and a movable contact mounted on a spindle anchored in the cap and adapted to be turned into and out of bridging engagement with said fixed contacts by the rotation of said cap. For mounting the switch in an electrical fixture such as a canopy, the base is provided with a threaded shank adapted to fit an opening in the fixture and to be held therein by suitable locking rings threaded on the shank and bearing against the inner face of the fixture.

In the accompanying drawing illustrating my invention, Figure 1 is a side elevation of a switch constructed and adapted to be operated in accordance therewith and shown as mounted in a canopy; Fig. 2 is a central vertical sectional view of same; Fig. 3 is a vertical central sectional view of same on line 3—3 in Fig. 1, being on a plane at right angles to that of Fig. 2; Fig. 4 is a transverse sectional view on line 4—4 in Fig. 2 looking downwardly; Fig. 5 is a top plan view of the insulating body; Fig. 6 is a top plan view of one of the fixed contacts; Fig. 7 is a side elevation of the same looking from right to left in Fig. 6; Fig. 8 is a top plan view of the rotatable contact; and Fig. 9 is a side elevation of same looking upwardly in Fig. 8.

Referring to the drawing, there is shown one embodiment of the invention comprising a base 12 having a shank portion 14 and a cap or finger piece 16 having a flange 18 and mounted on and enclosing the base. Both of these parts are of insulating material and preferably of an insulating material of moldable character. The top face of the base is recessed to form a switch chamber 20, preferably circular, and the cap is recessed at 22 to give additional height to said chamber within which is mounted the switch parts.

The floor of the recess or switch chamber 20 is in the form of an annular series of ratchet teeth 24 surrounding an annular boss 26 in the center of the chamber. In the form of switch shown the series of ratchet teeth number four, each tooth being a quarter circle in length. The shank 14 is provided with a pair of longitudinal bores 28 for receiving lead wires 30 provided with an insulating covering 32 and the bores open into the switch chamber through alternate and opposite ratchet teeth to permit a pair of fixed contacts 34 mounted on said teeth to be fastened to the lead wires respectively. This may be done in any suitable manner such as by bending a portion of a blank from which the contact 34 is made to form a tubular portion 36 on the bottom face of the contact within which a lead wire may be inserted and soldered (Figs. 6 and 7). The attachment of the lead wires to the fixed contacts holds them seated on their respective ratchet teeth.

For closing and opening a circuit through the fixed contacts 34 a rotatable contact 38 is mounted on a spindle 40 which is anchored in the cap for rotation therewith. The contact 38 is provided with a square central opening 42 (Fig. 8) adapted to fit loosely the spindle which is square in cross section so that the contact turns with the spindle but is free to move up and down on the spindle. The spindle is given a slight twist which facilitates the movement of the contact thereon and at the same time reduces the resistance to the turning of the spindle by the cap. An upwardly turned lip 44 surrounds the aperture 42 in the contact 38 to form a bearing surface for the spindle and to prevent undue tilting of the contact thereon.

The contact 38 is provided with a pair of depressed laterally extending wings 46 arranged on opposite sides, which wings are adapted to engage the fixed contacts or ratchet teeth and are, for the purpose of making a flat engagement therewith, inclined to correspond to the inclination of the said contacts or ratchet teeth (Figs. 8 and 9).

For rotating the spindle 40 and contact 38 when the cap is turned to open and close a circuit, the cap is recessed at 48 to form a small spring

chamber in the ceiling of which is a square recess 50 into which fits the upper end of the spindle 40. The lower end of said spindle is seated loosely within the annular boss 26 in which it may freely turn. Mounted on the spindle is a helical spring 52 under compress which at its upper end abuts the ceiling of the recess 48 and at its lower end the contact 38 thereby exerting a constant downward pressure to hold that contact in engagement with the fixed contacts or the ratchet teeth as the case may be yet permitting the contact 38 to move upwardly on the spindle when its wings ride upwardly on the inclined ratchet teeth in its rotation.

For locking the cap to the base yet permitting free rotary movement of the cap on the base for operating the switch, any suitable means may be provided and one such is shown comprising a split-spring ring 54 of slightly oval or elliptical form which is seated in complementary annular grooves 56 and 58 formed on the inner face of the flange 18 of the cap and on the periphery of the base respectively (Fig. 4). The two ends 60 of the ring, which are normally separated, are turned inwardly and seated in a recess 62 in the periphery of the base which locks the ring against rotation but permits it to be compressed to allow the cap to be mounted on or removed from the base by the exercise of sufficient force. The ring, however, while preventing separation of the cap and base under ordinary conditions of use, permits a free rotation of the cap.

In mounting the switch in a fixture part such as a canopy 64, the latter is provided with an opening 66 for receiving the threaded shank 14 of the base and a pair of clamping rings 68 and 70 are threaded on the shank for fastening the switch to the canopy.

In assembling the switch, the insulated lead wires 30 may be first pulled through the bores 28 in the base to expose the ends of the wires for soldering to the fixed contacts after which they may be pulled back to seat the contact on their respective ratchet teeth. The spindle may then have one end inserted in the square recess 50 in the cap while that member is held in a reversed position and after the spring and rotatable contact have been placed on the spindle, the cap and base may be locked together by the spring ring 58. The assembling operation, it will be noted, is very simple and may be performed expeditiously.

In use, the switch may be mounted in a canopy or other fixture as shown in the drawing and hereinbefore described or may be mounted in any other suitable manner. The switch is operated by turning the cap or finger piece preferably in a clockwise direction which, through the medium of the spindle, turns the movable contact either into or out of bridging engagement with the fixed contacts to close or to open the circuit therethrough. A quarter turn of the cap will be sufficient to open or close the switch. In this operation the wings of the movable contact ride up on the inclined faces either of the fixed contacts or the ratchet teeth and drop off the same into the next succeeding ratchet teeth, the helical spring mounted on the spindle exerting a downward pressure on the movable contact to maintain the wings in engagement with the ratchet teeth at all times. Rotation of the cap and the movable contact in a contra-clockwise direction is prevented by the vertical faces of the ratchet teeth being engaged by the rear ends of the wings so that the cap can be rotated in one direction only.

It will be observed that a switch constructed in accordance with my invention is simple, compact and durable in construction and capable of expeditious installation. It is to be understood that the invention is not to be limited to the specific form herein shown and described since it is capable of other embodiments within the purview of the following claims.

What I claim is:

1. An electric switch comprising a recessed insulating base, a cap or finger piece rotatably mounted on and having a flange enclosing said base and having an interior recess in its upper portion, a pair of fixed contacts mounted on the floor of the recess in said base, a spindle anchored at one end in said cap and rotatably seated at its other end in said base recess, a movable contact mounted on said spindle and adapted to be turned into and out of bridging engagement with said fixed contacts when said cap is rotated, said contact being movable longitudinally said spindle, and a spring mounted in the recess in said cap and on said spindle for holding said movable contact in operative position.

2. An electric switch comprising a recessed insulating base, a cap or finger piece rotatably mounted on and having a flange enclosing said base and having an interior recess in its top portion, a pair of fixed contacts mounted on the floor of said base recess, a spindle square in cross section anchored at one end in said cap for rotation therewith and rotatably seated at its other end in said base recess, a contact mounted on said spindle for rotation therewith to engage and disengage said fixed contacts, said contact being movable longitudinally said spindle, and a spring mounted in said cap recess and interposed on said spindle between said rotatable contact and said cap for holding said contact in operative position.

3. An electric switch comprising a recessed insulating base having a threaded shank for mounting said base on an electric fixture, a cap or finger piece rotatably mounted on and having a flange enclosing said base, a pair of fixed contacts mounted in the recess in said base, a spindle anchored in said cap and seated in said recess, a movable contact mounted on said spindle, said spindle being square in cross section and said contact having a central square aperture loosely fitting said spindle adapting said contact to be turned into and out of bridging engagement with said fixed contacts when said cap is rotated, said contact being movable longitudinally said spindle, and a spring mounted on said spindle for holding said movable contact in operative position.

4. An electric switch comprising an insulating base having a recess in its upper face, the floor of which is in the form of an annular series of ratchet teeth, a cap or finger piece rotatably mounted on and having a flange enclosing said base, a pair of fixed contacts mounted on alternate ratchet teeth in said recess, a spindle square in cross section anchored at one end in said cap for rotation therewith and rotatably seated at its other end in said recess, a contact mounted on said spindle and having a central square aperture for loosely fitting said spindle adapting said contact for rotation therewith to engage and disengage said fixed contacts, said contact being movable longitudinally said spindle, and a spring mounted on said spindle and interposed between said rotatable contact and said cap for holding said contact in operative position.

5. An electric switch comprising an insulating base having a recess in its upper face, the floor

of which is in the form of an annular series of ratchet teeth and having a pair of bores in its lower portion opening out opposite teeth in the floor of said recess, a hollow cap or finger piece rotatably mounted on and having a flange enclosing said base, a pair of fixed contacts mounted in said recess on alternate teeth, a spindle square in cross section anchored at one end in said cap for rotation therewith and rotatably seated at its other end in said recess, a contact mounted on said spindle and having a central square aperture for loosely fitting said spindle adapting said contact for rotation therewith to engage and disengage said fixed contacts, said contact being movable longitudinally said spindle, and a spring on said spindle interposed between said rotatable contact and said cap for holding said contact in operative position.

6. An electric switch comprising an insulating base having a recess in its upper face, the floor of which is in the form of an annular series of ratchet teeth with a central annular boss, said base having a pair of bores in its lower portion opening out in opposite teeth in the floor of said recess, a cap or finger piece rotatably mounted on and enclosing said base and having an interior recess in its top portion, a pair of fixed contacts mounted in said first mentioned recess on alternate teeth, a spindle square in cross section anchored at one end in said cap for rotation therewith and rotatably seated at its other end in said boss in said recess, a contact mounted on said spindle and having a central square aperture for loosely fitting said spindle adapting said contact for rotation therewith to engage and disengage said fixed contacts and a spring mounted in said cap recess and interposed between said rotatable contact and said cap for holding said contact in operative position.

7. An electric switch comprising a recessed insulating base, a cap or finger piece rotatably mounted on and enclosing said base, said base and said cap being provided with complementary grooves, the groove in said base having a recess, an oval split spring ring mounted in said grooves and having its two ends turned inwardly into the recess in said base groove for locking said cap to said base against separation therefrom yet permitting full rotation thereof, a pair of fixed contacts mounted in said recess, a spindle square in cross section anchored at one end in said cap for rotation therewith and rotatably seated at its other end in said recess, a contact mounted on said spindle for rotation therewith to engage and disengage said fixed contacts and a spring interposed between said rotatable contact and said cap for holding said contact in operative position.

8. An electric switch comprising a centrally recessed base having a threaded shank portion for insertion in a canopy, a hollow cap or finger piece rotatably mounted on and having a flange enclosing and concealing said base, said base, said threaded shank portion and said cap being all of insulating material, said base and said cap being provided with complementary grooves, the groove in said base having a recess, a split spring ring mounted in said grooves and having its two ends turned inwardly into said base groove recess and a switch structure mounted in said recess and adapted to be operated by the rotation of said cap.

9. An electric switch comprising a recessed insulating base, a hollow insulating cap or finger piece mounted on and having a flange enclosing and concealing said base, said base and said cap being provided with complementary annular grooves, the groove in said base having a recess, a spring split-ring of oval form mounted in said grooves for holding said cap on said base yet permitting free rotation of said cap on said base, the two ends of said ring being turned inwardly into the recess in said base groove to lock said ring to said base yet permitting contraction thereof for removing said cap from said base, and a switch structure mounted in said first mentioned recess and adapted to be operated by the rotation of said cap.

10. An electric switch comprising a centrally recessed base, a hollow flanged cap or finger piece mounted on and enclosing and concealing said base, said base and said cap being both of insulating material and the periphery of said base and the inner face of the flange of said cap being provided with complementary annular grooves, the groove in said base having a recess, a spring split ring mounted in said grooves for holding said cap locked to said base yet permitting free rotation of said cap on said base, the free ends of said ring being turned inwardly into the recess in said base groove and a switch structure mounted in said first mentioned recess and adapted to be operated by the rotation of said cap.

11. An electric switch comprising a recessed insulating base, a hollow cap or finger piece rotatably mounted on and having a flange enclosing and concealing said base, means for locking said cap against separation from said base yet permitting free rotation thereof including a split-spring ring having inwardly turned ends anchored in said base, a pair of fixed contacts mounted in the recess in said base, a spindle square in cross-section having its lower end seated in said recess and its upper end anchored in said cap, a movable contact loosely mounted on said spindle for rotation therewith into and out of bridging engagement with said fixed contacts, said contact being movable on said spindle longitudinally thereof, and a spring mounted on said spindle for holding said movable contact in operative position.

12. An electric switch comprising a recessed insulating base, a hollow cap or finger piece rotatably mounted on and having a flange enclosing and concealing said base, means for locking said cap against separation from said base yet permitting free rotation thereof on said base, a pair of fixed contacts mounted in the recess in said base, a twisted spindle square in cross-section having its lower end seated in said recess and its upper end anchored in said cap for rotation therewith, a movable contact loosely mounted on said spindle for rotation therewith into and out of bridging engagement with said fixed contacts, said contact being movable on said spindle longitudinally thereof, and a spring mounted on said spindle for holding said movable contact in operative position.

13. An electric switch comprising a recessed insulating base, a hollow cap or finger piece rotatably mounted on and having a flange enclosing and concealing said base, said base and said cap being provided with complementary annular grooves, a split spring ring mounted in said grooves for locking said cap against separation from said base yet permitting free rotation thereof on said base, a pair of fixed contacts mounted in the recess in said base, a spindle anchored in said cap for rotation therewith, said spindle being square in cross-section and having a slight twist to facilitate its operation, a movable contact

loosely mounted on said spindle for rotation therewith into and out of bridging engagement with said fixed contacts, said contact being movable on said spindle longitudinally thereof, and a spring mounted on said spindle for holding said movable contact in operative position.

14. An electric switch comprising an insulating base having a shank portion of restricted diameter for mounting in a canopy with the base in engagement with the outer face thereof, said base having its top face recessed to provide an annular recess and a central annular boss, a hollow cap or finger piece rotatably mounted on said base and having a flange enclosing and concealing the sides of said base, means for locking said cap on said base while permitting free rotation thereof, a pair of fixed contacts mounted at opposite points on the floor of said annular recess, a spindle anchored at one end in said cap to rotate with it and having its other end loosely mounted in said boss, a movable contact mounted on said spindle to turn with it into and out of bridging engagement with said fixed contacts, said movable contact being movable longitudinally said spindle, and a spring mounted on said spindle for holding said movable contact in operative position.

15. An electric switch comprising an insulating base having a shank portion of restricted diameter for mounting in a canopy with the base in engagement with the outer face thereof, said base having its top face recessed to provide an annular recess and a central annular boss, a hollow cap or finger piece rotatably mounted on said base and having a flange enclosing and concealing the sides of said base, a split-ring intermediate said base and the flange of said cap for locking said cap on said base while permitting free rotation thereof, a pair of fixed contacts mounted at opposite points on the floor of said annular recess, a spindle anchored at one end in said cap to rotate with it and having its other end loosely mounted in said boss, a movable contact mounted on said spindle to turn with it into and out of bridging engagement with said fixed contacts, said movable contact being movable longitudinally said spindle, and a spring mounted on said spindle for holding said movable contact in operative position.

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