May 16, 1950 G. C. CROWLEY 2,508,101

SWITCH TO BE BUILT INTO A HEATING PAD OR SIMILAR DEVICE

Filed Oct. 1, 1948

Fig. 1.

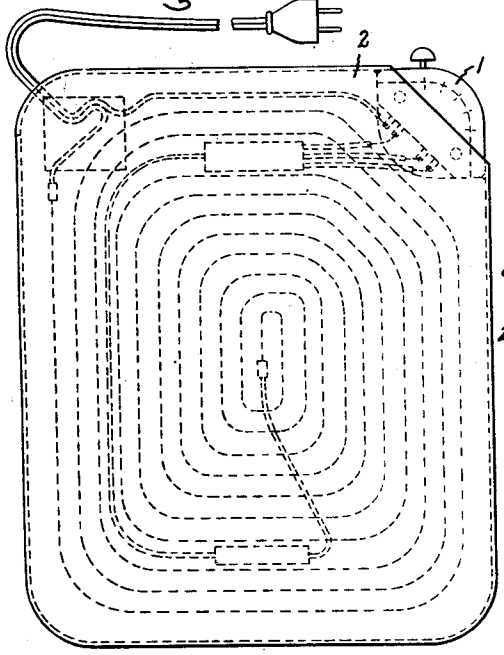


Fig. 4.

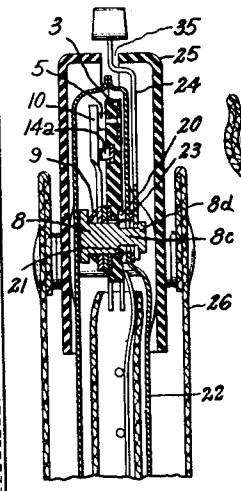


Fig. 5.

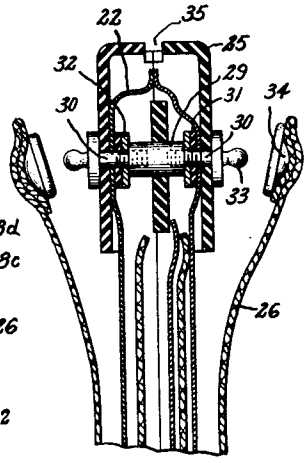


Fig. 2.

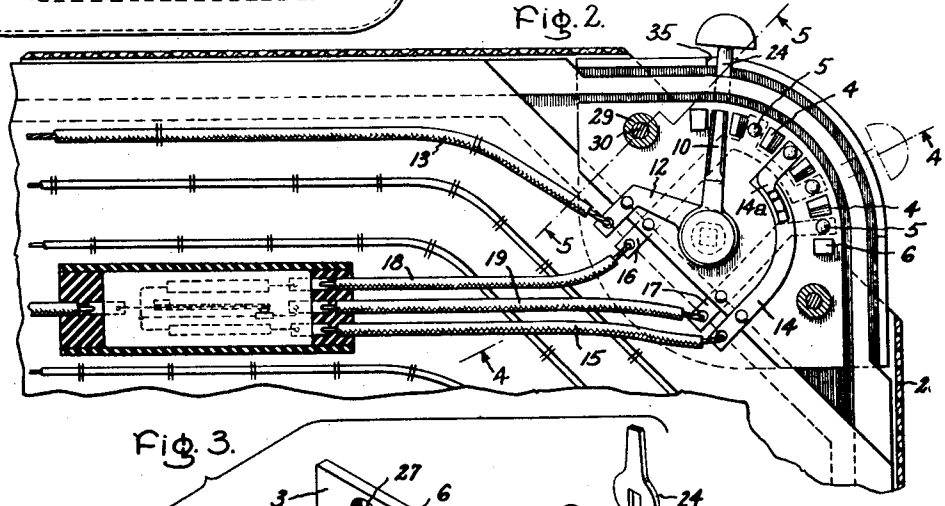
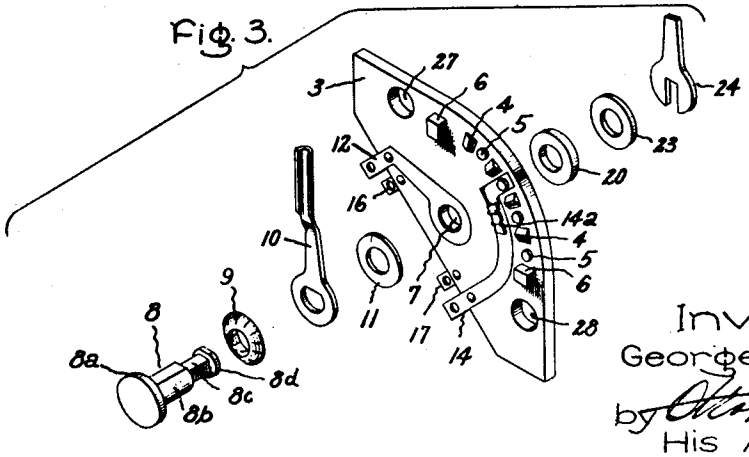


Fig. 3.



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Patented May 16, 1950 2,508,101

UNITED STATES PATENT OFFICE

2,508,101

SWITCH TO BE BUILT INTO A HEATING PAD OR SIMILAR DEVICE

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Application October 1, 1948, Serial No. 52,197

4 Claims. (Cl. 200—168)

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This invention relates to electric switches and more particularly to thin waterproof switches built into an electric heating pad, blanket, comforter, or similar device.

In conventional heating pads the switch which determines energy input or temperature is located in the cord, generally about eighteen inches from the pad. There are several disadvantages to this construction, principally in the switch striking against the rigid parts of the bed, or in being annoying to the user. Also the multiconductor cord from the switch to the pad is quite bulky.

It is desirable in such a device to have a switch which is sufficiently small to be built right into the pad without appreciably increasing the bulk of the pad, the advantage being that the conductor or cord from the plug to the pad is of the light two conductor type conventionally used between the plug and switch. This obviates the need for a switch in the cord itself. However, to be practicable a further condition must be satisfied; that is, the switch and pad must be waterproof and yet provide for external operation of the switch.

The objects of this invention are, therefore, to provide a thin waterproof switch having a plurality of contacts which may be secured in the corner of a heating pad or like device forming a relatively flat surface therewith; to provide such a switch with an external operating handle and protective housing; and to provide a simple and effective means for securing such a switch in a heating pad.

Further objects will be apparent to those skilled in the art from a consideration of the following specification and accompanying drawing wherein Fig. 1 is a plan view of the assembled heating pad and switch; Fig. 2 is an enlarged portion of Fig. 1 with parts removed and partially in section; Fig. 3 is an exploded view of the switch mechanism; Fig. 4 is a sectional view taken on line 4—4 of Fig. 2 when the operating handle is in the dotted position shown in Fig. 2; and Fig. 5 is a sectional view taken on line 5—5 of Fig. 2.

In Fig. 1 there is shown a switch 1 mounted in a corner of an electric heating pad 2 and electrically connected to the heating and protective elements of the pad as well as to a power source.

In order to show how the particular switch mechanism which I have provided is adapted to be readily waterproofed, keeping in mind the limitation on size of the switch, I have shown in Fig. 2 an enlargement with the outer covering removed of the portion of Fig. 1 to which this

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invention more particularly relates, and in Fig. 3 the detailed structure of the switch which I am about to describe. Considering Fig. 2 in conjunction with Fig. 3 it will be seen that I have provided a mounting plate 3 of insulating material having a plurality of projections 4 arranged in an arcuate fashion and interspaced with conductor buttons or contacts 5. Stop projections 6 are provided at both ends of the arc formed by projections 4. Centrally located in the mounting plate 3 with respect to the arc formed by the projections 4 and 6 and the contacts 5 is an aperture 7. This aperture 7 forms a bearing surface for an operating shaft 8 which has a flanged end 8a, a portion of reduced cross-section 8b having one flat side and the remaining surface cylindrical, a rectangular section 8c of further reduced cross section, and a flanged end 8d of cross section equivalent to 8b. On this operating shaft 8 is mounted a spring washer 9, a spring loaded contact arm 10 having an aperture in one end corresponding to the cross section of 8b, and a bearing washer 11. Secured to the mounting plate 3 and positioned in a groove provided therein is an L-shaped conducting strip 12. One end of the conducting strip 12 projects beyond an edge of the plate 3 and has terminal means for securing an input wire or conductor 13; the other end has an aperture therein corresponding in size to and aligned with aperture 7. A second conducting strip 14 is secured to mounting plate 3 and positioned in a groove provided in the face of the plate adjacent to conducting strip 12. One end of the conducting strip 14 projects beyond an edge of mounting plate 3 and has means for connecting wire 15. The other end of conducting strip 14 is connected to the second of contacts 5 and has a spring contact 14a mounted thereon. Additional conducting strips 16 and 17 are similarly mounted on the opposite face of conducting plate 3 and connect, respectively, wire 18 to the first and third of contacts 5, and wire 19 to the fourth of contacts 5.

After members 9, 10, and 11 are assembled on operating shaft 8, the end having the smaller cross section is passed through aperture 7 and a sealing gasket 20 assembled thereon. This sealing gasket 20 is of adequate size to fit into a circular recess 21 (best seen in Fig. 4) in the side of plate 3 opposite conductor strip 12 and adjacent to aperture 7.

Referring now to Fig. 4, the switch mechanism after assembly is placed in a sealing envelope 22 formed of rubber or other suitable material, which has an aperture in one side thereof

through which one end of the operating shaft 8 passes. Preferably, waterproof envelope 22 extends not only over the switch assembly, but encloses the body of the heating pad as well. Bearing washer 23 is provided on the end of the shaft 8 outside of the sealing envelope and secured by the forked end of an operating handle 24. This forked end slides on the rectangular section 8c of the shaft 8 and abuts against the flanged end 8d. As so secured, the sealing gasket 20 is compressed by the spring washer 9 to form an effective seal for the aperture in the sealing envelope. The switch is operated by moving operating handle 24 to rotate shaft 8 which in turn rotates the spring loaded contact arm 10, also secured to shaft 8. Contact arm 10 engages a single one of the contacts 5 or two in parallel to control the input current and hence the temperature of the heating pad.

To prevent the switch mechanism and mounting plate from moving as a unit when the operating handle is moved, the mounting plate 3 is secured to a housing 25 formed of a suitable insulating material and which in turn is secured to the heating pad outer cover 26 in a manner now to be described. It will be noted in Fig. 3 that two additional apertures 27 and 28 are provided in the mounting plate 3 on both sides of the switch mechanism. These apertures are adapted to receive securing studs 29, as shown in Fig. 5. Studs 29 have threaded holes in both ends adapted to receive securing screws 30 passing through apertures in the housing 25 which apertures are aligned with the threaded holes in securing studs 29, and also passing through similarly located apertures in the sealing envelope 22. Sealing gaskets 31 are positioned on the securing-screws 30 just inside of the sealing envelope 22 and metal washers 32 are placed on the screws between the securing studs 29 and the sealing gaskets 31. Thus when the screws 30 are tightened the sealing gaskets 31 are compressed and effective sealing of the apertures in the sealing envelope 22 is provided.

As a means for securing the heating pad outer cover 26 to the housing 25 the screws 30 are provided with snap and heads 33 adapted to receive snap buttons 34 secured to the heating pad cover. Preferably outer cover 26 is of a fabric, such as wool, so that a comfortable surface is presented to the user of this device.

The housing 25 has an operating slot 35 of sufficient length to provide for the swing of the operating handle 24.

From the above it will be seen that I have provided a moisture proof seal for enclosing the body of the heating device and essential portions of the operating switch attached thereto; a housing for protecting the portion of the sealing envelope not protected by the heating pad outer cover and for protecting the switch mechanism; and an arrangement for securing the heating pad outer cover to the housing.

While in the foregoing I have described one preferred embodiment of my invention by way of illustration, many modifications will occur to those skilled in the art, and I, therefore, intend in the appended claims to cover all such modifications as fall within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A thin waterproof switch adapted to be build into the corner of a heating pad or similar device comprising a mounting plate, a switch

mechanism mounted thereon, a waterproof envelope extending from the pad over said mounting plate and switch mechanism and having an aperture therein, said switch mechanism including an operating shaft projecting through said aperture, an operating handle secured to said shaft external to said envelope, sealing means arranged around said shaft to prevent entrance of moisture through said aperture, a housing surrounding said switch mechanism and a portion of said envelope covering said mechanism, said housing having a slot therein, said handle projecting through said slot, and means for securing said mounting plate to said housing.

2. A waterproof switch adapted to be incorporated in the body of a heating pad or similar device comprising a mounting plate, a switch mechanism mounted on said plate, a waterproof envelope extending from the heating pad over said mounting plate and switch mechanism and having an aperture therein, an operating shaft for said mechanism extending through said aperture, operating means attached to said shaft outside of said envelope, means including a sealing gasket surrounding said shaft within said envelope for preventing the entrance of moisture into said envelope through said aperture, bearing means surrounding said shaft outside of said envelope, said envelope and said gasket being compressed between said plate and said bearing means, a housing surrounding said mechanism and the portion of said envelope covering said mechanism, said housing having a slot therein to permit adjustment of said operating means, and means for attaching said mounting plate to said housing, said housing including means for attaching thereto an outer cover for said heating device.

3. A waterproof switch adapted to be built into the body of a heating pad or similar device comprising a mounting plate, a switch mechanism supported on said plate, a waterproof envelope extending from the device over said mounting plate and switch mechanism, said envelope having an aperture therein, said mechanism including an operating shaft projecting through said aperture, operating means attached to said shaft external to said envelope, means for sealing said aperture to prevent the entrance of moisture therethrough, a housing surrounding said mechanism and the portion of said envelope covering said mechanism, said housing including a slot arranged to permit adjustment of said operating means, means including a plurality of studs having threaded ends positioned in apertures in said mounting plate within said envelope for securing said mounting plate to said housing, securing screws passing through apertures in said housing aligned with said studs and similarly located apertures in said envelope and engaging the threaded ends of said studs, and sealing gaskets positioned on said screws inside said envelope and adjacent to said apertures in said envelope to prevent the entrance of moisture through said last apertures.

4. In a heating pad or similar device, a waterproof switch adapted to be located in a corner thereof comprising a mounting plate, a switch mechanism supported on said plate, a waterproof envelope enclosing the heating pad along with said mounting plate and switch mechanism, said envelope having an aperture therein, said mechanism including an operating shaft extending through said aperture, operating means secured to said shaft external to said envelope, sealing means positioned on said shaft adjacent to said

aperture to prevent the entrance of moisture therethrough, and a housing surrounding said mechanism and the portion of said envelope covering said mechanism, said housing including an opening arranged to permit operation of said operating means, and means attaching said mounting plate to said housing.

GEORGE C. CROWLEY.

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The following references are of record in the file of this patent:

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