No. 652,601. Patented June 26, 1900.

E. I. DODDS.

CUT-OUT FOR ELECTRIC LAMP CIRCUITS.

(Application filed Sept. 9, 1899.)

(No Model.)

Fig. 1

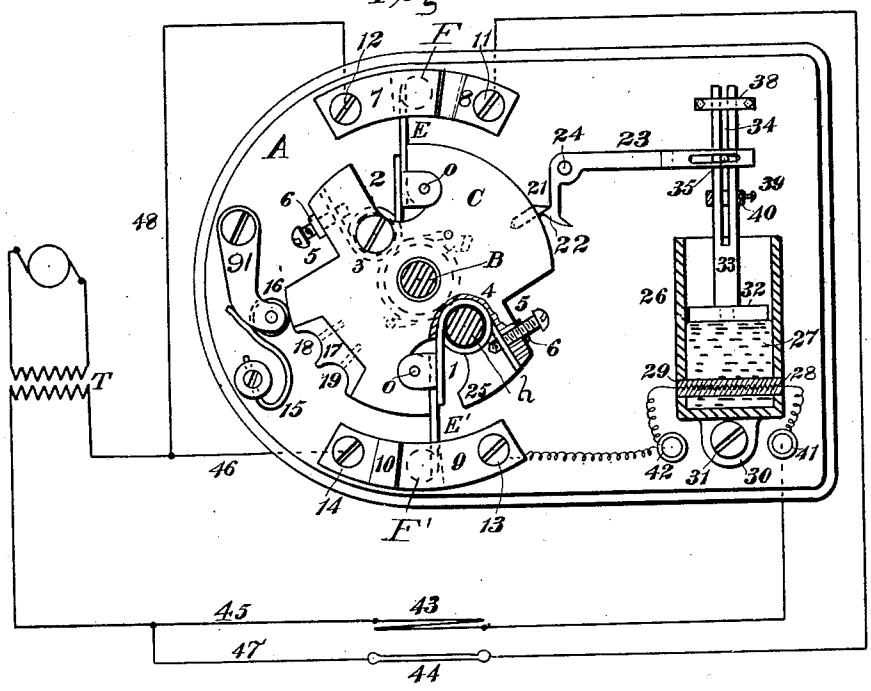


Fig. 2.

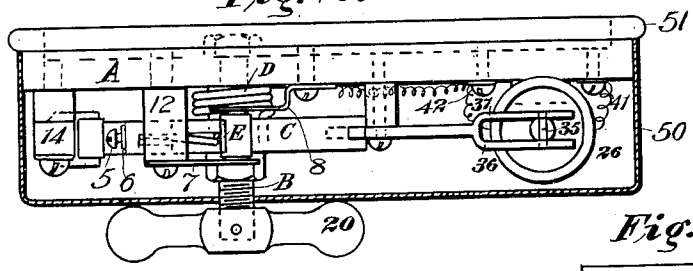


Fig. 4.

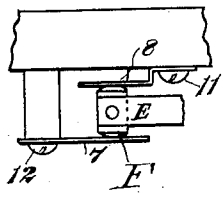
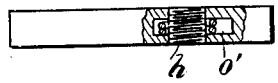


Fig. 3.



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CUT-OUT FOR ELECTRIC-LAMP CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 652,601, dated June 26, 1900.

Application filed September 9, 1899. Serial No. 729,893. (No model.)

To all whom it may concern:

Be it known that I, ETHAN I. DODDS, a citizen of the United States, and a resident of Avalon, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Cut-Outs for Electric-Lamp Circuits, of which the following is a specification.

In incandescent lamps wherein a glower or glowers are used which are formed from a material that is non-conductive when cold and conductive when hot electric heaters have been employed in combination with electromagnetic cut-outs for such heaters, the cut-outs being brought into operation by the changed condition of the glower-circuit when the heater has accomplished its work of bringing the glower to conductivity.

My invention relates to cut-out devices for the heater-circuits which are adapted to operate with a quick and sudden movement, so as to prevent sparking when the heater-circuit is ruptured.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my cut-out, together with a diagram of the circuits. Fig. 2 is a plan showing the cover of the cut-out in section, and Figs. 3 and 4 are detail views.

In the drawings, A is a base, of porcelain or other good insulating material, on which the main operative parts of my cut-out are mounted. The said parts will ordinarily be screwed to an upright wall or partition, so that the parts when ready for operation will occupy substantially the position shown. In the base A, I mount a shaft B in such manner that it may turn freely with relation to the base. On the shaft B is carried an insulating plate or disk C, the said plate or disk being held to the shaft by being forced thereupon, or by being screwed upon it, or by any other suitable means. To the disk C, I attach one end of a spiral spring D, and I attach the other end of the said spring to the base A. The relations are such that the spring D is tightened or put under tension when the shaft B is turned to the left. On the disk C I mount arms E and E′ by pivoting the said arms at *o o* within openings 1 and 2 in the said disk. The arms E and E′ are pressed against corresponding walls of the said openings by means of springs 3 and 4, respectively. The said springs are mounted inside openings *o′ o′* in the disk C, being adapted to surround screw-threaded hubs *h*, which are screwed into the said disk, as shown in Fig. 3. The ends of the springs 3 and 4 project outward, one end of each spring pressing against one of the arms E E′ and the other end coming out into line with a screw 5, so that the said screw may bear upon it for the purpose of tightening the spring. The said screws 5 5 are seated in brackets 6 6, which are formed on or secured to projections on the disk C, as shown. By the means last described the tension of the springs 3 and 4 can be varied at will. The arms E and E′ carry contact-pieces F and F′, which are adapted, as shown, to make contact at opposite ends with contact-springs 7 8 9 10. The spring 7 is mounted upon an insulating binding-post 12, and the spring 8 is joined by a screw 11 to the base A. Similarly the spring 9 is connected to an insulating binding-post 13, and the spring 10 is joined by a screw 14 to the base A. The connection described between the contact-pieces F F′ and the contact-springs 7, 8, 9, and 10 is such that the said springs bear upon the contact-pieces with a considerable degree of friction, thereby tending to retain the contact-pieces after contact has once been made. This action of the springs is, however, in opposition to the action of the spring D, as will be readily understood.

A dog 91 is pressed by a spring 15 in the direction of the disk C, and it carries at its free end a roller 16, which by the force of said spring 15 is urged against the periphery of the disk. In an opening in said disk I place a metallic piece 17, preferably of brass, having grooves 18 and 19, corresponding in shape to the roller 16. When the said roller 16 rests upon the periphery of the disk, as shown in Fig. 1, the contact-pieces F and F′ complete the circuit between the springs 7 and 8 and 9 and 10, respectively. The parts are brought to the position illustrated in the said figure by operating toward the left a handle 20, pinned to the shaft B. In the absence of any preventive device the disk would be turned to the right by the force of

the spring D if the handle were released after bringing the parts to the position illustrated. It will be seen, however, that the parts are held in this position by means of a tooth 21, projecting from the disk C, which tooth engages with a catch or detent 22 on a pivoted angular lever 23, the pivot being shown at 24. If now the catch should be removed and the parts released, the roller 16 would be forced into the groove 18, and the disk would again be held stationary, because the force of the spring 15, combined with the resisting force of the contact-springs 7 and 8, would be sufficient to counteract the force of the spring D and hold the disk from further rotation.

It will be understood that before the roller 16 enters the groove 18 or simultaneously with such entrance the contact-piece F′ will be forced out of contact with the springs 9 and 10 by the actual pushing of the wall 25 of the opening 1 against the arm E′. It will also be understood that prior to such expulsion of the contact-piece the arm E′ will have been bent backward against the force of the spring 4 until the wall 25 has been pushed against the said arm and that when the exit of the contact-piece takes place it does so by a quick and sudden movement. On the other hand, the opening 2 is made wider at its mouth than the opening 1, whence it follows that there will have been no such expulsion of the contact-piece F at the time the second position of the cut-out is occupied. Consequently the contact-piece F will remain in contact with the springs 7 and 8, while the roller 16 holds it in place in the groove 18. Now the function of tripping the disk C is performed by an apparatus which is presently to be described. This consists, essentially, of a holder 26, of glass or other suitable material, containing mercury, as shown at 27. Through the body of the holder is passed a disk or rod 28, of porcelain or similar insulating material, through which extends a fine heater-wire 29. The holder 26 is provided with a flange 30, by means of which it is secured by a screw 31 to the base A. In the holder 26, which is in the form of a cylinder, is located a plunger 32, to which is joined a rod 33. The said rod 33 projects upward considerably above the holder and is provided with a slot 34, in which a pin 35 is adapted to play. The said pin 35 passes through the angular lever 23 and is riveted thereto. The upper end of the rod 33 passes through the guide 38 to insure a practically-vertical up-and-down motion of the said rod. On the rod 33 I secure by a set-screw 39 a collar 40, which can be adjusted to any position on the rod by means of the set-screw. At 41 42 are shown binding-posts on the base A for the wires of the heater-circuit, the heater being shown at 43 in proximity to a glower 44.

The lighting device illustrated might be operated from any suitable source of electricity. I have shown at T a converter supplying the local circuit, the said converter being supposed to be connected up in circuit with any adequate generator. From the secondary of the converter T a wire 45 passes to the heater 43, thence to the binding-post 41 and the heater-wire 29, and from there to the binding-post 42 and the spring 9. From the other terminal of the converter the wire 46 goes to the spring 10, so that when the contact-piece F′ joins the springs 9 and 10 the circuit of the heater 43 is complete. The glower-circuit passes by way of a wire 47 through the glower 44 to the spring 8. Thence it goes by way of the contact-piece F, when the latter is in the position indicated in the drawings, to the spring 7, and by way of the wire 48 back to the other terminal of the converter.

The action of the cut-out can now be clearly understood. The first operation consists in taking hold of the handle 20 and turning the shaft B and the disk C, connected therewith, into the position illustrated—that is to say, until the tooth 21 has been brought behind the catch 22. The heater-circuit is now complete, and the process of bringing the heater-circuit to a high temperature begins. This results in making the heater-wire 29 very hot, and consequently raises the temperature of the mercury 27, causing it to expand. When the mercury has expanded far enough to push the collar 40 against the yoke formed by the arms 36 and 37, so as to raise the outer arm of the angular lever 23 some little distance, the disk C is tripped by the removal of the catch 22 from the part of the tooth 21, and the said disk moves into its second position, with the contact-spring F′ carried out of contact with the springs 9 and 10 by a quick movement and with the contact-piece F retained in contact with the springs 7 and 8, as already described. Accordingly the heater-circuit is broken and the heater-wire 29 cools off and the mercury 27 settles. The glower-circuit, however, is in full operation and the lamp continues to burn until the operator desires to extinguish the lamp, whereupon he turns the handle 20 to the right and brings the roll 16 into the groove 19. In the performance of this act the contact-piece F is removed from contact with the springs 7 and 8, and the glower-circuit is broken. Manifestly the automatic operation of the cut-out for the heater-circuit must be so timed as to allow the glower 44 to become fully heated to a conductive temperature before the said operation intervenes. This can be very accurately adjusted without waste—that is to say, without any unnecessary delay in the breaking of the heater-circuit—by a proper adjustment of the collar 40 on the rod 33.

The cut-out apparatus described is usually provided with a cover 50, of metal, resting against the flange 51 on the base A.

The invention claimed is—

The combination with two circuits, one including a glower and the other including an electric heater therefor, of a spring-actuated switch or cut-out in the heater-circuit, and a thermostatic device operated by the current in the heater-circuit for tripping the said switch or cut-out, the said thermostatic device consisting of a cylinder of expansive fluid in operative relation to a plunger, and a tripping-arm connected to said plunger.

Signed at New York, in the county of New York and State of New York, this 11th day of August, A. D. 1899.

ETHAN I. DODDS.

Witnesses:
WM. H. CAPEL,
GEORGE H. STOCKBRIDGE.