Oct. 4, 1949. J. KITMAN 2,483,646

THERMAL CIRCUIT BREAKER

Filed Jan. 2, 1948

Fig-1

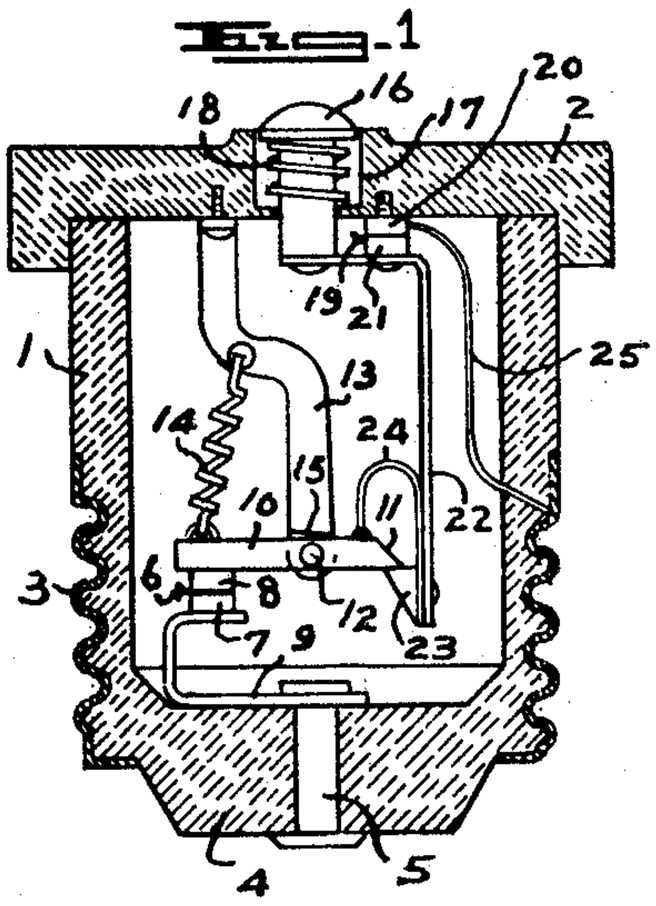


Fig-2

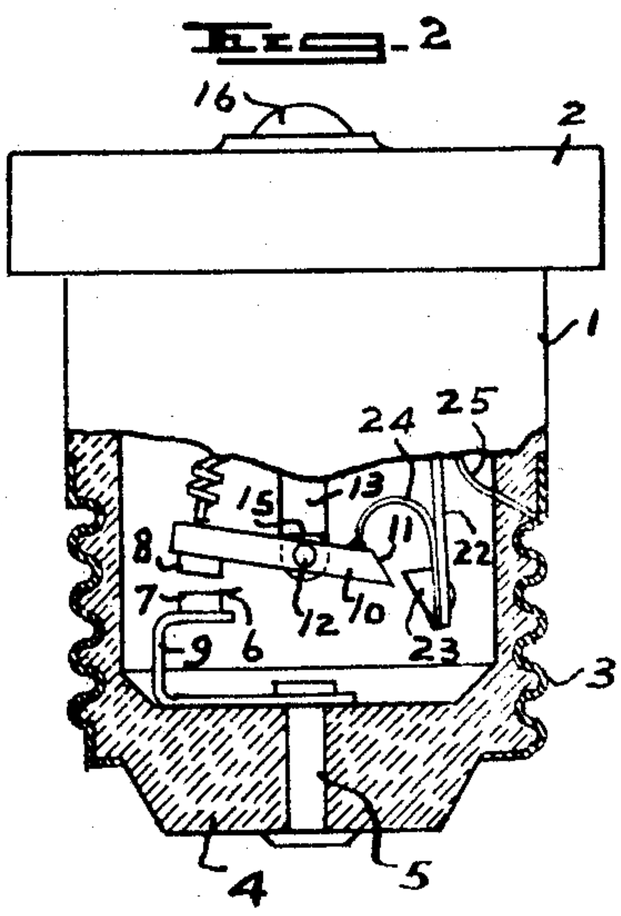
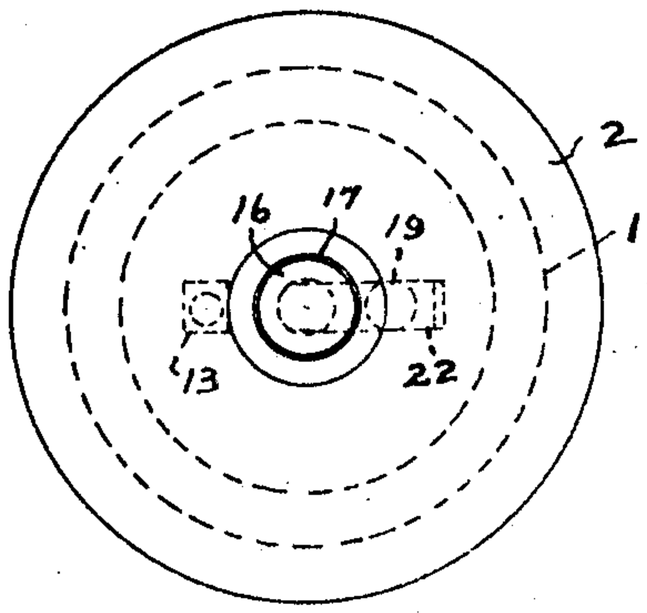


Fig-3



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THERMAL CIRCUIT BREAKER

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1 Claim. (Cl. 200—116)

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This invention relates to an electric circuit-breaker, and important objects and advantages thereof are to provide a circuit-breaker of the character described, which is designed and intended to supersede a fuse plug of the conventional type commonly used in branch circuits carrying the smaller currents, which will function automatically to break the circuit when the current strength reaches a certain predetermined value, which may be reset for repeated use, which is simple in its construction and arrangement, durable and efficient in its use, positive in its action, and comparatively economical in its manufacture and use.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the novel construction, combination, and arrangement of parts herein specifically described and illustrated in the accompanying drawing, but it is to be understood that changes in the form, proportions and details of construction may be resorted to that come within the scope of the claims hereunto appended.

In the drawing wherein like numerals of reference designate corresponding parts throughout the several views;

Figure 1 is a side elevational view, partly in cross section, of the improved electric circuit-breaker, with the embodied control mechanism in the operative position.

Figure 2 is a similar view, with the control mechanism in the inoperative position.

Figure 3 is a top plan view of the device.

Referring in detail to the drawing, the improved electric circuit-breaker comprises a hollow plug body 1, including a top cover 2, which latter is fixed to the plug body by cementing, or in any other suitable manner. The lower exterior portion of the plug body is surrounded by a fixed metallic thread shell 3, and the bottom 4 of the plug body carries a fixed contact pin 5 disposed centrally of the bottom.

The plug body 1 and the top cover 2 are constructed of any suitable insulating material, and the assembly of the plug body and top cover, together with the embodied thread shell 3 and contact pin 5, provide a plug structure which has a general contour identical to the conventional type of fuse plug, and which is designed and intended to be screwed into the conventional type of electrical socket.

A thermostatically controlled switch 6 is mounted in the plug body 1, and comprises a pair of vertically opposed contact members 7 and 8,

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The lower contact member 7 is carried by a contact bracket 9, which is fixed to the contact pin 5. The upper contact member 8 is carried on the lower face of the outer end of a horizontally disposed contact bar 10. The contact bar has a tapered inner end 11, and is pivotally connected by a pivoting pin 12 to the lower end of a supporting bracket 13. The latter is secured to and depends from the top cover 2.

A spiral compression spring 14 is connected with the supporting bracket 13 and with the outer end of the contact bar 10, and normally functions to shift and hold said contact bar to an angular position from the horizontal to open the switch 6, as clearly shown in Figure 2. The angular shiftable movement of the contact bar is limited by a shoulder 15 formed in the support bracket 13.

A push button 16 is mounted for vertical movement in a centrally disposed opening 17 in the top cover 2. A spiral spring 18 is mounted in the opening 17 and surrounds the push button. The action of the spring 18 normally tends to shift the push button to its upward position in the opening 17.

A manually actuated switch 19 is mounted in the plug body 1, and comprises a pair of vertically opposed contact members 20 and 21. The upper contact member 20 is carried by the top cover 2, and the lower contact member 21 is carried by a bimetallic latch arm 22.

The bimetallic latch arm 22 is thermostatically actuated, and has its upper end secured to the lower end of the push button 16. The latch arm is normally vertically disposed in the plug body 1, and carries a fixed tapered latching element 23 on the inner side of the lower end portion thereof. The latching element normally engages the tapered end 11, of the contact bar 10, for holding the latter in the normal horizontal position against the pull of the spring 14, to maintain the thermostatically actuated switch 6 in the closed position, as shown in Figure 1.

A flexible conductor 24 connects the inner end of the contact bar 10 with the lower end of the latch arm 22, and a flexible conductor 25 connects the upper end of the latch arm with the thread shell 3 of the plug body. It will here be noted that either or both of the conductors 24 and 25 may be constructed of material that will fuse to break the electric circuit when the current strength reaches a predetermined value.

When the improved electric circuit-breaker is screwed into an electric socket in the manner of an ordinary fuse plug, which it supersedes, the

circuit is completed through the contact pin 5, the contact bracket 9, the closed switch 6, the contact bar 10, the conductor 24, the latch arm 22, the closed switch 19, the conductor 25, and the thread shell 3. Under normal conditions the switches 6 and 19 are always closed to maintain the circuit, by the engagement of the contact bar 10 by the latching element 23.

The construction and operation of the bimetallic latch arm 22 is such that if the current strength of the circuit reaches and exceeds the predetermined value, the latch arm will be thermostatically actuated to release the latching element 23 from the tapered end 11 of the contact bar 10, whereby the latter will be shifted by the action of the spring 14 to open the switch 6 and thereby break the circuit.

To reclose the circuit, the push button 16 is depressed to lower the latching element 23 so that the latter will reengage the tapered end 11 of the contact bar 10. Upon release of the push button, the spring 18 will elevate the again normal latch arm 22 and cause the latching element 23 to reengage the contact bar and shift the latter to the normal horizontal position to close the switch 6 and thereby complete the circuit.

Due to the inherent resiliency of the latch arm 22, and to the tapers of the contact bar end 11 of the latching element 23, the reengagement of the latter with said end 11 is readily effected by snap action.

When the push button 16 is depressed to reclose the switch 6, in the manner stated, the switch 19 is opened for safety purposes, as the circuit is not closed until pressure upon the push button is removed to cause the closing of the switch 19 by the action of the spring 18. The construction and arrangement of the switch 19 limits the upward movement of the push button in the top cover opening 17, and thereby obviates the possibility of holding a closed circuit by exerting sufficient upward pull manually on the push button to prevent the normal thermostatic operation of the switch 6 to break the circuit when required for safety.

The present invention provides a most durable and efficient device of its kind, which may be cheaply manufactured and successfully and economically employed for the purpose and in the manner herein set forth.

What I claim is:

An electric circuit-breaker of the class described, comprising the combination of hollow plug body including a top cover, a thread shell surrounding the lower portion of said body, a contact pin secured in the bottom of said body, a thermostatically controlled switch mounted in said body, a manually controlled switch mounted in said body, a push button shiftably mounted in said cover, a spring mounted on said button for normally maintaining the latter in the upward position, a contact bracket secured to said pin and being connected with said thermostatically controlled switch, a supporting bracket carried by said cover, a contact bar pivotally connected with the lower end of said supporting bracket and being connected with said thermostatically controlled switch, a bimetallic latch arm carried by said button, a latching element carried at the lower end of said arm and normally engaging one end of said bar for maintaining said thermostatically controlled switch in the closed position, a spring connected with said supporting bracket and with said bar for shifting the latter to open said thermostatically controlled switch when said element is released from said bar by the thermostatic action of said arm, said manually controlled switch including a pair of contact members, one of said pair of contact members being carried by said cover, and the other of said contact members being carried by said arm, and means formed on said supporting bracket for limiting the shiftable movement of said bar, a conductor connecting said bar with said arm, and a conductor connecting one of said pair of contact members with said shell.

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

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