Nov. 30, 1937. J. F. McCORMACK ET AL 2,100,665

TEMPERATURE CONTROLLED SAFETY ELECTRIC SWITCH

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Fig. 1.

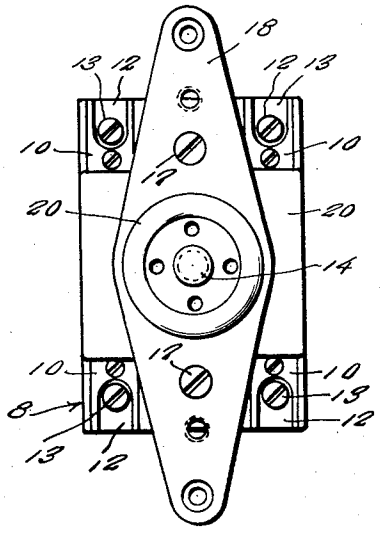
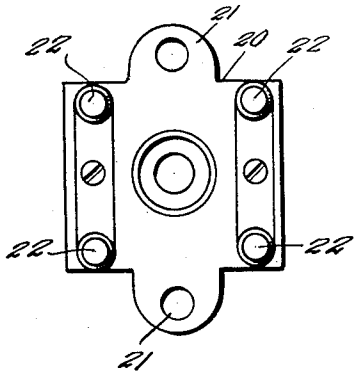


Fig. 2.



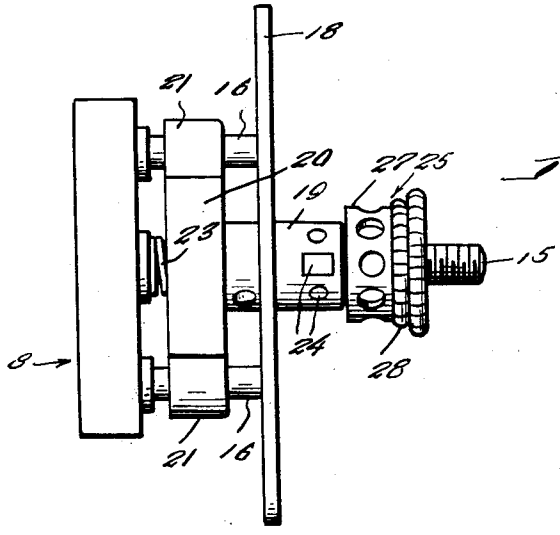


Fig. 3.

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Fig. 4.

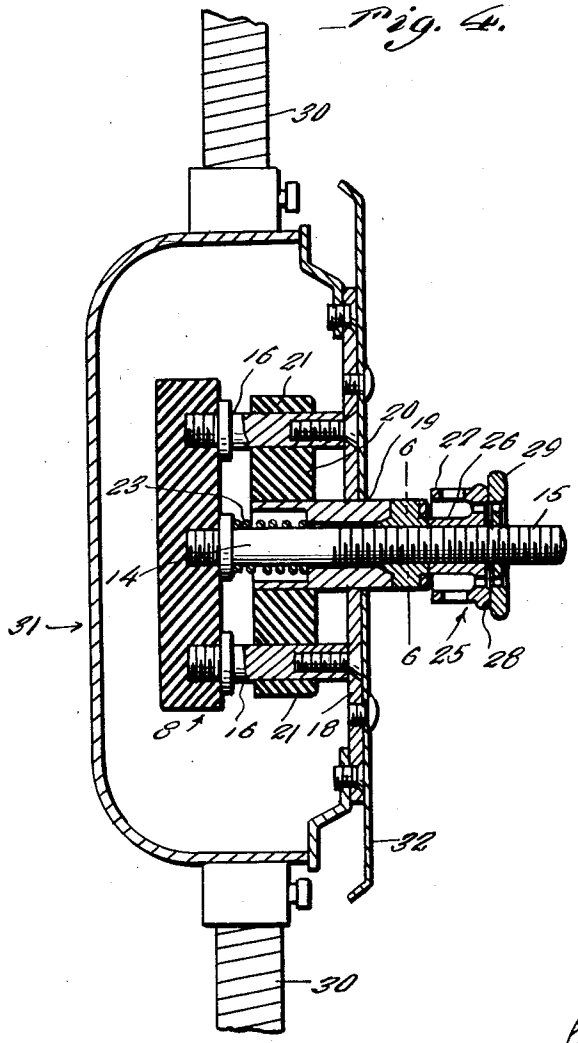


Fig. 5.

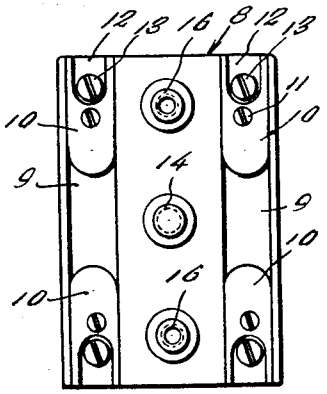


Fig. 6.

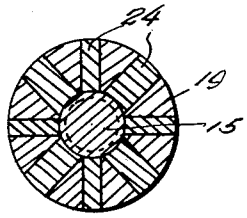
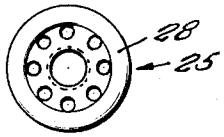


Fig. 7.



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UNITED STATES PATENT OFFICE

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TEMPERATURE CONTROLLED SAFETY ELECTRIC SWITCH

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Application November 16, 1936, Serial No. 111,100

2 Claims. (Cl. 200—142)

This invention relates to what is believed to be a structurally new and novel electric circuit make and break device such as may be conveniently classified in that category of structures having to do with temperature or heat controlled automatic safety switches, and the purpose of the invention is to provide a device of this type highly desirable and practicable for automatically throwing out of operation an oil burner or domestic air conditioning apparatus in case of fire.

Although I have shown and will describe the complete assemblage including the protective housing or casing and wall plate, etc., it is to be pointed out that the chief novelty is predicated upon the relatively fixed and movable contact carrying members and the spring actuated plunger means having fusible material incorporated therein in a particular and preferred manner.

More specifically, the structural novelty resides in the adoption and coordination of a pair of spaced parallel members having a spring pressed plunger actuated member mounted therebetween, the parts having properly corelated contact elements for electric circuit control, the plunger having manually regulated thrust means associated therewith to close the switch and having embodied therein fusible means whereby it is automatically tripped under abnormal heat conditions to break the circuit for obvious safety reasons.

The chief structural novelty, however, resides in the particular construction and use of the plunger which is charged or loaded with fusible material and which is so coordinated with a thrust nut as to permit said plunger, under the action of a spring, to move in a direction to automatically break the circuit when a fire hazard is present.

Other features and advantages will become more readily apparent from the following description and accompanying drawings.

In the drawings wherein like numerals are employed to designate like parts throughout the same:—

Figure 1 is what may be called a top plan view of the novel circuit make and break device.

Fig. 2 is what may be called a bottom plan view of the relatively movable contact carrier block.

Fig. 3 is an edge view of the assemblage seen in Fig. 1.

Fig. 4 is a view partly in section, and partly in elevation, showing circuit make and break device mounted in an enclosing casing.

Fig. 5 is a top plan view of the relatively stationary contact carrier block.

Fig. 6 is an enlarged cross sectional view on the line 6—6 of Fig. 4.

Fig. 7 is a detail view of the cap-nut.

Considering now the distinguishable parts of the circuit make and break device, attention first comes to the rectangular block of insulation material shown to advantage in Fig. 5. This is denoted by the numeral 8 and is provided with spaced parallel grooves or channels 9, in which the relatively fixed metal contact elements 10 are mounted and fastened in place by suitable fasteners 11. These contact elements 10 are notched as indicated at 12, to accommodate the terminals on the adjacent ends of the circuit wires (not shown). The numerals 13 designate binding screws or posts operable in an obvious manner. The numeral 14 at the center of the block designates a stud which is shown in Fig. 4, and is screw threaded at its outer end as indicated at 15. On opposite sides of the stud are auxiliary assembling and guide forming studs 16. These are formed at their outer ends with screw threaded sockets to accommodate the assembling screws 17. These assembled screws 17 serve to secure the metal bridge plate 18 in position. This plate is of any appropriate shape and is located in parallelism with the insulation block 8, being spaced therefrom, the same having an opening at its center to accommodate the relatively slidable tubular plunger 19. The plunger forms an integral part of the relatively slidable companion insulation block 20. This block 20, as shown in Fig. 2, is provided with apertured extensions 21, which constitute guides slidable on the guide studs 16. The block 20 is provided with a plurality of contact pins 22 located for cooperation with the contact element 10 on the block 8. The tubular plunger or sleeve 19 surrounds the central guide stud 14, and has one end socketed to accommodate a coiled spring 23 in the manner shown in Fig. 4. The spring surrounds the guide stud 14 and exerts an outward thrust on the sleeve-like plunger 19, to urge the contacts 22 and away from the contacts 10. At the outer end of this plunger sleeve, I provide the fusible filler. This filler is in effect a plurality of plugs 24 fitted into radial openings in the plunger. It will be observed, however, that the sleeve-like portion of the fusible means is in effect a bushing and surrounds the threaded part of the main stud 15.

The numerals 25 designate a thrust nut which includes a central sleeve portion 26 and a surrounding apertured annulus or rim 27. The numeral 28 designates a knurled finger grip. The numeral 29 designates a knurled lock nut. Both

of these nuts 29 and 25 are threadedly mounted on the screw threaded stem 15 of the main stud 14. The diameter of the rim or shell 27 is such as to permit it to telescope down over the adjacent end portion of the plunger-sleeve 19. The sleeve portion 26 of the thrust nut 25 is in direct thrust contact with the fusible element exposed through the adjacent end of the bore of said sleeve. It is obvious therefore that by turning the nut 25 down, this exerts an end thrust pressure on the plunger or sleeve 19 through the medium of the contacted portion of the fusible element. By thus turning the nut 25 "home", this forces the block 20 toward the block 8 against the tension of the spring 23 and brings the cooperating contact elements 22 and 10 together in electrical meeting engagement. When in this position as shown in Fig. 4, the switch or circuit make or break device is closed. This is the normal operating position of parts. Assuming that the device is built into an air conditioning apparatus system, or an oil burner system, it would be assembled as shown in Fig. 4. Here, the conductor wire cables are denoted by the numerals 30 and are connected to the ends of the housing or casing 31. The plate 18 is mounted in this casing, and is provided, if desired, by a wall or facing plate 32. Obviously, as before stated, this assemblage in Fig. 4 is of no moment. The invention is in the assembly depicted to advantage in Fig. 3.

Assuming that the current is on, and that the circuit make and break device is closed as shown in Figs. 3 and 4, if the room temperature becomes excessive or abnormal, the fusible element or means 24 is melted. Under the action of the expansion spring 23, the plunger 19 is then released and telescoped into the cup or rim 27 of the thrust nut 25. At the same time, the sleeve portion 26 of the nut rides down into the bore of the sleeve 19. Consequently, the contacts 10 and 22 separate and the circuit is automatically broken.

Structurally speaking, the novelty resides in the relatively stationary unit made up of parts 8 and 18 these being joined together through the instrumentality of the central main stud 14 and the auxiliary end studs 16; in conjunction with the relatively movable unit comprising the insulation block 20 and the fusible element equipped plunger. That is to say, the disposition of the block 20 between the parts 8 and 18 and the slidable mounting of the sleeve-like plunger 19 on the stud 14, accompanied by the springs 23 is an important phase of the invention. Essentially, however, the provision of the fusible element or means 24 is of outstanding importance, in that this constitutes a fusible abutment with which the cap-like thrust nut 25 is engaged. Normally, therefore, the nut 25 acts directly against the plunger and brings the contacts 22 and 10 into electrical engagement. At the same time when the fusible abutment melts, the spring then reacts automatically to telescope the plunger 19 into the cap-nut 25, bringing about the desired automatic breakage of the circuit.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Minor changes in shape, size, and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

What we claim as new is:—

1. In a circuit maker and breaker, a plate of conductive material, a pair of posts extending therefrom, a block of insulating material mounted on the free ends of said posts, a second block of insulating material slidably mounted on said posts, intermediate the first mentioned block and said plate for movement towards and from the first mentioned block, and tensioned against movement in the former direction, complemental contacts on said blocks, respectively, adapted to be engaged by movement of the second block toward the first block, a sleeve mounted at one end in the second block to slidably extend through said plate, a stud extending from the first block through and beyond said sleeve, a sleeve-like nut threaded on to the outer end of said stud to telescope into the outer end of said sleeve, and a plug of fusable material in the outer end of said sleeve blocking telescopic movement of said nut into the latter.

2. In a circuit maker and breaker, a plate of conductive material, a pair of posts extending therefrom, a block of insulating material mounted on the free ends of said posts, a second block of insulating material slidably mounted on said posts, intermediate the first mentioned block and said plate for movement toward and away from the first mentioned block and tensioned against movement in the former direction, complemental contacts on said blocks, respectively, adapted to be engaged by movement of the second block toward the first block, a sleeve mounted at one end in the second block to slidably extend through said plate and having radial slots in the outer end thereof, a stud extending from the first block to and beyond said sleeve, and a sleeve like nut threaded on to the outer end of said stud to telescope into the outer end of said sleeve, said slots being filled wth fusable material extending into said sleeve and blocking telescopic movement of said nut into the latter.

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