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J. H. HELLAND

2,228,956

CIRCUIT BREAKER
Filed June 1, 1938

Fig. 1.

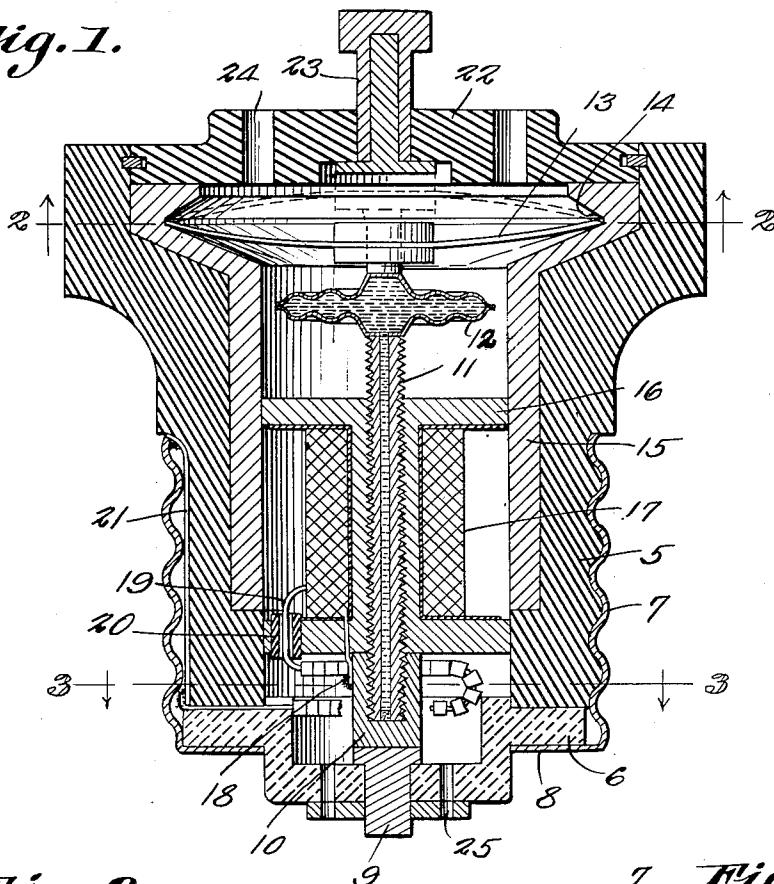


Fig. 2.

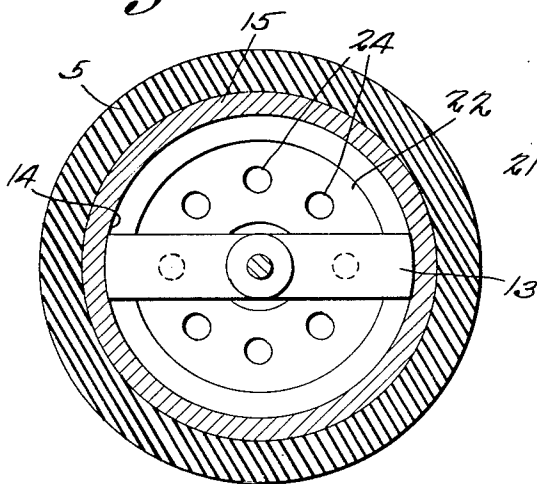
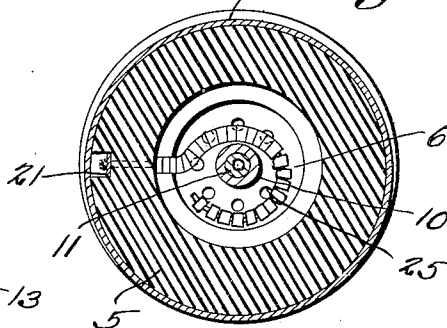


Fig. 3.



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CIRCUIT BREAKER

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Application June 1, 1938, Serial No. 211,300

2 Claims. (Cl. 200—122)

This invention relates to circuit breakers, and particularly to circuit breakers of the automatically controlled type, the primary object of the invention being to provide a circuit breaker for use in the usual fuse plug socket, the device being so constructed that an overload current will automatically cause the operation of the device to break the circuit in which the circuit breaker is positioned, thereby protecting the line and appliances connected therein.

An important object of the invention is to provide a device of this character which will be sensitive to abnormal heat caused by an overload current passing through the device.

A further object of the invention is to provide a circuit breaker which will operate instantaneously, and one which must be returned to its operative or reset position by an attendant, thereby preventing the operation of the device until the abnormal condition causing the overload current, has been corrected.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein described, may be made within the scope of what is claimed, without departing from the spirit of the invention.

Referring to the drawing:

Figure 1 is a longitudinal sectional view through a circuit breaker constructed in accordance with the invention.

Figure 2 is a transverse sectional view taken on line 2—2 of Figure 1.

Figure 3 is a transverse sectional view taken on line 3—3 of Figure 1.

Referring to the drawing in detail, the housing or body portion of the circuit breaker is indicated generally by the reference character 5, the lower end of the housing being closed by the disk-like member 6, constructed of suitable insulating material, and held to the housing or body portion 5, by means of the screw shell 7, which is formed with an annular inwardly extended flange 8 that engages the disk-like member, and holds the disk-like member against one end of the housing or body portion.

Supported by the disk-like member 6, is the stationary contact member 9 of the circuit breaker, which is normally in contact with the movable contact member 10 carried at the lower end of the threaded rod 11, the contact member 10 being

in the form of a cap, threaded on the lower end of the rod 11.

As shown, the threaded rod 11 is hollow and supports the expansible disk-like member 12 at its upper end, the member 12 being in communication with the hollow threaded rod and adapted to contain ether or other suitable liquid which will expand under the action of heat.

The member 12 is connected with the member 13 which embodies a length of flat steel spring material that has its ends held within the groove 14 formed in the liner 15 constructed of iron held within the housing or body portion 5. The length of the member 13, is such that when positioned within the groove 14, the member 13 is bowed. When the member 13 is bent downwardly, as shown by Figure 1 of the drawing, the contact member 10 is engaging the stationary contact member 9. It is obvious that when the member 13 moves upwardly, and the member 13 snaps past dead center, the movable contact member 10 will be moved away from the member 9, breaking the circuit.

Mounted on the threaded rod 11, is a spool-like piston 16 constructed of iron which provides a support for the resistance coil 17 which is wound therearound. One end of the electromagnetic coil 17 connects with the movable contact member 10, at 18, the opposite end of the electromagnetic coil 17 indicated at 19, extends through the insulating member 20 of the piston 16 from where it passes between the lower end of the piston 16 and disk-like member 6, and connects with the copper strip 21 that extends along the housing 5 and connects with the screw shell 7. The cover for the housing or body portion 5 is indicated by the reference character 22, and is constructed of suitable insulating material such as "Bakelite" or the like. This cover 22 is formed with a central opening in which the push button 23 extends, the push button 23 being designed to engage the spring member 13, to return the spring member to its normal active position, after it has been actuated to break the circuit.

Ventilating openings indicated at 24 are formed in the cover 22 and permit of a circulation of air through the housing or body portion.

Due to the construction shown and described, it will be seen that the contact member 10 will rest against the stationary contact member 9, completing the circuit to the circuit breaker, under normal conditions. Should an overload occur, it is obvious that the electromagnetic coil 17 will become heated, with the result that the

ether or liquid contained in the rod 11 and expansible disk-like member 12, will become heated causing the disk-like member 12 to expand against the action of the spring 13, or should a direct short occur, the action is instantaneous, such action being created by the magnetic pull set up between members 15 and 16. In case of a direct short occurring the thermal element is not essential to the operation of this device, but is embodied in the construction to take care of the more technical conditions involving overloads. As the spring 13 is moved past dead center it is obvious that the movable member 10 will move away from the contact member 9, breaking the circuit through the housing or body portion 5.

In order to reset the circuit breaker, it is only necessary to press the button 22 downwardly against the member 13, until the member 13 moves past dead center and snaps to its active or operative position.

It might be further stated that due to the construction of the rod 11, the piston, and contact member 10 may be adjusted with respect thereto to insure a true operation of the circuit breaker.

I claim:

1. A circuit breaker comprising a housing, a threaded shell on the housing and adapted to be positioned in a standard socket, contacting stationary and movable contact members in the housing, a thermal element within the housing, a hollow rod movable with the thermal element and on which the movable contact member is

secured, said rod and thermal element containing ether, a coil within the housing and in circuit with the shell and contact member on the rod, and said coil adapted to heat the ether in the hollow rod and thermal element under an overload current, expanding the thermal element and operating the rod whereby the circuit between the contact members is broken.

2. A circuit breaker comprising a housing, a threaded shell on the housing and adapted to be positioned in a standard socket, a stationary contact member disposed at one end of the housing, a length of flat spring steel material normally bent past dead center, mounted within the housing, a thermal element mounted within the housing, and being connected to the length of flat steel material at a point intermediate the ends thereof, said thermal element comprising a hollow rod and an expansible member connected to the rod, a stationary contact member secured at one end of the casing, a movable contact member secured to one end of the rod and engaging with the stationary contact member completing a circuit, said thermal element containing ether, a coil mounted on said hollow tube and being in circuit with the shell and movable contact member, said coil adapted to heat the ether in the thermal element under an overload current, expanding the thermal element, breaking the circuit between the contact members, and said length of spring steel material adapted to bend past dead center in the opposite direction, holding the contact members separated.

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