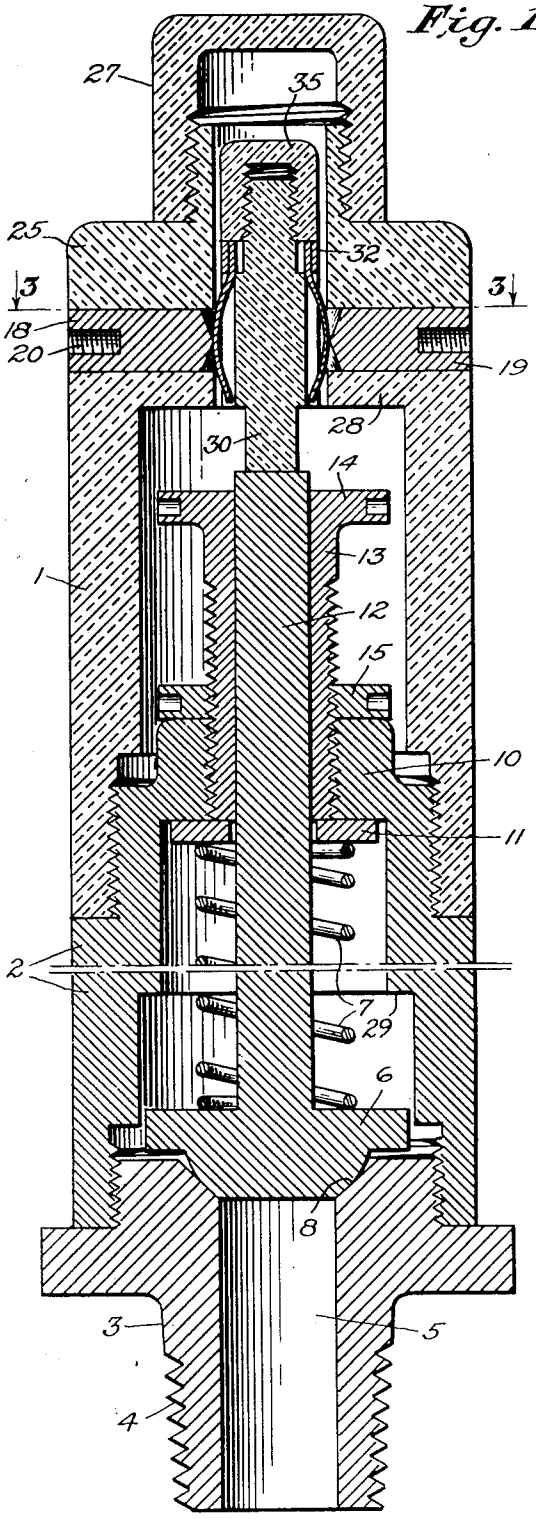
March 6, 1934. H. H. DODGE ET AL 1,950,049

CIRCUIT BREAKER

Filed Nov. 3, 1932

Fig. 1



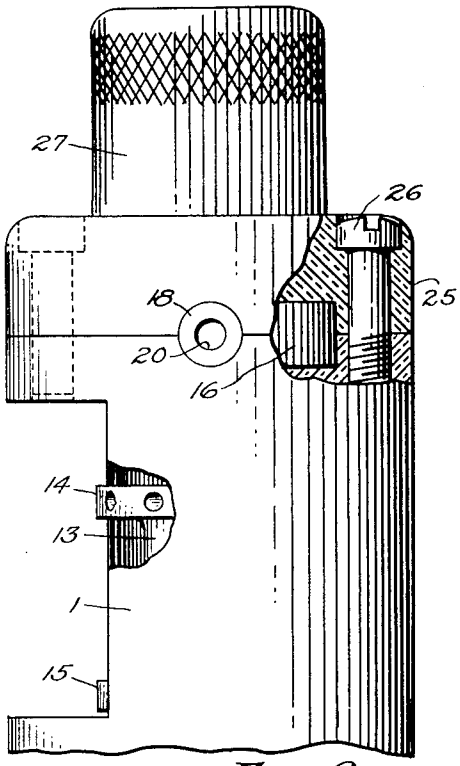


Fig. 2

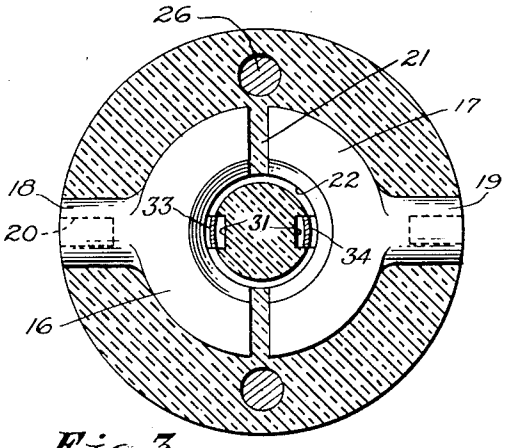


Fig. 3

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CIRCUIT BREAKER

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Application November 3, 1932, Serial No. 641,060

7 Claims. (Cl. 200—16)

This invention relates to pressure actuated circuit breakers and has for its object to provide a construction simple in parts, more efficient in use, and less costly of manufacture than those heretofore proposed.

With these and other objects in view the invention resides in the novel details of construction and combinations of parts as will be disclosed more fully hereinafter and particularly pointed out in the claims.

Referring to the accompanying drawing forming a part of this specification and in which like numerals designate like parts in all the views,

Fig. 1 is a vertical sectional view taken centrally of the device with a portion of the length of the device broken away to foreshorten the illustration;

Fig. 2 is an exterior side elevation of the upper portion of the device, with portions broken away to more clearly illustrate the construction; and

Fig. 3 is a transverse sectional view taken as on the line 3—3 of Fig. 1 and looking in the direction of the arrows.

This device is particularly useful as a safety means in connection with increase in pressures of air, steam, or other gases in that when a predetermined pressure over normal is attained, an electric circuit will be affected to give a visual or audible signal. An important feature, however, of this device is that, unlike heretofore known constructions, once the contact maker has been moved out of its intended position, it will remain in the position to which it has been moved, thereby requiring manual attention to reset the device for further use.

Referring to the drawing there is provided a cylindrical casing consisting of an upper portion 1, of bakelite or other electrical insulating material, the lower end of which is screw threaded to the lower portion 2 of the casing which is preferably made of metal. The extreme lower end of the portion 2 is screw threaded to a hollow plug 3 which is adapted by the threads 4 to be fitted into a steam header of a boiler, for example, thereby providing a passage 5 for the steam to reach the head 6 of a valve normally resting, under tension of the coil spring 7, in the valve seat 8 at the upper end of the plug 3. The upper end of the cylinder portion 2 is reduced in diameter to provide a central boss 10 creating an interior shoulder against which rests a metallic washer 11, the spring 7 resting against said washer and normally forcing the head of the valve against its seat.

A metallic rod 12, constituting the valve stem, extends slidably through a sleeve 13 threaded throughout the major portion of its exterior surface for engagement with the boss 10, there being provided on the upper end of said sleeve a capstan head 14 by means of which the sleeve is moved through said boss to regulate or adjust the tension of the spring 7. A lock nut 15 provided with capstan holes is threaded upon the sleeve 13 and takes against the surface of the boss 10. Fig. 2 clearly shows the cylinder portion 1 cut away on one side to provide an opening communicating with the interior of the casing and through which a suitable capstan pin or wrench may be inserted to adjust said sleeve and its locking nut.

The upper extremity of the bakelite portion 1 of the cylinder is closed except for a central opening through which the valve stem and contact maker may move in an axial direction, the upper surface of this portion being counter sunk to receive the metallic similarly formed switch terminals 16 and 17 particularly illustrated in Fig. 3. Each terminal comprises a semi-annular or semi-circular portion and a radially extending lug, the latter identified in the drawing by the numerals 18 and 19 and opposed substantially diametrically of the cylinder. These lugs are centrally tapped as at 20 to receive and hold an end of an electric conductor not shown, said lugs extending therefore to at least the outer surface of the cylinder, but the semi-annular portions of these terminals have a major diameter substantially less than the outside diameter of the cylinder wherefore said portions are not exposed. Further, these semi-annular portions when in place do not contact each other but their opposing ends are separated by a positive wall 21 of bakelite wherefore no current may jump from one terminal member to the other. The inner arcuate top and bottom edges of each terminal are bevelled to provide a sharp edge 22 in the midplane of both terminals, which edge is adapted to be engaged by a contact maker presently to be described.

There is provided a cover for the switch terminals which is also made of insulating material and which comprises a circular base portion 25 whose under surface is similarly recessed to accommodate said terminals, said cover being secured to the portion 1 of the cylinder in any suitable manner as by the tap bolts 26. It will therefore be understood that the switch terminals are countersunk equally in the two portions 1 and 25 of the cylinder and, if desired, the joint between these two portions may be provided with a moisture proof coating although the portions

are intended to have a finely machined surface where they contact which will ordinarily preclude the admission of such a quantity of moisture as would create a short circuiting of the switch terminals. This cover has a central upwardly extending portion which is externally threaded to receive a cover cap 27 likewise of bakelite, the members 25 and 27 being centrally recessed to accommodate the contact maker.

The valve stem 12 is of a length slightly less than the distance between the valve seat 8 and the upper head 28 of the cylinder, but said stem may be moved by increased steam, air or other gas pressure in the direction of its axis so that the upper end thereof may not only reach the said head but may extend thereinto a slight distance. The upward movement of said stem is stopped when the valve head 5 strikes an internal shoulder 29 formed in the lower portion 2 of the cylinder. Freely slidable within the aligned central passages of the cylinder head and the cover 25 is a bakelite switch pin 30 of generally cylindrical shape, with opposite ends of slightly reduced diameters, and a pair of diametric slots such as 31 cut lengthwise in the enlarged middle portion of the pin, as clearly indicated in Figs. 1 and 3. The lower end of this pin is adapted to normally contact the upper extremity of the valve stem 12.

The upper end of the pin receives on its reduced portion a continuous metallic contact ring 32 having brazed, or otherwise secured thereto, in substantially diametric positions, a pair of downwardly extending metallic springs 33 and 34 each of which is bowed outwardly as indicated to make contact with the sharp edge 22 of the switch terminals, said springs being disposed in the grooves 31 of the switch pin 30. A bakelite cap 35 is threaded upon the extreme upper end of the pin 30 to hold the contact ring firmly in place.

Therefore it will be readily understood that when the parts are positioned as illustrated in Fig. 1, current may flow from the switch terminal 16 through the springs 33, 34 and their connecting ring 32 to the other switch terminal 17 and thereby complete an electric circuit. When a boiler pressure is attained sufficient to move the valve stem 12 against the tension of its spring 7, then the upward movement of said stem will cause axial movement of the switch pin 30 with consequent disengagement of the springs 33 and 34 from the switch terminals, thereby opening the circuit therethrough. This open circuited condition will remain until an operator has removed the cap 27 and pushed the switch pin downwardly again into contact with the reseated valve. In other words, as a result of the opening of the circuit, the boiler pressure will be reduced in any desirable manner, thereby automatically permitting the reseating of the valve 6, and after the pressure has been reduced then the operator will reset the contact maker or pin 30 as just stated. In this connection it will be observed that, by making the cover 25 and the cap 35 of insulating material, no shock will be given the operator during said resetting. Also it will be observed that the central opening of the cover 25 has a diameter substantially equal to the spacing of the sharp edges of the switch terminals, wherefore the springs 33 and 34 will ride smoothly in passing from said edges to the surface of said opening, and the tension of said springs is made sufficient to hold the pin 30 in any position to which it is moved.

It is obvious that the reversal of the foregoing operation falls within the scope of this invention. That is to say, the switch terminals could be positioned higher than illustrated herein, so that the circuit would be closed upon an upward movement of the pin 30, in such a case the closing of the circuit causing a lighting of a lamp, a ringing of a bell, or effecting any other desired signal. Further, this invention contemplates a duplication of the pair of switch terminals, one pair above the other, insulatedly mounted or molded in bakelite for example. In such a construction when the valve stem and switch pin were in the positions shown in Fig. 1 (representative of normal boiler pressure) a circuit would be closed through the lower switch terminals which would be connected in an electric circuit associated with control mechanism permitting full intended operation of the boiler. When the pressure in the boiler exceeded the tension of the spring 7 then the valve stem would be raised causing the switch pin 30 to move upwardly thereby opening the circuit through the lower switch terminals and closing a second circuit through the upper switch terminals, which latter would be connected in another electric circuit which would create a change in the previous boiler control such for example as throwing in a known resistance whereby a lesser amount of electric current would flow through the main control circuit and thereby reduce the full intended operative control of the boiler. The same manual resetting of the switch pin as hereinbefore described would be necessary to recondition this device for normal and intended boiler operation.

It is obvious that those skilled in the art may vary the details of construction and arrangements of parts without departing from the spirit of this invention, and therefore it is not desired to be limited to the foregoing disclosure except as may be required by the claims.

What is claimed is:

1. In an electric switch the combination of a housing having a passage extending inwardly from an outer surface thereof, said housing provided with a pair of terminals extending inwardly thereof to, but separated by, said passage; a member having connected contacts engageable with said terminals for closing a circuit through said terminals, one of said contacts engageable with a wall of said housing for holding said member in open circuit position; and means to move said member from one position to the other, said member manually movable in the opposite direction through the open end of said passage.

2. In an electric switch the combination of a housing provided with a pair of semi-annular separated terminals; a member comprising a pin of insulating material carrying connected contacts movable in the circular space between said terminals and engageable with said terminals for holding said member in circuit-closing position, one of said contacts engageable with a wall of said housing for holding said member in open circuit position; and means to move said member from one position to the other.

3. In an electric switch the combination of a housing of insulating material; a passage extending inwardly from an outer surface of said housing; a pair of metallic terminals carried by said housing and extending inwardly thereof to, but separated by, said passage; a member slidable in said passage and carrying metallic connected contacts engageable with said terminals

for holding said member in circuit-closing position, one of said contacts engageable with a wall of said housing for holding said member in open circuit position; means to move said member from one position to the other; and a cover for the open end of said passage; said cover removable to permit manual movement of said member in the opposite direction.

4. In an electric switch the combination of a housing of insulating material formed with a separable joint; a passage extending inwardly from an outer surface of said housing and intersecting said joint; a pair of metallic terminals carried by said housing and extending inward thereof to, but separated by, said passage, said terminals disposed in the plane of said joint; a member slidable in said passage and carrying metallic connected contacts engageable with said terminals for holding said member in circuit-closing position, one of said contacts engageable with a wall of said housing for holding said member in open circuit position; means to move said member from one position to the other; and a cover for the open end of said passage, said cover removable to permit manual movement of said member in the opposite direction.

5. In an electric switch the combination of a housing of insulating material formed with a separable joint; a passage extending inwardly from an outer surface of said housing and intersecting said joint; a pair of semi-annular metallic terminals carried by said housing and extending inward thereof to, and partially around, said passage, said terminals countersunk in the material of said housing at the joint thereof to make said joint closed; a member slidable in said passage and movable into the circular space between said terminals, said member carrying metallic connected contacts engageable with said terminals for holding said member in circuit-closing position, one of said contacts engageable with a wall of said housing for holding said member in open circuit position; means to move said member from one position to the other; and a cover for the open end of said passage, said cover removable to permit manual movement of said member in the opposite direction.

6. In an electric switch the combination of a housing of insulating material; a passage extending inwardly from an outer surface of said housing; a pair of metallic terminals carried by said housing and extending inward thereof to, but separated by, said passage; a member slidable in said passage and carrying a metallic ring having opposed connected contacts engageable with said terminals for holding said member in circuit-closing position, one of said contacts engageable with a wall of said housing for holding said member in open circuit position, said member having a pin portion with diametrically opposed slotways for receiving said contacts, said member having a threaded reduced end portion forming a seat for said ring and a cap threaded to said end for rigidly holding said ring against said seat; means to move said member from one position to the other; and a cover for the open end of said passage, said cover removable to permit manual movement of said member in the opposite direction.

7. In an electric switch the combination of a housing of insulating material; a passage extending inwardly from an outer surface of said housing; a pair of metallic terminals carried by said housing and extending inward thereof to, but separated by, said passage; a member slidable in said passage and carrying metallic connected contacts engageable with said terminals for closing a circuit through said terminals, one of said contacts engageable with a wall of said housing for holding said member in open circuit position; and means to move said member from one position to the other, said member being manually movable in the opposite drection through the open end of said passage.

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