

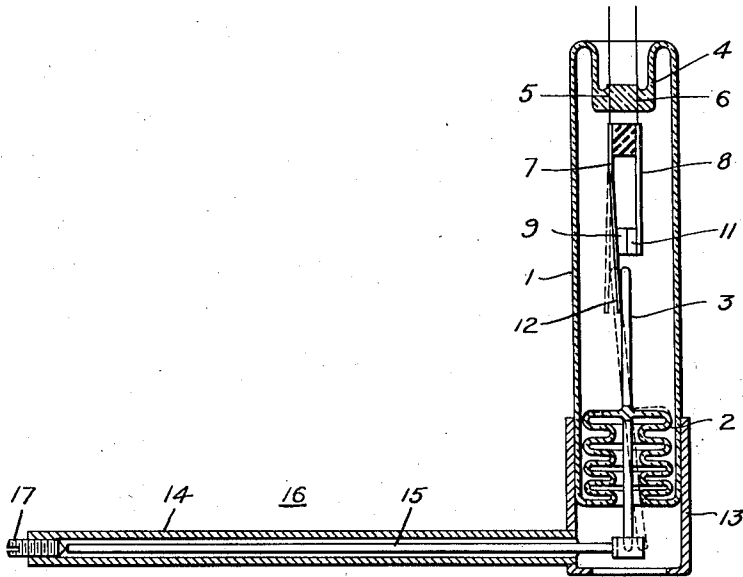
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CIRCUIT BREAKER

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CIRCUIT BREAKER

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Application April 5, 1928, Serial No. 267,685,
and in Germany June 8, 1927

3 Claims. (Cl. 200—137)

Our invention relates to circuit breakers and particularly to circuit breakers of the vacuum type wherein the circuit is interrupted within a vacuum vessel.

5 An object of our invention is to provide a circuit breaker of the vacuum type wherein the circuit-breaker contact elements are actuated through the medium of an operating lever mounted upon a flexible diaphragm, such as a sylphon, that constitutes a closure for the opening in the circuit-breaker casing and through which the operating lever operates.

10 A further object of our invention is to provide a circuit breaker having the above noted characteristics wherein the actuating member is mounted for lateral displacement or for pivotal movement in order to obviate longitudinal expansion of the sylphon, thereby obtaining a maximum operating movement of the circuit-breaker contacts with a minimum displacement of the sylphon or diaphragm.

15 A further object of our invention is to provide a circuit breaker of the vacuum type wherein the circuit-breaker contacts may be actuated by a thermostat mounted exteriorly of the circuit-breaker casing.

20 These and other objects, that will be made apparent throughout the further description of our invention are attained by means of the apparatus hereinafter described and illustrated in the accompanying drawing, wherein:

25 The single figure is a vertical section through a circuit breaker embodying features of our invention.

30 Referring to the drawing,

35 The circuit breaker comprises a casing 1 that may be made of glass or metal, as preferred, the casing of the device illustrated being made of glass of tubular form. The lower end of the casing 1 is closed by means of a glass sylphon 2 that extends interiorly of the casing and supports a circuit-breaker-operating member 3 that is operable from the exterior of the casing and serves to operate a circuit-breaker contact, in a manner to be hereinafter described.

40 The upper end of the tubular casing 1 is closed by a re-entrant diaphragm 4 through which the conductor terminals 5 and 6 extend to the interior of the casing where they are connected to circuit-breaker contact members 7 and 8, the former being flexible and provided with a contact plate 9 which engages a contact plate 11 mounted on the contact member 8.

45 The contact member 7 is provided with an extension 12 that is engaged by the free end of

the operating member 3 and may be moved to the open position, indicated by dotted lines, when the outer end of the operating member 3 is moved laterally, the operating rod 3 pivoting upon the end of the sylphon 2 and displacing it 60 laterally and angularly.

The degree of movement of the walls of the sylphon is relatively slight and not sufficient to exceed the elastic limit of the material of which it is made. By reason of the pivotal movement 65 of the operating member, a relatively wide movement of the circuit-breaker contact may be accomplished with a minimum displacement of the sylphon walls.

70 Heretofore, it has been customary to operate circuit-breaker contacts through the medium of an operating member mounted upon, or extending through, a sylphon, but the movement of the operating member was longitudinal or parallel with the axis of the sylphon, and, consequently, it was necessary to overstretch the sylphon to obtain the necessary separation of the circuit-breaker contacts. By reason of the present construction, a relatively short sylphon may serve to support the circuit-breaker-operating member and provide ample movement of the contact members.

75 It is obvious that the circuit-breaker contacts may be separated any desired distance by a very slight movement of the sylphon walls by proportioning the operating member in such manner that the inner arm thereof is considerably longer than the outer operating arm. A very slight movement of the outer end of the operating member causes a movement of the inner end 80 of the operating member in proportion to the ratio of the lengths of the parts of the operating member on opposite sides of the pivotal point.

85 As illustrated, the circuit-breaker casing is supported upon a metal supporting member 13 which is provided with a tubular extension 14 for containing an expansion bar of a thermostat 16. The position of the bar 15 within the tubular casing 14 is regulated by an adjusting 100 screw 17. Expansion of the bar 15, in response to a rise in temperature of the medium surrounding the thermostat, causes the lower end of the operating member 3 to be moved to the right and the inner end thereof to be moved to 105 the left to open the circuit breaker.

While we have illustrated but one embodiment of our invention, it will be apparent to those skilled in the art that various changes, modifications, substitutions, additions and omissions 110

may be made in the apparatus illustrated without departing from the spirit and scope of our invention, as set forth in the appended claims.

We claim as our invention:

- 5 1. In a circuit interrupter, a hermetically-sealed one-piece glass enclosing casing including a tubular side wall member and a flexible glass end portion re-entrant within said side wall member, a pair of electrical contacts mounted
- 10 within said casing and being surrounded by a vacuum ambient, an operating member laterally movable for actuating one of said contacts into and out of engagement with the other, said operating member extending through said flexible
- 15 glass end portion and being supported thereby, and means for laterally moving the outer end of said operating member so as to cause it to pivot about said end portion due to the flexing thereof and move one of said contacts.
- 20 2. In a circuit interrupter, an enclosing casing entirely of a unitary piece of vitreous insulating material, said casing including a side wall member and a re-entrant end portion extending within said side wall member, said re-entrant portion
- 25 being flexible and having annular corrugations

thereabout, a pair of electrical contact members mounted within said casing in side by side relation and an operating member for laterally moving one of said contact members, said operating member extending through said re-entrant portion and being supported thereby so as to pivot about said re-entrant portion due to the flexing thereof upon lateral movement of the outer end of said operating member.

3. In a circuit interrupter, a hermetically sealed casing including a tubular side wall member and a flexible re-entrant end portion of glass projecting within said tubular side wall for protecting said flexible glass end portion from breakage, a pair of electrical contact members mounted within said casing and being relatively separable in a lateral direction, and an operating member for separating said contact members extending through said flexible re-entrant portion for pivotal movement thereabout upon lateral movement of the outer end of said operating member.

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