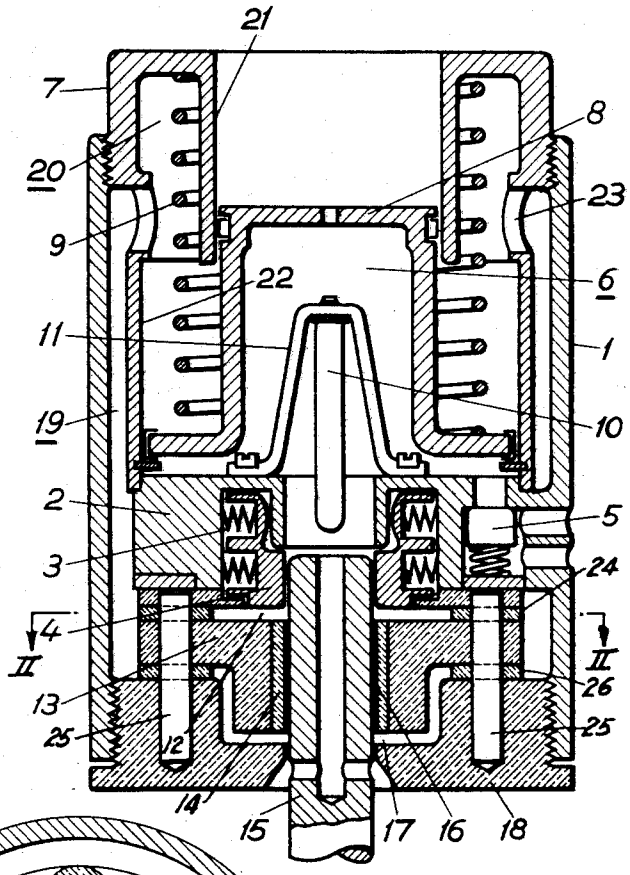
March 17, 1959 H. FORWALD 2,878,345

EXTINGUISHING CHAMBER FOR ELECTRIC CIRCUIT BREAKERS

Filed May 31, 1955

FIG. 1



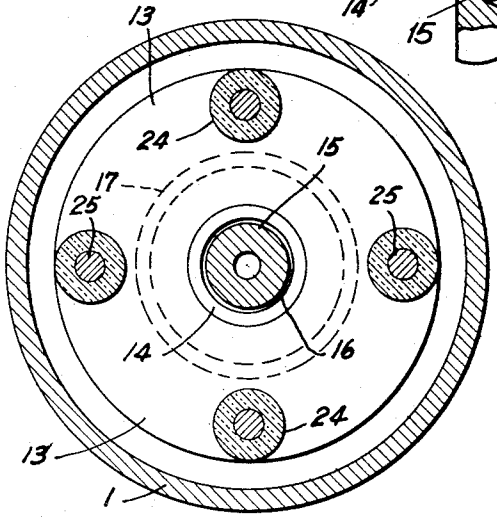


FIG. 2

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EXTINGUISHING CHAMBER FOR ELECTRIC CIRCUIT BREAKERS

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Claims priority, application Sweden February 11, 1955

3 Claims. (Cl. 200—150)

This invention relates to an electric circuit breaker of the type having an annular slot for the delivery of oil under pressure against the arc.

One object of the present invention is to prevent the hot gases generated by the breaking arc from attacking the surfaces of insulating material in the extinguishing chamber of the breaker and from thus reducing the insulating properties of such material by depositing thereon carbon and metal particles, so that such surfaces may act as conductors.

When the insulating surfaces in proximity to the breaking gap have lost their insulating properties by such deposits, the arc may easily be ignited, when the circuit breaker is being closed, or after extinguishing of the arc a reignition may occur along a path that is normally insulated.

The present invention relates more particularly to circuit breakers, in which an oil stream is delivered under pressure against the arc from an annular slot surrounding the arc channel, and the invention is particularly applicable to such circuit breakers of the type in which the oil stream is delivered by means of a differential piston actuated by the pressure of the gases generated by the arc.

Another object of the invention is to provide the oil delivery slot between an end surface of the stationary contact and the opposed end surface of an insulating tubular member arranged in properly spaced relation thereto.

Still another object of the invention is to provide means for conveying oil to both ends of such insulating tubular member, so that the gases developed by the arc are prevented from traversing the surface of the said insulating member, and such surface is thus protected against damage by said gases.

Still another object of the invention is to so construct the device that the extinguishing action takes place immediately after the contacts have been separated and the arc has been formed so that the extinguishing time is considerably reduced.

Other objects and advantages of the invention will appear more fully from the following description, especially when taken in conjunction with the accompanying drawing, which forms a part thereof.

In the drawing, Figure 1 shows the circuit breaker in vertical cross-section and Figure 2 is a horizontal section taken on the line II—II, Figure 1.

In the arrangement shown, a cylindrical casing 1 of metal has a central body part 2 carrying an annular stationary contact 4, which is made in segments and is pressed by the action of springs 3 against the movable contact 15, which extends upwardly through a central aperture in an insulating bottom part 18 in the casing. The central part 2 is also provided with one or more spring loaded valves 5, which limit the pressure in the low pressure space 6 of the extinguishing chamber. Mounted in the upper portion of the cylinder 1 is a member 7 having two concentric cylindrical parts 21, 22 spaced from each other and from the interior of the casing 1, and a differential cup-shaped piston 8 engages the internal surfaces of these two cylindrical parts 21, 22 so that the low pressure chamber 6 is divided from the high pressure chamber 20 and the piston 8 is normally held in its lowermost position by a compression spring 9. The lower end of the outer cylindrical part 22 is seated upon the central part 2, and openings 23 in the part 22 permit the passage of oil between the spaces 19 and 20, and in the central space formed by the cup-shaped piston an arcing contact 10 is supported by means of a bow 11 mounted on the upper surface of the central part 2 of the cylinder.

A sleeve 14 of insulating material is arranged between the bottom part 18 and the stationary contact 4 and is connected with an annular part 13, which is so held between said bottom part 18 and the center part 2 that free passages for oil are provided above and below said parts 13 and 14. An annular clearance space 16 is provided between the sleeve 14 and the movable contact 15 so that extinguishing oil may pass freely therethrough.

For spacing the member 13 in proper relation to the parts 2 and 18, a plurality of washers 24 are spaced from each other and are interposed between the parts 2 and 13 and a like number of similarly spaced washers 26 are interposed between the parts 13 and 18 and all these washers are retained in position by studs or pins 25 that extend through the member 13 and through the said washers 24, 26 and engage suitably arranged sockets in the parts 2 and 18, and the washers thus serve to maintain the parts in proper relative positions so that the dimensions of the oil passages 12 and 17 remain constant.

In operation, the upward movement of the piston 8 due to pressure on its under surfaces, when the arc is formed, causes displacement of oil from the high pressure space 20 through the openings 23 and the annular space 19 to the passages 12 and 17, so that oil under pressure is delivered to the arc in a direction at substantially right angles thereto from the annular space between the contact 4 and the upper extremity of the sleeve 14, and at the same time oil passes through the clearance space 16 between the sleeve 14 and the movable contact 15, so that the surface of the insulating sleeve 14 is protected from damage by the hot gases and the insulating properties of the sleeve 14 are thus preserved. In breaking, the arc is caught by the arcing contact 10 so that the arc is shortened and damage to the stationary contact 4 by burning is avoided.

While one embodiment of the invention has been described herein, it is to be understood that it is not intended as a limitation except within the scope of the claims hereto or hereinafter appended.

I claim as my invention:

1. An electric circuit breaker comprising an oil containing casing, a piston dividing the casing into high and low pressure oil compartments, a stationary contact having a central opening, an insulating sleeve member having a central opening arranged in alignment with the central opening in the stationary contact, a contact movable within the said sleeve member to make and break contact with the stationary contact, and an annular oil passage having its outer extremity in permanent communication with the said high pressure compartment independently of the interior of the sleeve and having its inner extremity closed by the movable contact until the latter is moved out of engagement with the stationary contact, and in which one end surface of the stationary contact and one end surface of the said insulating sleeve member form two opposed annular wall surfaces of the said oil passage.

2. A circuit breaker according to claim 1, compris-

ing an annular clearance space between the interior of said insulating sleeve and the movable contact, and means for directing a flow of oil through said annular space to protect the internal surface of the sleeve from the hot gases from the arc.

3. A circuit breaker according to claim 1, comprising an annular passage for the inward flow of oil to the end of said sleeve remote from the said fixed contact to cause an oil flow through the annular space between the sleeve and the movable contact.

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