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OIL CIRCUIT BREAKER

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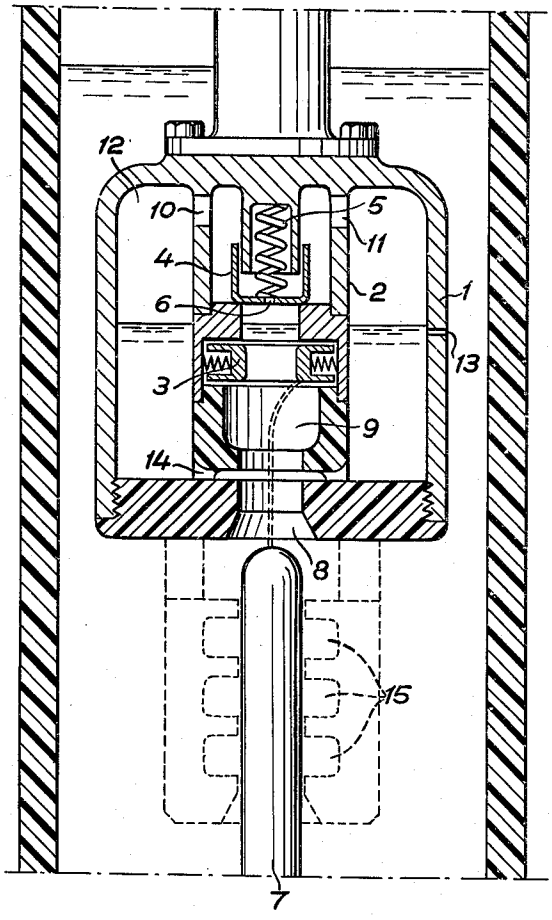

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OIL CIRCUIT BREAKER

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3 Claims. (Cl. 200—150)

The present invention relates to an oil circuit breaker comprising an extinguishing chamber immersed in oil and having a tubular housing projecting downwardly from the upper wall of the extinguishing chamber. The extinguishing chamber is provided with an oil level channel which connects the extinguishing chamber with the surrounding oil. The extinguishing chamber and the housing form above the oil level an annular pressure accumulating chamber. In the housing a stationary nozzle-shaped contact is arranged, to which a movable pin shaped contact can be passed through an opening in the bottom of the extinguishing chamber and a pressure generating chamber in the lower part of the housing. The invention is characterised in that the said pressure generating chamber, when the contacts are disengaged, through the nozzle contact, a back valve and one or a plurality of openings in the wall of the housing communicates with the annular pressure accumulating chamber and that the space between the bottom of the extinguishing chamber and the lower part of the housing forms a slot around the pin-shaped contact, through which slot oil below the annular chamber in the open position of the breaker communicates with the oil outside the extinguishing chamber.

According to the invention the breaking gases are conducted from the breaking gap through the stationary nozzle contact to the annular pressure accumulating chamber, so that the volume of this is held constant and not compressed due to the oil level limiting the annular chamber rising at a breaking action. This latter happens if the gas bubbles which are generated in the oil around the breaking gap are not conducted away from there. As the energy which is accumulated in the gas-filled annular chamber is proportional to the product of volume and pressure it is easily seen that a larger volume at one and the same pressure corresponds to a greater accumulation of energy. Among the advantages of the invention is the fact that the pressure generating chamber during the first part of the breaking action is held fully closed except for the connection through the nozzle contact with the pressure accumulating chamber and further, that this connection is simply shaped and in no way bridges the breaking gap.

To make sure that the pressure generating chamber will not gradually be filled with the breaking gases which after every breaking action remain in it the back valve has been shunted by a narrow channel, through which the breaking gases are conducted away to the pressure accumulating chamber.

To ensure the interruption at small currents and relatively high voltages, the extinguishing chamber below the opening in its bottom can be provided with oil pockets, through which the movable contact is passed.

The single FIGURE illustrates one form of the invention in vertical section.

In the figure, 1 designates an extinguishing chamber

which is immersed in oil. From the upper wall of the extinguishing chamber a tubular housing 2 projects downwardly. In the housing a stationary nozzle contact 3 is arranged which is closed by a back valve 4. The back valve 4 is held closed by a spring 5 and through the back valve a narrow channel 6 is arranged. A movable pin-shaped contact 7 can, through an opening 8 in the bottom of the extinguishing chamber and the lower part of the housing 2, be passed into a pressure generating chamber 9 which through the nozzle contact 3, the back valve 6 and the openings 10 and 11 communicates with the interior of the portion of the housing above the oil level to form an annular pressure accumulating chamber 12. The extinguishing chamber 1 is through an oil level channel 13 connected to the surrounding oil. The space between the bottom of the extinguishing chamber 1 and the lower part of the housing 2 forms an annular slot 14 which is closed by the movable contact 7 when this is passed into the housing 2. The extinguishing chamber 1 can at its lower end be provided with one or a plurality of oil-pockets 15 to ensure the extinguishing of the arc at small currents and high voltages.

At a breaking action gases of a high pressure are generated around the arc, which gases through the nozzle contact 3, the back valve 4 opened by the pressure of the gases and the openings 10 and 11, are conducted directly from the pressure generating chamber 9 to the pressure accumulating chamber 12 above the oil level in the extinguishing chamber 1. The oil level is, however, held on the same level as long as the opening 8 is closed by the movable contact 7. The pressure in the chamber 12 will therefore assume the same value as the pressure of the breaking gases generated by the arc. As soon as the movable contact during the breaking action is drawn out of the opening 8 the gas-pressure in the chamber 9 will rapidly decrease when the current approaches zero. Due to the gas pressure in the chamber 12 the back valve 4 is thereby closed and the oil below the chamber 12 is forced out through the slot 14 against the arc, which thereby is extinguished. As the extinguishing chamber 1 through the channel 13 communicates with the surrounding oil, the oil in the extinguishing chamber after each breaking action will rise to the same level as before the breaking action. The channel 6 in the back valve ensures that the oil in the housing 2 also rises to this level.

I claim:

1. Oil circuit breaker comprising means forming an extinguishing chamber immersed in oil, said chamber having an upper wall, a tubular housing projecting downwardly from said upper wall, an oil level channel which connects the extinguishing chamber with the surrounding oil at a point below the said upper wall so that the extinguishing chamber and a part of said housing in the extinguishing chamber above the oil level form an annular gas-filled pressure accumulating chamber; an opening in the housing at a point above said oil level channel, a stationary nozzle contact in said housing; said extinguishing chamber having a bottom wall and an opening therein, a pressure-generating chamber in the lower part of the housing, a pin-shaped contact movable through such opening in the bottom of the extinguishing chamber and such pressure generating chamber to engage said stationary contact; means including said nozzle contact and said housing opening connecting said pressure generating

chamber, when said contacts are disengaged, with the annular pressure accumulating chamber, a back valve in said connecting means allowing a flow of fluid only in a direction away from said pressure-generating chamber, and a slot around the path of the movable pin-shaped contact, said slot being located between the lower part of the housing and the bottom wall of the extinguishing chamber and communicating with the oil in the lower part of the annular pressure accumulating chamber.

2. In an oil circuit breaker according to claim 1, a narrow channel shunting said back valve.

3. In an oil circuit breaker according to claim 1, the extinguishing chamber being provided below the opening in its bottom wall with at least one oil pocket through which the movable contact is passed.

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