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DAMPING DEVICE FOR OIL CIRCUIT BREAKERS

Filed Dec. 10, 1959

FIG. 1

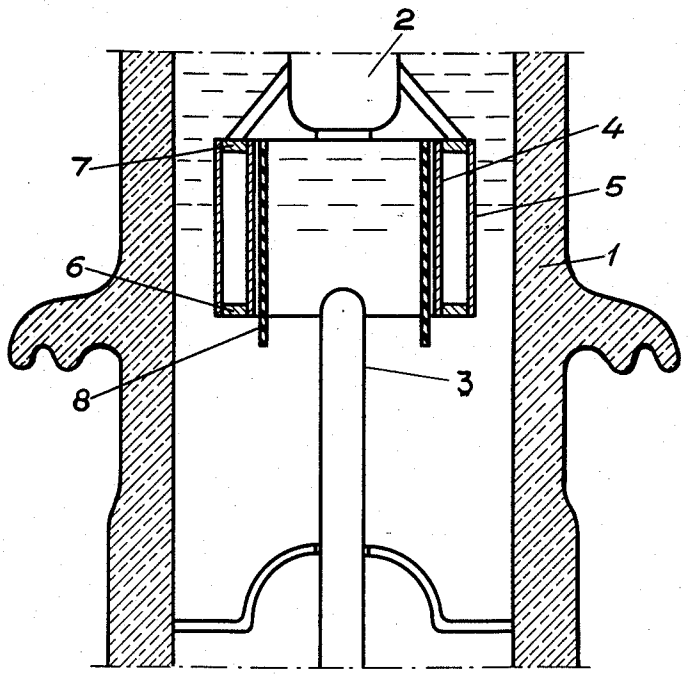
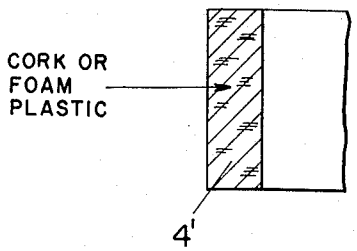


FIG. 2



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DAMPING DEVICE FOR OIL CIRCUIT BREAKERS

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6 Claims. (Cl. 200—150)

To connect and disconnect a battery of series condensers, an oil circuit breaker connected in parallel with the battery of series condensers is generally used, which battery is connected when the circuit breaker is opened and disconnected when it is closed. In both cases the battery of condensers will be discharged by the arc, which is generated during the opening or closing between the contacts of the circuit breaker. From the technical point of view these connections and disconnections are very easy and a special extinguishing chamber is not needed. However, the discharge current will be of a high frequency (order of magnitude 1000 cycles per second) and have a large amplitude, so that if an oil circuit breaker is used, a very heavy pressure blow is generated in the oil. As the oil is not compressible, the pressure blow will propagate with an undiminished force to the walls of the extinguishing chamber, so that these walls may easily be damaged.

In order to prevent the pressure blow causing damage, the present invention relates to a damping device for an oil circuit breaker comprising a main breaking gap in oil. The invention is characterised in that in the oil along the main breaking gap and mainly concentrically around it, a compressible medium is arranged so that the meduim on all sides is surrounded by oil.

Due to this arrangement the pressure blow will to a large extent be dampened in the compressible medium, which may suitably consist of an air cushion. Such an air cushion can be obtained by hermetically enclosing air between two tubes joined at their ends, which tubes have been arranged one inserted in the other, mainly concentrically around the main breaking gap.

The tubes are made of metal and the inner tube is suitably shielded by a tube of elastic insulating material which is longer than the tubes of metal. This is to ensure that the arc which is generated upon a connection or disconnection between the contacts of the breaker will not flash over to the metal tubes.

The compressible medium may also be constituted by a cylinder of cork or foam plastic placed concentrically around the main breaking gap. Thereby the advantage is obtained that an extra insulating cylinder is not necessary, but on the other hand the dampening is not so effective as in the said device comprising an air cushion because some of the air pockets in the cork or the foam plastic may be filled with oil.

In the drawings:

FIG. 1 shows one embodiment of the invention in cross-section; and

FIG. 2 shows in cross-section a part of a cushioning ring of a modification.

The accompanying drawing shows in FIG. 1 an embodiment of the invention in which drawing 1 designates an extinguishing chamber of porcelain filled with oil. 2 designates the stationary contact and 3 the movable pin contact.

Along the breaking gap and concentrically around it a device carried by the stationary contact 2 is arranged

which arrangement consists of concentric tubes 4 and 5, one inserted in the other. The space between these is filled with air and hermetically sealed by the tubes being joined at their ends by the rings 6 and 7. The air cushion, which is constituted by the air enclosed between the tubes 4 and 5 is intended to dampen a possible pressure blow in the extinguishing chamber caused by the discharge of the battery of series condensers through the oil circuit breaker. Further, to prevent a flash over between the tubes 4 and 5 on the one hand, which tubes are suitably made of metal, and the movable contact 3 on the other hand, a tube 8 of elastic insulating material, e.g. rubber, is inserted into the inner tube. This insulating tube is made somewhat longer than the other two tubes in order to increase the flash over gap between the movable contact 3 and the tubes 4 and 5.

FIG. 2 shows a ring 4^1 of cork or foam plastic which can be used in place of rings 4, 5, 6, 7 of FIG. 1.

I claim:

1. In a circuit breaker having a container and, within the container, a stationary contact and a movable contact movable along a path towards and away from the stationary contact, whereby in the portion of said path adjacent the fixed contact an arc is formed as the movable contact is moved away from the stationary contact, a body of oil within the container, said contacts being surrounded by the oil, and a ring composed essentially of compressible material surrounding said portion of the path of the movable contact, said ring being spaced inwardly from the wall of the container and being surrounded by said oil, to absorb shock waves produced in the oil by the arc and to protect the container wall therefrom.

2. In a device as claimed in claim 1, said ring comprising concentric tubes of different diameter, means sealing the ends of the annular space between the tubes, and a gas in said annular space.

3. In a device as claimed in claim 2, said tubes being formed of metal, and a sleeve of insulating material within the inner of the tubes extending beyond at least one end thereof.

4. In a device as claimed in claim 1, said ring comprising a cylinder of cork.

5. In a device as claimed in claim 1, said ring comprising a cylinder of foam plastic.

6. In a circuit breaker having a container and, within the container a stationary contact and a movable contact movable along a path towards and away from the stationary contact, whereby in the portion of said path adjacent the fixed contact an arc is formed as the movable contact is moved away from the stationary contact, a body of oil within the container, said contacts being surrounded by the oil, and compressible means forming a ring surrounding said portion of the path of the movable contact.

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