

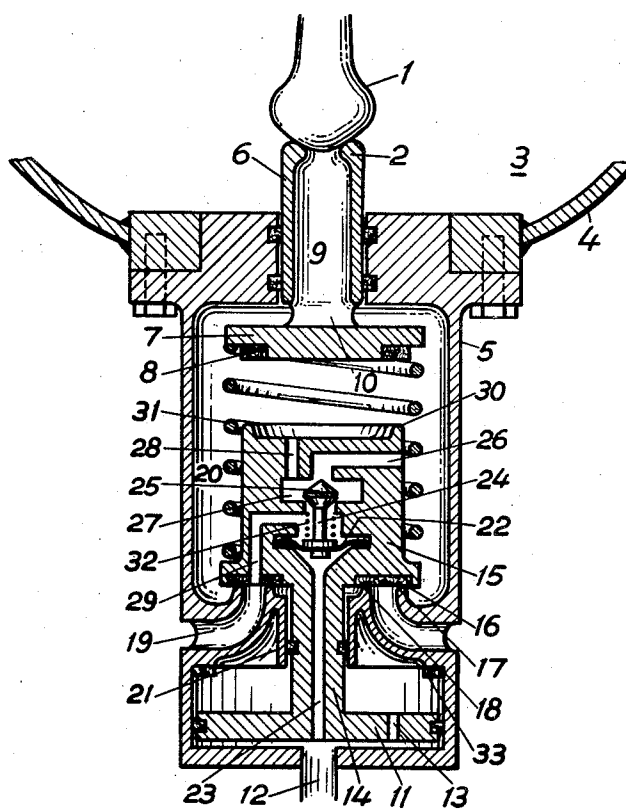
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OPERATING DEVICE FOR AIR BLAST CIRCUIT BREAKERS

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OPERATING DEVICE FOR AIR BLAST CIRCUIT BREAKERS

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The present invention relates to an operating device for air blast circuit breakers wherein the movable contact of the breaker is provided with a disc, which coacts with a member controlled by the operating air in such a way that the said member, when actuated by operating air, opens a communication between an operating space and the open air thus enabling the compressed air in the space, in which the contacts are arranged, to move the movable contact in the direction against the open position, the said disc being pneumatically coupled with said operating member, so that the movable contact is moved into the open position and retained in this position. By the invention the advantage is gained that the opening motion of the circuit breaker can be performed by a very limited amount of compressed air and the movable contact can be retained in the open position without any further consumption of operating air. According to the invention, the movable contact at the beginning of the opening motion is separated from the operating member, and during the opening of the circuit breaker moves in an opposite direction to the said operating member, which has the advantage that the contacts of the circuit breaker during the opening motion are retained for a moment at a distance from each other most suitable for the extinction action.

The invention will be readily understood with reference to the accompanying drawing which shows one form of the device in vertical section. On the drawing, 1 designates the stationary contact of the circuit breaker and 2 the movable contact, which two contacts are enclosed in a compressed air container 3, which is limited by the wall 4 partly shown on the drawing. In the wall 4 of the compressed air container the gear housing 5 is inserted. The movable contact 2 is provided with a hollow stem 6, at the lower end of which a disc 7 is attached, which on the lower side is provided with a packing 8. The channel 9 in the stem 6 is by openings 10 in communication with a space inside the gear housing 5. In the lower part of the gear housing 5 there is a piston 11, and below this piston in the wall of the gear housing the operating pipe line 12 ends. In the piston 11 there is a channel 13, which has for its purpose to allow the operating air to flow up to the upper side of the piston 11, so that the return of the piston 11 into the lower position is attained after a time interval, which is determined by the cross-section of the channel. The piston 11 is by means of the stem 14 joined with a valve member 15, which on the lower side is provided with an annular shaped packing 16, which in the lower position of the valve member is tightly forced against the annular edges 17 and 18 of the gear housing. Between these edges there are one or more channels 19, by which the space 20 in the gear housing is brought into communication with the open air, when the valve member 15 is in its upper position.

The stem 14, which slides tightly in a sleeve 21 in the gear housing itself, is penetrated by a channel 23, which extends to a membrane 22, on which a pilot valve stem 24

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carrying a valve cone 25 is attached, which cone, when in the upper position, closes a channel 26 in the valve member 15 between the space 20 and the space 27. From the space 27 a channel 28 runs to the space 20. Further there is a channel 29, by which the space above the membrane 22 is in communication with the open air. The valve member 15 is provided with a tightening edge 30, which is forced against the packing 8 of the valve disc 7. The movable contact is normally held in the upper position by a helical spring 31 acting against the valve member 15. The cone 25, which closes the channel 26 when compressed air is delivered to the pipe line 12, is moved to the lower position by means of a helical spring 32, when the pipe line is evacuated.

The arrangement acts in the following way: When the circuit breaker is to be opened, compressed air is delivered to the pipe line 12, which compressed air acts on the lower side of the piston 11 and moves it upwards, so that the packing 16 leaves the tightening edges 17 and 18. By this the space 20 in the gear housing is evacuated through the channels 19, and when the pressure in the space 20 is lowered, the compressed air in the container 3 will act on the movable contact 2 and move it downwards, until the packing 8 is forced against the tightening edge 30. After some time, however, compressed air from the lower side of the piston 11 will stream up to the upper side of the piston through the channel 13, and when the pressure in this space above the piston 11 has risen sufficiently, the pressure in the container 3 will be able to move the valve member 15 with the piston 11 and the movable contact 2 and disc 7 to the lower position, until the packing 16 again is forced against the tightening edges 17 and 18. In the cylinder in the gear housing, in which the piston 11 moves, there is a shoulder 33, by which the upward motion of the piston 11 is limited and thus also the first part of the motion of the movable contact 2. As long as there is compressed air in the pipe line 12, the movable contact 2 will be in the lower position, because it is retained in this position by the disc 7 on the valve member 15. This is due to the fact that inside the tightening edge 30 there is a space, which, through the channel 28, the channel 29 and the channels 19 is in communication with the open air, whereas the upper side of the disc 7 is exposed to the pressure prevailing in the compressed air container 3. This pressure predominates over the force from the spring 31 and will retain the contact in its lower position.

When closing the circuit breaker, the pipe line 12 is evacuated and the membrane 22 lowered, so that the valve cone 25 allows compressed air from the space 20 through the channel 26 and the channel 28 to pass to the space inside the tightening edge 30.

As the pressure on the lower side of the disc is then equal to the air pressure on the upper side of the disc, said disc will be liberated from the valve member 15 and moved upwards by the spring 31, so that the movable contact is brought in contact with the stationary contact 1.

I claim as my invention:

1. An operating device for an air blast circuit breaker, comprising stationary and movable contacts enclosed in a container permanently filled with compressed air, a housing forming an auxiliary space in communication with said container through a channel in said movable contact, a disc member located in said auxiliary space and connected with the movable contact, an air blast valve having a piston operated valve member in said auxiliary space, said valve member having a channel extending from said auxiliary space to the open air, a confined space formed by said valve member and said disc member when said members are in contact with each other, a membrane operated pilot valve in said channel for alternat-

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ingly connecting said confined space with said auxiliary space and with the open air, and a spring in said auxiliary space acting on the movable contact to move it in the contact closing direction.

2. An operating device according to claim 1, in which the said membrane for the operation of the pilot valve is in communication with the operating air supply by means of a passage extending through the said valve operating piston.

3. An operating device according to claim 1, in which the said spring is in compression between the said disc

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member and the said air blast valve in said auxiliary space and returns the movable contact to the closed position when air pressure is admitted to the confined air space between the disc member and the blast valve.

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