The present invention relates to gas-blast electric circuit interrupters for interrupting direct current at high voltages, of the order of 50 kv, for instance, and aims at providing an enhanced interrupting effect by means diverting the arc at right angles to the path it would follow without being influenced by the said means.

Accordingly the present invention resides in a switch for interrupting direct current circuits comprising a means for separating two main contacts from one another, and a diverting means to divert the arc at right angles from its natural path which would follow without the action of the diverting means.

In a preferred embodiment the diverted arc path is helical.

More details will become apparent and the invention will be more readily understood from the following description referring to the accompanying drawing, in which:

FIG. 1 is a side view of a switch embodying the invention; and

FIG. 2 is a partly sectional side view of the same switch, which will also serve to illustrate more clearly successive steps of arc diversion.

Referring to the drawing the switch comprises a fixed contact 1, a contact 2 movable to be disengaged from contact 1 for switch opening, and a fixed diverting contact 3 which is electrically connected to the contact 2 through a path 41 which includes an auxiliary or isolator switch 4. Two terminals 5, 6 are provided for connection of contacts 1, 3 to a D.C. circuit. When contact 2 is disengaged from contact 1 an arc is drawn whose axis comprises a more or less straight line between the contacts. A nozzle 7 is arranged to produce an insulating jet, comprising air for instance, directed towards the contact 3. This jet draws out the arc, first to a bight 8 and then along the path 10 to the contact 3, which has been previously connected to the contact 2 under no load. Now jet 7 can be discontinued and the switch 4 again under no load can be disconnected. Additional nozzle openings 11 are situated between the contact gap 1, 2 and the contact 3 to blow jets radially inwards towards an imaginary centre line, these jets being angularly spaced from one another along at least one complete 360° turn of a helix. Thus the arc is forced into a helical path, One end of the arc now roots on contact 3 and the other end roots on contact 2 or 1. In the present embodiment a helical duct 11 of electrically insulating material extends around the space between the contacts 1 and 3, and has holes forming nozzles 12 facing inwardly, to produce jets which are directed radially into the space between the auxiliary contact 3 and the contact pair 1, 2. A helical diaphragm 13 of electrically insulating material supports the duct 11 and is itself held by axial supports or spacers 14 between the convolutions of the diaphragm 13.

Insulating fluid for the jets is fed through tubes 15. Preferably each turn or convolution of the duct is fed by at least one tube 15. The outer ends of the tubes 15 connect with a common air supply pipe 16, in this case.

The jets from the nozzles 12 change the shape of the arc from the bight 10 to a helical or zigzag configuration as illustrated at 17. Thus the length of the arc path is further increased to extinguish the arc and effectively interrupt a high voltage D.C. circuit.

The arc shown diagrammatically and by way of example within the space bordered by the duct 11, may be further diverted towards the supporting structure 14 or even beyond, and metallic parts or earthed members are omitted within the expected range of arc diversion.

Modifications are possible without departing from the invention as defined by the appended claims. Two or more arrangements as shown by way of example can be connected in series or parallel or in series-parallel as required to meet individual voltage and current conditions. When two series switches are connected back to back the auxiliary fixed arc diverting contacts 3 and auxiliary switches 4 can be dispensed with, as the arcs are now blown towards each other to be joined together, by the jets from nozzles 7 of the two switches. In such an arrangement the arc is drawn between the fixed contacts 1 of the switches and is lengthened by the radial jets without the intermediary action of the switches 4 while the axial jets from nozzle 7 operate.

What I claim is:

1. A gas-blast electric circuit interrupter comprising two contacts movable in relation to each other to form a gap, a third contact, said third contact being arranged at one side of an imaginary straight line extending from one of said two contacts to the other, a gas jet exit opening situated at the other side of the said line in the gap, a plurality of additional gas jet exit openings situated between said gap and said third contact, the additional jets being directed towards an imaginary straight line extending from the third contact to said first exit opening, and being angularly spaced from one another along at least one complete 360° turn of a helix.

2. An interrupter as claimed in claim 1 wherein the gas of the gas jets is electrically insulating.

3. An interrupter as claimed in claim 1 wherein the jet gas is air.

4. An interrupter as claimed in claim 1 wherein the plurality of additional gas jet exit openings are in a wall of a helical duct made of an electrically insulating material.

5. An interrupter as claimed in claim 1 including an auxiliary switch, said switch being connected between said third contact and one of the said two relatively movable contacts.

6. A circuit interrupter as claimed in claim 4 wherein a helical diaphragm is provided to support at its inner edge the helical duct.

7. A circuit interrupter as claimed in claim 6, wherein in spacers of insulating material are provided between the convolutions of the diaphragm and near the outer edge thereof.

8. A circuit interrupter as claimed in claim 4, wherein a plurality of feed pipes are arranged to connect discrete points of the helical duct with a common system supplying the insulating fluid.

9. A circuit interrupter as claimed in claim 8, wherein a tube is provided to connect individually each convolution of the helical duct to the supply system.

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