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A. C. SCHWAGER ET AL
ARC FREE MULTIPLE BREAK CIRCUIT INTERRUPTING
AND ISOLATING MEANS

2,859,309

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2 Sheets-Sheet 1

Fig. 1.

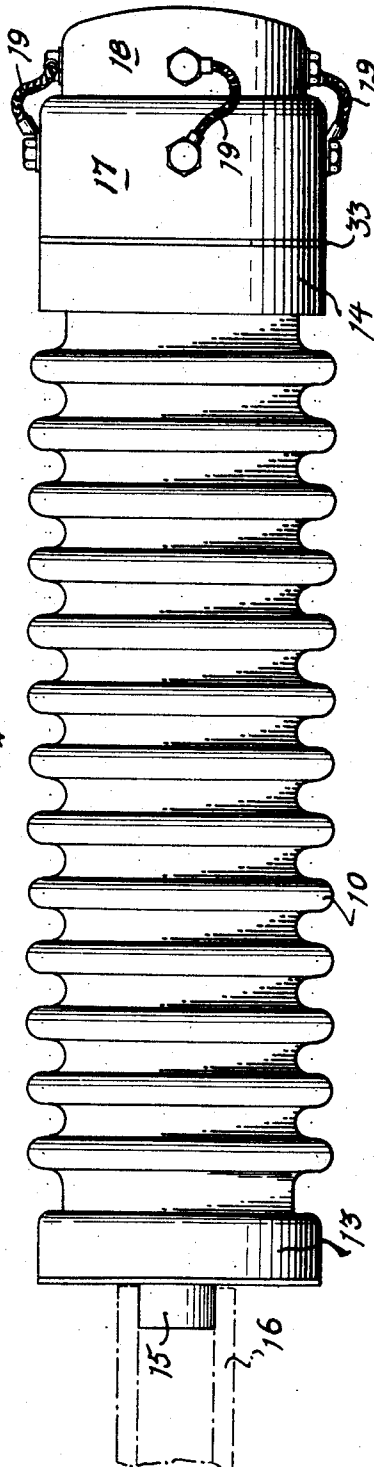
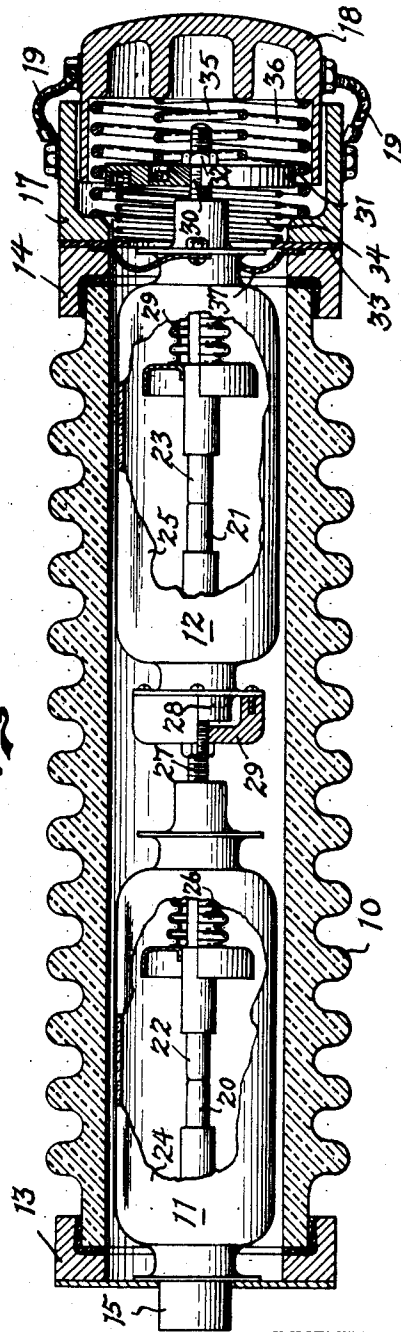


Fig. 2.



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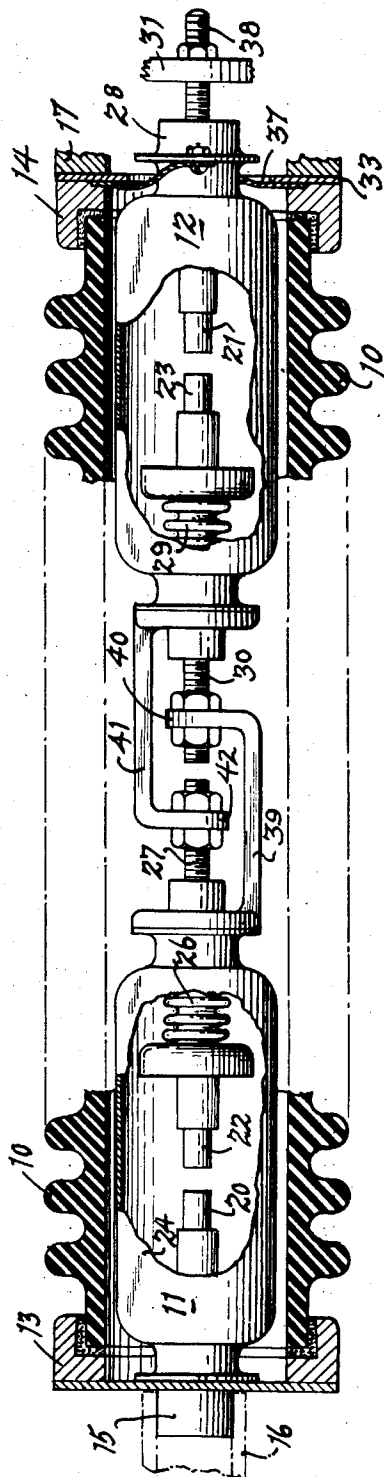
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Fig. 3.



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ARC FREE MULTIPLE BREAK CIRCUIT INTERRUPTING AND ISOLATING MEANS

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Application December 4, 1956, Serial No. 626,122

12 Claims. (Cl. 200—145)

The present invention relates to electrical circuit controlling switches and more particularly to a novel arrangement wherein a plurality of vacuum insulated circuit breakers are connected in series circuit relation with an air break switch blade and operated in response to movements of the switch blade.

An object of the invention is to provide an arrangement in which a plurality of vacuum insulated circuit breaker units may be connected and operated in series circuit in a novel manner in connection with a cooperating air break circuit isolating contact.

Another object of the invention is to provide an arrangement wherein a plurality of vacuum insulated circuit breaker units of limited voltage interrupting capacity may be mounted upon and connected in series circuit relation with an air break switch blade and operated simultaneously in response to the circuit controlling movements of said switch blade.

A further object of the invention is to provide a means by which a plurality of vacuum insulated circuit breakers can be mounted in axial alignment upon a switch blade and controlled by a common operating mechanism to substantially simultaneously open and close the contacts of said circuit breaker units as said switch blade is operated to open and close the circuit therethrough.

Another object of the invention is to provide a support for mounting a plurality of vacuum insulated circuit breakers at the outer end of and in series circuit relation with a circuit isolating switch blade with an exposed air break contact at the outer end thereof and operating to close the contacts of said circuit breaker units when said exposed air break contact is brought into engagement with a circuit completing terminal by said switch blade.

A further object of the invention is to provide an arrangement by which two or more vacuum insulated circuit breaker units may be mounted upon and used in connection with an air break circuit isolating switch blade in the manner disclosed and claimed in my co-pending application Serial Number 610,933 filed September 20, 1956, and entitled, "High Voltage Circuit Interrupting and Isolating Apparatus" and co-pending application Serial Number 615,837 filed October 15, 1956, and entitled, "Circuit Interrupting and Isolating Means for High Voltage Circuits."

Other objects and advantages will be in part evident to those skilled in the art and in part pointed out hereinafter in connection with the accompanying drawing, wherein there is shown by way of illustration and not of limitation a preferred embodiment of the invention.

In the drawing wherein like numerals refer to like parts:

Figure 1 is an external view of an embodiment of the invention,

Figure 2 is a sectional view taken along the longitudinal center line of a unit such as is shown in Figure 1 of the drawing, and

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Figure 3 is a view similar to Figure 2 showing a modified form of the invention.

As has been pointed out in the above identified co-pending applications for patent, the production of a practical vacuum insulated circuit breaker unit such as is here contemplated involves a number of difficulties which render it impractical and difficult to construct a vacuum insulated circuit breaker unit having an unlimited voltage interrupting and current carrying capacity. Therefore, up to the present time, as a practical compromise these vacuum insulated circuit breaker units have been limited to a voltage interrupting capacity in the neighborhood of 30,000 volts with a current rating in the neighborhood of 2500 amps. With such a circuit breaker unit, it has been found that a contact separation of approximately $\frac{5}{16}$ of an inch is capable of interrupting a 30,000 volt circuit. There are many situations where a voltage in excess of the above value is met with while at the same time the current value involved is not in excess of the current carrying capacity of the individual circuit breaker unit. Therefore, with this in mind, we are disclosing an arrangement wherein a plurality of vacuum insulated circuit breaker units of corresponding voltage interrupting and current carrying capacities are mounted in tandem within a novel support to provide an arc free interruption of the circuit in series circuit relation with a movable or pivotally mounted air break switch blade.

For a more detailed description of the invention, reference is now had to the accompanying drawings wherein the numeral 10 designates a hollow cylindrical insulating member of porcelain or the like within which there is supported two vacuum insulated circuit breaker units 11 and 12. As shown the hollow cylindrical insulating member 10 has a metallic closure caps or terminal forming members 13 and 14 at its opposite ends that are firmly secured thereupon by a suitable cement. The closure cap 13 is here shown as a support for the vacuum insulated circuit breaker unit 11 that has an extending end or current conducting terminal 15 which, as illustrated by dot and dash lines in Figure 1 of the drawing, may be inserted and secured in the open end of a tubular air break switch blade 16. At the other end of the cylindrical insulating member 10, the cap 14 is shown as supporting an open cylindrical sleeve 17 within which there is movably mounted an air break contact 18 which, as will be hereinafter pointed out, serves to complete a circuit from the switch blade 16 through the vacuum insulated circuit breaker units 11 and 12 to a cooperating stationary line terminal contact when the switch blade 16 is moved into its circuit closed position. In order to provide a good current conducting path between the movably mounted contact 18 and the cylindrical sleeve 17, there is a plurality of flexible current conducting jumpers 19 through which the line current will flow directly to the terminal forming closure cap 14.

With particular reference to Figure 2 of the drawing, it will be seen that the vacuum insulated circuit breaker units 11 and 12 respectively have stationary contacts 20 and 21 and cooperating contacts 22 and 23, that are enclosed within evacuated envelopes 24 and 25. In this arrangement, the vacuum insulated circuit breaker unit 11 is shown as supported within the hollow cylindrical member 10 by the extending terminal contact 15 with which its stationary contact 20 is connected. At the other end of the unit 11, the evacuated envelope 24 supports a movable contact 22, that is sealed in the end thereof by a Sylphon bellows seal 26 through which there extends an operating rod 27 for the movable contact 22. In alignment with the vacuum insulated circuit breaker 11, the vacuum insulated unit 12 is shown as

having a current conducting terminal 28 upon which there is mounted a yoke 29 that is threaded upon the operating rod 27 of the vacuum insulated circuit breaker unit 11. In this manner, the evacuated envelope 25 is held in axial alignment with the evacuated envelope 24 of the circuit breaker unit 11. Extending into one end of the evacuated envelope 25 from the terminal contact 28, there is the stationary contact 21 and at its other end there is the cooperating movable contact 23 which is similarly sealed by a Sylphon bellows 29 through which an operating rod 30 extends.

As a means for connecting the movable air break contact 18 in operative relation with the circuit breaker units 11 and 12, the operating rod 30 is shown as having a spring seating disc 31 which is positioned and secured thereupon by a lock nut 32. Interposed between a current conducting member 33 and the spring seating disc 31, there is a helical compression spring 34 that operates to normally overcome the effect of atmospheric pressure due to the vacuum within the envelopes 24 and 25 and also bias the movable contact 23 and the vacuum insulated circuit breaker unit 12 together with the movable contact 22 of the vacuum insulated circuit breaker 11 into an open circuit position. At the other side of the spring seating disc 31, there is a helical force transmitting spring 35 through which a relatively light contact pressure and operating force is exerted by the movable contact 18 to close the contacts of the vacuum insulated circuit breaker units 11 and 12. To provide for a considerably higher contact pressure between the air break contact 18 when in engagement with the cooperating stationary contact, there is an additional relatively heavier compression spring 36. A low resistance conductive path between the movable contact carrying terminal of the vacuum insulated circuit breaker unit 11 and the movable air break contact 18 is provided for by a plurality of flexible jumpers 37 that are connected at their outer ends to the terminal cap 14 upon the supporting housing 10 and at their inner ends these jumpers 37 are connected to the movable contact supporting terminal of the vacuum insulated circuit breaker unit 12.

With this embodiment of the invention, it will be seen that when the movable air break contact 18 is brought into engagement with a relatively stationary cooperating contact by a circuit closing movement of the air break switch blade 16, the contact 18 will be forced inwardly to the left as here viewed and by virtue of the relatively heavier compression spring 36, a high contact pressure will be first established between the cooperating air break circuit interrupting surfaces. During this period, the relatively lighter compression spring 35 will also become compressed and exert a lesser force upon the spring seating disc 31 that will overcome the bias of the spring 34 and operate the movable contact 23 of the circuit breaker unit 12 into engagement with its cooperating stationary contact 21. Subsequently due to the engagement of the contacts 21 and 23 of the unit 12, a further force will be exerted that will move the circuit breaker unit 12 as a whole and impart a circuit closing movement through the operating rod 27 of the circuit breaker unit 11 and close the circuit through the contacts 20 and 22 thereof. At the same time, the evacuated envelopes 24 and 25, here shown as of glass, will not be subjected to any contact pressure exerting force.

In the above described arrangement, it will be noted that the cooperating contacts 21 and 23 of the vacuum insulated unit 12 will become completely separated before a circuit opening movement can be imparted to the movable contact operating rod 27 of the circuit breaker 11. This is due to the fact that atmospheric pressure will tend to hold the contact 22 of the circuit breaker 11 into engagement with its cooperating stationary contact 20 until an operating force is exerted upon the operating rod 27 by movement of the circuit breaker 12 as a whole. For maximum circuit interrupting efficiency,

it is desirable to have both of the circuit breaker units 11 and 12 contribute substantially simultaneously to the interruption. Therefore, in order to keep the time lag between the circuit opening movements of the movable contact 23 of the circuit breaker unit 12 and the movable contact 22 of the circuit breaker 11 in this sequential opening of the circuit at a minimum the movable contact biasing spring 34 is of a character which will exert a substantial force when the contact pressure upon the air break contact 18 is released. With proper design of the spring 34, we have found it possible to obtain a complete circuit opening movement of the movable contacts 22 and 23 of the circuit breaker units 11 and 12 within approximately $\frac{1}{10}$ of a cycle on a 60 cycle circuit. This value has been found to provide excellent performance under operating conditions.

In Figure 3 of the drawings, as distinguished from the above described arrangement, we have with only a minor change in the circuit breaker unit 12, provided for an absolutely simultaneous opening of the circuits formed by the cooperating contacts of both of these vacuum insulated circuit breaker units. This minor change resides in the provision of an operating rod 38 which extends outwardly at the stationary contact end of the vacuum insulated circuit breaker unit 12. With this change, the circuit breaker unit 12 is turned about end for end within the supporting cylindrical insulating member 10 so that its operating rod 30 will extend toward and terminate in spaced axial alignment with the operating rod 27 of the vacuum insulated circuit breaker unit 11.

In this figure of the drawing as distinguished from Figure 2, the cooperating contacts of the units 11 and 12 are shown in their circuit interrupting positions. As here provided, the movable contact terminal of the circuit breaker unit 11 is shown as supporting a bracket 39 having an over-hanging portion 40 that is adjustably connected to the operating rod 30 for the movable contact 23 of the vacuum insulated unit 12. In like manner, the contact terminal for the movable contact 23 of the vacuum insulated unit 12 carries a similar bracket 41 that has an over-hanging arm 42 which is adjustably connected to the operating rod 27 of the vacuum insulated unit 11. With this arrangement, it will be seen that the movable contact 23 of the unit 12, will remain stationary relative to the insulating supporting member 10. Therefor, as distinguished from the arrangement of Figure 2, the stationary contact 21 of the circuit breaker unit 12 will move with this unit relative to its cooperating contact 23 when a circuit establishing operation is produced by movement of the operating rod 28 through the action of the compression spring 35 upon the spring seating disc 31 as now carried by the operating rod 38.

Stated more briefly, it will be seen that when a circuit closing movement is imparted to the circuit breaker unit 12 through the operating rod 38, the movable contacts 22 and 23 of the circuit breaker units 11 and 12 will move simultaneously at the same rate of movement relative to their cooperating contacts 20 and 23 and thus produce a uniform and simultaneous interruption of the circuit within each of the circuit breaker units 11 and 12. Conversely, a movement of the circuit breaker unit 12 to the right will produce a simultaneous circuit opening operation at a uniform rate and gap in the circuit through the units 11 and 12 as illustrated in this latter figure of the drawings.

While we have, for the sake of clearness and in order to disclose our invention so that the same can be readily understood, described and illustrated a specific form and arrangement, we desire to have it understood that this invention is not limited to the specific form disclosed, but may be embodied in other ways that will suggest themselves to persons skilled in the art. It is believed that this invention is new and all such changes as come within the scope of the appended claims are to be considered as part of this invention.

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Having thus described our invention what we claim and desire to secure by Letters Patent is:

1. In a multiple break vacuum insulated circuit breaker assembly for mounting upon a movable circuit controlling conductor, the combination of an elongated cylindrical terminal spacing insulator, a circuit forming terminal secured upon the opposite ends of said insulator, a first circuit breaker unit comprising an evacuated envelope having a stationary and a movable contact enclosed therein and secured in a fixed position with its stationary contact connected to the circuit forming terminal at one end of said terminal spacing insulator and having an operating means extending into said insulator, a second circuit breaker unit having a similar vacuum insulated stationary and movable contact movably mounted within said terminal spacing insulator its stationary contact connected directly to the extending operating means of said first vacuum insulated circuit breaker unit, a movable circuit completing contact mounted upon the line terminal at the other end of said elongated cylindrical terminal spacing insulator, and means forming an operating and current carrying connection between the circuit completing contacts of said second vacuum insulated circuit breaker unit adapted and arranged to move said second vacuum insulated circuit breaker unit relative to said first vacuum insulated circuit breaker unit, whereby the contacts of each of said circuit breaker units will be brought into circuit establishing contact with each other and complete a circuit through said movable circuit controlling conductor when said movable circuit controlling conductor is brought into engagement with a cooperating line terminal contact.

2. In a multiple break vacuum insulated circuit breaker assembly for operation in series with a circuit isolating switch blade, the combination of a switch blade, an elongated hollow terminal spacing insulator having a fixed circuit terminal at one end for connection with the end of said switch blade and a second fixed circuit terminal at its other end, a vacuum insulated circuit breaker unit comprising an evacuated envelope having a stationary and a movable contact enclosed therein with its stationary contact connected through said first fixed circuit forming terminal to the end of said switch blade and with its movable contact controlled by an operating means that extends into said elongated hollow terminal spacing insulator, a second similar vacuum insulated circuit breaker having its stationary contact connected to the operating means of said first vacuum insulated circuit breaker unit, a movable circuit completing contact mounted upon the fixed circuit terminal at said other end of said elongated hollow terminal spacing insulator, and means forming an electrical and driving connection between said movable circuit completing contact and the extending movable contact operating member of said second vacuum insulated circuit breaker unit adapted and arranged to move said second vacuum insulated circuit breaker unit relative to said first vacuum insulated circuit breaker unit and thus close the contacts of each of said vacuum insulated circuit breaker units when said movable circuit completing contact is brought into engagement with a cooperating line terminal contact by a circuit closing operation of said switch blade.

3. In a multiple break high voltage circuit interrupting device, the combination of a first circuit breaker unit comprising an evacuated cylindrical envelope having an exposed terminal at one end serving as a mounting for said envelope and carrying a stationary contact that extends into said evacuated envelope, a terminal at the other end of said envelope having a vacuum retaining seal, a movable contact connected to said latter terminal having an operating member extending outwardly through said vacuum retaining seal, a second circuit breaker unit comprising an evacuated cylindrical envelope having a similar terminal with stationary contact and a moving

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contact with vacuum retaining seal and an operating member extending in alignment with the operating member of said first circuit breaker unit, characterized by the fact that the stationary contact terminal of said second circuit breaker unit is connected to the operating member for the movable contact of said first circuit breaker unit and mounted for movement relative to said first circuit breaker unit, an exposed circuit completing contact electrically connected with and movably mounted upon the contact carrying terminal of said second circuit breaker unit, and an operating connection between said exposed circuit completing contact and the operating means of said second circuit breaker unit adapted and arranged to close the contacts of said second circuit breaker unit and move said unit relative to said first circuit breaker unit and close the contacts of said first circuit breaker unit and thus complete a circuit through said circuit breaker units in series with said circuit completing contact mounted upon the movable contact carrying terminal of said second circuit breaker unit.

4. In a multiple break high voltage circuit interrupting device, the combination of a first circuit breaker unit comprising an evacuated cylindrical envelope having an exposed terminal at one end serving as a mounting for said envelope and carrying a connected stationary contact that extends into said evacuated envelope, a terminal at the other end of said envelope having a vacuum retaining seal, a movable contact connected to said latter terminal having an operating member extending outwardly through said vacuum retaining seal, a second circuit breaker unit comprising an evacuated cylindrical envelope having a similar terminal with stationary contact and a moving contact with vacuum retaining seal and an operating member extending in alignment with the operating member of said first circuit breaker unit, characterized by the fact that the stationary contact terminal of said second circuit breaker unit is connected to the operating member for the movable contact of said first circuit breaker unit and that said second circuit breaker unit is mounted for movement relative to said first circuit breaker unit, an exposed circuit completing air break contact electrically connected with and movably mounted upon the movable contact carrying terminal of said second circuit breaker unit adapted and arranged when brought into engagement with a cooperating circuit completing contact to first close the contacts of said second circuit breaker unit and move said second unit as a whole relative to said first circuit breaker unit and thus complete a circuit through each of said circuit breaker units in series with the circuit completing air break contact carried by the movable contact carrying terminal of said second circuit breaker unit, and a yielding force transmitting spring means operating between said circuit completing contact and the movable contact operating member of said second circuit breaker unit for establishing a limited contact pressure between the contacts of said first and second circuit breaker units when said exposed circuit completing air break contact is moved into high contact pressure engagement with a cooperating circuit completing line terminal contact.

5. In a multiple break vacuum insulated circuit breaker assembly, the combination of an elongated hollow insulating support, line circuit terminals secured in spaced relation upon the ends of said insulating support, a vacuum insulated circuit breaker unit comprising an evacuated envelope with a stationary and a movable contact enclosed therein and secured in a fixed position within said insulating support with its stationary contact connected to one of the line circuit terminals upon said support, an operating means extending through a wall of said envelope for the movable contact therein, a second vacuum insulated circuit breaker comprising an evacuated envelope movably mounted within said insulating

support also having a stationary and a movable contact enclosed therein, the stationary contact of said second vacuum insulated circuit breaker being connected directly to the operating means of said first vacuum insulated circuit breaker unit and having its movable contact connected to the other of the line circuit terminals upon said insulating support, an air break circuit completing contact connected to said other line circuit terminal and movably mounted upon said insulating support, and means forming an operating and current conducting connection between said air break circuit completing contact and the movable contact operating means of said second vacuum insulated circuit breaker unit adapted and arranged to move said second vacuum insulated circuit breaker unit relative to said first vacuum insulated circuit breaker unit and complete a circuit through the contacts of each of said vacuum insulated circuit breaker units when said air break circuit completing contact is moved into full engagement with a cooperating line terminal contact by pivotal movement of said switch blade.

6. In a multiple break vacuum insulated circuit breaker assembly, the combination of an insulating support, a pair of line circuit terminals secured in spaced relation upon said insulating support, a vacuum insulated circuit breaker unit comprising an evacuated envelope with a stationary and a movable contact enclosed therein and secured in a fixed position upon said support with its stationary contact connected to one of the line circuit terminals upon said support and having an operating means extending from its movable contact, a second vacuum insulated circuit breaker comprising an evacuated envelope movably mounted upon said insulating support also having a stationary and a movable contact enclosed therein with the movable contact operating means of said second circuit breaker unit electrically connected to the movable contact operating means of said first vacuum insulated circuit breaker unit and having its stationary contact connected to the other of the line circuit terminals upon said insulating support, an exposed circuit completing contact connected to said other of the line circuit terminals and movably mounted upon said insulating support, means forming an operating connection between said exposed circuit completing contact and the stationary contact of said second vacuum insulated circuit breaker unit adapted and arranged to move said second vacuum insulated circuit breaker as a unit relative to said first vacuum insulated circuit breaker unit and complete a series circuit through the cooperating contacts of said vacuum insulated circuit breaker units when said exposed circuit completing contact is moved into full engagement with a cooperating line terminal contact.

7. In a multiple break high voltage circuit interrupting device, the combination of a first circuit breaker unit comprising an evacuated cylindrical envelope having an exposed terminal at one end serving as a mounting for said envelope and carrying a stationary contact that extends into said evacuated envelope, a terminal at the other end of said envelope having a vacuum retaining seal, a movable contact connected to said latter terminal having an operating member extending outwardly through said vacuum retaining seal, a second circuit breaker unit comprising an evacuated cylindrical envelope having a similar terminal with stationary contact and a moving contact with vacuum retaining seal and an operating member extending through its seal, characterized by the fact that the extending movable contact operating members of said circuit breaker units are arranged in opposed and spaced alignment with each other, an exposed and movable circuit completing contact mechanically and electrically connected to the stationary contact of said second circuit breaker unit, whereby upon movement of said exposed circuit completing contact said second circuit breaker unit will be moved as a whole relative to said first circuit breaker unit, and a circuit completing

force transmitting connection between the movable contact terminals of each of said circuit breaker units and the operating member of the other of said circuit breaker units, whereby the movable contacts of each of said circuit breaker units will be simultaneously moved relative to its related stationary contact to complete a series circuit through the contacts of said units upon relative movement between said circuit breaker units.

8. In a multiple break high voltage circuit interrupting device, a hollow support of insulating material mounted in co-extending relation upon the end of said switch blade, an air break contact movably mounted upon the outer end of said insulator support for engagement with a cooperating circuit completing terminal contact, the combination of a circuit isolating switch blade, a first circuit breaker unit connected at the end of said switch blade and mounted within said hollow insulating support comprising an evacuated cylindrical envelope having an exposed terminal at one end serving as a mounting for said envelope and carrying a stationary contact that extends into said evacuated envelope, a terminal at the other end of said envelope having a vacuum retaining seal, a movable contact connected to said latter terminal having an operating member extending outwardly through said vacuum retaining seal, a second similar circuit breaker unit also mounted within said hollow insulating support and in co-extending relation with said first circuit breaker unit comprising an evacuated cylindrical envelope having a terminal with stationary contact and a moving contact with vacuum retaining seal and an operating member extending through said seal, and an operating connection between said evacuated envelopes and the movable contacts of said circuit breaker units responsive to the operations of said switch blades, whereby the circuit opening and closing operations of said circuit breaker units will correspond with the circuit opening and closing operations of said switch blade as said air break contact is moved out of and into contact with said circuit completing contact.

9. In a multiple break vacuum insulated circuit breaker assembly for mounting upon and operation in series with a circuit isolating switch blade, the combination of a pivotally mounted switch blade, a terminal supporting insulator having a circuit terminal at one end for connection with the pivotally mounted end of said switch blade and a movable air break contact supporting line terminal at its other end, a first vacuum insulated circuit breaker unit comprising an evacuated envelope having a stationary and a movable contact enclosed therein with an operating means for the movable contact of said unit extending from said envelope, a second similar vacuum insulated circuit breaker unit having a like stationary contact and a movable contact with an extending operating means, a movable circuit completing air break contact mounted upon said line terminal at said other end of said terminal supporting insulator, a stationary line terminal contact with which said air break contact engages to complete a circuit through said switch blade, and means forming an operating connection between the extending movable contact operating means of each of said first and second vacuum insulated circuit breaker units and said movable air break contact, whereby upon a circuit closing operation of said switch blade movement of said air break contact will cause the contacts of said vacuum insulated circuit breaker units to engage and complete a circuit through said switch blade and said vacuum insulated circuit breaker units to said stationary line terminal contact.

10. In a multiple break vacuum insulated circuit breaker assembly for operation in series with a circuit isolating switch blade, the combination of a switch blade, an insulating support having circuit terminals for connection with said switch blade, a first vacuum insulated circuit breaker unit comprising an evacuated envelope having a stationary and a movable contact enclosed therein with an operating means for the movable contact of said unit

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extending from said envelope, a second similar vacuum insulated circuit breaker unit also having an extending operating means, an operating connection between the extending movable contact operating means of said first and second vacuum insulated circuit breaker units, whereby the movable contacts of said circuit breaker units will be moved simultaneously with respect to their cooperating stationary contact when one of said units is moved relative to the other of said units, and means responsive to the operations of said switch blade for imparting relative movement to one of said units.

11. In a multiple break high voltage circuit interrupting device, the combination of a first circuit breaker unit comprising an evacuated cylindrical envelope having an exposed terminal at one end serving as a mounting for said envelope and a stationary contact that extends into said evacuated envelope, a terminal at the other end of said envelope having a vacuum retaining seal, a movable contact connected to said latter terminal having an operating member extending outwardly through said vacuum retaining seal, a second circuit breaker unit comprising an evacuated cylindrical envelope having a similar terminal with stationary contact and a moving contact with vacuum retaining seal and an operating member extending in alignment with the operating member of said first circuit breaker unit, characterized by the fact that the stationary contact terminal of said second circuit breaker unit is connected to the operating member for the movable contact of said first circuit breaker unit and is mounted for movement relative to said first circuit breaker unit, means operating to bias said second circuit breaker unit into a circuit open position with respect to said first circuit breaker unit, an exposed circuit completing air break contact electrically connected to and mounted upon the contact carrying terminal of said second circuit breaker unit, and an operating connection between said exposed circuit completing air break contact and said second circuit breaker unit adapted and arranged to overcome said bias and move said second circuit breaker unit into a circuit closed position relative to said first circuit breaker unit when said air break contact is brought into circuit closed engagement with a cooperating line terminal contact.

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12. In a multiple break high voltage circuit interrupting device, the combination of a pivotally mounted circuit isolating switch blade, a hollow insulating support mounted in co-extending relation at the end of said switch blade, a first circuit breaker unit comprising an evacuated envelope having a stationary contact electrically connected to the end of said switch blade and extending into said hollow insulating support, said first circuit breaker unit having a movable contact within its evacuated envelope with an exposed operating member extending therefrom, a second similar circuit breaker unit disposed within said hollow insulating support and movable in co-axial relation with respect to said first circuit breaker unit, means for biasing said second circuit breaker unit with its evacuated envelope and enclosed contacts into one position with respect to said first circuit breaker unit, an air break contact movably mounted at the outer end of said insulating support for engagement with a cooperating circuit completing terminal contact, and an operating connection between said movably mounted air break contact and said second circuit breaker unit operating to overcome said bias and move said second circuit breaker unit into another position with respect to said first circuit breaker unit, and an operating connection between the movable contact operating member of said first circuit breaker unit and said second circuit breaker unit, whereby the circuit closing and opening operations between the stationary and movable contacts of said circuit breaker units will correspond with the circuit closing and opening operations of said switch blade as said air break contact is moved into and out of engagement with said cooperating stationary circuit completing contact terminal.

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