April 8, 1952 S. I. LINDELL 2,591,950

CIRCUIT INTERRUPTER

Filed Feb. 8, 1949 2 SHEETS—SHEET 1

Fig. 1

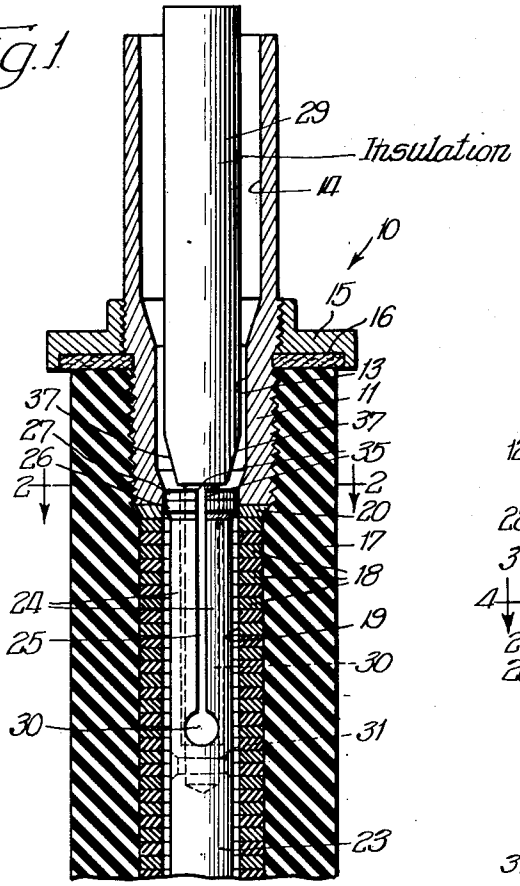


Fig. 3

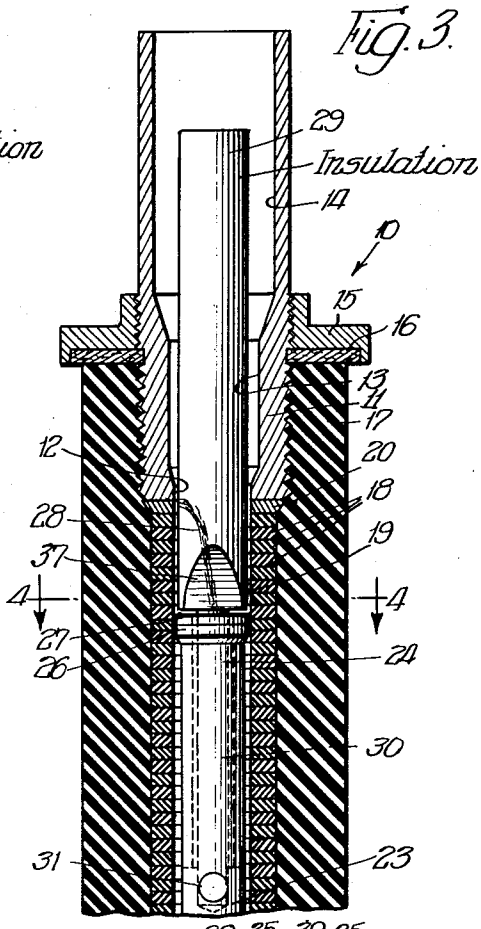


Fig. 4

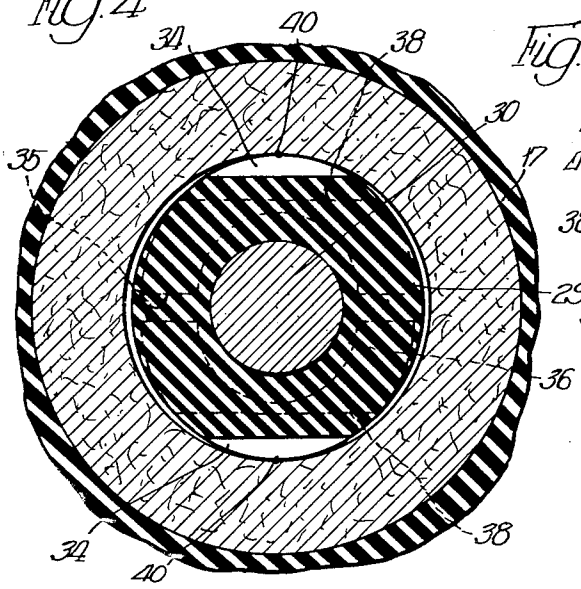
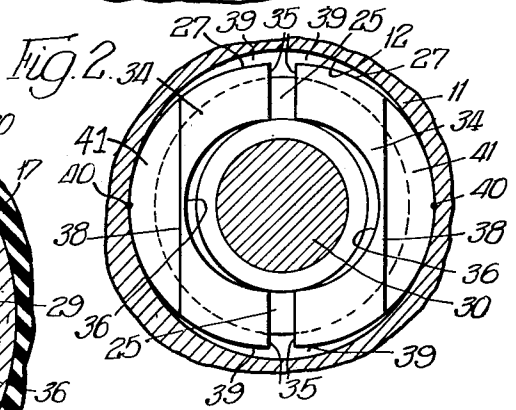


Fig. 2



INVENTOR.
Sigurd I. Lindell,
BY
Robert R. Lockwood
atty.

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CIRCUIT INTERRUPTER

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Fig. 5.

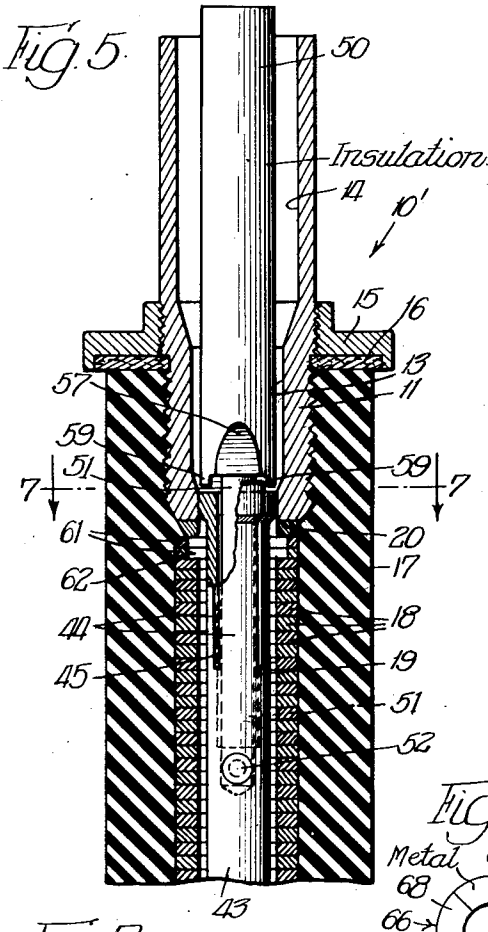


Fig. 6.

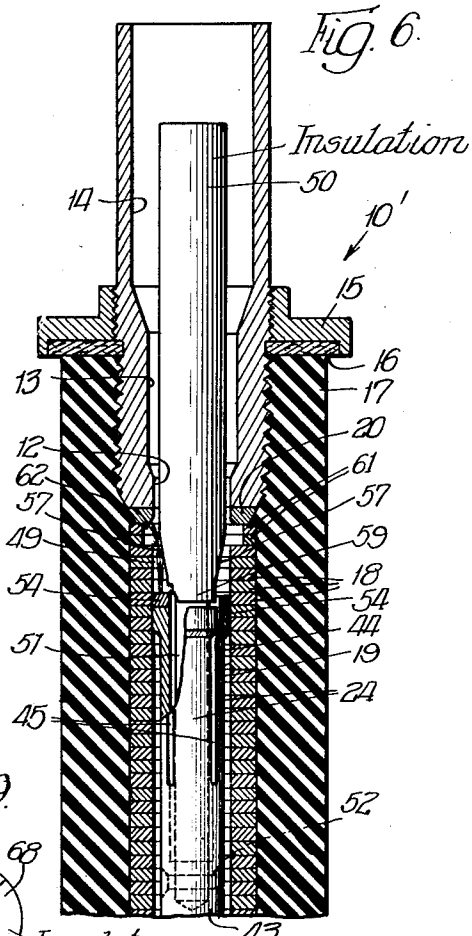


Fig. 9.

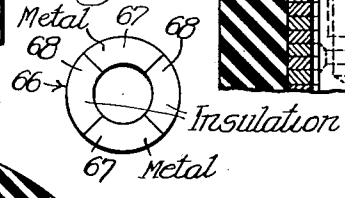


Fig. 7.

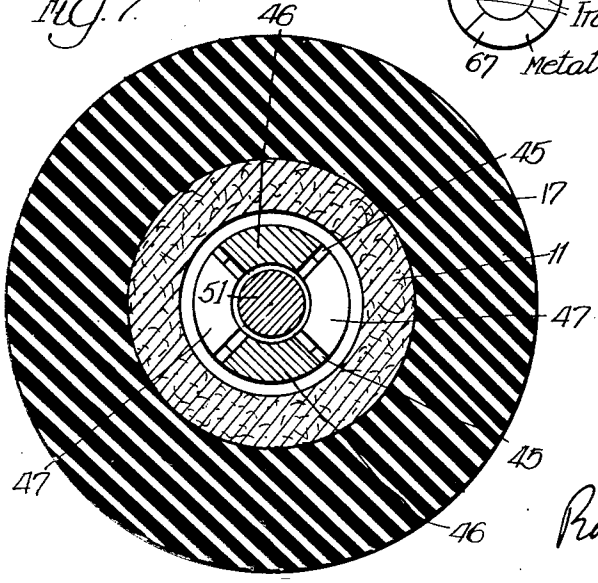
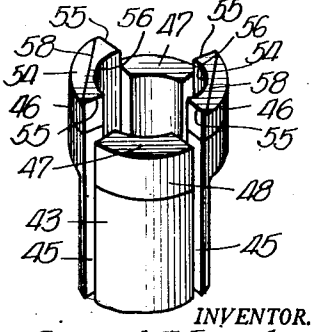


Fig. 8.



INVENTOR.
Sigurd I. Lindell,
BY
Robert R. Lockwood
Atty

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UNITED STATES PATENT OFFICE

2,591,950

CIRCUIT INTERRUPTER

Sigurd I. Lindell, Chicago, Ill., assignor to S & C Electric Company, Chicago, Ill., a corporation of Delaware

Application February 8, 1949, Serial No. 75,254

11 Claims. (Cl. 200—149)

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This invention relates, generally, to circuit interrupters, and it has particular relation to arc extinguishing devices therefor. It can be employed as a separate unit or used in conjunction with switch constructions as shown in Patent No. 2,351,826, issued June 20, 1944, to Lindell et al., and in copending application Serial No. 41,597, filed July 30, 1948, both assigned to the assignee of this application.

These switch constructions employ an interrupter unit for effecting the final break in the circuit in which any arc incident to the opening of the circuit is drawn and extinguished. This interrupter unit comprises a hollow cylindrical stationary contact with which a bifurcated rod-like movable contact cooperates. The rod-like contact is arranged to be drawn into a bore of insulating material, such as fiber, which constitutes a continuation of the inner surface of the stationary contact and a follower of insulating material, such as methyl methacrylate resin, is moved therewith so that the arc is drawn between the contacts and is confined between the bore and the outer surface of the follower. The arc is extinguished by the evolution of arc extinguishing material from these surfaces.

When the interrupter units constructed as disclosed in the foregoing patent and application were required to interrupt higher and higher currents repeatedly, it was found that considerable boiling away of the metal and erosion took place particularly along the edges of the inner end of the bifurcated movable contact adjacent the logitudinal slots thereof. This impeded arc extinction and shortened the useful life of the interrupter unit. Such erosion was caused by heat incident to the arc formed between the contacts intensified and concentrated on these edges by blast action from the arcing zone which tends to move the arc root into a fixed position on these edges. While erosion of the stationary and movable contacts formed of good conducting material, such as brass, can be reduced by providing arcing tips thereon of arc resistant material, such as silver tungsten, it was found that even these tips tend to disintegrate along these edges and particles thereof interfere mechanically with the operation of the movable contact. The silver boils away and the tungsten cranks and peels off.

Accordingly, among the objects of this invention are: To reduce erosion and limit disintegration of the movable contact in circuit interrupter units of the character described above although their use is not limited to auxiliary devices for disconnecting switches but, as indicated, they

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may be used as separate units; to avoid concentration of the arc drawn incident to circuit interruption on the edges of the bifurcated movable contact fingers of such interrupter unit; to confine the root of the arc to a continuous annular end surface of the movable contact away from its edges; to define a space for the arc bounded by said continuous annular end surface, the bore of insulating material into which the movable contact is drawn and the insulating follower; to bevel the insulating follower so as to provide such a space; to initiate the arc at a desired point adjacent said continuous annular end surface and to transfer it immediately thereto and to employ different lengths of contact fingers so that the arc is always drawn or struck between the stationary contact and the longer contact finger leaving the remaining contact fingers for current carrying purposes only.

Other objects of this invention will, in part, be obvious and in part appear hereinafter.

This invention is disclosed in the embodiments thereof shown in the accompanying drawings and it comprises the features of construction, combination of elements and arrangement of parts which will be exemplified in the constructions hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

For a more complete understanding of the nature and scope of this invention, reference can be had to the following detailed description, taken together with the accompanying drawings, in which:

Figure 1 is a longitudinal sectional view of the separable contacts of an interrupter unit of the character disclosed in more detail in the aforesaid patent and application, the contacts being shown in the closed position;

Figure 2 is an enlarged detail sectional view taken along the line 2—2 of Figure 1;

Figure 3 is a view at right angles to that shown in Figure 1 and showing the contacts in the partially opened position with an arc drawn therebetween;

Figure 4 is an enlarged detail sectional view taken along the line 4—4 of Figure 3;

Figure 5 is a view, similar to Figure 1, but showing a modified form of movable contact in which two of the fingers are longer than the other two;

Figure 6 is a view at right angles to that shown in Figure 5 and showing the contacts separated with an arc drawn therebetween;

Figure 7 is an enlarged detail sectional view taken along the line 7—7 of Figure 5;

Figure 8 is a perspective view of the bifurcated movable contact shown in Figures 5 and 6; and

Figure 9 is a top plan view of a modified form of arcing ring which can be employed in conjunction with the stationary contact in the interrupter construction shown in Figures 5 and 6.

Referring now particularly to Figures 1 and 3 of the drawings, it will be observed that the reference character 10 designates a portion of an interrupter unit in which the present invention is embodied. The interrupter unit 10 includes a cylindrical stationary contact 11 that may be formed of good conducting material, such as brass, and which has a bore 12 of minimum diameter that provides a cylindrical contact surface. The bore 12 opens into a bore 13 of larger diameter which facilitates the escape of the products of the arc and this in turn opens into a bore 14 of still larger diameter. The contact 11 has a collar 15 threaded thereon which serves to compress a gasket 16 of cork or like material against the upper end of a sleeve 17 of insulating material, such as melamine resin. Within the sleeve 17 there is a liner in the form of a stack of fiber washers 18 which together provide a bore 19 that constitutes a continuation of the bore 12 of minimum diameter in the cylindrical stationary contact 11. An arcing ring 20 of suitable arc resisting material, such as silver tungsten, is located at the lower end of the stationary contact 11. It is from the arcing ring 20 that the arc incident to the opening of the interrupter unit 11 is drawn. When the interrupter unit 10 is operated to the closed position any arc which may be struck extends from the arcing ring 20.

Cooperating with the stationary contact 11 and movable therethrough is a rod-like movable contact 23. The contact 23 is bifurcated to provide a pair of contact fingers 24 and it is formed of good conducting material, such as brass. The upper end of the movable contact 23 is slotted as indicated at 25 to provide the contact fingers 24 and they have contact sections 26 at their upper ends for making contact engagement with the bore 12 of the stationary contact 11 as indicated when the inerrupter unit 10 is in the closed position as shown in Figure 1. An annular arcing tip 27, of silver tungsten, is provided at the upper end of each of the contact fingers 24 above the contact sections 26 so that any arc which is drawn or struck is formed between the arcing tip 27 and the arcing ring 20, as will be understood readily. The annular arcing tip 27 is slotted to conform to the slot 25 and permit the required degree of resiliency between the contacts 11 and 23.

Any suitable means can be provided for moving the contact 23 relative to the stationary contact 11 through the bore 19 in the stack of fiber washers 18. When the contact 23 is moved away from the stationary contact 11, as shown in Figure 3, and the circuit in which the interrupter unit 10 is connected is carrying load, an arc, indicated at 28, is drawn between the arcing ring 20 and the arcing tip 27 at the upper end of one of the contact fingers 24 at a preferred point which will be described hereinafter. As shown in Figure 3 the arc 28 is confined in the bore 19 by a trailer 29 of insulating material such as methyl methacrylate resin. The trailer 29 is movable with the contact 23 and for this purpose a rod 30 extends therefrom to a suitably recessed space within the movable contact 23 and is held thereto by means of a transverse rivet 31.

As illustrated in Figures 2 and 4, annular end surfaces 34 are provided on the upper ends of the contact fingers 24, these surfaces being provided by the upper sides of the arcing tip 27 on each of the contact fingers 24.

In accordance with the prior constructions the lower end of the trailer 29 was beveled around the lower end and the upper end of the movable contact was cylindrical. While this construction was satisfactory in the lower current ranges, when the interrupter unit of the general construction here disclosed was called upon to interrupt larger and larger currents, it was found that the edges 35 of the arcing tips 27 and the inner edges 36 thereof, Figure 2, became severely eroded on successive operations of the device so that ultimately the arcing tips 27 disintegrated and particles thereof sometimes caused mechanical interference with the movement of the contact 23. In the prior constructions the gas flow through the slots 25 and over the edges 36 caused the arc root in most instances of circuit interruption to concentrate along the edges 35 and 36 with the results just mentioned.

Now in accordance with this invention provision is made for preventing the arc root from moving to the edges 35 and 36 and for confining it to the annular end surfaces 34 of the contact fingers 24. This is accomplished by providing beveled surfaces 37 on opposite sides of the trailer 29 as shown in Figure 1. The projections of the beveled surfaces 37 intersect the annular end surfaces 34 as indicated by the full lines 38 in Figure 2 and broken lines 38 in Figure 4. Thus segmental areas are defined by the intersection of the projection of the beveled surfaces 37 with the annular end surfaces 34. The lower end of the trailer 29 fits fairly closely to the annular end surfaces 34. Preferably a clearance of only .015 inch is provided therebetween. Moreover, the diameter of the trailer 29 is such that it fits fairly closely within the bore 19 while still providing sufficient clearance so that it moves freely therethrough.

The shape of the upper end of the movable contact 23 is important. The slots 25 are cut through the arcing tip 27 and the hollow upper end of the contact 23 to provide the fingers 24. Then these fingers are squeezed together in the space provided by the slots 25 and their upper ends are turned down so that, when they are separated, as shown in Figure 2, a generally oval shape is provided and the portions adjacent the edges 35 are spaced away from the bore 12 as indicated at 39. Since the fingers 24 are sprung far enough apart so that they engage the bore 12 with substantial pressure and since their upper ends are shaped as described, the engagement with the bore 12 takes place along lines 40, Figures 2 and 4, which are shown exaggerated to illustrate more clearly the construction. As a result the arc always is drawn or struck at one or the other of these points 40 since these portions of the movable contact 23 are the last to disengage the stationary contact 11 when the circuit is opened and the first to engage when the circuit is closed. Thus the arc is always drawn or struck at a preferred position which, it will be observed, is centrally located with respect to the segmental areas 41 that are parts of the annular end surface 34 and are defined by the intersection therewith of projections of the beveled surfaces 37.

Because of the provision of the beveled surfaces 37 on the lower end of the trailer 29 and the construction just described, spaces are provided on opposite sides within which the arc 28 may be

drawn. Each of the spaces is bounded by a beveled surface 37, the adjacent segmental area 41 of the annular end surface 34, which constitutes a continuous surface, and the bore 19. The segmental area 41 is referred to as a continuous surface in contrast to the discontinuous annular surface 34 which terminates along edges 35 and 36 that are not bounded by material adapted under the heat of the arc to evolve an arc extinguishing medium when the contact 23 is moving through the bore 19 in the stack of fiber washers 18.

While the arc always is formed at one or the other of the points 40 along the outer rounded edge of the area 41, the root thereof on the movable contact 23 is immediately blown into the area 41 by the gas evolved from the bore 19 due to the heat of the arc. Now as soon as the arc root approaches the boundary of the area 41 defined by the bore 19 and the surface 37 on the trailer 29, it is immediately driven back because of this blast action the effect of which increases as the arc root comes nearer to either of these surfaces. The arc root then plays on the segmental area 41 in the space defined by it, the bore 19 and the surface 37 and is not concentrated at any one spot. Experience shows that disintegration of the arcing tips 27 does not take place when this invention is employed and the device is operated to interrupt currents of the magnitude for which it is designed.

In Figures 5 and 6 of the drawings there is illustrated, generally, at 10' a modified form of interrupter unit. Generally, the stationary portion of the interrupter unit 10' is constructed the same as for the interrupter unit 10 shown in Figures 1 and 3 of the drawings and described hereinbefore. The difference resides principally in the construction of the movable contact 43 which is rod-like in character and which is bifurcated to provide two pairs of contact fingers 44. Like the movable contact 23, the contact 43 is formed of good conducting material, such as brass. The upper hollow end of the movable contact 43 is slotted as indicated at 45 to provide the four contact fingers 44.

In Figure 8 of the drawings the details of construction of the movable contact 43 are shown more clearly. It will be observed that an arcing tip 46 having a rounded upper outer edge is provided on each of the contact fingers of one pair which are located diametrically opposite each other. The other contact fingers, indicated at 47, thus are shorter than the contact fingers having the arcing tips 46 and they have contact surfaces 48 which are arranged to engage the bore 12 in the cylindrical stationary contact 11 for the purpose of carrying the load current. Since they are shorter than the other pair of contact fingers provided with the arcing tips 46, any arc incident to opening or closing of the interrupter unit 10' will always be drawn between the arcing tips 46 and the arcing ring 20 and will not be drawn or struck from the shorter contact fingers 47. When this construction is employed, since the arc ordinarily is not drawn from the shorter contact fingers 47, their contact surfaces 48 are not impaired and, as a result, even after repeated operation of the interrupter 10' accompanied by arcing between the movable and stationary contacts 43 and 11, the current carrying ability of the interrupter as a whole is not impaired.

The arc, which is drawn when the interrupter 10' operates under load, is indicated at 49, Figure 6. It is confined between the bore 19 and the outer surface of a trailer 50 which is formed of insulation like the trailer 29 shown in Figures 1 and 3. A rod 51, secured by a rivet 52 to the movable contact 43, extends into the trailer 50 and causes the same to move conjointly with the movable contact 43.

Referring again to Figure 8, it will be observed that each of the arcing tips 46 has an annular end surface 54 to the end edges 55 and inner edges 56 of which the arc may be drawn or struck, for reasons set forth hereinbefore, unless precautions are taken, as described above, to prevent the arc root from reaching these edges. In order to accomplish this the opposite sides of the lower end of the trailer 50 are beveled as indicated at 57 in such manner that the projections of these beveled surfaces intersect the annular end surfaces 54 of the arcing tips 46 along the lines 58 as indicated in Figure 8. Thus spaces are provided for confining the arc which are defined by the beveled surfaces 57, the segmental end surfaces of the annular end surfaces 54 and the bore 19. The arc is struck in the manner previously described and its root is confined to these segmental surfaces where it is free to play over the entire surface. Thus there is no concentration of the arc at any particular point and erosion and disintegration of the arcing tips 46 are avoided.

It will be noted that the trailer 50 has extensions 59 which extend below the end surfaces 54 toward the upper ends of the shorter contact fingers 47. Thus, a barrier of insulation is provided between these contact fingers and the stationary contact 11 during the operation of the device.

As illustrated in Figures 5 and 6 of the drawings, the upper two fiber rings 61 just below the arcing ring 20 have larger internal diameters than the remaining rings 19 so as to provide an annular space 62. Thus the arc drawn from or struck to the arcing ring 20 is not confined to the rounded lower inner edge but rather is repelled therefrom by the gas blast from the surface of the trailer 50 into the space 62 and plays over the entire lower surface of the arcing ring 20.

In Figure 9 of the drawings, a modified form of arcing ring is shown, generally, at 66. It is intended that the ring 66 may be employed in lieu of the arcing ring 20. The arcing ring 66 is formed of two metal segments 67 and two segments 68 of insulation. The metal segments 67 may be formed of silver tungsten and positioned so as to register with the arcing tips 46. When the arcing ring 66 is employed there is further assurance that the arc will not be drawn or struck from the shorter contact fingers 47.

Since certain further changes can be made in the foregoing constructions and different embodiments of the invention can be made without departing from the spirit and scope thereof, it is intended that all matter shown in the accompanying drawings and described hereinbefore shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In a circuit interrupter, in combination, insulating means providing a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, a first contact at one end of said bore, a second contact having a plurality of contact fingers biased outwardly for engaging said first contact and each

having an arcuate outer end surface, said second contact being movable through said bore to draw an arc over the surface thereof between said first contact and the arcuate outer end surface of one of said contact fingers on separation from said first contact, and a trailer of insulating material from the outer surface of which an arc extinguishing medium is evolved due to the heat of an arc movable with said second contact past said first contact into said bore and substantially filling the same with a slight annular space therebetween whereby said arc is confined between the outer surface of said trailer and said bore, the end of said trailer adjacent said second contact being recessed to provide pockets when said second contact and said trailer are moved into said bore which pockets are enlarged extensions of said annular space, those portions of said end of said trailer between said pockets constituting barriers extending substantially to said arcuate end surfaces and overlying the juxtaposed ends thereof, each pocket being individual to a contact finger and bounded substantially only by said bore, said trailer and that portion of the arcuate outer end surface of a contact finger away from the ends thereof whereby the arc root on said second contact is confined substantially to said arcuate outer end surface and is not permitted to move to an edge thereof between said contact fingers and concentration of the arc root at a corner of a contact finger and consequent disintegration thereof due to arc heat are avoided.

2. In a circuit interrupter, in combination, insulating means providing a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, a first contact at one end of said bore, a second contact rod-like in character having one end bifurcated to provide a pair of contact fingers biased outwardly for engaging said first contact and each having an arcuate outer end surface, said second contact being movable through said bore to draw an arc over the surface thereof between said first contact and the arcuate outer end surface of one of said contact fingers on separation from said first contact, and a trailer of insulating material from the outer surface of which an arc extinguishing medium is evolved due to the heat of an arc movable with said second contact past said first contact into said bore and substantially filling the same with a slight annular space therebetween whereby said arc is confined between the outer surface of said trailer and said bore, the end of said trailer adjacent said second contact being recessed to provide a pair of pockets when said second contact and said trailer are moved into said bore which pockets are enlarged extensions of said annular space, those two portions of said end of said trailer between said pockets constituting barriers extending substantially to said arcuate end surfaces and overlying the juxtaposed ends thereof, each pocket being individual to a contact finger and bounded substantially only by said bore, said trailer and that portion of the arcuate outer end surface of a contact finger away from the ends thereof whereby the arc root on said second contact is confined substantially to said arcuate outer end surface and is not permitted to move to an edge thereof between said contact fingers and concentration of the arc root at a corner of a contact finger and consequent disintegration thereof due to arc heat are avoided.

3. For combination in a circuit interrupter having a first contact with an aperture providing an internal contact surface and insulating means providing a bore constituting an extension of said contact surface; a second contact rod-like in character having one end bifurcated to provide a pair of contact fingers biased outwardly for engaging said contact surface and movable through said bore to draw an arc therein on separation from said first contact, said contact fingers together providing an annular end surface; and a trailer of insulating material movable with said second contact through said aperture into said bore whereby said arc is confined between the outer surface of said trailer and said bore, the end of said trailer adjacent said second contact being beveled on opposite sides so that the projections of the beveled surfaces intersect said annular end surface of said contact fingers to define segmental areas thereon to which the arc root on said second contact is confined thereby preventing it from moving to the inner or end edges of said contact fingers and concentration of the arc at a corner of either contact finger and consequent disintegration thereof due to the arc heat are avoided.

4. For combination in a circuit interrupter having a first contact with an aperture providing an internal contact surface and insulating means providing a bore constituting an extension of said contact surface; a second contact having a plurality of contact fingers biased outwardly for engaging said contact surface and movable through said bore to draw an arc therein on separation from said first contact, at least one of said contact fingers being longer than any other of said contact fingers to disengage last and engage first said first contact when said second contact is moved away from or toward the same whereby the arc always is drawn or struck between said first contact and said longer contact finger, and a trailer of insulating material movable with said second contact through said aperture into said bore whereby said arc is confined between the outer surface of said trailer and said bore.

5. For combination in a circuit interrupter having a first contact with an aperture providing an internal contact surface and insulating means providing a bore constituting an extension of said contact surface; a second contact having a plurality of contact fingers biased outwardly for engaging said contact surface and movable through said bore to draw an arc therein on separation from said first contact, at least one of said contact fingers being longer than any other of said contact fingers to disengage last and engage first said first contact when said second contact is moved away from or toward the same whereby the arc always is drawn or struck between said first contact and said longer contact finger, and a trailer of insulating material movable with said second contact through said aperture into said bore whereby said arc is confined between the outer surface of said trailer and said bore, the end of said trailer adjacent said second contact being recessed adjacent said longer contact finger to provide a space when said second contact is moved into said bore bounded substantially only by it, said trailer and the outer end of said longer contact finger whereby the arc root on said second contact is confined substantially to said outer end surface of said longer contact finger and is not permitted to move to an edge thereof and concentration of the arc at a corner thereof and its

consequent disintegration due to arc heat are avoided.

6. For combination in a circuit interrupter having a first contact with an aperture providing an internal contact surface and insulating means providing a bore constituting an extension of said contact surface; a second contact rod-like in character having one end bifurcated to provide two pairs of contact fingers biased outwardly for engaging said contact surface and movable through said bore to draw an arc therein on separation from said first contact, one pair of contact fingers being longer than the other pair to disengage last and engage first said first contact when said second contact is moved away from or toward the same whereby the arc always is drawn or struck between said first contact and said longer contact fingers, and a trailer of insulating material movable with said second contact through said aperture into said bore whereby said arc is confined between it and the outer surface of said trailer.

7. For combination in a circuit interrupter having a first contact with an aperture providing an internal contact surface and insulating means providing a bore constituting an extension of said contact surface; a second contact rod-like in character having one end bifurcated to provide two pairs of contact fingers biased outwardly for engaging said contact surface and movable through said bore to draw an arc therein on separation from said first contact, one pair of contact fingers being longer than the other pair to disengage last and engage first said first contact when said second contact is moved away from or toward the same whereby the arc always is drawn or struck between said first contact and said longer contact fingers, and a trailer of insulating material movable with said second contact through said aperture into said bore whereby said arc is confined between it and the outer surface of said trailer, the end of said trailer adjacent said second contact being recessed adjacent said longer contact fingers to provide spaces when said second contact is moved into said bore, each space being bounded substantially only by said bore, said trailer and the outer end surface of the contact finger individual thereto whereby the arc root on said longer contact fingers is confined substantially to said outer end surface thereof and is not permitted to move to an edge thereof between said contact fingers and concentration of the arc at a corner of a contact finger and consequent disintegration thereof due to the arc heat are avoided.

8. For combination in a circuit interrupter, a first contact with an aperture providing an internal contact surface, insulating means providing a bore constituting an extension of said contact surface and formed of a material capable of evolving an arc extinguishing medium when subjected to the heat of an arc, a second contact generally rod-like in character having one end bifurcated to provide a pair of contact fingers biased outwardly for engaging said contact surface and movable through said bore to draw an arc therein on separation from said first contact, each contact finger having an arcuate end surface, and a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said second contact through said aperture into said bore whereby said arc is confined between the outer surface of said trailer and said bore, the end of said trailer adjacent said second contact being beveled on opposite sides so that the projections of the beveled surfaces intersect said arcuate end surfaces of said contact fingers to define segmental areas thereon whereby the arc root on said second contact is repelled from said bore and a beveled surface of said trailer and plays at random over a segmental area and is not concentrated at any one spot thereon.

9. In a circuit interrupter, in combination, insulating means providing a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, a first contact at one end of said bore, a second contact generally rod-like in character for engaging said first contact and having a flat end surface, said second contact substantially filling said bore and being movable therethrough to draw an arc over the surface thereof between said first contact and said flat end surface on separation from said first contact, and a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said second contact past said first contact into said bore and substantially filling the same with a slight annular space therebetween whereby said arc is confined between the outer surface of said trailer and said bore, the end of said trailer adjacent said second contact being beveled on at least one side so that the projection of the beveled surface intersects said flat end surface of said second contact to define a segmental area thereon whereby the arc root on said second contact is repelled from said bore and said beveled surface of said trailer and plays at random over said segmental area and is not concentrated at any one spot thereon.

10. For combination in a circuit interrupter, a first contact with an aperture providing an internal contact surface, insulating means providing a bore constituting an extension of said contact surface and formed of a material capable of evolving an arc extinguishing medium when subjected to the heat of an arc, a second contact generally rod-like in character having one end bifurcated to provide a pair of contact fingers biased outwardly for engaging said contact surface and movable through said bore to draw an arc therein on separation from said first contact, each contact finger having its arcing end formed by a metal having high arc resisting characteristics and having an arcuate end surface, and a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said second contact through said aperture into said bore whereby said arc is confined between the outer surface of said trailer and said bore, the end of said trailer adjacent said second contact being beveled on opposite sides so that the projections of the beveled surfaces intersect said arcuate end surfaces of said contact fingers to define segmental areas thereon whereby the arc root on said second contact is repelled from said bore and a beveled surface of said trailer and plays at random over a segmental area and is not concentrated at any one spot thereon.

11. For combination in a circuit interrupter, a first contact with an aperture providing an internal contact surface, insulating means providing a bore constituting an extension of said contact surface and formed of a material capable of evolving an arc extinguishing medium when subjected to the heat of an arc, a second contact generally rod-like in character having one end bifurcated to provide a pair of contact fingers

biased outwardly for engaging said contact surface and movable through said bore to draw an arc therein on separation from said first contact, each contact finger having an arcuate end surface and the radius of curvature of the outer surface of each contact finger being less than that of the aperture in said first contact to provide small area contact engagement therebetween, and a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said second contact through said aperture into said bore whereby said arc is confined between the outer surface of said trailer and said bore, the end of said trailer adjacent said second contact being beveled on opposite sides so that the projections of the beveled surfaces intersect said arcuate end surfaces of said contact fingers to define segmental areas thereon whereby the arc root on said second contact is repelled from

said bore and a beveled surface of said trailer and plays at random over a segmental area and is not concentrated at any one spot thereon, the aforesaid small area contact engagement between each contact finger and said first contact taking place substantially symmetrically of the respective segmental area.

SIGURD I. LINDELL.

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The following references are of record in the file of this patent:

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Number	Name	Date
1,250,402	Wendelburg	Dec. 18, 1917
2,223,975	Traver	Dec. 3, 1940
2,294,801	Rawlins	Sept. 1, 1942
2,316,470	Triplett	Apr. 13, 1943
2,351,826	Lindell et al.	June 20, 1944