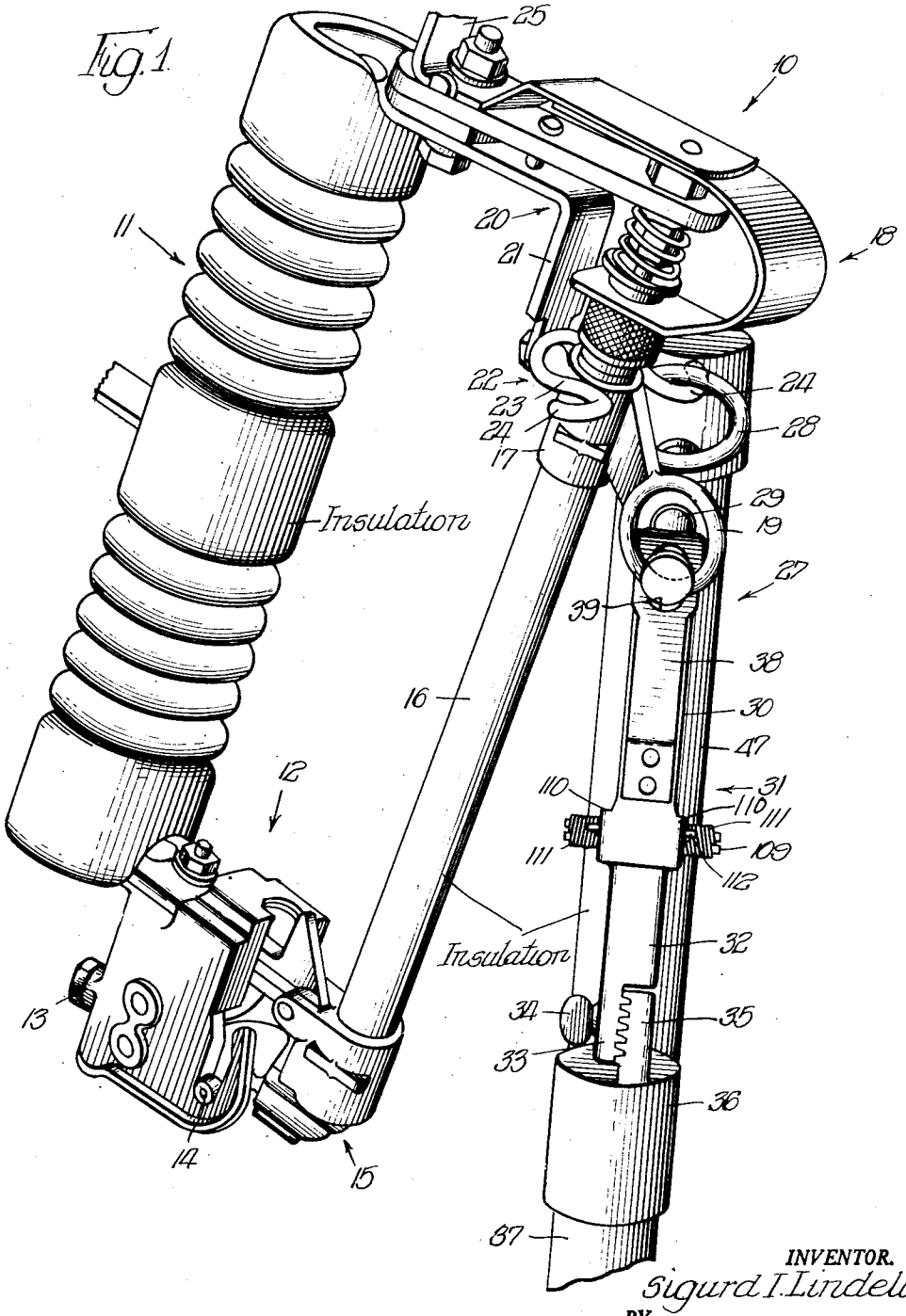
Dec. 17, 1957 S. I. LINDELL 2,816,978

CIRCUIT INTERRUPTER CONSTRUCTION

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Fig. 1.



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Fig. 2

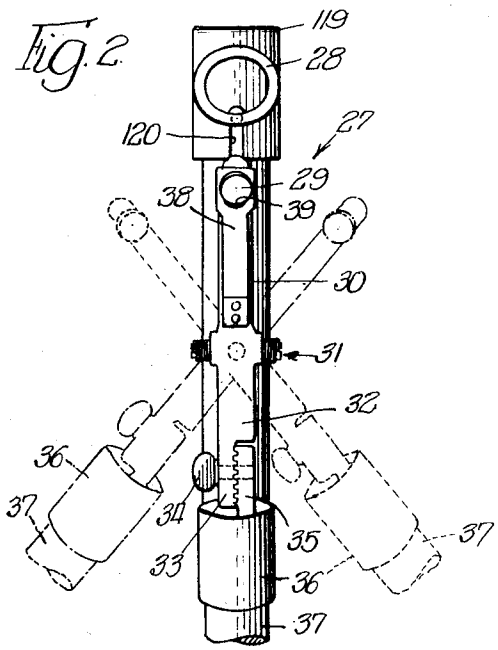


Fig. 3

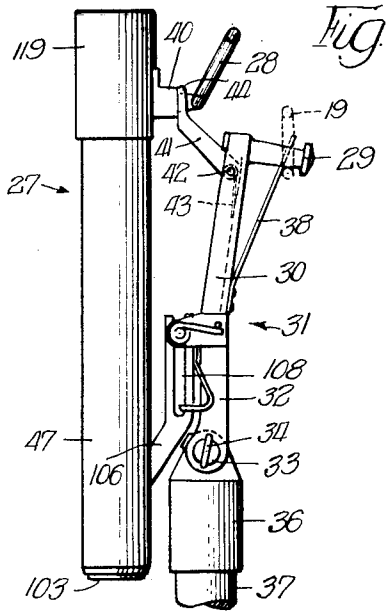


Fig. 4

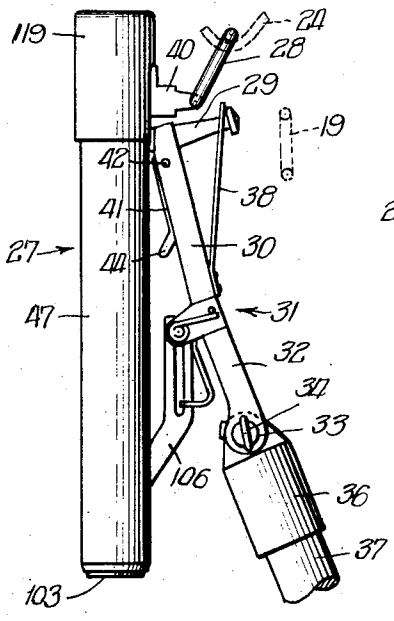
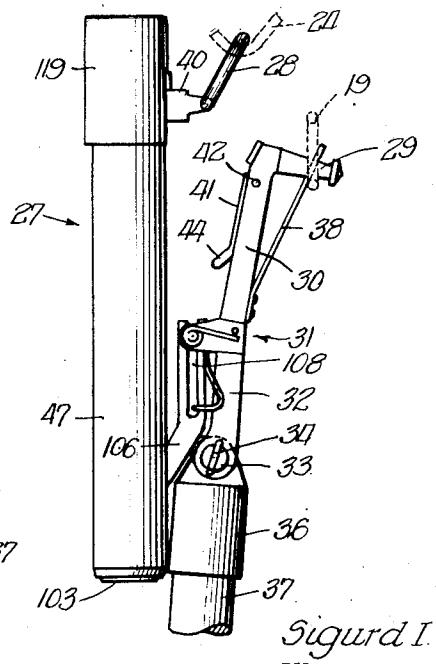


Fig. 5



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Fig. 6

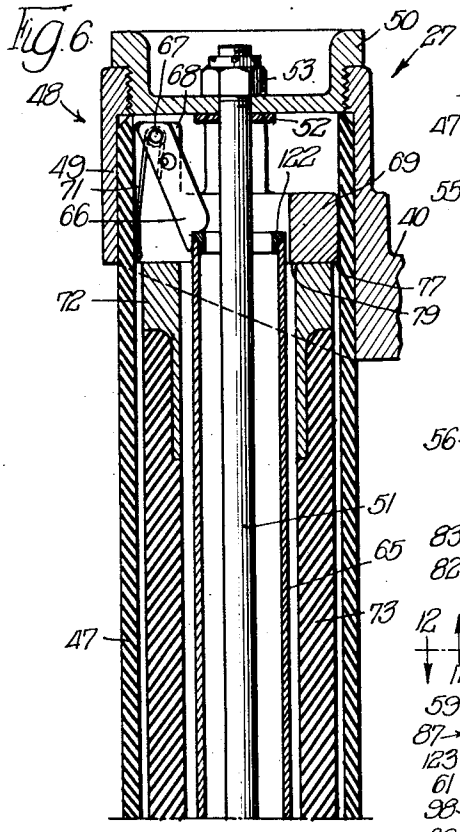


Fig. 6A

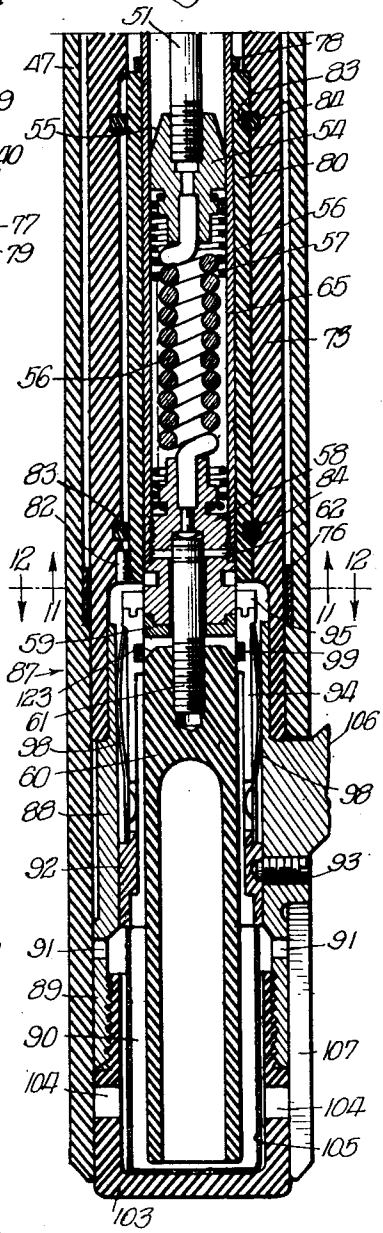


Fig. 13

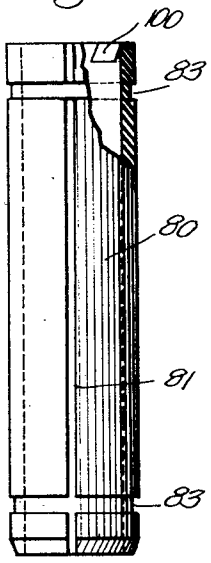


Fig. 14

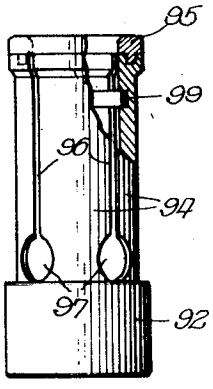


Fig. 11

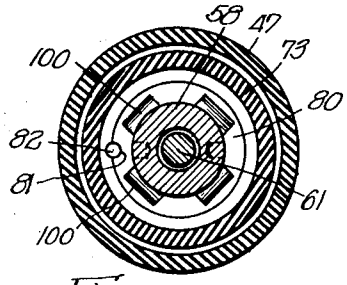
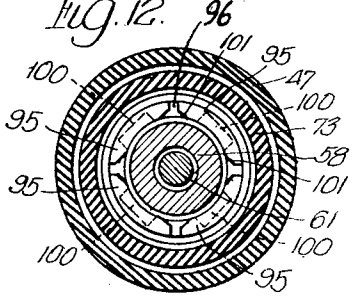


Fig. 12.



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Fig. 7

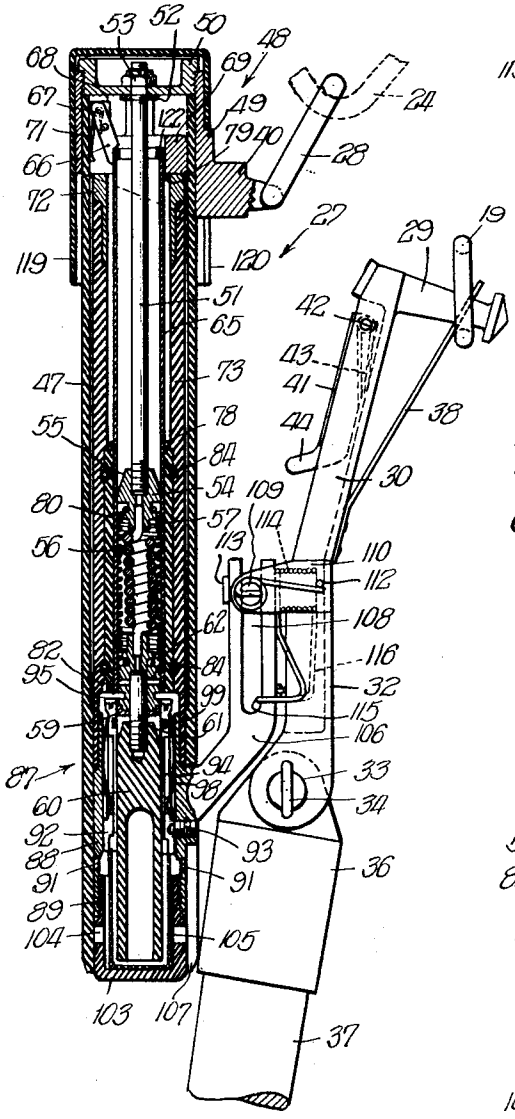
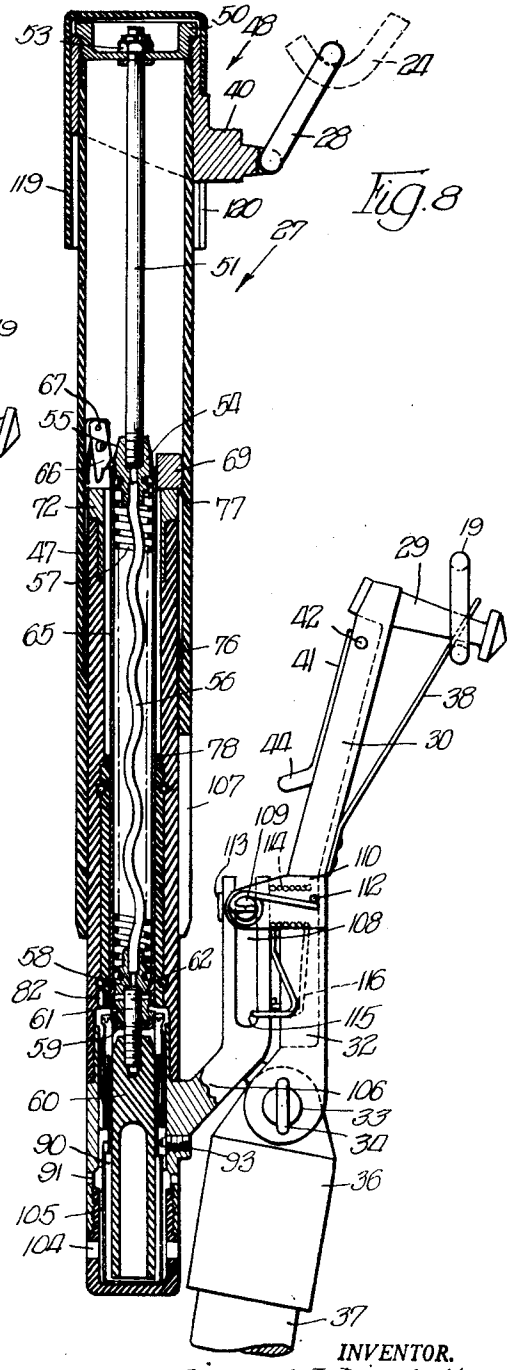


Fig. 8



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CIRCUIT INTERRUPTER CONSTRUCTION

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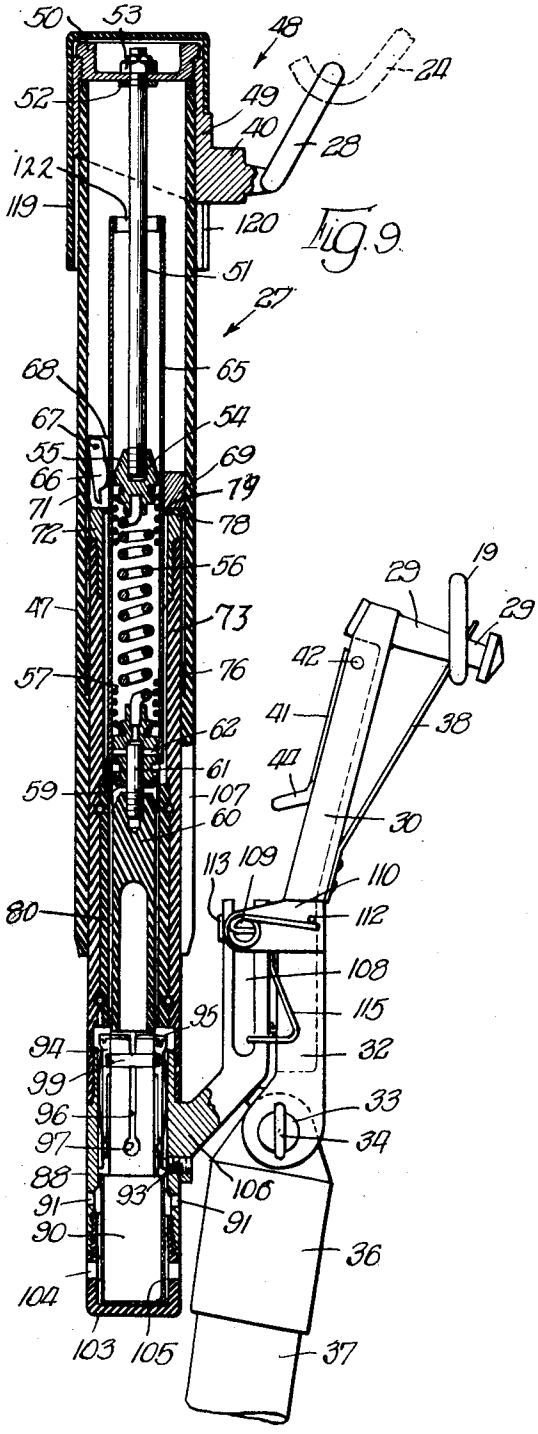


Fig. 9.

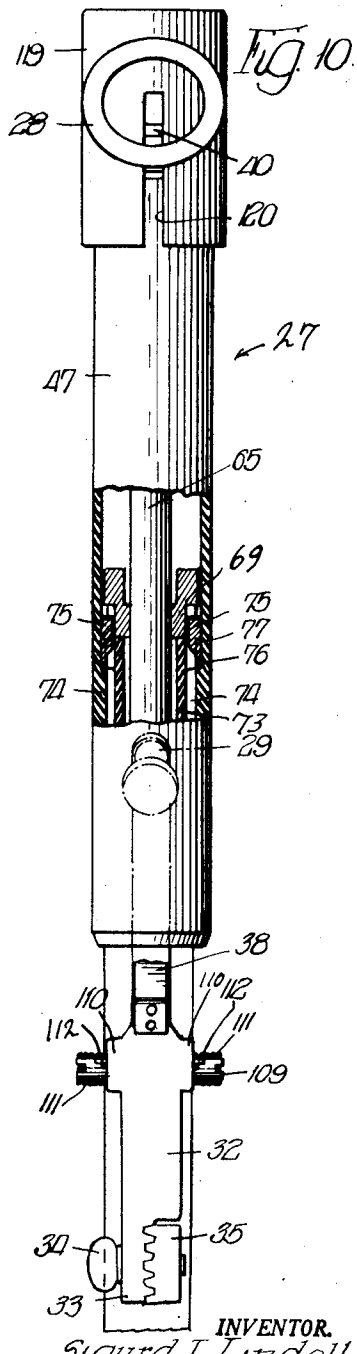


Fig. 10.

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CIRCUIT INTERRUPTER CONSTRUCTION

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Application February 24, 1954, Serial No. 412,182

44 Claims. (Cl. 200—114)

This invention relates, generally, to high voltage circuit interrupters, and it has particular relation to the construction of auxiliary circuit interrupters used in conjunction with high voltage isolating devices, such as disconnecting fuses, disconnecting switches and the like, for opening them without external arcing while they are carrying line current. This invention constitutes an improvement over the constructions disclosed in Lindell application Serial No. 362,891, filed June 19, 1953, now Patent No. 2,671,142, dated March 2, 1954, and Lindell application Serial No. 265,570, filed January 9, 1952, now Patent No. 2,671,145, dated March 2, 1954, all these applications being assigned to the assignee of this application.

Among the objects of this invention are: To flexibly mount the auxiliary circuit interrupter on a support that is adapted to be carried by a live line stick for manipulation into and out of operative engagement with the separable energized current carrying terminals or contacts of the circuit isolating device; to provide a rigid mechanical connection between the live line stick and the movable contact or terminal of the circuit isolating device to permit positive control thereof for swinging it either to the open position or reclosing it should the operator change his mind and decide not to complete the opening of the circuit; to permit relative movement of the interrupter unit with respect to the axis of the live line stick as the pin or stud of the stick follows the path taken by the movable contact on the circuit isolating device; to position an eye on the interrupter for engagement with a horn or stud on the stationary line terminal or contact of the circuit isolating device and incline the same with respect to the longitudinal axis of the live line stick in order to facilitate engagement with the horn or stud; to employ spring biased universal joint means for positioning the interrupter to facilitate engagement with the horn or stud by the eye and then permit moving of the live line stick sidewise to cause a pin carried thereby to engage a ring, or like device, on a movable contact or terminal of the load isolating device; to hold the flexibly mounted interrupter in fixed position with respect to the live line stick when the interrupter is not to be used for interrupting the circuit; to enclose the major portion of the interrupter within an insulating housing; to make connection with one of the separable contacts of the interrupter by a rigid conducting arm extending into the insulating housing; to provide for removing as a unit the circuit interrupting parts of the interrupter most likely to be eroded or consumed following repeated circuit opening operations, to control the position of the arc drawn on separation of the contacts in the auxiliary circuit interrupter in order to prevent it from impinging on contact surfaces or corners of contact fingers likely to be damaged; to provide for the ready escape of the products of the arc past one of the contacts; to mount a set of separable contacts for conjoint movement within the housing during which a spring is stressed and then releasing one of the contacts to move with a snap action away from the other to draw an arc and interrupt the circuit; to extinguish the arc thus drawn; to limit the separation of the

contacts; and to coordinate the separation of the contacts as biased by the spring with the separation of the terminals or contacts of the circuit isolating device whereby there is no likelihood of an arc restriking between these terminals or contacts.

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

This invention is disclosed in the embodiment 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 construction 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 perspective view of a circuit isolating device, such as a disconnecting fuse showing how the auxiliary circuit interrupter of the present invention can be applied thereto, the particular circuit isolating device being that disclosed in Lindell application Serial No. 367,801, filed July 14, 1953, and assigned to the assignee of this application, now Patent No. 2,745,923, issued May 15, 1956;

Figure 2 is an elevational view showing how the auxiliary circuit interrupter is mounted on a live line tool for relative movement in opposite directions with respect to its longitudinal axis in a plane parallel to the plane containing the same;

Figure 3 is an elevational view showing how the auxiliary circuit interrupter can be held in fixed position with respect to the live line stick when it is desired to employ the latter solely for manipulating a disconnecting fuse or disconnecting switch blade;

Figure 4 is an elevational view showing the first step employed in applying the auxiliary circuit interrupter to a circuit isolating device;

Figure 5 is an elevational view showing the second step employed in applying the auxiliary circuit interrupter to a circuit isolating device, this view showing the auxiliary circuit interrupter positioned so as to provide a shunt circuit between the separable energized current carrying terminals or contacts of the circuit isolating device;

Figures 6 and 6A taken together provide a longitudinal sectional view, at an enlarged scale, showing the internal details of construction of an auxiliary circuit interrupter embodying this invention;

Figure 7 shows a longitudinal sectional view of the auxiliary circuit interrupter at a reduced scale and illustrates how it is mounted on the live line stick, the connections being the same as described for Figure 5;

Figure 8 is a view, similar to Figure 7, showing the auxiliary circuit interrupter in extended position with the latch for holding the separable contacts in engagement in tripped position and just before any movement of these contacts takes place;

Figure 9 is a view, similar to Figure 8, but showing the contacts in the auxiliary circuit interrupter separated with one contact being withdrawn into the bore of the liner of arc extinguishing material;

Figure 10 is a view, partly in elevation and partly in section, showing the auxiliary circuit interrupter extended to its fullest extent, the section being taken at right angles to the section shown in Figure 9;

Figure 11 is a sectional view taken generally along the line **11—11** of Figure 6A;

Figure 12 is a sectional view taken generally along the line **12—12** of Figure 6A and looking in the direction opposite to the direction in which Figure 11 is taken;

Figure 13 is a view, in side elevation, of the liner of arc extinguishing material; and

Figure 14 is a view, partly in side elevation and partly in section, of the inner contact sleeve.

Referring now particularly to Figure 1 of the drawings, it will be observed that the reference character **10** designates, generally, a circuit isolating device of the disconnecting fuse type. As pointed out hereinbefore, the details of construction of the circuit isolating device **10** are set forth in Lindell Patent No. 2,745,923, issued May 15, 1956. Accordingly, only a general description of this device will be set forth here. While particular reference is made to a disconnecting fuse device, it will be understood that the present invention can be employed where the fuse tube of the disconnecting fuse is replaced by a metallic conducting tube or it can be used in conjunction with a disconnecting switch that is modified suitably for adaptation to be used in conjunction with the auxiliary circuit interrupter mounted on a live line stick as described hereinafter.

The circuit isolating device or disconnecting fuse **10** includes an insulator **11** which is arranged to be stationarily mounted on a cross arm or the like and has a lower terminal contact member **12** carrying a connector **13** for connection to a line terminal. Pivoted at **14** on the lower terminal contact member **12** is a lower current carrying member **15** that is positioned at the lower end of a fuse tube **16**. At its upper end the fuse tube **16** has an upper current carrying member **17** which is positioned in contact engagement with a normally energized contact member **18** carried by the upper end of the insulator **11**. In order to remove the upper current carrying member **17** from contact engagement with the terminal contact member **18**, the former is provided with an eye or pull ring **19** of conducting material for receiving the prong of a live line tool. In accordance with conventional practice, the fuse tube **16** is manipulated by inserting the prong of the live line tool in the eye or pull ring **19** for swinging the upper current carrying member **17** into or out of contact engagement with the terminal contact member **18**.

For purposes more fully disclosed in Lindell Patent No. 2,745,923, issued May 15, 1956, the terminal contact member **18** includes an L-shaped reinforcing bar **20** having a downwardly extending arm **21** which carries a guide **22**. The guide **22** is employed, in part, for guiding the upper current carrying member into proper contact engagement with the terminal contact member **18**. The guide **22** includes forwardly extending arms **23** at the outer ends of which are transversely extending horns or studs **24**. Provision is made for connecting the energized line conductor to the terminal contact member **18** through a terminal pad **25**. It will be understood that the upper portion of the terminal pad **25** (not shown) carries a connector or like device to facilitate connection of the energized line conductor thereto.

It is often necessary to open the circuit isolating device or disconnecting fuse **10** while it is carrying load current. When such operation is performed, an arc is drawn between the upper current carrying member **17** and the terminal contact member **18** which is likely to damage the parts which are contacted by the arc and also, where other circuits are involved, is likely to fault one or more circuits in the event that the arc is drawn and should jump to another circuit or the ground. Also there is the likelihood of injury to the operator. In accordance with the present invention, provision is made for safely and expeditiously opening the circuit isolating device **10** while it is carrying line current. It is for this purpose that the auxiliary circuit interrupter, shown generally at **27**, is employed. It will be observed that it includes an eye member **28** which is rigid therewith and is arranged to engage one of the horns or studs **24**. When the auxiliary circuit interrupter **27** is so positioned, one terminal of it is connected to the terminal contact member **18**. Connection to the upper current carrying member **17** is provided by contact means in the form of a pin or prong **29** rigidly mounted and extending transversely of a support

member or strut **30** that is preferably formed of aluminum and on which the auxiliary circuit interrupter **27** is flexibly mounted by a universal joint that, generally, is shown at **31** and the details of construction of which will be set forth hereinafter. The support member or strut **30** has an extension **32**, the lower portion of which forms a claw bracket **33** that is arranged to be secured by a clamp screw **34** to a corresponding claw bracket **35** that is formed integrally with an aluminum fitting **36** at the upper end of a live line stick **37** that is formed preferably of wood or like insulating material. Generally the live line stick **37** is considered to include the fitting **36** and the claw bracket **35** and may be so considered here.

Since the pin or prong **29** on the support member **30** loosely engages the eye or pull ring **19**, it is desirable to insure that contact engagement therewith is maintained. For this purpose a contact spring **38** is secured to the support member **30** and extends angularly outwardly therefrom for engagement with one side of the eye or pull ring **19**. Since the contact spring **38** moves relatively to the pin or horn **29**, it is provided with an elongated opening **39** to permit such relative movement.

As shown more clearly in Figure 2 of the drawings, the universal joint **31** permits the auxiliary circuit interrupter **27** to rock with respect to the live line stick **37** in a plane parallel to the longitudinal axis of the live line stick **37** for swinging the fuse tube **16** from the closed to the open position and vice versa. Figures 3, 4 and 5 of the drawings show how the auxiliary circuit interrupter **27** can rock in a plane at right angles to this plane for manipulation with respect to the circuit isolating device **10** for engaging the same.

In Figure 3 of the drawings, it will be observed that the eye member **28** is positioned at an obtuse angle with respect to the auxiliary circuit interrupter **27** and is formed integrally with a contact arm **40**. The reason for positioning the eye member **28** at this angle is to facilitate its being moved into engagement with the horn or stud **24**. By placing it at an angle, it is possible for the lineman to see through the opening therein from his position at the lower end of the live line stick **37**. Thus he is able to correlate the movement of the eye member **28** with the position of the horn or stud **24**.

In some instances it is desirable to manipulate the live line stick **37** with the auxiliary circuit interrupter **27** rigid therewith instead of being flexibly mounted thereon. For example, when the lineman wishes to employ the live line stick **37** solely for the purpose of performing an operation without using the auxiliary circuit interrupter **27**, it is desirable to provide for this rigid mounting thereof. For this purpose a brace **41** is pivoted at **42** on the upper end of the support member or stud **30** and it is arranged to be biased to the retracted or operative position by a spring **43**. At its outer end the brace **41** has a bifurcated portion **44**, the arms of which fit around the contact arm **40**. Thus, when the brace **41** is swung from the retracted position to the position shown in Figure 3, it holds the auxiliary circuit interrupter **27** in the position hereshown. As will appear hereinafter, provision is made for biasing the auxiliary circuit interrupter **27** to the position shown in Figure 4 relative to the support member or stud **30**. Accordingly the auxiliary circuit interrupter **27** is rigidly supported with respect to the live line tool **37** when the brace **41** is swung to its position as shown in Figure 3.

The details of construction of the auxiliary circuit interrupter **27** are shown more clearly in Figures 6 and 6A of the drawings to which reference now will be had. It will be observed that the auxiliary circuit interrupter **27** is of elongated cylindrical construction. It includes a tubular insulating housing **47** that is formed of suitable insulating material, such as a phenolic condensation product. For purposes of reference, the upper end of the housing **47** is referred to as the inner end and at this inner end there is mounted a stationary contact assembly

that is shown, generally, at **48**. The stationary contact assembly **48** includes a pull ring cap **49** that is formed preferably of aluminum and with which the contact arm **40** and eye member **28** are integrally cast. The cap **49** is secured by adhesive means to the inner end of the housing **47** and its upper end is closed by a screw plug **50**. Depending from the screw plug **50** is a rigid conductor rod **51**. The inner end of the rod **51** is secured to the screw plug **50** by a snap washer **52** on the underside and a nut **53** on the upper side. At its outer end the rod **51** has a cam terminal **54** which is provided with a latch engaging surface **55**, the purpose of which will be set forth presently. Depending from the cam terminal **54** are a flexible conductor **56** and a coil spring **57** coiled with initial tension, the latter being positioned around the former as shown. The lowermost ends of the flexible conductor **56** and coil spring **57** are connected to a movable first arcing contact **58** at the lowermost end of which there is an annular contact insert **59** formed of a material which is resistant to erosion due to impingement of an arc thereon. It will be understood that the stationary contact assembly **48** includes those parts just enumerated beginning with the pull ring cap **49** and concluding with the annular contact insert **59**.

In order to confine the arc drawn from the annular contact insert **59** on operation of the auxiliary circuit interrupter **27** to open a circuit under load, there is provided a trailer **60** that is formed of a material, such as methylmethacrylate resin, which is adapted to evolve an arc extinguishing medium when it is subjected to the heat of an arc. As will appear hereinafter, the trailer **60** is arranged to be drawn into the bore of a tube which itself gives off an arc extinguishing medium. In order to cause the trailer **60** to move conjointly with the movable first arcing contact **58**, a trailer stud **61** is screwed into the upper end of the trailer **60** and it extends into the movable first arcing contact **51** where it is pivotally held by a transversely extending trailer stud pin **62**. There is a limited clearance between the outer surface of the trailer stud **61** and the opening in the annular contact insert **59** and in the movable first arcing contact **58** so as to permit a limited degree of movement of the trailer **60** with respect thereto. This permits it to be positioned in the bore into which it is drawn somewhat flexibly.

A tubular metallic sleeve **65**, preferably formed of aluminum, is threaded at its outer end onto the movable first arcing contact **58** and it extends upwardly into the housing **47** toward its inner end. At the inner end of the metallic sleeve **65**, there is a trigger **66** which is pivotally mounted at **67** between arms **68** of a trigger frame stop **69**. A grasshopper spring **71** cooperates with the trigger **66** to bias it into latching engagement with the inner end of the tubular metallic sleeve **65**.

Secured by screws or other suitable means to the underside of the trigger frame stop **69** is a metallic tube end insert **72** that preferably is formed of aluminum. The insert **72** is secured by suitable means to the inner end of an inner insulating sleeve **73** that preferably is formed of a phenolic condensation product. The inner insulating sleeve **73** is arranged to be slidably mounted within the tubular insulating housing **47**. It is desirable that the inner insulating sleeve **73** be guided for movement within the housing **47** so that it is non-rotatable axially with respect thereto. For this purpose, as shown in Figure 10, longitudinally extending slots or grooves **74** are provided in diametrically opposite positions in the outer surface of the inner insulating sleeve **73** and tongues or pins **75** project thereinto. The tongues or pins **75** are carried by a ring **76** that is secured to the inner surface of the housing **47** near its outer end. The upper side of the ring **76** constitutes a stop for engaging the underside **77** of the trigger frame stop **69** for limiting the extent that the inner insulating sleeve **73** can be withdrawn from the housing **47**, this position being shown in Figure 10 of the drawings.

It will be recalled that the metallic sleeve **65** is slidable with the movable first arcing contact **58**. As shown in Figure 9 of the drawings, it is movable inwardly of the housing **47** and through the inner insulating sleeve **73**. Its movement with respect thereto is limited by a stop ring **78** that is secured to the outer surface of the metallic sleeve **65**. The stop ring **78** is arranged to engage a shoulder **79** on the underside of the trigger frame stop **69**.

As pointed out hereinbefore, the trailer **60** is drawn into a bore, the surface of which is capable of evolving an arc extinguishing material. For this purpose a liner **80**, formed preferably of methylmethacrylate resin, is positioned in the inner insulating sleeve **73** at its outer end. The liner **80** is illustrated in Figure 13 where it will be observed there is provided a longitudinally extending groove **81** arranged to cooperate with a locating pin **82**, Figure 6, for positioning the liner **80** in a predetermined location with respect to the inner insulating sleeve **73**. It is desirable that there be a fairly snug fit between the outer surface of the liner **80** and the inner surface of the insulating sleeve **73**. Since provision is made for removing the liner **80**, it is not possible to secure this snug fit by cementing the liner **80** into the sleeve **73**. Instead annular grooves **83** are provided in the outer surface of the liner **80** near its end and O rings **84** of neoprene or like material are positioned in these grooves to seal off the space between the liner **80** and the sleeve **73** to prevent arc products from entering this space and thus preventing restriking of the arc in this space when current is being interrupted and a high recovery voltage is encountered.

Cooperating with the stationary contact assembly **48** is a movable contact assembly that is indicated, generally, at **87** in Figure 6A of the drawings. It includes a metallic contact sleeve **88** that is formed preferably of aluminum which has an extension **89** at its lower end forming a chamber **90** to receive the products of the arc. Radial vents **91** serve to place the chamber **90** in communication with the atmosphere when the inner insulating sleeve **73** and parts associated therewith are withdrawn from the housing **47**, for example, to the position shown in Figure 8 of the drawings. Within the metallic contact sleeve **88** is an inner contact sleeve **92** which is secured in predetermined position therein by a contact locating screw **93**. It will be understood that the metallic contact sleeve **88** is secured to the outer end of the inner insulating sleeve **73** by suitable adhesive or other means.

As shown more clearly in Figure 14 of the drawings, the contact sleeve **92** is provided with four upwardly extending flexible contact fingers **94** which have contact tips **95** of material which is arc resistant. The inner ends of the contact fingers **94** are arranged to have peripheral contact engagement with the movable first arcing contact **58** and more particularly with the annular contact insert **59**, the arc being drawn between the latter and the contact tip **95** on one of the contact fingers **94**. The contact fingers **94** are separated by relatively wide slots **96** which extend longitudinally from the inner end to openings **97**. The purpose of the relatively wide slots **96** is to provide for free escape of the products of the arc drawn as described and to permit them to flow outwardly into the chamber **90** where they can be readily vented to the atmosphere. The contact fingers **94** are biased inwardly by spring fingers **98**. Since the trailer **60** is required to move through the opening defined by the flexible contact fingers **94**, provision is made to limit their inward movement when not in engagement with the movable first arcing contact **58**. For this purpose a contact retaining ring **99** is employed as shown in Figure 14, the size of the ring **99** is such that, while the contact fingers **94** are freely movable into engagement with the periphery of the movable first arcing contact **58**, as soon as it and the annular contact insert **59** are withdrawn, the spring fingers **98** bias the contact fingers **94** inwardly but only to a limited

extent which is determined by the contact retaining ring 99.

With a view to locating the arc incident to operation of the circuit interrupter 27 so that a minimum of erosion of the contact tips 95 takes place, the outer end of the liner 80, as shown in Figure 11, is provided with outflared grooves 100, each groove being individual to one of the contact fingers 94. In Figure 12 of the drawings, the outline of the grooves 100 is shown by broken lines. It will be observed that the grooves 100 are centered with respect to the contact tips 95. Also it will be noted that the inner edge portions 101 of the contact tips 95 are machined off so that the arc is drawn or initiated at the edge of the area defined by the broken line outline of the grooves 100 from which it is repelled and moved into the defined area by gas generated from the surface of the trailer 60.

Referring again to Figure 6 of the drawings, it will be observed that the outer end of the extension 89 is closed by a hollow light transmitting plug 103 which is threaded into position. The reason for employing a material which is light transmitting for the plug 103 is to permit the lineman to note the formation of the arc drawn on separation of the first arcing contact 58 from the contact tip 95 on the flexible contact fingers 94 which constitute a second arcing contact. By noting the flash of the arc and its extinction, the lineman is apprised of the fact that the circuit has been completely opened and that it is safe to remove the auxiliary circuit interrupter 27 from connection to the circuit isolating device 10.

Additional venting of the chamber 90 and the interior of the plug 103 is provided by radial vents 104. A screen 105 inside of the plug 103 extends over the vents 104 and over the vents 91. The screen 105 is formed preferably of metallic material which assists in cooling the arc products and preventing their escape to the atmosphere. In addition, it prevents to a limited degree the ingress of foreign material.

Integral with and extending radially from the metallic contact sleeve 88 is a conducting arm 106. As shown in Figure 6A of the drawings, the conducting arm 106 extends radially through a slot 107 in the outer end of the housing 47. Conducting arm 106 has a portion 108, Figure 8, that is parallel to the housing 47 and has an H-shaped cross-section. At its upper end the portion 108 of the conducting arm 106 carries a rod 109 which extends through arms 110 rigid with the support member or strut 30. The rod 109 permits the auxiliary circuit interrupter 27 to swing in the plane of the drawing with respect to the support member or strut 30 as shown in Figures 7 and 8. Springs 111, Figure 10, interacting between the rod 109 and pins 112 mounted on the arms 110 act to bias the auxiliary circuit interrupter 27 in a clockwise direction with respect to the live line stick 37 or to bias the latter in a counterclockwise direction with respect to the former.

In order to permit swinging movement of the auxiliary circuit interrupter 27 in a plane at right angles to the plane of its movement about the axis of the rod 109, a transverse shaft 113 of larger diameter than rod 109 extends through and is journalled in the bifurcated end portion 108 of the conducting arm 106 into a pocket in the support member or strut 30. The rod 109 extends through and is carried by the shaft 113. A centering spring 114 surrounds the transverse shaft 113 with one end 115 bearing against one side of the portion 108 of the conducting arm 106 and the other end 116 bearing against the corresponding side of extension 32 of the support member or strut 30 when the interrupter 27 is centered with respect to the live line stick 37. The function of the spring 114, which is pretensioned, is to center the auxiliary circuit interrupter 27 with respect to the longitudinal axis of the live line stick 37 or to bias it back to this position when the latter is swung relatively to the former as shown in Figure 2 by the broken line positions of the live line stick 37 on opposite sides of the position shown by full lines where it is aligned with the auxiliary circuit interrupter 27.

It is desirable to enclose the stationary contact assembly 48 at the inner or upper end of the tubular insulating housing 47. For this purpose a removable insulating cap 119 extends over the inner or upper end of the housing 47 and encloses the contact assembly 48. The cap 119 may be formed of neoprene or other flexible insulating material. It has a longitudinally extending slot 120 on one side for accommodating the contact arm 40.

When the auxiliary circuit interrupter 27 is in the fully closed position with the inner insulating sleeve 73 telescoped therein, there are no exposed energized parts on the side away from the live line stick 37. Aside from the fitting 36 on the live line stick 37 and the parts associated with the support member or strut 30, the only energized exposed parts are the eye member 28, contact arm 40 and the conducting arm 106. The insulating housing 47 and the insulating cap 119 serve to enclose all other conducting parts which are energized when the eye member 28 engages the horn or stud 24 of the energized terminal contact member 18.

It is highly desirable that provision be made for quickly and easily dismantling the auxiliary circuit interrupter 27 for the purpose of permitting inspection of the parts, such as the contact 58, contact fingers 94, the trailer 60 and the liner 80. The dismantling of the circuit interrupter 27 can be accomplished by removing the insulating cap 119, loosening the nut 53 and removing the screw plug 50. The screws holding the trigger frame stop 69 to a metallic tube end insert 72 then can be removed and the inner insulating sleeve 73 with associated parts then can be removed through the outer end of the housing 47. The trailer 60 then can be removed from the inner insulating sleeve 73 together with the movable first arcing contact 58, metallic sleeve 65, the flexible conductor 56, spring 57, cam terminal 54, and conductor rod 51. Next the plug 103 is unscrewed from the extension 89 and the screen 105 is withdrawn. On removal of the contact locating screw 93, the inner contact sleeve 92 can be removed to permit inspection of the contact fingers 94 and contact tips 95. The liner 80 is next pushed out of the inner insulating sleeve 73 for inspection. The arcing contact 58 with the tubular metallic sleeve 65 and stop ring 78 can be employed for this purpose.

In operation the lineman manipulates the live line stick 37, as shown in Figure 4, first to a position where the eye member 28 engages the horn or stud 24. Then the live line stick 37 is swung sidewise about the axis of the rod 109 to position the pin or prong 29 within the eye or pull ring 19. Contact therewith is maintained by the contact spring 38. Assuming that the circuit isolating device 10 is carrying current, the circuit between the upper current carrying member 17 on the upper end of the fuse tube 16 and the energized terminal contact member 18 is shunted through the auxiliary circuit interrupter 27. Then the lineman exerts a longitudinal downward pull on the live line stick 37 with the pin or prong 29 positioned in the eye or pull ring 19 as shown in Figure 5. This initial movement causes the upper current carrying member 17 to be moved out of engagement with the terminal contact member 18 of the circuit isolating device 10 and the current flow formerly therethrough is transferred to the auxiliary circuit interrupter 27.

This initial movement of the live line stick 37 is accompanied by an outward movement of the inner insulating sleeve 73 from the insulating housing 47. While the rigid conductor rod 51 of the stationary contact assembly 48 remains stationary, the other parts of the contact assembly 48 move, as shown in Figure 8. The reason for this is that the trigger 66 is in engagement with the inner end of the tubular metallic sleeve 65 and the trigger 66, being mounted on the trigger frame stop 69

which is attached to the metallic tube end insert **72**, moves with the inner insulating sleeve **73** along with the conducting arm **106**. The annular contact insert **59** of the movable first arcing contact **58** remains in contact engagement with the inner ends of the flexible contact fingers **94** and the contact tips **95**. The flexible conductor **56** is extended as is the coil spring **57** which is stressed.

The movement of these parts continues to the position shown in Figure 8 where the trigger **66** has just engaged the latch engaging surface **55** on the cam terminal **54** and has been moved out of latching engagement with the inner end of the tubular metallic sleeve **65**. For illustrative purposes it is pointed out that the inner insulating sleeve **73** moves through about 5¾" from the position shown in Figure 7 to the position shown in Figure 8 of the drawings where the trigger **66** has been moved out of latching engagement with the inner end of the metallic sleeve **65**. This distance is such that the gap formed between the upper current carrying member **17** and the terminal contact member **18** at this time is sufficiently great so that there is no likelihood of an arc restriking therebetween. As soon as the trigger **66** is actuated, the spring **57** retracts the movable arcing contact **58** and the trailer **60** into the bore of the liner **80**. An arc is drawn between the annular contact insert **59** on the contact **58** and one of the contact tips **95** on the contact fingers **94**. As the trailer **60** moves through the contact tips **95** and into the bore of the liner **80**, one end of the arc is confined between the outer surface of the trailer **60** and the surface of one of the outflared grooves **100**. The other end is confined between the bevelled upper end **123** of the trailer **60** and the inner surface of the line **80**. As the contact **58** continues to move inwardly under the influence of the coil spring **57**, the arc is confined between the outer surface of the trailer **60** and the inner surface of the liner **80** where it is extinguished.

Since the first arcing contact **58** substantially fills the bore in the liner **80**, the products of the arc can not flow upwardly therethrough. Rather they flow downwardly past the contact tips **95** and into the chamber **90**. As shown in Figure 8 of the drawings, the chamber **90** is well below the outer end of the housing **47** and as a result the products of the arc and the gas pressure incident thereto can be relieved through the vents **91** in the extension **89** and through the vents **104** in the plug **103**.

As shown in Figure 9 of the drawings, the first arcing contact **58** moves inwardly of the housing **47** until the stop ring **78** engages the shoulder **79** on the underside of the trigger frame stop **69**. For illustrative purposes, it is pointed out that the length of this stroke is 4⅜". In this circuit open position there is still substantial tension applied by the coil spring **57** to the movable arcing contact **58** and the same is held in the retracted position shown in Figure 9.

While the extent of movement of the live line stick **37** thus described is sufficient to effect opening of the circuit through the interrupter **27**, a further movement of the live line stick **37** is possible and desirable in order to provide a greater separation between the contact **58** and the contact fingers **94**. In the embodiment of the invention disclosed, this further movement is of the order of 3⅞" to the position shown in Figure 10. The spring **57** is further tensioned until the ring **76** engages the underside **77** of the trigger frame stop **69**. By providing for this further travel and tensioning of the spring **57** abrupt stopping of the live line stick is avoided and severe shock to the interrupter **27** is obviated.

The live line stick **37** then is manipulated so as to disengage the pin or prong **29** from the eye or pull ring **19**. The fuse tube **16** then swings downwardly under the influence of gravity to the open position. Then the live line stick **37** is moved upwardly to lift the eye member **28** off of the horn or stud **24**. Afterwards the auxiliary circuit interrupter **27** can be manually restored to the closed position shown in Figures 6 and 7 by moving the inner insulating sleeve **73** inwardly of the tubular housing **47** until the trigger **66** again is in position where it engages the inner end of the metallic sleeve **65**. The spring **57** goes solid and acts as a strut to transmit compressive force therethrough to cause contact **58** to engage the contact fingers **94**. In that position the annular contact insert **59** on the first arcing contact **58** is telescoped with the inner ends of the contact fingers **94** and the contact tips **95** thereon.

In the event that some obstruction should prevent the first arcing contact **58** and the trailer **60** from moving from their positions shown in Figure 8 to the open circuit position shown in Figure 9 under the influence of the spring **57**, there is still a margin of movement of the inner insulating sleeve **73** which will effect the separation of the contacts and the opening of the circuit even though the spring **57** is ineffective to do so. In Figure 8 of the drawings, it will be observed that there is still some distance between the shoulder **77** on the metallic tube end insert **72** and the ring **76**. As shown in Figure 10 and as described hereinbefore, the outward movement of the inner insulating sleeve **73** is limited by the ring **76** engaging the underside **77** of the trigger frame stop **69**. This further extent of movement is of the order of 2½" in a particular embodiment and is sufficient to disengage and withdraw the movable contact assembly **87** sufficiently far away from the first arcing contact **58**, which is held against movement by the flexible conductor **56** that goes taut under these circumstances, to open the circuit and exinguish the arc. The inner insulating sleeve **73** moves downwardly together with the liner **80** and movable contact assembly while, as stated, the arcing contact **58** remains stationary. The arc is drawn and exinguished then in the bore of the liner **80** as above described.

In the event that it is not desired to depend on the flexible conductor **56** for holding the contact **58** stationary, reliance can be placed on a ring **122**, Figure 6, secured to the inner end of the metallic sleeve **65**. The inner periphery of this ring **122** projects over the cam terminal **54** sufficiently far that the latter will not pass through the former. The metallic sleeve **65** then is held stationary and, since it is threaded on the contact **58**, it holds it stationary also.

The flexible conductor **56** can be omitted if sufficient contact engagement between the inner surface of the metallic sleeve **65** and the cam terminal **54** is provided as a conducting path for current flow. The latter can be provided with contact fingers to provide additional engagement with the former to increase the current carrying capacity. The spring **57** can be formed of relatively good conducting material, such as berryllium, copper, to carry the current during the interrupting operation.

By reversing the foregoing described sequence of operations, it is possible to close the circuit isolating device **10**. In such case the interrupter is operated first to the open circuit position and then is applied to the device **10** also in the open circuit position. Then the interrupter is closed and next the device **10** is operated to the closed position. Finally the interrupter **27** is removed from the device **10** after service has been restored.

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

What is claimed as new is:

1. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick,

said mechanism comprising, in combination, a live line stick of insulating material, a support member adapted to be rigidly mounted on said live line stick, an auxiliary circuit interrupter flexibly mounted on said support member and having limited freedom of movement relative to said live line stick, said interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said movable current carrying member and when closed providing a shunt circuit therebetween, means on said support member for mechanical connection to said current carrying member whereby manipulation of said support member by said live line stick disengages said movable current carrying member from said terminal contact member while said shunt circuit is maintained, and means for operating said interrupter to open said shunt circuit after said movable current carrying member disengages said terminal contact member.

2. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carryng current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a support member adapted to be rigidly mounted on said live line stick and having contact means rigid with respect thereto for engagement with said movable current carrying member and to operate the same into and out of engagement with said terminal contact member by manipulation of said live line stick, an auxiliary circuit interrupter flexibly mounted on said support member and having limited freedom of movement relative to said live line stick, said interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said contact means on said support member and when closed providing a shunt circuit between said terminal contact member and said current carrying member, manipulation of said support member by said live line stick disengaging said movable current carrying member from said terminal contact member while said shunt circuit is maintained, and means for operating said interrupter to open said shunt circuit after said movable current carrying member disengages said terminal contact member.

3. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a strut adapted to be rigidly mounted on said live line stick and to constitute an endwise extension thereof and having contact means rigid therewith and extending transversely thereof for engagement with said movable current carrying member and to operate the same into and out of engagement with said terminal contact member by manipulation of said live line stick, an auxiliary circuit interrupter flexibly mounted on said strut and having limited freedom of movement relative to said live line stick, said interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said contact means on said strut and when closed providing a shunt circuit between said terminal contact member and said current carrying member, manipulation of said strut by said live line stick disengaging said movable current carrying member from said terminal contact member while said shunt circuit is maintained, and means for operating said interrupter to open said shunt circuit after said movable current carrying member disengages said terminal contact member.

4. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a support member adapted to be rigidly mounted on said live line stick, an auxilary circuit interrupter flexibly mounted on said support member and having limited freedom of movement relative to said live line stick, resilient means interposed between said support member and said interrupter and biasing the latter to a predetermined position with respect to the former, said interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said movable current carrying member and when closed providing a shunt circuit therebetween, means on said support member for mechanical connection to said current carrying member whereby manipulation of said support member by said live line stick disengages said movable current carrying member from said terminal contact member while said shunt circuit is maintained, and means for operating said interrupter to open said shunt circuit after said movable current carrying member disengages said terminal contact member.

5. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a support member adapted to be rigidly mounted on said live line stick, an auxiliary circuit interrupter flexibly mounted on said support member and having limited freedom of movement relative to said live line stick, said interrupter having contact means including an eye member of conducting material for connection to said terminal contact member and additional contact means for connection to said movable current carrying member and when closed providing a shunt circuit therebetween, means on said support member for mechanical connection to said current carrying member whereby manipulation of said support member by said live line stick disengages said movable current carrying member from said terminal contact member while said shunt circuit is maintained, and means for operating said interrupter to open said shunt circuit after said movable current carrying member disengages said terminal contact member.

6. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a support member adapted to be rigidly mounted on said live line stick, an auxiliary circuit interrupter flexibly mounted on said support member and having limited freedom of movement relative to said live line stick, said interrupter having contact means including an eye member of conducting material mounted thereon and inclined at an obtuse angle away therefrom to facilitate engagement with a horn or stud on said terminal contact member and additional contact means for connection to said movable current carrying member and when closed providing a shunt circuit therebetween, manipulation of said support member by said live line stick disengaging said movable current carrying member from said terminal contact member while said shunt circuit is maintained, and means for operating said interrupter to open said shunt circuit after said movable

current carrying member disengages said terminal contact member.

7. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable about a fixed pivot into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, an auxiliary circuit interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said swingable current carrying member and when closed providing a shunt circuit therebetween, a support member adapted to be rigidly mounted on said live line tool, means flexibly mounting said interrupter on said support member, means on said support member for mechanical connection to said current carrying member whereby manipulation of said support member by said live line stick causes said current carrying member to swing away from said terminal contact member while said shunt circuit is maintained and is accompanied by movement of said interrupter relative to said normally energized contact member and to said live line tool, and means for operating said interrupter to open said shunt circuit after said current carrying member disengages said terminal contact member.

8. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable about a fixed pivot into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, an auxiliary circuit interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said swingable current carrying member and when closed providing a shunt circuit therebetween, a support member adapted to be rigidly mounted on said live line tool, means mounting said interrupter on said support member for pivotal movement about two axes at right angles to each other whereby manipulation of said support member by said live line stick causes said current carrying member to swing away from said terminal contact member while said shunt circuit is maintained and is accompanied by movement of said interrupter relative to said normally energized contact member and to said live line tool, resilient means individual to each axis and interposed between said support member and said interrupter for biasing the latter to a predetermined position with respect to the former, and means for operating said interrupter to open said shunt circuit after said current carrying member disengages said terminal contact member.

9. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable about a fixed pivot into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, an auxiliary circuit interrupter having contact means including a member of conducting material mounted thereon for connection to said terminal contact member and additional contact means for connection to said swingable current carrying member and when closed providing a shunt circuit therebetween, a strut adapted to be rigidly mounted on said live line stick and to constitute an endwise extension thereof and having contact means rigid therewith and extending transversely thereof and forming a part of the connection between said additional contact means and said swingable current carrying member for engaging the same to operate it into and out of engagement with said terminal contact member by manipulation of said live line stick, means flexibly mounting said interrupter on said strut whereby manipulation of the latter by said live line stick causes said current carrying member to swing away from said terminal contact member while said shunt circuit is maintained and is accompanied by movement of said interrupter relative to said normally energized contact member and to said live line tool, and means for operating said interrupter to open said shunt circuit after said current carrying member disengages said terminal contact member.

10. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable about a fixed pivot into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, an auxiliary circuit interrupter having contact means including a member of conducting material mounted thereon for connection to said terminal contact member and additional contact means for connection to said swingable current carrying member and when closed providing a shunt circuit therebetween, a strut adapted to be rigidly mounted on said live line stick and to constitute an endwise extension thereof and having contact means rigid therewith and extending transversely thereof and forming a part of the connection between said additional contact means and said swingable current carrying member for engaging the same to operate it into and out of engagement with said terminal contact member by manipulation of said live line stick, means mounting said interrupter on said strut for pivotal movement about two axes at right angles to each other whereby manipulation of said strut by said live line stick causes said current carrying member to swing away from said terminal contact member while said shunt circuit is maintained and is accompanied by movement of said interrupter relative to said normally energized contact member and to said live line tool, resilient means individual to each axis and interposed between said strut and said interrupter for biasing the latter to a predetermined position with respect to the former, and means for operating said interrupter to open said shunt circuit after said current carrying member disengages said terminal contact member.

11. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a tubular insulating housing, snap acting separable contacts within said housing, contact means rigidly mounted on one end of said housing and connected to one of said separable contacts and adapted to be connected to said terminal contact member, a conducting arm connected to the other of said separable contacts and extending outwardly of and movable longitudinally with respect to said housing, a metallic support adapted to be rigidly mounted on said live line stick and having contact means for engagement with said current carrying member to swing the same out of engagement with said terminal contact member by manipulation of said live line stick, means flexibly mounting said conducting arm on said metallic support, a shunt circuit being provided between said terminal contact member and said current carrying member when said separable contacts are engaged, and means responsive to movement of said conducting arm to a predetermined position by manipulation of said live line stick for separating said separable contacts to open said shunt circuit after said movable current carrying member has been swung away

from said terminal contact member a predetermined distance.

12. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a tubular insulating housing; a stationary contact assembly at one end of said housing including a rigid conductor having its inner end secured to said one end of said housing and extending endwise into the same, a contact arm connected to said inner end of said rigid conductor and extending outwardly of said housing for engagement with said terminal contact member, a movable first arcing contact in endwise spaced relation to the outer end of said rigid conductor, conducing means interconnecting said movable arcing contact and said rigid conductor, a spring interconnecting said arcing contact and said rigid conductor, and a latch engaging shoulder carried by said rigid conductor; an inner insulating sleeve slidably mounted within said tubular housing, a liner of arc extinguishing material within said inner sleeve near its outer end, a tubular metallic sleeve slidably mounted within said liner and secured at its outer end to said first arcing contact and extending into said inner sleeve, and a latch carried by said inner sleeve and cooperating with said metallic sleeve to effect conjoint movement of said sleeves when said inner sleeve is moved outwardly of said housing, said latch being released from said inner sleeve on engagement with said latch engaging shoulder to permit said first arcing contact and said metallic sleeve to be withdrawn through said liner under the biasing action of said spring; a movable contact assembly including a metallic contact sleeve secured to and movable with said inner sleeve at its outer end, contact means carried by said contact sleeve for contact engagement with said first arcing contact and constituting a second arcing contact, and a conducting arm extending from said contact sleeve outwardly of said housing; a trailer of arc extinguishing material connected to and movable with said first arcing contact into said liner for cooperating therewith to confine the arc drawn between said arcing contacts between the outer surface of said trailer and the inner surface of said liner, a metallic support adapted to be rigidly mounted on said live line tool and having contact means for engagement with said current carrying member to operate the same into and out of engagement with said terminal contact member by manipulation of said live line stick, and means flexibly mounting said conducting arm on said metallic support.

13. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a tubular insulating housing; a stationary contact assembly at one end of said housing including a rigid conductor having its inner end secured to said one end of said housing and extending endwise into the same, a contact arm connected to said inner end of said rigid conductor and extending outwardly of said housing for engagement with said terminal contact member, a movable first arcing contact in endwise spaced relation to the outer end of said rigid conductor, conducting means interconnecting said movable arcing contact and said rigid conductor, a spring interconnecting said arcing contact and said rigid conductor, and a latch engaging shoulder carried by said rigid conductor; an inner insulating sleeve slidably mounted within said tubular housing, a liner of arc extinguishing material within said inner sleeve near its outer end, a tubular metallic sleeve slidably mounted within said liner and secured at its outer end to said first arcing contact and extending into said inner sleeve, and a latch carried by said inner sleeve and cooperating with said metallic sleeve to effect conjoint movement of said sleeves when said inner sleeve is moved outwardly of said housing, said latch being released from said inner sleeve on engagement with said latch engaging shoulder to permit said first arcing contact and said metallic sleeve to be withdrawn through said liner under the biasing action of said spring; a movable contact assembly including a metallic contact sleeve secured to and movable with said inner sleeve at its outer end, contact means carried by said contact sleeve for contact engagement with said first arcing contact and constituting a second arcing contact, a conducting arm extending from said contact sleeve outwardly of said housing, and an outer extension on said contact sleeve providing a chamber to receive products of the arc drawn between said arcing contacts; a trailer of arc extinguishing material connected to and movable with said first arcing contact into said liner for cooperating therewith to confine the arc drawn between said arcing contacts between the outer surface of said trailer and the inner surface of said liner, a hollow light transmitting plug extending into the outer end of said contact sleeve extension and closing off the outer end of said chamber, a metallic support adapted to be rigidly mounted on said live line tool and having contact means for engagement with said current carrying member to operate the same into and out of engagement with said terminal contact member by manipulation of said live line stick, and means flexibly mounting said conducting arm on said metallic support.

14. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a tubular insulating housing; a stationary contact assembly at one end of said housing including a rigid conductor having its inner end secured to said one end of said housing and extending endwise into the same, a contact arm connected to said inner end of said rigid conductor and extending outwardly of said housing for engagement with said terminal contact member, a movable first arcing contact in endwise spaced relation to the outer end of said rigid conductor, conducting means interconnecting said movable arcing contact and said rigid conductor, a coil spring interconnecting said arcing contact and said rigid conductor, and a latch engaging shoulder carried by said rigid conductor; an inner insulating sleeve slidably mounted within said tubular housing, a liner of arc extinguishing material within said inner sleeve near its outer end, a tubular metallic sleeve slidably mounted within said liner and secured at its outer end to said first arcing contact and extending into said inner sleeve, and a latch carried by said inner sleeve and cooperating with said metallic sleeve to effect conjoint movement of said sleeves when said inner sleeve is moved outwardly of said housing, said latch being released from said inner sleeve on engagement with said latch engaging shoulder to permit said first arcing contact and said metallic sleeve to be withdrawn through said liner under the biasing action of said spring; a movable contact assembly including a metallic contact sleeve secured to and movable with said inner sleeve at its outer end, contact means carried by said contact sleeve for contact engagement with said first arcing contact and constituting a second arcing contact, a conducting arm extending from said contact sleeve outwardly of said housing, and an outer extension on said contact

sleeve providing a chamber to receive products of the arc drawn between said arcing contacts; a trailer of arc extinguishing material connected to and movable with said first arcing contact into said liner for cooperating therewith to confine the arc drawn between said arcing contacts between the outer surface of said trailer and the inner surface of said liner, a hollow light transmitting plug extending into the outer end of said contact sleeve extension and closing off the outer end of said chamber and having one or more radially extending vents normally closed by said housing for venting said chamber when the same is moved out of said housing, screen means within said plug overlying said vents, a metallic support adapted to be rigidly mounted on said live line tool and having contact means for engagement with said current carrying member to operate the same into and out of engagement with said terminal contact member by manipulation of said live line stick, and means flexibly mounting said conducting arm on said metallic support.

15. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a tubular insulating housing having a longitudinally extending slot at one end; a stationary contact assembly at the other end of said housing including a rigid conductor having its inner end secured to said other end of said housing and extending endwise into the same, a contact arm connected to said inner end of said rigid conductor and extending radially of said housing for engagement with said terminal contact member, a movable first arcing contact in endwise spaced relation to the outer end of said rigid conductor, a flexible conductor interconnecting said movable arcing contact and said outer end of said rigid conductor, a coil spring surrounding said flexible conductor and interconnecting said arcing contact and said rigid conductor, and a latch engaging shoulder carried by said outer end of said rigid conductor; an inner insulating sleeve slidably mounted within said tubular housing, pin and slot means in said housing and sleeve respectively to guide the latter in its movement in the former, a liner of arc extinguishing material within said inner sleeve near its outer end, a tubular metallic sleeve slidably mounted within said liner and secured at its outer end to said first arcing contact and extending to said inner end of said inner sleeve, a latch carried by said inner end of said inner sleeve and cooperating with the inner end of said metallic sleeve to effect conjoint movement of said sleeves when said inner sleeve is moved outwardly of said housing, said latch being released from said inner sleeve on engagement with said latch engaging shoulder to permit said first arcing contact and said metallic sleeve to be withdrawn through said liner under the biasing action of said spring; a movable contact assembly including a metallic contact sleeve secured to and movable with said inner sleeve at its outer end, a plurality of flexible contact fingers secured to and disposed around the inner periphery of said contact sleeve for peripheral contact engagement with said first arcing contact and constituting a second arcing contact, a conducting arm rigid with and extending radially from said contact sleeve through said slot and along said housing toward said one end thereof, and an outer extension on said contact sleeve providing a chamber to receive products of the arc drawn between said arcing contacts; a trailer of arc extinguishing material connected to and movable with said first arcing contact into said liner for cooperating therewith to confine the arc drawn between said arcing contacts between the outer surface of said trailer and the inner surface of said liner, a hollow light transmitting plug extending into the outer end of said contact sleeve extension and closing off the outer end of said chamber and having one or more radially extending vents normally closed by said housing for venting said chamber when the same is moved out of said housing, a metallic screen within said plug overlying said vents, a metallic support adapted to be rigidly mounted on said live line tool and having contact means for engagement with said current carrying member to operate the same into and out of engagement with said terminal contact member by manipulation of said live line stick, and means flexibly mounting said conducting arm on said metallic support.

16. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member swingable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a tubular insulating housing having a longitudinally extending slot at its outer end; a stationary contact assembly at the inner end of said housing including a rigid conductor having its inner end secured to said inner end of said housing and extending endwise into the same, a contact arm connected to said inner end of said rigid conductor and extending radially of said housing for engagement with said terminal contact member, a movable first arcing contact in endwise spaced relation to the outer end of said rigid conductor, a flexible conductor interconnecting said movable arcing contact and said outer end of said rigid conductor; a coil spring surrounding said flexible conductor and interconnecting said arcing conductor and said rigid conductor, and a latch engaging shoulder carried by said outer end of said rigid conductor; an insulating cap enclosing said inner end of said housing, an inner insulating sleeve slidably mounted within said tubular housing, pin and slot means in said housing and sleeve respectively to guide the latter in its movement in the former, a radially inwardly extending shoulder at the inner end of said inner sleeve, a liner of arc extinguishing material within said inner sleeve near its outer end, a tubular metallic sleeve slidably mounted within said liner and secured at its outer end to said first arcing contact and extending to said inner end of said inner sleeve, a latch carried by said inner end of said inner sleeve and cooperating with the inner end of said metallic sleeve to effect conjoint movement of said sleeves when said inner sleeve is moved outwardly of said housing, said latch being released from said inner sleeve on engagement with said latch engaging shoulder to permit said first arcing contact and said metallic sleeve to be withdrawn through said liner under the biasing action of said spring, and a stop projecting radially from said metallic sleeve for engaging said shoulder at said inner end of said inner sleeve; a movable contact assembly including a metallic contact sleeve secured to and movable with said inner sleeve at its outer end, a plurality of flexible contact fingers secured to and disposed around the inner periphery of said contact sleeve for peripheral contact engagement with said first arcing contact and constituting a second arcing contact, a conducting arm rigid with and extending radially from said contact sleeve through said slot and along said housing toward its inner end, and an outer extension on said contact sleeve providing a chamber to receive products of the arc drawn between said arcing contacts; a trailer of arc extinguishing material connected to and movable with said first arcing contact into said liner for cooperating therewith to confine the arc drawn between said arcing contacts between the outer surface of said trailer and the inner surface of said liner, a hollow light transmitting plug extending into the outer end of said chamber and having one or more radially extending vents normally closed by said housing for venting said chamber when the same is moved out of said housing, a metallic screen within said plug overlying said

vents, a metallic support adapted to be rigidly mounted on said live line tool and having contact means for engagement with said current carrying member to operate the same into and out of engagement with said terminal contact member by manipulation of said live line stick, and means flexibly mounting said conducting arm on said metallic support.

17. A circuit interrupter comprising, in combination, a tubular insulating housing; a stationary contact assembly at one end of said housing including a rigid conductor having its inner end secured to said one end of said housing and extending endwise into the same, a movable first arcing contact in endwise spaced relation to the outer end of said rigid conductor, conducting means interconnecting said movable arcing contact and said rigid conductor, a spring interconnecting said arcing contact and said rigid conductor, and a latch engaging shoulder carried by said rigid conductor; an inner insulating sleeve slidably mounted within said tubular housing, a liner of arc extinguishing material within said inner sleeve near its outer end, a tubular metallic sleeve slidably mounted within said liner and secured at its outer end to said first arcing contact and extending into said inner sleeve, and a latch carried by said inner sleeve and cooperating with said metallic sleeve to effect conjoint movement of said sleeves when said inner sleeve is moved outwardly of said housing, said latch being released from said inner sleeve on engagement with said latch engaging shoulder to permit said first arcing contact and said metallic sleeve to be withdrawn through said liner under the biasing action of said spring; a movable contact assembly including a metallic contact sleeve secured to and movable with said inner sleeve at its outer end, and contact means carried by said contact sleeve for contact engagement with said first arcing contact and constituting a second arcing contact; a trailer of arc extinguishing material connected to and movable with said first arcing contact into said liner for cooperating therewith to confine the arc drawn between said arcing contacts between the outer surface of said trailer and the inner surface of said liner, and means for moving said contact sleeve outwardly of said housing to effect separation of said arcing contacts.

18. A circuit interrupter comprising, in combination, a tubular insulating housing; a stationary contact assembly at one end of said housing including a rigid conductor having its inner end secured to said one end of said housing and extending endwise into the same, a movable first arcing contact in endwise spaced relation to the outer end of said rigid conductor, conducting means interconnecting said movable arcing contact and said rigid conductor, a spring interconnecting said arcing contact and said rigid conductor, and a latch engaging shoulder carried by said rigid conductor; an inner insulating sleeve slidably mounted within said tubular housing, a liner of arc extinguishing material within said inner sleeve near its outer end, a tubular metallic sleeve slidably mounted within said liner and secured at its outer end to said first arcing contact and extending into said inner sleeve, and a latch carried by said inner end of said inner sleeve and cooperating with said metallic sleeve to effect conjoint movement of said sleeves when said inner sleeve is moved outwardly of said housing, said latch being released from said inner sleeve on engagement with said latch engaging shoulder to permit said first arcing contact and said metallic sleeve to be withdrawn through said liner under the biasing action of said spring; a movable contact assembly including a metallic contact sleeve secured to and movable with said inner sleeve at its outer end, contact means carried by said contact sleeve for contact engagement with said first arcing contact and constituting a second arcing contact, and an outer extension on said contact sleeve providing a chamber to receive products of the arc drawn between said arcing contacts; a trailer of arc extinguishing material connected to and movable with said first arcing contact into said liner for cooperating therewith to confine the arc drawn between said arcing contacts between the outer surface of said trailer and the inner surface of said liner, a hollow light transmitting plug extending into the outer end of said contact sleeve extension and closing off the outer end of said chamber and having one or more radially extending vents normally closed by said housing for venting said chamber when the same is moved out of said housing, screen means within said plug overlying said vents, and means for moving said contact sleeve outwardly of said housing to effect separation of said arcing contacts.

19. A circuit interrupter comprising, in combination, an insulating housing having a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, cylindrical contact means in endwise spaced relation to one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, and a plurality of contact fingers engaging the periphery of said contact means at said one end of said bore, said housing having out flared grooves at said one end of said bore individual to and of less peripheral extent than the portions of said contact fingers in engagement with said contact means whereby on separation thereof an arc drawn therebetween is confined by said trailer and the surface of the groove in which the arc is formed to a location intermediate the longitudinal edges of the contact finger individual to said groove.

20. A circuit interrupter comprising, in combination, an insulating housing having a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, annular contact means in endwise spaced relation to one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, means extending through said annular contact and interconnecting the same and said trailer, and a plurality of contact fingers engaging the periphery of said contact means at said one end of said bore, said housing having out flared grooves at said one end of said bore individual to and of less peripheral extent than the portions of said contact fingers in engagement with said contact means whereby on separation thereof an arc drawn therebetween is confined by said trailer and the surface of the groove in which the arc is formed to a location intermediate the longitudinal edges of the contact finger individual to said groove.

21. A circuit interrupter comprising, in combination, an insulating housing, a liner in said housing having a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, cylindrical contact means in endwise spaced relation to one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, and a plurality of contact fingers engaging the periphery of said contact means at said one end of said bore, said liner having out flared grooves at said one end of said bore individual to and of less peripheral extent than the portions of said contact fingers in engagement with said contact means whereby on separation thereof an arc drawn therebetween is confined by said trailer and the surface of the groove in which the arc is formed to a location intermediate the longitudinal edges of the contact finger individual to said groove.

22. A circuit interrupter comprising, in combination, an insulating housing, a liner in said housing having a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, tongue and

groove means on said housing and liner to hold the same in predetermined relation, cylindrical contact means in endwise spaced relation to one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, and a plurality of contact fingers engaging the periphery of said contact means at said one end of said bore, said liner having out flared grooves at said one end of said bore individual to and of less peripheral extent than the portions of said contact fingers in engagement with said contact means whereby on separation thereof an arc drawn therebetween is confined by said trailer and the surface of the groove in which the arc is formed to a location intermediate the longitudinal edges of the contact finger individual to said groove.

23. A circuit interrupter comprising, in combination, an insulating housing having a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, cylindrical contact means at one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, and a plurality of contact fingers surrounding said trailer and engaging the periphery of said contact means at said one end of said bore and extending lengthwise away therefrom, there being longitudinally extending slots between said contact fingers providing passageways for the discharge of the products of the arc drawn on separation of said contact means and said contact fingers.

24. A circuit interrupter comprising, in combination, an insulating housing having a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, cylindrical contact means at one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, and a plurality of contact fingers surrounding said trailer and engaging the periphery of said contact means at said one end of said bore and extending lengthwise away therefrom, there being longitudinally extending slots between said contact fingers providing passageways for the discharge of the products of the arc drawn on separation of said contact means and said contact fingers, said housing having outflared grooves at said one end of said bore individual to and of less peripheral extent than the portions of said contact fingers in engagement with said contact means whereby on separation thereof an arc drawn therebetween is confined by said trailer and the surface of the groove in which the arc is formed to a location intermediate the longitudinal edges of the contact fingers individual to said groove.

25. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a support member adapted to be rigidly mounted on said live line stick, an auxiliary circuit interrupter flexibly mounted on said support member and having limited freedom of movement relative to said live line stick, said interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said movable current carrying member and when closed providing a shunt circuit therebetween, manipulation of said support member by said live line stick disengaging said movable current carrying member from said terminal contact member while said shunt circuit is maintained, said auxiliary circuit interrupter having a tubular insulating housing alongside of said support member, and means mounted on one of the last named elements and swingable into engagement with the other for holding said auxiliary circuit interrupter rigidly with respect to said support member and said live line stick.

26. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a support member adapted to be rigidly mounted on said live line stick, an auxiliary circuit interrupter flexibly mounted on said support member and having limited freedom of movement relative to said live line stick, said interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said movable current carrying member and when closed providing a shunt circuit therebetween, manipulation of said support member by said live line stick disengaging said movable current carrying member from said terminal contact member while said shunt circuit is maintained, said auxiliary circuit interrupter having a tubular insulating housing alongside of said support member, a brace pivotally mounted on said support member and swingable into operative relation to said housing for holding said auxiliary circuit interrupter rigidly with respect to said support member and said live line stick.

27. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination a live line stick of insulating material, a strut adapted to be rigidly mounted on said live line stick and to constitute an endwise extension thereof and having contact means rigid therewith and extending transversely thereof for engagement with said movable current carrying member and to operate the same into and out of engagement with said terminal contact member by manipulation of said live line stick, a contact finger connected to said strut at a position spaced from said contact means and biased into engagement with said movable current carrying member to maintain contact therewith, an auxiliary circuit interrupter mounted on said strut and having contact means for connection to said terminal contact member and additional contact means for connection to said contact means on said strut and when closed providing a shunt circuit between said terminal contact member and said current carrying member, manipulation of said strut by said live line stick disengaging said movable current carrying member from said terminal contact member while said shunt circuit is maintained, and means for operating said interrupter to open said shunt circuit after said movable current carrying member disengages said terminal contact member.

28. A live line handling tool for mounting on a live line stick comprising, in combination, a strut adapted to be rigidly mounted on said stick, a prong carried by said strut and extending transversely thereof for engaging an energized member of an electrical device to shift it from one position to another, and a contact finger movably mounted on said strut in coplanar relation thereto and to said prong and biased away from said strut to have engagement with said energized member and to maintain contact therewith, said contact finger having an elongated opening through which said prong projects.

29. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying line current comprising, in combination, an auxiliary circuit interrupter having a relatively fixed conducting member for attachment to a stationary energized conducting part of said

circuit isolating device and a relatively movable conducting member adapted to be carried by a live line stick means mounting said conducting members for relative movement toward and away from each other, a contact arm on said movable member for mechanical and electrical attachment to a movable energized conducting part of said circuit isolating device, a pair of conjointly movable separable contacts in said circuit interrupter connected respectively to said fixed and movable conducting members, movement of said movable conducting member away from said fixed conducting member effecting separation of said movable energized conducting part from said stationary energized conducting part and conjoint movement of said separable contacts away from said fixed conducting member while maintaining a shunt circuit between said parts through said contacts, and means effective when said contacts have been conjointly moved through a predetermined extent to separate the same and open said shunt circuit.

30. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying line current comprising, in combination, an auxiliary circuit interrupter having a relatively fixed conducting member for attachment to a stationary energized conducting part of said circuit isolating device and a relatively movable conducting member adapted to be carried by a live line stick means mounting said conducting members for relative movement toward and away from each other, a contact arm on said movable member for mechanical and electrical attachment to a movable energized conducting part of said circuit isolating device, first and second conjointly movable separable contacts in said circuit interrupter, means flexibly connecting said first contact to said fixed conducting member, means connecting said second contact to said movable conducting member for conjoint movement therewith, movement of said movable conducting member away from said fixed conducting member effecting separation of said movable energized conducting part from said stationary energized conducting part and conjoint movement of said separable contacts away from said fixed conducting member while maintaining a shunt circuit between said parts through said contacts, and means effective when said contacts have been conjointly moved through a predetermined extent to move said first contact away from said second contact and open said shunt circuit.

31. A circuit interrupter comprising, in combination, relatively fixed and movable conducting members adapted to be connected to an electric circuit, a pair of conjointly movable separable contacts in said circuit interrupter uninterruptedly connected respectively to said fixed and movable conducting members, means holding said contacts in contact engagement while they are being moved conjointly, movement of said movable conducting member away from said fixed conducting member effecting conjoint movement of said separable contacts away from said fixed conducting member, means for releasing said holding means, and means cooperating with one of said separable contacts on operation of said holding means to separate the same from the other contact in the direction of the conducting member to which it is connected to open the circuit therethrough.

32. A circuit interrupter comprising, in combination, relatively fixed and movable conducting members adapted to be connected to an electric circuit, first and second conjointly movable separable contacts in said circuit interrupter, means flexibly connecting said first contact to said fixed conducting member, means uninterruptedly connecting said second contact to said movable conducting member for conjoint movement therewith, means holding said contacts in contact engagement while they are being moved conjointly, movement of said movable conducting member away from said fixed conducting member effecting conjoint movement of said separable contacts away from said fixed conducting member, means for releasing said holding means, and means cooperating with said first contact on operation of said holding means to move the same away from said second contact toward said relatively fixed conducting member to open the circuit therethrough.

33. A circuit interrupter comprising, in combination, relatively fixed and movable conducting members adapted to be connected to an electric circuit, a pair of separable contacts in said circuit interrupter uninterruptedly connected respectively to said fixed and movable conducting members, and cojointly movable while in contact engagement movement of said movable conducting member away from said fixed conducting member effecting conjoint movement of said separable contacts therewith away from said fixed conducting member, and spring means increasingly tensioned as a function of the distance said conducting members are relatively moved apart to move one of said contacts away from the other in the direction of the conducting member to which it is connected to open the circuit therethrough.

34. A circuit interrupter comprising, in combination, relatively fixed and movable conducting members adapted to be connected to an electric circuit, a pair of separable contacts in said circuit interrupter uninterruptedly connected respectively to said fixed and movable conducting members, and conjointly movable while in contact engagement movement of said movable conducting member away from said fixed conducting member effecting conjoint movement of said separable contacts therewith away from said fixed conducting member, spring means increasingly tensioned as a function of the distance said conducting members are relatively moved apart to move one of said contacts away from the other in the direction of the conducting member to which it is connected to open the circuit therethrough, latch means cooperating with said contacts to hold them in engagement against the biasing force of said spring means, and means for releasing said latch means when said conducting members have been relatively moved apart through a predetermined extent.

35. A circuit interrupter comprising, in combination relatively fixed and movable conducting members adapted to be connected to an electric circuit, first and second conjointly movable separable contacts in said circuit interrupter, means flexibly connecting said first contact to said fixed conducting member, means uninterruptedly connecting said second contact to said movable conducting member for conjoint movement therewith, and with said first contact while said first and second contacts are in contact engagement movement of said movable conducting member away from said fixed conducting member effecting conjoint movement of said separable contacts away from said fixed conducting member, and spring means increasingly tensioned as a function of the distance said conducting members are relatively moved apart to bias said first contact away from said second contact toward said relatively fixed conducting member to open the circuit therethrough.

36. A circuit interrupter comprising, in combination, relatively fixed and movable conducting members adapted to be connected to an electric circuit, first and second conjointly movable separable contacts in said circuit interrupter, means flexibly connecting said first contact to said fixed conducting member, means uninterruptedly connecting said second contact to said movable conducting member for conjoint movement therewith, movement of said movable conducting member away from said fixed conducting member effecting conjoint movement of said separable contacts away from said fixed conducting member, spring means tensioned as a function of the distance said conducting members are relatively moved apart to bias said first contact away from said second contact toward said relatively fixed conducting member to open the circuit therethrough, latch means cooperating with said

contacts to hold them in engagement against the biasing force of said spring means, and means for releasing said latch means when said conducting members have been relatively moved apart through a predetermined extent.

37. A circuit interrupter comprising, in combination, a tubular insulating housing having a conducting member secured thereto carrying externally extending contact making means, an inner insulating sleeve relatively slidably mounted within said housing having a conducting member secured thereto carrying externally extending contact making means, a pair of cojointly movable separable contacts in said sleeve connected respectively to said conducting members, movement of said sleeve relatively away from said housing effecting conjoint movement of said separable contacts away from said conducting member on said housing, and means for separating said contacts to open the circuit therethrough.

38. A circuit interrupter for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying line current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith comprising, in combination, a tubular insulating housing having a conducting member secured thereto carrying externally extending contact making means for electrical connection to said contact member, an inner insulating sleeve relatively slidably mounted within said housing having a conducting member secured thereto carrying externally extending contact making means for electrical connection to said current carrying member, a pair of conjointly movable separable contacts in said sleeve connected respectively to said conducting members, movement of said sleeve relatively away from said housing effecting conjoint movement of said separable contacts away from said conducting member on said housing, and means for separating said contacts within said sleeve as a result of its movement to a given position relatively away from said housing.

39. A circuit interrupter for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying line current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith comprising, in combination, a tubular insulating housing having a conducting member secured thereto carrying externally extending contact making means for electrical connection to said contact member, an inner insulating sleeve relatively slidably mounted within said housing having a conducting member secured thereto carrying externally extending contact making means for electrical connection to said current carrying member, a pair of conjointly movable separable contacts in said sleeve connected respectively to said conducting members, movement of said sleeve relatively away from said housing effecting conjoint movement of said separable contacts away from said conducting member on said housing, spring means operatively interconnecting said housing and one of said contacts and acting to bias the latter for movement away from the other contact with a force depending upon the extent of relative movement apart of said housing and sleeve, and means for releasing said one contact for movement under the influence of said spring to open the circuit through said contacts.

40. Mechanism for opening a high voltage circuit isolating device such as a disconnecting fuse, disconnecting switch or the like, normally carrying current and having a normally energized terminal contact member and a current carrying member movable into and out of engagement therewith by manipulation of a live line stick, said mechanism comprising, in combination, a live line stick of insulating material, a support member adapted to be rigidly mounted on said live line stick, an auxiliary circuit interrupter flexibly mounted on said support member and having limited freedom of movement relative to said live line stick, said interrupter having contact means for connection to said terminal contact member and additional contact means for connection to said movable current carrying member and when closed providing a shunt circuit therebetween, manipulation of said support member by said live line stick disengaging said movable current carrying member from said terminal contact member while said shunt circuit is maintained, said auxiliary circuit interrupter having a tubular insulating housing alongside of said support member, and means cooperating with said support member to hold the same rigid with respect to said tubular insulating housing.

41. A circuit interrupter comprising, in combination, a tubular insulating housing having a pair of inwardly opening spaced annular grooves intermediate its ends, a liner removably telescoped within said housing and overlying said grooves and having a bore from which an arc extinguishing medium is evolved due to the heat of an arc, resilient O rings within said grooves and engaging the juxtaposed outer surface portions of said liner to provide fluid tight sealing engagement therewith, cylindrical contact means in endwise spaced relation to one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, and a plurality of contact fingers engaging the periphery of said contact means at said one end of said bore.

42. A circuit interrupter comprising, in combination, relatively fixed and movable conducting members adapted to be connected to an electric circuit, a pair of conjointly movable separable contacts in said circuit interrupter connected respectively to said fixed and movable conducting members, movement of said movable conducting member away from said fixed conducting member effecting conjoint movement of said separable contacts therewith away from said fixed conducting member, spring means tensioned as a function of the distance said conducting members are relatively moved apart to move one of said contacts away from the other to open the circuit therethrough, latch means cooperating with said contacts to hold them in engagement against the biasing force of said spring means, means for releasing said latch means when said conducting members have been relatively moved apart through a predetermined extent to permit said spring means to separate said contacts, and means for positively separating said contacts on further relative movement apart of said conducting members in the event that the same is not effected by said spring means.

43. A circuit interrupter comprising, in combination, an insulating housing having a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, cylindrical contact means in endwise spaced relation to one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, and a plurality of contact fingers engaging the periphery of said contact means at said one end of said bore, said housing having out flared grooves at said one end of said bore individual to and of less peripheral extent than the portions of said contact fingers in engagement with said contact means whereby on separation thereof an arc drawn therebetween is confined by said trailer and the surface of the groove in which the arc is formed to a location intermediate the longitudinal edges of the contact finger individual to said groove, one root of the arc being located on an end surface of one of said contact fingers, said cylindrical contact means having a surface inwardly of the peripheral surface thereof on the side toward and spaced from said trailer onto which the other arc root is moved by gas generated from the

surface of said bore and the surface of the trailer by the heat of the arc.

44. A circuit interrupter comprising, in combination, an insulating housing having a bore from the surface of which an arc extinguishing medium is evolved due to the heat of an arc, cylindrical contact means in endwise spaced relation to one end of said bore and movable into and substantially filling the same, a trailer of insulating material capable of evolving an arc extinguishing medium when subjected to the heat of an arc and movable with said contact means into said bore, and a plurality of contact fingers engaging the periphery of said contact means at said one end of said bore, one root of the arc being located on one of said contact fingers, said cylindrical contact means having a surface inwardly of the peripheral surface thereof on the side toward and spaced from said trailer onto which the other arc root is moved by gas generated from the surface of said bore and the surface of the trailer by the heat of the arc.

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