March 19, 1968 G. BROCKHAUS ET AL 3,374,331

ELECTRICAL COUPLING IN WHICH MAKING AND BREAKING OF CONDUCTORS IS WITHIN CASING FILLED WITH AN INSULATING MEDIUM

Filed May 26, 1965 5 Sheets-Sheet 1

FIG.2

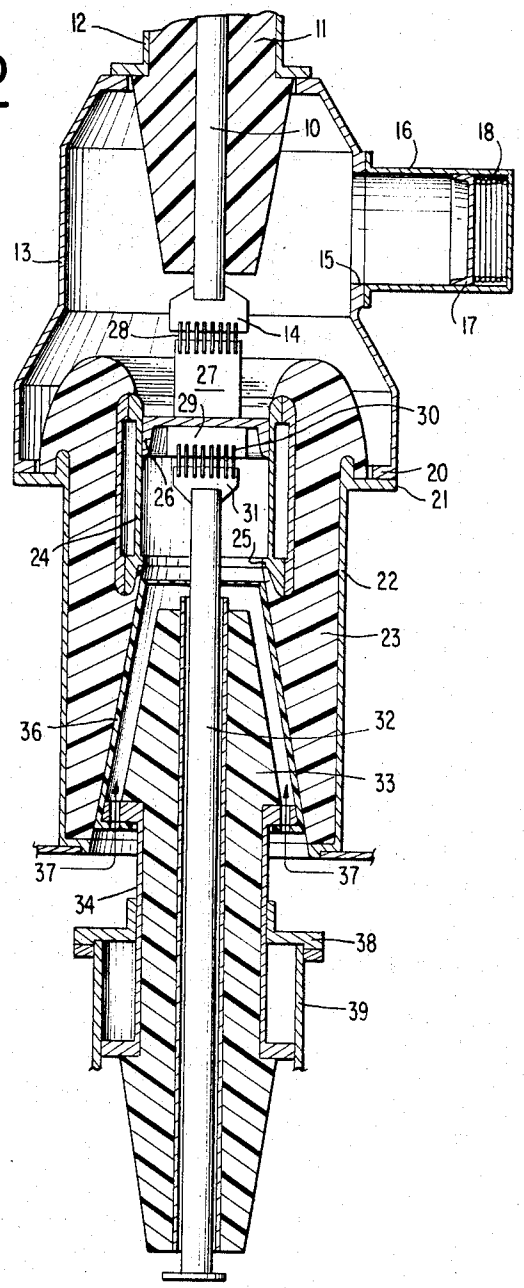
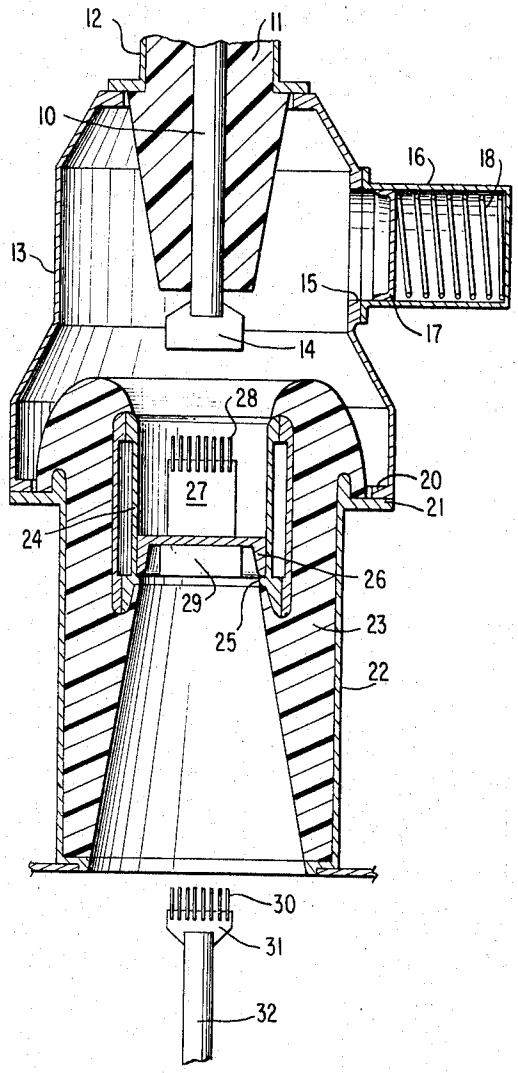


FIG.1



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ELECTRICAL COUPLING IN WHICH MAKING AND BREAKING OF CONDUCTORS IS WITHIN CASING FILLED WITH AN INSULATING MEDIUM

Filed May 26, 1965 5 Sheets-Sheet 2

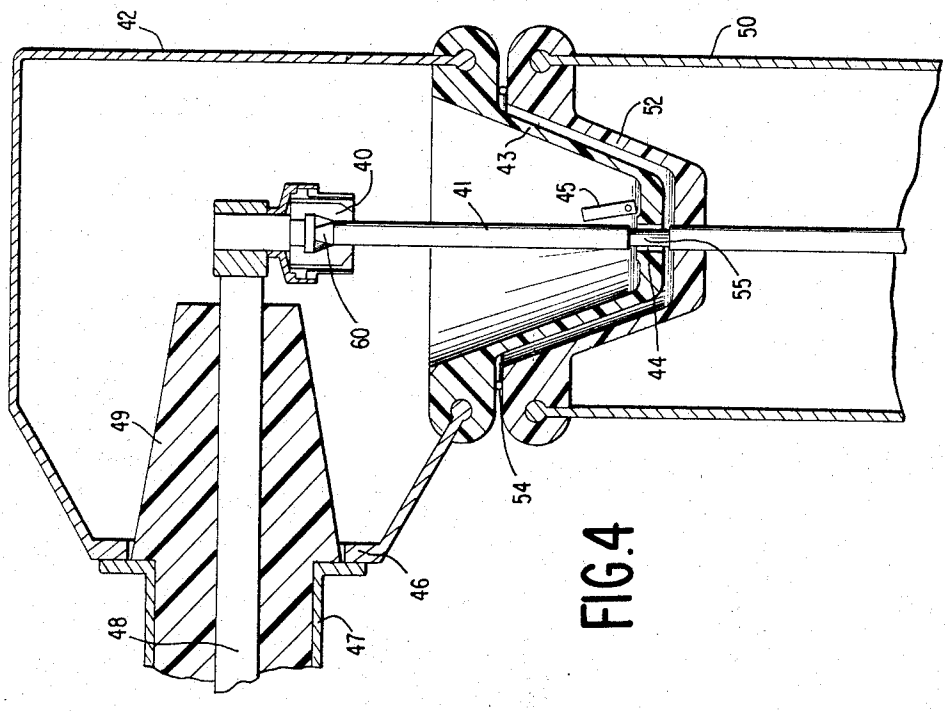

FIG.4

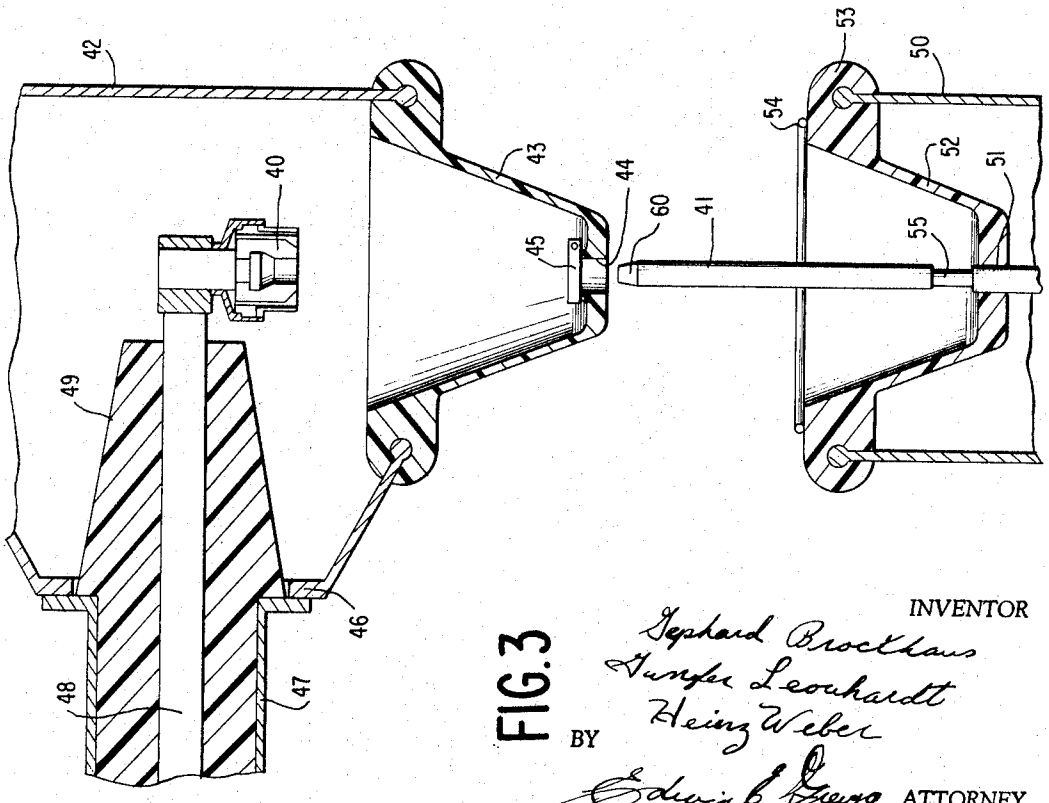

FIG.3

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ELECTRICAL COUPLING IN WHICH MAKING AND BREAKING OF CONDUCTORS IS WITHIN CASING FILLED WITH AN INSULATING MEDIUM

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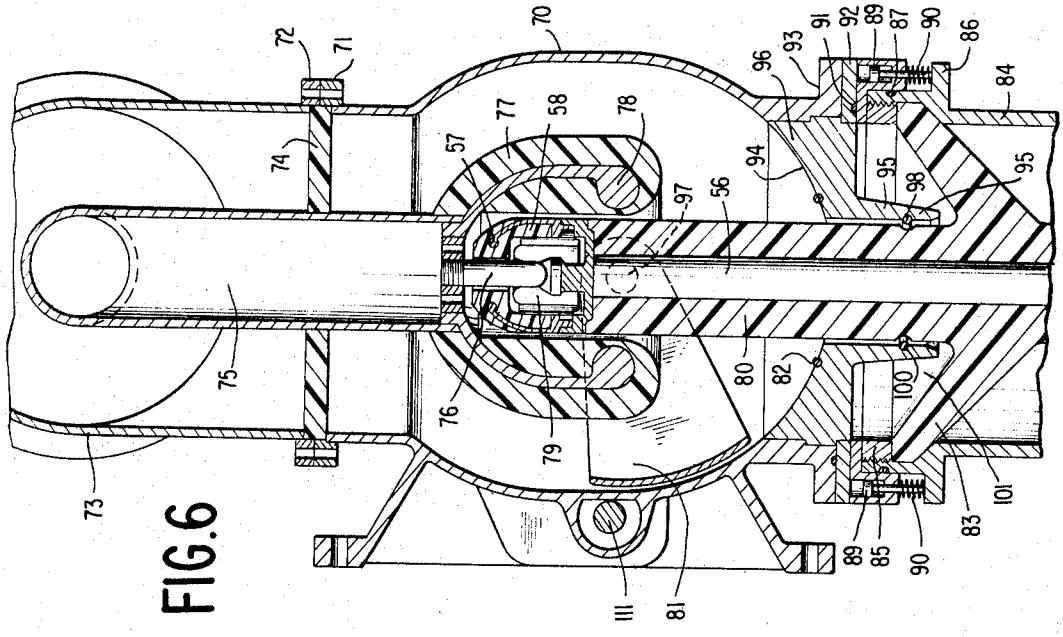

FIG.6

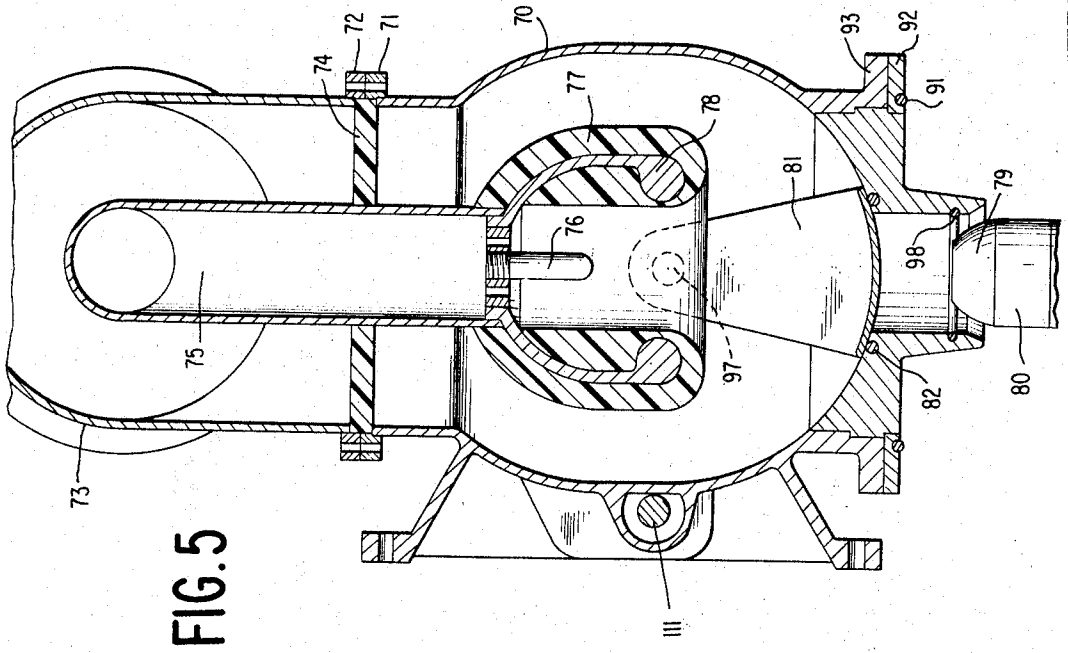

FIG.5

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ELECTRICAL COUPLING IN WHICH MAKING AND BREAKING OF CONDUCTORS IS WITHIN CASING FILLED WITH AN INSULATING MEDIUM

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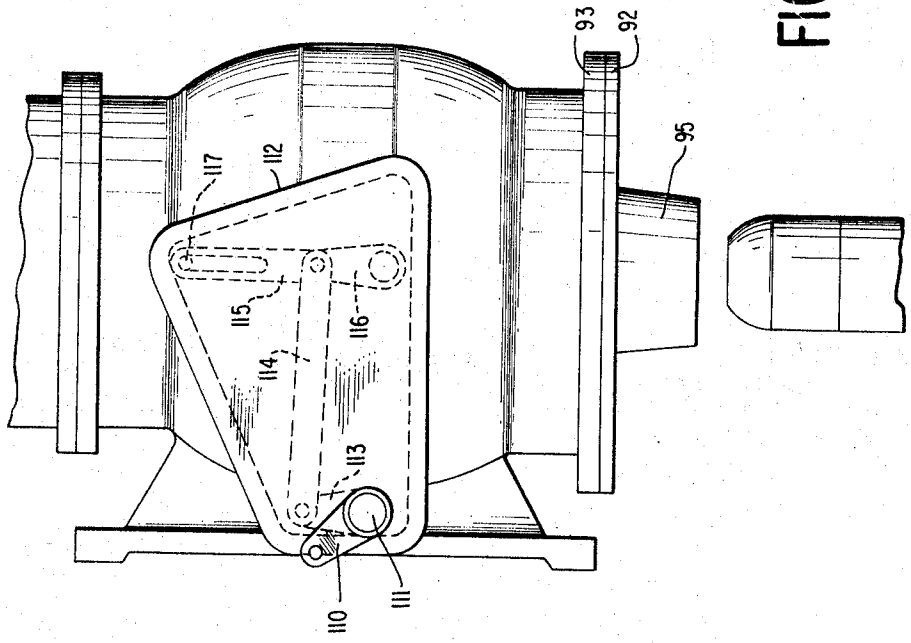
FIG.8



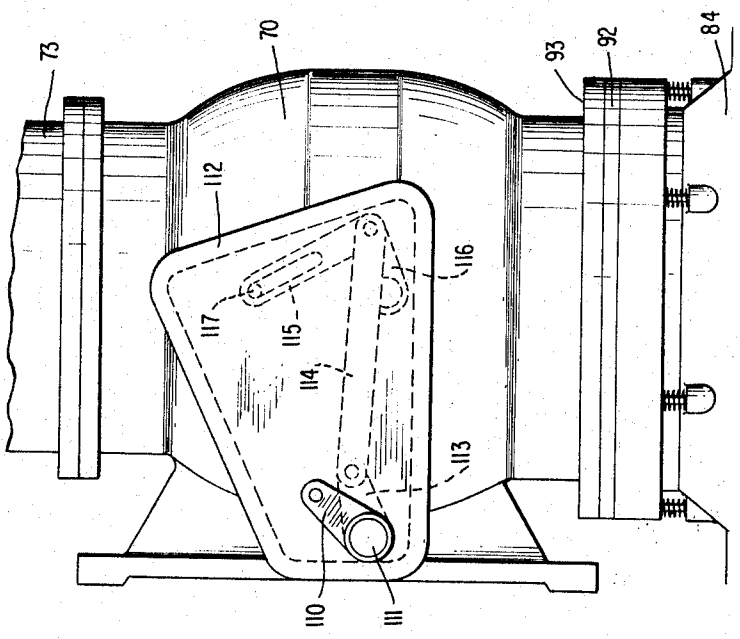


FIG.7

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ELECTRICAL COUPLING IN WHICH MAKING AND BREAKING OF CONDUCTORS IS WITHIN CASING FILLED WITH AN INSULATING MEDIUM

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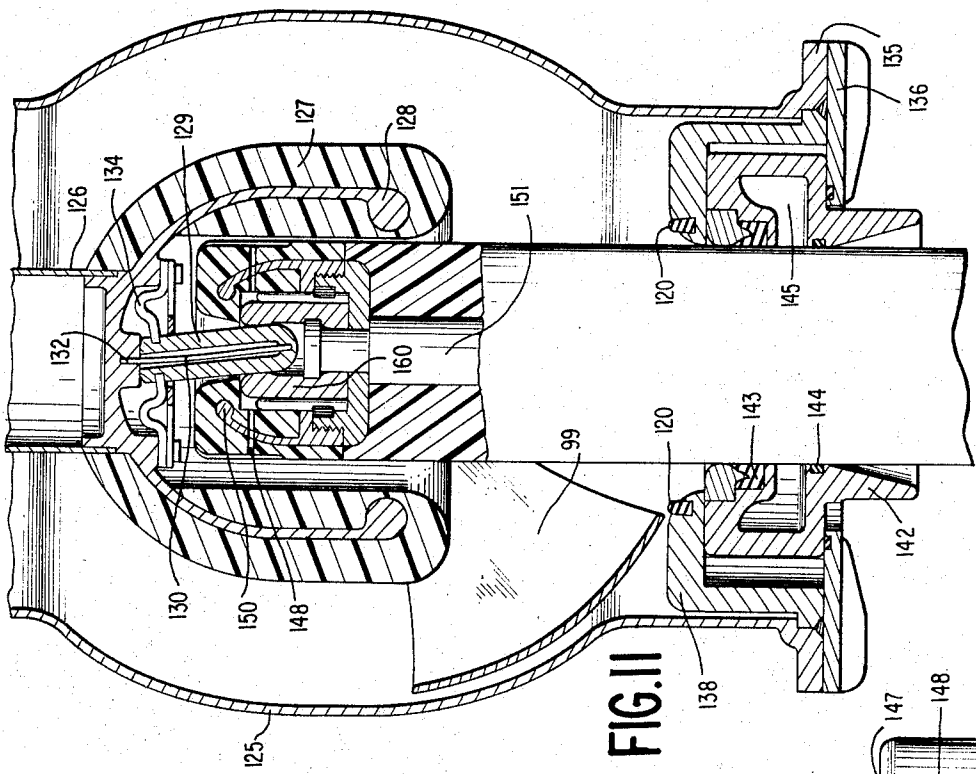

FIG. 11

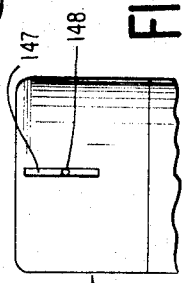

FIG. 10

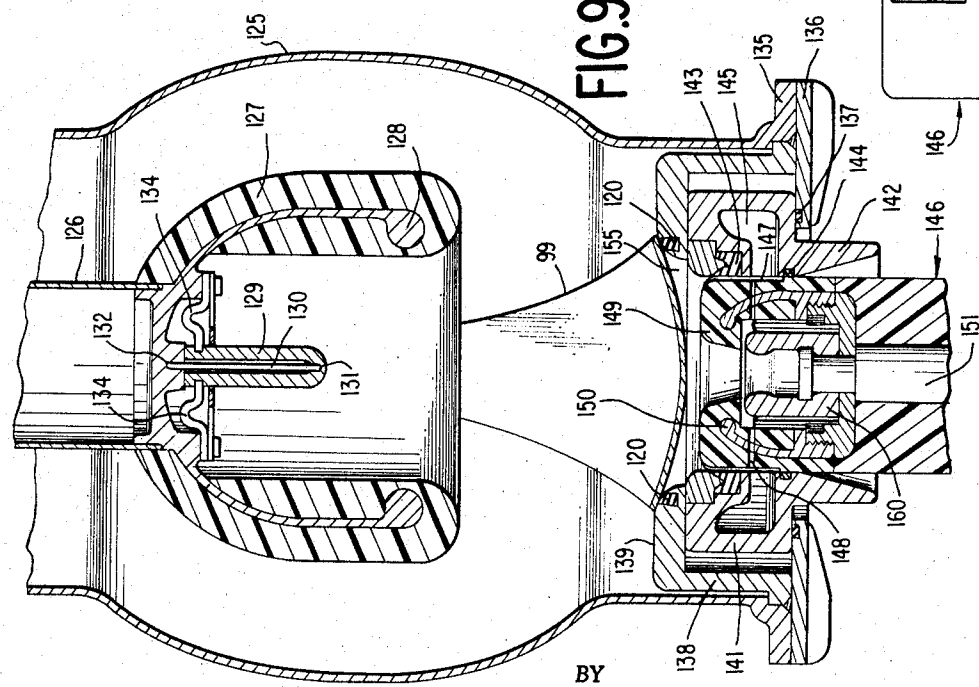

FIG. 9

BY

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Patented Mar. 19, 1968

3,374,331

ELECTRICAL COUPLING IN WHICH MAKING AND BREAKING OF CONDUCTORS IS WITHIN CASING FILLED WITH AN INSULATING MEDIUM

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Filed May 26, 1965, Ser. No. 458,982
Claims priority, application Germany, May 27, 1964, C 32,984
10 Claims. (Cl. 200—144)

ABSTRACT OF THE DISCLOSURE

This invention relates to improvements in high tension conductors, the making and breaking of the electrical contacts of the circuit of which takes place in a casing filled with an insulating medium. The principal advantage of this construction enables the disengagement of the electrical contacts within the insulated casing and withdrawal of one contact from the casing without appreciable loss of the insulating medium.

This invention relates to improvements in coupling means for high tension conductors and, more particularly, conductors of the type which are completely immersed in an insulation medium such as oil, non-conductive gas, cast resin, or the like, the insulant being contained in a grounded envelope.

It is presently known to provide high-tension conductors of this general type which may be positioned close to similar elements that are at a different potential and they, therefore, permit installations for high voltages to be compactly designed. Difficulties arise, however, where mobile components of installations, such as mobile trucks containing power-circuit breakers, are required to be connected or disconnected to the system under potential. The connection and disconnection of such insulated conductors, when carrying voltages of 100 K.V. or at even higher voltages, have been impossible with conventional coupling and uncoupling means when the spacing of conductors is reduced to take full advantage of the efficiency of this kind of insulation.

Thus, the invention has among its objects to provide a coupling for high tension conductors of the type referred to by the use of which the above-mentioned difficulties can be easily avoided.

According to the invention, there is provided a coupling for high tension conductors which are immersed in an insulating medium with the coupling including contact members that are adapted to be disengaged in a substantially permanently closed casing filled with an insulating medium, and from which no significant quantities of the insulating medium can escape and within which casing disengagement of the high tension conductors takes place before the conductor insulation is separated and a break in the air is formed and wherein the contacts are not re-engaged until the air break and the conductor insulation have first been closed.

In a coupling of this type the described sequence of operations may be automatically performed when the coupling members are pushed together or pulled apart. Furthermore, in such a coupling the conductor insulant may be a solid, a liquid, or a gas, and it is unimportant whether the insulant is any one of these mediums provided the insulant in the casing wherein the engagement and disengagement takes place is filled with a fluid medium. Of utmost importance is the fact that the engaging and disengaging operation is effected between solid walls so that no insulation medium can escape.

The construction taught herein, it will be observed, can be made so that the casing, together with the auxiliary spacer gap, form one movable wall which is provided with diametrically disposed contact pieces adapted to be interconnected on the inside of the casing as well as the outside thereof, through the medium of another contact member interposed between the first contact piece positioned in the casing and a secondary movable contact, the elements being so arranged that when coupling is to be achieved, the insulant which is displaced from within on the casing is forced into an accumulator that is positioned over a perforation in an aperture in the casing, and subsequently returned to the casing upon withdrawal or disconnection of the last named contact. The accumulator can be constructed in the form of a cylinder provided with a reciprocable piston, as shown, or a bellows, or invertible sleeve.

Thus, according to the principal object of this invention, there is provided an improved high tension coupling means in which at least one electrical contact is positioned in a closed insulation-filled chamber or container with access to the chamber or container being gained by a means positioned exteriorly thereof which supports another electrical contact means.

Another object of the invention is to provide an improved valve and operating means therefor which permits the making and breaking of the electrical contacts without loss of the insulation medium.

A further object of the invention is to include as a part of the closed chamber or casing an improved accumulator or storage chamber for the displaced insulant.

Another object of the invention is to provide intermediately disposed electrical contact means movably mounted in the insulant-filled chamber.

A still further object of the invention is to provide a linkage means which, upon actuation by the second electrical contact means, oscillates the valving means into an inoperative position, thereby permitting coupling of the contacts.

Yet another object of the invention is to provide a slidable orifice valve in one wall of the insulant chamber or container, the orifice valve being capable of lateral movement to longitudinally align the cooperating electrical contacts when they are moved relatively toward each other.

Other objects and advantages will become apparent upon a further reading of the following detailed description taken in conjunction with the drawings, in which:

FIG. 1 is a cross-sectional elevational view of one embodiment of a coupling illustrating the contacts in disengaged position;

FIG. 2 is a cross-sectional elevational view of the coupling of this embodiment of the invention shown in fully engaged circuit-making relation;

FIG. 3 is a cross-sectional elevational view of another embodiment of the invention showing the contacts in fully disengaged position;

FIG. 4 is a cross-sectional elevational view of the contacts shown in FIG. 3 in fully engaged position;

FIG. 5 is a cross-sectional elevational view of a third embodiment in accordance with the invention showing the contacts in disengaged position;

FIG. 6 is still another cross-sectional elevational view of the third embodiment of the invention with the contacts in fully engaged position;

FIG. 7 is an elevational view of the exterior of the casing with the electrical contacts in fully engaged position and the linkage mechanism shown in dotted lines;

FIG. 8 is an elevational view of the same embodiment

of the invention showing the electrical contacts disengaged and the linkage in dotted outline;

FIG. 9 is a cross-sectional elevational view of still another embodiment of the invention showing one of the contacts being prepared for movement through an orifice for engagement with a contact member;

FIG. 10 shows a horizontal elevational view of the movable contact member; and

FIG. 11 is a view partially in elevation and partially in cross-section of the contact in fully engaged position within the casing.

Turning now to the drawings, and more particularly to FIG. 1, a first electrical conductor **10** is connected to a bus-bar system (not shown). This conductor **10** is embedded in a cast resin envelope **11** that is telescoped by a metal sheath **12** and projects downwardly therefrom into the casing or container **13** which is filled with oil, or an insulating gas, such as sulfahexafluoride. Positioned at the free end of the first electrical conductor **10**, which projects from the cast resin envelope, is a contact **14** which is shown in elevation. One portion of the wall of the casing or container **13** is apertured as at **15**, flanged as shown and adapted to receive a cylinder **16** which contains a piston **17** pre-loaded by a spring **18**. The casing **13** is provided with an annular inturned flange portion **20** which is adapted to be received on an outwardly projecting annular ledge portion **21** which is integrated into a grounding tubular means **22** within which is positioned a generally tubular hollow cast resin body **23**. The hollow cast resin body **23** is provided with a central aperture extending therethrough and adapted at its upper portion to telescope a metallic cylinder member **24** which is provided at its lowermost extremity with an inturned annular shelf portion **25** which is adapted to receive a piston member **26** which is adapted to movably support an electrical contact member **27**. It is to be noted that the upper extremity of the contact member **27** is provided with a plurality of contact fingers **28** which are adapted to be received within complemental contact means provided within the element **14**.

Beneath the piston **26** and arranged to be movably supported thereby is another contact member **29** which is also shown in elevation, this contact member being open to the atmosphere. Contact member **29** is provided in its lower surface with a series of electrical contacts (not shown) within which the plurality of contact fingers **30**, supported on the carrier **31**, are adapted to project the last named carrier being positioned on the extremity of a conductor **32** carried by a piece of mobile equipment.

Referring now to FIG. 2, it will be noted that the carrier **32**, which extends through a cast resin member **33** the intermediate portion of its longitudinal extremity being provided with a metallic sleeve **34**, has together therewith been moved into a fully engaged contacting position. The sleeve **34** is provided with an annular outturned perforated flange **35** to which is secured an inverted substantially frusto-conical cup-shaped plastic member **36**, the lower inturned annular perforated flange portion of which is suitably secured to the perforated flange **35**. It will be noted that the interior diverging wall of the cast resin body **23** is substantially frusto-conical and complementally formed to the perimeter of the frusto-conical plastic sleeve **36**. As indicated by the arrows **37**, the interior of the plastic sleeve **36** can be pressurized by the introduction thereinto of a gas through the coincident apertured flanges, as described, thereby moving the plastic sleeve **36** into firm engagement with the internal frusto-conical face of the cast resin body **23** and aligning all of the series of contact elements into fully engaged position, as shown.

The elements **38** and **39** are the only portions represented of a piece of mobile equipment which may be, for example, a truck for a retractable power circuit breaker, these parts being mounted thereon. When the electric circuit breaker is to be disengaged, these elements are moved

downwardly together with the conductor **32** and as a consequence, the piston **26** and contact carrier member **27** are lowered into a disengaged position and at which time the preloaded piston **17** is forced by means of spring **18** into its position as shown in FIG. 1 which assists in breaking the contact between elements **14** and **28** and thereby returning the piston **26** to its lowermost position as shown in FIG. 1.

As is obvious from a study of these drawings, the disengagement of contacts **14** and **28** occurs inside the insulating medium within the casing **13**. During the course of the further retraction of the contact carrier means **32**, the contacts **29** and **31** are fully disengaged. In order to completely disengage all the contacts thereby moving the telescoped sleeve **34** downwardly within elements **38** and **39**, the pressure medium, as shown as being applied at **37**, must be released.

When the coupling is disengaged, the piston **17** is displaced by the preloaded spring **18**, to the left as viewed in FIG. 1, and piston **26** moves downwardly; thus contact **14**, which carries the potential remains completely immersed in the insulating medium in the casing **13** and does not come into contact with the ambient air. When the coupling is to be re-engaged, the described sequence of events proceed in the reverse order.

Turning at this time to another embodiment of the invention, the coupling elements of which are best shown in FIG. 3 and disposed in disengaged position are comprised of a fixed coupling member **40** as well as the movable coupling and conductor member **41**, the casings surrounding both of which are filled with an insulating medium. In this embodiment of the invention there is, as was described in connection with FIGS. 1 and 2, a gas-filled envelope or container **42**, the opening in one wall of which there is secured an offstanding hollow frusto-conical cast resin member **43**, the reduced extremity of which is provided with an aperture **44** and a pivotable valve means **45** to prevent loss from within the casing **42** of the insulation medium. Another wall portion of the casing is provided with an inturned annular flange **46** adapted to have secured thereto in any suitable manner a flanged sleeve **47**. The contact member **40** is secured at the free end of a conductor **48** which extends through a cast resin body **49** which projects into the insulation-filled chamber **42**, as shown.

With further reference to FIG. 3, it will be noted that the conductor **41**, which is supported within the gas-filled tubular member **50**, projects therefrom through an aperture **51** provided in a downwardly extending frusto-conical cast resin body **52**, the outer flanged portion **53** of which encases the extremity of the tubular casing **50**, as shown.

By referring at this time to FIG. 4, which shows the conductors in fully engaged position, it will be noted that the frusto-conical cast resin bodies **43** and **52** are maintained in spaced gas-sealing relation by means of the O-ring **54** which is carried by the upwardly extending wall of the cast resin body **52**, thereby permitting gas to escape from within the casing **42** around the hairspring biased valve **45** and the reduced portion of the conductor **55** formed in the conductor and thence into the area between the two spaced complementally formed bodies **43** and **52**.

From an examination of FIGS. 3 and 4, it will be observed that the conductor member **41** includes a contact engaging member **60**, of reduced area, which merges into the conductor member **41**, the perimeter of which is of an otherwise substantially constant area throughout its length except for the reduced portion **55** and is thus adapted to completely close the aperture **44** when the members are brought into engagement thereby releasing only an insignificant amount of gas from within the chamber **42** to the temporary chamber formed between the spaced bodies **43** and **52**. When the contacts are disengaged and the elements moved relatively away from

each other, then conductor member **41** is withdrawn from the casing **42**; and the pivotal valve **45** will be quickly snapped into closed position by means of a spring (not shown).

In a further embodiment of the invention best shown in FIGS. 5 and 6, there is a gas-filled metallic casing **70** which is secured to an annular flange **71** perforated, as shown, and adapted to abut and to be secured to a complementally perforated flange **72** which is secured to a stationary tubular element **73**. An insulative partition **74** is interposed between the fixed portion of the assembly **73** and the upper portion of the gas chamber **70** and is adapted to telescope the cylindrical conductor body **75**, thus confining the insulative gas to casing **70**.

Disposed within the lower extremity of the cylindrical body **75**, and supported in a dependent position generally axially thereof, is an elongated contact **76** which is shrouded by an inverted cup- or bonnet-shaped insulation member **77** which confines an electrode means **78** therewithin, as shown.

In FIG. 5, the movable contact means shown at **79** carried by conductor **56** is provided at its upper extremity with an electrode **57** encased in a bonnet **58** and encased in a cast resin body **80** as has been explained heretofore in connection with the other embodiments of the invention. In this view, the movable valve means **81** positioned within the metallic gas-filled casing **70** is shown in a closed position and in engagement with a sealing means **82** and is constructed to operate in a manner now to be described and will be best understood from an examination of the views in FIGS. 6, 7 and 8.

The cast resin body **80** is provided with an integrated inverted umbrella-shaped portion **83**, the perimeter of which is secured to the inner circumferential area of the tubular means **84** by a threaded ring **85**. The tubular means **84** includes an annular circumferential offstanding rim **86** and an O-ring **87** which is recessed into the perimeter of the tubular means **84** and is surrounded by a ring **88** provided with a dependent portion constituting a trough means, the last named means being provided with a plurality of vertically extending apertures for a purpose that will be described now. A series of bolts **89, 89**, the heads of which are confined in the annular trough means, have their shank portions projecting downwardly through the perforations in the troughed ring **88**, said shank portions being encompassed by springs **90, 90** which are positioned between the annular rim **86** and the horizontally extending area of the perforated ring **88**, thus urging the ring upwardly against an O-ring **91** carried by a bearing plate **92** which abuts the flanged portion **93** of the gas-filled casing **70**.

Positioned within the lower portion of the casing **70**, and including a concave wall **94** which conforms to the general configuration of the lower portion of the casing for a purpose to be described and including a downwardly extending neck **95**, is an insulation member **96** which includes O-ring sealing means **98**. Through the medium of a linkage system best shown in FIGS. 7 and 8 which will now be described, the valve means **81** is rotated to the inoperative position shown in FIG. 6 about pivot **97**, this being accomplished by the projection of the movable conductor **56** through the neck **95** upwardly into the gas-filled chamber where it establishes a circuit-making connection with the complemental contact **76**. The cast resin body **80** is provided with an annular channel **100**, as shown, which permits a limited quantity of gas to leak from the casing when the conductor is projected into the gas-filled casing past an O-ring **98** into a secondary chamber **101**. It will be apparent that as the conductor **56**, together with its surrounding cast resin covering **80**, is moved into the casing **70** to make contact as explained. that only a small amount of gas will be permitted to leak from the casing by the sliding engagement of the circumferential area of said member **80** over the O-ring **98**.

The linkage means which accomplishes the function of oscillating the valve **81** to its inoperative position, best shown in FIG. 6, to thereby permit engagement of the conductors **76** and **82** is best shown in FIGS. 7 and 8.

An elongated means, not shown, which may extend from any suitable position on the casing is secured to the rotatable link means **110** which pivots about the relatively fixed point **111**.

In the phantom lines of FIGS. 7 and 8 which depicts members that are confined within the cover plate **112**, there is shown the means by which the valve means **99** is rotated to its open and closed positions. A stub shaft **113** is pivotally secured at each end, one end to the point **111** and at its opposite end to an elongated substantially perpendicularly disposed elongated lever means **114**, the last named lever means being pivotally connected to oppositely extending links **115** and **116**, respectively. Link **115** is slotted, as shown, and confined to a predetermined path of travel relatively about a fixed pin **117** under the influence of lever **114** thereby oscillating the valve means **99** to and from its open and closed positions as will be readily understood from an examination of these views.

Although the means for accomplishing this additional operation are not illustrated in any of the views, it is also contemplated that the movable valve will be first lifted from the sealing means (**82** in FIG. 6 and **120** in FIGS. 9 and 11) before it is rotated to either its operative or inoperative position illustrated and conversely for returning the valve means to its position above said sealing means as the contacts are disengaged and before it is finally pressed into firm contact with the sealing means.

A still further embodiment of the invention is shown in FIGS. 9, 10 and 11.

In FIG. 9 there is shown a gas-filled chamber or casing **125** of the type similar to those previously described in connection with the other embodiments of this invention and supported substantially centrally thereof by the fragmentarily illustrated cylindrical conductor means **126** is the cup- or bonnet-shaped cast resin means **127** which surrounds the electrode **128**, all of which will be understood from the previous description of this invention.

Positioned within the confines and depending axially of said bonnet means **127** is a first electrical contact **129**, the interior of which is hollow, as shown. An elongated spring means **130** extends the full length of the hollow contact **129** and has one end fixed therein as shown at **131** with its upper end being fastened securely within the cast resin body, as at **132**.

The hollow first electrical contact means includes a depressed or channel area at its upper portion, as shown, and is adapted to receive therein a series of radially extending flexible current carrying means **134**.

The gas-filled chamber **125** is provided with a flanged opening **135** to which is secured an annular ring **136** which, in turn, is provided at its upper surface with a sealing means **137**, as shown. Projecting upwardly into the gas-filled chamber and supported on the ring **136** is a collar **138** which includes an inturned an annular flange portion **139** that is provided with a sealing means **120** adapted to cooperate with the valving means denoted as **99** and also previously described in connection with embodiments of FIGS. 5 and 6. Confined between the ring **136** and the annular flange **139** of the collar **138** is a laterally shiftable orifice member **141** which includes a downwardly extending neck portion **142** that extends through the opening in the ring **136**. Vertically spaced sealing means **143** and **144**, respectively, provide a chamber **145** for a purpose now to be described.

The movable contact carrying body generally indicated as **146** includes at least a pair of vertically extending slots **147** in the side wall which communicate with horizontally extending perforations **148** that extend through the upwardly extending bonnet **149** as well as the electrode **150**.

Thus, as the movable conductor or contact **151** is moved upwardly into contact with the diverging walls of the neck

portion 142, it first engages sealing means 144, then sealing means 143, and simultaneously therewith, the valve means 99 is being lifted from its seat 140 and rotated to the position shown in FIG. 11. It will be apparent at this time that the air, which is trapped in the space 155, is permitted to escape through the vertically extending channels 147 provided in the bonnet 149 so long as the slots permit access to the chamber 145. However, as the secondary contact 151 continues to move upwardly, its circumferential wall 146 will come into engagement with the lower sealing means 144, at which time the spill chamber 145 is sealed and communicates only with the interior of space 155. It is to be understood, of course, that both spaces 145 and 155 are filled with air at atmospheric pressure. However, when the lower sealing means 144 is first brought into sealing engagement with the slotted area of bonnet 149, the pressurized insulating gas contained in chamber 125 flows through the slot 147 and channels or perforations 148 into the spill chamber 145 until the pressures are equalized. Therefore, as the flow of insulating gas displaces the greater proportion of the air contained in space 155 into the spill chamber 145, only a fraction of the insulating gas in chamber 125 is thus mixed with air. During the course of the further advance of the secondary or movable contact 151, the ends of slots 147 pass over the seal 143 which separates the gas-filled chamber 125 from chamber 145 and then as the movable contact is brought into complete engagement with the first contact, chamber 145 is vented to atmosphere.

In view of the foregoing, it will be appreciated that as the movable secondary contact 151 with its surrounding cast resin body, generally depicted at 146, is withdrawn, the slots 147 will first communicate with chamber 145 before the movable valve means 99 has swung back to its former operative position and in contact with seal means 120. Accordingly, as the coupling is continued to be withdrawn from the area, best shown in the view in FIG. 9, chamber 145 also fills with a gas-air mixture at the same pressure as that in chamber 125 and this mixture is finally discharged to atmosphere as the movable valve means 99 is fully seated on seal means 120. During the course of making and breaking of the electrical contacts within the gas-filled chamber 125, there is a minimal amount of gas loss from said chamber. However, this is replaced by pure insulating gas from a storage chamber through a constant pressure device, not shown, in the drawing.

It will be appreciated in view of the foregoing that each time the movable contact member is introduced into the gas-filled container 125, a given volume of air from space 155 will be pushed into chamber 125 which is filled with the insulating gas, and as a result of this pressure increase in this chamber and the consequent overspill into chamber 145, a given volume of gas-air mixture escapes into the atmosphere. It will be also understood by those skilled in the art that by appropriately designing space 155, slots 147, horizontal channels or perforations 148 for a given gas pressure in chamber 125 and by suitably designing the capacity of the spill chamber 145, the proportions of the gas-air mixture in chamber 125 can be maintained substantially constant.

By virtue of the described arrangement of elements, any further increase in the quantity of diluting air in the insulating gas can be prevented when the proportion of air in the insulating gas is as high as that introduced by the air which is forced into the casing upon insertion of the movable coupling member thereinto. Experience with this construction has shown that the air content of the insulating gas may rise to about 10% without any adverse effect upon the resultant efficiency of the insulation. The percentage of air in the insulating gas can be controlled within desired limits by appropriate design of the slot in the movably mounted secondary conductor means or coupling member, by modifying the capacity of the spill chamber in the entry tube of the fixed coupling member as well as the gas pressure maintained in the fixed coupling member, although only to the extent of preventing the proportion of air in the insulating gas from rising to a level beyond which it would not be permissible.

Referring at this time to FIG. 11, it will be noted that the flexibility of the fixed contact 129 referred to earlier in this disclosure in conjunction with the lateral mobility of the orifice valve 142 and the rounded shape of the contact element 160 in the movable contact 151, ensures that a good electrical connection between the movable and fixed coupling members is established even if the two coupling members are not in precise registry when moved relatively to each other.

Although several embodiments of the invention have been depicted and described, it will be apparent that these embodiments are illustrative in nature and that a number of modifications in the apparatus and variations in its end use may be effected without departing from the spirit or scope of the invention as defined in the appended claims.

That which is claimed is:

1. A coupling for high tension conductors for electric circuit breakers including relatively stationary and movable conductive members of the type that are immersed in an insulative medium in the coupled position thereof and wherein the movable conductive member is arranged in ambient air in the uncoupled position comprising, a closed container filled with a fluid insulation, means defining an opening in said container, movable closure means closing said opening in the uncoupled position of said high tension conductors, further closure means associated with the movable conductive member cooperating with the means defining the opening and adapted to retain the fluid in said container and prevent emission thereof through the means defining the opening during coupling and uncoupling operation of the conductive members, said relatively stationary conductive member being arranged in said container in substantially axial alignment with the means defining the opening in said container, said movable conductive member being movable through the means defining the opening to couple said conductive members and establish a circuit.

2. A coupling for high tension conductors as claimed in claim 1, wherein means associated with the movable conductive member is formed complementally to the wall of said container.

3. A coupling for high tension conductors as claimed in claim 1, wherein the movable closure means in said container is pivotally mounted therein.

4. A coupling for high tension conductors as claimed in claim 3, wherein said movable conductive member is provided with linkage means, said last named means being adapted to pivot said closure means into an inoperative position when the movable conductive member is advanced into contact engaging relation with the relatively stationary conductive member and returned to an operative position with the movable conductive member is disengaged from the relatively stationary conductive member.

5. A coupling for high tension conductors as claimed in claim 1, wherein each of said relatively stationary and movable conductive members are provided with bonnet-shaped complementally formed insulation means.

6. A coupling for high tension conductors as claimed in claim 2, wherein the relatively stationary conductive member is provided with a bonnet-shaped insulation means.

7. A coupling for high tension conductors as claimed in claim 1, wherein the movable closure means cooperates with a slidable orifice valve, said slidable orifice valve adapted to longitudinally align the relatively stationary conductive member with the movable conductive member.

8. A coupling for high tension conductors as claimed in claim 1, wherein said relatively stationary conductive

member is provided with radially extending flexible current carrying means.

9. A coupling for high tension conductors for electric circuit breakers as claimed in claim **7**, wherein the slidable orifice valve includes spaced annular flanges, at least one of said flanges being provided with seal means, said seal means arranged to slidably receive a means carrying the movable conductive member.

10. A coupling for high tension conductors for electric circuit breakers as claimed in claim **9**, wherein the means carrying the movable conductive member includes a perforated wall portion, said perforated wall portion arranged to spill gas into a chamber formed adjacent to said seal means.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,374,331 March 19, 1968

Gerhard Brockhaus et al.

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 58, strike out "an", second occurrence; column 8, line 56, for "with" read -- when --.

Signed and sealed this 24th day of June 1969.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents