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ELECTRICAL CONNECTION FOR POTHEADS AND METHOD OF FORMING SAME

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Fig. 1.

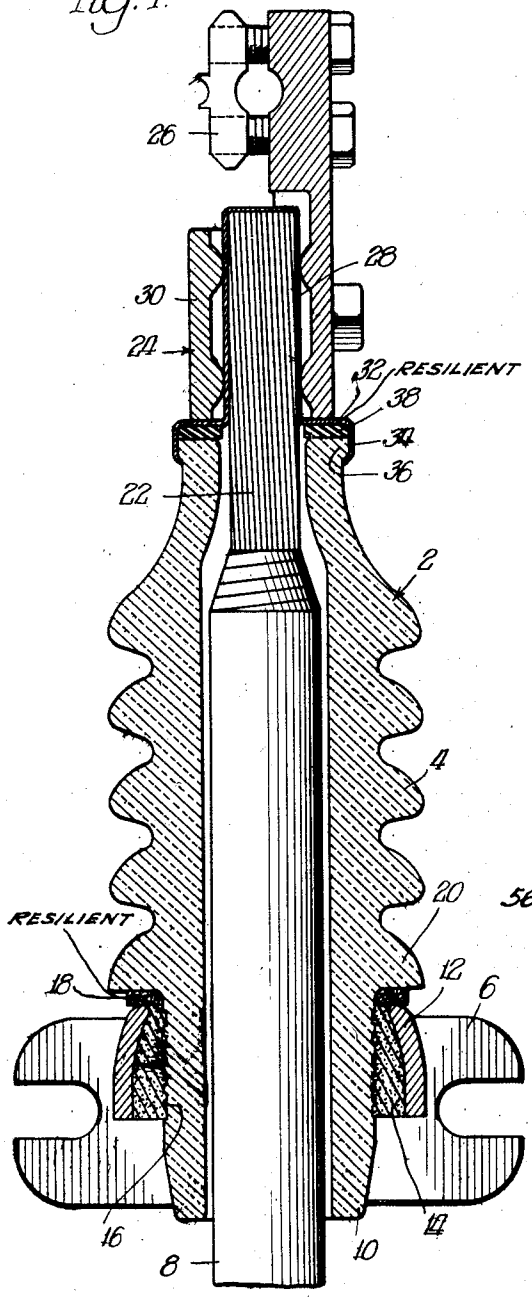
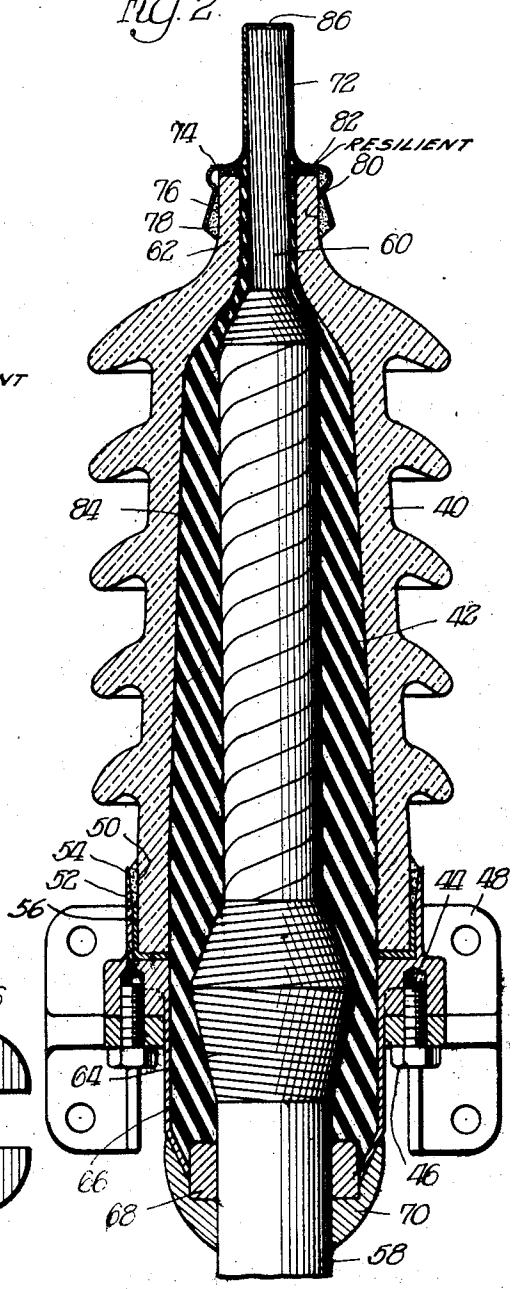


Fig. 2.



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ELECTRICAL CONNECTION FOR POTHEADS AND METHOD OF FORMING SAME

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6 Claims. (Cl. 174—75)

The present invention relates to electrical connections, and more in particular to novel electrical connections between cables in pothead assemblies and a novel method of assembling said connections.

Among the objects of the present invention is to provide a novel connection between cables in pothead assemblies, and a novel method of assembling the same.

Electrical connections of the type herein contemplated are characterized as embracing within their assembly a yieldable hood or closure member fitting the end of an insulating body and adapted to embrace the exposed conductor of a cable which extends through and beyond the open end of the insulating body and through which a connection to another cable is effected by way of clamping means or the like. Such connections as developed heretofore in the art have taken one of two forms, one of which may be referred to as being fixed or permanent in character wherein the hood or closure member is permanently affixed to the insulating body, and the other of which is of the removable type wherein the yieldable hood or closure member serves as an element to lock the cable to the said insulating body.

Although a connection according to the first above-named type provides an electrical conducting relation between the cables of the pothead assembly, nevertheless the same possesses inherent deficiencies making its use highly restricted in the field. The most glaring defect of such assembly resides particularly in the form of connection between the yieldable hood or cap and the insulator body which is permanent in character and is such that the same cannot be made in the field. This relegates this type of construction to an inferior position in the art in that before the pothead assembly can be shipped it is necessary to permanently connect the yieldable cap or hood to the procelain insulator body in the shop. This form of connection, although permanent in character, has the latent defect that it is not readily replaceable to accommodate various type and sizes of cables which it may be desired to use in the assembly where changes are to be made. Inasmuch as the connection between the hood and insulating body can be made only in the shop, the connection between the cables in the field must be made with the insulating body closed at its top, which greatly increases the difficulties in making field connections between these cables particularly where the space available is limited. As another contributing factor making imperfect connections the rule and not the exception, the cable must be cut before introduction into the pothead device, which operation makes it extremely difficult to effect a perfect connection between the cable and the yieldable hood or closure member. This latter factor is of considerable importance where space limitations are the dominant consideration in assembling the unit in the field, and also where certain types of clamping mechanisms require that the cable conductor extend to the full extent of the hood to prevent damage to the said hood when the clamping mechanism is applied thereto.

The second type of assembly alluded to hereinabove is characterized by certain features attempting to avoid the difficulties experienced with the first-named type of assembly. This type embodies in its construction a connector attached to the cable and which has threaded engagement with the yieldable cap or hood and is provided with one or more lugs adapted to cooperate with opposed lugs or shoulders formed on the interior of the insulating body of the pothead. This form has the advantage of ready replaceability necessary in devices of the type herein contemplated, yet considerable difficulty has been experienced with such assemblies in that a "blind" connection must be made between the cable and the yieldable cap or closure. That is to say, should the said cable be cut too short, the connector will not properly seat with the insulating body or a bushing associated therewith, and if the cable is cut too long said cable becomes distorted in assembled relation with the pothead assembly, which may result in electrical failure. It will be quite apparent from this description of the second type of assembly that its main disadvantage resides in the necessity for cutting the cable to the exact length, which becomes an extremely critical factor in the proper assembly of the various elements of the pothead device. Under the conditions which usually exist in the field, these operating conditions cannot be fulfilled, with the result that the connection is subject to electrical failure requiring further attention and adjustment, with possible damage which flows from such imperfect assemblies.

The present invention has therefore proceeded upon the theory of providing a novel connection of the type herein contemplated to overcome the defects inherently possessed by the said connections known at the present time, and to provide a novel method which can be readily followed

under field conditions for assembling said connections in the pothead devices to provide an effective electrical connection between cables of the said device.

More particularly, the present invention is grounded upon the desire to provide a novel electrical connection of the type herein disclosed which depends upon the incorporation of a yieldable connecting element serving in the dual capacity of an electrical conductor between cables and as a housing to perfect a seal between one of the said cables and the insulating body used as an element in the assembly.

Still a further object of the present invention is to provide a novel electrical connection such as hereinabove identified and characterized wherein the yieldable hood or closure member is connected to the insulating body in a novel manner to provide for its ready replaceability to make way for another closure member where change in the size of the cable with which the same is associated is contemplated without in any way destroying or injuring the said insulating body.

As a further object within the purview of the present invention, the said electrical connection hereinbefore described embraces within its defining characteristics a novel assembled relation to the insulating body such that the same is operatively connected to the said insulating body only as a last step in the assembling operation after the cable with which the same is associated is disposed within the said insulating body and cut to the desired length whereby a uniform and perfect fit is effected therebetween in conformity with predetermined requirements as to dimensions in accordance with the particular pothead assembly.

Still a further object of the present invention is to provide a novel method of assembling the various elements of a pothead device in accordance with the present disclosure, wherein the yieldable closure element for the said device can be connected to the insulating body after the cable has been assembled in predetermined relation to the insulating body.

As a further object of the present invention, various types and forms of connections between the yieldable closure cap or closure member and the insulating body are contemplated which may be readily effected in the field, such connections between the closure member and the insulating body being effected by crimping the closure member about or soldering the same to the insulating body, or otherwise providing a readily detachable connection between the two, facilitating the ready removal of the closure member without injuring in any way the insulating body when it is desired to replace or renew the said yieldable closure member.

Other objects, features, capabilities and advantages are comprehended by the invention, as will later appear and as are inherently possessed thereby.

Referring to the drawing:

Figure 1 is a fragmentary view in cross section of a pothead device incorporating an electrical connection member in accordance with the present invention; and

Figure 2 is a fragmentary view in cross section of another pothead device embodying another form of electrical connection, all in accordance with the present invention.

Referring now more in detail to the drawing, an embodiment selected to illustrate the present invention is disclosed in connection with a pothead assembly **2** comprising a hollow insulating body **4** in the form of a porcelain bushing mounted upon a bracket **6** and enclosing a cable **8**. This porcelain bushing is of somewhat conventional design having a lower open end portion **10** adapted to be received in and secured by supporting element **12** of the bracket **6** as by way of cementitious material **14** interlocking with the corrugated or roughened surface **16** of the said securing portion **10**, a resilient washer **18** being interposed between the supporting element **12** and an annular shoulder **20** provided on the said insulating body.

The cable **8** extends upwardly through the lower open end of the poreclain bushing and is unsheathed to lay bare its conductor **22** which extends through and beyond the upper open end of the insulating body or bushing, the same being connected by way of a connection generally referred to as **24** to one or more cables (not disclosed) which may be received within the clamping mechanism **26** of the said connection.

The present invention is particularly concerned with the construction of the connection **24** and primarily with the hood or closure member or cap **28** which, as shown in the embodiment of Figure 1, is constituted by a drawn tube of copper or the like adapted to embrace the exposed end of the conductor **22** beyond the insulating body **4**, this cap or hood being yieldable whereby a connection can be effected between the clamping element **30** of the connection and the said conductor **22** of the cable. The cap is further formed with an annular securing portion **32** formed with a depending flange **34** which is adapted to be bent inwardly to engage the annular shoulder **36** of the insulating body, a resilient or compressible washer **38** being provided between the annular and laterally extending securing portion **32** and the insulating body to provide a flexible connection between the hood and insulating body and the said cable conductor **22**.

In accordance with the present invention, the pothead assembly as above described is effected in most instances by moving the cable **8** with its conductor **22** exposed into position with the insulating body **4** whereby the said conductor extends through and beyond the open end of the said insulating body. The conductor is then severed in any desired manner to provide a length thereof above the open end of the insulating body conforming to predetermined dimensions and to accommodate the yieldable hood or closure member **28** so formed as to provide a substantially uniform contacting engagement over substantially its entire length with the said conductor **22** and to provide a connection to the insulating body **4** This hood is inserted in place after the cable and insulating member are disposed in proper relation to one another and the conductor cut to the proper length, after which the said depending flange **34** may be bent as by a crimping, spinning or clamping action to engage the annular marginal shoulder **36** of the insulating body with the gasket pressed to the desired amount in order to securely hold the elements in proper relation and to provide a fluid-tight housing preventing entrance of moisture and the like into the interior of the insulating body. After the yieldable hood or cap has been secured in the manner indicated, the clamping element **30** may be tightened about the yieldable hood to effect a connection between the same and the exposed cable conductor, after

which one or more cables can be secured by way of the clamping element 26 to effect an electrical conducting relation between said cables and the conductor 22.

It will be clearly apparent from the above that the securing of the hood in operative association with the conducting body is effected as a final step in the method of assembly which has certain desirable attributes in that the cable does not have to be cut or adjusted as to its length until after assembled in relation to the insulating body 4, after which the same may be cut as desired to conform to the particular yieldable hood or cap which is to be used to effect the connection. In an assembly of the type herein contemplated, the cutting of the cable is a critical operation which cannot be performed accurately unless the cable is disposed in its operative associated relation to the insulating body 4 and accordingly, inasmuch as the present assembly provides for this cutting to be effected only after the cable is associated with the insulating body, the exposed length of cable may be determined accurately in accordance with the requirements for the hood or cap, and as a result an effective connection is provided therebetween.

Furthermore, according to the present invention this yieldable hood or closure member is effectively connected by way of the crimping, spinning or clamping operation to engage the annular shoulder 36, which form of connection does not in any way injure or affect the porcelain insulator so that should it be desired to disassemble the pot head device and introduce another cable other than the one disclosed, the connection formed by way of the depending flange 34 can be readily and easily broken in the field and a substitute hood or closure cap inserted in place to conform to the requirements for the new cable. In addition, should replacement of the hood or closure member become necessary, the connection by way of the depending flange 34 may be similarly broken to permit removal of the yieldable cap 28 and the substitution of another one in its place.

Although the embodiment of Figure 1 is disclosed as comprising a yieldable closure or hood member formed with an upper closed end, nevertheless there may be situations requiring this to be open either in part or wholly during the assembling operation which is herein contemplated, the closure being effected upon completion of the assembly by means of a soldering operation or the like.

As an alternative form of assembly, the embodiment shown in Figure 2 has been selected as illustrating one form of construction which may be desirable in many cases, particularly where it is desired to use insulating compound in conjunction with the cable being used to effect the connection. In the embodiment of Figure 2, the pothead device comprises an insulating member 40 having a relatively large interior compartment 42 mounted within a supporting sleeve 44 which in turn is mounted on and secured as by way of bolts 46 or the like to a supporting bracket such as 48. In accordance with the assembly of Figure 2, the insulating body is constituted by a porcelain body having its surface as at 50 "metallized," which comprises the introduction of metal into its structure to give the said surface 50 the characteristics of a metal surface. The supporting sleeve 44 at its upper end is defined by a wall 52 surrounding in spaced relation the "metallized" surface 50 of the porcelain, the connection between the two being effected by way of a soldered joint 54 connected to the wall 52 and the "metallized" surface 50 of the porcelain, the joint between the two being further perfected by means of a gasket 56.

Introduced into the pothead device is a cable 58 which has its covering stripped to lay bare its conductor 60 which extends through and beyond the upper open end 62 of the insulating body 40. Said cable is provided with a built-up relief cone 64 which is introduced into the insulating body through an opening provided in the lower wall 66 of the supporting sleeve 44. The tight closure connection disclosed in the drawing between the cable 58 and the supporting sleeve 44 comprises a lead ring 68 disposed in the opening of the sleeve wall 66 which is enclosed or embraced by the soldered joint 70 disposed between the lead covering for the cable 58 and the annular wall 66 of the supporting sleeve effected by a wiping operation or the like.

The connection between the conductor 60 and other cable or cables (not disclosed) associated with the pothead device is effected in much the same manner as in Figure 1 of the drawing to provide a yieldable housing between the cable conductor and certain clamping or other securing means associated with the other cables of the assembly, and which yieldable housing serves to provide a fluid-tight joint for the upper end of the insulating body 40. The yieldable housing or hood 72 is formed with a tubular body portion much in the same manner as the yieldable hood or cap 28 of the first-described embodiment and which merges into a laterally disposed annular securing part 74 terminating in a downwardly diverging annular securing flange 76 adapted to provide a connecting medium with the insulating body 40 by way of a soldered joint 78 disposed therebetween and the opposed wall 80 of the insulating body which has been "metallized" as hereinbefore described.

As in the first illustrated embodiment, the connection between the yieldable hood member 72 and the insulating body 40 is effected in the presence of a resilient or compressible gasket 82 interposed between the end wall of said insulating body and the annular and laterally extending connecting portion 74 of the hood whereby a flexible and resilient connection is provided between the hood and the insulating body and the said conductor 60. As alluded to before, the clamping or other connecting means used in the present assembly may conform to that shown in Figure 1 to engage the hood 72 and through the medium of its flexible and yieldable wall provide an electrical conducting connection between the conductor 60 and one or more cables electrically connected to the said clamping mechanism.

In the present illustration, the insulating body 40 is of such a construction as to provide for the introduction of an insulating compound represented as 84 surrounding the cable and being disposed within the confines of the pothead device. To facilitate the introduction of insulating compound into the device, the said hood 72 may be initially provided with an opening 86 permitting the escape of air as the compound is introduced into the device to insure against the possible inclusion of air pockets within the chamber 42, which would be detrimental from the standpoint of operation of a pothead of the type herein disclosed.

The embodiment according to Figure 2 embraces all of the advantages set forth in connec-

tion with the embodiment according to Figure 1 of the drawing, thus providing for the facile assembly of the device and the removal and substitution of the yieldable cap or hood **72** wherever and whenever desired.

While I have herein described and upon the drawing shown an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention.

I claim:

1. A method of providing an electrical connection in a pothead provided with an insulator member of hollow construction having an open end, comprising the steps of introducing a cable into said insulator member whereby the conductor thereof extends through and beyond said open end, severing said cable a predetermined distance from said open end, fitting a yieldable closure cap of a predetermined length over said conductor, and effecting a connection between said cap and insulator member to provide a tight joint therebetween.

2. A method of providing an electrical connection in a pothead provided with an insulator member of hollow construction having an open end, comprising the steps of introducing a cable into said insulator member whereby the conductor thereof extends through and beyond said open end, severing said cable a predetermined distance from said open end, fitting a yieldable closure cap of a predetermined length over said conductor, effecting a connection between said cap and insulator member to provide a tight joint therebetween, and connecting another cable to said first-named cable by way of a clamping engagement therewith through the medium of said yieldable closure cap.

3. An electric connection for a pothead, comprising in combination a hollow insulator member having an open end formed with an exteriorly disposed shoulder, a cable disposed in said insulator member and having its conductor extending through and beyond said open end, a closure cap of yieldable wall construction fitting over and embracing the end of said conductor to provide for an electrical connection therethrough and having its end wall portion fitting over said open end of said insulator member, said cable being secured to said closure cap by means external thereto, said end wall portion being locked to said insulator member through said shoulder and being readily destructible for removal of said closure cap from said insulator member without injury to said insulator member.

4. An electrical connection for a pothead, comprising in combination a hollow insulator member having an open end formed with a shoulder disposed about the exterior thereof adjacent said open end, a cable disposed in said insulator member and having its conductor extending through and beyond said open end, a closure cap of yieldable wall construction fitting over and embracing the end of said conductor to provide for an electrical connection therethrough and having its end wall portion fitting over said open end of said insulator member, said cable being secured to said closure cap by means external thereto, said end wall portion extending inwardly into locking engagement with said shoulder and being readily destructible for removal of said closure cap from said insulator member without injury to said insulator member.

5. An electrical connection for a pothead, comprising in combination a hollow insulator member having an open end formed with an exteriorly disposed shoulder, a cable disposed in said insulator member and having its conductor extending through and beyond said open end, a closure cap of yieldable wall construction fitting over and embracing the end of said conductor to provide for an electrical connection therethrough, said cable being secured to said closure cap by means external thereof, said closure cap having an enlarged end portion locked to said insulator member through said shoulder and being readily destructible for removal of said closure cap from said insulator member without injury to said insulator member.

6. An electrical connection for a pothead comprising in combination a hollow insulator member having an open end formed with a shoulder disposed about the exterior thereof adjacent said open end, a cable disposed in said insulator member and having its conductor extending through and beyond said open end, a closure cap of yieldable wall construction fitting over and embracing the end of said conductor to provide for an electrical connection therethrough, said cable being secured to said closure cap by means external thereto, said closure cap having an enlarged end portion fitting over said insulator member and extending inwardly into locking engagement with said shoulder, said end portion being readily destructible for removal of said closure cap from said insulator member without injury to said insulator member.

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