Oct. 15, 1929. W. A. DEL MAR 1,731,297

METHOD OF AND MEANS FOR IMPROVING INSULATION OF CABLES

Filed April 20, 1928

Fig. 1.

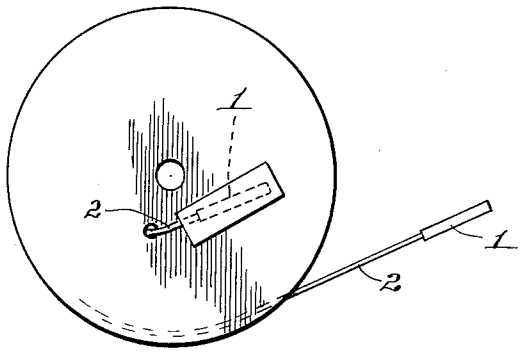


Fig. 2.

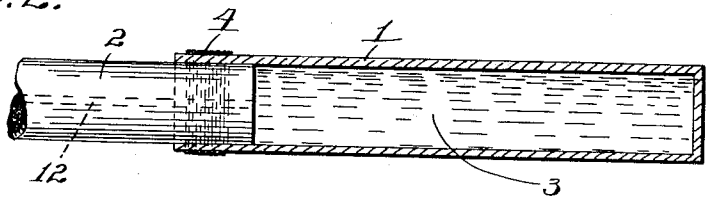


Fig. 3.

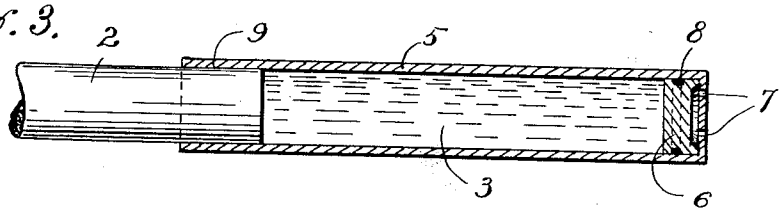
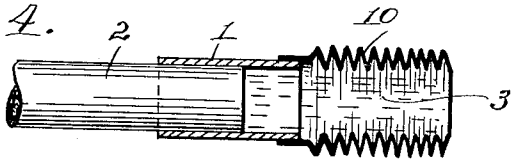


Fig. 4.



Inventor
William A. Del Mar

By his Attorneys
Cooper, Kerr & Dunham.

Patented Oct. 15, 1929 1,731,297

UNITED STATES PATENT OFFICE

WILLIAM A. DEL MAR, OF GREENWICH, CONNECTICUT, ASSIGNOR TO HABIRSHAW CABLE & WIRE CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

METHOD OF AND MEANS FOR IMPROVING INSULATION OF CABLES

Application filed April 20, 1928. Serial No. 271,641.

This invention relates to cables, i. e. conveyers of electric current comprising a conductor, or plurality of conductors, surrounded by insulation such as paper or the like, in turn surrounded by a sheath, usually of lead.

It has been the practice to impregnate the paper or other insulating material with oil, or other insulating liquid or compound, to increase its insulating properties and thereby to increase the break-down voltage of the cable. Such impregnation of the insulating material with fluid has been and usually is effected prior to application of the sheath to the cable. The sheath was then applied and ultimately, at some time prior to shipment, the ends of the sheath were sealed.

The heat incident to application of the sheath buckling of the sheath in handling, stretching of the sheath, and/or other causes, led to the formation of ionizable voids within the cable, between the conductors and sheath, thereby considerably and objectionably lowering the break-down voltage or potential of the cable.

According to the present invention these voids are filled with insulating fluid and the formation of voids prevented, at least up to the time that the cable is spliced.

One object of this invention is to provide a simple and efficient method of employing atmospheric or other pressure to supply oil, grease, or like fluid to voids which occur in oil-impregnated cables, while a further object is to provide a simple device embodying the method described and comprising a collapsible reservoir, of oil, affixed to one or both ends of the sheath of a cable and furnishing a means for supplying oil, grease or like fluid to the voids in an oil-impregnated cable, or to take in or expel oil in accordance with the contraction or expansion of the oil in the cable either or both at the factory during the process of manufacture, during shipment or after installation and prior to the time of splicing.

These objects are attained by means of the method set forth and the device illustrated in the accompanying drawings, in which:—

Fig. 1 is an end view of a cable drum showing oil reservoirs attached to the ends of a cable.

Fig. 2 is a section through the reservoir.

Fig. 3 is a section showing a modified form which will be hereinafter described.

Fig. 4 is a sectional view showing a modified form of collapsible reservoir.

Referring in detail to the parts, 1 designates a reservoir or bottle which is attached to and over the open end of a cable 2, during the process of its manufacture and is preferably constructed of rubber or other suitable flexible material. The said reservoir acts as a holder for oil, grease, or the like 3, which, due to atmospheric or other pressure upon the walls of the container, will find its way between the strands of the cable or through an especially provided duct within the cable, to any voids in the cable. The reservoir further acts to compensate the effect of the expansion and contraction of the oil in said cable.

The voids in the cable may be caused by buckling of the sheath upon bending, by stretching the sheath or by contraction of the oil therein. The voids are vacuum spaces and create a suction when the open end of a cable is exposed to atmospheric or other pressure. The method embodied in this invention takes advantage of the suction thus created and comprises a means for supplying oil, grease, or like fluid to the open end of the cable.

When the reservoir is attached after the cable is installed, a collapsible reservoir containing oil is secured over the end of the cable and the lead seal punctured, whereupon, the oil will be drawn by suction, from the reservoir into the cable. The reservoir is allowed to remain until absorption of the oil by the cable ceases, after which it is removed and the cable spliced in the regular manner. In the said method of application the seal upon the end of the cable is punctured after the reservoir is attached, and suitable means for this purpose may be provided.

While it is intended, in practice, to slip the reservoir over the end of the cable and depend upon its snug fit to hold same in place,

any suitable tying or clamping means, as 4, may be employed.

The modified form shown in Fig. 3 may, in some cases, be desirable and in this form the walls of the reservoir 5 are rigid and a movable stopper or piston 6 is provided therein. In the end of the reservoir, air holes 7 are provided and the said piston may have around its periphery a packing ring 8. Another modification is shown in Fig. 4, wherein a metal reservoir with collapsible corrugated sides 11 is provided.

The collapsible reservoir may be attached at the factory and remain on the cable ends during shipment, installation and until the ends of the cables are spliced.

A duct 12, shown in Fig. 2, may be provided as a means of facilitating the impregnation of the cable.

The form shown in Fig. 3 may be held tightly upon the end of the cable at 9, or may be screwed thereon, by providing a threaded end at 9.

Various other modifications may be employed without departing from the spirit of this invention and it is therefore not intended to limit same to the particular embodiments shown.

What is claimed:—

1. The herein described method of completing the impregnation of a cable, consisting in the employment of a collapsible oil reservoir attached to the ends of said cable, after the application of the sheath; the said impregnation taking place before splicing.

2. The herein described method of completing the impregnation of any oil-impregnated cable, consisting in the attachment, to the end of said cable, of a collapsible oil reservoir after the application of the sheath and seal, puncturing said seal and permitting said impregnation to take place before splicing.

3. A collapsible container in combination with an oil-impregnated cable, and an oil or similar fluid within the container in engagement with an open end of said cable.

4. The device of claim 3, wherein means are provided for attaching said container to the open end of said cable.

5. The combination with an oil-impregnated cable, of a reservoir secured to an open end of the said cable, oil or similar fluid within said reservoir, and means, actuated by pressure, for forcing said oil between the strands and through a duct within the cable.

6. The device of claim 5, wherein means are provided for securing said reservoir to the end of the cable.

7. The method of preventing voids in a body of fluid insulation within a sheathed cable during the process of manufacture of such cable which consists in exerting pressure upon a body of fluid insulation in contact with the open end of the cable.

8. Apparatus for maintaining the integrity of a body of fluid insulation within a sheathed cable during shipment and comprising the combination with the cable of a confined body of insulating fluid in contact with an open end of the cable sheath, and means subjecting said last mentioned body of fluid to pressure to cause pressure to be exerted through the open end of the sheath upon the fluid insulation within the sheath when the pressure of the latter falls below that of the second mentioned body of insulating fluid.

In testimony whereof I hereto affix my signature.

WILLIAM A. DEL MAR.