

[54] **METHOD FOR PREPARING AN OIL-FILLED CABLE HAVING A CORRUGATED SHEATH FOR CUTTING AND CABLE SO PREPARED**

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[56] **References Cited**

UNITED STATES PATENTS

1,744,887 1/1930 Greene174/21 R
 2,089,052 8/1937 Calvert.....174/21 R

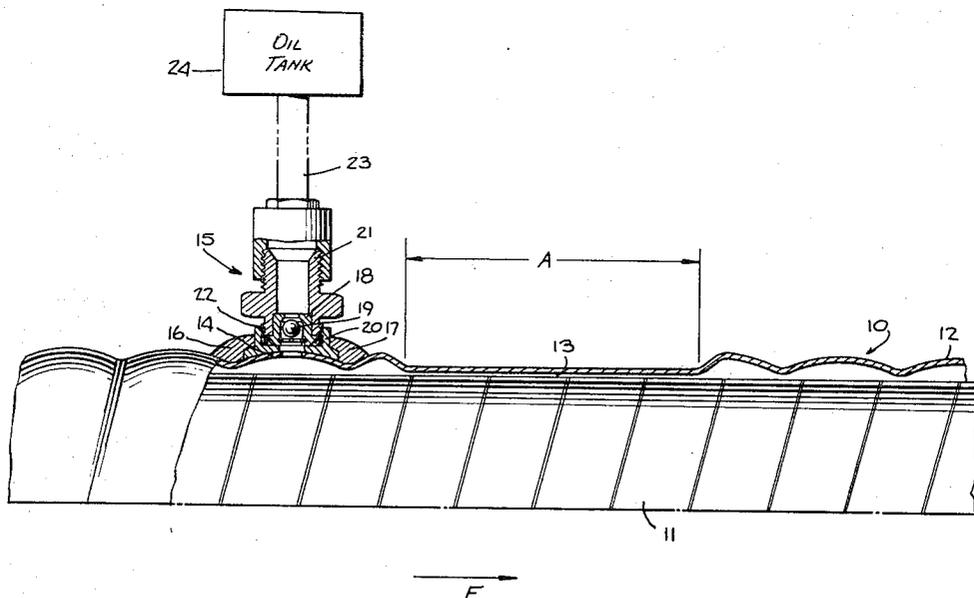
2,053,163 9/1936 Phillips174/21 R
 2,321,731 6/1943 Bouton.....29/401

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[57] **ABSTRACT**

An oil-filled cable having a corrugated sheath is prepared for cutting transversely of its length by drawing the sheath down to cylindrical form at the cutting zone and on both sides thereof so that only a small annular space remains between the sheath and the insulation of the cable core. Prior to cutting, an apertured support is secured to the sheath upstream of the cutting zone by welding and the sheath is punctured through the support. A valve is secured to the support and is connected to a source of oil under pressure. When the cable is cut, oil flowing out of the space between the sheath and the insulation is compensated for, at least in part, by oil supplied through the valve.

5 Claims, 1 Drawing Figure



**METHOD FOR PREPARING AN OIL-FILLED
CABLE HAVING A CORRUGATED SHEATH FOR
CUTTING AND CABLE SO PREPARED**

The present invention relates to a method for preparing an oil-filled cable having a corrugated sheath, e.g., of aluminum, preliminary to the cutting of said sheath when end accessories are to be added or joints are to be built up.

For the building up joints of any kind and for the adding of sealing ends, the sheath of a cable must be cut. However, when the sheath is corrugated, its cutting can cause an oil outflow which will allow air penetration into the insulation. The ideal condition would be to draw the corrugated sheath in such a way as to cause it to adhere to the insulation, so as to prevent an excessive oil outflow, but an aluminum sheath covering a cable core cannot be extruded closely on the latter. On the contrary, it is necessary to leave a hollow space between the sheath and the insulation which acts both as a thermal insulating means and as a mechanical protective means.

Aluminum is a good heat-conductive material so that, if a hollow space were not left between the sheath and the core, the temperature which the sheath can reach in some working phases, as during extrusion, welding, etc., may be transferred, practically without reduction, to the conductor and would burn it.

Moreover, aluminum is of low malleability, so that possible drawing operations, intended to cause the adhesion of the sheath to the insulation, would subject the latter, both during processing and during laying or service, to high mechanical stresses liable to damage it.

The hollow space mentioned above gives, however, rise to a number of disadvantages, when the sheath is to be cut for the purposes of adding accessories (joints in general and sealing ends).

In fact, the cut would leave open an annular section of the hollow space, through which oil would outflow nearly instantaneously, in an amount exceeding that which could be balanced by the normal cable supply, allowing, therefore, air to be drawn into the insulation, with the well known prejudicial consequences for the dielectric strength of the cable itself.

The present invention aims at obviating the above indicated disadvantages, by providing a method which permits preparation of the cable preliminary to the cutting of its sheath in such a way that said cutting operation can be carried out with the complete assurance that air penetration into the cable insulation does not take place.

More precisely, the object of the invention is a method for preparing for cutting a corrugated aluminum sheath for the purpose of building up of accessories, characterized in that it comprises the steps of: drawing a portion of sheath on both sides of and including the cutting zone until the minimum hollow space between the sheath and the insulation which is consistent with the safety of the latter is obtained; puncturing said drawn portion of the sheath, while keeping the cable under pressure, in a position upstream that of the accessory to be fitted; applying an oil supply filling, such as a valve, to the puncture during the considerable oil outflow subsequent to the puncturing; and, supplying compensating oil through said valve for a period beginning before the sheath cutting and lasting as long

as the opened section of the hollow space is exposed to air.

A further object of the invention is a cable provided with an aluminum sheath, in which said sheath is prepared for cutting according to the above indicated method.

The single FIGURE of the accompanying sheet of drawing illustrates by a fragmentary, side elevation view, partly in section, one example of a cable prepared for cutting according to the method of the invention.

The drawing illustrates diagrammatically a core 11 of a cable 10, said core being constituted by at least one conductor surrounded by insulation or layers of insulation. The core 11 is surrounded by a corrugated aluminum sheath 12.

The corrugated aluminum sheath 12 is drawn down for the whole length A, which includes the zone to be cut, and extends on both sides thereof. For example, when it is desired to cut the cable for the purpose of adding an accessory, it would be cut transversely of the length of the cable a portion thereof in the length A spaced from the left end thereof as viewed in the drawing. The accessory is added in the direction of the arrow F with respect to the drawn portion.

The portion of drawn sheath forms with the cable core a hollow space 13, which preferably is of the order of 1 millimeter radially of the cable, so that the sheath will not engage the insulation throughout its periphery so that risk of damage to the latter is avoided.

A valve 15 is assembled with the sheath 12 upstream of the drawn portion A. Said valve 15, in the drawing, is applied on the top of corrugation 14, and such position is preferred.

The valve 15 comprises a support 16 provided with a central hole and welded to the sheath 12 at 17. The valve body 18 is provided with a ball 19 acting as a shutter permitting flow of oil into, but not out of, the cable 10. An annular gasket 20 is provided between the valve body 18 and the support 16, and a nozzle 21 has screw threads 22 engaging corresponding threads on support 16 and holds the valve body 18 in position.

Although such automatic valve 15 is preferred, a valve of another type known in the art could also be used. For example, the valve 15 could be a manually operable valve.

The method for preparing the sheath to cutting comprises essentially the operations described hereinafter. With a cable provided with a corrugated aluminum sheath 12, the sheath is first accurately drawn down, about the zone to be cut, along a length A so as to create, with respect to the core, a hollow space 13 which is the minimum consistent with the safety of the insulation and which, preferably, is of the order of 1 millimeter.

The drawing is carried out with known methods, for example, with a variable diameter jaw, which is gradually clamped down on the relevant portion and is slowly rotated about the cable axis to obtain a smooth surface.

Thereafter, the support 16 is secured on the sheath by means of welding 17 upstream of the drawn portion A, and a hole is formed in the aluminum sheath corresponding to the hole in the support 16, acting with the utmost care in order not to damage the underlying insulation. Then, while the oil outflows from the hole

and the support, the ball 19, the gasket 20, the valve body 18 and the nozzle 21 are mounted and tightened on the support 16. The nozzle 21 is then connected to an oil source, such as by the line 23 to a tank 24 containing oil under pressure, before carrying out the cut, the supply of oil being continued as long as the annular section, created in consequence of the sheath cut, remains open and exposed to air.

By means of the above described method it is possible to maintain the desired degree of degassing of the insulating oil. In fact, the oil supply through the valve 15, added to the normal oil feeding, compensates adequately for the outflowing oil, so that no lack of oil is noticed in the cable and consequently no air is drawn into the insulation.

After the cut end of the cable has been sealed, such as by the addition of a sealing end, the valve 15 may be replaced by a threaded plug screwed into the support 16.

It will be understood by those skilled in the art that the details of construction of the devices of the invention can of course be varied as necessary, without departing from the principles of the invention.

What is claimed is:

1. Method for preparing an oil-filled cable for cutting transversely of its length at a predetermined cutting zone, said cable having a core comprising a conductor surrounded by insulation and having a corrugated sheath around said insulation, said method comprising drawing down said sheath at said cutting zone and on both sides thereof to reduce the spacing between said

sheath and said insulation at said cutting zone and to thereby reduce the oil flow passageway between said sheath and said insulation, puncturing said sheath at a portion thereof at one side of said zone while maintaining the oil under pressure at said portion whereby oil flows out of the aperture produced by puncturing and thereafter stopping the flow of oil from said aperture with a fitting permitting the subsequent supply of oil under pressure to said aperture from exteriorly of said sheath.

2. Method as set forth in claim 1, further comprising supplying oil under pressure to said aperture through said fitting and thereafter, cutting said cable at said cutting zone while maintaining a supply of oil to said aperture sufficient to prevent the flow of air into the space between said sheath and said insulation.

3. Method as set forth in claim 1, wherein said fitting is a valve which permits the flow of oil inwardly of said sheath but prevents the flow of oil outwardly of said sheath.

4. Method as set forth in claim 1, wherein said portion which is punctured is the top of a corrugation.

5. Method as set forth in claim 1, wherein prior to puncturing said sheath, a valve part having a hole therethrough is welded to said sheath at said portion and that after said valve part is welded thereto, said sheath is punctured through said hole in said valve part and wherein the flow of oil through said aperture is stopped by closing the hole in said valve part.

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