

United States Patent

Hubbard et al.

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[54] DISPENSABLE COIL PACKAGE

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206/46 R, 52 W, 65 S, 59 R, 59 A, 59 B

[56] References Cited

UNITED STATES PATENTS

R9,605	3/1881	Palmer.....	242/171 X
1,063,646	6/1913	Bournonville	242/171
1,937,468	11/1933	Talbot.....	242/170 UX

2,596,970	5/1952	Adams.....	242/171 X
2,720,309	10/1955	Kimball.....	242/170 UX
3,355,010	11/1967	Harrison	206/46 R
3,374,882	3/1968	Amalixsen	206/46 R
3,397,773	8/1968	Harrison et al.....	206/46 R X

FOREIGN PATENTS OR APPLICATIONS

311,122 5/1929 Great Britain.....242/171

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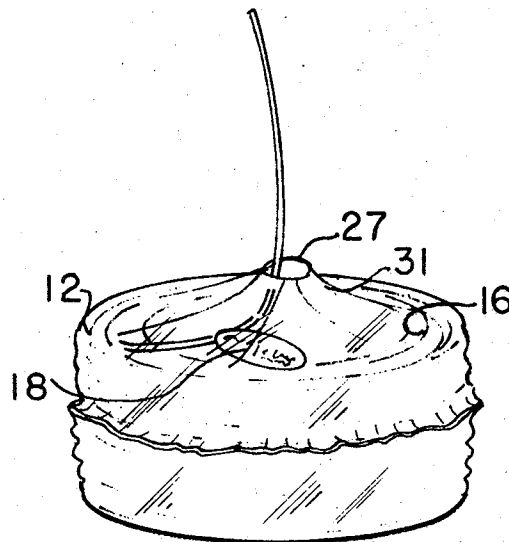
Attorney—Victor F. Volk

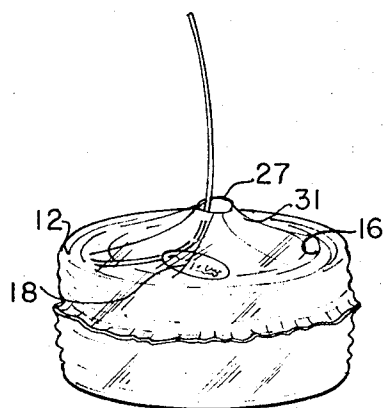
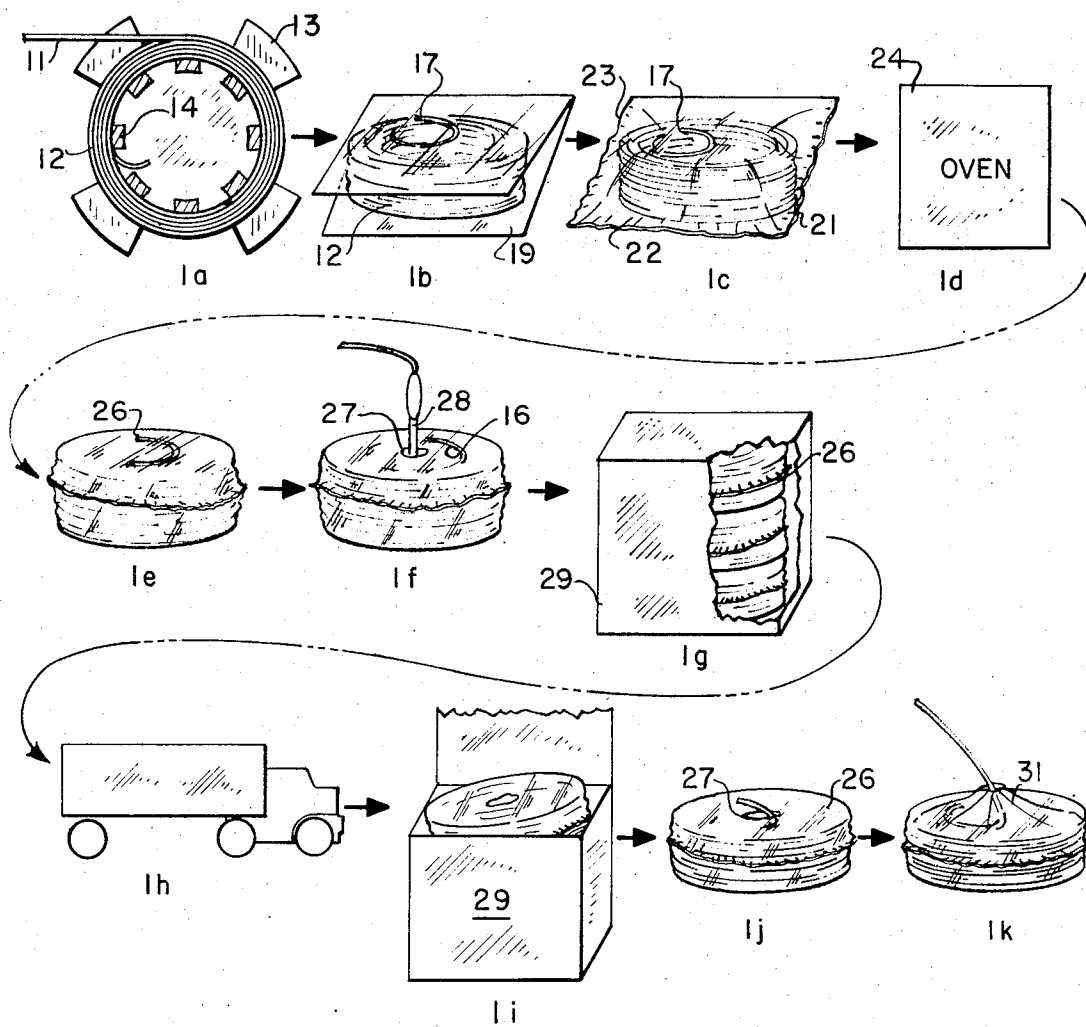
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ABSTRACT

A shipping and dispensing package comprising coils comprising a plurality of radial layers, each layer comprising a helical winding of insulated wire or other strand and a thin-walled, stretchable, polymeric membrane enclosing and compressing the coils and having an aperture for pulling the wire from within the package.

1 Claim, 2 Drawing Figures





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DISPENSABLE COIL PACKAGE

BACKGROUND OF THE INVENTION

Insulated electrical wire, and particularly so-called "building wire" is customarily delivered in 500 or 1,000 foot coils from which the wire is pulled at an installation site, after the coil has been removed from its fiberboard shipping container and has been laid on some substantially horizontal surface. Fiberboard boxes are also used having removable wall panels so that the wire could be withdrawn without removing the coil bodily from its container. This latter device has not proved satisfactory because in the large majority of cases, snarls or tangles develop in the coils during pay-off and it is necessary to tear apart the containers, after all, to straighten out the tangles. Indeed, tangles in conventional coils are the rule rather than the exception and the elimination of such tangles constitutes one of the principal purposes and advantages of the present invention. The reason that tangles do occur in conventional boxed wire coils appears to be that the turns of the coils become interchanged by the shaking or vibration that is unavoidable during transportation, either by truck or by rail.

When conventional coils are removed from their containers for pay-off they are open to abrasion and soiling and to spontaneous spreading open of the coil, particularly as its size is reduced. If, however, the coils are left in their containers for removal through the panel cut outs, close inspection of the container markings is required to identify the size and color of the wire. This sometimes leads to costly mistakes in installation but always to lost time for the installation crew.

SUMMARY

We have made an invention, hereinbelow described, by which the deficiencies of present coil packaging are overcome. By means of our invention the coils can be paid off at high speed without any tangling, and at the same time remain visible and protected from dirt and abrasion. For this purpose we have invented a dispensable supply unit of strand comprising a coil of the strand with a large plurality of radial layers, each of which comprises a helical winding of the strand. A thin-walled, stretchable, polymeric membrane snugly encloses and compresses the coil, and is stretched across the central open core of the coil. A peripheral edge in the membrane defines a small opening over the core through which the strand can be withdrawn at high speed while the membrane assumes a conical configuration. The gage of the membrane is preferably 2-5 mils and most preferably comprises a 3.5 mil gage of polyethylene.

In our new method of continuously paying from a strand coil at high speed, a shrinkable, tear-resistant membrane is sealed over the coil and shrunk down tightly around it. A small opening is formed in the membrane over the open core of the coil, one end of the strand is paid through the opening and the strand is continuously withdrawn so as to distend the membrane into a tapering guide leading to the opening.

Our method of shipping and paying off insulated electric wire, particularly, comprises the steps of forming the wire into a plurality of coils, each comprising a large plurality of radial layers made up of helical windings of the wire. We then seal shrinkable, tear-re-

sistant, polymeric membranes around the coils and shrink the membranes down tightly against them. We form small apertures in the membranes at points over the open cores of the coils and stack a plurality of the covered coils in a fiberboard container which we ship to the utilization site of the wire. The coils are then removed from the containers, the ends of the wires are paid through the openings and the strands withdrawn through the openings so as to distend the membranes to form tapering guides.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows steps 1a-1k of a method of our invention.

FIG. 2 shows a pictorial view of a coil of our invention during pay-off.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Although our invention has wide application to the dispensing of stranded materials such as wire and cable, hose and tubing, rope and, indeed, any elongated product that may be shipped in the form of coils, as distinguished from being shipped on flanged reels, we have confined this detailed description to the use of our invention for insulated wire for which purpose it has been widely tested. In FIG. 1a the wire 11 from a large supply, not shown, is formed into a conventional coil 12 on a coiling machine 13 of a known type. This is done in the usual manner of winding one helical layer on a rotating mandrel 14 and continuing to cover this with another helical layer until a large number of layers have been built up required for the desired length of wire, usually 500 feet. The coil is removed from the coiling machine with an open core or space 16 (FIG. 2) remaining from the withdrawal from the mandrel 14. An inside end 17 of the coil 12 is free so that it can easily be seized for pay-off, as shall be more fully described. At this point also a printed circular label 18 seen in FIG. 2 can be inserted in the core 16 before folding the coil in a sheet or membrane 19 of heat sealable, shrinkable polyethylene. Although we do not wish to limit our invention to polyethylene, other materials such as nylon, and polypropylene being also usable we much prefer polyethylene because of its low cost, high transparency, stretchability, ability to be sealed without added adhesives, and resistance to tearing. This last feature is important, as we shall show, and for this reason we do not consider polyvinyl chloride, which might otherwise be serviceable, as suitable for the membrane 19. Three edges 21, 22, 23 of the membrane 19 are heat sealed between platens of a conventional sealing machine (not shown) to form a completely enclosed membrane envelope around the coil 12, which is then passed through an oven 24 maintained at a temperature of 330° F. This temperature is sufficient to cause up to 40 percent shrinkage of the membrane having a gage or thickness of 3½ mils in 5-10 seconds without damaging the wire 11. The gage of the membrane 19 is important to our invention and should not be less than 2 nor more than 5 mils, for if the gage is too low the membrane will not be sufficiently strong to keep the coil from tangling, and if it is too heavy it will not allow the membrane to stretch during pay-off, as we shall show to be desirable.

When the coil 12 emerges from the oven 24 it is in the form of a tightly wrapped package 26 in which the coil is actually under some compression from the shrunken membrane 19. It is a feature of our invention that the membrane covering is not used merely for shipping but remains on the coil to keep it in shape during pay-off as we shall show, and for this purpose an opening or aperture 27 is formed in the membrane by means of a hot iron 28 at a point over the open core 16. The opening 27 is small, preferably no larger than a man will need to reach his thumb and forefinger into the core to pull out the free end 17. Three or four of the wrapped coils 26 are placed in a fiberboard carton 29 depending on the size of the wire and the length in each coil. We have found that our invention is particularly useful for round building wire cables up to 0.58 inches in diameter and also for flat cable of the type known as nonmetallic sheathed cable. In FIG. 1*h* we have shown a plurality of the cartons 29 being shipped to a building site or other site for installation. This step may, of course, include an intermediate shipment and storage at a warehouse but in either case it is during this step that conventional coils have usually been so jostled and vibrated that the coil turns become interposed with the result that tangles occur when it is attempted to pay-off the wire. In the actual wide-spread practice of conventional building wire packaging we believe that tangles occur, at least once, in a majority of the coils being used. This compares very unfavorably to the record for the present invention whereby over 3,000,000 feet of wire have been distributed in coils and paid out without a single tangle.

At the site the coils are removed from the carton 29 as shown at FIG. 1*i* and laid flat for pay-off (FIG. 1*j*). This is the most convenient way, and our packaged coils pay-off very well from a flat position. Where desired, however, the coil may be tilted and will actually pay-off very well from any unobstructed position. FIGS. 2 and 1*k* show wire being pulled out of the coil and stretching the membrane 19 to form a core or taper 31 with the opening 27 at its apex. We have found that

even during a rough and jerky wire withdrawal the polyethylene membranes will not tear so as to destroy the loop confining and guiding means 31 and that the resiliency of the membranes, which accounts for the taper, permits a small spiral of wire to form within the confines of the package as it is being paid off. This fact and the fact that the shape of the coil has been firmly held by the compressive action of the membrane during shipping and up to the point where only a few turns of the coil remain is believed to account largely for the superior performance of our supply unit shown in FIG. 2, and method.

We have invented a new and useful product and method of which the foregoing description has been exemplary rather than definitive, and for which we desire an award of Letters Patent as defined in the following claims.

I claim:

1. A shipping and dispensing package comprising
 - a. a coil comprising a large plurality of radial layers, each of said layers comprising a helical winding of insulated electrical conductor around a central open core, and
 - b. coil enclosing and guiding means comprising
 1. a thin-walled, stretchable, polyethylene membrane having a gage of 2-5 mils snugly enclosing and compressing said coil during shipping and dispensing, a portion of said membrane being stretched across said coil, and
 2. a peripheral edge in said membrane defining, over said core, an opening of a size sufficient to permit insertion of a man's fingers to pull out an end of said insulated conductor enclosed within said membrane, whereby said insulated conductor can be withdrawn at high speed from within said membrane and said membrane about said opening assumes the form of a truncated cone with said opening at its apex which acts to guide said insulated conductor into a smaller spiral within the confines, of the membrane as it is being removed therefrom.

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