

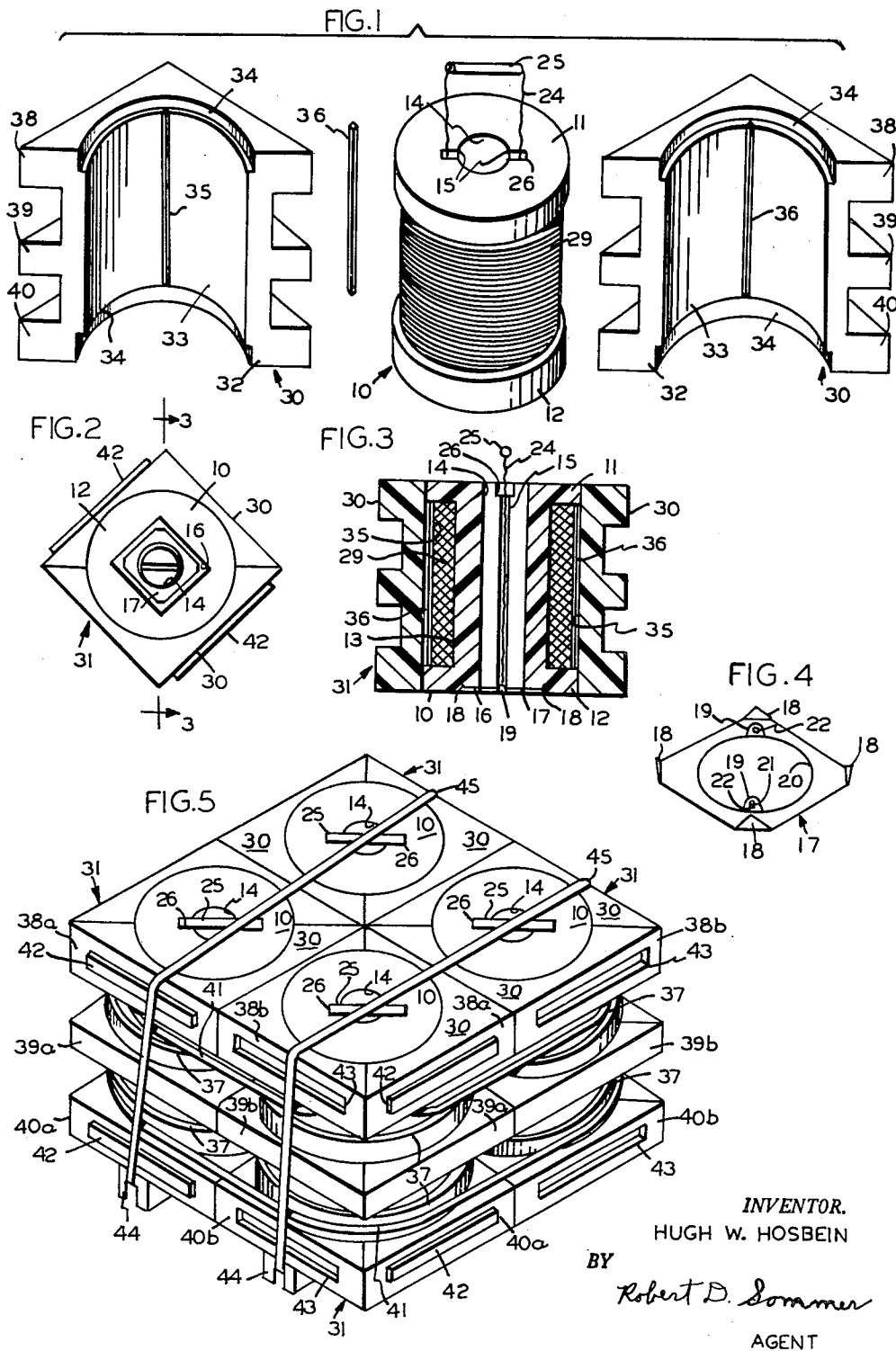
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SPOOL PACKAGE

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3,164,252 SPOOL PACKAGE

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This invention relates to spool packages for protecting wire and the like from damage in storage and transportation, and particularly to durable, light-weight and inexpensive spool packages for magnet wire.

In the electrical wire industry, it has been the practice to wind magnet wire onto spools for storage, transportation and the applying by winding to electromagnets, transformers, motors and the like. In recent years, the spools have been formed from a variety of materials including metal, plastic and the combination of wood and metal. The smaller spools are usually stored and shipped in wooden boxes or in corrugated paper cartons. The larger spools (commonly designated as reels) are usually shipped individually or attached to a pallet with no protective packaging other than a wrapping of paper over the outer layer of wire on the spool. The present invention is of special application to the larger size spool packaging but is also of use with smaller size spool packages.

The primary object of this invention is to provide a stronger and lighter spool package of the character indicated which protectively and fully encloses the wire yet is relatively inexpensive so that it may be discarded after a single use.

Another object of the invention is to provide a spool package of the character indicated which protectively and fully encloses the wire yet is relatively inexpensive so that it may be discarded after a single use.

Another object of the invention is to provide a spool package which is so constructed as to facilitate its packing, handling, shipping and unpacking.

A further object of the invention is to provide a spool package especially suited for carrying a large weight of magnet wire.

A still further object of the invention is to provide a spool package for wire which will withstand rough handling and is effective in holding the wire in orderly condition during handling and shipping of the package.

With these objects in view, the present invention comprises a wire spool package of a spool and cover sections formed of a low density, substantially rigid cellular plastic material having substantial resistance to compression. The cover sections are shaped to provide means for interlocking a multiplicity of the packages together to form a multiple unit shipping bundle. In other respects, the invention comprises the subject matter hereinafter described and particularly defined in the claims.

Other and more detailed objects and features of the invention will be apparent from the following description and accompanying drawing in which:

FIGURE 1 is an exploded perspective view of a spool package embodying the invention;

FIGURE 2 is a bottom plan view of the assembled spool package;

FIGURE 3 is a sectional view taken along the line 3-3 of FIGURE 2.

FIGURE 4 is a perspective view of an anchor plate; and

FIGURE 5 is a perspective view of a plurality of spool packages associated with one another to form a palletized bundle.

Referring now to the drawing, the reference numeral 10 designates an unreinforced spool comprising disc shaped upper and lower end flanges 11 and 12 formed integrally with a hollow cylindrical barrel 13 fabricated of

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low density, substantially rigid cellular plastic having substantial resistance to compression. An expanded polystyrene resin of a density of three pounds per cubic foot has been found suitable when employed with flange thicknesses of one and one-half inches. Such material has a smooth, tough surface, low moisture absorption and does not become brittle at low temperatures. The spool 10 may be formed by a conventional molding process in which plastic beads containing an expanding agent are placed in a mold and heated. The barrel 13 is formed with a central bore 14 and key-receiving grooves 15 by which the spool 10 is mounted for driving engagement with the usual winding shaft.

The lower end flange 12 is recessed slightly on its outer face at 16 to receive a generally rectangular metal anchoring plate 17. As best seen in FIGURE 4, the four corners of the plate 17 are angularly bent to provide prongs 18 which are driven into the flange 12 for securely mounting the plate 17 to the spool 10. Two arms 19 extending at right angles to the plane of the plate 17 from the inner peripheral edge formed by the central opening 20 are disposed in the grooves 15 of the barrel 13. A tang 21 is struck out of the central portion of each arm 19 and folded upon the arm in a direction toward the free end of the arm to provide an opening 22 having a rounded upper edge. The ends of a flexible strand or cord 24 pass through the openings 22 and are secured to the arms 19 as by tying. The strand 24 extends upwardly through the grooves 15 of the barrel 13 in the form of a loop and passes through a hollow tube 25 at the upper surface of the end flange 11. It will be apparent that the tube 25 serves as a handle by which the spool 10 may be lifted and carried. The flange 11 may be provided with an elongated groove 26 of sufficient length and depth to receive the tube 25 so that the tube may be disposed in an unobstructed position when not in use.

The spool 10 when wound with magnet wire 29 or the like is substantially enclosed by a generally cylindrical cover formed of a pair of identical cover sections 30, each extending between the end flanges 11 and 12 and forming with the spool a complete enclosure or spool package 31 for the wire winding 29. The cover sections 30 which preferably are molded of the same material as the spool 10 each comprise a generally semi-cylindrical main body 32 of substantially the same length as the spool 10 and having an inner wall formed with a transversely arcuate, substantially semi-cylindrical concavity 33 extending from one end to the opposite end. The concavity 33 has a diameter slightly less than that of the spool flanges 11 and 12 except for the end portions 34 which are recessed to conform in configuration with the peripheral edges of the spool flanges and are snugly seated upon the flanges. The depth of the recessed portions 34 are such that the concavity 33 is slightly spaced from the outer layer of wire 29 on a fully wound spool 10. According to a feature of the invention, the concavity 33 is provided with a shallow groove 35 in which is seated a strip 36 of a compressible plastic such as cellular polyurethane. After the cover sections 30 are assembled upon the loaded spool 10, the strip 36 is compressed between the outer layer of the wire 29 and the cover section 30, thereby holding the outer coils of wire 29 against slippage out of place with the consequent preventing of snarls and the like. The cover sections 30 may be held in assembled relation upon the spool 10 by a strip of adhesive tape 37 or other flexible band means passing around the cover sections 30.

The outer wall of each cover section 30 is formed with integral outwardly projecting flange sections 38, 39 and 40 defining, respectively, three laterally spaced sets of pads 38a-38b and 40a-40b which lie transversely of the axis of the cover section 30. The pads are of equal length

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and the pads 38a, 39a and 40a intersect at an angle of 90° with their respective pads 38b, 39b and 40b. When the cover sections 30 are assembled about the spool 10, the flange sections 38, 39 and 40 of one cover section cooperate with the respective flange sections of the other cover section to form generally square flanges which may have rounded corners. As the spool package 31 thus has a generally rectangular configuration, it is evident that any number of such spool packages may be stacked together both sidewise and endwise in a compact arrangement.

In accordance with another feature of the invention, the outer faces of the pads 38a and 40a are each provided with a laterally projecting integral lug 42. The pads 38b and 40b have notches 43 formed therein which are longitudinally spaced and dimensioned to receive the lugs 42. The pairs of lugs 42 and notches 43 interengage to prevent relative shifting of the spool packages 31 when stacked side-by-side. FIGURE 5 shows four spool packages 31 secured together by the metal bands 41 which pass about the outer surfaces of the cover sections 30 between the flange sections 38, 39 and 40. The bands 41 hold the lugs 42 in interlocking engagement with the notches 43 to prevent relative movement of any spool package. Such a stacked bundle of spool packages may be placed on a conventional pallet which consists of an elevated platform or may be merely supported on the channels 44 as illustrated in FIGURE 5 with flexible metal bands 45 bound around the bundle of spool packages and laid in the channels 44. Such palletized bundles are well suited to handling by the conventional fork-lift truck. If desired, one palletized bundle of spool packages may be stacked vertically upon a similar palletized bundle.

While the invention has been illustrated and described in what is at present considered its preferred embodiment and has included certain details, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same may be carried out in other ways falling within the scope of the invention as claimed.

What is claimed is:

1. In combination, a one-piece spool for wire having a hollow barrel and integral upper and lower end flanges; said spool being formed of a low-density, substantially rigid cellular plastic having substantial resistance to compression; the outer face of a central portion of said lower end flange being slightly recessed; an anchor plate securely mounted in said recessed portion; a flexible strand secured to said anchor plate and extending through the interior of said barrel to the outer face of said upper end flange; and handle means disposed above said upper end flange and attached with said strand to said spool to form a means for lifting said spool.

2. The combination according to claim 1 wherein the outer face of said upper end flange is formed with a longitudinal groove in which said handle may be disposed when not in use.

3. In combination, a one-piece spool for wire having a hollow barrel and integral upper and lower end flanges; said spool being formed of a low-density, substantially rigid cellular plastic having substantial resistance to compression; a central portion of the outer face of said lower end flange being slightly recessed; a metal anchor plate fitting in said recessed portion and having a plurality of prongs in fastening engagement with said lower end flange; a flexible strand having its ends secured to said anchor plate and extending upwardly through the interior of said barrel to the outer face of said upper end flange

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in the form of a loop; handle means disposed above said upper end flange comprising a tubular member through which said loop of strand passes; and the outer face of said upper end flange being formed with a longitudinal groove in which said tubular member may be recessed when not in use.

4. A spool package comprising a spool having a generally cylindrical barrel and integral disc shaped upper and lower end flanges; a winding of wire between the flanges of said spool; a generally cylindrical cover formed of two substantially identical semi-cylindrical sections; each extending between said flanges and forming with said spool a substantially complete enclosure for said winding; said sections being of substantially the same length as said spool; the diameter of the inner surface of each section being increased near the ends thereof to provide recessed ends adapted to seat against the peripheral edges of said flanges; said sections each having a plurality of flat integral pads projecting laterally of the outer side of said sections giving the package a generally rectangular contour enabling a plurality of said packages to be stacked in side by side relation; each of said cover sections having a first laterally spaced pair of said pads which lie in a direction transverse of the axis of the section with a lug projecting from each pad of said first pair; each of said sections having a second laterally spaced pair of said pads which lie at substantially right angles to said first pair of pads; said second pair of pads having notches formed therein which are longitudinally spaced and dimensioned to receive said lugs on said first pair of pads so that when one spool package is placed beside another spool package, the lugs and notches on adjacent spool packages interlock to prevent relative shifting of such spool packages; said spool and said sections each being formed of a low density, substantially rigid cellular plastic having substantial resistance to compression; and means for holding said sections in engagement with said spool.

5. A bundle comprising a multiplicity of spool packages according to claim 4 arranged side-by-side in horizontal alignment and with said lugs and notches of adjacent section in engagement; and at least one flexible band extending around said bundle and holding said spool packages together; said band being effective to hold said lugs and notches in interlocking engagement.

6. In combination with the bundle of claim 5, a plurality of channel-like skids disposed beneath said bundle; and a plurality of flexible bands surrounding said bundle and passing under said skids to secure said bundle to said skids.

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