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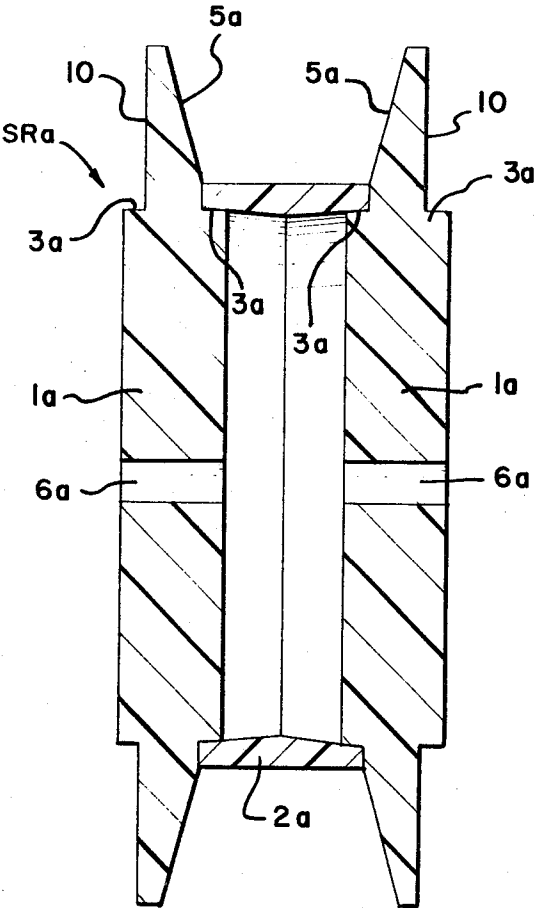
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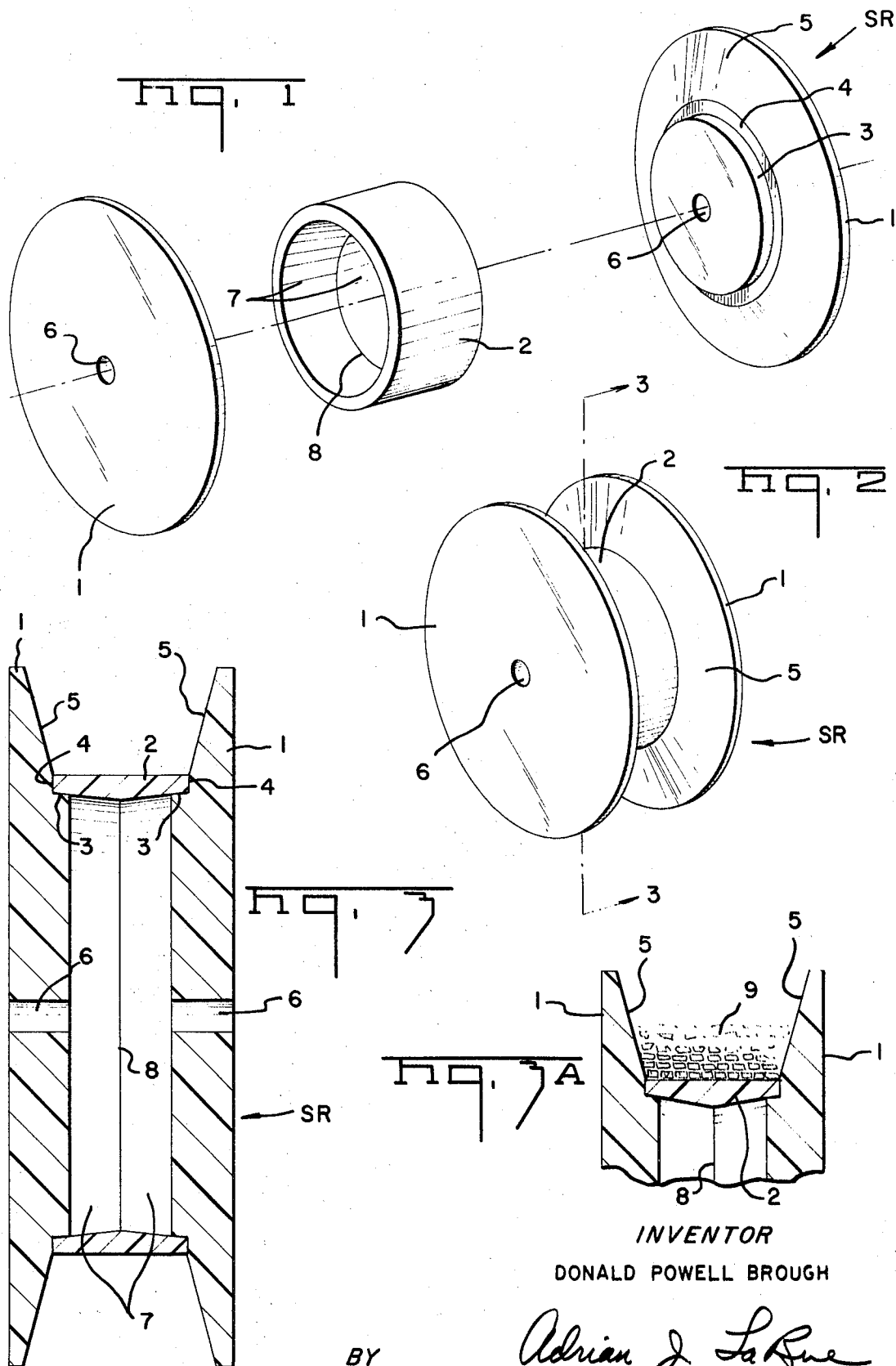
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[54] STORAGE REEL
2 Claims, 7 Drawing Figs.
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242/118.7
[51] Int. Cl.....B65h 75/14
[50] Field of Search..... 242/118.7,
118.61, 118.6, 118.4

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ABSTRACT: A storage reel is made from a suitable molded foam material and it comprises a cylindrical core and end plates having shoulders on each side that are frictionally positioned within ends of the core. One side of the end plates has a beveled surface while the other side is provided with a straight surface.





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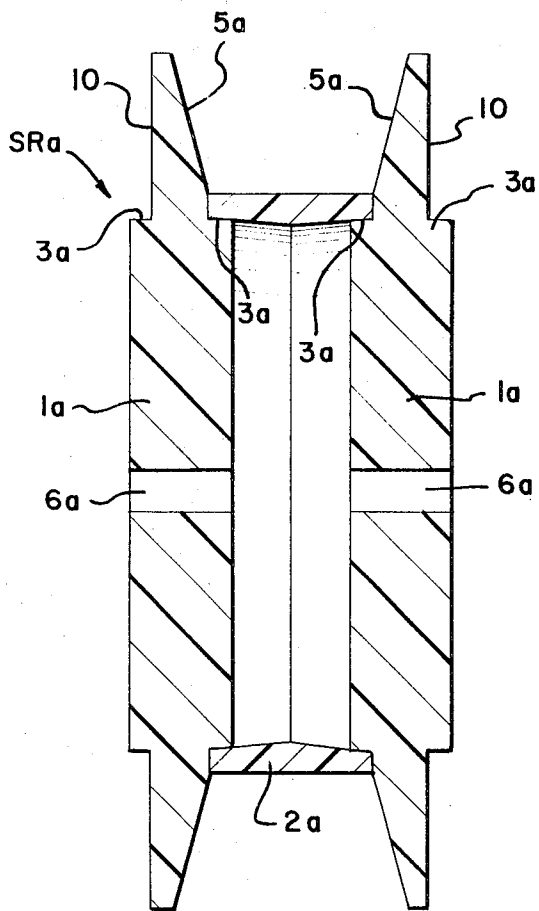


Fig. 4

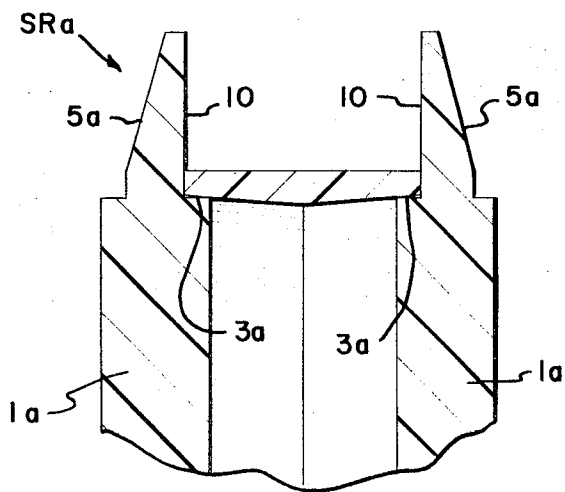


Fig. 5

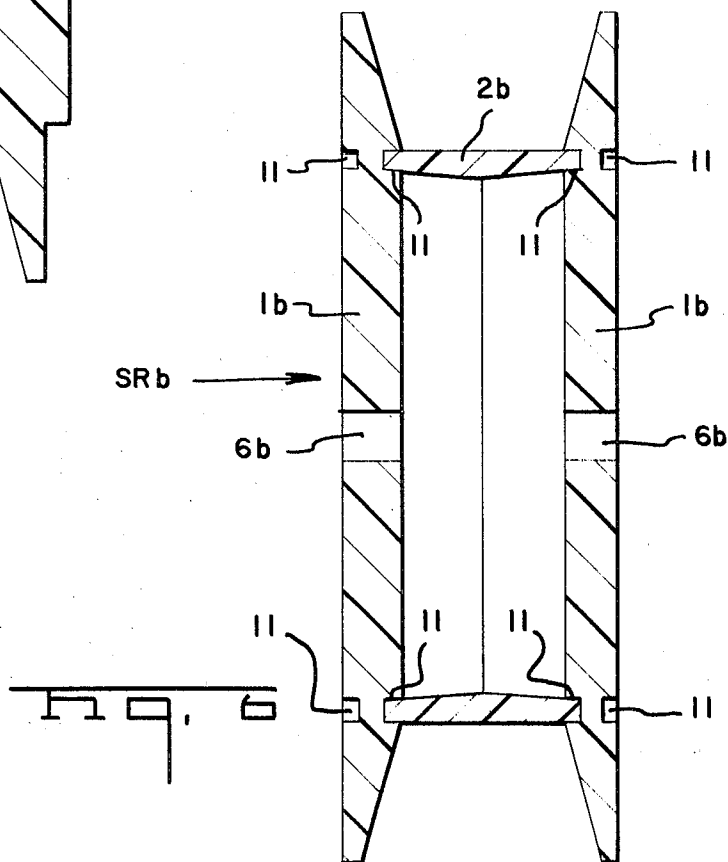


Fig. 6

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STORAGE REEL

This invention relates to storage reels and more particularly to storage reels made from lightweight material and having excellent strength characteristics.

Electrical terminals of the type which are adapted to be applied onto the ends of wire are frequently manufactured in strip form by conventional stamping and forming techniques and wound on conventional storage reels after manufacture. In applying the terminals onto wire ends, a storage reel is mounted on a spindle on a terminal applicator and the strip is fed by means of a strip feed mechanism in synchronism with the operating cycle of the applicator in a manner such that the leading terminal of the strip is positioned between applying means at the end of each operating cycle. The wires to which terminals are being applied are successively positioned between the applying means and in alignment with the leading terminal so that during each operating cycle, the leading terminal is applied onto a wire, sheared from the strip and the strip is advanced to position an adjacent terminal in the applying means.

The foregoing operations are commonly carried out with semiautomatic applicators requiring manual positioning of the wires of fully automatic applicators which include means for feeding the wires and positioning their ends in position in the applying means. With either type of applicator, high production rates are obtained; semiautomatic applicators achieving 2,000 to 3,000 connections per hour are not uncommon and higher rates than this are generally achieved with fully automatic applicators.

With most types of terminals in strip form, conventional reels having a central hub or core and flanges or plates on each side thereof and being made generally of cardboard have been found to be satisfactory, but with some types of terminals having relatively complicated shapes which are provided with projections that have a tendency to hook terminals together, difficulties have been encountered with the prior art types of reels as a result of tangling of the terminal strip and/or hooking of the projections of the terminals of one layer with the terminals of the immediately adjacent layers. Such tangling and hooking results in frequent interruptions of the operation of the applicators while the operator frees the strip to permit it to be fed to the terminal-applying area.

Cardboard reels are the prevalent reels in use today for carrying electrical terminals, but these reels have a number of disadvantages or drawbacks. One disadvantage is the warpage of the plates which creates tangling problems when the plates warp in one direction and drag on the strip of terminals when the plates warp in another direction. Another drawback is that the cardboard absorbs oil, grease, sulfur and other foreign substances which are transmitted onto the terminals thereby introducing foreign substances onto the terminals. A further drawback is that the plates are susceptible to being readily damaged by being bent beyond a point of elasticity of the cardboard plates whereby a crease is formed resulting in a weakened area. An additional drawback is that the plates easily flex outwardly during the reeling of the strip of terminals onto the reel thereby resulting in the strip of terminals being improperly reeled due to the strip getting lodged between the plates and the layers of terminals. A still further drawback is that a brake has to be generally used with the cardboard reels because of the free-reeling thereby causing excessive play between the reel and feeding means for feeding the strip of terminals into a terminal-applying area of an applicator. Still another drawback is the fact that the cardboard core and plates are difficult to glue together to provide an accurate reel.

An object of the invention is to provide a storage reel made from a plastic foam.

Another object is the provision of a foam storage reel that has great strength to weight ratio.

A further object is to provide a foam storage reel that has substantially rigid plates having resilient characteristics to provide excellent reeling capability to preclude lodging of terminals between the plates and layers of terminals.

An additional object is the provision of a plastic foam storage reel that does not absorb oil, grease, sulfur or other foreign substances that can be introduced onto terminals of the strip of terminals stored on the reel.

A still further object is to provide a plastic foam storage reel which fits a spindle of an applicator machine in a frictionable manner so that uniform reeling is achieved.

Still an additional object is the provision of a plastic foam storage reel having reversible plates to provide flat or tapered sides in communication with the core.

Still a further object is to provide a plastic foam storage reel which is easy to assemble, can be cured during operation, is accurate after being assembled to provide a true path of operation and is economical to manufacture.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there are shown and described illustrative embodiments of the invention; it is to be understood, however, that these embodiments are not intended to be exhaustive nor limiting of the invention but are given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

FIG. 1 is an exploded perspective view of end plates and a core of a storage reel;

FIG. 2 is a perspective view of the storage reel in an assembled condition;

FIG. 3 is a view taken along lines 3-3 of FIG. 2;

FIG. 3a is a part cross-sectional view similar to FIG. 3 showing a strip of terminals thereon;

FIG. 4 is a view similar to FIG. 3 of an alternative embodiment of the invention;

FIG. 5 is a fragmentary cross-sectional view of FIG. 4 showing an end plate in a reversed position; and

FIG. 6 is a view similar to FIGS. 3 and 4 of another embodiment of the invention.

Turning now to the drawings and especially FIGS. 1 through 3 thereof, a storage reel SR is illustrated and it comprises end plates 1 and cylindrical or hollow core 2. The end plates and cylindrical core are molded in accordance with conventional molding techniques and the material for molding the plates and core is polystyrene pellets that form a foamed product during the molding process. Of course, other plastic materials capable of being formed into a foamed product can be used such as, for example, rigid polyurethane foam. Forming the plates and core of plastic foam provides plates and cores that are substantially rigid and the rigidity depends upon the density of the material. The ratio of the weight to the strength of the material is very good.

Each of end plates 1 has an annular shoulder 3 and a flat surface 4 which merges into a tapered surface 5. A hole 6 is centrally located in each end plate 1 and extends through the thickest part thereof.

Cylindrical core 2 is provided with slightly tapering surfaces 7 which taper outwardly from a center line 8.

In assembly, a suitable glue is applied to shoulders 3 and surfaces 4 then shoulders 3 are inserted into surfaces 7 of core 2 until the edges of core 2 abut against surfaces 4. Shoulders 3 fit snugly within surfaces 7 and the slight taper of surfaces 7 maintains end plates in position to allow the glue to cure and the snug fit between shoulders 3 and surfaces 7 permits the reel to be put into immediate use while the glue is curing. In fact, the frictional fit between shoulders 3 and surfaces 7 will not need to be glued if the pressure on end plates 1 is not to be too great.

Electrical terminals 9 of any configuration in strip form are reeled onto storage reel SR, as illustrated in FIG. 3a, and the rigidity of end plates 1 permits the strip of electrical terminals to be uniformly reeled onto the storage reel between tapered surfaces 5 and the outer surface of cylindrical core 2; the

rigidity of end plates 1 obviates the terminals being wedged between the layers of terminals and the tapered surfaces 5. The resiliency of the styrofoam material prevents the end plates from being deformed and enables the uniform reeling to be effected. After the storage reel has been assembled by end plates being disposed in position on cylindrical core 2, the accuracy of the reel is excellent so that it provides a true path of operation for immediate use. Holes 6 in end plates 1 are preferably designed to frictionally fit the spindle onto which the storage reel is to be disposed so that the terminals can be uniformly reeled thereoff thereby precluding the use of a conventional brake. The core can be of any length to provide for different-sized areas of storage as desired. The styrofoam does not absorb any oil, grease, sulfur, moisture, etc. so as not to introduce any foreign substances onto the terminals reeled thereon. It is to be understood that other than strips of terminals can be stored on the reel.

FIGS. 4 and 5 illustrate storage reel SRa which is an alternative embodiment wherein end plates 1a are provided with annular shoulders 3a on each side thereof so that in one position, tapered surfaces 5a are in communication with cylindrical core 2a as illustrated in FIG. 4 and in another position, flat surfaces 10 are in communication with cylindrical core 2a as illustrated in FIG. 5. Thus, the storage reel can be provided with either tapered surfaces or flat surfaces in the storage area depending upon the use.

FIG. 6 illustrates storage reel SRb which is similar to the embodiment of FIGS. 4 and 5 to provide tapered and flat surfaces except that end plates 1b are provided with annular grooves 11 for receiving the edges of cylindrical core 2b to provide either tapered surfaces or flat surfaces in the storage area of the storage reel.

Thus, in the embodiments of FIGS. 4-6, either the reel is assembled at the outset to provide tapered surfaces in the storage area, or it is assembled to provide flat surfaces in the storage area. The reel is generally glued during assembly so it would be a permanent construction; however, if the subject matter to be stored on the reel is such that it would not apply excessive forces on the end plates, then the reel can be assembled via a frictional fit thereby permitting the reel to be used with either tapered or flat surfaces in accordance with the need.

When the strip of terminals is to be reeled onto the storage reel, the end terminal is forced into the core to anchor the strip of terminals in position so that the reeling can begin.

Holes 6, 6a and 6b are equal to the thickness of the end plates and they provide sufficient area of contact with the spindle that no ovaling thereof is effected during prolonged reeling operations.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiments of the invention, which are shown and described herein, are intended as merely illustrative and not as restrictive of the invention.

I claim:

1. A storage reel comprising a hollow core and end plates of plastic foam, a circular external surface and an internal surface provided by said hollow core, annular shoulder means provided by said end plates in frictional engagement with said internal surface of said hollow core, said end plates having aligned central holes in communication with said internal surface of said hollow core, and tapered surfaces on said end plates extending outwardly from said circular external surface of said hollow core, said end plates have other annular shoulder means and straight surfaces extending outwardly therefrom and normal to an axis extending through said holes, said other annular shoulder means adapted to be positioned within said internal surface of said hollow core so that said straight surfaces extend outwardly from said circular external surface of said hollow core.

2. A storage reel comprising a hollow core and end plates of plastic foam, a circular external surface and an internal surface provided by said hollow core, groove means disposed in one side of said end plates, ends of said hollow core frictionally disposed in said groove means, and tapered surfaces provided by said end plates in communication with said circular external surface of said hollow core, other groove means are disposed in other sides of said end plates and straight surfaces extending outwardly from said other groove means substantially normal with respect to a reeling axis of said reel so that when said ends of said hollow core are disposed in said other groove means, said straight surfaces are in communication with said circular external surface of said hollow core.

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