

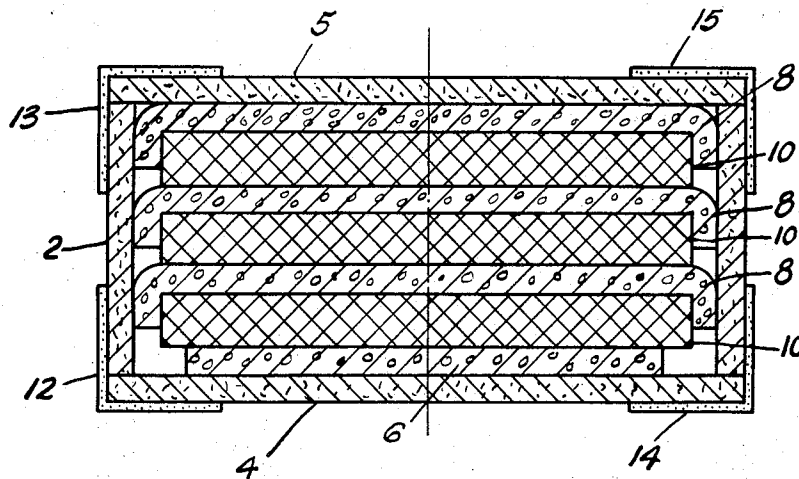


FIG. 1

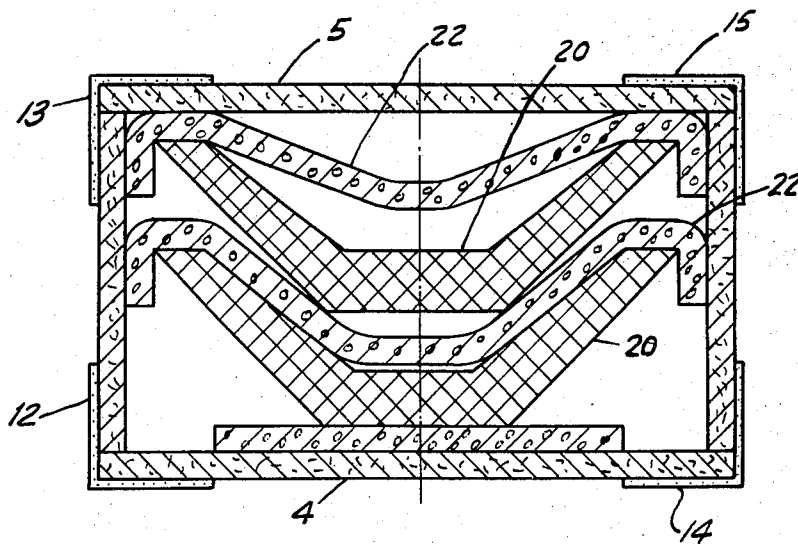


FIG. 2

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[54] **PACKAGING FOR CYLINDRICAL AND SIMILAR OBJECTS**

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[51] Int. Cl. **B65b 1/04, B65d 71/00**

[58] Field of Search ... **53/3, 24, 37; 206/46 H, 46 FL, 206/65 K, 65 R**

[56] **References Cited**

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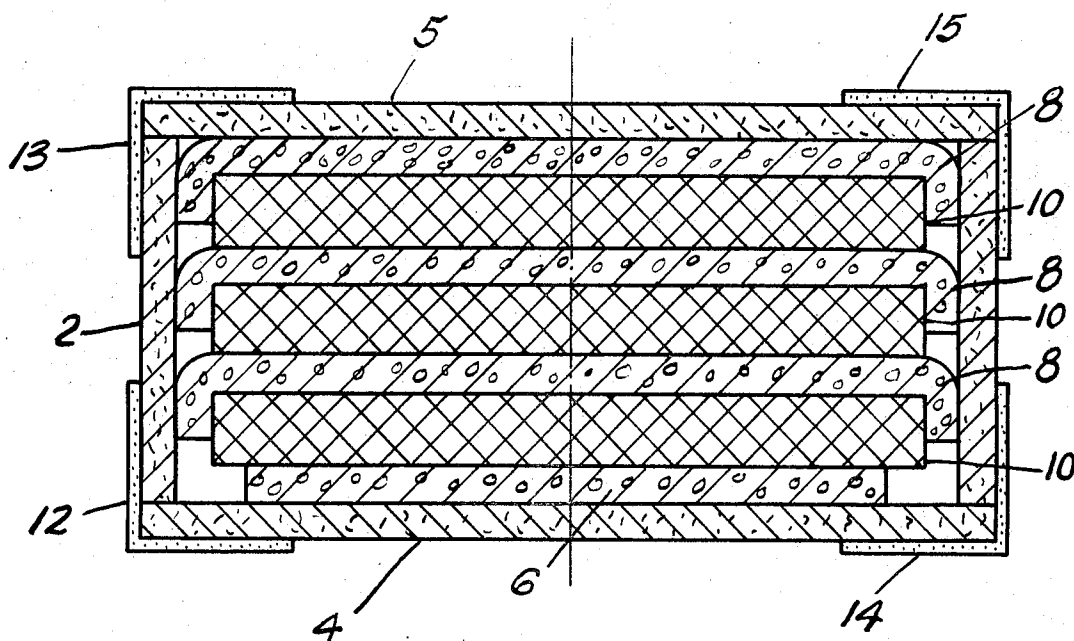
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[57] **ABSTRACT**

Packaging is provided using an outer tube selected to be one size larger than the objects to be packaged. Individual objects are held in position within the tube by foam discs. The ends of the tube are closed by fiber discs which are held in position by adhesive coated tape.

4 Claims, 2 Drawing Figures



PACKAGING FOR CYLINDRICAL AND SIMILAR OBJECTS

The present invention relates to the packaging of a large variety of objects which have generally a cylindrical shape. It relates particularly to packaging grinding wheels and similar manufactured components which are of a cylindrical or cylinder-like form.

A number of problems have been encountered in packaging a large variety of generally similar objects of various sizes. For example, it has proven to be troublesome and expensive to provide efficient packaging for the large range of grinding wheels produced by a factory. Typically, a large inventory of packing boxes of different sizes and shapes has been required. Also, large quantities of packing material have been required. This has meant that a large amount of space must be used for storing materials of use in packaging. Many of the materials used have been expensive from the internal insulating material to the heavy corrugated boxes and/or wooden boxes for strong external support. The costs for space and personnel to complete the actual packaging have been high. The packages produced by such procedures have frequently been excessively bulky and heavy and thus have constituted a further source of inefficiency in terms of handling and shipping costs.

It is an object therefore of the present invention to provide for packaging cylindrical and similar shaped objects in an economical manner.

It is a further object to provide for economical packaging while assuring adequate shock protection to the material being packaged.

It is yet another object to provide packaging for a variety of objects while minimizing the inventory of packaging material.

It is still another object of the invention to minimize the storage space required for packaging materials.

It is yet a further object to provide packaging which will add a measure of common identity to a variety of packaged products.

The foregoing objects and others ancillary thereto I prefer to accomplish by using outer packaging selected from a number of tubes of various dimensions which are made of fiber or plastic with inner packaging formed by fiber or plastic discs of selected sizes. An inventory of tubing is secured in a range of diameters and wall thicknesses suitable to contain the objects to be packaged. An inventory of fiber and plastic discs that match the outside diameter of the selected tubes is also secured. An inventory of plastic foam discs, or foam packing in the shape of other plane figures, is selected to have outside dimensions larger than the inside diameters of selected tubes. An inventory of adhesive coated paper is also secured.

Actual packaging involves selecting a tube of greater inside diameter than the object to be packaged. A flat fiber disc selected to match the outside diameter of the tube, is placed on a table. An undersize foam disc is placed on the fiber disc and a grinding wheel is placed on the foam disc. An oversize foam disc is placed on the grinding wheel and a second grinding wheel is placed on the second foam disc. This procedure is repeated, using oversize foam discs, until all the grinding wheels to be packaged are held between foam discs. The tube is then cut to a length related to the height of

the assembled pile so that the wheels may be tightly held and the tube is placed over the stack. The top of the tube is covered by a fiber disc of the outside diameter of the tube. The top and bottom of the tube are then sealed, using adhesive coated tape, to form a solid package.

The above mentioned and other features and objects of this invention and the manner of obtaining them will become more apparent, and the invention itself will be best understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a sectional view of a tube in which elements have been assembled in accordance with the invention, and

FIG. 2 is another sectional view showing a variation of the invention.

Turn now to FIG. 1 for a detailed explanation of an embodiment of the invention. In FIG. 1, element 2 represents a section of the wall of a tube made of fiber or plastic material. Fiber discs 4 and 5 are selected to have diameters equal to the outside diameter of the tube 2, so that they can be used in sealing the ends of the tube. An undersize foam disc at 6 and a plurality of oversize discs at 8 are used to pack grinding wheels at 10 securely with the tube 2 between the discs 4 and 5. The discs are secured to the ends of the tube 2 by use of adhesive coated tapes, such as are indicated at 12, 13, 14 and 15.

The package indicated by FIG. 1 may be assembled by steps set out as follows. First of all, a packager working at a table selects from inventory a tube 2 of a size next larger than the diameter of the grinding wheel 10. He places flat on the table a fiber disc 4 that matches the selected tube's outside diameter. An undersize foam disc 6 is centered on the fiber disc. A grinding wheel 10 is placed on the foam disc. An oversize foam disc 8 is placed on the grinding wheel. Oversize foam discs and grinding wheels are then alternated in a stack until the desired number of grinding wheels is included. An oversize foam disc 8 is placed on top of the uppermost grinding wheel. The height of the stack of foam discs and grinding wheels is measured (the stack may be compressed for this measurement). A length of the selected tube is cut to match the measured height of the stack. The cut tube is pushed over the stack into contact with the bottom fiber disc. Another fiber disc 5, of the same size as the bottom fiber disc 4, is placed on top of the tube. An adhesive coated tape (indicated at 12 and 13) is used to attach the fiber discs 4 and 5 to the walls of the tube, thus sealing and completing the package.

FIG. 2 shows a variation over FIG. 1 in which similar parts are numbered as in FIG. 1. In the package represented by FIG. 2, cup-shaped grinding wheels are indicated at 20. In this embodiment oversize foam discs at 22, which are somewhat larger than those at 8 in FIG. 1, are used to provide additional needed packing. The steps involved in the assembly of the package indicated in FIG. 2 are identical except for the substitution of the larger foam discs for the oversize discs of FIG. 1.

Packaging in accordance with the present invention offers a number of advantages as set out in the following paragraphs.

The packaging materials are readily available at low cost, requiring by way of special processing only that they be pre-cut to the desired sizes.

Shock protection is provided for the packaged items by the oversize plastic discs which fold over the edges of the grinding wheels when the tube is pushed down over the stack. The folds of the foam over the edges of the grinding wheels protect the periphery of the grinding wheels. Because the fiber tube is cut to the desired length, the foam discs may be compressed by the fiber discs to a suitable degree. The compressed foam will inhibit shifting of the contents of the package.

The inventory of packing materials is minimal for use with this invention. The inventory consists of four basic items, three of which are used in varying diameters. Because the tubes are cut to the final package length, the inventory does not need to contain specific packages for various quantities. Wheel diameter is the only significant consideration. If desired, one or more packages may be strapped or otherwise attached to a standard size permanent or disposable pallet.

The requirements for storage space for packaging materials are minimized by the invention. Tubes of different diameter may be nested one inside another for storage so as to minimize stored volume. All the discs may be stacked to minimize volume.

A measure of common identity may be provided among various products. All the packages are cylindrical with flat ends. In addition, both tubes and fiber discs may be distinctly colored and/or printed to identify, caution and instruct. A contrasting colored sealing tape may be used for further identification.

While the principles of the invention have been described above in connection with specific apparatus and applications, it is to be understood that this description is made only by way of example and not as a limitation on the scope of the invention.

I claim:

1. A method for packaging objects of various sizes comprising:
 - selecting a tube having an inside diameter larger than the maximum dimension of an object to be packaged,

selecting a fiber disc of substantially the same outside diameter as the tube,
 placing the fiber disc flat on a support,
 selecting a foam packing of substantially smaller outside dimension than the inside diameter of the tube,
 centering the foam packing flat on the fiber disc,
 placing the object to be packaged on the foam packing,
 selecting an oversize foam packing having a substantially larger outside dimension than the inside diameter of the tube,
 placing the oversize foam packing on the object,
 measuring the height of the resulting stack of discs, packing and the object,
 cutting the tube off to a length matching the measured height of the stack of discs, packing and the object,
 pushing the tube over the stack,
 selecting a second fiber disc of substantially the same outside diameter as the tube,
 placing the second fiber disc on top of the tube, and sealing the tube with the foam, packing, discs and the object inside, thereby forming a package for shipping.

2. A method as claimed in claim 1, in which sealing the tube comprises placing adhesive coated tape over joints between the tube and the fiber discs.
3. A method as claimed in claim 1, including the additional steps of
 - placing a second object on the oversize foam packing,
 - placing a second oversize foam packing on the second object,
 - repeating these last two steps, alternating objects and oversize foam packings until the desired number of objects is included.
4. A method as claimed in claim 1, in which the object is a grinding wheel and the grinding wheel is placed flat on the foam packing which is smaller than the inside diameter of the tube.

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