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SHIPPING CONTAINER FOR HEAVY SPOOLS

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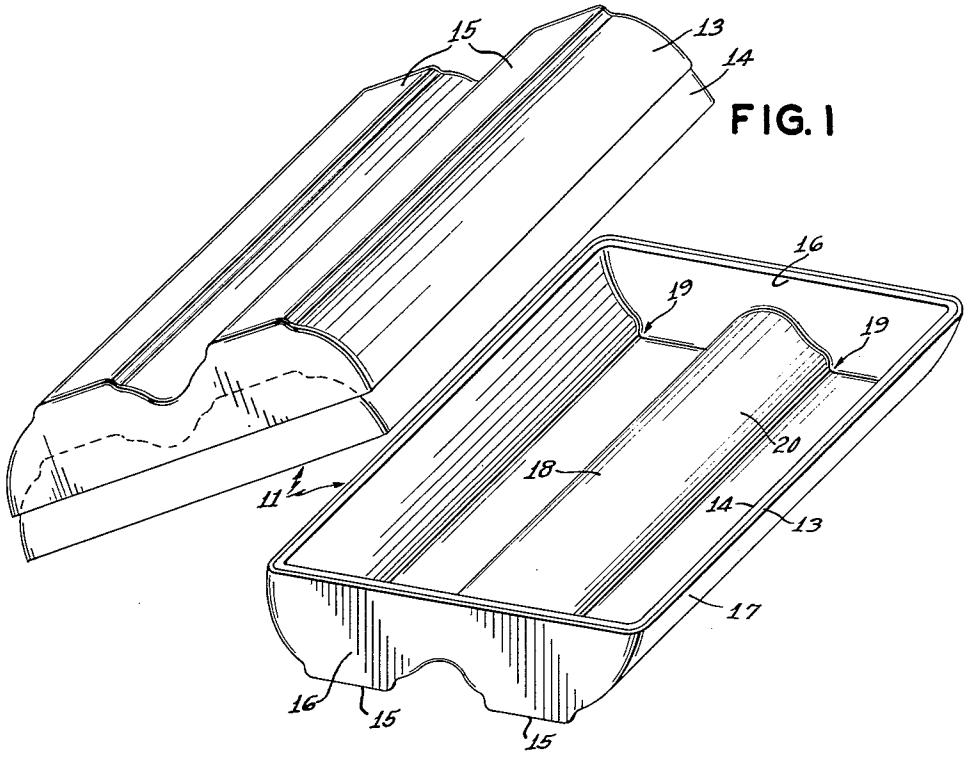
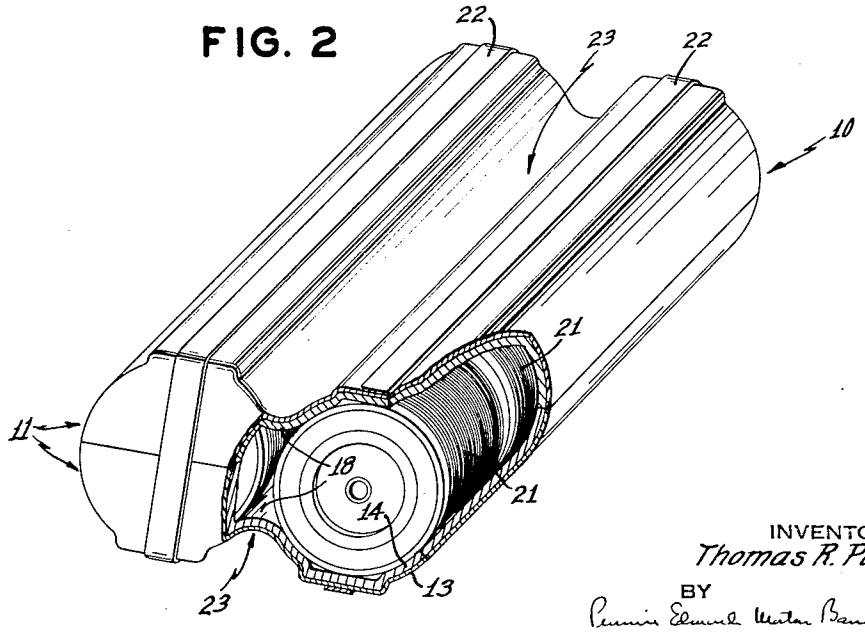


FIG. 1

FIG. 2



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SHIPPING CONTAINER FOR HEAVY SPOOLS

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1 Claim. (Cl. 206—65)

This invention relates to shipping containers. Particularly it relates to a shipping container which may be used in preparing shipping packages of heavy spools which are to be securely maintained in axial alignment to minimize the danger of one spool overriding and thus damaging the contents of another.

The shipment of heavy spools, for example, spools of copper magnet wire, has created many troublesome problems which are attributable to the relatively heavy weight-to-size ratio of the spools, the awkward shape as far as packaging is concerned, and the susceptibility of the contents of the spools to damage if two spools come into violent contact with one another during transit. It has been common practice heretofore to ship heavy spools in wooden shipping cases. The necessarily sturdy and elaborate construction of these wooden cases adds greatly to their cost, and the weight of the case adds substantially to the freight and shipping charges. In fact, the weight of the wooden shipping cases represents about 25% of the freight charges incurred in a shipment of magnet wire.

I have devised a new shipping container for heavy spools which is fabricated of inexpensive materials and is strong, durable and light in weight. The novel design of my container prevents damage to the spools by providing substantially cylindrical spool receiving compartments preformed to accommodate a plurality of axially aligned spools. An inner liner advantageously is provided to protect the spools from impact damage. The light weight and durable construction of the new container minimize freight and replacement charges.

My shipping container comprises two substantially identical container parts each forming one half of a complete shipping container. The container parts are integrally molded of plastic impregnated fibrous material or fiber-reinforced plastic material and have a five-sided open box-like structure. Each container part comprises a base wall, two substantially parallel end walls substantially perpendicular to the base wall, and two side walls perpendicular to and extending between the end walls outwardly from the base wall. The side walls curve outwardly from the base wall to conform to the cylindrical contour of the spools, giving these side walls a substantially quarter-cylindrical configuration. At least one interior wall extends inwardly from the base wall parallel to the side walls to form a longitudinal partition or spool separator dividing the interior of the container part into at least two parallel compartments. Each spool separator has two faces, each face being cylindrically curved to conform to the contours of the spools in correspondence to the curvature of the side walls. The spool separator (or separators) divides the container part into at least two parallel substantially semi-cylindrical spool receiving compartments each adapted to receive a semi-cylindrical portion of a plurality of axially aligned heavy spools. The two container parts are assembled to form a shipping container by fitting the container parts together, open side to open side, with their respective side walls and end walls in substantial alignment. The shipping container thus formed has at least two parallel substantially cylindrical interior compartments, advantageously lined with a cushion of molded fibrous pulp material, and adapted to receive in each compartment a plurality of axially aligned spools.

A shipping package for heavy spools assembled according to my invention comprises a shipping container formed of two substantially identical container parts, each having two or more parallel spool-receiving compartments, a row of axially aligned heavy spools received in each of said spool-receiving compartments, and suitable container fastenings. One of the container parts forms the bottom half of the shipping container in which the semi-cylindrical lower halves of the rows of heavy spools are received, and the second of the container parts forms the top half of the shipping container in which the upper halves of the rows of spools are received. The spool-receiving compartments securely maintain each row of spools in axial alignment, and the spools maintain the two container parts in vertical alignment. The container parts are securely fastened together about the heavy spools by the container fastenings to form the assembled shipping package.

For a more detailed description of my invention, reference is made to the accompanying drawings in which

Fig. 1 shows a pair of substantially identical container parts according to the invention prior to assembly; and

Fig. 2 shows the assembled shipping package, with the shipping container partly broken away to reveal its contents.

The shipping container **10** comprises two substantially identical container parts **11** each of which forms one half of the complete shipping container. When these container parts **11** are fastened together about the spools that are to be shipped therein a complete shipping package is formed. The package particularly shown in the drawings is intended to contain two rows of spools.

In a preferred embodiment of my invention the container parts **11** each comprise an outer shell **13** and an inner liner **14**. The outer shell **13** is the principal structural element of the container part in that it supplies the desired qualities of strength, toughness and durability. It is integrally formed of plastic impregnated fibrous material or fiber-reinforced plastic material. Excellent results have been obtained with the use of a polyester plastic reinforced with glass fibers—in the case of a shipping container for 8 spools of magnet wire, each spool weighing, say, about 10 pounds, molded of this material, a wall thickness of $\frac{3}{32}$" was found to be sufficient to give the container ample strength and rigidity. A less expensive and also very satisfactory outer shell **13** may be molded of plastic impregnated fibrous material such as paper pulp.

The inner liner **14** serves as a cushion which lines the outer shell **13** and tends to minimize impact damage to the contents of the container. As the principal function of the liner **14** is that of a cushion, it should be formed of a relatively soft material such as papier maché or other fibrous pulp. The inner liner **14** is substantially the same shape as the outer shell **13** and fits within the outer shell **13** to completely line it with a layer of fibrous pulp material approximately $\frac{3}{16}$" in thickness.

Each container part **11**, comprising the outer shell **13** and the liner **14**, are molded in the form of a five-sided open box-like structure. It comprises a base wall **15** which provides a flat surface to facilitate stacking and storage. Perpendicular to the base wall **15** are two substantially parallel end walls **16**. Extending between the end walls **16** and perpendicular thereto are two side walls

17. The side walls 17 extend outwardly from the base wall 15 and have a generally concave interior configuration which conforms to the contours of the spools intended to be shipped in the shipping container. That is to say, the side walls 17 are substantially quarter-cylindrical in contour. An interior wall or partition 18 is provided which extends inwardly from the base wall 15 and parallel to the side walls 17. The interior wall 18 forms a longitudinal partition which divides the interior of the container part 11 into two longitudinal compartments 19. The faces 20 of the longitudinal partition or interior wall 18 are generally concave in configuration and so correspond to the interior configuration of the side walls 17. Thus the end walls 16, one face 20 of the interior wall 18, and the opposing side wall 17, together define a substantially semi-cylindrical compartment which conforms to the contours of the spools to be shipped therein and which is adapted to receive a semi-cylindrical half portion of a row of the axially aligned spools.

An assembled shipping package according to the invention is shown by Fig. 2. One container part 11 forms the bottom half of the shipping package and the other container part forms the upper half thereof. Two rows of axially aligned spools 21 are positioned in the two longitudinal compartments 19. The longitudinal dimension of the interior compartments 19 should be just sufficient to accommodate the quantity of spools that are to be shipped therein. The spools in each row are held in a position of axial alignment by the close-fitting contours of the container part 11 and as a consequence, these axially aligned spools cannot override one another and cause damage to wire wound on them. The two parallel rows of spools 21 are prevented from striking against each other by the interior wall 18, which acts as a spool separator. The upper container part is fitted over the upper halves of the two rows of spools 21 so that each row of spools is enclosed in a substantially cylindrical compartment. The spools are held in axial alignment by the close-fitting contours of the container parts 11, and conversely the container parts 11 are held with their respective end walls 16 and side walls 17 in substantial vertical alignment by the two rows of spools.

The two container parts 11 are fastened together about the spools by means of a suitable fastener, preferably metal bands or straps 22. An adhesive tape or a gummed tape might be used as a fastening provided the tape selected has sufficient tensile strength to bind the two container parts 11 together without danger of breaking or bursting apart during shipment. The straps 22 are passed around the container parts 11 lengthwise along the base walls 15, or, if desired, lengthwise through the valleys 23 formed externally by the partition 18. It is undesirable for the straps to be passed around the container parts 11 transversely so that they bridge across the valleys 23, for then freight handlers might be tempted to use the straps as handles with consequent danger of injury.

The abutting edges of the side and end walls of the two container parts 11 may assume several forms. These edges may be simply butted together as illustrated in Fig. 2 or, if it is thought desirable, these abutting edges might be formed with an outwardly turned flange or bead, or with a tongue and groove configuration. If the side and end walls are sufficiently thick, say about 3/16 of an inch, it is preferable that they be formed without a flange or bead. However, very thin side walls, or the need for greater rigidity, may indicate the desirability of providing flanges to form mating bearing surfaces or reinforcements along the edges of the container parts.

My invention is not limited merely to the form of shipping container comprising only two parallel spool-receiving compartments 19 which is described above. It is evident that a shipping container having more than one spool separator 18 and more than two spool-receiving compartments 19 is within the scope of my invention. In general I find it best to use the form of package containing only two rows of spools for shipping the larger and heavier sizes of spools, and to use a form of package accommodating more than two rows for shipping the smaller and hence lighter spools.

Shipping packages of spools made according to this invention are neat in appearance and are compact and easy to handle. They may be stacked readily on the flat surfaces provided by the base walls 15. The container parts weigh no more than about a third as much as a wooden case of similar capacity, and thus a substantial saving in freight charges is possible with the use of this new container. The close-fitting contours of the container maintain the spools securely in axial alignment so that they cannot override each other, with all the advantages that flow as a consequence thereof.

I claim:

A shipping package for heavy spools having at least two parallel spool-receiving compartments comprising a shipping container formed of two substantially identical container parts, at least two rows of axially aligned spools received in said spool-receiving compartments, and container fastenings, each container part including an outer shell integrally formed of plastic impregnated fibrous material and an inner liner integrally formed of fibrous pulp material, said container parts having a five-sided open box-like structure comprising a base wall having a pair of flat portions, two substantially parallel end walls substantially perpendicular to said base wall, two side walls substantially perpendicular to said end walls, said side walls extending between said end walls and curving outwardly from said base wall to conform to the cylindrical contour of the said spools, and at least one interior wall extending inwardly from said base wall centrally between and parallel to said side walls, each interior wall forming a spool separator having two faces, each face thereof being curved to conform to the contours of the spools in correspondence to the opposing face of the side walls, said spool separators dividing the interior of the container part into at least two parallel substantially semi-cylindrical spool-receiving compartments each receiving a plurality of the axially aligned spools, one of said container parts forming the bottom half of the shipping container in which the lower halves of the rows of heavy spools are received and the second of said container parts forming the top half of said shipping container in which the upper halves of said rows of spools are received, said spool-receiving compartments securely maintaining each row of spools in axial alignment and said spools maintaining the two container parts in vertical alignment, said container parts being securely fastened together about said heavy spools by said container fastenings to form a shipping package having a liner of fibrous pulp material protecting and cushioning said spools.

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