

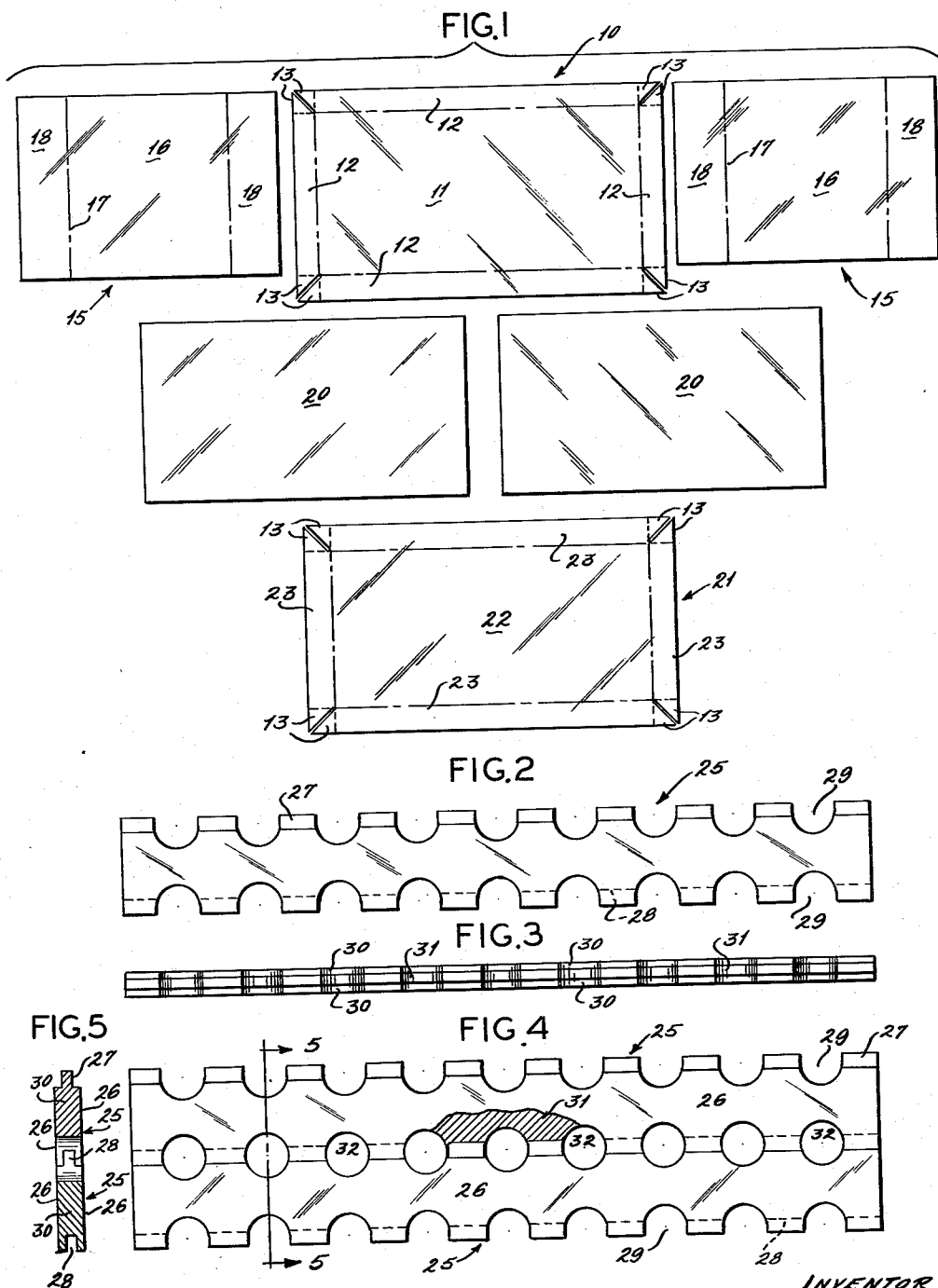
July 4, 1961

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PAPERBOARD CONTAINERS AND METHOD OF ERECTING
AND SIMULTANEOUSLY LOADING SAME

2,990,951

Filed May 24, 1957

2 Sheets-Sheet 1



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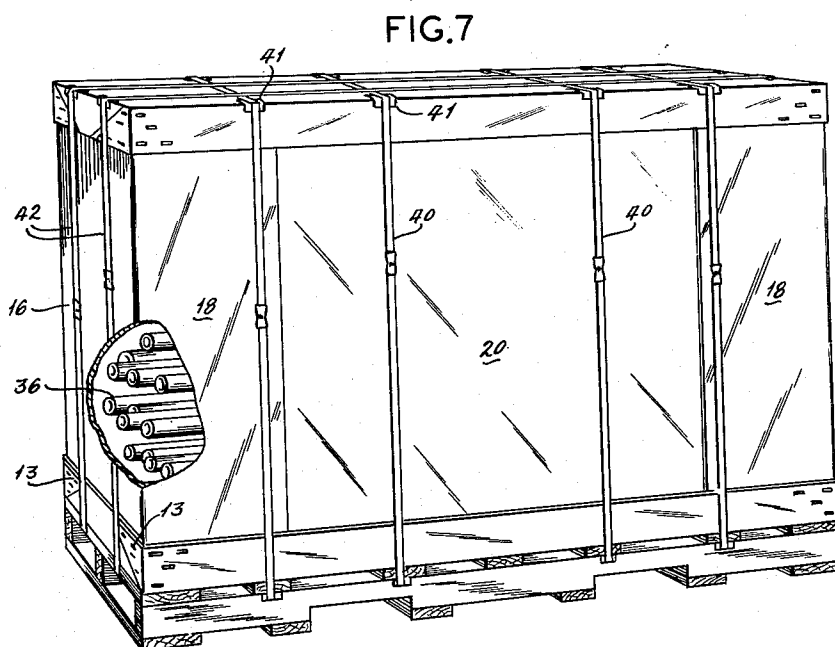
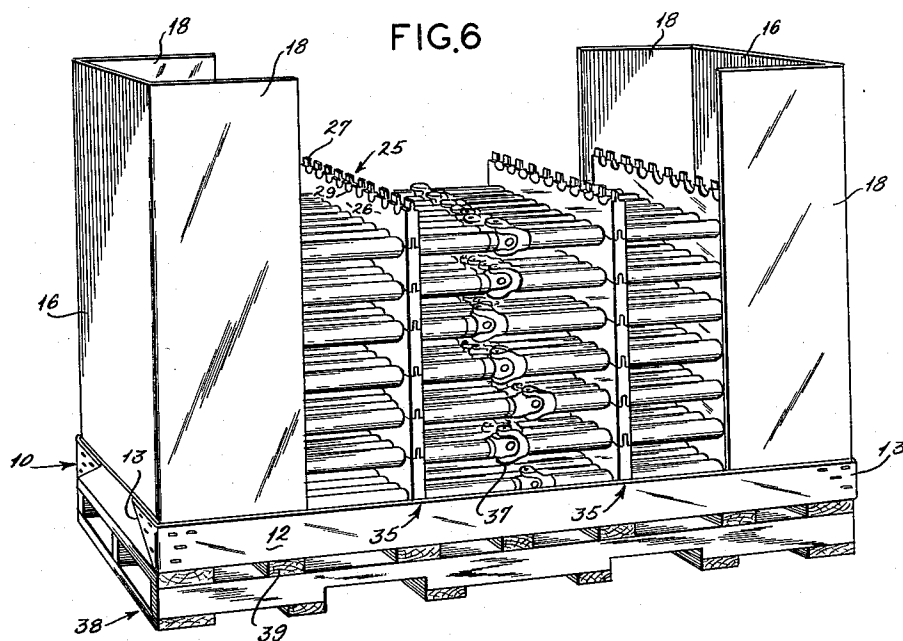
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PAPERBOARD CONTAINERS AND METHOD OF ERECTING AND SIMULTANEOUSLY LOADING SAME

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Filed May 24, 1957, Ser. No. 661,546

1 Claim. (Cl. 206—65)

This invention relates to large, heavy-duty paperboard containers for shipping automobile drive shafts, other relatively long rods, tubes and the like, which require protection by spacing from each other for shipment.

The container is designed primarily for packaging, storage and shipment of quantities weighing up to eighteen hundred pounds or more of automobile drive shafts having a universal joint at each end and a third one intermediate the length of the shaft. Each shaft is held in parallel spaced relation free of contact with all others by a series of inserts hereinafter described, but free to move longitudinally as an individual unit as a result of shocks and jolts during transportation.

Drive shafts of the kind described have hereinbefore been shipped in wood crates separated from each other but with the entire contents secured together as a single fixed unit by wood inserts. When the loaded crate is subjected to sudden longitudinal shocks or jolts arising in the normal course of transportation, the entire contents may move as a unit against the inflexible end of the crate with such force as to damage or even completely break through the end of the crate. Large metal returnable containers are also employed but add substantially both to the initial and transportation costs.

More specifically, the paperboard container of the present invention comprises a rectangular bottom tray with upstanding, connected together walls. Opposite end walls with relatively wide flanges integral with their vertical edges, folded right-angularly inwardly, are positioned in the bottom tray with their free end edges abutting the bottom panel of the tray, and with the lower margins of the walls and their flanges in contacting relation with the inner faces of the bottom tray walls. A series of novel inserts to be hereinafter described forming transverse partitions at spaced intervals across the length of the container, which hold the articles in spaced relation, are placed on the panel of the bottom tray. Side walls coextensive in height with the end walls are placed against the inner face of the end wall flanges with their lower edges resting on the panel of the bottom tray. A top cap similar to the bottom tray is placed over the end walls, side walls, and the end wall flanges, completing the assembly of the container. The invention is so designed that after the end walls and their vertical flanges have been positioned in the bottom tray, loading of the container with the aforesaid drive shafts or other articles proceeds simultaneously with the insertion of the aforesaid inserts which form the transverse partitions.

The series of inserts, preferably formed of four thicknesses of double wall corrugated paperboard, are placed in the bottom tray across the width thereof. The several thicknesses of double wall corrugated paperboard are secured together so that the upper edge of each insert has a tongue extending its entire length and the bottom edge has a mating groove throughout its length. The tongues and grooves of the insert are preferably formed of the two inner plies of the double wall paperboard. Each insert has half circles each having a radius slightly larger than the radius of the shaft cut in the top and bottom margins at uniform spaced intervals from end to end. In a preferred practical form of the invention, nine half

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circles may be employed in each insert, although the number may be varied as desired.

Four of said inserts are placed transversely in the tray, one spaced from each end and two at intermediate spaced intervals from the aforesaid end inserts with the grooved edges positioned on the bottom tray panel.

The inside length of the container is dimensioned to provide a free space of one inch to two inches or more between the ends of the drive shafts and the end walls of the container. A drive shaft is placed in each of the half circles of the aforesaid bottom inserts positioned at random with respect to the said free space between the ends of the shafts and the end walls. A second set of inserts is then added with the grooves enclosing the tongues of the first set. Since the half circles of the inserts are aligned with each other, the drive shafts are thus completely enclosed in the circles formed by the first and second sets of inserts.

Drive shafts and additional inserts are added in the same manner until the tiers thereof are built up to the height of the end walls. In the preferred practice the container may carry ten tiers of shafts enclosed in the inserts as described for a total of ninety units.

The side walls are next inserted inside the vertical end wall flanges and the upstanding walls of the bottom tray with their bottom edges resting on the bottom panel of the tray. The top cap is then placed over the side walls, the end walls and their vertical flanges, completing the loading and the assembly of the box. A series of encircling metal bands are preferably placed at spaced intervals around the side walls aligned with the transverse tiers of inserts for added strength to the structure. One or more bands encircle the end walls.

By the provision of the free space between the ends of the drive shafts and the end walls, due to the juggling of the container in transportation, the ends of the individual drive shafts will continue generally in more or less random relation with respect to the aforesaid free space; the ends of some of them may be in contact with one of the end walls, others with the other end wall, while the ends of still others may divide the free space equally and some unequally. Thus when the container is suddenly severely jolted, the impact of the individual freely moving units will be variable both as to the force exerted on an end wall and as to the time of the impacts. Furthermore, due to the resiliency of the paperboard, the variable force and time of the impact of each shaft or article will be confined or localized to a comparatively small adjacent area, whereby the effect of such sudden jolts will be well dispersed and absorbed over the affected wall and disruption or damage thereto effectively prevented. This is in direct contrast to the often damaging effect of similar impacts of the entire contents as a single unit which may occur with the hereinbefore described wood crate.

Thus, by the combination of the novel inserts for separating the drive shafts but permitting longitudinal movement thereof, and the greater length of the container than the length of the drive shafts, the paperboard container will safely carry contents of the kind described and similar relatively long rods, tubes and the like weighing up to eighteen hundred pounds or more without damage to either the container or the contents.

An object of the invention is to provide a large heavy-duty all paperboard container for packing, storing, and shipping a plurality of automobile drive shafts, other relatively long shafts, rods and tubes, secured in spaced relation from each other.

Another object is to provide a paperboard container for shipping quantities weighing up to eighteen hundred pounds or more of drive shafts, rods, tubes or similar relatively long articles with the said articles securely separated from each other.

Still another object is to provide a container which may be loaded with a plurality of drive shafts or similar relatively long articles securely separated from each other simultaneously with the assembly of the container.

A further object is to provide a paperboard container with a series of tongue and groove inserts extending transversely at spaced intervals, each insert having half circles at spaced intervals from end to end forming, with a similar superposed insert, complete circles enclosing a horizontal tier of drive shafts or similar relatively long articles extending to the top of the container, the length of the container being dimensioned to provide a free space between the end walls and the end of the articles in each tier.

Another object is to provide a container with a series of upright drive shaft retaining transverse partitions positioned at spaced intervals between the end walls, each partition being formed of a plurality of double wall sections secured together to form a tongue at the top edge and a mating groove at the bottom edge and having shaft receiving half circles at uniform spaced intervals from end to end, the sections being built up to the height of the container and forming the partition by inserting the tongues of the lower most section in the groove of the superposed section.

Still another object is to provide a rectangular container with insert forming partitions spaced transversely in the container for holding relatively long drive shafts and other articles in spaced relation from each other, articles being substantially equal in length but shorter than the inside dimension of the container, and the articles being placed in said supporting partitions at random with respect to the free space between their ends and the end walls, whereby the effect of a severe jolt on the container in the course of transportation will be variable both as to force and time on an end wall, and due to the resiliency of the paperboard the impact of each article will be localized to a small area immediately adjacent the end of said article, and the effect of said jolts will be dispersed and effectively absorbed by the end wall without damage thereto or to the contents.

With the above and other objects in view the invention consists in the construction of novel combinations and arrangements of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claim hereto appended, it being understood that various changes in the form, proportions and minor details of construction within the scope of the claim, may be employed without departure from the spirit or sacrificing any of the advantages of the invention.

The invention also consists in the parts, arrangement and combination of parts hereinafter described and claimed. The accompanying drawings form a part of this specification and like numerals and symbols therein appearing refer to like parts wherever they occur.

In the drawings:

(1) FIGURE 1 illustrates the blanks for the end walls, side walls and top and bottom closure caps of the container.

(2) FIGURE 2 is a side elevation of one of a plurality of tongue and groove inserts for supporting the lading and forming vertical transverse partitions,

(3) FIGURE 3 is a top plan view of the insert of FIGURE 2,

(4) FIGURE 4 is a side elevation of the insert shown in FIGURE 2 and a superposed insert secured together by their tongues and grooves in the process of building a transverse partition,

(5) FIGURE 5 is a vertical section of the secured together inserts of FIGURE 4, illustrating the tongue and groove securing means,

(6) FIGURE 6 is a perspective view of the container in process of assembly and loading with articles, and

(7) FIGURE 7 is a perspective view of the container fully assembled and loaded with one end wall partly

broken away to illustrate the random position of the ends of the articles with respect to the free end spaces between the articles and the ends of the container.

In FIGURE 1 the blank 10 for the bottom tray for the container is shown having a bottom panel 11 with flanges 12 secured together by flaps 13, forming the up-standing walls of the tray. The blank 15 for forming the end walls and their vertical flanges are scored transversely at 17 to define the end panel 16, and the fold lines of the flanges 18. Side walls 20 extend from end to end of the container with their side edges abutting the end panel 16 and their bottom edges abutting the bottom panel 11 of the bottom tray 10. The top cap 21 is similar in all respects to the top tray 10 having a bottom panel 22 with flanges 23 and securing flaps 13 for forming the downwardly extending walls of the cap.

A side elevation of one of the support means or inserts 25 which, with a superposed support means or insert, hold the articles free of contact with each other and form a part of a transverse partition, is illustrated in FIGURE 2. The support means or inserts are formed of a plurality of plies of corrugated paperboard secured together, preferably at least four in number, with the inner plies displaced upwardly to form tongues 27 and mating grooves 28. The upper and lower margins of the inserts have openings 29 cut at uniform spaced intervals for receiving individual drive shafts or other relatively long articles in the course of loading and assembly of the container. For round articles such as drive shafts, tubes or rods, the openings are substantially half-circles. The half-circles are slightly larger than half the cross section of the round articles to provide longitudinal freedom of motion of said articles through said half-circles. For articles of a different cross sectional contour, the openings in the insert are cut to conform to slightly more than half the maximum cross section of the articles.

In a preferred form of the invention the insert is formed of inner and outer sheets of double wall corrugated paperboard, as shown in FIGURES 2, 3 and 5, with two sheets of double wall corrugated paperboard 30 interposed therebetween. The interposed sheets 30 are displaced upwardly in forming the insert to provide the tongue 27 on the top edge of the insert and the mating groove 28 on the bottom edge.

Upon superposing an insert 25 over another with the tongue of the lower insert engaging the groove of the upper one, the half-circles 29, or other shaped openings corresponding to slightly more than half the cross-sectional contour of the articles, form the complete openings 32 shown in FIGURE 4. The manner of combining and interfitting the inserts is best shown in FIGURE 5 wherein the grooves 28 of the lower insert rest on the bottom of the tray of the container with its tongue 27 friction fitting into the groove 28 of the superposed insert. This cross section drawing shows the two sheets of double wall corrugated board 30 forming the upper boundary of the groove 28 and the tongue 27 enclosed in the complementary groove of the superposed insert.

The container may be conveniently partly assembled as illustrated in FIGURE 6 by placing the bottom tray 10 on a skid 38 having upper transverse wood strips 39 positioned in spaced relation from end to end of the skid. The end walls 16 are positioned in the tray with the bottom edges thereof resting on the bottom panel 11 and their lower margins contacting the inner face of the upstanding tray walls 12 with the flanges 18 folded right-angularly inwardly with their lower margins in contact with the tray walls 12. In a preferred form of the invention for packing automobile drive shafts with universal joints at each end and a third universal joint intermediate therebetween, four of the inserts 25 are placed with their grooved edges downwardly at spaced intervals on the bottom panel 11 in transverse relation thereto. In the embodiment of the invention illustrated, the inserts have nine half-circles spaced uniformly

throughout their length. A drive shaft is placed in the openings of the described lowermost set of inserts and a second insert placed thereover, whereby the entire first set or tier of shafts are supported and fully enclosed in the complementary openings thus formed. As hereinbefore pointed out the drive shafts or other articles are of substantially uniform length and the inside length of the container is slightly greater than the length of the articles thereby providing a free space between the ends of the articles and the end walls of the container and the articles are placed in the openings in the inserts at random with respect to this free space.

The described operation is continued until the column of inserts enclosing the successive tiers of drive shafts is built up to the top of the walls of the container, forming the series of spaced partitions 35. The end walls 20 are then inserted between the upstanding tray walls 12 and in contacting relation of the inner face of the end flanges 18 with their side margins abutting the end walls at their corners. The top cap 21 is then placed over the side and end walls and the end wall flanges with its walls extending downwardly. Steel bands 40 are secured transversely around the container in alignment with the inner partitions 35 with metal clips 41 inserted between the band and the corners of the top caps. Lighter weight bands 42 likewise encircle the container longitudinally and complete the assembly and loading of the package.

A portion of the end of the assembled and loaded container shown in FIGURE 7 is broken away to show the random position of the drive shafts (or other articles) in the free space provided between the ends thereof and the end walls. In the preferred form of the invention illustrated, the universal joints on the ends of the drive shafts are omitted for convenience in illustrating the hereinbefore described random position of the shafts with respect to the said free space, whereby if suddenly jolted the impact of the individual impact on an end wall will be variable both in force and in time and due to the resiliency of the paperboard, the impact of each unit will be localized to a small area surrounding the unit so that the effect of a sudden severe jolt will be dispersed and absorbed without damage either to the end wall or to the contents of the container.

It is to be understood that the embodiments of the invention herein described are illustrative and not restrictive, and it is also to be understood that the invention may be susceptible of embodiments in other forms, and all such modifications which are similar and equivalent thereto come equally within the scope of the claim next appearing.

I claim:

In a pallet mounted package for the transportation of two or more relatively long tubes, rods and other uniform cylindrical articles of substantially the same length, the combination of a strap bound pallet mounted container with individual top, bottom and end forming members and individual side forming members, which are each substantially longer than the said packaged articles, and a series of article supporting partitions transversely spaced at intervals from the end forming members, within the container; each said article supporting partitions being vertically positioned on the bottom forming member at a distance from the end forming members of the container, and comprising a plurality of superposed tongue and groove mating inserts, coextensive in height with the end and side forming members, connected together in vertical relation and extending from side wall to side wall, each insert having a tongue extending above its top marginal edge with a mating groove in its bottom marginal edge, and having cooperating article receiving half openings slightly larger but each substantially conforming to one-half the contour of the cross section of said packaged articles, cut at uniform spaced intervals from end to end in its top and bottom margins, the said packaged articles, being of a length less than the length of the said container and of a uniform diameter, the diameter of said articles being less than that of the diameter of the said openings, cut in the marginal edges of the inserts, whereby the packaged articles will be free to slide laterally through the openings of the said supporting portions, and through the free end space at the either end of the container.

References Cited in the file of this patent

UNITED STATES PATENTS

1,476,009	Suss	Dec. 4, 1923
2,457,197	Beckmann	Dec. 28, 1948
2,570,105	Fryda	Oct. 2, 1951
2,628,715	Budd	Feb. 17, 1953
2,762,551	Fallert	Sept. 11, 1956
2,778,174	Malone	Jan. 22, 1957
2,796,709	Bolding	June 25, 1957

FOREIGN PATENTS

60,719	France	Jan. 25, 1955
	(1st. Add. to No. 971,473)	
1,133,197	France	Oct. 20, 1955