Aug. 14, 1945. I. L. LESAVOY ET AL 2,382,240

CARTON

Filed April 25, 1944

FIG. 1.

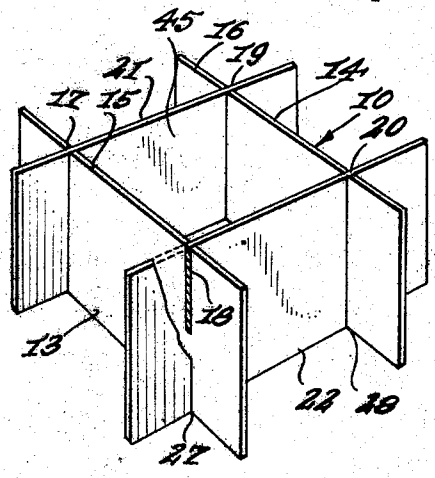



FIG. 2.

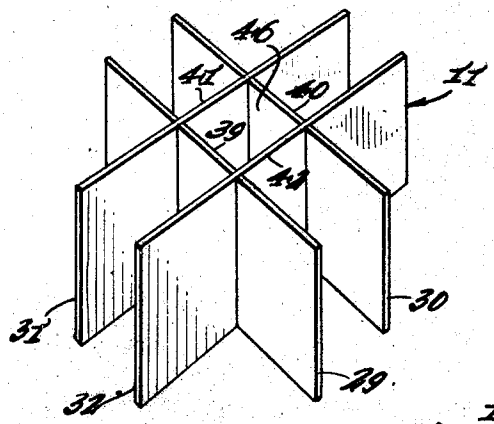



FIG. 3.

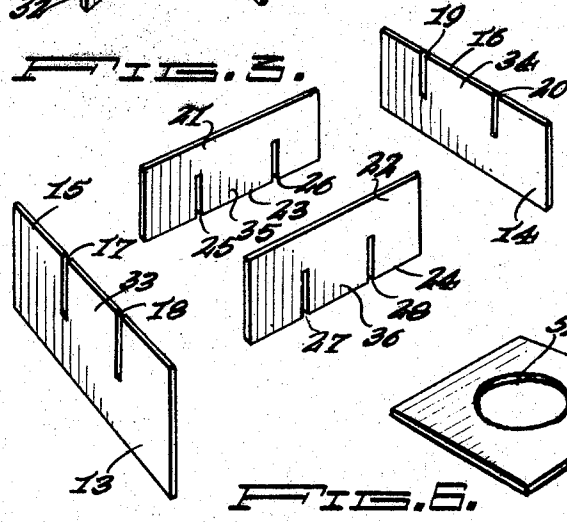



FIG. 4.

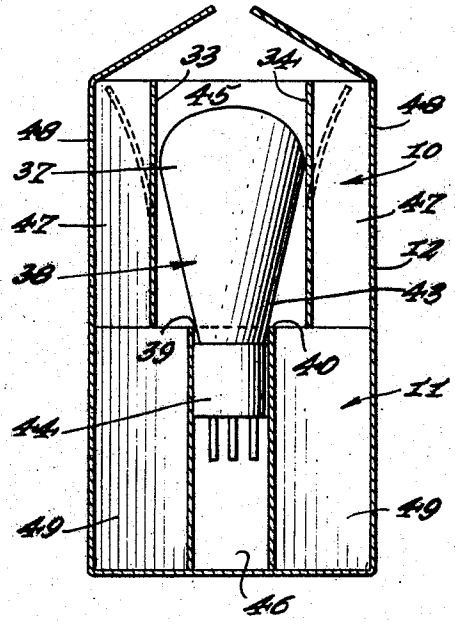



FIG. 5.

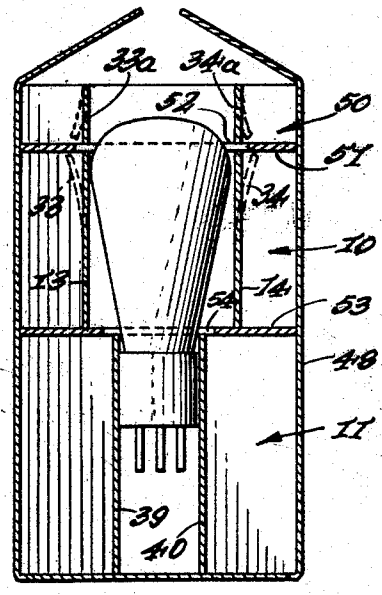



FIG. 6.




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2,382,240

## CARTON

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Application April 25, 1944, Serial No. 532,582

4 Claims. (Cl. 229—15)

This invention relates to containers, and particularly although not exclusively to cartons for fragile articles such as radio tubes and bulbs having differently proportioned upper and lower portions.

Various types of cartons are commercially employed for the storage and shipment of fragile articles, especially of such items as glass radio tubes manufactured in mass production. Many of the cartons, particularly those made of cardboard or corrugated board, are of such internal construction as to more or less firmly support the article, and yet keep it spaced from the sides of the carton so that the article may not be injured due to impacts directed against the sides of the carton. It has, however, been found that the supporting structure, while keeping the fragile article centrally disposed within the carton, does not provide a sufficiently yieldable or resilient support so as to render it safe from the danger of breakage when forcefully brought into actual contact with the supporting structure itself. Where attempts have been made to provide a resilient structure, the resultant carton has generally been intricate in structure and high in cost.

It is within the contemplation of our invention to provide a carton with the aforesaid shortcomings eliminated, whereby a fragile article such as a radio tube may be safely supported centrally within a carton, and separated from the walls thereof, without any danger of breakage due to impact engagement with the supporting structure. And it is a further important object of our invention to enable a yieldable support to be effectuated by means of a structure of simple, readily fabricated and inexpensive design.

It is also within the contemplation of this invention to provide a carton with an arrangement of simply constructed inserts adapted not only to provide the yieldable support above referred-to, but also to snugly accommodate the article by supportably engaging it at two differently proportioned portions thereof.

It is another object of this invention to provide a carton of the above-described category with yieldable retaining walls and with limiting means engageable with the fragile article to hold it against movement beyond predetermined limits.

Other objects, features and advantages will appear from the drawing and the description hereinafter given.

Referring to the drawing,

Figure 1 is a perspective view of one of the carton retainer inserts in accordance with our invention, a portion of one of the retainer walls being broken away for clarity.

Figure 2 is a perspective view of another insert, substantially similar to that of Figure 1 and adapted for cooperative use therewith in our invention.

Figure 3 is a disassembled view, in reduced size of the unit of Figure 1.

Figure 4 is a vertical section of a conventional outer casing of rectangular cross-section, showing the units of Figures 1 and 2 in an operative position therein, and supporting a radio tube, two of the retainer walls being shown, in broken lines, flexed outwardly.

Figure 5 is a vertical section of a modification of our invention containing three retainer inserts and two horizontal retainer walls between the inserts, certain of the retainer walls being shown, by broken lines, in their flexed positions, and

Figure 6 is a perspective view of one of the retainer walls employed in our invention.

The retainer units employed in the preferred form of our invention are illustrated as the units 10 and 11, unit 10 being superimposed upon unit 11 within the conventional type of outer casing 12. Unit 10 consists of two parallel vertical walls 13 and 14, containing slots extending downwardly from the upper edges 15 and 16, respectively. Wall 13 contains slots 17 and 18, and wall 14 contains slots 19 and 20. In interlocking engagement with said walls 13 and 14, and preferably at right angles thereto, are the vertical parallel walls 21 and 22 containing slots extending upwardly from the lower edges 23 and 24 thereof, respectively. Wall 21 contains the slots 25 and 26 and wall 22 contains the slots 27 and 28.

Unit 11 contains a similar arrangement of interlocking walls, 29, 30, 31 and 32. Inasmuch as the interlocking arrangement is substantially similar to that of unit 10, a detailed description thereof will not herein be given. It is, however, understood that the invention is not limited to the particularly slotted arrangement specifically shown in Figures 1 to 3, inasmuch as other wall supporting means may be employed within the scope and intent of this invention.

Referring specifically to the form of our invention illustrated, it is apparent that sections 33 and 34 of walls 13 and 14, respectively, can, if made of bendable material, be flexed inwardly or outwardly. Figure 4 illustrates an outward flexing of said sections. Similarly, sections 35 and 36 of walls 21 and 22 can be flexed inwardly or outwardly under the influence of suitable forces applied thereto.

In the specific arrangement shown in Figure 4, the upper portion 37 of radio tube 38 is normally in proximate relation to sections 33 and 34 of walls 13 and 14, and also to walls 21 and 22—and if desired the unit can be so proportioned with respect to the tube that the tube will actually engage said walls. Unit 11 is so proportioned that the upper edges 39, 40, 41 and 42 engage the annular wall 43 of the radio tube so as to prevent a downward movement thereof. In other words, the upper portions of walls 29, 30, 31 and 32 of unit 11 serve to support the tube 38 in suspension. It is preferred, although not required, that the walls of said unit 11 be so proportioned as to be either in actual engagement or in proximate relation to the base or bottom 44 of tube 38. Inasmuch as the radio tube is of greater proportions in its upper portion than in its lower portion, the central chamber 45 in unit 10 is of larger proportions than the central chamber 46 of unit 11.

It will further be observed that inasmuch as the slots of the walls constituting units 10 and 11 are disposed intermediate the lateral edges of the respective walls, they provide a plurality of cells surrounding the central chambers 45 and 46. For example, in Figure 4, the upper unit 10 is provided with cells 47 between the central chamber 45 and the sides 48 of the outer casing. Similarly, the lower unit 11 contains cells 49 between the central chamber 46 and the sides 48 of the outer casing.

When the device is in operative use, the fragile article, such as the radio tube 38, is suspended centrally of the container. The arrangement is hence such that it is protected by the air spaces 47 and 49 from impacts that may be directed against the sides 48 of the casing. Being suspended, both the upper and lower portions of the tube are out of contact with the sides, top or bottom of the outer container. In this case it should be observed that if the top of the container were filled with some resilient material, such as excelsior, the tube would be prevented from shifting in the event the carton were inverted.

Should the carton be subjected to sudden impacts, the tube 38 might be forcefully directed against one of the adjacent vertical walls. For example, the upper portion 37 of the tube might be directed against any of walls 13, 14, 21 or 22. If these were made of corrugated board or some slightly bendable material, there would be sufficient give to prevent danger to the tube, since the flat or bendable portions of these walls are engageable with the tube. These walls, being vertical, constitute in effect bendable columns if a force is applied intermediate the upper and lower edges thereof. This is in contradistinction to certain known arrangements where an unyielding edge of a wall is arranged for abutment with the tube. If the tube were suddenly directed against walls 13 or 14, the sections 33 or 34 thereof would flex outwardly as shown in Figure 4—thereby preventing any damage to the tube. In like manner, the walls of unit 11 are adapted to yieldably receive the lower portion of the tube when the carton is subjected to sudden forces.

Referring to the form of our invention illustrated in Figure 5, units 10 and 11 are disposed within the walls 48 of the outer casing shown. In addition, there is another unit 50, preferably proportioned like unit 10 but of less height, and inverted so that the walls 33*a* and 34*a* are disposed at the bottom and in adjacent relation to walls 33 and 34. Disposed between units 10 and 50 is the flat horizontal board 51 containing a central aperture 52 of greater proportions than the normal distances between walls 13 and 14. Similarly a horizontal board 53 is disposed between units 10 and 11, having a central aperture 54 proportioned larger than the distances between walls 39 and 40, and the distances between walls 41 and 42.

In the operative use of the structure of Figure 5, it is apparent that the annular wall of aperture 52 will limit the lateral movement of the tube, in the event walls 33, 33*a*, 34 and 34*a* yield more than a predetermined amount. In other words, if the force of impact is sufficiently great to cause a considerable flexing or buckling of the walls surrounding the tube, the horizontal boards 51 and 53 come into play by preventing an excessive movement of the tube. Inasmuch as the surrounding walls had already softened the blow, any contact of the tube with the annular walls of aperture 52 and 54 will be gentle in nature, with the danger of injury reduced to a minimum.

In both forms of our invention, readily fabricated retainer inserts are employed without the necessity of employing specially formed or die-cut retaining walls. It is apparent that only flat partitions are employed, yet they are capable, if suitably proportioned, of accommodating variously sized devices, and of affording protection to a fragile article in the event the carton is subjected to impacts or other rough handling.

It is understood that this invention is not limited to the particular forms thereof illustrated and hereinabove described, inasmuch as other embodiments thereof may be employed within the intent and scope of this invention, and the scope of the appended claims.

We claim:

1. In a container of the class described, an outer casing and at least two retainer units disposed within the casing, each of said units comprising at least two spaced bendable walls and supporting means for said walls, said units being disposed one above the other with the said walls extending in the same general direction, the spaces between said walls forming a continuous passageway, and walled limiting means disposed between said units, the distance between opposite portions of said walled limiting means being greater than the distance between the said walls in either of said units.

2. In a container of the class described, an outer casing and at least two retainer units disposed within the casing, each of said units comprising flexible walled means forming a central chamber, said chambers being of different cross-sectional proportions, said units being disposed one above the other with said chambers in registry and forming one continuous passageway, and a board with a central aperture therein and disposed between said units, the distance between opposite portions of the wall constituting said aperture being greater than the distance between corresponding opposite portions of the walls of either of said chambers.

3. In a container of the class described, an outer casing and at least two retainer units disposed within the casing, each of said units comprising at least two substantially parallel bendable walls and at least two other substantially parallel bendable walls in intersecting and interlocking engagement with the first-mentioned walls, whereby a central chamber and a plurality of cells surrounding the chamber are formed

said walls being in abutting engagement with the lateral wall of the casing, certain corresponding portions of at least two of the parallel walls in at least one of said units being free for lateral flexing, said units being disposed one above the other with said chambers in registry and forming one continuous passageway, and a board with a central aperture therein and disposed between said units, the distance between opposite portions of the wall constituting said aperture being greater than the distance between corresponding opposite portions of the walls of said chambers.

4. In a container of the class described, an outer casing and three retainer units disposed within the casing, each of said units comprising at least two substantially parallel bendable walls and at least two other substantially parallel bendable walls in intersecting and interlocking engagement with the first-mentioned walls, whereby a central chamber and a plurality of cells surrounding the chamber are formed, said walls being in abutting engagement with the lateral wall of the casing, said units being disposed one above the other with said chambers in registry and forming one continuous passageway, predetermined upper portions of certain two parallel walls in the intermediate unit being free for lateral flexing, the lower portions of the two parallel walls of the upper unit corresponding to the last-mentioned two parallel walls of the intermediate unit being similarly free for lateral flexing, and two boards each with a central aperture therein and disposed between the intermediate and the upper and lower units, the distance between opposite portions of each of the aperture walls in said boards being greater than the distance between corresponding opposite portions of the walls of the chambers flanking the boards.

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