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SHOCK-PROOF CARTON

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Fig. 1.

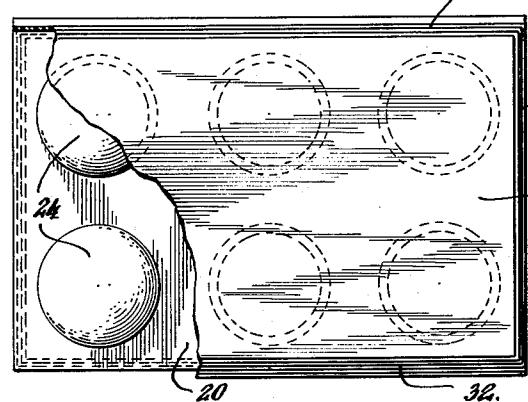


Fig. 3.

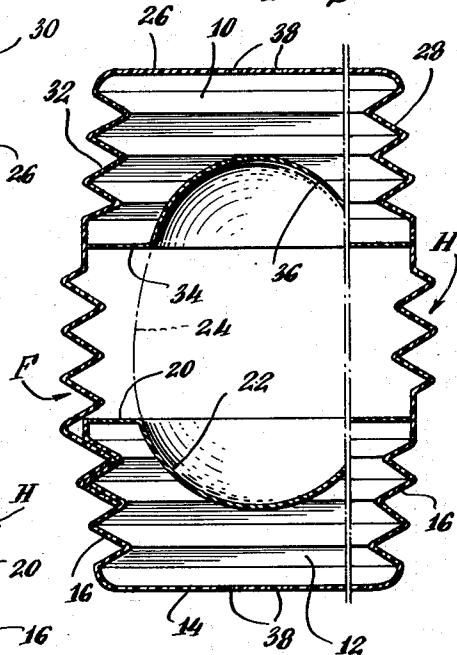


Fig. 2.

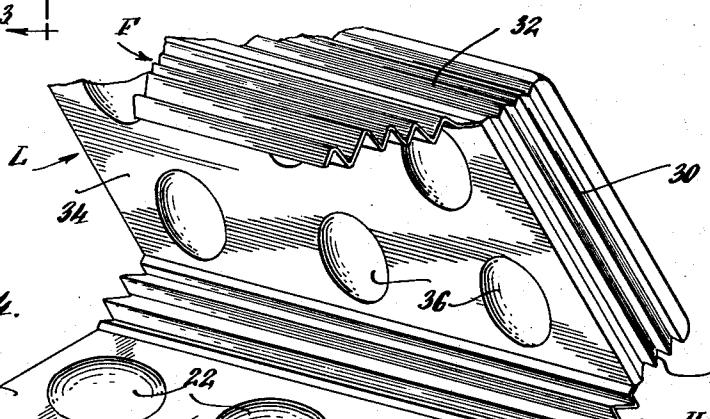
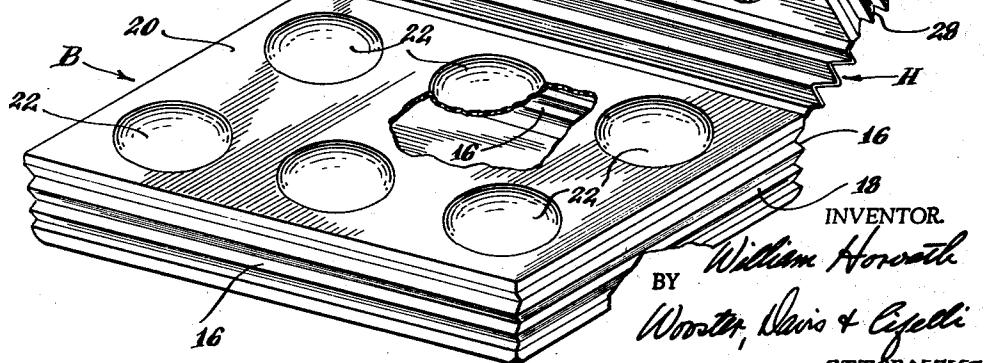


Fig. 4.



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## SHOCK-PROOF CARTON

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3 Claims. (Cl. 150—5)

This invention relates to a shock-proof carton and, more particularly, to such a carton which is especially well suited for transporting fragile articles, such as eggs.

Many advances have been made in recent years in techniques and means for packing, transporting and protecting fragile articles, such as electronic components. However, many of these advances have resulted from the development of the components themselves which, in many cases, are both fragile and expensive. Accordingly, these have been special purpose packaging efforts and cost has not been a controlling factor in the development of packages for such applications. Therefore, the art has not produced an inexpensive, adequately shock-proof packaging means, and this is nowhere more evident than in the average grocery store or supermarket. For example, the eggs which the housewife purchases are carried home in a type of carton which differs very little from those of twenty-five years ago. Furthermore, the egg cartons presently widely used are not shock-proof. While a certain amount of jostling may not injure the eggs packaged in such cartons, dropping such a carton on a hard surface almost invariably results in the loss of many, if not all, the eggs it contains.

Accordingly, it is the primary object of this invention to provide an improved shock-proof carton. Other objects are to provide such a carton which is inexpensive, and especially well suited for containing and transporting eggs.

The manner in which the foregoing objects are achieved will be more apparent from the following description, the appended claims, and the figures of the attached drawing, wherein:

FIG. 1 is a plan view of a carton constructed in accordance with this invention, shown in its closed position and partially cut away to clearly illustrate its construction;

FIG. 2 is a front elevational view of the carton of FIG. 1;

FIG. 3 is an enlarged cross sectional view taken along the line 3—3 of FIG. 2; and

FIG. 4 is a perspective view of a carton constructed in accordance with this invention shown in the open position.

The carton illustrated in the accompanying drawings more specifically comprises a container L forming an upper air chamber 10 and a container B forming a lower air chamber 12 (FIG. 4). In the illustrated embodiment, the container B forms the base of an egg carton, while the container L forms its lid. The base B and lid L are interconnected by a pleated hinge H. The lid L includes a depending pleated flap member F, as is clearly shown in FIGS. 2—4, which functions as a closure for the container. The base B of the egg carton includes a flat bottom wall 14, front and back accordion-pleated side walls 16, and left and right accordion-pleated end walls 18. The upper wall 20 of the base B may be separately formed and secured to both side walls and both end walls, thus completing the closure of air chamber 12. The upper wall 20 is provided with concave depressions 22, each designed to receive the ends of stored eggs 24, as illustrated in FIG. 3.

The lid L of the illustrated carton is similar to the base B but in reversed relationship. It includes a flat top wall 26, an accordion-pleated back wall 28, ac-

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cordion-pleated end walls 30, and an accordion-pleated front wall 32 which has the depending flap F formed integrally with it. The lower wall 34 of the lid L is separately formed and secured to back wall 28, front wall 32 and end walls 30 to complete the closure of air chamber 10. Lower wall 34 is provided with concave depressions 36 for receiving and retaining the upper ends of stored eggs 24.

In one successful embodiment of this invention in practice, the entire shell of the carton, that is, all portions other than walls 20 and 34, was molded of a single sheet of thin resilient plastic material of sufficient density and thickness to be semi-rigid. In practice, a sheet of polyethylene having a thickness of .025 inch and sufficient density to be semi-rigid was employed. The walls 20 and 34 were formed of sheets of thinner plastic material, .010 inch thickness, and secured to the shell in the positions illustrated by heat sealing. Other materials may be utilized; however, it is important that the material be resilient; the shell be sufficiently rigid to retain its shape illustrated in FIG. 4 under normal conditions, and the walls 20 and 34 be more resilient than the shell. Because they are relatively more resilient than the shell, the walls 20 and 34 are deformable by the opposite ends of the stored eggs in use.

Eggs are stored in the carton by being placed upright in the depressions 22 on the upper wall 20 of base B. The lid L of the carton is then closed over the upper ends of the eggs so that each of the upper ends is contained within one of the depressions 36 on the lower wall 34. The hinge H is designed so that when the carton is closed it is under slight tension (that is, its pleats are expanded slightly) and thus exerts a compressive force on opposite ends of the eggs contained within the carton. In the illustrated construction, the flap F is pleated so that its pleats generally match corresponding pleats on the front side wall 16 of the base B. The flap is molded in a position and sufficiently stiff so that it has to be stretched over front side wall 16 to close the carton, as illustrated in FIGS. 2 and 3. When so disposed, its pleats nest into the pleats on front wall 16 and lock the front sides of the carton together, while at the same time urging the containers B and L together to cause their walls 20 and 34 to exert a compressional force on the ends of the eggs, similar to the effect caused by hinge H.

It will be understood, of course, that other carton closing means could be employed. For example, flap F could contain openings adapted to engage studs molded on the front side wall 16.

It is important to note that, in the carton of this invention, the eggs are gripped substantially only at their ends, and the retaining force is applied to each egg along its longitudinal axis. It is well known that eggs are very strong and highly resistant to compressive forces applied to their ends. It is extremely difficult, for example, to crush an egg by applying finger pressure solely at its ends. However, it is also common knowledge that an egg has very little strength in a transverse direction. An egg can be crushed readily when squeezed from side to side. In the carton of this invention, therefore, the eggs are secured within the carton in such a way that all forces are supplied along the direction of maximum strength.

It should also be noted that forming the base B and lid L as air containers produces a highly shock-resistant carton, for an air cushioned mounting is provided for fragile articles. As an additional feature of this invention, small air ports 38 (FIG. 3) may be provided in the top wall 26 and the bottom wall 14. These ports are beneficial in two ways. First, they provide an air relief vent that effects some additional cushioning when either of the upper or lower containers is suddenly compressed as, for example, when the carton is dropped onto a hard surface.

Second, these ports also allow for differences in egg sizes by making the containers forming air chambers 10 and 12 less rigid and more adaptable to compression by various sized eggs.

The carton of this invention is light in weight, simple to manufacture, and inexpensive. Most importantly it has excellent shock-absorbing qualities and is quite capable of protecting eggs even when dropped several feet onto a concrete surface. Although the specifically described embodiment of the invention is for the protection of eggs, those skilled in the packaging art will readily understand the relevance and usefulness of the inventive concept to the protection of other packaged fragile articles.

It will also be readily understood that a number of variations and modifications may be made in this invention without departing from its spirit and scope. For example, the carton of the invention has been described as manufactured from a plastic material, such as polyethylene sheeting of suitable thickness and density; however, this should not be interpreted as a limiting requirement. Resilient material of various other types may be employed for this purpose. It is also to be understood that the carton of this invention need not necessarily be provided with accordion pleats, as has been described and illustrated. Although this is the preferred construction, smooth-sided chambers may be suitable for many applications. Similarly, while the hinge and flap members have been illustrated as integral with the remainder of the carton, this is not a necessary requirement, for these members could be separately made and assembled to the containers. Further, the egg engaging walls have been described as including concave depressions for receiving eggs, as the illustrated embodiment is an egg carton; however, the shape of the depressions may vary to accommodate the particular fragile articles being packaged, or if desired can be entirely omitted and reliance for positioning the articles placed entirely on the resilience of the article engaging walls which will form temporary depressions. Further still, though it is preferred to have the base and lid as air containers, the bottom and top walls of the carton could be omitted. Other variations and modifications of this invention will also be apparent to those skilled in the art. Accordingly, it is to be understood that the foregoing disclosure is merely illustrative of this invention and is in no way limiting. The invention is limited only by the scope of the following claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A shock-proof carton for fragile articles which comprises: a first member formed of semi-rigid material, having pleated side walls and having at least one resilient outer wall thereof arranged to engage a first portion of each of the fragile articles; a second member formed of semi-rigid material, having pleated side walls and having at least one resilient outer wall thereof arranged to engage a second portion of each of the fragile articles; pleated hinge means interconnecting said members in spaced relationship to retain the fragile articles therebetween under slight compression when the carton is closed; and means including a pleated flap on one of said members arranged to selectively cooperate with a portion of the pleated side walls on the other of said members for securing said members to effect closure of the carton; said members, said pleated hinge means and said pleated flap comprising a self-contained unit.
2. The carton of claim 1 wherein each of said members defines an atmospheric-pressure air chamber and air port means between the atmosphere and its air chamber.
3. The carton of claim 1 wherein the one outer wall of said first member and the one outer wall of said second member each define a plurality of depressions shaped and disposed to receive the end portions of eggs.

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