

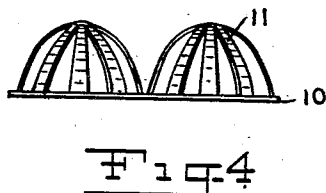
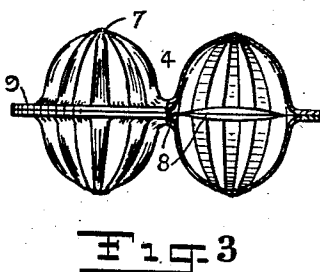
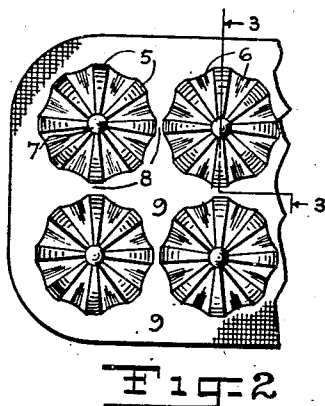
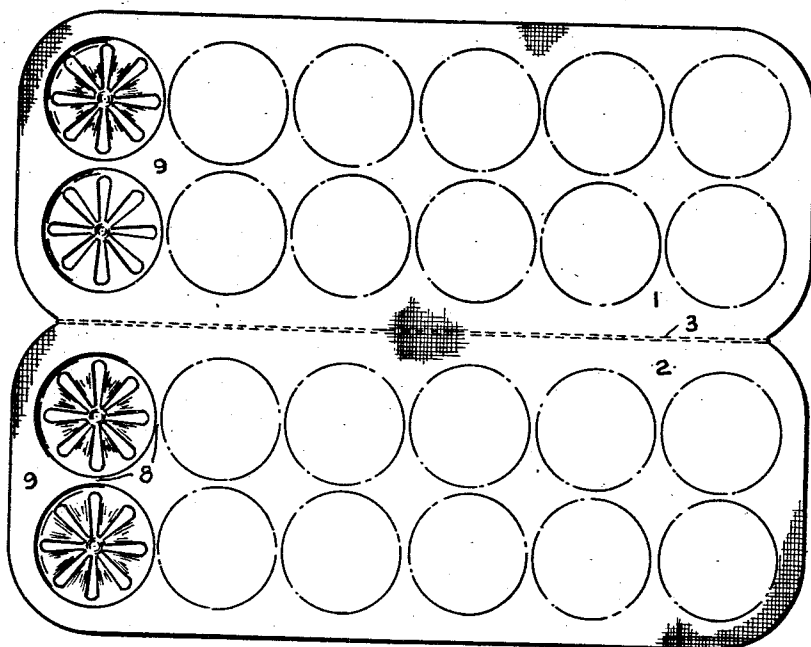
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F. D. GRAY

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CARTON FOR FRAGILE ARTICLES

Filed July 21, 1927



Inventor
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By his Attorney
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UNITED STATES PATENT OFFICE

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HOLED-TITE PACKING CORPORATION, A CORPORATION OF NEW YORK

CARTON FOR FRAGILE ARTICLES

Application filed July 21, 1927. Serial No. 207,361.

The improvements relate to cartons for fragile articles and the method of making the same, and more particularly to the form of said cartons and the article holders therein and the means employed in producing the same, which have a wider application than that herein described and illustrated, the illustration being an exemplification of the embodiment of the improvements.

10 The objects of the improvements are in part the production of a carton, for the reception, carrying or other transportation of fragile articles, such as eggs, which will securely hold and protect such articles, and in
15 some uses without the employment of any external box or casing, against all ordinary shocks tending to break them and which at the same time, on account of its form and construction, will have such a rigid character
20 as to maintain its form under all ordinary conditions, of use, and also may be re-used for the same or other purpose, if desired. Other objects are the provision of a ventilated carton and holders, the simplification
25 of the methods of manufacture and the saving of materials, power, heat and labor involved therein. The improvements are illustrated in the accompanying drawings, in which—

30 Figure 1 is an inside plan of a box or carton for fragile articles open, embodying the improvements;

Figure 2 is an outside plan of a portion of the same;

35 Figure 3 is an elevation vertical and sectional on the line 3—3 of Fig. 2, looking in the direction indicated by the arrows;

40 Figure 4 is an elevation of the cage forms on which the holding caps are given their peculiar conformation.

The body of the carton or holder consists of a sheet of material divided into two sections 1 and 2 provided at their junction with
45 a weak line 3 on which they are adapted to be folded to form a container enclosing the articles, and the holding cups or domes 4 are formed in double rows integral therewith and so arranged that when the sheet is
50 folded they will form individual cells for the

articles, each cup forming half of the said cell.

The cups or domes are provided with radial ribs 5 extending from the base to the apex of each dome and tapering upwardly. Between the ribs are depressions 6 separating
55 them and adapted to be in contact with the article received therein. At the apex the ribs are merged and form a button 7 projecting slightly beyond the surface thereof. It
60 will be seen that in this manner there is formed a cup for the egg or other article having inwardly curved ribs adapted to hold it in a yielding grip and outwardly projecting
65 ribs to protect it from external shocks, the convergence of the ribs at the bottom or apex of the cup, with the uniting button, forming a reinforcement at that point having great strength and resistance to outside pressure
70 or shocks tending to cause injury to the article, so that when the container is placed on a flat surface this reinforced portion will form a base and a protecting support.

Between the cups or domes the surface of the base sheet is curved upwardly, as shown
75 at 8 (see Fig. 3) while between each four cups and around the edges and through the middle of the sheet are zones 9 which are approximately plane, so that when the container is folded over on the article these zones of
80 each section of the sheet will be in contact with the similar zones of the other section, or nearly so. The material of which the container is formed is also slightly thickened so as to form a relatively rigid connecting web
85 between the cups in each row and each cup and the one adjacent to it in each double row. In this manner a rigid base is provided and at the same time separated connecting portions between the cells formed by the cups
90 which will give the entire structure strength and a certain amount of resiliency, and also provide for the circulation of air to ventilate the articles.

In use the articles are placed in one-half
95 of the carton, and the other half then folded down thereon to enclose them snugly. If some are slightly larger than the standard size—as in the case of eggs—the inwardly curved ribs 6 will yield to a sufficient extent
100

to permit the cell to close thereon, and in all cases the articles will be held thereby in a slightly yielding grip so that they will not roll about therein while being carried or otherwise transported, and the raised ribs 5 will protect them throughout their entire surface against external shocks or pressure.

The carton thus described may be closed in any suitable manner, as by a piece of cord or the like passed around it between the domes, or the free edges may be secured together in any manner. The entire device may then be placed in an outside box or crate if desired, and this may be done with the carton in open position, one open carton being placed over another. In the drawings, a carton for a dozen eggs is illustrated, but the number may be increased or diminished at will.

The method of forming the ribbed cups and the base is illustrated in Fig. 4, in which a sheet of metal 10 is provided with radial metal strips 11 forming a cage having the shape of the ribs 5 of the cups.

The sheets are formed by the well known felting process of the art with the domes or cups preferably having substantially smooth unbroken walls. This is usually done by passing suitable forms through a bath having fibres suspended therein, while maintaining suction on the inner side of the forms to draw the fibres against them and form a sheet of fibrous material, comprising the base and the cups or domes. These sheets are then transferred, in a wet, soft condition to plates such as the plate 10 with the cages 11 thereon corresponding in number, position and size to the cups, the cages engaging the inside surfaces of the cups. The molded sheets are now passed through a suitable compartment for drying treatment where they are subjected to the action of heated air while being held on the cages. This causes them to shrink and harden and to form the depressed inwardly curved segments between the bars of the cage and the radial ribs corresponding with the said bars. It also causes them to stretch to a certain extent over the cages, so that the circumference of each cup or dome following the contour of its sides will be as great as or greater than the original molded cup. The result is that each cup or dome is susceptible of considerable expansion under internal pressure and compression under external pressure, without danger of injury to the article held therein, and while protecting the said article from injury. This method of forming the corrugations also makes them very strong, and gives them a tendency at all times to return to their normal finished form after being subjected to flattening or distorting pressure. This is probably due to the fact that the fibres are not bent or twisted or moved from their normal positions or relations in the shrinking operation which causes the formation of the ribs or corrugations, but

are merely placed under tension and stretched while passing through the setting stage.

After the sheets have set and hardened and are dried to a sufficient extent to insure that they will retain the form designed, they may be removed from the holders with the cages without difficulty, as the bars of the cages are imperforate and do not therefore permit the fibres to engage them except superficially, and there is a tendency on the part of the cups to creep slightly toward the tops of the cages and thus free themselves therefrom. Therefore it is necessary only to invert the cages and permit the dried sheets to fall therefrom by gravity, but if any slight adhesion is found to exist under any conditions or with any particular material, the plates carrying the cages may be agitated or a moderate blast of air applied to the underside thereof to remove the sheets.

In the shrinking and setting stage the upwardly curved portions 8 between the cups or domes are formed, producing the useful conformation heretofore mentioned. These portions, however, are not stretched to any material extent, and therefore retain their original thickness and their intended strength. In the process of forming the cups in the bath the sheet will be slightly thicker at these connecting portions than in the domes owing to the fact that the floating pulp is pocketed to some extent between the molds on which the domes are formed, and this fact, together with the fact that these portions are not materially stretched in the drying operation leaves them thicker and stronger, so that the entire holder is given sufficient stiffness and strength to resist strains tending to bend it or cause ruptures. The particular form and arrangement of the cups or domes and other details may be varied without departing from the scope of the present improvements, and the packing may be used in the place of "flats" in crates or other containers. When shipped or stored without articles therein the sheets may be packed open in nested relation, and when they are superposed one upon another with articles therein, either folded or in open position, the cells may be arranged so that the cells of one tier may be positioned in the spaces between those above and below them, thus economizing space and forming an interlocking engagement, and at the same time holding the articles therein spaced from one another.

I claim:

In packing for fragile articles, a sheet of relatively yieldable unfinished pulp material having hollow dome-like article-receiving and holding protuberances uniformly disposed thereon, said protuberances having substantially half-ovoid forms for conforming to the shape of an egg for supporting same in upright position, dome-shaped pro-

protecting means defining outwardly bulged apices of said protuberances, the walls of said protuberances having bossed ribs extending towards and merging with said dome-shaped protecting means, portions of the peripheral bases of said protuberances merging with the sheet by flaring outwardly and upwardly at areas interposing at least three of said protuberances for providing elevated zones, other portions of the peripheral bases flaring outwardly and merging with one another at locations between contiguous protuberances and in planes offset from the planes of said zones, whereby additional cushioning and resilience is provided for the article holding protuberances as a whole.

Witness my hand this 18th day of July, 1927, at the village of Herkimer, in the county of Herkimer, State of New York.

FRED D. GRAY.