June 28, 1949. S. BERGSTEIN 2,474,391

PROCESS FOR PRODUCING PACKING STRUCTURES

Original Filed Nov. 30, 1944 2 Sheets-Sheet 1

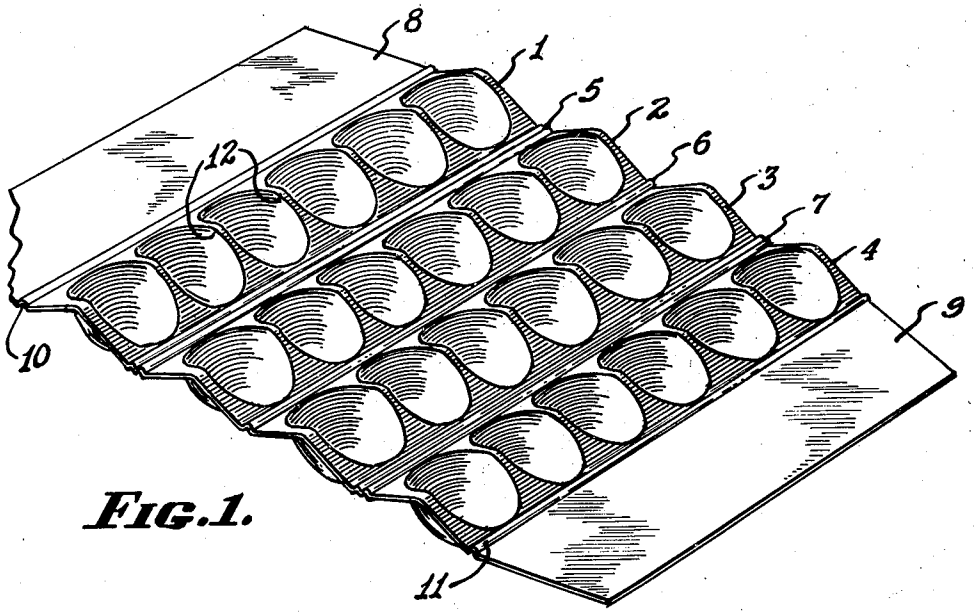


FIG. 1.

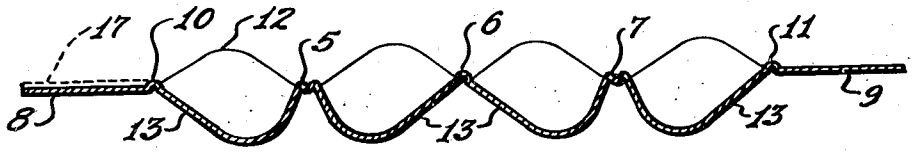


FIG. 2.

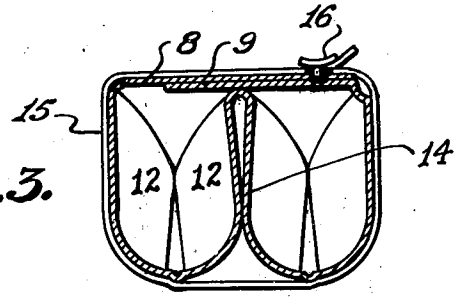


FIG. 3.

INVENTOR.
SAMUEL BERGSTEIN.
BY Allen & Allen
ATTORNEYS.

June 28, 1949. S. BERGSTEIN 2,474,391

PROCESS FOR PRODUCING PACKING STRUCTURES

Original Filed Nov. 30, 1944 2 Sheets-Sheet 2

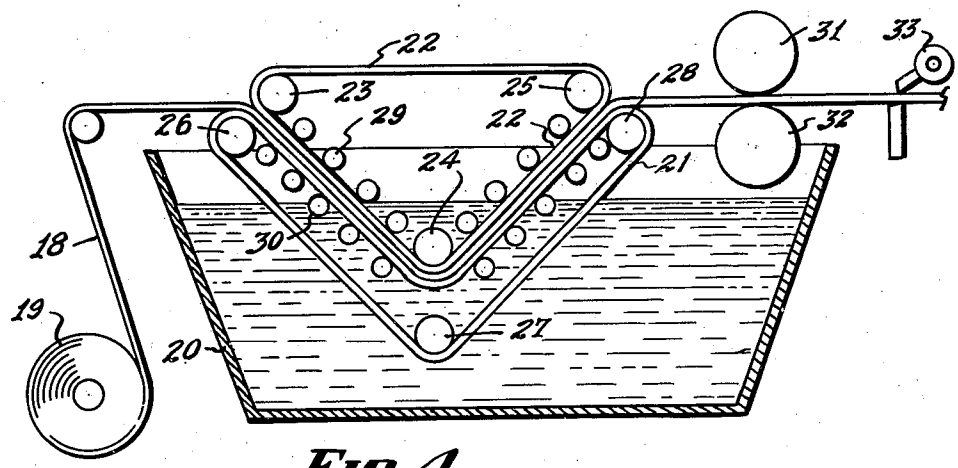


FIG. 4.

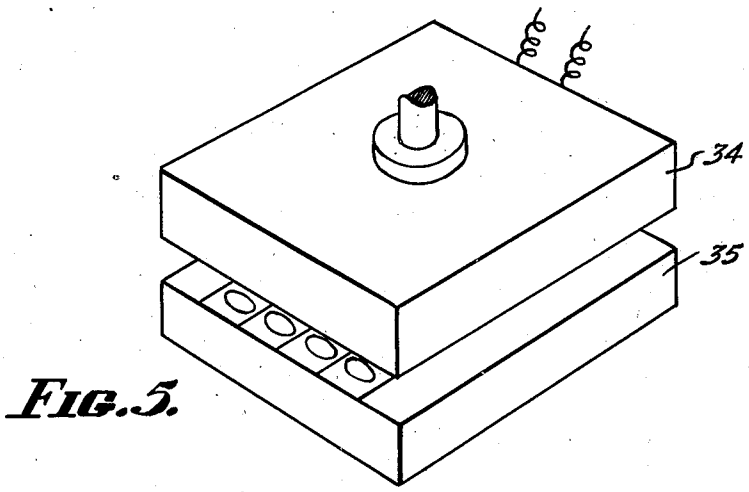


FIG. 5.

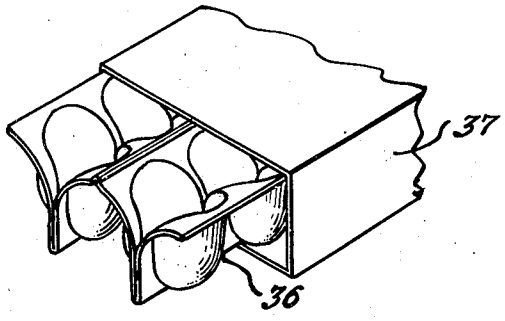


FIG. 6.

INVENTOR.
SAMUEL BERGSTEIN.
BY Allen & Allen
ATTORNEYS.

Patented June 28, 1949 2,474,391

UNITED STATES PATENT OFFICE

2,474,391

PROCESS FOR PRODUCING PACKING STRUCTURES

Samuel Bergstein, Cincinnati, Ohio, assignor to Robert Morris Bergstein and Frank David Bergstein, trustees

Original application November 30, 1944, Serial No. 565,888. Divided and this application October 26, 1945, Serial No. 624,713

5 Claims. (Cl. 18—56)

1

This application is a division of my co-pending case, Serial No. 565,888, filed November 30, 1944, and entitled Devices for packing eggs and the like.

In the retail merchandising of eggs, two forms of packages have, for the most part, been employed. The first form employs a paperboard carton fitted with cut partitions of boxboard, the partitions being either a separate structure or integral with the carton blank. The other principal type of package employs a filler or packing device made in a shape to conform more or less to the shape of the eggs. Such a filler, containing the eggs, is usually placed within a carton or slid into a boxboard sleeve. The second type of package is somewhat preferable from the point of view of mechanical protection.

Egg box fillers of the conforming type have generally been made by depositing pulped paper fibers on screen molds. The process is cumbersome, requiring bulky and expensive apparatus of various kinds and involving a long drying period.

An object of my invention is the provision of an egg holding means of the conforming type, which either may be employed as a unitary or integral container. It is an object of my invention to produce structures of this kind which will be strong and durable, but essentially cheaper than structures and packages heretofore employed.

Another object of one aspect of the invention is the provision of an integral structure forming in itself a complete package which is novel and useful, irrespective of the material of which it is made and its mode of formation.

Yet another object of the invention is the provision of new and advantageous processes and apparatus for the formation of fillers and packages, as hereinafter set forth.

These and other objects of my invention, which will be disclosed later, or will be apparent to one skilled in the art upon reading these specifications, I accomplish in those structures, mechanisms, and procedures, of which I shall now describe exemplary embodiments.

Reference is made to the drawings wherein:

Figure 1 is a perspective view of a structure capable of being formed into a package.

Figure 2 is a sectional view of the same structure taken along the center line of any series of contiguous cell spaces in the various rows.

Figure 3 is a sectional view taken similarly, but showing the structure with its parts in operative relationship as a completed package.

2

Figure 4 is a diagrammatic elevational view with parts in section showing a means for treating raw material for the formation of my structures.

Figure 5 is a diagrammatic perspective view of a die mechanism which may be employed.

Figure 6 is a partial perspective view of one of my structures when used as a filter for a sleeve.

Fillers of the molded pulp variety referred to above have hitherto been made with four rows of contiguous semi-cells or depressions, the structure being foldable on the lines separating the rows to form two rows of completed cells capable of partially enclosing a sales unit of eggs. The specific form of these structures and their semi-cells has varied. But the two outer rows of semi-cells have been narrower than the intermediate rows and have extended up sufficiently only to form an outside packing structure for the rows of eggs. This was possible because the structures were used as filters for a carton or sleeve which served not only to keep the parts of the fillers in folded and assembled relationship, but served also to close off the several cells at the top of the package.

In Figure 1, I have shown a new structure which, in part, consists of four rows of semi-cells, generally indicated at 1, 2, 3 and 4. These rows are all of the same width and of a width at least equal to the longest dimension to be expected in the eggs to be packed therein. The several rows are separated from each other by lines 5, 6 and 7, which are lines upon which the structure may be bent, to juxtapose the semi-cells of adjacent rows to each other. The outer rows of semi-cells, 1 and 4 have articulated to them flap members, indicated at 8 and 9, by lines of articulation or fold lines, 10 and 11.

The specific form of the semi-cells is not a limitation on this invention. As previously indicated, the structure is to be bent along lines 5 and 7 and reversely along line 6 so as to bring the semi-cells together to form a completed structure. This will result in a W-shaped arrangement, as can be seen in Figure 3. Protuberances or raised portions indicated at 12 in the partitions between the semi-cell depressions come together in the folded structure, as shown in Figure 3, tending to maintain the other parts in correct relationship and tending to relieve the eggs themselves from external strains.

It will be noted that when the structure is folded, as has just been described, a plurality of complete cells is formed, essentially, however,

open at the top. The bases of the several semi-cell depressions extending toward fold lines 10, 6 and 11 are preferably flattened, as will be apparent in Figures 2 and 3 and as indicated in the former figure at 13. The purpose of the flat members, 9 and 10, (which are foldable respectively on fold lines 10 to 11) will be apparent from Figure 3. These flaps, superposed across the top of the erected structure, close it and enable it in itself to form a complete package. Either or both of the flaps may be printed, if desired. All that is required is a means for preventing unfolding of the several parts. There are various ways of accomplishing this. The user of the cartons may fasten together at the point 14 (Figure 3) the bases (or some of them) of the semi-cell depressions adjacent the fold line 6 by gluing, stapling or otherwise. When this is done, it is possible to fasten the flaps 8 and 9 by cementing, by the provision of interlocks, or otherwise, after the package has been filled.

The essential result may, however, also be accomplished by any sort of band or tie encircling the completed package. A closed paper band may be employed and does not require to be of the same length as the structure of Figure 1. A string or tape tie may again be employed. A convenient structure is to provide the package with a tie means including a string 15 and a stapled or grommeted washer 16, to which one end of the string is attached. The other end of the string may then be brought around the package and engaged beneath the washer, as will be readily understood.

The flap members 8 and 9, or either of them, may be corrugated or fluted, as indicated in dotted lines at 17 in Figure 2. This will increase the cushioning effect of the flaps; and it also has another advantage when the structure is made from pressed board, as will hereinafter be set forth.

The structure thus far described is a novel and useful integral or one-piece package, irrespective of the material from which it is made. It may, indeed be formed from molded pulp by methods current in the art, or it may be made as hereinafter described. It will be understood that the specific disposition and number of semi-cell spaces is not a limitation on the invention. I have shown a structure capable of receiving one dozen eggs in two rows of six each, but other structures in accordance with my invention may be made, containing the same number of eggs in different arrangements, or a different number of eggs in the same or different arrangements, as for example, with an increase or decrease in the number of rows of semi-cells.

I have further found that it is possible with great advantage to form structures similar to those described by die pressing boxboard and the like. Substantially any type of boxboard may be used, including chip board; but boards having longer fiber lengths are to be preferred because of their superior moldability and strength when molded. In general, the longer the fibers' length within economic limits, the better and more perfect the result.

A sized board is also advantageous, though not indispensable. By way of example, I have achieved my best results using a hard sized, solid kraft board. The thickness of the board is not a limitation, but will be chosen in the light of the protection and service required. For most uses, a .020 point sheet is satisfactory. The board may be of the type formed either on a Fourdrinier

machine or on single or multi-cylinder machines. I have found that boxboard, if brought to a condition in which it is thoroughly wetted throughout its thickness without being made sloppy or too weak, can be embossed or molded between heated dies to the required configuration and depth, such, for example, as is illustrated in Figures 1, 2 and 3, easily, quickly and cheaply. In the molding or embossing process, there will be some wrinkling of the board, and there may, in instances, be some slight pulling apart of the board structure, though this is at a minimum. The board is maintained under pressure in the heated dies long enough to dry it sufficiently to enable it to maintain its shape. Thereupon, it may be withdrawn from the dies and dried thoroughly elsewhere. When hard sized boards are used, an effect of the water appears to be a softening of the size, which thereafter hardens when the structure is dried, stiffening and rigidifying it in its new shape. A somewhat stronger effect is obtained by maintaining the board in the dies until it has dried sufficiently to set the size.

The wetting may be accomplished in a simple manner by passing boxboard in bulk or in sheet form rapidly through a bath of water, and thereupon passing it through squeeze rolls. The effect of the squeeze rolls is not alone to remove excess water from the surfaces of the board, but also to drive the water into the board, making for a thorough and homogeneous wetting without excess moisture and without undue loss of strength. Where desired a sizing substance may be added to the water; but this is not ordinarily necessary.

Referring to Figure 4, I have shown boxboard 18 (which may be already printed) being unwound from a bulk roll 19 and carried into a water bath maintained in a tank or pan 20. In making a structure such as that illustrated in Figures 1, 2 and 3, it is advantageous to moisten the parts which are to be embossed or molded, but not the remaining parts, e. g. the flaps 8 and 9. The flaps will be less subject to wrinkling if they are not wetted. Furthermore, any printing on them can thus be protected from the water. As a consequence, I may pass the board through the water bath in the pan 20 with edge portions of the board gripped between traveling belts, a pair of which are shown at 21 and 22. The upper belt passes over the rolls 23, 24 and 25, while the lower belt has directing rollers 26, 27 and 28. In their flights between the respective directing rollers, the belts may be maintained in close contact with the board by means of small pressure rollers, sets of which have been shown at 29 and 30. The several rollers are journaled for rotation in any convenient way; and it is preferable to drive at least one roller for each belt so as to cause the belts to move with the board without exerting strain upon it. Where a structure such as that shown in Figure 1 and characterized by flaps 8 and 9 at either edge is to be formed, it will be understood that there will be a set of belts 21 and 22 for each side edge of the board web. The sets of belts may be multiplied where the structures are to be produced in tandem. The wetted board then passes between squeeze rolls 31 and 32, where the action hereinabove described takes place. These rolls are preferably located above the same pan 20 which, therefore, receives the excess water. After the board has been treated as described, it may be cut apart into sheets in any suitable way, as by the usual fly knife arrangement, indicated at 33. Needless to say, the board may be handled

through the wetting apparatus in the form of pre-cut, individual sheets, if desired.

The sheets are then taken to a press diagrammatically illustrated in Figure 5, and comprising upper and lower heated platens **34**, **35**, together with means (not shown) for applying pressure to the platens. The platens may be electrically heated or otherwise, as by steam or other hot fluid. It will be understood that the dies will respectively be configured to correspond with the upper and lower surfaces of the desired embossed structure. The treated sheets are laid between the platens, and the platens brought together under pressure, the pressure being maintained during a partial drying cycle.

As has been explained, there is a tendency for the sheets being embossed to draw together or take up widthwise and lengthwise. The maintenance of the flap portions **8** and **9** in a dry condition helps to keep these flaps flat in the completed article; but where the taking up of the intermediate embossed portions of the board tends to wrinkle the flap portions, a suitable conformation of the dies to flute or corrugate the flaps, as hereinabove described and as illustrated in Figure 2, will produce a corresponding lengthwise contraction in the flaps to keep them generally flat.

Modifications may be made in my invention without departing from the spirit of it. Where my structure is to be employed as a filler in a carton or sleeve, I may either retain or omit the flaps **8** and **9** or one of them. In Figure 6 I have shown a structure **36** minus flaps employed as a filler in a boxboard sleeve, indicated at **37**. A useful integral package may be formed generally, as indicated in Figure 3, even though one of the flaps is omitted. Or a single flap may be provided at one edge only of the structure, made of a width sufficient to extend across the top of the structure and provided with an integral fold-down extension at its outer edge to form a tighter closure. Where the cost of raw material permits, a series of flaps at one side, articulated to each other, may be provided, so that these flaps may be folded about the embossed structure in the form of an integral sleeve.

Having thus described my invention in certain exemplary embodiments, what I claim as new and desire to secure by Letters Patent is:

1. A process of molding paperboard which comprises passing paperboard briefly through a bath of water, shielding portions of the board from the water as it passes through the bath so as to produce relatively wet and dry areas in the board, then molding configurations of relatively greater depth in the relatively wet areas than in the relatively dry areas, said board being molded between heated die members maintained in contact therewith until the board has lost sufficient moisture to retain its molded shape.

2. A process of molding paperboard which comprises passing paperboard briefly through a bath of water and immediately between press rollers acting to drive some of the water into the board and to remove surface excess, shielding portions of the board from the water as it passes through the bath so as to produce relatively wet and dry areas in the board, then molding configurations of relatively greater depth in the relatively wet areas than in the relatively dry areas.

3. A process of molding paperboard which comprises passing paper board briefly through a bath of water and immediately between press rollers acting to drive some of the water into the board and to remove surface excess, shielding portions of the board from the water as it passes through the bath so as to produce relatively wet and dry areas in the board, then molding the board between heated die members maintained in contact therewith until the board has lost sufficient moisture to retain its molded shape, and including the step of molding configurations of relatively greater depth in the relatively wet areas than in the relatively dry areas.

4. A process of molding paperboard which comprises passing paperboard briefly through a bath of water and immediately between press rollers acting to drive some of the water into the board and to remove surface excess, shielding portions of the board from the water as it passes through the bath so as to produce relatively wet and dry areas in the board, then molding the board between heated die members maintained in contact therewith until the board has lost sufficient moisture to retain its molded shape, and including the step of molding large, deep configurations in the relatively wet areas of the board and corrugations in the relatively dry areas of the board, said corrugations in the relatively dry areas of the board being smaller, shallower, and more closely spaced than the configurations in the relatively wet areas of the board whereby to contract the board in one direction approximately the same amount.

5. A process of molding paperboard which comprises passing paperboard briefly through a bath of water and immediately between press rollers acting to drive some of the water into the board and to remove surface excess, shielding portions of the board from the water as it passes through the bath so as to produce relatively wet and dry areas in the board, then molding the board between heated die members maintained in contact therewith until the board has lost sufficient moisture to retain its molded shape, and including the step of molding large, deep configurations in the relatively wet areas of the board and corrugations in the relatively dry areas of the board, said corrugations in the relatively dry areas of the board being smaller, shallower, and more closely spaced than the configurations in the relatively wet areas of the board whereby to contract the board in one direction approximately the same amount, the board being passed through the bath in a continuous length and cut apart into sheets before molding.

SAMUEL BERGSTEIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,668,349	Baum	May 1, 1928
1,696,894	Labombarde	Dec. 25, 1928
1,904,268	Bronson	Apr. 18, 1933
2,083,273	O'Neil	June 8, 1937