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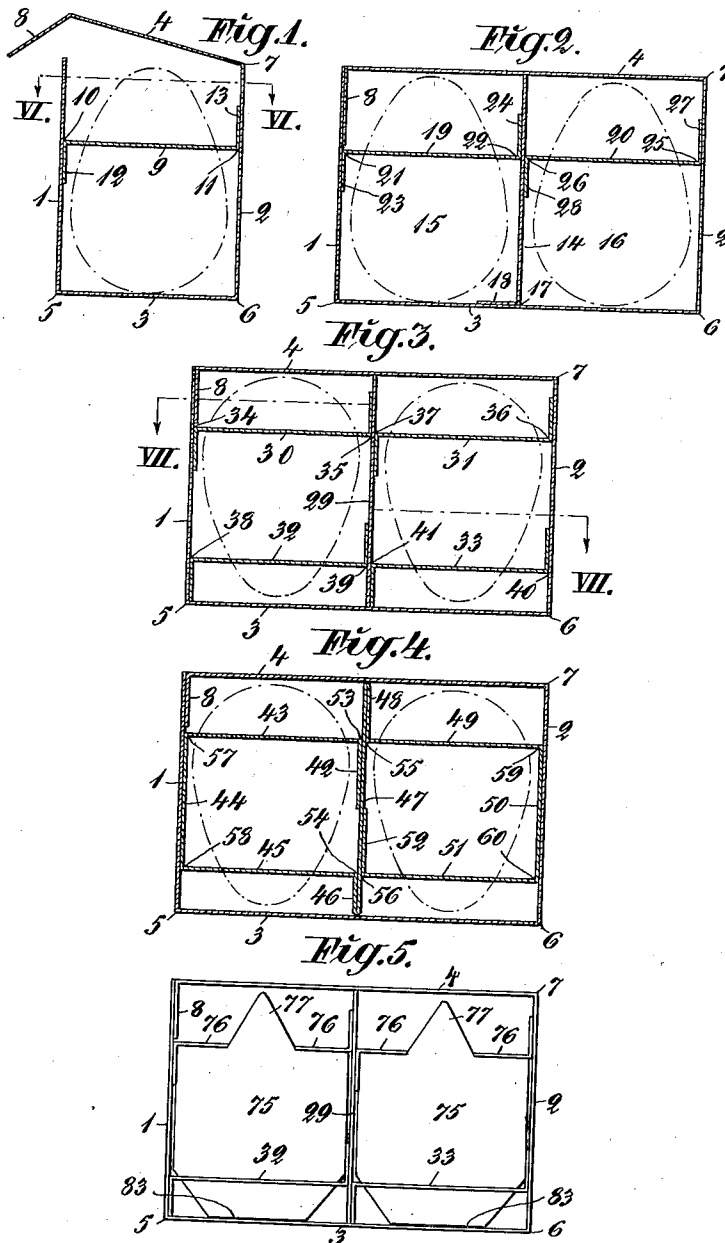
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EGG CARTON

Filed Nov. 8, 1937

2 Sheets-Sheet 1



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Fig. 6.

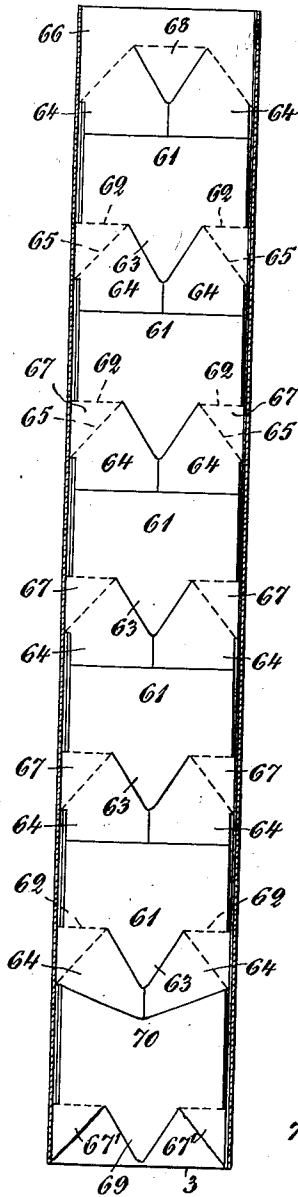
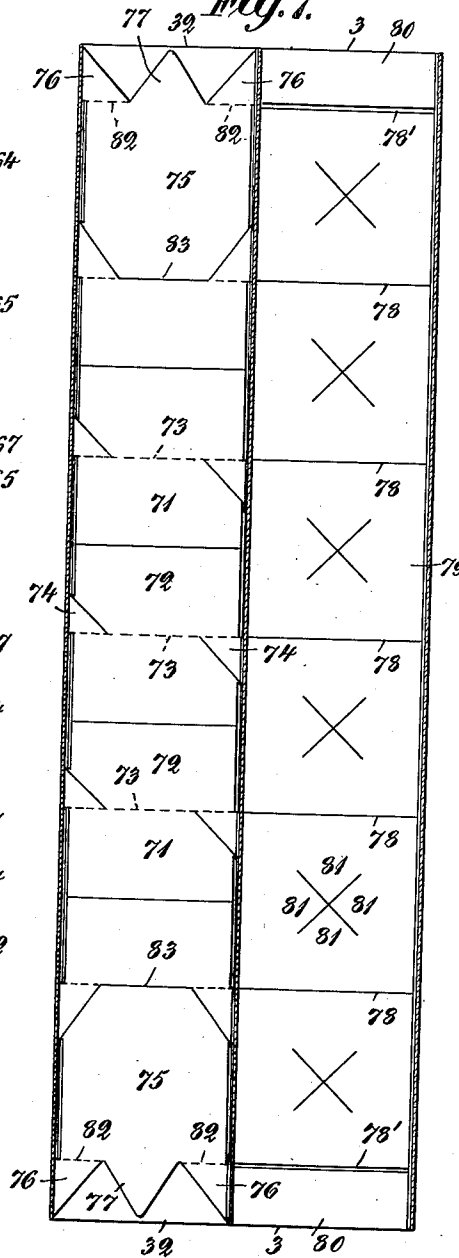


Fig. 7.



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EGG CARTON

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3 Claims. (Cl. 229—29)

This invention relates to improvements in egg cartons, and more particularly to collapsible egg cartons of card-board comprising an outer shell including bottom, side walls and top of the carton, and an interior member containing one or more panels adapted as egg holders and arranged between the top and bottom of the carton.

In the manufacture of egg cartons of this kind it is customary to make the entire carton, that is said outer shell together with said interior member, from one and the same continuous sheet of card-board which in the longitudinal direction of the carton is provided with parallel scoring lines along which the sheet is folded to form the carton. Those sections of the card-board sheet which are intended to form the egg-holding panels are provided with one or more rows of seats for the eggs, such seats being formed by cut out flaps which are bent down when an egg is inserted into a seat. Said flaps are then intended to protect and hold the egg in the seat.

Now it is a well known fact that the buckling resistance of card-board is much greater in the longitudinal direction than in the transverse direction of the fibres, the buckling resistance in the transverse direction being usually only 40-50% of the buckling resistance in the longitudinal direction of the fibres. This difference may also be expressed by the general rule that a piece of card-board offers much greater resistance against forces that tend to bend it about a line running transversely to the fibres than about a line running parallel with the fibres. To obtain sufficient stiffness in the outside walls of the carton, it is obviously necessary to arrange the material with the fibre direction running in the transverse direction of the carton. When making the entire carton of the above-mentioned design from one continuous sheet of card-board, also all the interior parts of the carton, such as egg-holding panels, will have their fibre direction running in the transverse direction of the carton.

However, it is equally necessary that the bent down flaps of the egg-holding panels offer the proper resistance against movements of the eggs in the longitudinal direction of the carton. If such flaps are bent downwards about lines running substantially in the transverse direction of the carton, it is obvious that the flaps will offer the greatest resistance against deflection by the pressure of the eggs, if the fibres of the egg-holding panels are running in the longitudinal direction of the panel or carton, as the fibres then

will be bent about lines running transversely to the fibres. Further it is to be noted that it is necessary to use a tough material for the egg-holding panels, as otherwise the cut out flaps or the like would be easily torn or mutilated when inserted or removing the eggs, or generally during the routine handling of the cartons on their way from the egg producer to the egg consumer with repeatedly occurring inspecting, candling and repacking operations etc.

On the other hand, the outer shell requires in the first place a stiff material, whereas toughness is a secondary consideration. Thus it will be seen that the requirements upon the material in the outer shell and the material in the interior member stand in opposition to each other. As stiffness and toughness cannot be combined in the same piece of card-board except at a high price, and the card-board in addition must have great stiffness also in the longitudinal direction of the egg-holding panels to satisfy the requirements of stiffness of resistance of the bent down flaps against deflection, it is obvious that if the entire carton is made from one continuous sheet of cardboard having the fibre direction running in the transverse direction of the carton, a card-board of a very high quality and a corresponding very high price must be used.

In addition to the necessity of using a very expensive card-board material when making the entire carton from one continuous sheet, such cartons require much manual work in the manufacture which limits the output of the machinery used and makes the cost of manufacture high. If an entirely automatic machine really could be designed to eliminate all manual work, such a machine would be extremely complicated and expensive and would nevertheless have a rather limited capacity.

The present invention has for its object an egg carton of a novel and simple design, in which the above mentioned conditions regarding strength, stiffness and toughness of the material in the different parts of the carton may be satisfied with the use of very cheap card-board material, and which may be manufactured at a very low cost by means of entirely automatic machinery of a large capacity without any manual work.

The main novel features of the carton according to the invention by which said objects are reached consist therein that the interior member of the carton is made separately from the outer-shell and is hingedly secured to the latter, as by gluing, along lines running in the longitudinal

nal direction of the carton, the egg-holding panel or panels of the interior member having their fibre direction running in the longitudinal direction of the carton.

By thus making the outer shell and the interior member from different pieces of material, it will be possible to use materials of different quality in the outer shell and the interior member respectively so that the special requirements as to toughness of the egg-holding panels may be fulfilled independently of the quality of the card-board of the outer shell. It will also be possible to turn the fibre direction of each part in such a manner that the requirements as to stiffness are satisfied in both parts without the use of any expensive quality of card-board.

A number of embodiments are illustrated by way of example on the accompanying drawings.

Figs. 1-4 show cross-sections through four different embodiments of the egg carton.

Fig. 5 shows an end view of the carton according to Fig. 3.

Fig. 6 shows a longitudinal horizontal section along the line VI—VI in Fig. 1.

Fig. 7 shows a longitudinal horizontal section along the line VII—VII in Fig. 3.

In Figs. 1-4 the collapsible outer shell of the carton consists of the two longitudinal side walls 1 and 2, the bottom 3 and the top 4, being made preferably from one sheet of cardboard provided with longitudinal scoring lines 5, 6 and 7, along which the outer shell is foldable. The top 4 may be terminated by a foldable flap 8, which may be turned downwards in the closed carton as indicated in Figs. 2, 3 and 4. The outer shell has preferably its fibre direction running substantially in the transverse direction of the bottom, side walls and top of the carton so that the carton will obtain sufficient buckling resistance in the transverse direction.

In Fig. 1 the carton is provided with only one compartment for the eggs, the interior member of the carton being formed by a single longitudinal panel 9 arranged substantially horizontally between the top and bottom and adapted as egg holder. For the latter purpose the panel is provided with a row of seats for the eggs each formed by a number of cut out flaps which are bent downwards when inserting an egg in the seat so that the flaps will support the egg in the longitudinal direction of the carton. Said flaps may be cut out in many various ways and are not indicated in Fig. 1 for the sake of clearness.

The panel 9 forming the interior member is hingedly connected to the outer shell along the longitudinal lines 10 and 11 so that the entire carton may be collapsed to a plane state in the transverse direction of the carton. For this purpose the panel 9 is provided with longitudinal extensions 12 and 13 which are foldable along the lines 10 and 11 respectively and secured to the side walls 1 and 2, as by gluing or the like. According to the invention the fibre direction of the panel 9 is running in the longitudinal direction of the carton for the reasons set forth above.

In the carton according to Fig. 2 a vertical partition wall 14 is provided which divides the carton into two compartments 15 and 16, each for one row of eggs. The partition wall 14 is at the same time adapted as a supporting wall for the bottom and top of the carton. For this purpose the partition wall extends between the bottom and top of the carton and is hingedly secured to the bottom along the longitudinal line 17 which is a folding line for the extension 18

of the partition wall, said extension being glued to the bottom 3.

In each compartment 15, 16 there is arranged an egg-holding panel 19, 20 provided with one row of seats for the eggs and secured in similar manner as the panel 9 in Fig. 1. The panel 19 is hingedly secured to the side wall 1 and the partition wall 14 along the longitudinal lines 21 and 22 respectively by means of the foldable extensions 23 and 24 respectively. The panel 20 is in the same way hingedly secured to the side wall 2 and partition wall 14 along the longitudinal lines 25 and 26 respectively by means of the foldable extensions 27 and 28 respectively.

The interior member of the carton will thus in this embodiment consist of the two panels 19, 20 and the vertical partition wall 14, and the interior member considered as a unit is hingedly secured to the outer shell along the longitudinal lines 17, 21 and 25 so that the interior member together with the outer shell will be collapsible to a plane state in the transverse direction of the carton. In this embodiment the interior member is made up of three pieces 14, 19 and 20. However, the two panels may be made from one strip of card-board which is folded above the top edge of the partition wall so as to enclose the upper part of the partition wall being glued to both sides of the latter. The fibre direction of the egg-holding panels is running in the longitudinal direction of the carton for the reasons set forth above. As mentioned above, it will be possible to select different qualities of card-board for the outer shell, the panels and the partition wall respectively so as to suit the special requirements of each of said parts with regard to strength, stiffness and toughness, and for these reasons it will be possible to entirely avoid the use of card-board which is superqualified in any of said respects, such as was necessarily the case when making the entire carton from one continuous sheet of card-board.

It is obvious that the embodiments of Fig. 2 may be utilised in the same way for egg-cartons having more than two compartments for the eggs by adding one or more partition walls and providing an egg-holding panel in the same way in each additional compartment.

Fig. 3 shows an egg-carton with two compartments for the eggs being separated by a supporting partition wall 29 extending between the top and bottom of the carton. In this embodiment two egg-holding panels are arranged in each compartment, an upper panel 30, 31 and a lower panel 32, 33. Each panel is hingedly secured to one of the side walls and the partition wall 29 in the same manner as the partition wall 14 in Fig. 2 along longitudinal lines by means of foldable extensions glued to the side walls and the partition wall as illustrated. Said hinging lines of the panels 30, 31, 32 and 33 are designated by 34 and 35, 36 and 37, 38 and 39, 40 and 41 respectively. In this embodiment the supporting partition wall 29 is not necessarily secured to the bottom 3 of the carton.

The interior member of the carton is in this embodiment formed by five different strips of material 29, 30, 31, 32 and 33, and the interior member considered as a unit is hingedly connected to the outer shell along the four longitudinal lines 34, 36, 38 and 40 so as to make the interior member together with the outer shell collapsible to a plane state in the transverse direction of the carton.

In the same manner as in the embodiment

according to Fig. 2, the outer shell, the egg-holding panels, and the partition wall may be made out of different qualities of card-board to suit the requirements of said parts regarding strength, stiffness and toughness. The fibre direction of the egg-holding panels and preferably also that of the supporting partition wall should for the reasons stated above run in the longitudinal direction of the carton, whereas the fibre direction of the outer shell may run in the transverse direction of the carton as stated above.

Fig. 4 also shows an egg carton with two compartments separated by a supporting partition wall and with two egg-holding panels in each compartment.

In this embodiment the interior member comprising the partition wall and the egg-holding panels is made from one continuous sheet of card-board having its fibre direction running in the longitudinal direction of the carton. Said sheet forming the interior member is composed of a plurality of sections separated by parallel scoring lines along which the sheet is folded to form the interior member. Said sections are from one end of the sheet to the other designated by the numerals 42—52 respectively as illustrated. The sections 43, 45, 49, 51 form the egg-holding panels. The sections 44 and 50 are glued to the side walls 1 and 2 respectively and reinforce the latter. The sections 42, 46, 48, 52 are glued to the section 47 and form together with the latter a reinforced partition wall between the top and bottom of the carton. The panels 43, 45, 49 and 51 are hingedly connected to the partition wall along the longitudinal lines 53, 54, 55 and 56 respectively, and to the side walls 1 and 2 respectively along the longitudinal lines 57, 58, 59 and 60 respectively. The partition wall is not connected to the bottom 3.

The whole interior member is thus hingedly connected to the outer shell along the longitudinal lines 57, 58, 59 and 60 so that the interior member together with the outer shell will be collapsible to a plane state in the transverse direction of the carton. Referring again to Fig. 1, it is obvious that this embodiment may also have an additional panel, arranged in a similar way to the panel 32 shown in Fig. 3.

Fig. 6 illustrates by way of example an arrangement of cuts in the panel to form the seats for the eggs. In Fig. 6 the actual cuts made are shown by full lines, and the bending lines of the flaps thus formed are indicated by dotted lines.

In the panel the transverse flaps 61 are bent downwards about the bending lines 62 when an egg is inserted. As the flaps 61 extend across the total width of the compartment, they will then brace up the side walls. The cut out tongue 63 as being integral with the flaps 61 are moved upwards into the upper part of the compartment above the panels 30, 31 and form a support of the eggs in that part of the carton. The flaps 64 are bent downwards along the oblique bending lines 65 when an egg is inserted and form supports of the eggs both sideways and longitudinally. When the flaps 61 and 64 are bent down they leave the side parts 67 of the panel in the horizontal position. In the ends of the panels the cuts are arranged somewhat differently, as illustrated, leaving at one end the horizontal part 66 and at the other end the horizontal parts 67¹, the tongues 68 and 69

being bent upwards, the former by hand, the latter automatically when bending the flap 70 downwards.

However, in certain cases it may be found advisable to reverse the direction of the flaps in one or more seats at one end of the carton, so that the end seats at both ends will have the appearance of 64, 64, 68, or of 70, 69, 67¹ and 67¹. In the former case there will be four flaps 64 in that seat where the reversal starts whereas in the latter case the seat where the reversal starts will consist, in the longitudinal direction of the carton, of one flap 61 on each side, but without corner flaps 64.

Fig. 7 illustrates by way of example how the seat-forming flaps may be arranged in the panels in the embodiment according to Figs. 3-5. The left half of Fig. 7 shows the seats in the upper panels, and the right half the seats in the lower panels. In Fig. 7 the actual cuts made are shown by full lines, and the bending lines of the flaps thus formed are indicated by dotted lines.

In the upper panels the transverse flaps 71, 72 are bent downwards about the transverse bending lines 73 when an egg is inserted. As the flaps 71, 72 extend across the total width of the compartment, they will then brace up the partition wall and the outer side wall. When the flaps 71, 72 are bent down, they leave the side parts 74 in the horizontal position. In the ends of the upper panels the flaps are formed somewhat differently. At each end a flap 75 is formed of larger extension longitudinally for reasons set forth below. The flaps 75 are bent downwards about the lines 82 leaving the side parts 76 in the horizontal position. The tongues 77 being made integral with the flaps 75 are turned upwards into the upper part of the compartment when the flaps 75 are bent downwards.

The lower panels 32, 33 are divided by transverse cuts 78 into a number of inter-independent resilient cushions 79 for the bottom of the eggs and a transverse strip 80 at each end of a panel. Each such cushion corresponds to a seat in the upper panel. In the centre of each cushion 79 a cross-shaped seat is made by crossing cuts forming resilient flaps 81, which are bent downwards more or less, when an egg is introduced into a seat. The illustrated flaps 81 may be replaced by flaps of any other suitable form, and they may even be omitted as the cushions 79 themselves possess a resilience that may be sufficient for the intended purpose.

The end flaps 75 in the upper panels should have such longitudinal extension that when they are bent downwards about the lines 82, the edge 83 will snap into the corresponding transverse cuts 78¹ in the lower panel, as illustrated in Fig. 5. In this way the flaps 75 will form effective end walls of the carton.

The flaps of the panels 43, 49, 45, 51 of the embodiment according to Fig. 4 may be of the same design as the flaps illustrated in Figs. 6 and 7.

The embodiment according to Fig. 1 may be modified by adding a second lower egg-holding panel of the same kind as the lower panels according to Fig. 4. The flaps of the two panels may be of the same design as shown in Figs. 6 and 7.

Having now particularly described the nature of my invention and the manner of its operation what I claim is:

1. A collapsible egg carton of card-board comprising a collapsible outer prismatic shell in-

cluding bottom, longitudinal side walls and top of the carton, and an interior member, said outer shell and said interior member being made from separate pieces of material and hingedly secured to each other along lines running in the longitudinal direction of the carton to make the entire carton collapsible in the transverse direction of the carton, said interior member being composed of at least one longitudinal panel arranged between the bottom and top of the carton, seats for the eggs being provided in said panel by means of flaps cut out in the panel and adapted to be bent down into the space below said panel to form supports for the eggs therein in the longitudinal direction of the carton, at least two of the flaps in each seat being cut out in such a position as to be bent downwards about lines oblique to the side walls of the carton to form corner flaps for the support of the eggs, and in which at least part of the other cut out flaps extend between the side walls of the corresponding egg compartment and are adapted to be bent downwards about a line perpendicular to said side walls to form a brace between them in the transverse direction of the erected carton, said panel having its fibre direction running in the longitudinal direction of the carton, and the outer shell having its fibre direction running in the transverse direction of the carton.

2. A collapsible egg carton of card-board comprising a collapsible outer prismatic shell including bottom, longitudinal side walls and top of the carton, and an interior member, said outer shell and said interior member being made from separate pieces of material and hingedly secured to each other along lines running in the longitudinal direction of the carton to make the entire carton collapsible in the transverse direction of the carton, said interior member being composed of at least one longitudinal supporting wall dividing the carton into a corresponding number of compartments for the eggs, and at least one longitudinal panel arranged in each of said compartments between the bottom and top of the carton, seats for the eggs being provided in said panel by means of flaps cut out in the panel and adapted to be bent down into the space below said panel to form supports for the eggs therein in the longitudinal direction of the carton, at least two of the flaps in each seat being cut out

in such a position as to be bent downwards about lines oblique to the side walls of the carton to form corner flaps for the support of the eggs, and in which at least part of the other cut out flaps extend between the side walls of the corresponding egg compartment and are adapted to be bent downwards about a line perpendicular to said side walls to form a brace between them in the transverse direction of the erected carton, said panels having their fibre direction running in the longitudinal direction of the carton, and the outer shell having its fibre direction running in the transverse direction of the carton.

3. A collapsible egg carton of card-board comprising a collapsible outer prismatic shell including bottom, longitudinal side walls and top of the carton, and an interior member, said outer shell and said interior member being made from separate pieces of material and hingedly secured to each other along lines running in the longitudinal direction of the carton to make the entire carton collapsible in the transverse direction of the carton, said interior member being composed of at least one longitudinal panel arranged between the bottom and top of the carton, seats for the eggs being provided in said panel by means of flaps cut out in the panel and adapted to be bent down into the space below said panel to form supports for the eggs therein in the longitudinal direction of the carton, at least two of the flaps in each seat being cut out in such a position as to be bent downwards about lines oblique to the side walls of the carton to form corner flaps for the support of the eggs, and in which at least part of the other cut out flaps extend between the side walls of the corresponding egg compartment and are adapted to be bent downwards about a line perpendicular to said side walls to form a brace between them in the transverse direction of the erected carton, said bracing flaps being also provided with an extension adapted to be automatically brought into the space above the egg-holding panel to support the eggs therein when the bracing flap is bent downwards, said panel having its fibre direction running in the longitudinal direction of the carton, and the outer shell having its fibre direction running in the transverse direction of the carton.

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