

Jan. 25, 1955

Y. DURAND

2,700,499

FOLDING BOX FOR A PLURALITY OF SIMILAR OBJECTS

Filed June 19, 1951

3 Sheets-Sheet 2

Fig. 5.

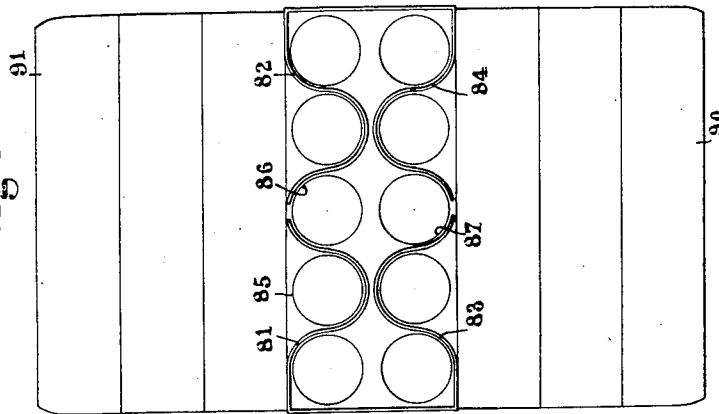
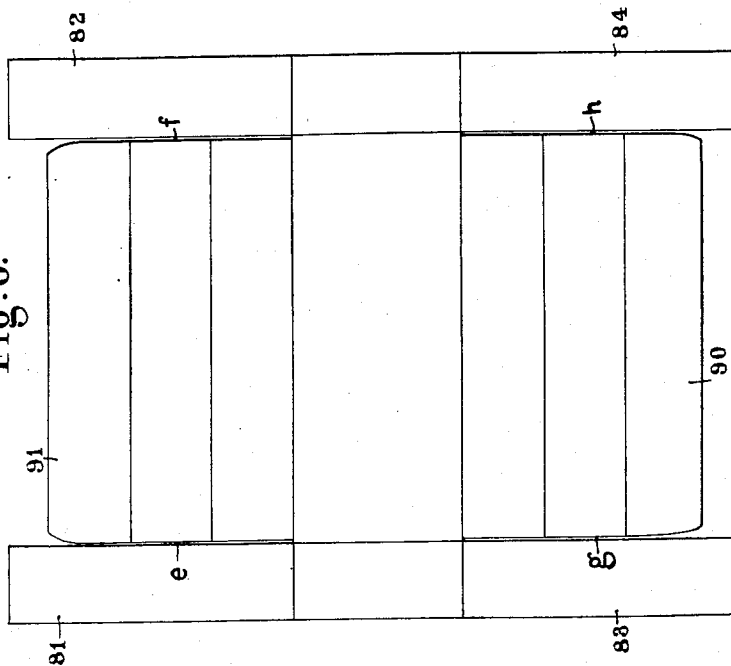


Fig. 6.



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Fig. 7.

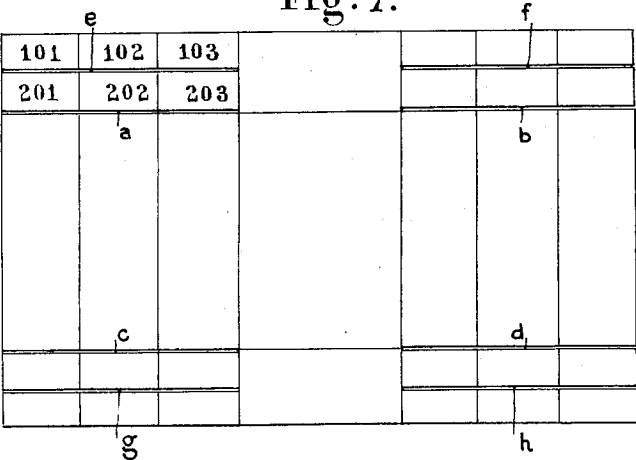
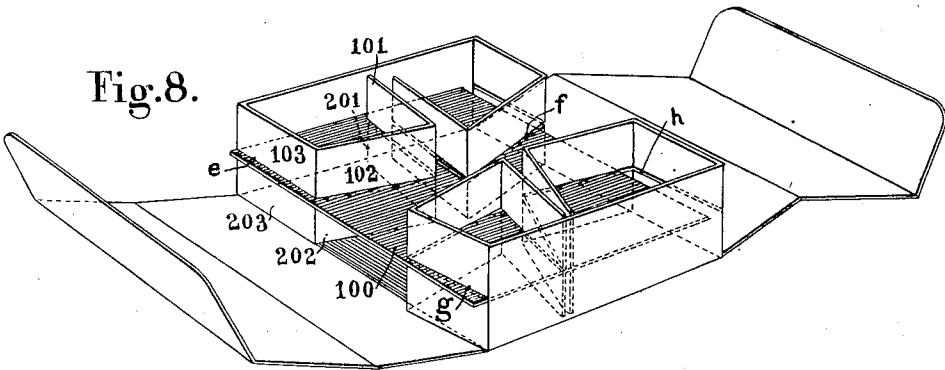


Fig. 8.



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FOLDING BOX FOR A PLURALITY OF SIMILAR OBJECTS

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4 Claims. (Cl. 229—28)

This invention relates to folding packings and more particularly to packings comprising a plurality of compartments made of a single sheet of cardboard or any other suitable material for transporting in a shock-proof manner a plurality of similar objects such as glassware, fruits, etc., these packings requiring neither wire stitching nor pasting.

Packings according to this invention comprise a single and only principal sheet of cardboard or any other material adapted to be folded, this sheet being divided by folding lines and cuts into a number of adjacent surface elements of which some constitute the external faces of the packing whilst the other are folded towards the inside of the space bound by these external faces and are shaped to form recesses or compartments in which the objects to be packed can be placed.

According to a preferred embodiment of this invention, the packing consists of a rectangular sheet divided into rectangular and square surface elements by folding lines and cuts parallel to the sides of the sheet and separated by distances which are multiples of a standard dimension or modulus, the various surface elements thus obtained on the sheet being folded at right angles in order to form cubic compartments inside a four-cornered packing.

Still according to this first embodiment the finished packing may comprise six or ten cubic shaped compartments.

According to another embodiment of the invention which is particularly suitable for packing circular objects, a rectangular sheet is divided into rectangular and square surface elements by folding lines and cuts parallel with the sides of the sheet, some of these surface elements thus formed on the sheet being folded at right angles to one another so as to form four-cornered spaces while other surface elements are incurvated in order to obtain sinuous cylindrical surfaces forming circular compartments inside the quadrangular spaces thus obtained.

The folding of the packing to its final shape may be facilitated by rounding or truncating off the angles of some of the surface elements thus formed on the sheet.

According to a further embodiment of the invention, additional sheets or plates are disposed horizontally at various levels in the packing obtained as described above whereby the compartments can be divided into tiers, the folded packing surfaces which form the vertical walls of the compartments being suitably cut to position additional sheets or plates.

The accompanying drawings forming part of this specification illustrate diagrammatically by way of example a few embodiments of the invention. In the drawings:

Fig. 1 shows a fully unfolded six-compartment packing according to a first embodiment of the invention.

Fig. 2 illustrates the same embodiment during the folding operation.

Fig. 3 is another view of the packing of Figs. 1, 2 in its fully folded condition.

Fig. 4 shows a ten-compartment packing still according to the first embodiment in its fully unfolded condition.

Fig. 5 is a plane view of another embodiment of the invention consisting of a ten-compartment packing for circular objects.

Fig. 6 is the fully unfolded view thereof.

Fig. 7 is the fully unfolded view of the main component of a tiered packing.

Fig. 8 is a perspective view of the same packing during the folding thereof, an additional sheet for vertically dividing each compartment into tiers being inserted halfway up the vertical walls of the packing.

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According to the first embodiment of the invention illustrated in Fig. 1, the packing consists of a rectangular sheet the length and width of which are 8 and 5 times a given modulus respectively. Four rectilinear cuts *a*, *b*, *c*, *d* parallel to the longer sides, and folding lines parallel partly with the longer sides, partly with the shorter sides of the sheet, mark the boundaries of a number of surface elements of square and rectangular shape, designated in the drawing by the reference numerals 1 to 21. All the sides of these surface elements are the multiples of a same modulus. The length and width of the central rectangle 11 are three and two times the modulus respectively and form the basic surface element of the packing. As indicated in Fig. 2 surface elements 1, 2, 3 and 5, 6, 7 are so folded as to extend upwards from the basic surface element 11 and to be at right angles with one another in succession. With surface element 4 these two sets of vertical walls form two cubic compartments A and B. At the opposite end of base element 11 two cubic compartments C and D are formed in the same manner. There remains centrally of base element 11 the space for another pair of cubic compartments E, F which will be definitely formed after folding at right angles to one another in succession both sets of surface elements 8, 9, 10 and 12, 13, 14, of which elements 10 and 12 constitute the longer vertical walls of the packing and elements 9, 13 the top thereof, whilst surface elements 8, 14 will be inserted between elements 1 and 7 of compartments A, B and also between elements 15 and 21 of compartments C, D. Fig. 3 illustrates the same packing in fully folded or closed condition (thick lines) and the resulting six compartments thereof (dotted lines). Preferably, the corners of surface elements 8, 14 will be rounded off as shown at 22, 23, 24, 25 Fig. 2 in view of facilitating the folding and closing of the packing.

It is to be noted that within the scope of the invention, the breadth of the basic element 11 of Fig. 1 may be different from the two thirds of the length of the same, the length of the walls 4 and 18 being the same as this breadth, the breadth of the faces 9 and 13 being then one half of the breadth of element 11, the faces 2, 16, 6 and 20 being then rectangles and no more squares.

Moreover, other simple numerical ratios can be resorted to regarding both the dimensional proportions of the unfolded packing and those of the surface elements bound by folding lines and cuttings, in view of obtaining a number of cubic compartments other than six.

Thus, Fig. 4 illustrates an unfolded packing measuring ten moduli by seven moduli and giving when folded a packing containing ten cubic shaped compartments indicated by the reference letters Q to Z. The basic sheet is folded in a manner substantially similar to that already described. The dash-and-dot line centrally of the figure indicates the position assumed by elements such as 51, 52, 53, 54 after the folding operation. The only difference is that surface elements 70 and 80 are folded beneath the cubic shaped compartments so as to form another bottom therefor. They may be dispensed with if desired so that the initial sheet of cardboard or other convenient material will be cut without these surface elements 70 and 80.

In the same way as for the foregoing packing, the breadth of the basic element of Fig. 4 may be, within the scope of the invention, different from the two fifths of the length of this basic element, the breadth of some other faces being varied accordingly.

According to another embodiment of this invention, illustrated in Figs. 5, 6, the initial plate or sheet may comprise four incisions *e*, *f*, *g*, *h*, the adjacent surfaces 81, 82, 83, 84 being so incurvated as to form sinuous cylindrical walls and therefore incurvated compartments adapted to contain round objects such as 85, 86, 87, the remaining surface elements being folded at right angles in order to form a quadrangular box surrounding these compartments. In particular, surface elements 90, 91 are inserted vertically between two rows of round objects so as to separate the compartments of both rows and prevent the objects of one row from contacting those of the other row, for example objects 86, 87 in the case illustrated.

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A modified embodiment wherein the packing is formed with two or more tiers is illustrated in Fig. 7 showing a packing identical with that of Fig. 1 except that it is formed, in addition to cuttings *a*, *b*, *c*, *d*, with cuttings *e*, *f*, *g*, *h* parallel thereto.

Thus, square shaped surfaces elements 1, 2, 3, 4 of Fig. 1 forming the vertical walls of the corresponding compartments are divided into six surface elements 101, 102, 103 and 201, 202, 203, the first half of which being separated from the other half by the cutting *e*.

Thus, as illustrated in Fig. 8, by successively folding surface elements 201, 202, 203 and 101, 102, 103 respectively the lower and upper sets of compartments of the packing will be obtained.

Additional sheets 100 (see Fig. 8) inserted through the cuttings *e*, *f*, *g*, *h*, will separate the lower from the upper compartments with a horizontal partition and the resulting packing will comprise twelve compartments, the height of each compartment being the half of that of the compartments obtained in the case illustrated in Figs. 1-6.

A pair of smaller sheets corresponding to two longitudinal halves of the initial sheet 100 may be substituted for the latter in view of facilitating the positioning thereof.

Still in accordance with the modified embodiment of Fig. 8 the compartments of any of the packings described above may be divided into two or more tiers by inserting therein a suitable number of additional sheets.

This manner of dividing the compartments by means of inserted sheets is applicable not only to the packings illustrated in Figs. 1-3 but also to any types of packing within the limits of the present invention.

What I claim is:

1. A cellular receptacle formed from a folded rectangular blank of sheet material consisting of a rectangular central portion constituting the bottom of the receptacle and defined by a first pair of spaced parallel fold lines extending transversely of the sheet and a second pair of spaced parallel fold lines extending lengthwise of the sheet, said bottom being two cells wide and at least three cells long and disposed with its length extending transversely of the sheet; integral rectangular end walls disposed between the ends of said bottom and the side edges of the sheet and defined by said second pair of fold lines, the side edges of the sheet and extensions of said first pair of fold lines, said end walls being folded about said second fold lines to a position perpendicular to the bottom; partition strips extending linearly from opposite ends of each of said end walls and separated from intervening portions of the sheet by four slits extending rectilinearly respectively from opposite ends of and in line with said second fold lines; two side wall portions disposed on opposite sides of said bottom and defined by said first fold lines, said slits and a third pair of fold lines parallel to the first, said side walls having the same height as said end walls and being folded about said first fold lines to a position perpendicular to said bottom and to said end walls; two cover portions disposed at opposite sides of said side wall portions and defined by said third pair of fold lines, said slits and a fourth pair of fold lines parallel to said third pair, each of said cover portions being one cell wide, said cover portions being folded about said fourth fold lines to a position parallel to said bottom; said partition strips being folded to define two rows of cells between said bottom and cover, each of said strips being folded the same and having a first portion of one cell length parallel and contiguous to the respective side walls, a second portion perpendicular to said side walls and a third portion parallel to said side walls and spaced one cell width therefrom, said strips having the same height as said side and end walls and separating all of the cells in each row from one another and partially separating the cells of one row from those of the other; integral flap portions at opposite sides of said cover portions and defined by said fourth fold lines, said slits and the end edges of said sheet, said flap portions having a width approximately equal to and no greater than the height of said side and end walls, said flaps being folded about said fourth fold lines to a position perpendicular to the cover portions and extending from said cover portions, substantially to the bottom between said two rows of cells, thereby separating the cells of one row from those of the other.

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2. A cellular receptacle formed of a folded rectangular blank of sheet material consisting of a rectangular central portion constituting the bottom of the receptacle and defined by a first pair of spaced parallel fold lines extending transversely of the sheet and a second pair of spaced parallel fold lines extending lengthwise of the sheet, said bottom being two cells wide and three cells long and disposed with its length extending transversely of the sheet; integral rectangular end walls disposed between the ends of said bottom and the side edges of the sheet and defined by said second pair of fold lines, the side edges of the sheet and extensions of said first fold lines, said end walls being one cell high and being folded about said second fold lines to a position perpendicular to the bottom; partition strips extending linearly from opposite ends of each of said end walls and separated from intervening portions of the sheet by four slits extending rectilinearly respectively from opposite ends of, and in line with, said second fold lines; two side wall portions disposed on opposite sides of said bottom and defined by said first fold lines, said slits and a third pair of fold lines parallel to the first, said side walls having the same height as said end walls and being folded about said fold lines to a position perpendicular to said bottom and to said end walls; two cover portions disposed at opposite sides of said side wall portions and defined by said third pair of fold lines, said slits and a fourth pair of fold lines parallel to said third pair, each of said cover portions being one cell wide, said cover portions being folded about said fourth fold lines to a position parallel to said bottom; said partition strips being folded to define two rows of cubic cells between said bottom and cover, said strips being folded on linear extensions of said first, third and fourth fold lines and each of said strips having a first portion of one cell length parallel and contiguous to the respective side wall, a second portion of one cell width perpendicular to said side wall and a third portion of one cell length parallel to said side walls and spaced one cell width therefrom, said strips having the same height as said side and end walls and separating all of the cells in each row from one another and partially separating the cells of one row from those of the other; integral flap portions at opposite sides of said cover portions and defined by said fourth fold lines, said slits and the end edges of said sheet, said flaps having a width approximately equal to, and no greater than, the height of said side and end walls, said flaps being folded about said fourth fold lines to a position perpendicular to the cover portions and extending from said cover portions substantially to the bottom between said two rows of cells, thereby separating the cells of one row from those of the other.

3. A cellular receptacle formed from a folded rectangular blank of sheet material consisting of a rectangular central portion constituting the bottom of the receptacle and defined by a first pair of spaced parallel fold lines extending transversely of the sheet and a second pair of spaced parallel fold lines extending lengthwise of the sheet, said bottom being two cells wide and five cells long and being disposed with its length extending transversely of the sheet; integral rectangular end walls disposed between the ends of said bottom and the side edges of said sheet and defined by said second pair of fold lines, the side edges of the sheet and extensions of said first pair of fold lines, said end walls being one cell high and being folded about said second fold lines to a position perpendicular to the bottom; partition strips extending linearly from opposite ends of each of said end walls and separated from intervening portions of the sheet by four slits extending rectilinearly respectively from opposite ends of, and in line with, said second fold lines; two side wall portions disposed on opposite sides of said bottom and defined by said first fold lines, said slits and a third pair of fold lines parallel to the first, said sides having the same height as said end walls and being folded about said first fold lines to a position perpendicular to said bottom and to said end walls; two cover portions disposed at opposite sides of said side wall portions and defined by said third pair of fold lines, said slits and a fourth pair of fold lines parallel to said third pair, each of said cover portions being one cell wide, said cover portions being folded about said fourth fold lines to a position parallel to said bottoms; said partition strips being folded to define two rows of cells with five

cells in each row, each of said strips being folded the same and having a first portion of one cell length parallel and contiguous to the respective side walls, a second portion of one cell width perpendicular to said side walls, a third portion of one cell length parallel to said side walls and spaced one cell width therefrom and a fourth portion of one cell width perpendicular to, and extending toward, the respective side wall, said strips having the same height as said side and end walls and separating all of the cells in each row from one another and partially separating the cells of one row from those of the other; integral flap portions disposed at opposite sides of said cover portions and having a width approximately equal to, and no greater than, the height of said side and end walls and a length equal to that of said cover portions, said flaps being folded about said fourth fold lines to a position perpendicular to the cover portions and extending from said cover portions substantially to the bottom between said two rows of cells, thereby completely separating the cells of one row from those of the other.

4. A cellular receptacle formed from a folded rectangular blank of sheet material consisting of a rectangular central portion constituting the bottom of the receptacle and defined by a first pair of spaced parallel fold lines extending transversely of the sheet and a second pair of spaced parallel fold lines extending lengthwise of the sheet, said bottom being two cells wide and three cells long and disposed with its length extending transversely of the sheet; integral rectangular end walls disposed between the ends of said bottom and the side edges of the sheet and defined by said second pair of fold lines, the side edges of the sheet and extensions of said pair of fold lines, said end walls being two cells high and being folded about said second fold lines to a position perpendicular to the bottom; a pair of partition strips extending linearly from each end of each of said end walls, said strips being separated from intervening portions of the sheet by four inner slits extending rectilinearly respectively from the opposite ends of, and in line with, said second fold lines and the two strips of each pair being separated from one another by outer slits parallel to said inner slits and disposed halfway between said inner slits and the outer side edges of said sheet; two side wall portions disposed on opposite sides of said bottom and defined by said first fold lines, said inner slits and a third pair of fold lines parallel to the first, said side walls having the same height as said end walls

and being folded about said first fold lines to a position perpendicular to said bottom and to said end walls; two cover portions disposed at opposite sides of said side wall portions and defined by said pair of fold lines, said inner slits and a fourth pair of fold lines parallel to said third pair, each of said cover portions being one cell wide, said cover portions being folded about said fourth fold lines to a position parallel to said bottom; said partition strips being folded inwardly to define two rows of cells between said side walls, each of said strips being folded the same and having a first portion of one cell length parallel and contiguous to the respective side walls, a second portion perpendicular to said side walls and a third portion parallel to said side walls and spaced one cell width therefrom, each of said strips having half the height of said side and end walls and separating all of the cells in each row from one another and partially separating the cells of one row from those of the other; a horizontal partition disposed between the strips of each pair to divide the cells in each row into two tiers of like cells one above the other; integral flap portions at opposite sides of said cover portions and defined by said fourth fold lines, said inner slits and the end edges of said sheet, said flap portions having a width approximately equal to, and no greater than, the height of said side and end walls, said flaps being folded about said fourth fold lines to a position perpendicular to the cover portions and extending from said cover portions vertically downwardly substantially to the bottom between said two rows of cells in each tier, thereby completely separating the cells of one row from those of the other.

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