Oct. 9, 1962 R. E. V. J. MIOCQUE 3,057,504

FOLDABLE CASES AND IMPROVED ELEMENTS FOR FORMING THE SAME

Filed Feb. 27, 1956

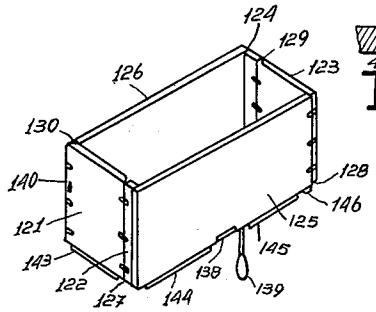

FIG. 1

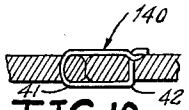

FIG. 12

FIG. 2

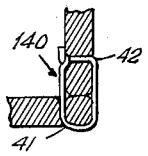

FIG. 13

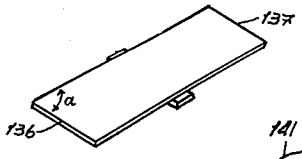

FIG. 4

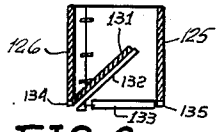

FIG. 3

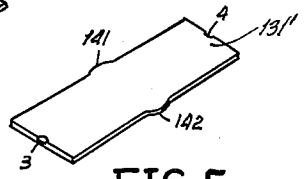

FIG. 5

FIG. 9

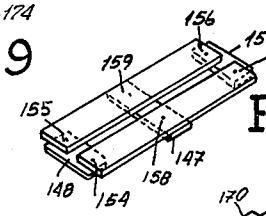

FIG. 6

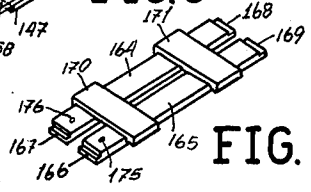

FIG. 7

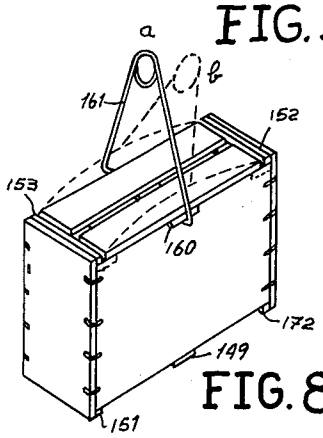

FIG. 8

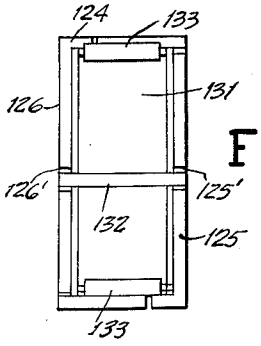

FIG. 11

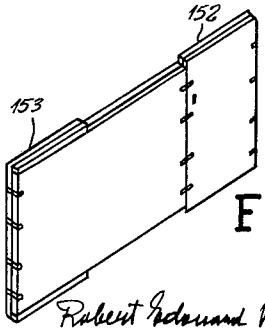

FIG. 10

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FOLDABLE CASES AND IMPROVED ELEMENTS FOR FORMING THE SAME

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2 Claims. (Cl. 217—16)

The present invention relates to foldable cases.

The foldable cases designed in accordance with the present invention are of such structure that they can be used over again many times and can be returned for reuse in folded position. In such folded position, the cases required little volume and, therefore, the expenses for the return shipment are very low.

It is one object of the present invention to provide a foldable case which comprises a front wall and a rear wall, constituting a first pair of oppositely disposed vertical walls, and a second pair of oppositely disposed vertical walls connecting the first pair of walls, a cover wall and a bottom wall, each of the walls of one of the pairs of walls consisting of two parts which are disposed in the same plane in their operative position and disposed at an angle of about 90° in their collapsed or inoperative position, to be used during the return shipment of the cases. One of the two parts of the one pair of walls is rigidly connected to the adjacent wall of the other pair of walls at an angle of about 90° at one of its ends and is hingedly connected with the other of the two parts of the one pair of walls.

It is another object of the present invention to provide a foldaable case, wherein strips connect the two parts of the same vertical walls and the other of the two parts of the one pair of walls with the adjacent wall of the other pair of walls.

It is still another object of the present invention to provide a foldable case, wherein shield bars are secured to the bottom end of the end walls and extend inwardly to support the bottom thereon, the bottom wall including a reinforcing bar which is secured thereto. The reinforcing bar has a greater length than the width of the bottom wall to form protruding ends and the side walls have at their corresponding bottoms corresponding openings to receive the protruding ends, in order to lock the bottom wall in its operative position.

It is yet another object of the present invention to provide a foldable case, wherein one side of the bottom wall is cut obliquely to form an angle of less than 90° with the corersponding side of the adjacent wall, in order to provide a play between the bottom wall and the adjacent vertical wall.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawing, in which:

FIGURE 1 is a perspective front view of a foldable case;

FIG. 2 is a perspective front view of the foldable case shown in FIG. 1 in folded position;

FIG. 3 is a cross-section of the case shown in FIG. 1 indicating the bottom wall and its reinforcement wall;

FIG. 4 is a perspective top view of the bottom wall of the case shown in FIG. 1;

FIG. 5 is a perspective top view of another embodiment of the bottom wall, applied to smaller cases;

FIG. 6 is a top perspective view of the cover;

FIG. 7 is a bottom perspective view of the cover, without the engaging means at the edges;

FIG. 8 is a top perspective view of the case with removable bottom and provided with a reinforcing bar;

FIG. 9 is a perspective front view of the tool for opening and closing the case, respectively;

FIG. 10 is a perspective front view of the case shown in FIG. 8 in folded position;

FIG. 11 is a bottom plan view of the case shown in FIG. 3, indicating the reinforcing bar ends on each side secured in the openings of the side walls.

FIG. 12 is a section through two adjacent walls showing two parts with holes, secured together by means of a connection member; and

FIG. 13 is a section through the two adjacent walls shown in FIG. 12 with the two parts at a right angle.

Referring now to the drawing, and in particular to FIGS. 1–4, the case comprises two oppositely disposed vertical side walls, each of which consists of two parts, namely a part **121** of greater length and a part **122** of smaller length of one of the vertical side walls, shown on the left side in FIG. 1, and a part **123** of greater length and a part **124** of shorter length of the other of the vertical side walls, shown on the right side in FIG. 1.

The case comprises further a vertical front wall **125** and a vertical back wall **126**. One end of the part **122** of one of the vertical walls is rigidly and permanently secured to and forms an angle of about 90° with the front wall **125** and the other end of the part **122** is hingedly connected with the other part **121** of the same vertical side wall. In the same manner, one end of the part **124** of the other of the vertical side walls is rigidly and permanently secured to and forms an angle of about 90° with the back wall **126**.

Thus, the part **121** of one of the side walls is hinged to the back wall **126** at **130**, and to the front wall at **127**, while the part **123** of the other of the side walls is hinged to the front wall **125** at **128** and to the back wall **126** at **129**.

This arrangement permits a folding of the vertical walls along the given hinge lines **127**, **128**, **129** and **130**, to form in the folded position a complete parallelepipedon, as shown in FIG. 2 of the drawing. The folded vertical walls are sufficiently spaced apart to receive therebetween the bottom wall **131** with its reinforcing bar **132**, as well as the shield bars **133** forming a shield to the bottom wall (FIG. 3).

It is to be understood, that it is possible to form the front wall **125** and the back wall **126** of two parts each and the side walls of a single integral part, with the same result.

The bottom wall **131** is hinged to the back wall **126** along the longer side thereof by means of connection strips and can fold inwardly and upwardly between the vertical walls, as shown in FIG. 3.

The reinforcing bar **132**, secured crosswise to the bottom face of the bottom wall **131**, has a length greater than the width of the bottom wall **131** and, thus, protrudes beyond the opposite edges of the bottom wall **131**. The vertical front and back walls **125** and **126** have openings or recesses **125'** and **126'**, respectively, at their lower edge and the protruding end portions of the reinforcing bar **132** are received in the openings **125'** and **126'** in the upright, operative position of the case, thereby locking the bottom wall **131** in its operative position, the later simultaneously resting on the shield-bars **133** which in turn are connected with the vertical walls.

The turning of the reinforcing bar **132** from its folded position into its operative horizontal position is made possible by the resiliency of the front wall **125**, which is capable to curve out slightly during the downward movement of the reinforcing bar **132** due to the pressure of the protruding end portions upon the front wall **125**.

In order to provide an improved resilient yielding of the front wall **125**, a predetermined amount of play is provided between one of the shorter sides of the bottom

wall **131** and the vertical wall **125** and for this reason the shorter side of the bottom wall **131** may be cut obliquely. In the embodiment shown in the drawing, the left side of the bottom wall is cut obliquely. As shown in FIG. 4, the side **136** of the bottom wall **131** is cut under an angle α of less than 90°, while the opposite side **137** is cut at an angle of 90°.

In order to fold the case, at first the protruding end portions **138** are removed from the openings **125'** and **126'** of the front wall **125** and the back wall **126**, for instance by means of a screw driver **139** (FIG. 1), which is inserted between the edge of the bottom wall **131** and the front wall **125**, whereupon the bottom wall **131** can be raised inwardly and upwardly and the vertical walls can be folded, to assume the position indicated in FIG. 2.

The folding and the upright, operative position, may be retained by the use of clamping irons **140** (FIG. 1) which are resilient and permit the change of each pair of adjacent, hingedly connected walls from a position in which the walls are disposed in the same plane to a position in which the walls are disposed at an angle of 90° relative to each other. Such angle irons are disclosed in FIGS. 12 and 13, where the holes **41** and **42** in the respective walls permit the insertion of the angle iron **140** therethrough.

Each of the cases is equipped with the shield-bars **133** which project over the bottom plate **131** by the projections **143, 144, 145** and **146** and form a guiding frame, in order to pile up the cases in superposed positions.

If the cases are small, the reinforcing bars can be eliminated and the bottom wall **131'** itself is equipped with projections **141** and **142** (FIG. 5).

Referring now to FIG. 8, a casing is shown in which the bottom wall (not shown) has again a reinforcing bar **149** and the bottom wall rests on the shield bars **151** and **172**. As shown in FIGS. 8 and 10, the casing has in addition also top shield bars **152** and **153**.

If the cases are used for the transportation of agricultural products, a cover as shown in FIG. 6 is preferably used. The cover comprises in this case longitudinal bars equipped with overpassing cross bars **148** and **150**, the length of which is shorter than the distance of the corresponding opposite vertical walls, and with a central reinforcing bar **147** having a length substantially identical with the external width of the case. The longitudinal bars are connected with the cross-bars **148** by nails at the points **154, 155, 156, 157, 158** and **159**. By relative movement of the longitudinal bars and the cross-bars **148** assuming an oblique position, the space between the longitudinal bars can be eliminated.

In order to put the cover wall into place, one of its overpassing portions **150** (FIG. 6) is set below the shield-bar **152** (FIG. 8) and by lifting the center portion of the cover wall the other of its overpassing portions **148** is set below the opposite shield bar **153**, so that the cover wall is secured to the casing.

The removal of the cover wall can be brought about by means of a tool **161** which is inserted below the central bar **160** which causes again lifting of the central portion of the cover wall, whereupon the overpassing portions **148** and **150** are released from the corresponding shield-bars. By moving the tool **161** from the position *a* (shown in full lines) to the position *b* (shown in dotted lines) the lifting of the cover wall is achieved speedily.

Another embodiment of the cover wall is shown in FIG. 7, which comprises longitudinal bars **164** and **165**, the ends **166, 167, 168** and **169** of which are partially cut away and cross-bars **170** and **171** having ends of greater thickness are secured to the longitudinal bars

170 and **171**. It is also possible to make the inner portions of the shield-bars **152** and **153** of a reduced thickness than their portions to substitute for the cut-out portions of the longitudinal bars **164** and **165**.

The tool disclosed in FIG. 9 can be used for assembling and disassembling, respectively, the case. The tool comprises two spurs **173** and **174** inserted in a wooden block **178**.

The bottom wall shown in FIG. 5 may serve also as a cover wall, provided it is designed in the same manner as the cover wall, the structure of which has been disclosed above.

The structure of the casing lends itself to instantaneous unfolding and folding, respectively, by placement and removal of the bottom and cover walls and folding and unfolding, respectively, of the vertical walls.

While I have disclosed one embodiment of the present invention, it is to be understood, that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

What I claim is:

1. A foldable case comprising at least two pairs of oppositely disposed vertical walls, a cover wall and a bottom wall, all said walls defining a chamber, the walls of one of said pairs of vertical walls consisting of two parts disposed in the same plane in the operative position of said case and disposed at an angle of about 90° in the collapsed position of said case, one of said parts being rigidly connected at an angle of about 90° at one of its ends to the adjacent wall of the other of said pairs of vertical walls, and being hingedly connected at the other of its ends with the other of said parts, and strips connecting said two parts of the same vertical walls and the other of said parts of vertical walls with the adjacent walls of the other pair of said vertical walls, shield bars secured to the bottom end of the end walls and extending inwardly to support the bottom thereon, said bottom wall including a reinforcing bar secured thereto, said reinforcing bar having a length greater than the width of said bottom wall, so as to form protruding ends, said side walls defining at their bottom corresponding openings to receive said protruding ends, thereby locking said bottom wall in its operative position.

2. The case, as set forth in claim 1, wherein one side of said bottom wall is cut obliquely to form an angle of less than 90° with another adjacent side, in order to provide a play between said bottom wall and the adjacent of said vertical walls.

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