

Feb. 13, 1940.

E. R. STIVERS

2,190,199

BOX

Filed Feb. 21, 1935

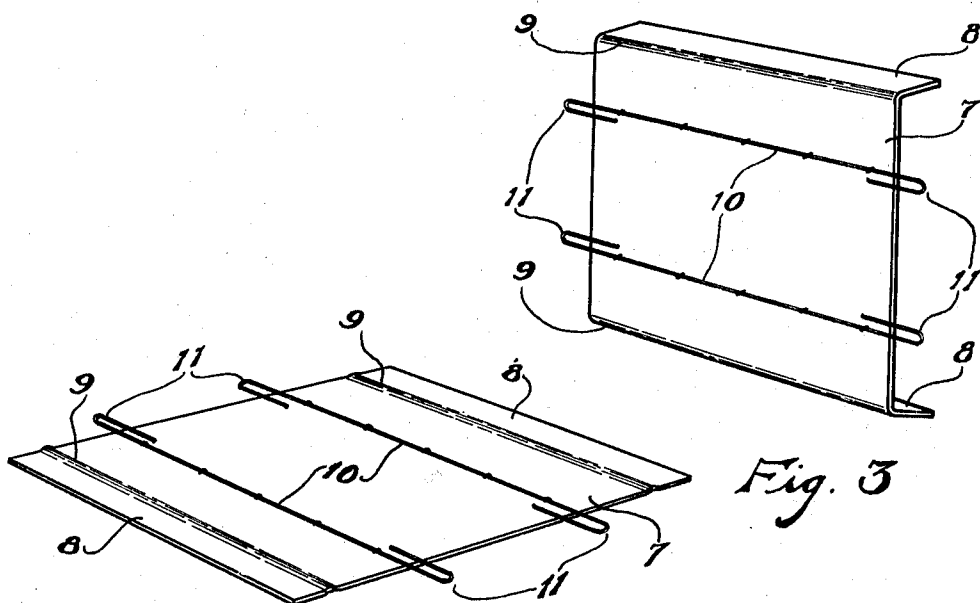


Fig. 2.

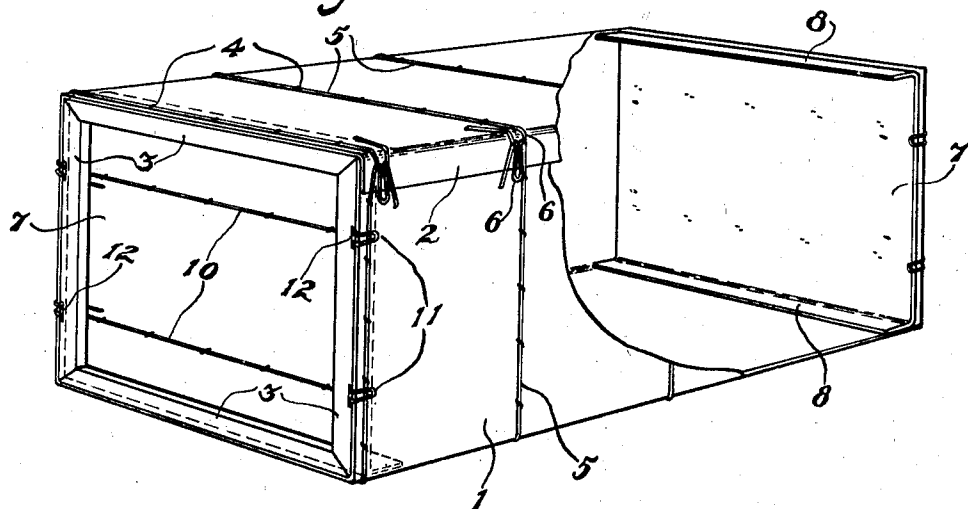


Fig. 1.

INVENTOR.
EARL R. STIVERS.
BY *Blair, Curtis & Dunne*
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,190,199

BOX

Earl R. Stivers, Rockaway, N. J., assignor to
Stapling Machines Co., a corporation of Dela-
ware

Application February 21, 1935, Serial No. 7,498

6 Claims. (Cl. 229-23)

This invention relates to boxes and particularly to wirebound fiberboard boxes.

It is an object of the invention to construct a box end and incorporate it in a box in such manner as to increase the resistance to rough handling of both the box end and the box as a whole.

It is a further object to form the box end in such manner as to increase its resistance to buckling under stress.

It is a further object to provide a strong fiberboard box end from a minimum amount of material.

One illustrative embodiment of the invention is shown in the drawing, in which:

Figure 1 is a perspective view of one type of wirebound fiberboard box embodying the invention, certain portions of the box being broken away to show the interior of the box end and the manner in which it is incorporated with the box sides.

Fig. 2 is a perspective view of an end section for the illustrative box, said view showing the end section in the flat and before its extremities are bent for incorporation with the box sides.

Fig. 3 is a perspective view of the illustrative end section with upper and lower flaps bent at right-angles to the body of the section for incorporation in the box.

As conducive to a better understanding of this invention it may be noted that wirebound fiberboard boxes when subjected to rough handling such as being rolled about or dropped on an end or corner, fall principally at the ends because of buckling or crumpling of the fiberboard in the end section, or because of displacement of the fiberboard end section in its relation to the side sections.

Various means and methods have been utilized to stiffen and reinforce the fiberboard ends to strengthen them against the failures referred to above. Such means and methods have involved the use of battens or strengthening strips secured to one of the faces of the end section, or the increasing of the thickness of the fiberboard in the end section. While the various strengthening means and methods heretofore employed have been to a certain extent successful, they have all been too expensive to permit any extensive use of them, the added strengthening strips or increased thickness of the fiberboard, rendering the construction prohibitively expensive for use in cheap shipping containers of fiberboard construction.

The present invention is intended to produce

a fiberboard end section of sufficient stiffness and strength without material increase in the cost.

In Fig. 1 is shown one type of wirebound fiberboard box comprising a sheet of fiberboard 1 for the four sides of the box bent integrally over the box corners and preferably overlapping at the closing corner edge, as shown at 2. The fiberboard side material 1 is supported at each end of the box by cleats 3, preferably of wood, which are stapled to the side material 1 by staples 4. Encircling the side material 1 are flexible binders 5 (preferably wires) some of which encircle the box in the plane of the cleats 3 and are stapled to the side material 1 and the cleats 3 by the staples 4 which straddle the binder 5, pass through the side material 1 and anchor in the cleats 3. The binders intermediate the end binders are stapled to the side material 1 by other staples 4 which straddle the binder 5, pass through the side material 1, and are clinched on the under side of the side material 1.

The ends of the binders 5 may be provided with interengageable bights or loops 6 to close the box.

The end openings of the box are closed by end sections positioned inside the end frames formed by the cleats 3. Each end section is preferably positioned substantially in contact with the inner faces of the cleats 3 and secured in such position by the fastening means hereinafter described.

Referring to Fig. 2, the illustrative end section consists of a sheet of fiberboard 7 having extensions or flaps 8 at each end. The fiberboard is creased as at 9, 9 to permit the extensions or flaps to be bent at right-angles to the sheet 7, as shown in Fig. 3.

The illustrative means for fastening the end section to the box sides consists of two wires 10 stapled in spaced relationship to one side of the sheet 7 and bent at their ends to form bights or loops 11, each of which may be passed through a groove 12 formed in a cleat 3 and bent over against the exterior of a box side, as shown in Fig. 1.

The width of the fiberboard end sheet 7 is substantially equal to the inside width of the box, and the length of the end sheet 7 between the creased lines 9, 9 is substantially equal to the inside depth of the box.

As shown in Fig. 1, the extensions or flaps 8 of the end section are bent inwardly at substantially a right-angle to the body of the sheet 7 and lie adjacent to or in contact with the inner side of the side material 1 at the top and bottom of

the box, while the outer face of the sheet 7 with the wires 10 secured thereto, rests against the inner faces of the end cleats 3.

It will be understood that the end sections are inserted and secured to the side sections before the top or lid of the box is lowered into closing position.

While the flaps or extensions 8 of the end section need not be secured to the side material and may merely extend inwardly in contact with or in close proximity to the inner surface of the side material 1, such flaps or extensions so located nevertheless greatly stiffen and strengthen the fiberboard sheet 7 and increase its resistance to buckling or crumpling under stresses and strains.

Actual tests establish that boxes equipped with ends having the extensions or flaps 8 of this invention have from 44% to 131% greater resistance to rough handling than the same box equipped with ends which are not provided with extensions or flaps 8.

The tests referred to were made in a 14 ft. revolving drum in which boxes loaded with the same contents were tested to destruction.

The surprising increase in resistance to rough handling of the flap end construction as compared with ends having no flaps is due partly to the contact between the flaps and the side material 1, and partly to the contact between the flaps and the contents of the box, but primarily to the stiffness added to the end by the flap being at an angle to the end; in other words, the end with the flap is similar in construction and function to a steel channel or I-beam which though consisting of a thin web is rendered stiff and strong by means of the flanges on the ends.

It should be noted, however, that this strengthening function of the flaps is at its maximum when the end section is maintained in its normal plane, and the strengthening function of the flaps is reduced when the body of the end section is distorted or bent out of its normal plane. The wires 10, which are stapled to the body of the end section, extend across the end section, and are hooked to opposite box sides, not only serve to connect the end section to the box sides, but also resist bulging or bending of the end section and serve to maintain it in its normal plane, thus permitting the flaps to continue their maximum strengthening function under stresses and strains which, in the absence of the wires, would distort the end section out of its normal plane. In other words, the wires cooperate with the flaps to increase the holding power of the end section and thus increase the resistance to rough handling of the end section and the box as a whole.

It will be understood that the invention is not to be limited to the particular embodiment shown for purposes of illustration as the inventive features may be variously embodied without departing from the invention. For example, the illustrative box is four-sided and the end section is provided with two flaps or extensions 8. The end construction of this invention may be used in a box having more than four sides and the end

section may be provided with one flap or two flaps or more than two flaps, depending upon the degree of stiffness or strength required.

It will also be understood that all of the features of the invention need not be used conjointly as they may be used in various combinations as defined in the sub-joined claims.

I claim:

1. A wirebound fiberboard box comprising four side sections connected together by encircling flexible binders secured to the side sections; interior cleats secured to the side sections to provide an interior cleat frame at each end of the box; and an end section located within the cleat frame at each end of the box, each end section comprising a sheet of fiberboard substantially as wide as the inside width of the box and longer than the inside depth of the box, the top and bottom of the end section being bent inwardly of the box and held in bent position by the top and bottom of the box respectively, and flexible binders extending across and secured to the end section and connected to opposite side sections of the box.

2. A box comprising a plurality of side sections connected together and having interior cleats to provide an interior cleat frame at an end of the box and a fiberboard end section located within the cleat frame and having a flexible binder secured thereto and connected to opposite side sections and having also a flap bent at an angle to the body of the end section and extending into the interior of the box.

3. A box comprising a plurality of side sections connected together and an end section closing an end of the box, the end section having a flap bent at an angle to the body of the end section and extending into the interior of the box, and a flexible binder secured to and extending across the end section and connected to opposite box sides.

4. In a box having a cleat frame at one end thereof, a fiberboard end section located within the cleat frame and substantially in contact therewith, the end section having a flap bent at an angle to the body of the end section and extending into the interior of the box, and a flexible binder secured to and extending across the end section and connected to opposite sides of the cleat frame.

5. In a box having a cleat frame at one end thereof, an end section located within the cleat frame and having a flap bent at an angle to the body of the end section and extending into the interior of the box and also having a flexible binder secured to the end section and connected to opposite sides of the cleat frame.

6. In a box having a cleat frame at one end thereof, an end section located within the cleat frame and secured thereto by wires stapled to the end section and connected to the cleat frame, the end section having a flap bent at an angle to the body of the end section and extending into the interior of the box.

EARL R. STIVERS.