June 7, 1955 L. H. SCHROEDER ET AL 2,710,134

CORRUGATED PAPERBOARD BOX STRUCTURE

Filed Jan. 18, 1954 2 Sheets-Sheet 1

Fig. 2.

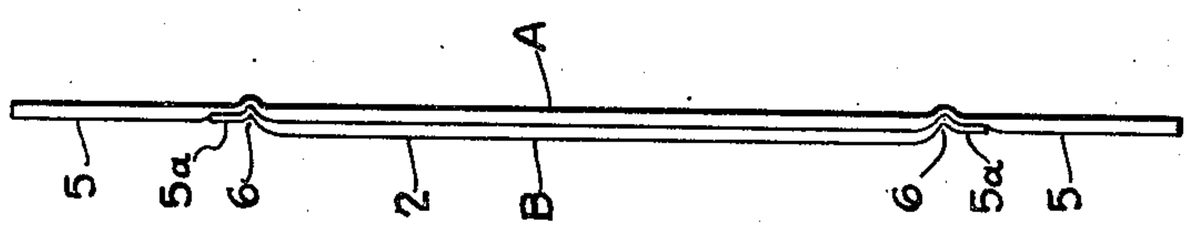

Fig. 3.

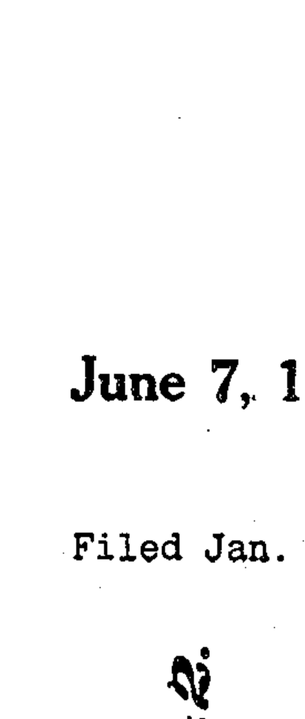

Fig. 1.

INVENTORS.
LOUIS H. SCHROEDER
JOSHUA WAGNER.
BY
Brand Crosby & Head
ATTORNEYS.

June 7, 1955 L. H. SCHROEDER ET AL 2,710,134

CORRUGATED PAPERBOARD BOX STRUCTURE

Filed Jan. 18, 1954 2 Sheets-Sheet 2

Fig. 5.

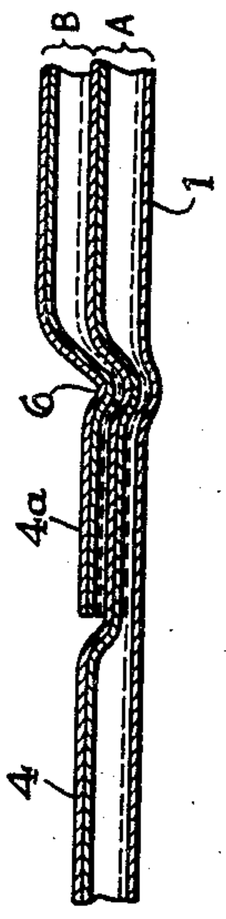

Fig. 5a.

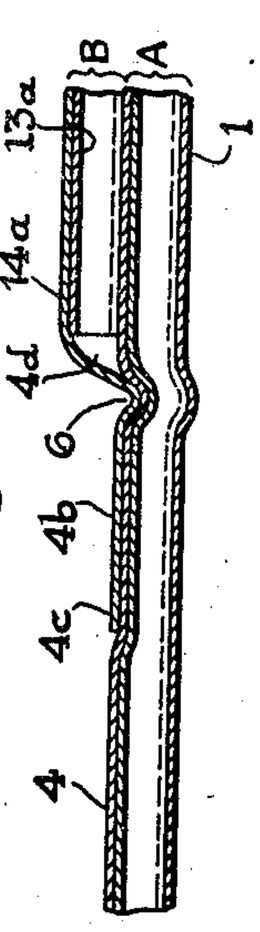

Fig. 6.

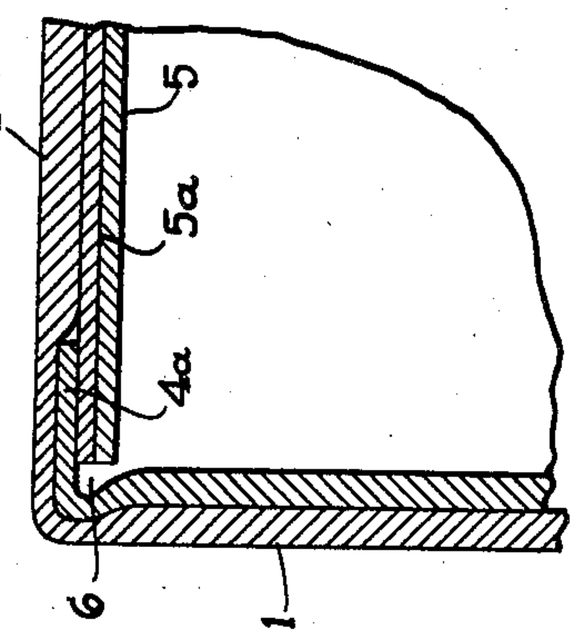

Fig. 4.

INVENTORS.
LOUIS H. SCHROEDER
JOSHUA WAGNER.
BY Brand Crosby & Head
ATTORNEYS.

United States Patent Office

2,710,134

Patented June 7, 1955

2,710,134

CORRUGATED PAPERBOARD BOX STRUCTURE

Louis H. Schroeder, Roslyn Heights, and Joshua Wagner, Brooklyn, N. Y., assignors to Dixie Container Corporation, Richmond, Va., a corporation of Virginia

Application January 18, 1954, Serial No. 404,585

2 Claims. (Cl. 229—37)

The invention relates to boxes and box blanks constructed of corrugated paper board, and particularly to such boxes and blanks wherein multi-walled corrugated paper board is incorporated to secure added strength and rigidity. The primary purpose is to provide such a box in which the reinforcement of the multi-walled board will be afforded in the portions of the structure where most required, other portions of the box being of corrugated material of lesser thickness to avoid the expense of providing multi-walled board throughout, but the portions of lesser thickness reinforcing each other when the box is shaped to form, and the joints between the portions of the box which are of different thickness being reinforced as hereinafter described, so that different portions of the box are fairly uniform in respect to strength and resistance to distortion.

In accordance with the invention, the box blank is constructed of corrugated paper board having its various plies adhesively bonded together, the portions of the blank which are to constitute the side walls of the box being constructed of multi-walled board having more plies than the main areas of the blank which constitute the end flaps of the box. However, the additional plies, or at least one of them, extend from the side wall panels a short distance beyond the creases which join the side walls of the box to the end flaps thereof, thereby to reinforce the portions of the end flaps which are adjacent the joints between the end flaps and the side walls. When the inner and outer end flaps are folded together in shaping the blank to box form the top and bottom walls of the box are thereby built up to a thickness and strength comparable to that of the side walls. Thus the box becomes fairly uniform in respect to the strength and resistance to distortion of its various walls and edges, without requiring that multi-walled board of maximum thickness be provided throughout, and with reinforcement as above referred to, at the joints between the end and sidewalls of the box.

The above and further features of the invention are more particularly set forth in this specification which, taken in conjunction with the accompanying drawings, discloses certain preferred forms of box blank and box constructed in accordance with the invention; the disclosure, however, should be considered as merely illustrative of the invention in its broader aspects.

In the drawings:

Fig. 1 is a plan view of a corrugated paper board box blank constructed in accordance with the invention, in flat form.

Fig. 2 is an end view of such blank, looking from the right of Fig. 1;

Fig. 3 is a detail section taken on the line **3—3** of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a perspective view with certain parts cut away, of a box constructed from the blank shown in Figs. 1 to 3;

Fig. 5 is a detail section taken on the line **5—5** of Fig. 1 looking in the direction of the arrows;

Fig. *5a* is a view similar to Fig. 5 but showing a somewhat modified form of the invention; and

Fig. 6 is a detail section taken on the broken line **6—6** of Fig. 4, looking in the direction of the arrows.

The invention is disclosed as embodied in a box made up from the blank shown in Fig. 1 as having side wall panels **1**, **1** and **2**, **2**, creases as indicated at **3** being provided to run along the joints between adjacent panels and form the side edges of the box when the blank is shaped into box form. The above-mentioned side wall panels have respectively extending therefrom, inner end flaps **4**, **4**, and outer end flaps **5**, **5**, creases **6**, **6** being provided at the joints between the respective end flaps and side wall panels, to define the top and bottom edges of the box when the blank is folded into box form. The end flaps are shown as having slots **7** therebetween, and it will be understood that the dimensions of the side wall panels and the flaps will depend upon the size of box desired, also on whether or not it is desired to have the inner flaps, or the outer flaps, or both, overlap each other in the completed box. Suitable means such as the tape **8** (Fig. 4) will be provided as known in the art, to secure together the opposite side edges of the blank.

In the form of the invention under discussion, the side walls **1** and **2** are constructed of multi-walled corrugated paper board which comprises double faced corrugated paper board (indicated generally at A in Figs. 2, 3 and 5) and single faced corrugated paper (indicated generally at B in Figs. 2, 3 and 5) adhesively bonded together. The double faced corrugated paper board as shown more in detail in Figs. 3 and 5, is made up of the facing sheets **9** and **10** which as indicated at the points **12** in Fig. 3, are adhesively bonded to the corrugated paper web **11** interposed therebetween. The single faced corrugated paper comprises the corrugated paper web **13** (Fig. 3) and the facing sheet **14** which are adhesively bonded as indicated at **15** in Fig. 3. The thus constituted single faced corrugated paper is adhesively bonded to the double faced corrugated board as indicated at **16** in Fig. 3.

The side wall panels **1**, **2** and the creases **3** which define the side edges of the box, are constructed of the multi walled corrugated paper board above described, and the double faced corrugated paper board extends beyond the creases **6** throughout the full extent of the end flaps **4** and **5**, to constitute the main bodies of the latter. In the form of the invention shown in Figs. 1 to 5 and 6, both the corrugated web **13** and the facing sheet **14** of the single faced corrugated paper B extend from the side wall panels a short distance beyond the creases **6** (see particularly Fig. 5) to constitute supplementary flaps *4a* and *5a*, which supplementary flaps are located respectively at the portions of the flaps **4** and **5** which are adjacent the creases **6**.

Accordingly the side walls of the box and its side edges as formed at the creases **3** will be constituted of multi walled board, while the flaps **4** and **5** will be constructed in the main of double faced corrugated board which is substantially thinner and less costly. When the flaps **4** and **5** are folded inwardly at the creases **6**, to shape the blank into box form as shown in Fig. 4, the combined thickness of the thinner end flaps will be comparable to that of the side walls of the box, the contacting areas of the end flaps being usually adhesively bonded so that their strength approximates that of the side walls. The supplementary flaps *4a* and *5a* above described will provide reinforcement for the top and bottom edges of the box and the portions of the end walls adjacent such edges. Preferably as shown in Fig. 5, the supplementary flaps *4a* and *5a*, and the portions of the flaps **4** and **5** which contact the supplementary flaps, are somewhat

compressed so that their combined thickness is equal to that of the remaining portions of the end flaps, as indicated in Fig. 5.

Corrugated paper board of the above nature may be made in known double backer machines arranged to produce multi walled board, by feeding into the double backer, single faced corrugated paper of width appropriately narrower than the width of the double faced corrugated paper board which passes through the double backer. The plies which constitute the end flaps **4** and **5** may still be sufficiently bonded adhesively in the double backer, despite the thinner material used therein. The compression of the supplementary flaps *4a* and *5a* substantially to the same thickness as the remainder of the flaps **4** and **5**, may be done in connection with the operation of forming the creases **6**.

Fig. *5a* shows a somewhat modified form of the invention wherein the corrugated web **13***a* of the single faced corrugated paper terminates slightly inwardly of the creases **6**, and the facing sheet **14***a* of the single faced paper is extended slightly beyond the creases **6** to form supplementary flaps **4***b* (Fig. *5a*). These supplementary flaps should be adhesively bonded to the contacting areas of the flaps **4** and **5**, as indicated at *4c* in Fig. *5a*, for which purpose coatings of adhesive may be applied to the inner surfaces of the flaps **4***b* just before they enter the double backer. As indicated at *4d* in Fig. *5a*, the flaps **4***b* preferably have portions adjacent the creases **6** which are free of adhesion to the adjacent plies. These portions thereby can adjust themselves independently and loosely to the right angled bends formed at the creases **6**, and strains which may rupture remaining plies adjacent the creases **6**, do not necessarily rupture the portions **4***d*.

While the invention has been disclosed as applied to box structures of the above described specific forms, it should be understood that changes may be made therein without departing from the invention in its broader aspects, within the scope of the appended claims.

What is claimed is:

1. A corrugated paperboard box structure of the character described, having adjoining side wall panels and inner and outer end flaps extending respectively from each of said panels, said structure having creases running along the joints between adjacent panels and also having creases running along the joints between the panels and the flaps extending respectively therefrom, said side wall panels and the joints between them being each constructed throughout their full extent of a plurality of plies of corrugated paper and a plurality of facing sheets, and the successive plies of said panels being adhesively bonded together at their respective contacting areas, the outer of said corrugated paper plies and the adjacent facing sheet plies extending from each of the side wall panels beyond said second mentioned creases

and throughout the full extent of said end flaps to constitute the main bodies of the latter, said last mentioned corrugated plies and facing sheet plies being also adhesively bonded together at their respectively contacting areas, and the inner of the corrugated plies extending from each of the side wall panels a lesser distance beyond each of said second mentioned creases to constitute supplementary reinforcing extensions lying along the inner sides of the portions of said first mentioned flaps which are adjacent such second mentioned creases, said supplementary reinforcing extensions having creases which register with the creases at the joints between said side wall panels and main flap bodies.

2. A corrugated paperboard box structure of the character described, having adjoining side wall panels and inner and outer end flaps extending respectively from each of said panels, said structure having creases running along the joints between adjacent panels and also having creases running along the joints between the panels and the flaps extending respectively therefrom, said side wall panels and the joints between them being each constructed throughout their full extent of a plurality of plies of corrugated paper and a plurality of facing sheets, and the successive plies of said panels being adhesively bonded together at their respectively contacting areas, the outer of said corrugated paper plies and the adjacent facing sheet plies extending from each of the side wall panels beyond said second mentioned creases and throughout the full extent of said end flaps to constitute the main bodies of the latter, said last mentioned corrugated plies and facing sheet plies being also adhesively bonded together at their respectively contacting areas, and the inner of the corrugated and facing sheet plies extending from each of the side wall panels a lesser distance beyond each of said second mentioned creases to constitute supplementary reinforcing extensions lying along the inner sides of the portions of said first mentioned flaps which are adjacent such second mentioned creases, said supplementary reinforcing extensions having creases which register with the creases at the joints between said side wall panels and main flap bodies, said supplementary extensions and the corresponding portions of said first mentioned flaps being also adhesively bonded together at their respectively contacting areas.

References Cited in the file of this patent

UNITED STATES PATENTS

1,097,390	Corwin	May 19, 1914
1,417,776	Shafer	May 30, 1922
1,634,073	Labombarde	June 28, 1927
1,912,698	Forsman	June 6, 1933
2,075,679	Weber	Mar. 30, 1937
2,330,294	Leavitt et al.	Sept. 28, 1943