Nov. 6, 1928. 1,690,109

R. A. GROSS

COLLAPSIBLE BOX

Filed Nov. 4, 1926 2 Sheets-Sheet 1

Fig. 1.

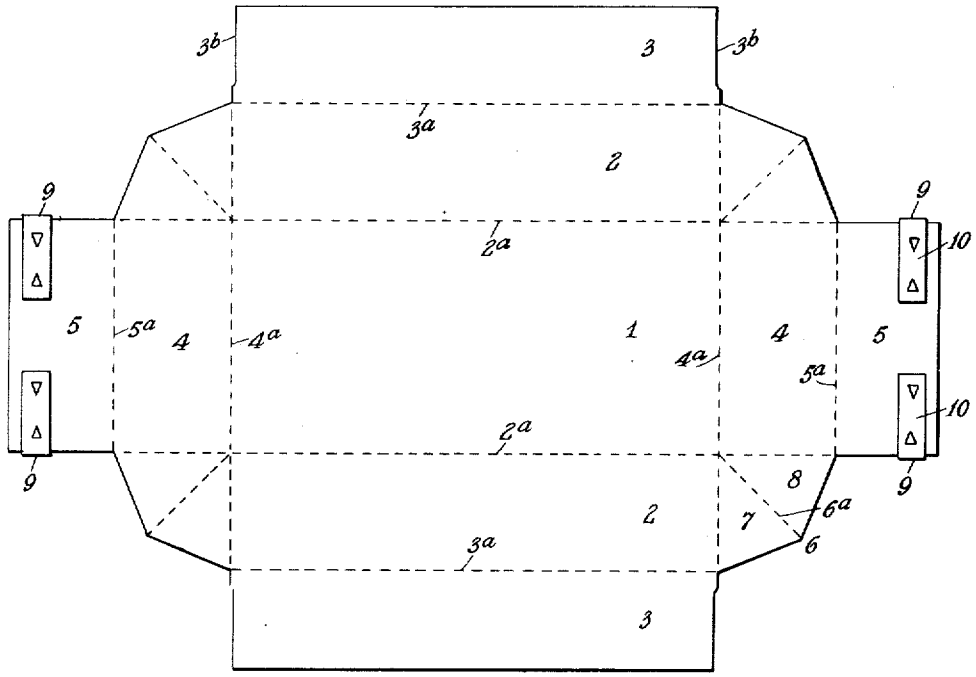


Fig. 2.

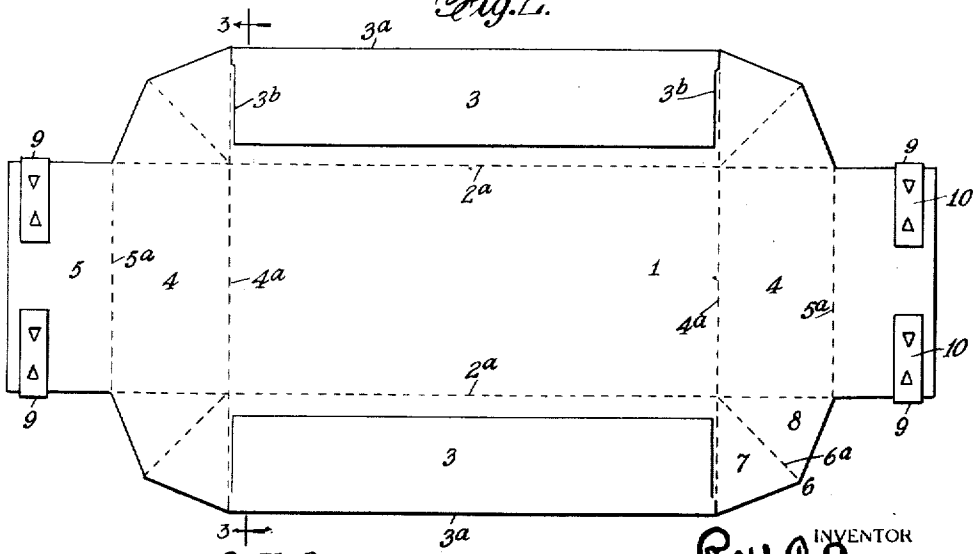


Fig. 3.

INVENTOR

Ralph A. Gross

BY

Louis Prosser & Hunter

ATTORNEY

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Filed Nov. 4, 1926 2 Sheets-Sheet 2

Fig. 4.

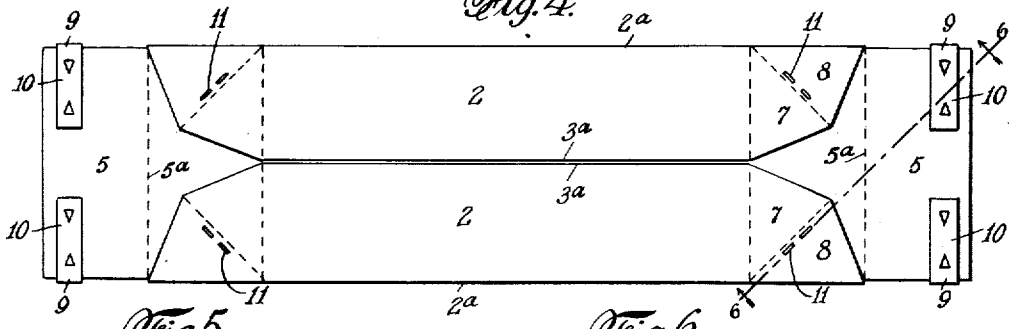


Fig. 5.



Fig. 6.

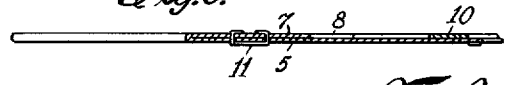


Fig. 7.

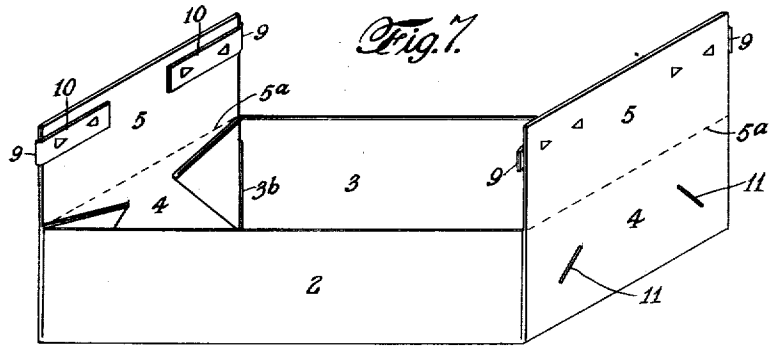


Fig. 9.

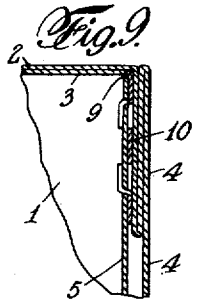


Fig. 10.

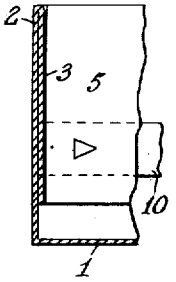
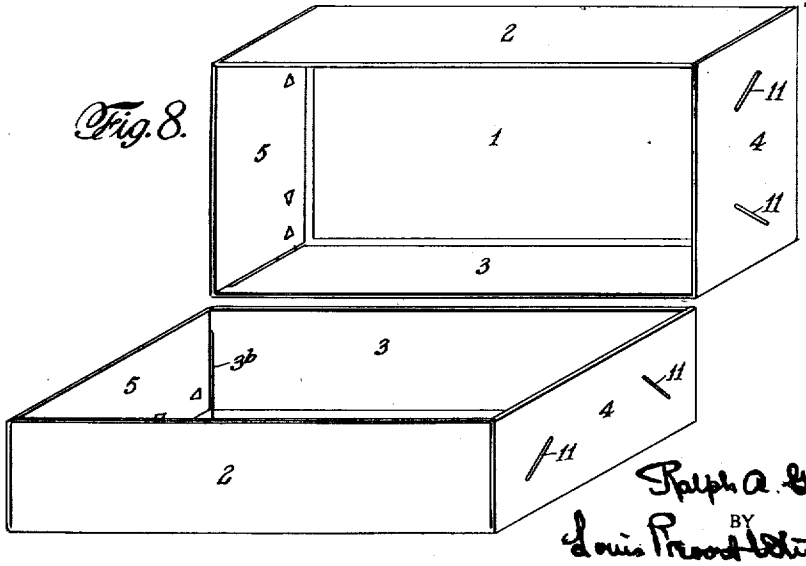


Fig. 8.



INVENTOR

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BY

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Patented Nov. 6, 1928. 1,690,109

UNITED STATES PATENT OFFICE.

RALPH A. GROSS, OF LITITZ, PENNSYLVANIA, ASSIGNOR TO SIMPLEX PAPER BOX CO., OF LITITZ, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COLLAPSIBLE BOX.

Application filed November 4, 1926. Serial No. 146,079.

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawings which illustrate one embodiment of my invention selected by by me for purposes of illustration, and the said invention is fully disclosed in the following description and claims.

My invention consists in a novel box made of paper or cardboard stock which is capable of being shipped flat, in knock down or collapsed form, and can be instantly folded and locked in operative condition, my improved box being so constructed and arranged as to produce as rigid and strong a box from comparatively thin sheet stock as can be obtained by the use of much heavier stock, as ordinarily constructed, and thus effecting a considerable saving in manufacture, while additional economy of space in transportation and storage is effected with additional savings to the user.

According to my invention the box comprises two similar collapsible members, which telescope one over the other in use, and reinforce each other, thereby adding to the rigidity and ruggedness of the box and the parts of each member are positively locked in operative position when folded and assembled, so that there is no danger of the box collapsing or permitting any separation of its members when in use.

In the accompanying drawings,

Fig. 1 is a plan view of the blank for one member of my improved box, showing it creased for folding and having its end locking flaps provided with locking plates, or projections.

Fig. 2 is a similar view of the blank after the auxiliary side flaps have been folded and united to the main side flaps.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a similar view of the blank showing the side flaps folded over the main (top or bottom) section and the exterior corner sections secured to the main end flaps.

Fig. 5 is a transverse section taken through Fig. 4.

Fig. 6 is a section on line 6—6 of Fig. 4.

Fig. 7 represents the positon of the blank when the end flaps and locking flaps are raised into vertical position.

Fig. 8 shows the two members of a completed box ready to be telescoped one over the other.

Fig. 9 is a partial horizontal sectional view of a box member adjacent to one corner showing the engagement of one of the locking plates with the edge of the adjacent auxiliary side flap.

Fig. 10 is a partial vertical section of a box member adjacent to one corner thereof.

In carrying out my invention, I take a sheet of cardboard, paste-board, or other suitable sheet material, which can be creased and bent or folded, and cut it into the form, substantially as illustrated in Fig. 1, and crease it, as indicated in the dotted lines in said figure. I prefer to crease or indent the lines of fold, instead of cutting or scoring them, as the cutting or scoring cuts the fibres of the stock so that a scored blank has a strength at the lines of fold considerably less than the strength of the uncut material. By creasing or indenting the material at the lines of fold, the fibres are merely stretched and substantially the full strength of the material is retained.

The creased blank comprises preferably in one piece, the following parts: a rectangular central body portion, 1, main side flaps, 2, 2, at each side thereof and separated by creases or lines of fold, indicated at 2^a, and auxiliary side flaps or reinforcing side flaps 3, 3, each of which is slightly narrower and preferably slightly shorter than the adjacent side flap from which it is separated by the crease or line of fold, indicated at 3^a. At each end of the body, 1, is an end fold, 4, separated therefrom by a crease or line of fold, 4^a, and being of the same height as the main side flaps, and beyond each end fold is a locking flap, 5, of the same width as the end fold, but of slightly less height and separated from the adjacent end flap by a crease or line of fold, 5^a.

The ends of the main side flaps, 2, and end flaps, 4, are connected by the corner sections, 6, divided into two triangles, 7 and 8, by a diagonal crease or line of fold, 6^a, extending from the adjacent corner of the body, 1, and bisecting the outer edges of the corner piece.

The locking flaps, 5, of the blank are also provided each with a locking projection, 9, at each end. These locking projections may be formed in any one of several ways. They may be formed integrally with the locking flaps, but I prefer to form them by securing

flaps, with their ends projecting laterally as shown. These locking plates may be of cardboard, celluloid, metal, or other suitable material and may be secured in any desired manner, as by pasting or stitching, stapling, etc. I prefer, however, to form them of metal, which is preferably given a coat of shellac, paint, enamel or other coating to prevent rusting, and the plates are conveniently provided with struck-up pins or clinching points, which are passed through the locking flaps and clinched. They may, however, be secured in any other desired way. The projecting ends, 9, of the plates, 10, are preferably bent slightly backward from the inner face of the locking flap, to facilitate folding up the box without sticking into the adjacent parts.

The blank being formed and creased as described, and as shown in Fig. 1, the auxiliary side flaps, 3, are folded on the lines, 3^a, 3^a, down upon the main side flaps, 2, 2 respectively and permanently secured thereto, as shown in Fig. 2, preferably by an adhesive, as paste or glue, throughout their entire extent. This reinforces the side flaps and gives them the strength of material of more than double the thickness.

The doubled side flaps are then folded together with the adjacent corner pieces over upon the body section, 1, and end flaps, 4, 4, as shown in Fig. 4, and the triangular portions, 8, of the corner sections are permanently secured to and upon the adjacent end flap, 4. This may be accomplished by pasting, stitching, stapling or otherwise, as preferred, but I prefer to connect these parts by staples, 11, or wire stitches, disposed parallel to and closely adjacent to the inclined lines of fold, indicated at 6^a, although this is not essential. The box is now completed, ready for shipment, flat, as shown in Fig. 4. It will be understood that the cover member is formed in identically the same manner, except that the blank for the cover is made sufficiently larger than the blank for the lower member, or box proper, as to fit over and telescope upon the latter. The blanks may be retained in flat or knockdown or collapsed form, or may be folded up into box form, and assembled, as preferred.

To fold up the blank into box form, is but the work of a moment. The blank shown in Fig. 3 is taken in both hands at the ends, and the end flaps and locking flaps are brought simultaneously up into vertical position, as in Fig. 7, with the result that the triangular sections, 7 and 8, of each corner section, will be folded together upon themselves and by reason of the connection with the end flaps, will lie closely adjacent thereto. The locking flaps are then folded down within the box over the triangular portions, and the projections, 9, of locking plates, 10, will snap past and engage the side flaps, 2, and the edges 3^b, of the auxiliary side flaps, 3, securely locking the box in final assembled position. The cover is formed up in the same manner, and telescoped over the box proper.

It will be seen that the side walls of each box member being doubled and cemented together, are very strong and rigid. The ends of each box member comprises the end flap, the four triangles, folded in pairs and clamped between the end flap and the locking flap, and are further stiffened by the locking plates, 10. The corners are further reinforced by the engagement of the locking projections 9, with the ends of the auxiliary side flaps, as shown and described. These locking plates and locking projections make it absolutely impossible to disengage the locking flaps accidentally. They can be disengaged if it is desired, but it requires both intention and care to accomplish this, and there is no danger of the box coming apart and spilling the contents.

In making these boxes I prefer to employ a tough thin sheet to a thick and brittle one, and as before stated, the construction is such that a box of comparatively thin stock can be made as rigid as a box constructed in the ordinary way, of much heavier stock. It will also be noted that the blanks can be printed, colored or decorated in any desired manner, and the box body and cover may be made of different materials. For example, the box proper may be made of plain white sheet stock, and the cover member which encloses it, of colored, decorated or fancy stock, as desired.

What I claim and desire to secure by Letters Patent is:—

1. A knockdown box comprising a blank, having a body portion, side flaps, end flaps, locking flaps connected to the outer edges of the end flaps and adapted to fold upon the same, and connections between the side flaps and end flaps for raising the side flaps into and holding them in operative position when the end flaps are raised, the inner faces of the side flaps and the opposite ends of the locking flaps being provided with portions adapted to interlock automatically by the folding of the locking flaps upon the end flaps when the latter are in raised position to hold the box in operative position.

2. A knockdown box comprising a blank having a body portion, side flaps, end flaps, locking flaps connected to the outer edges of the end flaps and adapted to fold upon the same, and connections between the side flaps and end flaps for raising the side flaps into and holding them in operative position when the end flaps are raised, said side flaps being provided with fixed shoulders and said end flaps having rigid projections adapted to automatically spring into locking engagement with said shoulders when said locking flaps

are infolded into substantial parallelism with the end flaps so as to lock the box in operative position.

3. A knockdown box comprising a blank having a body portion, main side flaps, auxiliary side flaps folded upon the side flaps and secured with reference thereto, end flaps, locking flaps secured to the outer edges of the end flaps and adapted to fold upon the same, and provided with locking portions to lock with the edges of the auxiliary side flaps, when folded.

4. A knockdown box comprising a blank having a body portion, main side flaps, auxiliary side flaps folded upon and secured to the side flaps, end flaps, locking flaps secured to the outer edges of the end flaps and adapted to fold upon the same, and provided with locking projections at each end to engage and interlock with the edges of the auxiliary side flaps when folded.

5. A knockdown box comprising a blank having a body portion, main side flaps, auxiliary side flaps folded upon and secured to the side flaps, end flaps, locking flaps secured to the outer edges of the end flaps and adapted to fold upon the same, and provided with locking plates secured thereto and extending transversely thereof and having their ends projecting beyond the edges of the locking flap to engage and interlock with the edges of the auxiliary side flaps when folded.

6. A knockdown box comprising a blank having a body portion, main side flaps, auxiliary side flaps folded upon and secured to the side flaps, end flaps, locking flaps secured to the outer edges of the end flaps and adapted to fold upon the same, corner sections connecting said main side flaps and end flaps, and provided with diagonal creases dividing them into triangular portions, said main and auxiliary side flaps and corner pieces being folded upon the main body and end flaps, and one part of each corner section being permanently united to the adjacent end flap, said locking flaps being adapted to fold inwardly upon the end flaps and to enclose the folded triangular portions of the corner sections and to automatically lock with the edges of the auxiliary side flaps when folded on the end flaps.

7. A knockdown box comprising a blank having a body portion, main side flaps, auxiliary side flaps folded upon and secured to the side flaps, end flaps, locking flaps secured to the outer edges of the end flaps and adapted to fold upon the same, corner sections connecting said main side flaps and end flaps, and provided with diagonal creases dividing them into triangular portions, said main and auxiliary side flaps and corner pieces being folded upon the main body and end flaps, and one triangular portion of each corner section being permanently united to the adjacent end inwardly upon the end flaps and to enclose the folded triangular portions of the corner sections, said locking flaps being provided with locking projections at its opposite ends to lock with the edges of the auxiliary side flaps when folded.

8. A knockdown box comprising a blank having a body portion, main side flaps, auxiliary side flaps folded upon and secured to the side flaps, end flaps, locking flaps secured to the outer edges of the end flaps and adapted to fold upon the same, corner sections connecting said main side flaps and end flaps, and provided with diagonal creases dividing them into triangular portions, said main and auxiliary side flaps and corner pieces being folded upon the main body and end flaps, and one triangular portion of each corner section being permanently united to the adjacent end flap, said locking flaps being adapted to fold inwardly upon the end flaps and to enclose the folded triangular portions of the corner sections, said locking flaps being provided with metal locking plates permanently secured thereto and having locking portions projecting at opposite ends of each locking flap to engage the edges of the auxiliary side flaps when folded.

9. A folding box comprising a blank having a body portion, side flaps, end flaps, and locking flaps connected to the end flaps, the side flaps being adapted to fold upon the body portion in the knockdown position, and connections between the side flaps and the end flaps constructed to raise the side flaps into perpendicular relation with the body portion by the manipulation of the end flaps into perpendicular relation to the body portion, said locking flaps being provided with locking portions for automatically engaging co-acting portions of the box when the locking flaps are folded upon the inner faces of the end flaps, whereby the box can be instantly converted from the knockdown to the locked operative position by merely raising the end flaps and infolding the locking flaps.

10. A folding box comprising a blank having a body portion, side flaps, end flaps, and locking flaps connected to the end flaps, the side flaps being adapted to fold upon the body portion in the knockdown position, and connections between the side flaps and the end flaps constructed to raise the side flaps into perpendicular relation with the body portion by the manipulation of the end flaps into perpendicular relation to the body portion, said locking flaps and the side flaps being provided with co-engaging locking portions adapted to be automatically brought into operative engagement by the folding of the locking flaps upon the inner faces of the end flaps, whereby the box can be instantly converted from the knockdown to the locked

11. A folding box comprising a blank having a body portion, side flaps, end flaps, and locking flaps connected to the end flaps, the side flaps being adapted to fold upon the body portion in the knockdown position, and connections between the side flaps and the end flaps constructed to raise the side flaps into perpendicular relation with the body portion by the manipulation of the end flaps into perpendicular relation to the body portion, said locking flaps being provided with rigid locking portions for automatically engaging co-acting portions of the side flaps when the locking flaps are folded upon the end flaps, whereby the box can be instantly converted from the knockdown to the locked operative position, by merely raising the end flaps and infolding the locking flaps.

In testimony whereof I affix my signature.

RALPH A. GROSS.

DISCLAIMER

1,690,109.—*Ralph A. Gross*, Lititz, Pa. COLLAPSIBLE BOX. Patent dated November 6, 1928. Disclaimer filed May 21, 1932, by the patentee, and the assignee, *Simplex Paper Box Corporation*.

Hereby disclaim from the scope of each of claims numbered 3 and 4 all collapsible boxes except those provided with corner sections integral with both the adjacent main side flaps and end flaps and provided with diagonal lines of fold dividing them into triangular portions, which fold upon themselves and upon the connected end flaps, and are enclosed between the end flaps and the locking flaps connected therewith.

[*Official Gazette June 14, 1932.*]

11. A folding box comprising a blank having a body portion, side flaps, end flaps, and locking flaps connected to the end flaps, the side flaps being adapted to fold upon the body portion in the knockdown position, and connections between the side flaps and the end flaps constructed to raise the side flaps into perpendicular relation with the body portion by the manipulation of the end flaps into perpendicular relation to the body portion, said locking flaps being provided with rigid locking portions for automatically engaging co-acting portions of the side flaps when the locking flaps are folded upon the end flaps, whereby the box can be instantly converted from the knockdown to the locked operative position, by merely raising the end flaps and infolding the locking flaps.

In testimony whereof I affix my signature.

RALPH A. GROSS.

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[*Official Gazette June 14, 1932.*]