April 7, 1936. N. ROSENTHAL 2,036,542

FOLDING BOX

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Fig. 1.

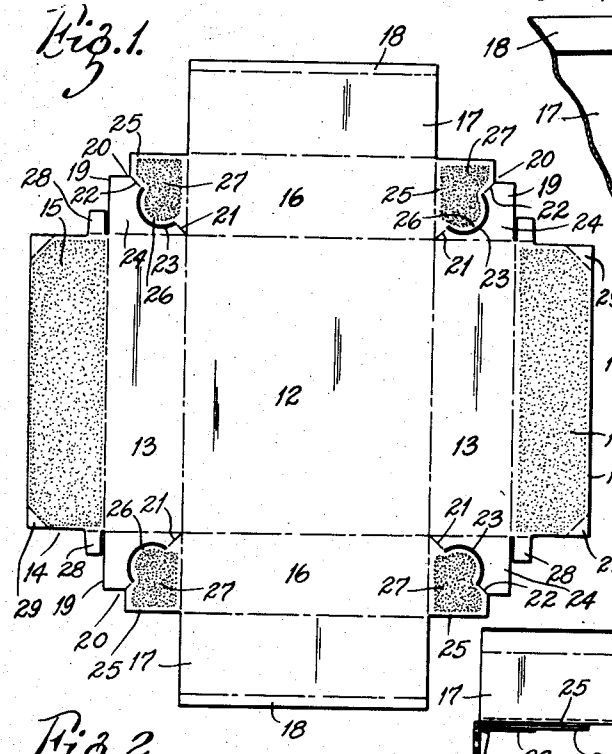


Fig. 3.

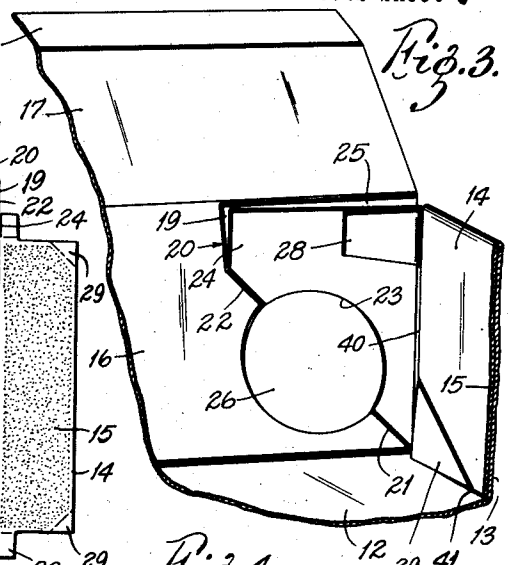


Fig. 2.

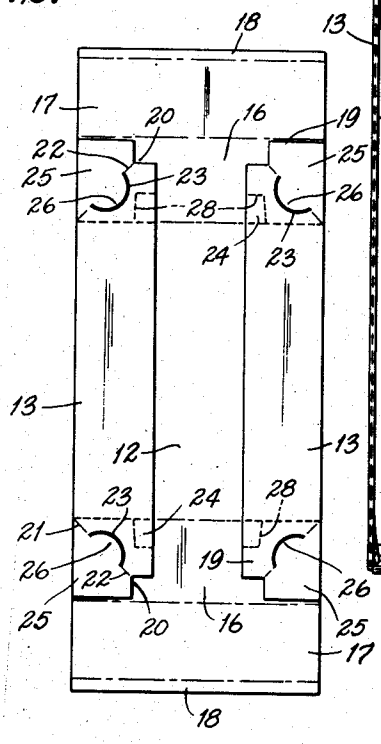
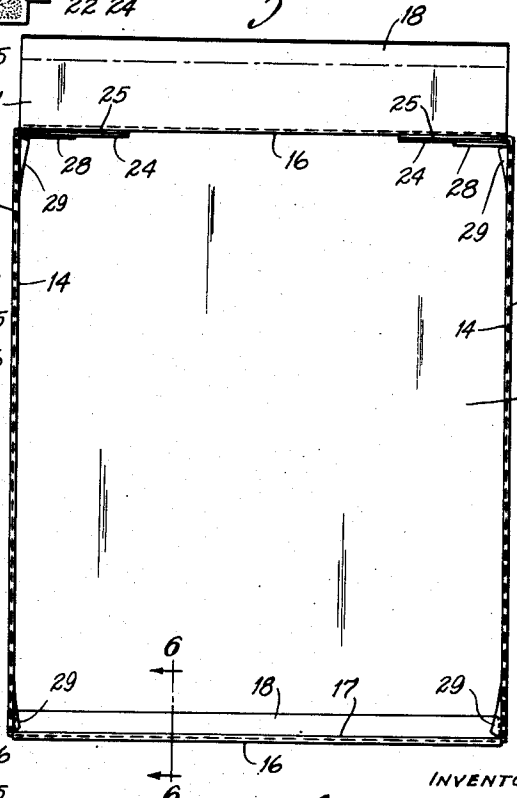


Fig. 4.



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Fig. 5.

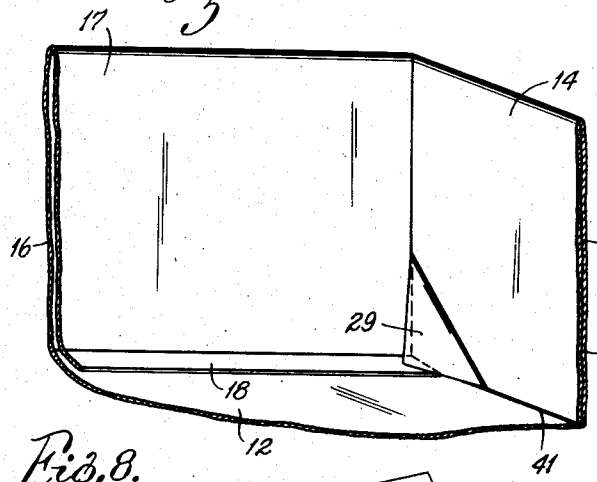



Fig. 6.

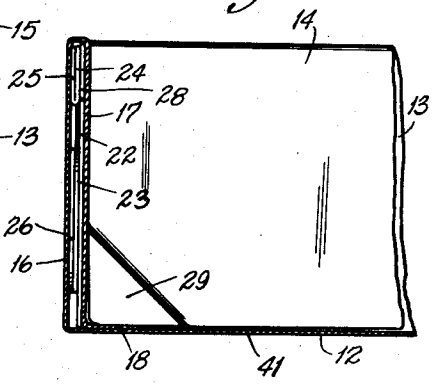



Fig. 8.

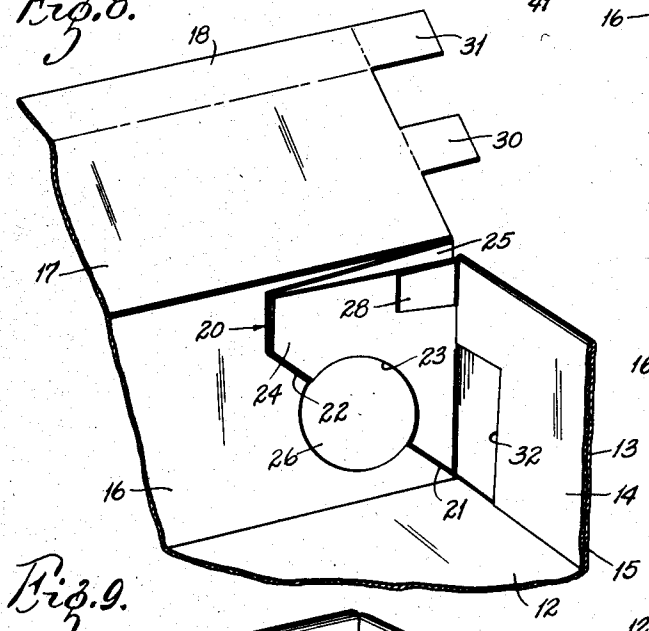



Fig. 7.

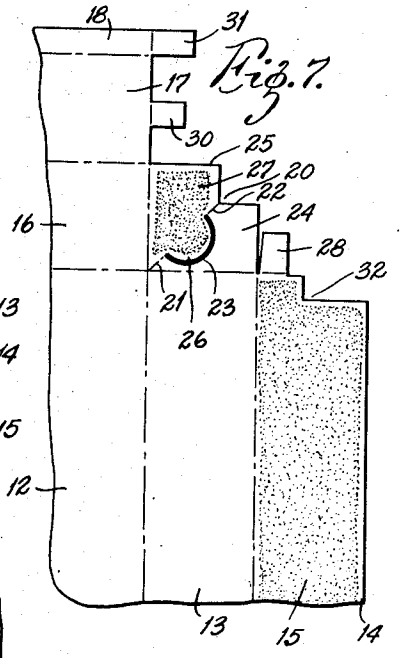
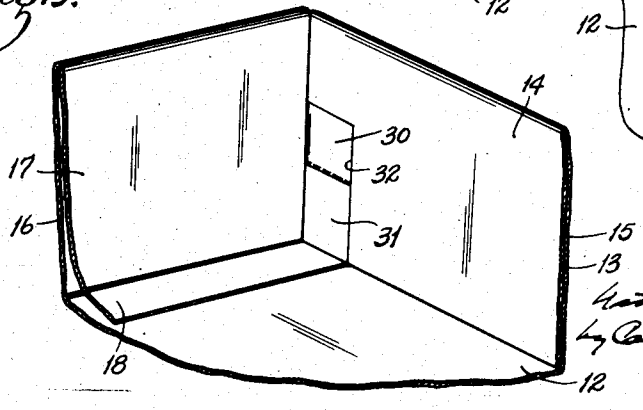



Fig. 9.




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Patented Apr. 7, 1936 2,036,542

# UNITED STATES PATENT OFFICE

2,036,542

## FOLDING BOX

Nathan Rosenthal, St. Louis County, Mo., assignor to Rosenthal Paper Company, St. Louis, Mo., a corporation of Missouri

Application August 31, 1935, Serial No. 38,726

11 Claims. (Cl. 229—34)

This invention relates to folding boxes of the type wherein the ends and sides are connected by corner portions that are creased diagonally to form a bellows fold, as illustrated, for instance, by Knobeloch Patent No. 622,496 dated April 4, 1899. Boxes of this type have been extensively used and, in practice, it has been quite common to secure, as by gluing, one leaf or triangular member of each bellows fold to the end of the box so that the raising of the ends of the box will automatically raise the sides also and thus facilitate the setting up of the box. While the merits of this old construction are obvious, it involves two difficulties that are more or less serious with divers sizes and materials. The first difficulty is that the material may be too stiff for the bellows fold to operate readily; and the second is that it is frequently difficult to apply sufficient glue to the leaf of the corner member to insure the proper operation of the bellows fold without getting some of the glue onto the other leaf and thus causing it also to adhere to the end of the box and thus preventing operation of the bellows fold. The principal object of the present invention, therefore is to overcome such difficulties and to improve the locking devices that secure the box in set-up condition. The invention consists in the parts and combinations of parts hereinafter described and claimed.

In the accompanying drawings, wherein like reference numerals refer to like parts wherever they occur,

Fig. 1 represents a blank suitable for the manufacture of my box, the creasing or scoring thereof being shown by dotted lines and the portions that are glued or pasted together being indicated by stippling;

Fig. 2 represents the box in its folded or knock-down condition;

Fig. 3 is an isometric projection of the corner portion of the box after the main side and end flaps have been wedged but prior to the swinging down of the locking flaps;

Fig. 4 is a plan view of the box showing one end thereof set up and showing the other end at the stage of the setting-up operation represented by Fig. 3;

Fig. 5 is an isometric projection of the corner portion of the box in set-up position;

Fig. 6 is a vertical sectional detail on the line 6—6 of Fig. 4 showing the locking devices; and

Figs. 7, 8 and 9 are views of a corner portion of a box embodying a modified form of locking device, Fig. 7 being a plan view of a portion of the blank, Fig. 8 being an isometric projection of the corner portion of the box in the course of setting up, and Fig. 9 being an isometric projection of the corner portion of the set-up box.

As shown in Fig. 1, the blank comprises a single piece of pasteboard or other suitable material which is creased or scored along four parallel longitudinal lines and along six transverse lines that cross the longitudinal lines at right-angles and divide the blank into panels. The middle rectangular panel thus defined constitutes the bottom 12 of the box. The panels next to the long edges of the box constitute the main side flaps 13 and the outer panels contiguous with said main side flaps 13 constitute the inner side flaps 14. These inner side flaps 14 are folded back along their crease lines and secured flatwise by glue or other adhesive, indicated at 15, to the main side walls of the box.

The panels contiguous with the ends of the bottom 12 constitute the main end flaps 16 of the box and the panels contiguous with the long edges of said main end flaps 16 constitute the main locking flaps 17. The panels contiguous with the long outer edges of the main locking flaps 17 constitute the bottom locking flaps 18.

The main side flaps 13 are extended beyond the bottom of the box and the main end flaps 16 are extended beyond the sides of the box, thereby forming corner members 19 that are integral with the main sides and end flaps of the box. The general shape of these corner members 19 is a rectangle with a notch 20 in its outer corner or with its outer edges meeting at an obtuse angle. Each of these corner members 19 has a crease or score 21 that extends diagonally outwardly from a corner of the bottom of the box. Each corner member 19 has a second diagonal crease or score 22 extending inwardly from its edge in alinement with said last-mentioned crease. The adjacent ends of the alined creases 21, 22 of each corner member are connected by a semicircular or arcuate slit 23 which is cut in that triangular leaf or fold 24 which is next to the main side flap 13 of the box. The other triangular leaf 25, together with the arcuate tongue or extension 26 formed thereon by such slit, is secured flatwise to the main end flap of the box, as by glue or other adhesive indicated at 27.

In the construction illustrated, the panels constituting the inner side flaps 14 of the box have tongues or extensions 28 at their ends close to the creases that separate said panels from the panels which constitute the main side flaps 13. When the box is set up, these tongues or extensions are close to the top of the box and are

turned inwardly at right angles to the sides for the purpose of reinforcing the corners of the box. The portion of the inner side flaps below said tongues is notched or cut enough shorter than the length of the bottom to afford spaces 40 at each end between said inner side flaps and the main end flaps of the box to receive the main locking flaps. Said inner side flaps are cut narrower than the main side flaps to provide spaces 41 next to the bottom of the box to admit the bottom locking flaps between said inner side flaps and the bottom of the box. Preferably the main locking flap is as long as or slightly longer than the width of the bottom of the box so as to have its ends engage frictionally with the main side flaps. Likewise, the main locking flap is of proper width crosswise to insure the engagement of the bottom locking flap beneath the edges of the inner side flaps. In this construction, it is preferable to form creases in each inner side flap and extending obliquely from the lower edge thereof to an end edge thereof. The triangular corner portions 29 defined by the creases are left free, that is, are not glued to the main side flap, and are bent somewhat away from the main side flaps along said creases. This arrangement facilitates the interlocking of the main and bottom locking flaps with the inner side flaps, as the inherent resiliency of the material enables said corner portions to yield to the pressure of the main locking flaps in the operation of setting up the box and to snap outwardly into locking position when the main locking flap reaches that position.

The construction illustrated in Figs. 7, 8, and 9 comprises a modified form of locking device. According to this modification, each main locking flap 17 has a rectangular tab or extension 30 at each end about midway of the height thereof, and each bottom locking flap 18 has a rectangular tab or extension 31 at each end, said tabs being defined by score lines at the ends of the body portions of the locking flaps. According to this modification, the lower corner portions of the inner side flaps are cut away to form recesses 32 for receiving these tabs. It is noted that, in the set-up position of the box, the tabs of the bottom locking flap extend upwardly while the tabs of the main locking flap extend horizontally. The tabs are so proportioned that, in the set-up position, the top of the bottom locking flap tab bears against the bottom of the main locking flap tab, which in turn fits under the top wall of the recess.

The construction hereinbefore described has important advantages. In the first place, the force required to operate the bellows folds is greatly reduced because the slits between the alined creases of the bellows folds reduces the amount of material that has to be bent. The tongues produced by the arcuate slitting greatly increase the areas available for gluing the bellows folds to the end flaps of the box and minimize the difficulties heretofore experienced when the creases extended continuously across the corner member. The principal difficulty arises from the fact that glue is applied in a liquid condition to one leaf only of the bellows fold and such leaf is then pressed against the main end flap so that, if there is an excess of glue or of pressure or if the glue is too liquid, some glue is liable to be squeezed beyond the score line and cause the second leaf of the bellows fold to be glued to the main end flap and thus spoil the corner or prevent the smooth and easy setting up of the box. On the other hand, if insufficient glue or insufficient pressure is used, the glue may give way to the force required to set up the box. My invention overcomes this difficulty by affording a much larger gluing surface and at the same time shortening the material that has to be bent.

The construction hereinbefore described admits of modification without departing from my invention. For instance, the shape of the tongue formed in the corner piece or of its enclosing slit may be varied considerably. In some cases, the increase in the area surface available for gluing may be the more important factor, while in other cases the length of the slit that controls the ease of operation may be the more important factor. Likewise, while it is usually preferable to crease obliquely the lower corner portions of the inner side flaps, it may be practicable to dispense with such creases and merely bend such corners away from the main side flap without first creasing such corners, the important consideration being that the corner portions stand out from the main side flap as flexible locking devices.

Likewise, while I have described my invention as applicable to the body of the box, it is obviously equally applicable to the lid of the box and it is desired that the word "box" as used herein be understood as applicable equally to either body or lid.

What I claim is:

1. A folding box comprising side and end flaps and corner portions integrally connecting them together throughout the width thereof, each of said corner portions having alined diagonal creases and a slit connecting said creases, the inner crease reaching from said slit to the innermost corner of said corner portion.

2. A folding box comprising side and end flaps and corner portions integrally connected with said side and end flaps throughout the width thereof, each corner portion having diagonally disposed creases spaced apart in alinement and a slit connecting said creases, the inner crease reaching from said slit to the innermost corner of said corner portion, whereby said corner portion is divided into two leaves, the leaf next to the end flap having a tongue integral therewith and the slit being in the other leaf and shaped to define the edge of said tongue.

3. A folding box comprising side and end flaps and corner portions integrally connected with said side and end flaps throughout the width thereof, each corner portion having diagonally disposed creases spaced apart in alinement and an arcuate slit connecting said creases, the inner crease reaching from said slit to the innermost corner of said corner portion, whereby said corner portion is divided into two leaves, said slit being in the leaf next to the side flap and the tongue being integral with the leaf next to the end flap.

4. A folding box comprising side and end flaps and corner portions integrally connected with said side and end flaps throughout the width thereof, each corner portion having diagonally disposed creases spaced apart in alinement and an arcuate slit connecting said creases, the inner crease reaching from said slit to the innermost corner of said corner portion, whereby said corner portion is divided into two leaves with a tongue on one of them, said slit being in the leaf next to the side flap and the tongue being integral with the leaf next to the end flap, said last mentioned leaf together with its tongue being adhesively secured to said end flap.

5. A folding box comprising side and end flaps

and corner portions integrally connected with said side and end flaps throughout the width thereof, each corner portion having diagonally disposed creases spaced apart in alinement and a slit connecting said creases, the inner crease reaching from said slit to the innermost corner of said corner portion, whereby said corner portion is divided into two leaves, the leaf next to the end flap having a tongue integral therewith and the slit being in the other leaf and shaped to define the edge of said tongue, said tongue and the leaf with which it is integral being adhesively secured to the end flap.

6. A folding box comprising side and end flaps and corner portions integrally connected with said side and end flaps, each corner portion having diagonally disposed creases spaced apart in alinement and a slit connecting said creases, the inner crease reaching from said slit to the innermost corner of said corner portion, whereby said corner portion is divided into two leaves, the leaf next to the end flap having a tongue integral therewith and the slit being in the other leaf and shaped to define the edge of said tongue, said tongue and the leaf with which it is integral being adhesively secured to the end flap, said side flaps having inner side flaps integral therewith and adhesively secured to the inner faces thereof with recesses in the lower corner thereof, said end flaps having main locking flaps on said end walls and bottom locking flaps at the bottom of the main locking flaps, tabs on the ends of the main locking flaps adapted to fit in the upper portions of said recesses, and tabs on the ends of said bottom locking flaps adapted to fit in the lower portions of said recesses.

7. A folding box comprising side walls having integral flaps folded against and glued to the inner faces thereof with recesses in the lower corners thereof, end walls, diagonally creased corner portions integrally connecting said side and end walls, main locking flaps on said end walls and bottom locking flaps at the bottom of the main locking flaps, tabs on the ends of the main locking flaps adapted to fit in the upper portions of said recesses, and tabs on the ends of said bottom locking flaps adapted to fit in the lower portions of said recesses.

8. A folding box comprising side walls having integral flaps folded against and glued to the inner faces thereof with recesses in the lower corners thereof, end flaps, diagonally creased corner portions integrally connecting said side and end flaps, main locking flaps on said end flaps and bottom locking flaps at the bottom of the main locking flaps, tabs on the ends of the main locking flaps adapted to fit in the upper portions of said recesses, and tabs on the ends of said bottom locking flaps adapted to fit in the lower portions of said recesses, one leaf of each corner portion being glued to an end wall and the other leaf having a slit at the crease line forming a tongue extending from said glued leaf and itself glued to an end wall.

9. A folding box comprising double side walls, whose inner members are shorter than its outer members and fall short of the bottom of the box, double end walls whose inner members are of such length as to enter the spaces between the ends of the box and the adjacent ends of the inner side members, and an extension on the bottom of said inner end member of such length as to enter the spaces between the bottom edges of the inner side members and the bottom of the box, the bottom corners of the inner side members being bent outwardly to insure interlocking of the inner end members and their extensions with said inner side members.

10. A folding box comprising a bottom portion, side flaps and end flaps integrally connected to said bottom portion, and corner portions integrally connecting said side and end flaps throughout the width thereof, the outer edges of said corner portions being substantially continuations of the outer edges of said flaps, each corner portion having a diagonally disposed slit and alined diagonal creases extending from the ends of said slit to the edges of said corner portion.

11. A folding box comprising double side walls, whose inner members are shorter than its outer members and fall short of the bottom of the box, double end walls whose inner members are of such length as to enter the spaces between the ends of the box and the adjacent ends of the inner side members, and an extension on the bottom of said inner end member of such length as to enter the spaces between the bottom edges of the inner side members and the bottom of the box, the bottom corners of the inner side members being bent outwardly to insure interlocking the inner end members and their extensions with said inner side members, said box having corner portions whose outer edges are substantially in alinement with the outer edges of the double side and end walls and whose inner edges are integral with the outer members of said side and end walls, each corner portion having alined creases extending diagonally from the innermost and outermost corners and a slit connecting said creases.

NATHAN ROSENTHAL.

## DISCLAIMER

2,036,542.—*Nathan Rosenthal*, St. Louis County, Mo. FOLDING BOX. Patent dated April 7, 1936. Disclaimer filed February 25, 1937, by the assignee, *Rosenthal Paper Company*.

Hereby enters this disclaimer to claims 1, 2, 3, and 10 of said Letters Patent.

[*Official Gazette March 30, 1937.*]