Dec. 25, 1934. R. A. HIMES 1,985,779

PAPER BOX

Filed June 20, 1934 3 Sheets-Sheet 1

Fig. 1.

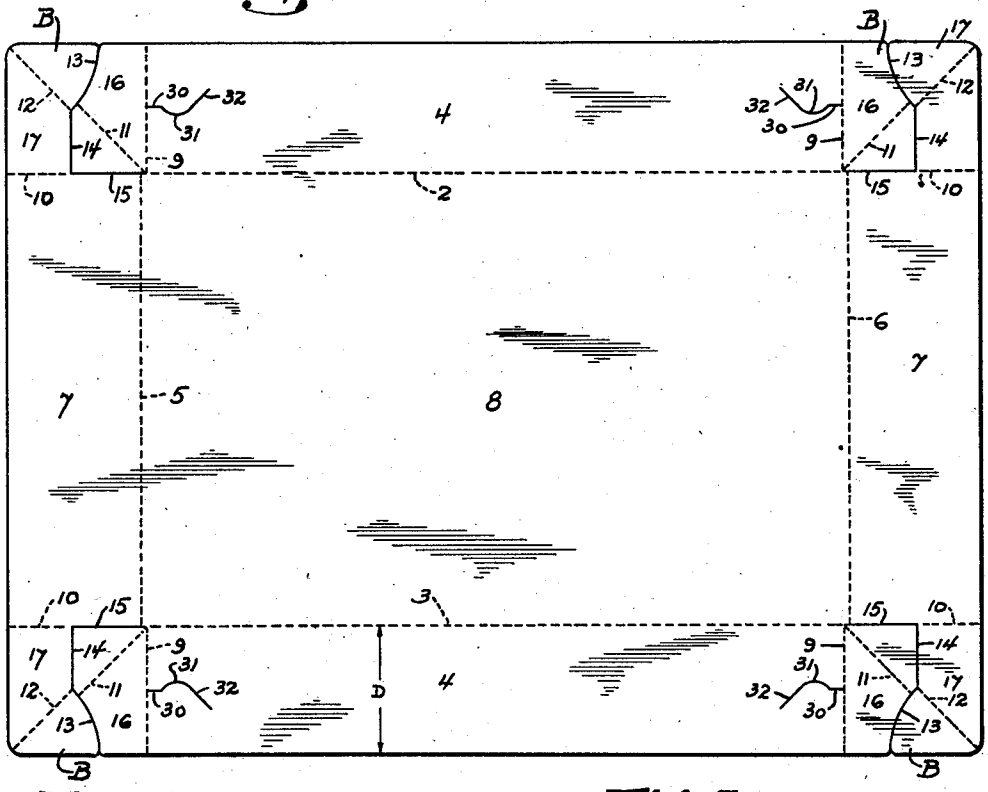



Fig. 2.

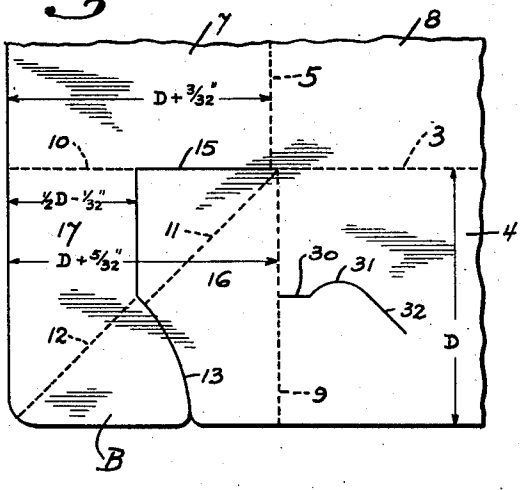
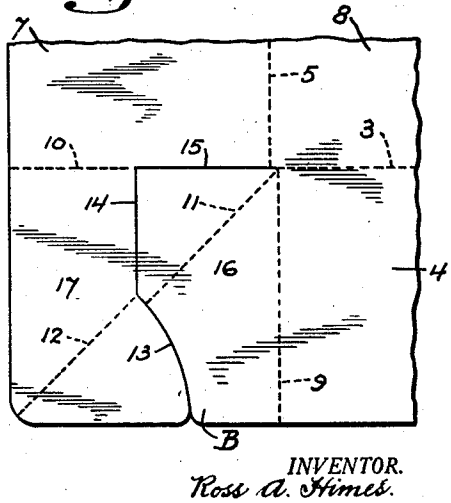



Fig. 3.

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PAPER BOX

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Fig. 4.

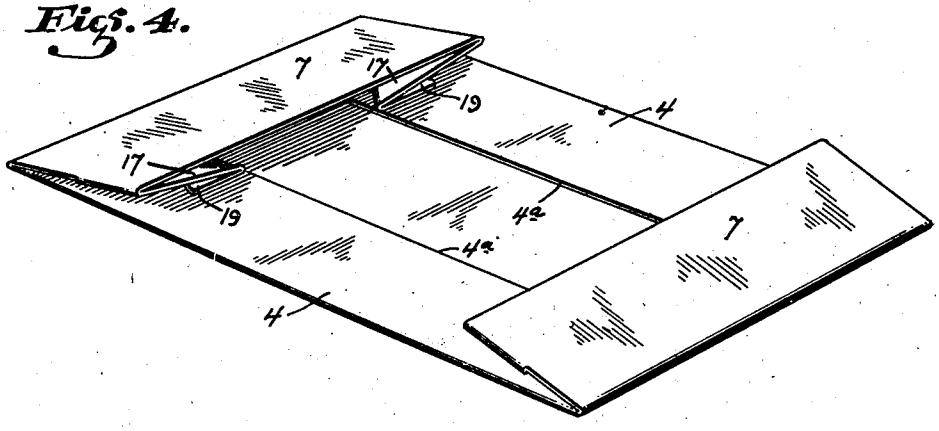


Fig. 5.

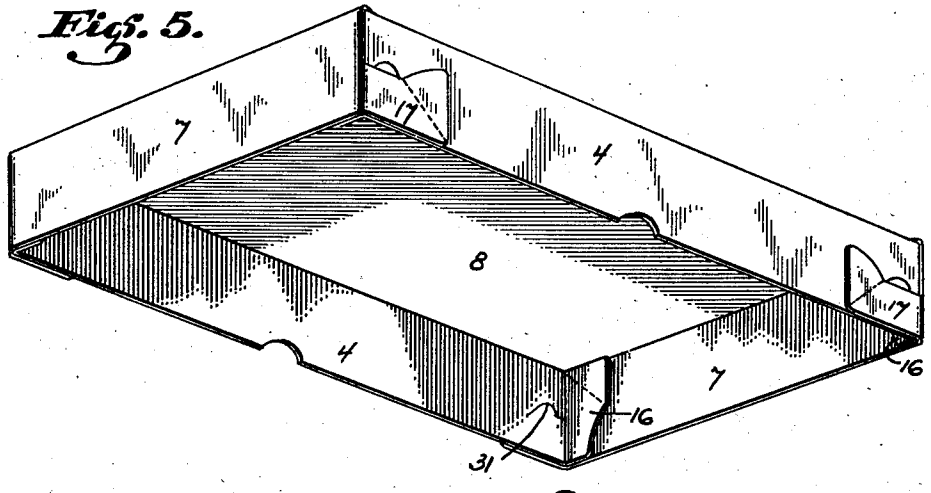


Fig. 6.

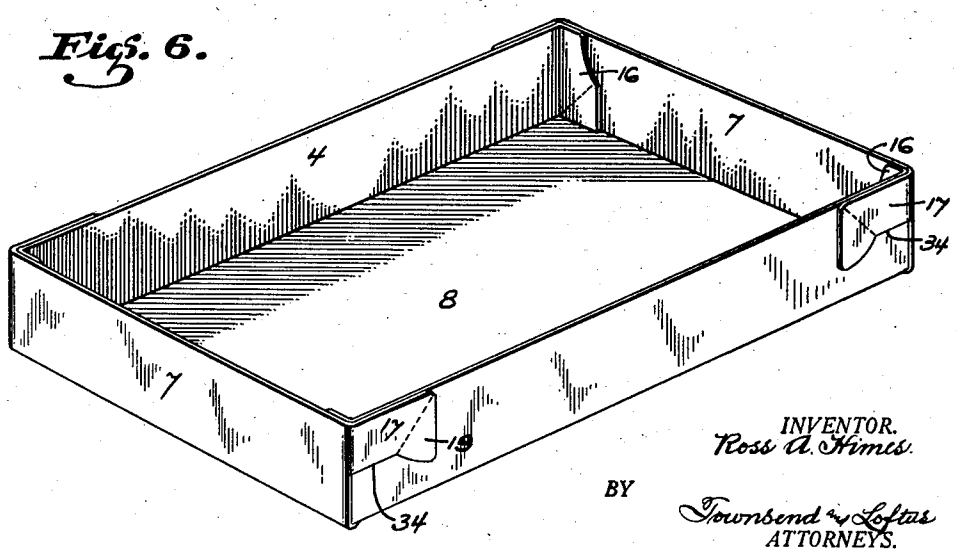


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Fig. 7.

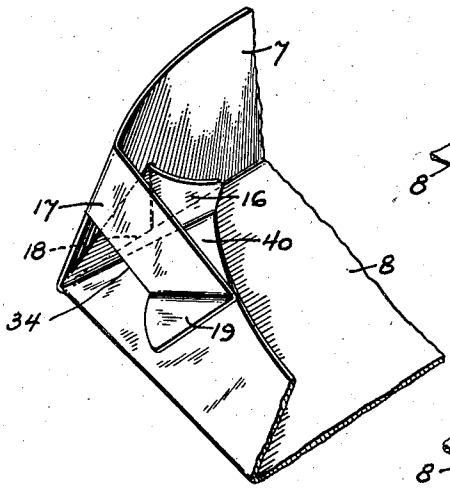



Fig. 8.

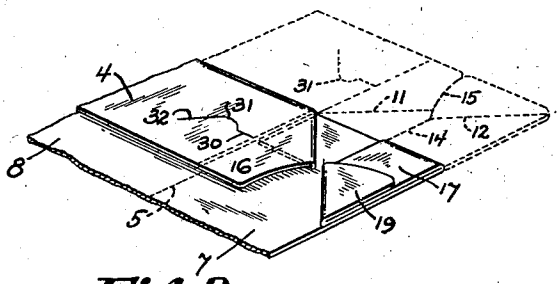



Fig. 9.

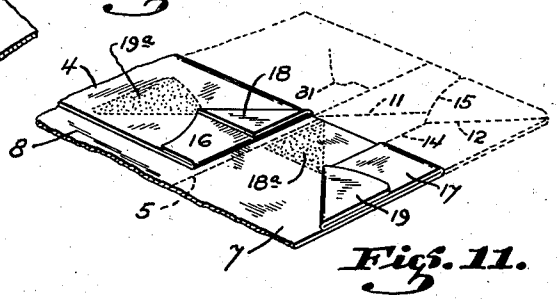



Fig. 10.

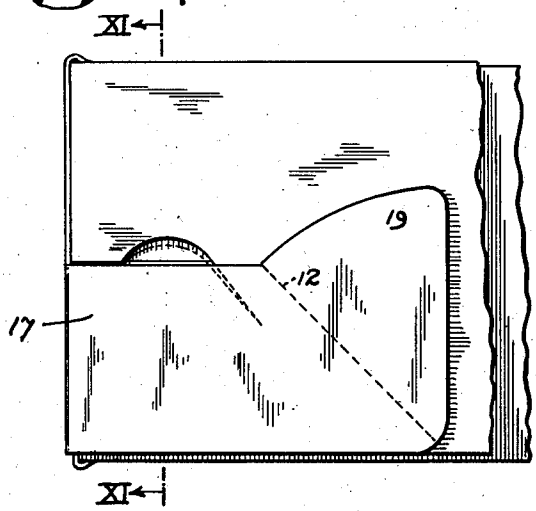
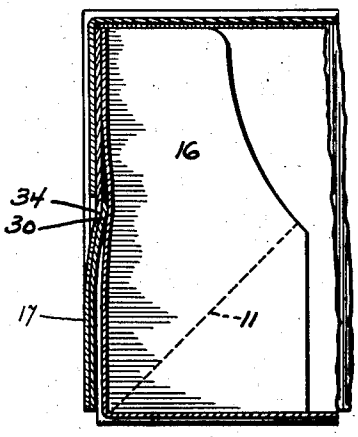



Fig. 11.

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Patented Dec. 25, 1934 1,985,779

# UNITED STATES PATENT OFFICE

1,985,779

## PAPER BOX

Ross A. Himes, Piedmont, Calif., assignor to Addison N. Himes, Oakland, Calif.

Application June 20, 1934, Serial No. 731,404

4 Claims. (Cl. 229—41)

This invention relates to paper boxes, such as used for packing suits of clothing, dresses, laundered shirts, and the like, and especially to paper boxes which may be manufactured in a flat knock-down form and which may be quickly erected when needed.

Boxes of the foldable or knock-down type have been made in several forms but have not met with any considerable commercial success as manufacture of such boxes by machinery has proven impractical. The trouble encountered has been due to the fact that allowance for the thickness of the board employed has not been considered.

Applicant has discovered that allowance for the thickness of the board employed is important, as it is only when allowance for the thickness of the board employed is taken care of in the formation of the blank that the box may be folded and creased absolutely flat without binding or cramping whatsoever, and will still be capable of being readily and quickly unfolded or erected without cramping or binding action when ready for use.

The object of the present invention is generally to improve and simplify the construction and operation of paper boxes of the character described; to provide a blank which can be cut and creased by simple die operation without removal or waste of any paper whatsoever; to provide a blank on which the score lines and cut portions are arranged to allow for the thickness of the board employed so as to permit folding to form the sides, ends and corners of the box without binding or cramping action; to provide a blank which may be readily folded and the corners secured by machine operation in folded, flat, knock-down form ready for shipment and storage; to provide a box which can be quickly erected from flat or knock-down form when needed; to provide a paper box which presents double-walled rigid corners of uniform shape; to provide a paper box the corners of which are not only strengthened by double walls but also by additional means, such as glue, stitching, etc.; to provide a paper box which may be manufactured at a minimum cost both in regard to material and labor; and further, to provide a box structure of the character described in which the cover, when applied to the box, may be interlocked with relation thereto, thereby eliminating the use of string or the like to secure the cover against removal.

The paper box is shown by way of illustration in the accompanying drawings, in which—

Fig. 1 is a plan view of the blank from which the cover is formed.

Fig. 2 is an enlarged plan view of one corner forming the cover of the box.

Fig. 3 is a view similar to Fig. 2, showing one corner of the box proper.

Fig. 4 is a perspective view showing the box in folded, flat knock-down form ready for shipment or storage.

Fig. 5 is a perspective view of the cover of the box, the cover being tilted so as to show a portion of the interior thereof.

Fig. 6 is a perspective view of the box proper, showing it in position to receive the cover.

Fig. 7 is a perspective view showing the position assumed by the side and end wall sections of the box just before they approach or reach erect position and before the corner snaps outwardly into place.

Fig. 8 is a perspective view showing one corner of the box showing one side folded against the bottom section and one end section, and also showing the flap 17 folded over its adjacent end section.

Fig. 9 is a view similar to Fig. 8, but showing the flap 16 folded over the side section, the glue flaps 18 and 19 being thereby in a position to have glue applied thereto.

Fig. 10 is an enlarged side elevation of one end of the box showing the cover applied.

Fig. 11 is a vertical cross-section taken on line XI—XI of Fig. 10, said view showing the manner in which the tongue of the cover interlocks with the flap 17 of the box.

Referring to the drawings in detail, and particularly Fig. 1, which is a plan view of the blank forming the box, it will be noted that the blank may be made of any suitable material but is preferably cut from cardboard, fiberboard, heavy paper, or the like.

The blank is cut from stock by die operation and is creased along the lines indicated at 2 and 3 to form a pair of side sections 4—4. It is also creased along the lines 5 and 6 to form a pair of end sections 7—7, and a central bottom section 8. The blank is further creased along the lines indicated at 9, 10, 11 and 12 to form foldable corner portions generally indicated at B which will hereinafter be described in more detail.

During the cutting and creasing of the blank by die operation, cuts are made in each corner as indicated by the lines 13, 14 and 15 to divide each corner section into two flaps, indicated at 16 and 17, one of said flaps being employed to cover

a portion of the exterior corner of the box and the other being folded in such a manner as to cover a portion of the interior corner portions of the box. It will be noted that the cut lines which divide each corner into two flaps are so arranged that the one indicated at 16 will adjoin the side wall section 4, while the other indicated at 17 will adjoin an end wall section 7 of the box.

It has already been stated that allowance for the thickness of the board employed in a box of the type here disclosed is an important factor, this being particularly true when the construction of the corners is considered as there will be several superimposed layers of board at each corner, both during the forming of the box and after it has been completed. For this reason let the reference character D represent the inside depth of the box and let it be assumed that D is three inches; also, let it be assumed that the thickness of the board employed is one-thirty-second of an inch. If that is the case, the end sections of the box will have a depth equal to D, plus three thirty-seconds. The corners B will be rectangular in shape, one side of the corner having a dimension the same as D and the other dimension equal to D, plus five thirty-seconds. The crease line 10 forming one of the sides of the corner B is in direct alignment with the crease line 2, but the crease line 9 forming the other side of the corner section B becomes offset with relation to the crease line 5, the dimension of said offset being equal to two thicknesses of board, or in this instance two thirty-seconds of an inch, this being plainly shown in Figs. 1, 2 and 3. The cut line 15 commences at line 9. It follows lines 2 and 10 and stops where it is intersected by the cut line 14. Line 14 is spaced from the end of the blank one thirty-second of an inch less than one-half the dimension of D. Line 14 extends at right-angles to line 15 and it terminates at the point where it is intersected by the diagonal creased line 12, which is positioned on an angle of 45° struck from the outer corner. The cut line then continues on a radius 13, also struck from the outer corner, and as such divides the rectangular-shaped corner portion B into the two flaps indicated at 16 and 17. There is a second diagonal crease line in each corner portion B and this extends outwardly from the point of intersection of lines 9 and 15 to the curve cut by line 13. It is important to note that the two diagonal lines 11 and 12 are offset with relation to each other as this offset provides a clearance between a pair of glue or securing flaps hereinafter to be described.

Inasmuch as a machine for folding and securing the side and end sections is not illustrated the manner in which it is accomplished by hand will be described. The side sections 4, including the corners B, are first folded along the crease lines 2, 3 and 10 to lie flat against the bottom section 8 and the end sections 7 as shown in Fig. 8. The flap sections 16 formed by the cut lines 13, 14 and 15 are then folded along the crease line 9 over the ends of the side sections 4 to lie on top thereof and the outermost corners of the flaps 16 and 17 are folded on the diagonal creased lines 11 and 12 so as to form securing flaps such as shown at 18 and 19 in Fig. 9. It can thus be seen that the flap portions 16 are cut so as to form an integral part of side sections 4. The second cut portion or flap 17 of each corner member B, as already stated, is cut so as to be formed integral with the end section 7. The two flaps formed by the cutting of the corner sections being employed for the purpose of reinforcing and securing the corners of the box when the flaps have been folded, as shown in Fig. 9, to form the glue tabs 18 and 19. An adhesive, such as glue or the like, is applied to the upper surfaces of these tabs, the end sections 7 are then folded on the crease lines 5 to lay on top of the side sections 4—4, which have already been folded against the bottom section 8 and when the end sections are folded over them the glue tabs 18 will adhere to the inner surface of the end sections at the point indicated by the stippling at 18*a*, while the glued surface of the tabs 19 will adhere to the exterior surface of the side sections at the point indicated by the stippled area 19*a*. The flaps when so secured first function to secure the side and end walls of the box with relation to each other and their second function is that of forming a foldable or hinge connection between the side and end sections of the box which permits collapsing or folding of the wall sections to a flat form or extension from a flat form to erect position as conditions may demand.

The importance of allowing for the thickness of the board should be apparent. For instance, when the folding of the side sections 4, together with the flaps 16 and 18 is accomplished, there will be three thicknesses of board laying on top of the bottom section 8, hence when the end sections 7 are to be folded over the side sections and the flaps 16 and 18 lying on top thereof the crease line 5 must be offset as previously described to allow for this thickness of material. Hence, the reason for such offset. In order that there shall be no further superimposition of the board material employed it should be noted that the crease lines 11 and 12 are offset, see particularly Figs. 2 and 3, as this allows the flaps 16 and 17, together with their respective glue flaps 18 and 19 to clear each other when the end sections are folded over the side sections. This clearance can be clearly seen in Figs. 7, 8 and 9, as it should be apparent when looking at Fig. 7 that when the end section 7 is folded down against the side section and the bottom section upon which it rests the flaps 16 and 18 will fold into the space indicated at 40, thus lying inside of the glue tab 19 and thereby preventing further superimposition of material.

When the glue has been applied to the flaps 18 and 19 and the end sections have been folded over and pressure applied, the box will be completed and it will assume the flat form shown in Fig. 4, which is known as a flat knock-down form and in this form it is ready for shipment or storage. When the boxes have reached the consumers and are needed they are removed from the shelves or other place of storage, one by one, and to erect the box it is only necessary to grasp the side sections 4—4 at the points indicated at 4*a*, see Fig. 4, and to raise them upwardly. In so doing, the side sections raise the end sections 7—7 and as both the side and end sections approach an erect position the corners will automatically snap outwardly and become fully extended. When so extended, it will be noted that double wall corners are presented, said corners being formed by the flaps 16 and 17, which have been cut from the corner sections, the flaps being cut in such a way that the portion 16 will be formed integral with the ends of the sides of the box and the portion 17 will be formed integral with the sections 7 forming

the ends of the box. The portions 17 will lie exterior of the sides of the box, as clearly shown in Fig. 6, while the portion 16 will lie interior of the box as clearly shown in Figs. 5 and 6. The portions 16 thus reinforce the end of the box and the portion 17 the sides of the box.

The operation of erecting the box is almost instantaneous as it is accomplished as quickly as a person can raise the side sections from a flat folded position to an erect position. The blank shown in Fig. 1 is of rectangular form. It can be cut with the simplest type of dies without any waste of material as no portion of the paper stock is cut away. The crease lines may, of course, be formed in the same operation. By cutting and creasing the blank in this manner it is possible to fold and secure the ends with relation to each other and it is possible to accomplish this while the sides and ends assume a flat position, as shown in Fig. 4, thus permitting machine manufacture and discharge of the boxes from the machine in a flat knock-down form ready for shipment or storage. The box produced has great rigidity and strength and the box will be uniform in shape. Both dies and machinery of simple form may be employed in the manufacture of the box and as there is no paper waste whatsoever the box may be manufactured with a minimum of cost both as regards material and labor.

In paper boxes of the type here disclosed a cover when applied is usually secured by string, cord, tape, or the like. This involves extra cost, requires time, and is not always satisfactory as the string or other tying means employed may break when the box is being carried. The box structure here shown is provided with means whereby the cover is quickly and readily interlocked with relation to the box, thereby eliminating string or like tying means. The interlocking means is best shown in Figs. 1, 2, 5, 10 and 11. It is formed by cutting opposite ends of each side section as indicated by the lines 30, 31 and 32, see Fig. 2. The curved line 31 forming a tab or tongue and the lines 30 and 32 are merely extensions thereof to permit free bending or flexing of the tongue when an interlock is to be made. The tongues interlock with the free or unglued portions of the exterior flaps 17 of the box and it is, therefore, important that the tongues assume a position approximately half way between the ends of the box and the glue flap 19 and it is also important that the base of the tongue align with the lower edges 34 of the flap 17. In actual operation when a cover has been placed on the box it is only necessary for the packer or wrapper to place his or her thumb on one or more of the tongues and press them inwardly. In so doing the tongues are snapped under the lower edge 34 of the flaps 17 and an interlock is thus formed, as shown in Fig. 11, which prevents the cover from being lifted off the box, it being understood that the same operation is performed at all corners, as there are four tongues and four flaps 17. The interlock is positive and will remain so until purposely released. This is accomplished by inserting the hand between the side sections of the cover and the box and spreading them a sufficient distance to separate the tongues and flaps, hence permitting quick release of the cover when desired.

It should be noted that the tongues are entirely exterior of the inner surface of the box as they are introduced between the flaps 17 and the exterior surface of the sides of the box. This is important as projections on the interior of the box are thus avoided, removal of the contents can be assured without catching or being otherwise hung up on tongues, flaps or like projections on the interior.

While the drawings show a box of rectangular form it may obviously be made square. In describing the box, a box which is three inches deep and which is constructed of material one thirty-second of an inch thick has been specified, obviously heavier or lighter material may be employed and the depth, width, length of the box may be varied within reason, and while other features of the present invention are more or less specifically described, I wish it understood that various changes may be resorted to within the scope of the appended claims. Similarly, that the materials and finish of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. A blank for paper boxes comprising a cardboard having creased lines extending longitudinally and transversely thereof to form a bottom section, a pair of sides, a pair of ends, and four corner sections, the crease lines running longitudinally of the blank and parallel to the sides being placed at a point which determines the depth of the box and the crease lines running transversely and parallel to the ends being placed at a point equal to the depth of the box, plus approximately three thicknesses of the board employed, said transverse crease lines crossing the longitudinally extending crease lines and being offset at the point of crossing to give the corner sections a rectangular shape, the length of the rectangle being equal to the depth of the box plus approximately five thicknesses of the board employed and a cut dividing each corner section into two flaps leaving one flap integral with an adjacent side of the box and the other flap integral with an adjacent end of the box.

2. A blank for paper boxes comprising a cardboard having creased lines extending longitudinally and transversely thereof to form a bottom section, a pair of sides, a pair of ends, and four corner sections, the crease lines running longitudinally of the blank and parallel to the sides being placed at a point which determines the depth of the box and the crease lines running transversely and parallel to the ends being placed at a point equal to the depth of the box, plus three thicknesses of the board employed, said transverse crease lines crossing the longitudinally extending crease lines and being offset at the point of crossing to give the corner sections a rectangular shape, the length of the rectangle being equal to the depth of the box, plus five thicknesses of the board employed, a cut dividing each corner section into two flaps, leaving one flap integral with an adjacent side of the box and the other flap integral with an adjacent end of the box, and a diagonally disposed crease line on each flap, the crease line on the flap attached to the end of the box extending from the outer corner of the flap across the flap on an angle of substantially 45° and the crease line on the other flap extending across said flap from the inner corner and on an angle of approximately 45°.

3. A paper box comprising a cardboard blank, said blank having crease lines extending longi-

tudinally and transversely thereof to form a bottom section, a pair of sides, a pair of ends and four corner sections, the crease lines running longitudinally of the blank and parallel to the sides being placed at a point which determines the depth of the box and the crease lines running transversely thereof and parallel to the ends being placed at a point equal to the depth of the box plus three thicknesses of the board employed, said transverse crease lines crossing the longitudinally extending crease lines and being offset at the point of crossing to give the corner sections a rectangular shape, the length of the rectangle being equal to the depth of the box, plus five thicknesses of the board employed, a cut dividing each corner into two flaps leaving one flap integral with an adjacent side of the box and the other flap with an adjacent end of the box, said side and end sections adapted to be folded on their crease lines to assume a vertical position so that the flaps forming an integral part of the end sections can be folded to lie exterior of the side sections and the flaps formed integral with the ends of the side sections may be folded to lie interior of the end sections, and means for securing the outer ends of the flaps to the respective exterior and interior surfaces of the side and end sections of the box.

4. In a box of the character described having a cover adapted to telescope over the same, a pair of flaps carried by each end of the box, said flaps being folded to lie exterior of the sides of the box and having their outer ends secured to the sides of the box, the intermediate portions of said flaps being free with relation to the sides of the box and a plurality of flexible tongues cut in the sides of the cover section, one for each flap, said tongues being bendable to snap in under the free portions of the flaps and to form an interlock to secure the cover against removal.

ROSS A. HIMES.