No. 715,026. Patented Dec. 2, 1902.

G. O. CRAWFORD.

COLLAPSIBLE BOX.

(Application filed June 11, 1901.)

(No Model.)

Fig. 1.

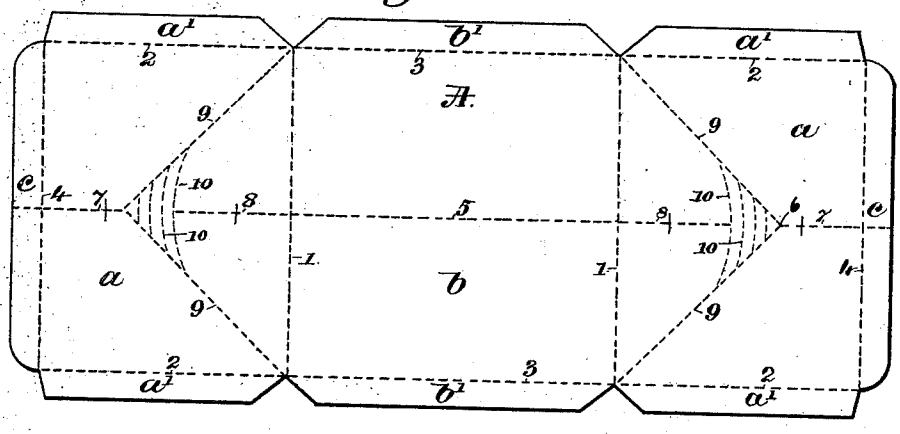
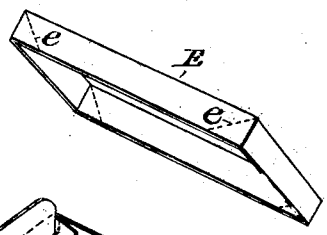


Fig. 2.



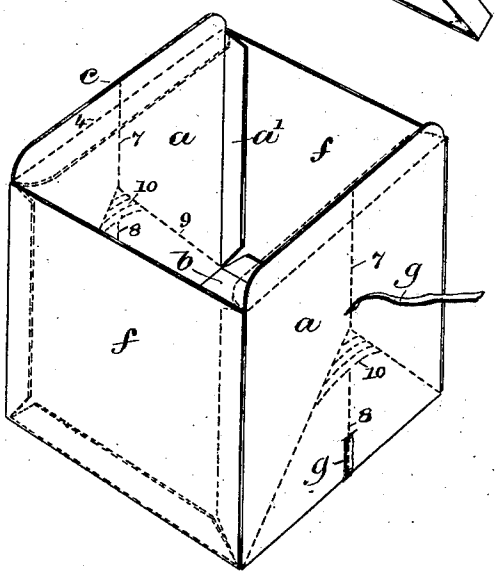
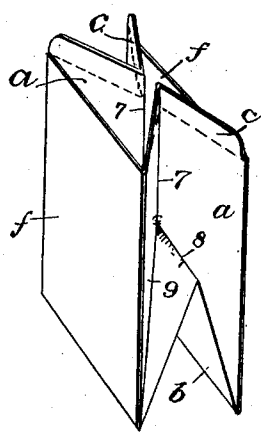


Fig. 3.



Witnesses.
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COLLAPSIBLE BOX.

SPECIFICATION forming part of Letters Patent No. 715,026, dated December 2, 1902.

Application filed June 11, 1901. Serial No. 64,194. (No model.)

To all whom it may concern:

Be it known that I, GEORGE O. CRAWFORD, a citizen of the United States, residing at South Weymouth, in the county of Norfolk, State of Massachusetts, have invented an Improvement in Collapsible Boxes, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

My invention has for its object to provide a novel collapsible box.

Prior to my invention what are known as "knockdown" boxes have been largely used, they being provided with overlapping bottom or side members with tongues and slots by which the overlapping portions have been made to engage with each other for supporting the box in proper shape for its intended use. Boxes of this type are objectionable, mainly because the overlapping members can never form a perfectly-tight box or closure and also because the tongues are apt to be torn off and the slots torn out, rendering the boxes useless or substantially so. They are further objectionable in that it requires considerable care, accompanied with much annoyance, in putting the boxes into condition for use when required.

The aim of my present invention is to provide a box that is completely made up in the first instance and substantially tight or is as nearly so as any ordinary box and that is collapsed after it is made or after it is put together in condition for use and which when desired for use is merely extended or restored to its box-like condition, its several sides or members taking their proper positions one relative to another and each to all without any considerable work on the part of the user or injury to the material of which it is made.

The nature of my invention will be best understood after a description of one or more of the best embodiments thereof now known to me.

In the drawings, Figure 1 in plan view shows a blank employed in carrying out one form of my invention. Fig. 2 in perspective shows the blank in made-up form, said figure showing the box complete and ready for use, one form of cover being shown also in connection with this figure; and Fig. 3 in perspective shows the box, Fig. 2, collapsed, the folds being left somewhat open for the sake of clearness.

Referring to Fig. 1, the blank A is essentially rectangular in outline and is scored or otherwise formed or manipulated to present cross-lines of weakness at 1 1, about which the end sections *a a* may be turned upward relative to the middle section *b* in the formation of the box. The edges of the blank A are formed, as shown, to present the flange portions or flaps *a' a' b' b'*, the blank being scored or otherwise formed to produce lines of weakness 2 2 and 3 3 between these flange or flap portions and the main portions of their respective sections. The end sections *a a* also have formed upon them what I have designated as "reinforcing" or "stiffening" flanges or flaps *c c*, with lines of weakness 4 4 between them and their respective sections formed by scoring or otherwise. These lines of weakness are formed merely to facilitate a natural and accurate folding along the desired lines, and the term as here used is intended to cover any construction or manipulation of the blank along these respective lines for this purpose, however they may be formed. The middle section *b* of the blank is provided with a middle folding-line 5, formed by scoring or otherwise to enable the said section to fold inwardly or upwardly, as will be described. By the term "middle" as here used I refer to a line that falls somewhere between the outer edges of the section, though preferably at or near the actual middle line of the section. Each of the end sections *a a* is shown provided with a series of lines of weakness or folding-lines radiating from a common center or point 6, which I call a "middle" point, located somewhere within the area of the section and preferably at or near the actual middle point of the section. These radiating folding-lines are designated 7 8 and 9 9. The folding-lines 7 and 8 are preferably substantially continuations of the folding-line 5 of the middle section *b*, although the end sections are intended to fold in opposite directions about the said lines 7 and 8, as will be hereinafter described, and

the lines 9 9 radiate from the middle point 6 to the inner corners of the end sections adjacent the middle section *b* and are intended to permit their respective sections to fold inwardly along the said lines 9 9, as will be described. One or more distributing or sweep lines of weakness or scores 10 10 are arranged in the vicinity of the middle points or center 6 6 of the end sections within or adjacent those areas or portions of the said end sections where a part thereof must fold in one direction and a part in an opposite direction to facilitate such opposite folding, as will be described, and to prevent the rupturing of the material.

In making up the box the flanges *a' b'* are turned upwardly at right angles to the sections *a* and *b* and the end sections *a a* turned upwardly on the middle section *b*, forming three sides of the complete box, and separate side sections *f f* are then secured to the inturned flanges *a' b'* by glue or otherwise, as clearly shown in Fig. 2. The stiffening or reinforcing flanges *c c* preferably are not turned inwardly or upwardly when the box is first made, but are permitted to remain in their natural extended positions as long as the box remains in collapsed condition or until it is needed for intended use, when they are bent into position, as will be described. The box being now made up initially in its intended form, it is desired to collapse the same for transportation and for storage until it is needed for actual intended use. This is done by taking the box in the hands by its ends *a a*, and by placing the fingers on the bottom, which is the middle section *b* of the blank A, said bottom is collapsed or folded inwardly along the folding-line 5, and at the same time by pressure of the thumbs upon the ends of the box, that are the end sections *a a* of the blank A, said ends are pressed or collapsed inwardly to cause the box to collapse in the form shown in Fig. 3. In this figure it will be noticed that the ends *a a* collapse inwardly along the lines 7, 9, and 9, Fig. 1, but that along the line 8, Fig. 1, said ends collapse toward the outer side of the box or outwardly or upwardly and over and around the fold in the bottom of the box. When collapsed as in Fig. 3, the box may be flattened down like an accordion to substantially the thickness of the several parts in their folding conditions that make up the box, and in this collapsed condition very many of these boxes may be compactly stored under a counter or elsewhere, as desired, until required for use. When required for use, the box is easily restored to its original condition by opening up the folds somewhat, as in Fig. 3, and separating the sides and pressing down the bottom until the parts assume their original condition, Fig. 2. The box being now required for use, it is desirable to stiffen the end sections *a a* against collapse, owing to the presence of the folding-lines 7, 8, and 9 therein. For this purpose the operator who makes up the box will fold inwardly the reinforcing and stiffening flanges *c c*, as shown in dotted lines, Fig. 2, so as to bring the said flanges into positions substantially perpendicular to the ends *a a*, in which positions they effectually prevent any inward or outward collapse of the ends *a a*, they resisting any such tendency edgewise or in the direction where they have no flexibility whatever. The stiffening-flanges *c c* normally lie flat with the end walls to which they are attached when the box is collapsed, thus avoiding the extra thickness which would result were the said flanges permanently turned back upon and against the said ends. When, however, the box is opened up for use and these flanges are turned down into horizontal positions, so that they resist edgewise any tendency of their connected end walls to collapse, the tendency of said flanges is to spring upward into the same plane with their connected end walls, this being due to the resiliency of the material of which the box is composed; but this tendency is resisted by the cover of the box when placed upon the latter, which acts to press down the said flanges into their horizontal edgewise stiffening positions. Thus there are provided stiffening-flanges which are folded with and as extensions of the walls which they subsequently stiffen and which are prevented from moving from their edgewise stiffening positions when the box is in use by the cover applied to the box.

Any desired cover may be used, preferably collapsible or knockdown, in any suitable form—such, for instance, as indicated in Fig. 2, where the cover E has two of its opposite edges or flanges scored or otherwise formed for folding at *e e*, whereby the flanges of the cover may be collapsed and the cover flattened out after the general manner described with reference to the box.

In collapsing the box in the first instance and in restoring it for use in the second instance I find the distributing or sweep lines 10 10 in the ends *a a* of the box of material assistance in enabling the stiff board of which these boxes are usually made to shape or adapt itself from the outward or upward fold along 8 8 to the inward fold along 7 7 and the diagonal folds 9 9. Without some such means as this to permit gradual adaptation of the stock within the areas where the opposite folds make themselves felt I find by experience that the folded stock is apt to rupture in making up the collapse.

A string, tape, or cord *g* may be strung into or around the box, as shown in Fig. 2, for use in securing the cover in place where such means are required—as, for instance, in millinery and the like.

My invention is not limited to the particular sizes, shapes, or details of construction here shown.

I claim—

1. A collapsible box having a bottom con-

structed to fold along a median line and adjacent end walls that collapse about vertical lines, said end walls having their top edges provided with flange extensions that normally lie flat with said ends and fold with the latter as extensions thereof, said flange extensions when the box is made up or extended having the capacity to be turned inward and horizontally, whereby they act edgewise to resist collapse of their connected end walls, and a cover for said box, the same acting to prevent said stiffening-flanges rising from their edgewise stiffening positions when the box is in use.

2. The within-described collapsible box, the same having a wall that folds inwardly along a middle line and adjacent walls that fold each a part in one direction and a part in another direction, with one or more distributing or sweep lines of weakness each adjacent the meeting areas of said opposite folds.

3. A collapsible box, one or more of the walls of which collapse in different directions about divergent lines, and provided with distributing-lines to control the stock in folding in said different directions.

4. The within-described rectangular blank for collapsible box, the same comprising three sections each of the full width of the blank and separated by folding-lines, the middle section having a longitudinal, middle folding-line, and the end sections having not only longitudinal, middle folding-lines, but also diagonal folding-lines leading from middle points of said ends to the inner corners thereof and distributing or sweep lines of weakness in the apex between said diagonal folding-lines.

5. The within-described blank for collapsible box, the same comprising three sections in line with one another and separated by folding-lines, the middle section having a longitudinal, middle folding-line, and the end sections having not only longitudinal, middle folding-lines, but also diagonal folding-lines leading from middle points of said ends to the inner corners thereof and sweep or curved lines of weakness in the apex between said diagonal folding-lines.

6. As a new article of manufacture, a collapsible box having one or more walls adapted to be folded in opposite directions on intersecting lines and distributing or sweep lines of weakness adjacent to the meeting point of said lines.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE O. CRAWFORD.

Witnesses:

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A. O. CRAWFORD.