

March 6, 1951

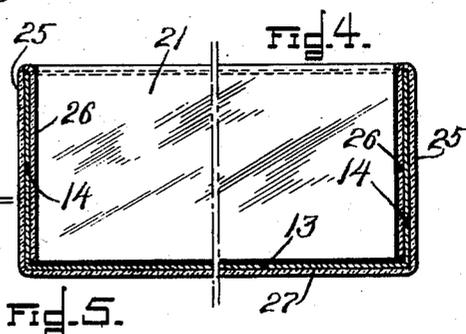
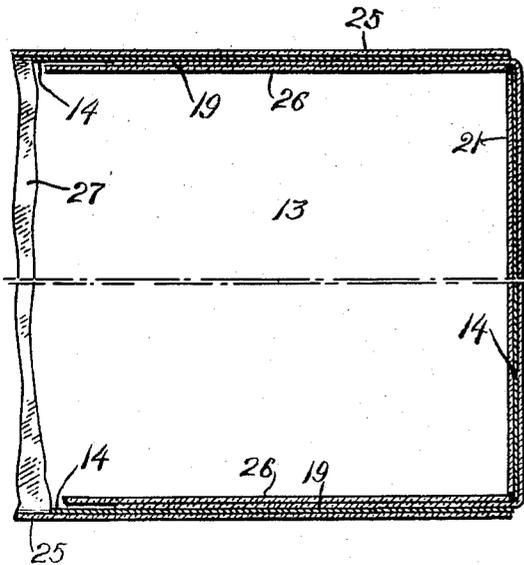
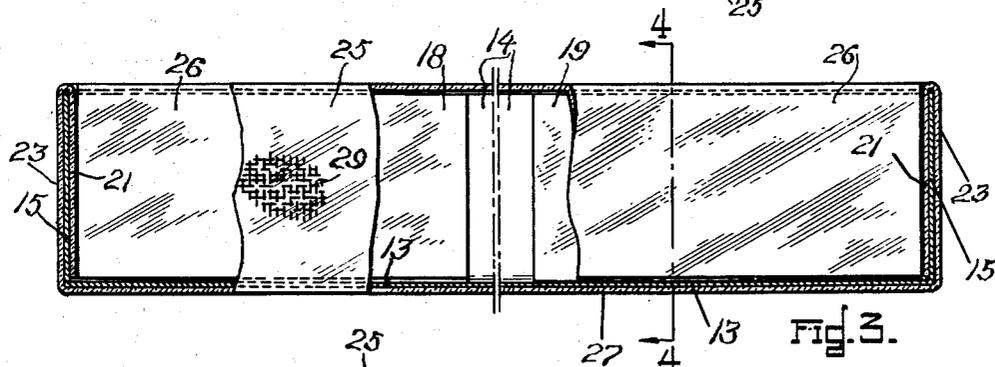
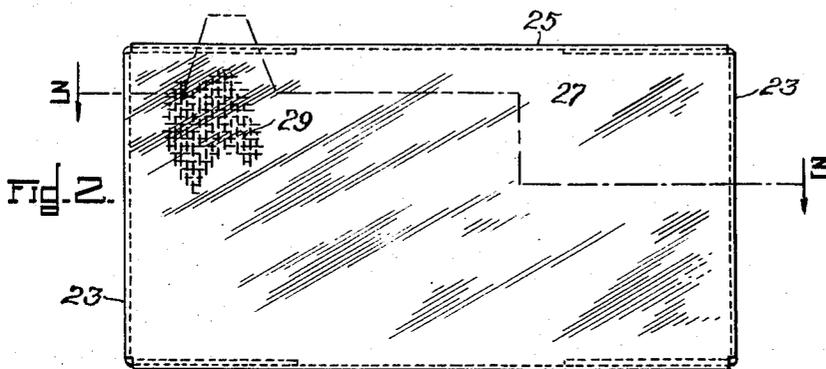
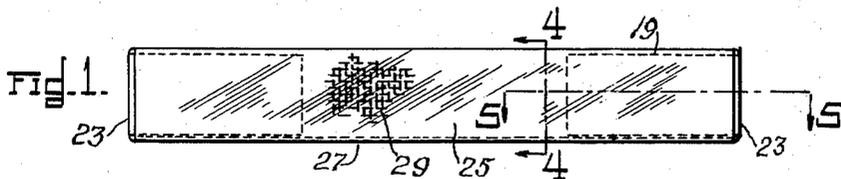
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2,544,101

BOX

Filed July 24, 1946

2 Sheets-Sheet 1



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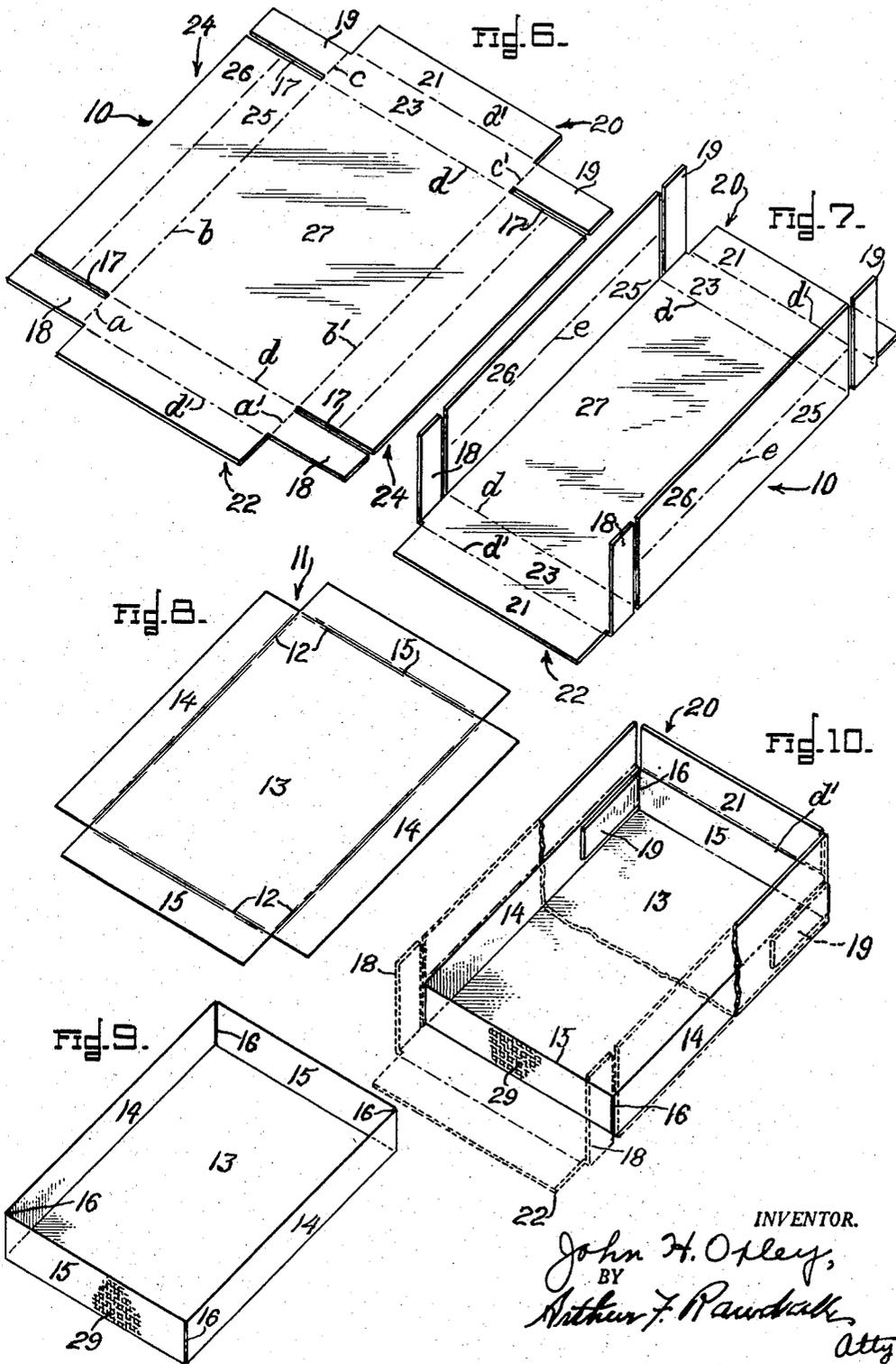
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2,544,101

BOX

Filed July 24, 1946

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,544,101

BOX

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Application July 24, 1946, Serial No. 685,813

1 Claim. (Cl. 229-23)

1

This invention relates to boxes such as are produced from thermoplastic sheet material and the object of the invention is to provide an attractive, inexpensive and durable lined box of improved construction.

My improved box comprises an outer box-like element formed from a single blank of thin flat transparent synthetic thermoplastic sheet material which, in its normal condition, is rigid under edgewise stresses but which may be laterally flexible and resilient to a limited extent. This blank is preferably heat treated as described in my co-pending application filed December 29, 1945, Serial Number 637,941, now abandoned, to produce therein temporarily malleable fold-defining streaks or veins on which it is bent or folded sharply into the form of a box element having a flat middle panel or wall bordered throughout its perimeter by relatively perpendicular two-ply side walls which are coupled together at the corners of the box by in-folded tangs that are integral parts of said blank and each of which is incorporated within one of the side walls between the plies thereof.

It is also a feature of this invention that an inner lining element of sheet material, preferably paper, is closely fitted within the outer transparent element, said lining element being made with perpendicular side walls bordering a flat middle panel and fixedly held within the two-ply side walls of said outer transparent element between the plies thereof.

Another feature of the invention consists in so constructing and associating the parts of the box that the inner lining element is fixedly held in position within the outer transparent element by the inner plies of the side walls of the latter without the use of cement.

A further feature of the invention consists in making the lining element from sheet material, preferably paper, having one face thereof at least, ornate either in color or design and exposed to view through the transparent outer element.

Other features of the invention are hereinafter pointed out.

In the accompanying drawings:

Figure 1 is a side elevation of a box, or box section, constructed in accordance with this invention.

Figure 2 is a bottom plan view of the box, or box section shown in Fig. 1.

Figure 3 is an enlarged section on line 3-3 of Fig. 2.

Figure 4 is a section on line 4-4 of Fig. 3.

2

Figure 5 is an enlarged section on line 5-5 of Fig. 1.

Figure 6 is a perspective view of the blank of transparent synthetic sheet material from which the outer element of my improved box, or box section, is produced.

Figure 7 is a perspective view of the blank of Fig. 6 after two oppositely disposed side walls thereof have been partially formed.

Figure 8 is a perspective view of the blank from which the paper lining element is formed.

Figure 9 is a perspective view of the lining element of Fig. 8 after being folded or bent into its final shape.

Figure 10 is a perspective view of a partially formed portion of the outer transparent element showing the position of the lining element therein preparatory to completion of said outer element.

The box, or box-section, shown in Figs. 1 and 2 comprises but two elements, viz., an outer box-like element formed from a single blank 10 (Fig. 6) of thin transparent synthetic thermoplastic sheet material which, under its normal condition, is rigid under edgewise stresses but which may be laterally flexible and resilient to a limited extent, and an inner lining element of any suitable sheet material, preferably paper, which is formed from a single blank 11 (Fig. 8) into the box shape shown in Fig. 9 and closely fitted within the outer transparent element that is formed from the blank 10.

The blank 10 may be produced from any suitable transparent synthetic sheet material such as "Lucite," "Vinylite," "Acetate" and the like which is normally rigid as described but which is rendered pliant and malleable through the application of heat. In practice I have used such materials having a thickness of about .015 of an inch.

The lining blank 11 may be produced from any suitable sheet material, preferably opaque paper, so as to conceal the contents of the box, and in practice I have used such material of various colors having a thickness in the neighborhood of .004 of an inch and including foil paper, colored paper, embossed paper, white paper, etc., which give to the finished box a distinctive ornate appearance since the lining element is exposed to view through the transparent outer element while the latter imparts an attractive glossy or polished appearance to the structure.

The lining blank 11 (Fig. 8) is formed with four bend-defining creases 12 surrounding a rectangular middle or body panel 13 that is thus

provided with two pairs of oppositely disposed marginal side wall panels 14, 14 and 15, 15. All of the side wall panels 14 and 15 are bent on the creases 12 into positions where they are perpendicular to the middle or body panel 13 as shown in Fig. 9 preparatory to incorporating the lining within the outer transparent element of the box. Thus an open slit 16 (Fig. 9) is provided at each corner of the lining element in its final form which is utilized as presently to be described.

In fabricating the outer transparent element of synthetic sheet material I preferably employ mechanism similar to that shown and described in my above noted co-pending application which mechanism is characterized by the employment of a thin straight heated metallic blade that is applied intermittently to the blank as the shaping thereof proceeds, thereby to produce in said blank pliant and malleable veins or streaks on which it is sharply bent or folded into its final shape on the broken lines indicated in Figs. 6 and 7, said lines merely indicating the places of application of said blade as determined by certain gauges incorporated in the mechanism referred to above.

The blank 10 (Fig. 6) for the outer transparent element of the box is characterized by the provision of a plurality of marginal slits 17, one adjacent to each corner of the blank, which provide two pairs of relatively parallel marginal coupling tangs 18, 18 and 19, 19.

To convert the blank of Fig. 6 and the lining element of Fig. 9 into the lined box of Figs. 1 to 5, inclusive, the procedure is as follows: The heated blade referred to above is first applied edgewise to blank 10 in register with the broken line *a-b-c* to produce in the blank a malleable or pliable bend-defining streak or vein which permits the adjacent outer side flap of the blank, including the tangs 18 and 19 at that side of the blank, to be bent into positions at right angles to the middle portion of the blank, whereupon the blank is permitted to cool and set in that condition.

Then the heated blade is applied edgewise to blank 10 in register with the broken line *a'-b'-c'* to produce in the blank a malleable or pliable bend-defining streak or vein which permits the proximate outer flap of the blank, including the tangs 18 and 19 at that side of the blank, to be bent into positions at right angles to the middle panel 27 of the blank, whereupon the said streak or vein is permitted to cool and set in that condition.

Then the heated blade is applied edgewise to blank 10 in register with the broken line *d* at one end of the blank to produce in the blank a malleable and pliable bend-defining streak or vein on which a third marginal flap 20 of the blank with which the tangs 19 connect, is bent into a position at right angles to the middle panel 27 of the blank (Fig. 10), whereupon the said streak or vein is permitted to cool and set in that condition with the tangs 19 inside of the two previously bent side portions.

The lining element of Fig. 9 is now slid into position within the three perpendicular side flaps of the blank (Fig. 10) as the tangs 19 are manually guided into two of the corner slits 16 of the lining element after which the heated blade is imposed upon the blank in register with the broken line *d'* of flaps 20 to produce in the blank a malleable fold-defining streak or vein at that place, whereupon the marginal extension flap 21 of this flap 20 of the blank is folded inwardly over the top of the proximate wall 15 of the

lining element and then downwardly into position against the inner face of said lining wall as shown in Figs. 3 and 10.

The opposite side wall of the box is similarly constructed from the flap 22 of blank 10, the heated blade being applied to said blank first in register with the broken line *d* and then in register with the broken line *d'* and the tangs 18 of said flap 22 being directed into the proximate slits 16 (Fig. 9) of the lining element as the flap 22 is bent into its perpendicular position so that at this time all four tangs are disposed immediately inside of the side walls 14, 14 of the lining element. It will thus be seen that each of these two oppositely disposed side walls comprises three plies including an outer panel ply 23 (Fig. 3), the flap 15 of the lining element, and the reentrant inturned extension flap 21 that is integral with the outer panel 23.

Continuing the fabrication of the box, the heated blade is now applied to first one and then the other of the two oppositely disposed marginal flaps 24 (Fig. 6) of blank 10 in register with the broken line *e* to produce a malleable fold-defining streak or vein coincident therewith on which a marginal extension flap 26 (Fig. 7) of said flap 24 is folded inwardly over the top of the proximate side wall 14 (Fig. 10) of lining element 11 and downwardly into position against the inner face of said wall and against the tangs 18 and 19. After treating the oppositely disposed marginal flap 24 in the same manner the box is complete. Each side wall thus produced from one of the marginal flaps 24 of blank 10 comprises three plies (Figs. 4 and 5) including an outer transparent panel 25, the intermediate side wall 14 of the lining element and the inturned reentrant flap extension 26, while the bottom of the box is made up of two plies including the middle panel 13 of the lining element and the middle panel 27 of the outer transparent element.

The outer side of the lining element may be rendered ornate in any suitable manner as by embossing the material from which it is made, by coloring or otherwise. In Figs. 1, 2, 3, 9 and 10 I have indicated at 29 that the lining element is of golden color as seen through the transparent outer element. Also, printing may be imposed upon the outer side of the lining element where it is clearly exposed to view through the transparent outer element and, incidentally, it is much less expensive to print upon the paper lining element than it is to print upon the outer element of synthetic sheet material.

The above described box is of very substantial and attractive construction and appearance and may be utilized alone as a box, or it may be telescopically associated with another section preferably constructed in the same manner, the dimensions of said other section being either slightly smaller or slightly greater than the dimensions of the box section above described.

As shown particularly in Figs. 3 and 4 of the drawings the tangs 18 and 19 are of approximately the same width vertically as the height of the space between the outer and inner panels 21 and 23 and 25 and 26 so that they cannot be displaced edgewise in any direction and all four walls of the box are locked together against relative displacement.

What I claim is:

A box comprising an outer element made from thin flat transparent synthetic thermoplastic sheet material and comprising a one-ply bottom

5

wall panel bordered throughout its perimeter by relatively perpendicular two-ply side walls; means coupling together the ends of said side walls at each corner of the box, and an inner ornate opaque lining element of paper closely fitted within and throughout the interior of said outer element so that it is exposed to view through the latter, said inner lining element comprising a flat middle panel bordered by relatively perpendicular one-ply side walls which are incorporated within the two-ply side walls of the outer transparent element directly between the plies thereof, each side wall of said outer element comprising an outer one-ply panel provided at its top with an integral inturred re-entrant one-ply marginal flap extension disposed flatwise against the inner face of the side wall of the lining element so that the latter is fixedly

6

enclosed and held by the two plies of the side wall of said outer element.

JOHN H. OXLEY.

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