B. F. BAIN.

FOLDING BOX.

APPLICATION FILED OCT. 14, 1916.

1,230,552.

Patented June 19, 1917.

2 SHEETS—SHEET 1.

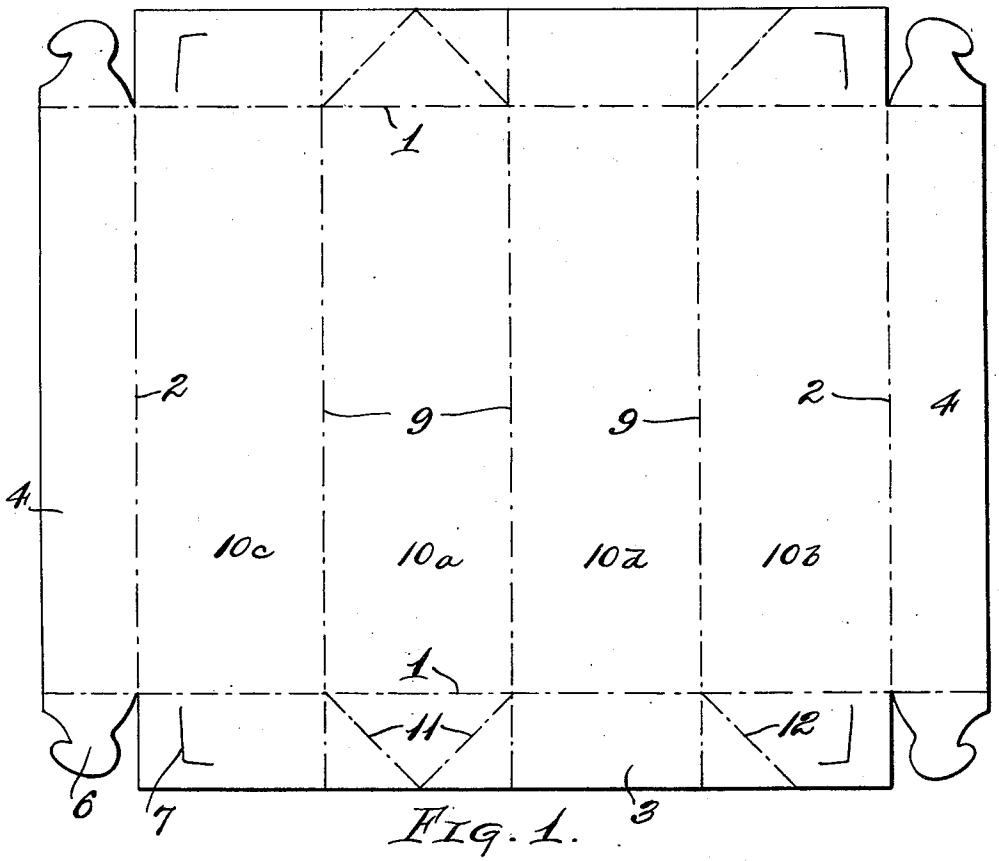


FIG. 1.

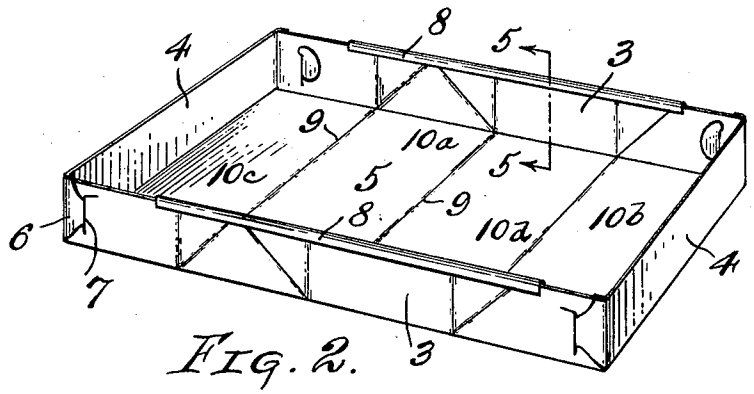


FIG. 2.

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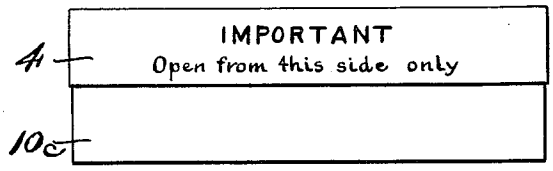


FIG. 6.

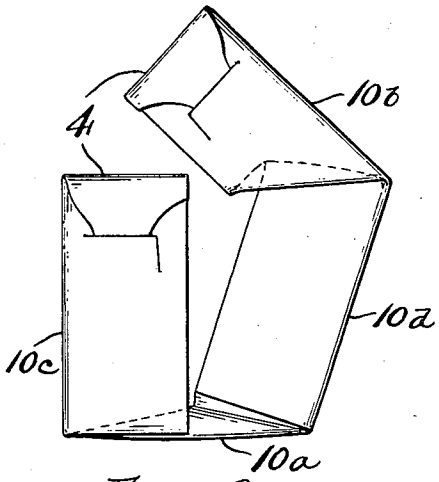


FIG. 3.

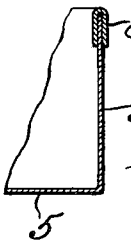


FIG. 5.

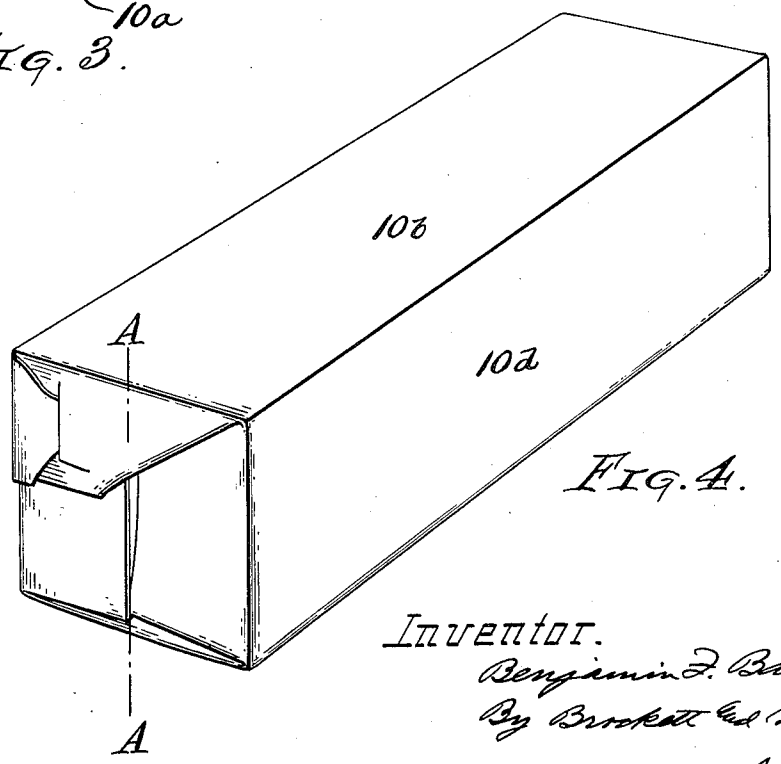


FIG. 4.

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UNITED STATES PATENT OFFICE.

BENJAMIN F. BAIN, OF PITTSBURGH, PENNSYLVANIA.

FOLDING BOX.

1,230,552. Specification of Letters Patent. Patented June 19, 1917.

Application filed October 14, 1916. Serial No. 125,630.

To all whom it may concern:

Be it known that I, BENJAMIN F. BAIN, citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Folding Boxes, of which the following is a specification.

This invention relates to folding boxes or containers. One object of the invention is to provide an improved form of box in which a complete closure is produced from a single piece of material so folded as to form both the body and cover, and which box can be made, shipped and stored in flat blank form to save space. A further object of the invention is to provide a folding box capable of being folded into two forms, first, as a complete closure for covering and protecting an article, and second, as a wide, open tray to receive and display an article, and which box can be easily converted from the first form into the second without injury whenever desired. A further object of the invention is to provide a reinforced open tray whose folded walls are strengthened and locked against collapse when open. Finally, the invention has for its object to provide an improved box of the kind described which can be made at low cost and without special tools or implements; which requires a minimum amount of stock; which can be manipulated by anyone without special instructions; and which is strong and serviceable in both of its forms.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

The invention comprises the folding tray and box hereinafter described and claimed.

In the drawings, which represent one embodiment of the invention, Figure 1 is a view of the cut blank from which the box is formed, the dotted lines indicating the necessary lines of fold; Fig. 2 is a perspective view of said blank folded into tray form, with certain wall reinforcements applied thereto; Fig. 3 is an end view showing the tray partly folded into box form; Fig. 4 is a perspective view, showing the completely folded box; Fig. 5 is a cross section on the line 5—5, Fig. 2; and Fig. 6 is a front view of the complete box, on a reduced scale.

My improved tray and box may be made of any desired size and proportions depending upon the size and shape of the article it is to contain. In the drawings I have shown for purposes of illustration a rectangular tray longer in one direction than in the other and have herein referred to "sides," "ends," etc., but it is to be understood, that neither such terms nor the specific form illustrated are to be taken as limiting the invention to the relative proportions shown or described.

The tray and box shown is made from a single flat sheet of paper, card or paper board, or other suitable material cut to the proper size and proportions, for example, as shown in Fig. 1. It is also provided with longitudinal and transverse scores, creases or lines of fold 1 and 2 to form the side and end walls 3, 4 of the tray, which walls stand up perpendicularly from the bottom 5 when the sheet is folded to tray form. The side and end tray walls are united or locked together by any of the well known corner joints for this purpose, any one of which is suitable, the drawings showing the usual tabs 6 adapted to be slipped into and locked in the kerfs 7.

The bottom and side walls of the tray are also provided with lines of fold, to be later described, for use in folding it to box form. After the box has been once folded to a complete closure said lines of fold become partly set, as it were, and if the box is then opened out to wide tray form the side tray walls tend to fold up or crease. I therefore brace and strengthen the side tray walls so as to hold them in flat plane form by stiff clips or reinforcements 8, which may be made of any suitable material such as thin sheet metal strips folded into U-form and adapted to be slipped over the edges of the side tray walls, as shown in Fig. 2. These reinforcements are preferably made of such length as to pack nicely into the box when completely folded into a closure. They may be made of thin spring metal to be sprung on and taken off, as desired, but preferably are of less resilient metal and after being put on are pressed or hammered shut to permanently reinforce the walls.

The bottom 5 of the tray is divided by three transverse lines of fold, creases or scores 9 into four sections marked 10^a, 10^b, 10^c and 10^d respectively, which are of substantially equal size and proportions, and which, when the tray is folded into box form, as in Fig. 4, become respectively the

bottom, top or cover, front and back of said box. The transverse lines of fold 9 extend out through the side walls of the tray, as shown in Fig. 1, and said side walls, opposite the bottom section 10^a, are each provided with diagonal lines of fold 11, and opposite the top section 10^b with a diagonal line of fold 12, which enable the side walls to be collapsed when folding the tray to box form.

In closing the box the front section 10^c is turned or bent up into the vertical plane, as shown in Fig. 3, the back section 10^d being folded to similar position and being shown partly so folded in Fig. 3. The diagonal fold lines 11 cause the side wall portions opposite the bottom section 10^a to fold inwardly into the box so that they are inclosed therein when the box is completed. Said wall portions may lie flat on the box bottom or against the end walls of the completed box (which were the side wall portions opposite sections 10^c and 10^d). The side wall portions of the tray are preferably made of a depth equal to substantially one half the length (in this case the shorter dimension) of the tray bottom section 10^a. Consequently when the front and back sections of the tray are folded as described the side wall portions meet edge to edge along the line A—A as shown in Fig. 4, and effect a complete closure of the box ends.

The top section or cover 10^b is folded over and incloses the upper half of the front section, as shown in Fig. 4. This serves to lock all the parts together and prevent separation except when desired. The complete box is a full closure which protects the contents on all sides and has sufficient strength and rigidity to avoid collapse.

Preferably the end wall 4 of the top or cover section of the box is provided with the legend "Important—Open from this side only," as shown in Fig. 6, advising users of the box how to open it thereby preventing possible accidental destruction or injury to the parts.

The combined tray and box may be used in various forms, shapes and sizes and for various purposes. For example, it is particularly valuable as a shipping carton for small articles, such for example as mechanical toys, one form of which is shown in my prior Patent No. 1,192,031, granted July 25, 1916. This toy is shipped in knock-down form to be erected by the purchaser. The box or carton, therefore, is made of the right size and shape to contain all the parts of the toy and also the reinforcements 8. Said toy and others of similar kind are operated with sand carried by the moving parts of the toy from place to place and, therefore, liable to scatter over the floor. The purchaser opens the box into tray form and secures and stiffens its side walls with the reinforcements and places the toy in said tray which collects all dropped sand and protects the floor, table or other support.

The box, in tray form, may also be used for displaying the article contained in said box and may be used to inclose and display any desired articles or substances.

What I claim is:—

1. A combined tray and box, comprising a single tray having a bottom and side and end walls, the side and end walls of the tray being of full height around its entire periphery, the bottom and side walls of said tray being provided with lines of fold whereby it may be folded up into a complete closed box.

2. A combined tray and box, comprising a single shallow tray having a bottom and side and end walls, the side and end walls of the tray being of full height around its entire periphery, the bottom being provided with three transverse parallel lines of fold and the side walls with diagonal and straight lines of fold whereby it may be folded up into a complete closed box.

3. A combined tray and box, comprising a single shallow tray having a bottom and side and end walls, the bottom being provided with three transverse parallel lines of fold dividing it into four sections and the side walls with diagonal and straight lines of fold whereby it may be folded up into a complete closed box, two of the sections of said tray bottom forming the bottom and top of the complete box, the other two of said sections of the tray bottom forming the two side walls of the complete box, and said tray side walls forming the ends of said box.

4. A folding box, comprising a single sheet of material provided with lines of fold dividing it into four sections, end walls connected to the end ones of said sections, and side walls connected to the side portions thereof, one of said end sections with its side and end walls being adapted to fold over the other end section to form a complete box.

5. A folding box, comprising a single sheet of material provided with lines of fold dividing it into four sections, end walls connected to the end ones of said sections, and side walls connected to the side portions thereof, one of said end sections with its side and end walls being adapted to fold over the other end section to form a complete box, the length of one of said end sections in a direction transverse to said lines of fold being substantially equal to twice the height of said side walls.

6. A folding box, comprising a single sheet folded to form bottom, end and side walls, corner joints for said end and side walls, said bottom and side walls being provided with lines of fold whereby one end portion of said tray may be folded over and

at right angles to the other end portion of said tray and produce a complete box.

7. A folding box, comprising a single sheet folded to form a bottom, end and side walls, corner joints for said end and side walls, said bottom and side walls being provided with lines of fold whereby one end portion of said tray may be folded over and at right angles to the other end portion of said tray and produce a complete box, two portions of said side walls abutting at their free edges when the tray is folded into box form to form the ends of said box.

In testimony whereof I affix my signature.

BENJAMIN F. BAIN.