June 15, 1948. B. B. BUTLER 2,443,341

STARCH TRAY

Filed March 2, 1945

Fig-1

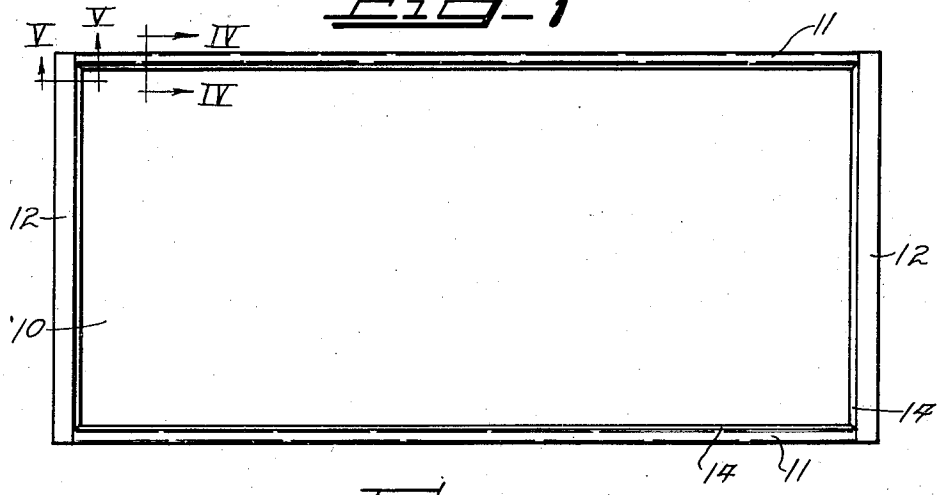


Fig-2

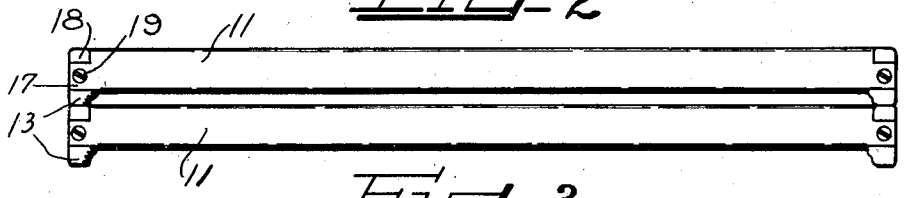


Fig-3

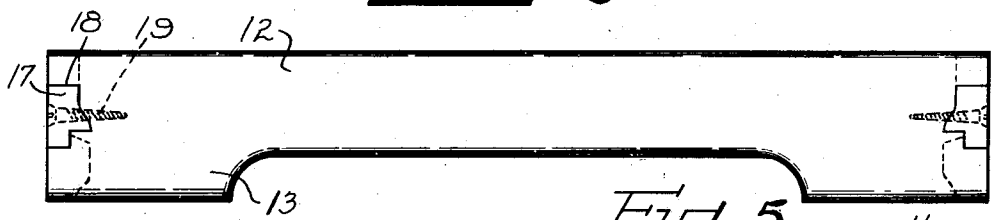


Fig-4

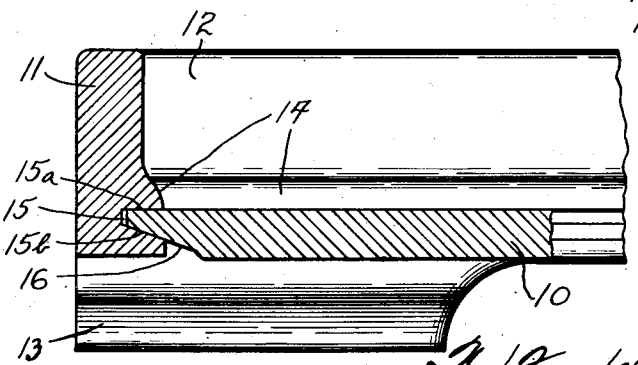
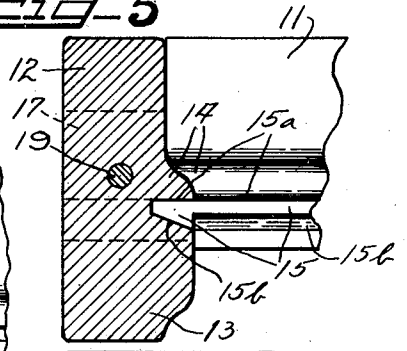


Fig-5



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ATTYS

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STARCH TRAY

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1 Claim. (Cl. 217—65)

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This invention relates to a tray, and more particularly to a starch tray employed in the preparation of confections such as candy bars.

In the manufacture of candy bars and the like, it is the usual practice to provide a suitable depth of powdered corn starch in a tray which is carried by a conveyor. The tray is brought on the conveyor under suitable dies which are pressed into the corn starch to form mold depressions therein of the desired shape. The depressions are then filled with the desired confectionary materials in a soft state, which are then hardened. The trays are stacked one upon another before being placed on the conveyor, and also after being removed from the conveyor with the hardening confections therein, so as to conserve space.

It is desirable that such trays be light in weight yet sturdy, and that they be so constructed as to permit circulation of air therebetween when stacked. It is also desirable that such trays be of a construction preventing the sifting of corn starch or similar finely powdered material into or through the joints between the parts of the tray. The tray should also be of substantially rigid material, and the parts so joined together as to retain the tightness thereof and avoid the development of any play between the parts even after prolonged use.

The trays employed prior to this invention did not fulfill these requirements. The need for repair or replacement was very frequent, and the trays were not proof against sifting of the corn starch or similar material through the joints. These trays were ordinarily fastened together by means of nails, which did not provide sufficiently rigid and tight joints, and readily allowed development of looseness and play between the parts of the tray. Furthermore, the construction was such that the bottom of the tray was afforded no support during the formation of the mold depressions, with the result that the pressure of the dies frequently caused breaking or cracking of the tray bottom.

The tray of this invention is constructed to embody all of the desirable features pointed out above, and to avoid the disadvantages of prior constructions.

It is an object of this invention to provide a tray with the joints between the parts proof against the sifting of finely powdered material therethrough.

It is another object of this invention to provide a starch tray or the like with the bottom constructed for support thereof to prevent breakage during application of pressure to the upper surface thereof.

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It is a further object of this invention to provide a starch tray or the like having a wedging connection of the bottom with the side walls to afford a tight joint and a rigid construction.

It is also an object of this invention to provide a tray construction in which the corner joints are made tight and rigid by a minimum of fastening elements by virtue of mutually interfitting portions on the tray walls.

It is still another object of this invention to provide a tray of the type described in which the inner surfaces of the walls slope toward the tray bottom to afford ease in emptying and cleaning the tray.

It is a still further object of this invention to provide a tray having foot portions to permit spacing of a plurality of trays when stacked, as well as to permit ready grasping of the tray.

It is an additional object of the invention to provide a tray of the type described in which the parts are so connected as to avoid development of looseness and play between the parts in use.

Another object of the invention is to provide a tray the parts of which may easily and quickly be assembled or disassembled.

The invention also has as an object the provision of a tray which is light, sturdy, and convenient to handle.

Other and further objects and advantages of the invention will be apparent to those skilled in the art from the following description and the appended drawings.

In the drawings:

Figure 1 is a plan view of the tray of this invention;

Figure 2 is a side elevational view of two of the trays in stacked relation;

Figure 3 is an enlarged end elevational view of the tray;

Figure 4 is an enlarged fragmentary sectional view taken on the line IV—IV of Figure 1; and

Figure 5 is an enlarged fragmentary sectional view taken on the line V—V of Figure 1, with a part omitted.

As shown in the drawings, the tray is rectangular in shape and is formed with a bottom 10, side walls 11, and end walls 12. Each of the end walls 12 has a foot portion 13 at each end thereof extending below the level of the bottom 10 and the bottom edges of the side walls 11. The tray may thus readily be grasped between the foot portions either at the ends or sides either when resting on a surface or when in a stack with other trays.

Also, as will readily be evident from Figure 2, trays of this kind when stacked are in vertically spaced relation to each other, so that circulation of air therebetween is readily possible.

As clearly shown in Figure 4, the lower surface of the bottom 10 lies slightly below the bottom edges of the side walls 11. The tray is placed on a conveyor with the side walls crosswise of the conveyor and with the bottom 10 resting on the conveyor and the feet 13 off the conveyor, the bottom edges of the side walls 11 being spaced slightly above the conveyor. When a tray is positioned beneath dies or the like for the formation of mold depressions in the material such as corn starch carried by the tray, the bottom 10, resting directly on the conveyor, is supported thereby against the pressure of the dies and transmits the pressure to the conveyor. In trays of this type as previously constructed, the bottom did not rest directly on the conveyor but was spaced thereabove. The bottom was often split, cracked, or completely broken upon application of the die pressure, since it was unsupported except about its edges, and a large proportion of trays had to be replaced for this reason. With the present construction, substantially the entire surface of the bottom 10 is supported by the conveyor, and therefore will withstand anything short of crushing pressure.

The end walls 12 of the tray bear the greatest proportion of the shock and jolts received by the tray in normal use. The end walls 12 are therefore made stronger than the side walls 11, as by the use of thicker stock. The heavier construction of the end walls 12 also aids in the stacking of the trays, since the upper surface of each wall 12 provides a greater area on which the feet 13 of the tray next above may rest. In addition, the heavier construction of the end walls gives better balance to the tray than would be the case if all the walls were of the same dimensions throughout.

Each of the walls 11 and 12 is enlarged inwardly adjacent the bottom 10, as indicated at 14. The portion 14 is shown in the drawings as curved, but it will be obvious that the enlarged portion 14 might be defined by an inner surface of the wall of a shape other than that shown. Each of the walls 11 and 12 has a groove 15 formed in the enlarged portion 14 to accommodate an edge of the bottom 10. Preferably the groove is of the general shape shown in Figure 4 of the drawings, with the upper wall 15*a* of the groove horizontal and the lower wall 15*b* lying at an angle. Each edge of the bottom 10 of the tray is beveled on the underside thereof, as indicated at 16 in Figure 4. The walls and bottom of the tray are assembled by inserting the beveled edges of the bottom 10 in the grooves 15 of the walls 11 and 12, so that the bottom 10 is wedged in the walls 11 and 12.

The construction of the joint between the bottom and the walls which has just been described has several advantages. The upper surface of the bottom 10 is held tightly against the upper horizontal wall 15*a* of the groove. The harder the edge is forced into the groove, the tighter is the joint formed. The wedging connection of the edges of the bottom 10 in the walls of the tray insures a tight joint which prevents the passage of finely powdered material therethrough, holds the walls and bottom in substantially rigid relation, and avoids the use of nails, screws, or similar fastening elements which might weaken the material of the tray. The enlarged portions 14 of the walls permit the grooves 15 to be of substantial depth without weakening the walls and provide a substantial area of interfitting engagement between the parts so that they are held substantially rigid. The enlarged portions 14 also permit easier emptying and cleaning of the tray, since the open top of the tray has a greater area than the tray bottom, and the walls meet the bottom at an angle greater than 90°, thus eliminating sharp corners from which it might be difficult to remove residual material.

The side walls 11 and end walls 12 are connected by mortise and tenon joints. At each end of each side wall 11, adjacent the bottom edge thereof, a tenon 17 is formed, with a portion of the groove-defining part of the bottom of the walls being removed for a short distance from the end of the walls. The cross-sectional shape of the tenon 17 is clearly shown in Figure 3. In each end of each end wall 12 there is formed a mortise 18 shaped to correspond to the cross-section of the tenon 17, as will be clear from Figure 3. A screw 19 is driven through the tenon 17 into the end wall 12 to secure the parts together.

A rigid and strong connection of the parts is provided at each corner by the interengagement of the mortise and tenon, with the several abutting surfaces thereof holding the parts against relative movement in any direction. A single screw in each joint is sufficient to hold the parts securely together. Any tendency of the leverage afforded by the walls to overcome the tightness of the connection is prevented by the engagement of the bottom 10 with the walls. The wedging connection of the walls and bottom holds these parts rigidly perpendicular to each other, and furthermore in effect provides with the screws 19 a spaced two-point securement of each wall at each corner to prevent the loosening which might develop by repeated application of pressure at one side or the other of a single point of securement. A tight and rigid joint is thus formed at each corner which is maintained even after prolonged use. The construction permits the use of a minimum number of fastening elements, such as the screws 19, one at each corner. The use of a plurality of screws or the like at each corner is avoided, together with the consequent weakening of the material. Furthermore, as will be obvious, the use of only four screws or similar fastening elements permits easy and rapid assembly of the tray.

The engagement of the bottom 10 with each wall 11 and 12 at each corner is such as to make a tight joint despite the difficulties occasioned by the junction of three parts. This tightness is obtained by terminating the lower wall 15*b* of groove 15 in the side wall 11 short of the end of the side wall, so that the end of the wall 15*b* abuts the edge of the corresponding lower wall 15*b* of the end wall 12. The upper wall 15*a* of the side wall 11 extends to the end of the side wall, as part of the tenon 17. On the other hand, the lower wall 15*b* of the end wall 12 extends to the end of the wall 12 as defined by the mortise 18, to abut the tenon 17 of the side wall 11, and the upper wall 15*a* of the end wall, while also extending to the mortise, does not extend as far as the lower wall because of the shape of the mortise to accommodate the tenon 17. In other words, the upper wall 15*a* of the groove in the end wall 12 abuts the edge of the upper wall 15*a* of the side wall groove. Thus, the grooves 15 of the side and end walls intersect at the corner

joints to provide a corner recess, with the lower wall of the groove recess formed by the extension of the lower groove wall of the side wall 11, and the upper wall of the recess formed by the extension of the upper grooved wall of the end wall 12. The corner of the bottom 10 extends into the corner groove recess so formed, and is tightly held against the upper wall thereof by the wedging action of the bevels 16 along each edge of the bottom. The corner angle formed by the junction of the bevels extends between the junction of the groove walls 15a. The corner groove construction is best illustrated in Figure 5, in which the bottom 10 is omitted for greater clearness.

The invention contemplates the use of wood as the material of which the tray is made, since it permits a rigid construction, does not become deformed in use, and is readily worked. It will be obvious, however, that other materials having suitable properties may be employed instead of wood. Similarly, other fastening means than the screws 19 might be employed, such as glue, nails, or the like, but the screws are preferred because they permit simple and ready disassembly of the tray as well as the simple and secure initial assembly thereof.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claim.

I claim as my invention:

A starch tray for molding candy comprising a rectangular bottom plate having all margins thereof beveled only on the bottom, side walls and

end walls each comprising a solid unit and having respective longitudinal grooves in their lower portions generally complementary to said beveled margins but deeper so that the margins are drawn tightly therein and extending short of the respective bottoms of the grooves and the upper sides of the bottom plate margins make starch-tight contact with the upper sides of the grooves, the upper portion of each wall presenting a smooth substantially vertical inner surface, each wall having an inclined surface immediately above the bottom plate smoothly merging with said inner surface and said inclined surface blending into a substantially vertical lower surface to thus thicken the lower portion of each wall and enable said groove to be deeper than otherwise would be possible and to afford a filleted molding cavity for said tray to facilitate emptying said tray.

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