Sept. 4, 1934. S. WORONIECKI 1,972,396

COLLAPSIBLE BOX

Filed July 31, 1931 2 Sheets-Sheet 1

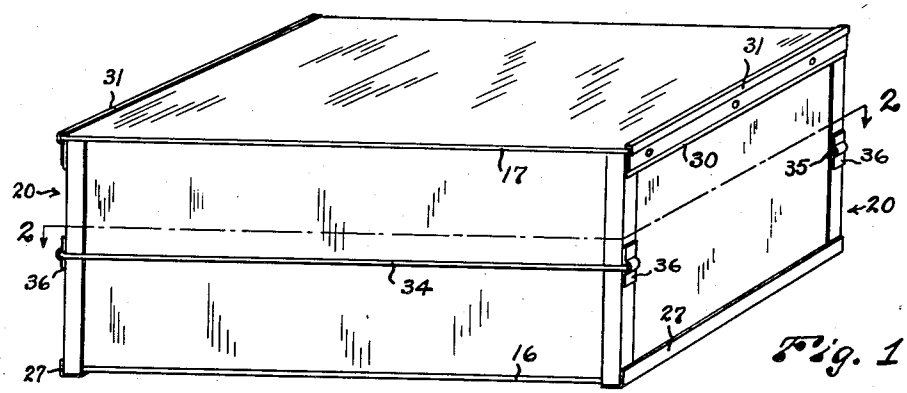


Fig. 1

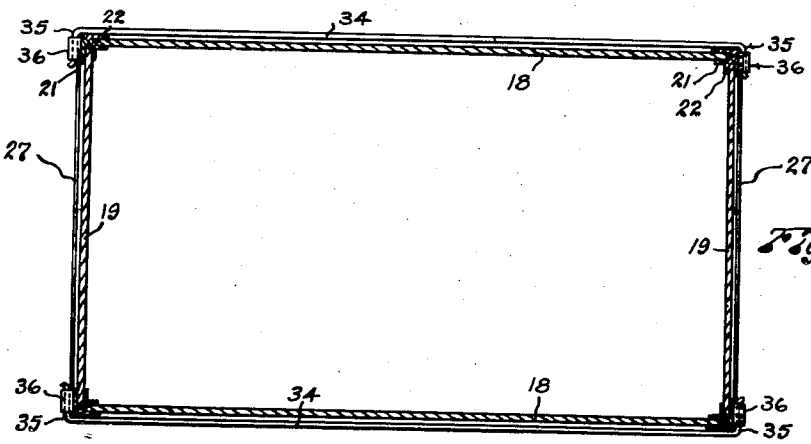


Fig. 2

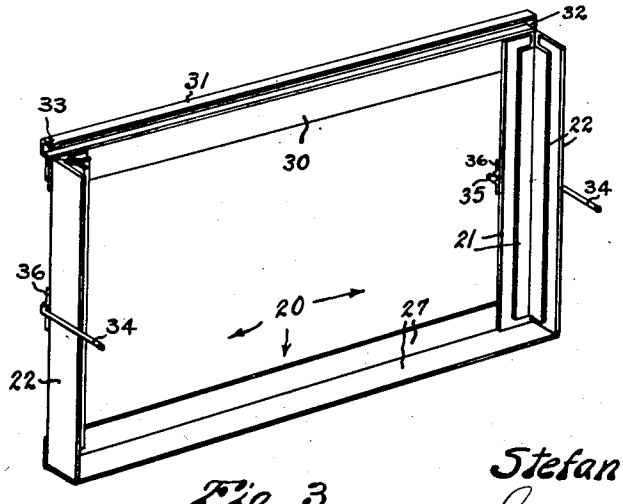


Fig. 3

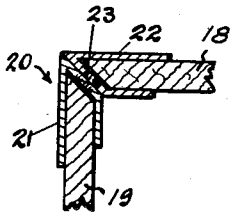


Fig. 4

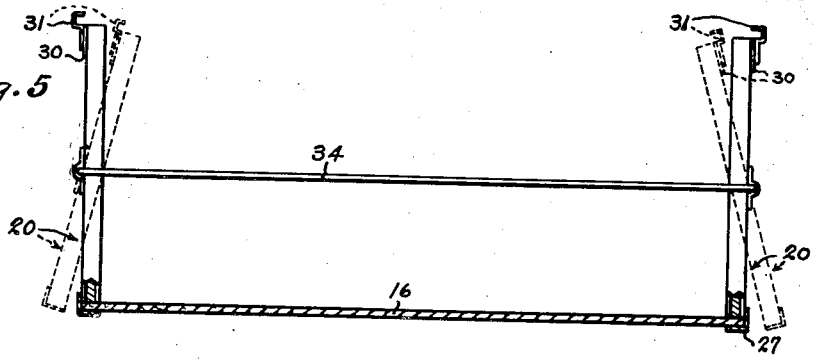
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Filed July 31, 1931 2 Sheets-Sheet 2

Fig. 5



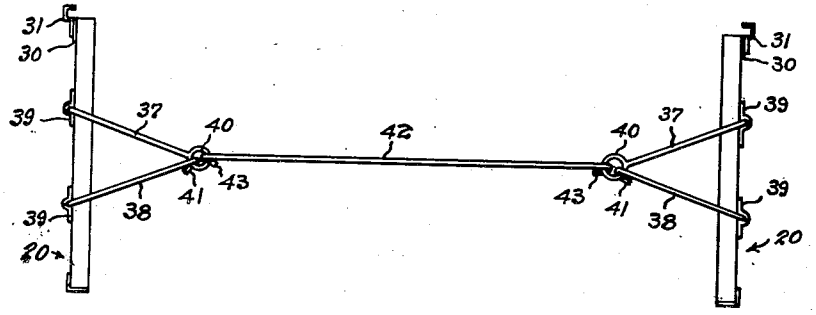


Fig. 6

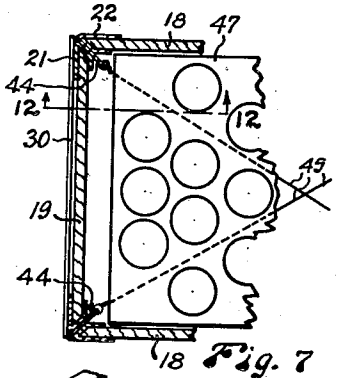


Fig. 7

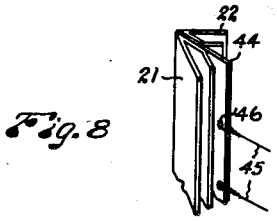


Fig. 8

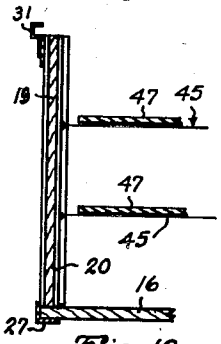


Fig. 12

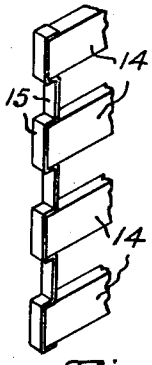


Fig. 10

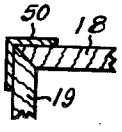


Fig. 14



Fig. 11

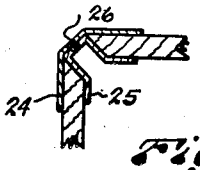


Fig. 9

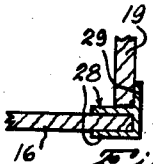


Fig. 13

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Patented Sept. 4, 1934 1,972,396

UNITED STATES PATENT OFFICE

1,972,396

COLLAPSIBLE BOX

Stefan Woroniecki, Seattle, Wash.

Application July 31, 1931, Serial No. 554,246

10 Claims. (Cl. 217—12)

My invention relates to new and useful improvements in packing boxes. More particularly my invention relates to a collapsible box which is provided with means to detachably secure the bottom, sides, top and ends of the box together in such a manner that the said parts are readily detached and removed when it is desirable to collapse the box, and which means also permits ready and easy insertion of these said parts when it is found desirable to build up the box.

A further object of my invention is to provide a packing box, which is not only adapted to be readily collapsed or built up, but to provide a box which is strong, durable and capable of withstanding a considerable amount of rough wear and abuse in handling and in transportation. In actual use, a number of boxes embodying my invention were used by a large bakery in the transportation of bread. These boxes were thrown in and about the plant, in and out of trucks and in and about retail establishments where bread was sold. These boxes are at this writing still in actual operation and have outlived by many times the usage obtained from ordinary nailed boxes.

Another object of my invention is to provide a box which will permit the replacement of worn parts with little expense and a minimum delay. Another object of my invention is to provide a box which is simple in construction and may be therefore readily collapsed or built up by the average stevedore and is also economical in construction.

The above mentioned general objects of my invention, together with others inherent in the same, are attained by the device, illustrated in the following drawings, the same being preferred exemplary forms of embodiment of my invention, throughout which drawings like reference numerals indicate like parts:

Figure 1 is a perspective view of the completed box.

Fig. 2 is a section in plan on the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of one side broken away.

Fig. 4 is an enlarged fragmentary view in cross section showing the corner construction.

Fig. 5 is a view in elevation with the sides removed showing by full lines, the ends in holding position relative to the bottom and by dotted lines, the ends tilted at an incline to receive or release the bottom.

Fig. 6 is an alternative construction.

Fig. 7 is a fragmentary view partly in cross section and partly in plan of one end of the box with wires connecting the corners to support partitions, a partition being shown in place.

Fig. 8 is a fragmentary perspective view of the corner construction and wires shown in Fig. 7.

Fig. 9 is a fragmentary sectional view showing an alternative corner construction.

Fig. 10 is a fragmentary perspective view showing adaptor means to be used in connection with slats, when the same are desirable instead of solid panels.

Fig. 11 is an alternative construction showing another means for securing the partition supporting wires in place.

Fig. 12 is a detached view in cross section on broken line 12—12 of Fig. 7.

Fig. 13 is a fragmentary sectional view of an alternative bottom construction.

Fig. 14 is a fragmentary sectional view of a box corner.

The panels forming the top, bottom, ends or sides may be made of any desirable material depending upon the uses to which the box is to be put, which materials are well known in the art and comprise among others solid wood, veneer or plywood, metallic, artificial compositions, paper, rubber or slate. Also slat or strip construction of any of the foregoing may also be used. However, if such strip construction is used, it is preferable that the ends of slats 14 be first inserted into the grooves of adaptors 15 (see Fig. 10).

16 represents the bottom panel, 17 the top panel, 18 the side panels and 19 the end panels. 20 represents the U shaped metallic end members each having panel receiving grooves. These U shaped end members preferably consist of two side members, each of which comprises members 21 and 22, (see Fig. 4). Members 21 and 22 are substantially U shaped in cross section and each have a base on a plane, which plane intersects the planes of the leg members at an angle of 45°. The members 21 and 22 are preferably welded together at their respective bases at 23 so that the open ends of the U portions of the members 21 and 22 will be at an angle of 90° to each other. Obviously rivets or other securing means may be substituted for welding.

In Fig. 9 I have shown an alternative construction of the sides of the panel end receiving members which comprises two members 24 and 25 secured together at 26, preferably by welding or by other means as described in connection with members 21 and 22. Other substitutes may be used for the sides of the panel receiving members and in case of a box for lighter duty where extreme economy is necessary, the ends of members

18 and 19 (see Fig. 14) may be placed adjacent each other within a right angle member 50.

The bottom of each U shaped panel receiving member 20 is preferably formed of a base member 27 of a 90° angle, in cross section, which member is suitably secured to the side members of 20. In Fig. 13, I have shown an alternative construction for the member 27, which alternative construction provides two parallel members 28 to encompass the end of the base panel 16 and an upright member 29 adjacent the end 19.

Supporting members 30 connect together the open ends of panel receiving members 20. Top securing members 31 are suitably secured to supporting members 30. Obviously, members 30 and 31 may be made integral, or 30 may be eliminated if found desirable. End 32 of the top securing member 31 is blocked as by turning (as shown in Fig. 3) so the top panel 17 must be drawn out away from this end. By such blocking only one end of the top panel receiving guide is open for withdrawing the panel 17, and to secure the top 17 in position only this one end thereafter need be blocked. This securing is accomplished by depressing end 33, as shown in Fig. 3. End 33 may be thereafter turned up to permit withdrawal of the top panel or turned down to secure the same in place. The channel forming end members 20 are pivotally secured together and permit swinging movement of the channel forming members as respects each other by suitable means as wires 34, which wires are preferably provided with right angle portions 35 mounted in bearings 36. Obviously the end members 20 may be otherwise secured together, as for example by a similar connecting member located within the box without departing from my invention.

To assemble my box, the ends 19 are first inserted from the top and slid downwardly and the members 20 are turned in the position shown in broken lines in Fig. 5. It is to be noted that the top panel receiving members 31 are positioned so they will not interfere with the insertion of the end panels 19, (see Fig. 5). In this position the channel forming end members 20 are in position to receive the bottom panel 16 and during the insertion of the panel 16, the channel forming end members 20 are returned to an upright position. Then the side panels 18 are slid downwardly from the top. By the insertion of the side members 18, the channel forming end members are secured in an upright position, which members in such position retain the bottom 16 in its position. Obviously, the sequence in which the parts are inserted may be varied, except the bottom must be inserted before the sides. After the box has been loaded, the top 17, which is somewhat larger than the bottom, is slid into place and the top 17 is held in place by turning end 33 as previously described, which securing can be obviously had by means of cotter pins or other similar devices. When the top panel 17 is in position it will prevent the sides 18, and ends 19 from being withdrawn, which parts in turn prevent the withdrawal of the bottom panel 16, thus the single top panel locks the other panels.

In the alternative construction in Fig. 6, I have shown two wires 37 and 38 pivotally secured to members 20 by bearings 39. Wire 37 has an eye 40 at its end and wire 38 has a hook 41 at its end adapted to engage the eye 40. Wire 42 having hooks 43 at its ends, is adapted to secure the respective eyes 40 together. This construction permits the same movements as the other construction (shown in Fig. 5), is stronger and may be more completely dismounted by removing hooks 41 and 43 from eyes 40 and then turning wires 37 and 38 up and down respectively and removing wire 42.

In Figs. 7, 8 and 12, I have shown engaging means 44 secured between members 21 and 22 having suitable means for engaging wires 45 as holes 46. I have shown a partition 47 in Fig. 7 with holes therein showing an adaptation of my device to the carrying of bottles. Obviously other adaptations with varying numbers of partitions with or without holes will be apparent to those skilled in the box art.

In Fig. 11, I have shown an alternative manner of providing a securing means for the wires supporting the partitions. This is accomplished by suitable securing (as by welding) between 21 and 22, of wires 48 around which wires 45 may be readily secured.

If slats are to be used, instead of solid members, it is preferable that the ends of slats 14 be first inserted into the grooves in members 15 and then that these be slipped in as a unit. (See Fig. 10). As the retainers 15 are on the ends of the slats 14, the slats will secure the retainers 15 in place, which retainers in turn keep the slats 14 separated.

The terms, ends, sides, bottom and top of the box are used herein in a relative sense and the scope of these terms shall not be limited by any arbitrary position of the box and shall include members having similar functions to those set forth in the drawings herein.

Obviously, changes may be made in the forms, dimensions and arrangement of the parts of my invention, without departing from the principle thereof, the above setting forth only preferred forms of embodiment.

I claim:

1. In a collapsible box, a channel forming member comprising two leg members having channels adapted to detachably receive the ends of side box panels and of end box panels, a base member having a channel adapted to detachably receive the ends of a box bottom panel, a channel forming member adapted to detachably receive the ends of a box top panel, all of said channel members being secured together and means carried by the leg members adapted to pivotally receive securing means to another channel forming member.

2. In a collapsible box, a channel forming member comprising two leg members having channels adapted to receive the ends of side box panels and of end box panels, a base member having a channel adapted to enclose the ends of a box bottom panel, a channel forming member adapted to receive the ends of a box top panel, all of said channel members being secured together and means carried by the leg members adapted to pivotally receive securing means to another channel forming member.

3. A collapsible box comprising channel forming members positioned at the ends of the box, means for securing said channel forming members together, panel members adapted to be received by said channel forming members, partition supporting means, disposed within the box, and devices connecting said partition supporting means with said channel forming members.

4. In a collapsible box the combination of panel end receiving members and connecting means pivotally mounted to said members, said pivotal mounting being located intermediate the

height of said end members whereby ends may be inclined toward each other for assembling or disassembling purposes.

5. A collapsible box comprising channel forming members positioned at the ends of the box; means pivotally connected to each of said channel forming members and positioned upon the respective sides of the box intermediate the height thereof; and panel members adapted to be received by said channel forming members, whereby the channel forming members may be pivoted permitting the insertion of a bottom panel and such pivotal movement prevented after the insertion of side panels.

6. A collapsible box comprising channel forming members positioned at the ends of the box; means positioned upon the respective sides of the box intermediate the height thereof swingingly connecting the channel forming members as respects each other and panel members adapted to be received by said channel forming members, whereby the channel forming members may be moved permitting the insertion of a bottom panel and such movement prevented after the insertion of side panels.

7. A collapsible box comprising channel forming members positioned at the respective ends of the box; each channel forming member being adapted to detachably and slidingly receive the end portions of end, side, and bottom panels; and means, positioned on and intermediate the height of each of two sides, swingingly connecting said channel forming members as respects each other, whereby the channel forming members may be moved for the insertion of a bottom panel and such swinging movement prevented after the insertion of side panels.

8. A collapsible box comprising channel forming members positioned at the respective ends of the box; each channel forming member being adapted to detachably and slidingly receive the end portions of end, side, and bottom panels; means, positioned on and intermediate the height of each of two sides, swingingly connecting said channel forming members as respects each other, whereby the channel forming members may be moved for the insertion of a bottom panel and such swinging movement prevented after the insertion of side panels; and other channel means carried by the channel forming members adapted to secure a top panel in place against vertical movement, said last named channel means being remotely disposed as respects the path of movement for the insertion and removal of said end and side panels.

9. In a collapsible box, the combination of panel end receiving members and connecting means therebetween, said connecting means being mounted on oppositely disposed sides and located intermediate the height of said panel end receiving members and swingingly mounting said panel end receiving members as respects each other, whereby said panel end receiving members may be inclined towards each other for assembling or disassembling purposes.

10. In a collapsible box, a rectangular metallic end member provided with substantially permanently secured together top, bottom and leg member; slot forming means, adapted to slidingly receive the end portions of side and end panels, said slot forming means being carried by each of said leg members and each of said slot forming means providing slots disposed substantially at right angles to each other; panel end retaining means carried by said bottom member and adapted to slidingly receive the end portions of end and bottom panels, said end and bottom panels being retained substantially at right angles to each other; and other slot forming means carried by said top end member and adapted to slidingly receive the end portion of a top panel in place against vertical movement, said last named slot forming means being disposed outside of the path of movement in slidingly receiving or removing said side and end panels.

STEFAN WORONIECKI.