Oct. 29, 1946. E. T. INSOLL 2,410,216

STACKING BOX

Filed July 23, 1942 2 Sheets-Sheet 1

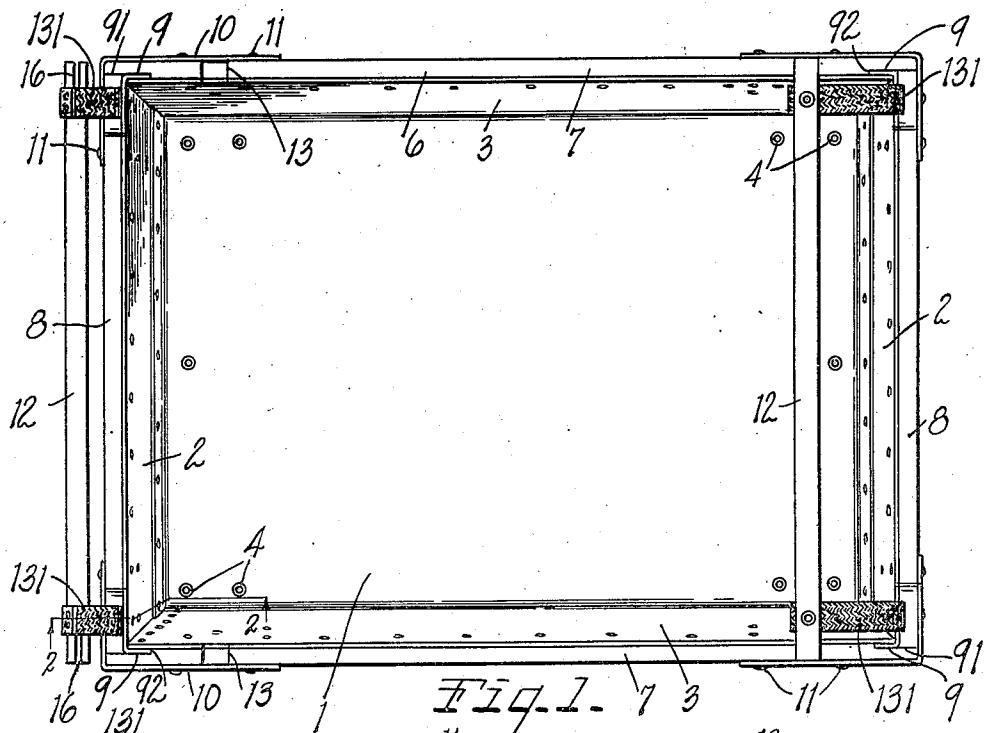


Fig. 1.

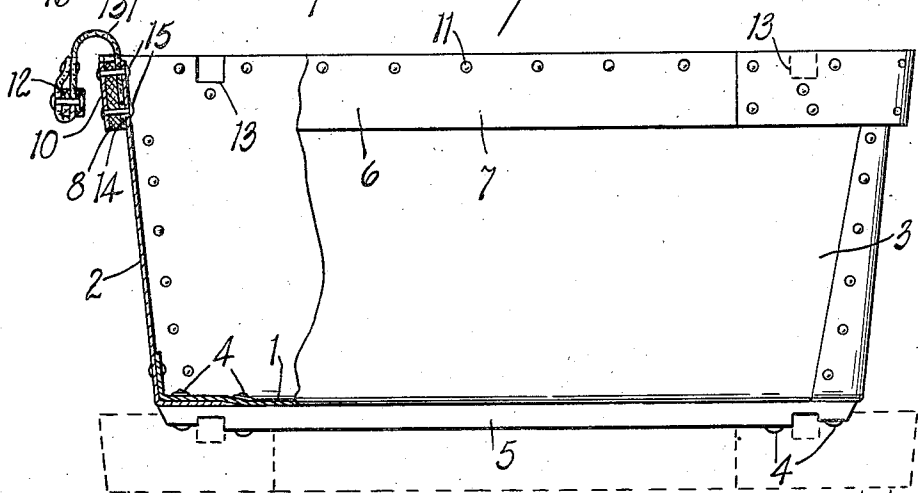


Fig. 2.

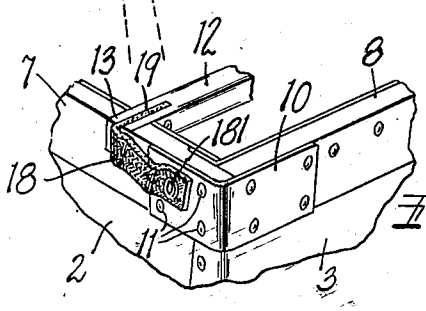


Fig. 4.

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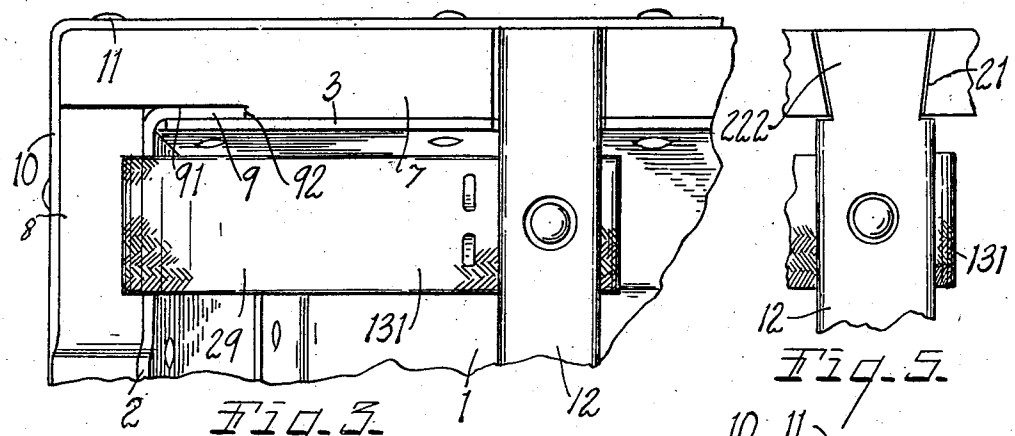


Fig. 5.

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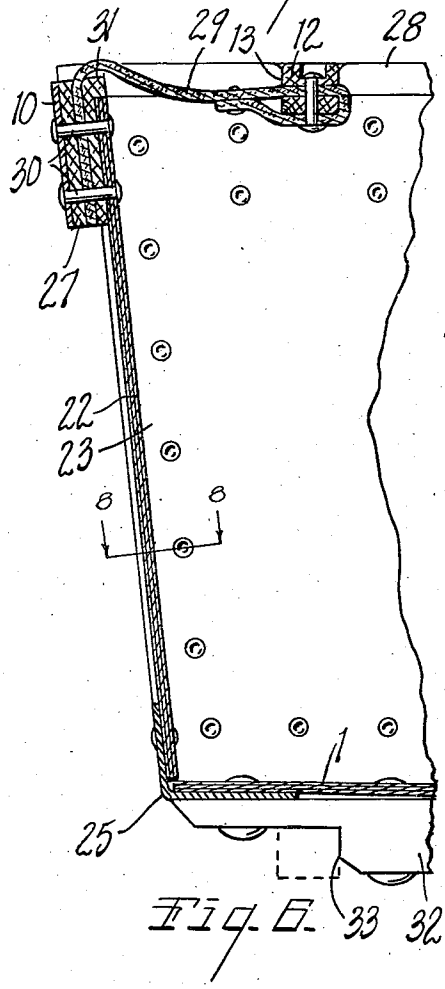


Fig. 6.

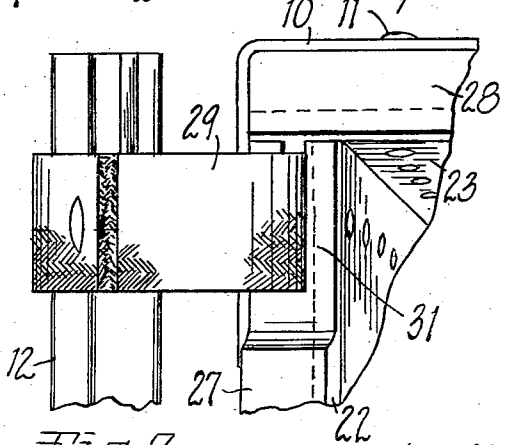


Fig. 7.

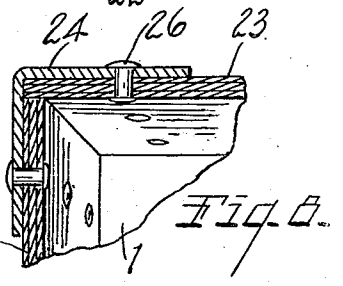


Fig. 8.

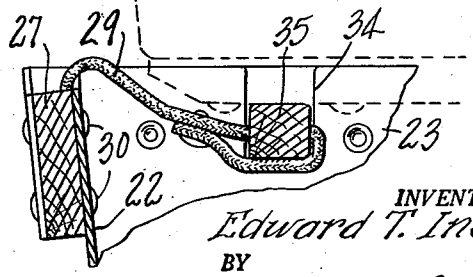


Fig. 9.

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2,410,216

STACKING BOX

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Application July 23, 1942, Serial No. 452,000

7 Claims. (Cl. 220—97)

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The main objects of this invention are:

First, to provide a stacking box suitable for the reception and transportation of merchandise of various types, which is strong and sturdy in construction notwithstanding its lightness in weight, being fabricated of relatively inexpensive non-metallic materials.

Second, to provide a stacking box having stacking bars capable of being also employed as handles which are swingably connected to the box in a novel manner.

Third, to provide a stacking box of the type described including stacking bars and means for supporting the latter on the body of the box in operative position in a manner to prevent lateral movement of a further box superimposed or stacked thereon.

Fourth, to provide a box of the type described having various details of improvement in the construction of the box per se which lends added rigidity and strength thereto, enabling the same to withstand impacts and rough treatment successfully, notwithstanding its comparatively light, inexpensive non-metallic construction.

Further objects relating to details and economies of my invention will appear from the description to follow. The invention is defined in the claims.

A structure embodying the features of my invention is illustrated in the accompanying drawings wherein:

Fig. 1 is a top plan view of a preferred embodiment of my invention, illustrating one of the stacking bars thereof in operative stacking position and the other thereof in collapsed position.

Fig. 2 is a view in front elevation, being partially broken away and in section on a line corresponding to line 2—2 of Fig. 1, illustrating certain details of the box structure and the manner in which boxes of the character described are stacked one upon the other.

Fig. 3 is an enlarged fragmentary top plan view further illustrating a detail of the box structure and indicating the relationship thereto of the stacking bars in stacking position.

Fig. 4 is a fragmentary perspective view illustrating an alternative hinging structure for the stacking bar of the box.

Fig. 5 is a fragmentary top plan view, generally similar to Fig. 3, illustrating a modified arrangement for receiving and supporting the stacking bar of the box wall.

Fig. 6 is a fragmentary view in longitudinal vertical section illustrating a somewhat modified form of box contemplated by the invention, which is fabricated in the main of plywood.

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Fig. 7 is a fragmentary top plan view further illustrating the structure of the embodiment of Fig. 6.

Fig. 8 is a fragmentary view in section on a line corresponding to line 8—8 of Fig. 6, and

Fig. 9 is a fragmentary view in longitudinal section, of a box in accordance with a still further modified embodiment of the invention, likewise illustrating the manner in which boxes of this type are stacked one on the other.

It is the purpose of the present invention to provide a stacking box or receptacle which largely eliminates the use of metal and which is formed in its entirety of inexpensive, readily available materials, which are further characterized by the fact that they are light in weight. Notwithstanding the relatively light weight of the materials, however, the box when fabricated in accordance with the invention has ample strength, ruggedness and rigidity to withstand the rough usage to which boxes of this type are commonly subjected. Moreover, provision is made to enable stacking of these boxes one on the other, using stacking bars pivoted to the box body in a novel manner, including novel means for preventing lateral displacement of the boxes relative to one another in the aforesaid stacked condition.

Referring to the drawings, in Figs. 1, 2 and 3, I illustrate a stacking box in accordance with my invention, comprising a rectangular bottom 1 and pairs of end and side walls 2, 2 and 3, 3, respectively, secured to the bottom in inclined relation to one another, the side walls 3, 3 being preferably integral with the bottom. The bottom and end and side wall panels are, in accordance with the present invention, fabricated of a suitable relatively tough, stiff fiberboard characterized by its strength and rigidity, in proportion to weight. At the bottom of the box the end walls are bent inwardly and overlapped externally with bottom member 1, the latter being provided at its ends with extensions or flaps which are turned up interiorly of the box end panels and disposed in side by side relation to said end walls 2. Securement is effected by rivets 4, those at the bottom being preferably serving also to secure the wooden skids or runners 5 to the bottom of the box.

A supporting and reinforcing rim 6 is provided constituted by the side and end top rim members 7, 8, respectively. Rim 6 projects laterally of the wall panels to support the box when it is nested

in another similar box. The manner of associating the rim members with the wall panels and with one another should be noted particularly inasmuch as it serves to rigidify and brace the walls substantially.

Referring to Figs. 1 and 3, it will be noted that the end walls 2 are of sufficient length to afford lateral extensions in flanges 9 at either side thereof, which are overlappingly folded around the adjacent end edges of the side panels 3, so as to dispose the thus folded extensions or portions 9 externally of the side walls at the ends thereof. The side rim members 7 are rabbeted at 91 on the inner side at the ends thereof to accommodate the thus overlapped portions, while disposing the length of the side rim members between the rabbets in full lateral supporting engagement with the top of the side walls 3. Note that the inner rabbeted shoulder 92 of the rabbets 91 abuttingly engages the extremity of the overlapped extension 9. This lapped construction and abutting engagement of the end of the lapped portion 9 serves effectively to prevent inward collapse of the end panel, greatly rigidifying the end structure.

The end rim members 8 are fabricated in a length to fit snugly between the side top members 7 at the rabbeted ends thereof, in end abutting relation to the latter, and angular corner reinforced strips 10, preferably of the same fibrous material as the walls, are bent around the thus constituted corner joints to further reinforce and bind the same. Rivets 11 are employed to secure the corner reinforcing members 10, the rim members 7, 8, and the walls 2, 3 together in the manner described.

The reference numeral 12 designates the stacking bars associated with the present box, which are, in the embodiment under consideration, formed of wood rectangular in section and of a length approximately equal to the overall width of the box top. The rim members 7 and side walls are provided with alined recesses 13, also of rectangular sectional outline corresponding to that of the bars 12, for the reception of said bars in the manner illustrated in Figs. 1 and 3. The reinforcing strips 10 are made sufficiently long on the sides of the box to extend over and cover the recesses 13 externally of the top members 7, and it will be appreciated that in operative stacking position of the bars 12 in said recesses the reinforce strips 10 prevent end movement of said bars in said recesses.

In order to swingably connect said bars to the box for selective swinging to and from operative stacking position, I employ strap-like flexible fabric hinge members 131, preferably of a suitably strong fibrous material such as webbing, although if desired leather or other equivalent material may be employed. As illustrated in Figs. 1 and 2, these hinge members are disposed in recesses 14 cut in the inner side of the end rim members 8, so as to lie between said members and the end walls 2, with the members otherwise in external side by side supporting engagement with the panel. Rivets 15 serve to rigidly secure the panels, hinges, end rim members and corner reinforcing members together. At the outer ends thereof the hinge members are looped through slots 16 in the ends of the stacking bars 12 and riveted thereto in the manner illustrated in Fig. 2. The length of the hinge members is of course sufficient to enable the disposition of the stacking bars to be swung inwardly into the recesses 13, and in operative retracted position the

bars and hinge hang at the ends of the box or serve as convenient handles.

It will be noted in Figs. 1 and 2 that recess 13 is of such depth that the stacking bar 12 lies flush with the top of the box in operative or stacking position thereof. In order to prevent longitudinal and undue lateral sliding movement of the boxes on the bars in the stacked relation thereof, illustrated in solid and dotted lines in Fig. 2, I provide the skids or runners 5 with transversely alined rectangular bottom recesses 17 spaced longitudinally from one another a distance equal to the spacing of the stacking bars when they are disposed in their recess 13. This enables one box to be positioned on the other, the engagement of the stacking bars of the lowermost box in the skid recesses 17 of the uppermost serving to prevent longitudinal or endwise movement while excessive sidewise movement is prevented by the fact that the skids 5 are below the upper edge of the supporting box.

Being of tapered construction, the boxes may be readily nested within one another when empty, the external overhang of the rim members 7, 8 supporting the nested box.

Owing to the structure and arrangement the box is amply strong and rugged to withstand the rough treatment which it receives in use. Recessing of end top members 8 also accommodates hinges 131 in a compact, snug manner. The effect is to substantially brace and rigidify said box at the top thereof by a very compact structure indeed. The box dispenses practically entirely with the use of metal, using only the slight amount represented by the securing rivets.

In Fig. 4 I illustrate a slightly modified embodiment of the box, similar in all respects to that described above except the provisions for pivoting or hinging the stacking bar 12 thereto. In this case the flexible hinge 18 is inserted endwise in a slot 19 in the stacking bar and suitably riveted therein, the hinge extending externally of the side member 7. To permit this the reinforce member 10 is reduced in its length along the side of the box, so that it does not extend externally over the recess 13 in top member 7. The hinge is swingably pivoted adjacent the end of the side wall by means of a grommet 181 or the like, enabling the bar 12 and hinge 18 to be swung outwardly and externally of the box. The hinge in this case, though flexible and of fibrous material, acts in the manner of a rigid connecting link, rather than in the manner of a flexible strap as in Figs. 1–3.

In Fig. 5 I illustrate a slightly modified embodiment of stacking bar and rim member structure in which the recess 21 in the rim member and the end 22 of the stacking bar have dovetailed engagement. This dovetail feature enables the stacking bar to perform the further function of preventing spreading of the side walls, likewise internal collapse thereof, due to the abutting relation of the dovetail connection, as clearly illustrated in Fig. 5. Obviously, in this form it is unnecessary to extend the reinforce strip 10 sufficiently to close the external end of the top member recess.

In Figs. 6 and 7 I illustrate an alternative somewhat simplified wall and bottom structure in which the end and side wall panels 22, 23, respectively, are simply butted together at the corners, rather than being lapped as in the preceding forms. In this embodiment the panels are preferably fabricated of ply wood or similar rigid, non-metal material which obviously does not per-

mit the lapped relationship mentioned. Reinforcing members **24**, **25** of stiff but bendable fiber are applied around the corners of the box for practically the full vertical height thereof, i. e., up to the wooden top members, and continuously around the bottom periphery of the box at the joint between the bottom forming member and the wall panels. Securement of the fiber reinforce strips **24**, **25** to the ply wood panels and bottom is effected by rivets **25**, **26**.

The end and side top members **27**, **28**, respectively, it will be noted in Figs. 6, 7 and 8, are vertically rabbeted on the inner sides thereof and applied to the end wall panels **22**, **23**, respectively, by abuttingly engaging the upper edges of said panels in the rabbet of the top members. It should be noted particularly in this embodiment that the flexible hinge **29** is disposed in a slot in the end top members which is located intermediate the inner and outer side of the latter and in substantially spaced relation to the inner side, being secured in said slot by rivets **30**. This affords a wooden surface **31** interiorly of the hinges **29** when the latter are in inoperative position, as illustrated clearly in Fig. 7, on which the top member of a superimposed nested box may rest without frictional wearing engagement with the web of the hinge, such as would tend to reduce the life thereof.

It will also be noted that in Fig. 6 the box under consideration, rather than being provided with recesses in the skids **32** thereof, merely has a portion of the material at the ends of the runners removed to provide end shoulders **33** at either end of the runner, which shoulders are readily engageable between the stacking bars of a box therebeneath.

In Fig. 9 I illustrate a further modified form of the invention, generally similar to that of Figs. 1–3, save that in this case the runners are not recessed. Excessive and objectionable displacement of a superposed stacked box is prevented by recessing the top side members and panels relatively deeply, as illustrated at **34** in Fig. 9, so that in stacked position the stacking bar **35** of a supporting box is disposed sufficiently below the upper edge of that box to laterally and longitudinally engage and restrain the runners of the superposed box against undue movement.

In all of the foregoing embodiments the boxes are, in the main, fabricated of readily and economically available materials, rather than incorporating substantial amounts of metal which is presently comparatively unavailable. Notwithstanding this, they are well braced against collapse, and are likewise characterized by the lightness and inexpensiveness thereof.

Embodiments of the invention which incorporate the principles of the invention in a highly desirable manner have been illustrated and described, though I am aware that other embodiments within the intent of the invention will suggest themselves to those skilled in the art. It should be understood that the foregoing terminology is used only descriptively rather than in a limiting sense, and with full intention to include equivalents of the features shown and described, within the scope of the following claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A stacking box comprising a bottom and upwardly diverging side and end walls of fiberboard, side and end rim members of wood disposed on the outer sides of the side and end walls and riveted thereto, the end rim members being provided with vertical slots on their inner sides and adjacent the ends thereof, the side walls and side rim members having upwardly facing stacking bar receiving recesses adjacent the ends thereof, angled corner members of fiberboard secured upon the outer sides of said side and end rim members to overlap said stack bar recesses in said side walls and side rim members, stacking bars of wood, and flexible straps secured to said stacking bars, the inner ends of said straps being arranged in said slots in said end rim members and secured therein by rivets arranged therethrough and through the end walls, the end rim members and said corner members, said stacking bars being adapted to constitute handles and being swingable on said straps into engagement with said stacking bar recesses or to collapsed position at the ends of the box permitting nesting of one box within another.

2. A stacking box comprising a bottom and side and end walls of fiberboard, side and end rim members of wood disposed on the outer sides of the side and end walls and secured thereto, the side walls and side rim members having upwardly facing stacking bar receiving recesses adjacent the ends thereof, angled corner members of fiberboard secured upon the outer sides of said side and end rim members to overlap said stacking bar recesses in said side wall and side rim members, stacking bars of wood, and flexible straps secured to said stacking bars and to the ends of said box, said stacking bars being adapted to constitute handles and being swingable on said straps into engagement with said stacking bar recesses or to collapsed position at the ends of the box permitting nesting of one box within another, said flexible straps being positioned to be movable across the top edges of the ends of the box when said stacking bars are moved from an inoperative position outside said box to an operative position in said stacking bar receiving recesses.

3. A receptacle of the type described, comprising side and end wall panels, and top reinforcing rim members secured thereto, said rim members and panels being secured together in rigid distortion resistant relationship, stocking bars, flexible hinge-like means connecting said stacking bars to the ends of the box, said side top members having recesses in the top edges thereof for the reception of the stacking bars in operative stacking position thereof, and reinforcing elements on said top members at the corners of the box having portions extending in external covering relation to said recesses to prevent longitudinal displacement of said bars therein, said flexible hinge-like means being positioned to be moved across the ends of the receptacle when said stacking bars are moved from an inoperative position outside said receptacle to an operative position in said recesses.

4. A stacking box comprising relatively rigid fiberboard side and end wall panels and rim members of wood secured thereto, said rim members and panels being secured together in rigid distortion resistant relationship, flexible fabric hinge straps secured to the ends of the box and positioned to be moved across the upper edges of the ends of the box, stacking bars of wood secured to the free ends of said straps, the side rim members having upwardly facing recesses for the reception of the stacking bar ends in operative stacking position thereof, and reinforcing elements on said top members at the corners of the box having portions extending in external

covering relation to said recesses to prevent longitudinal displacement of said bars therein.

5. A packing box comprising a bottom, end and side wall panels fabricated of relatively stiff non-metallic material, rigid rim members extending along and in side by side supporting engagement with said respective panels, said end rim members having recesses spaced from the inner sides thereof adjacent the respective panels, in which flexible fibrous hinge straps are disposed and secured, and non-metallic stacking bars secured to the free ends of said straps, the side rim members having recesses on the upper edge thereof for supporting reception of said bars, said bottom having longitudinal skids, portions of which are engageable between the stacking bars of a supporting box in stacked relationship to dispose said skids below the upper edge of the supporting box and prevent undue movement of the supported box.

6. A packing box comprising a bottom, end and side wall panels fabricated of relatively stiff non-metallic material, rigid rim members extending along and in side by side supporting engagement with said respective panels, said end rim members having recesses spaced from the inner sides thereof adjacent the respective panels, in which flexible fibrous hinge straps are disposed and secured, and non-metallic stacking bars secured to the free ends of said straps, the side rim members having recesses on the upper edge thereof for supporting reception of said bars.

7. A receptacle of the type described comprising side and end wall panels and corresponding side and end rim members secured thereto externally thereof, flexible fibrous hinge members secured to the end panel rim members having elongated stacking bars on the free ends thereof swingable internally of said box, the side panel rim members having alined recesses on the upper edges thereof and spaced from the ends thereof and corresponding in sectional outline to that of the stacking bars for the reception of the latter, said recesses providing shoulders to engage the stacking bars to prevent movement of the same longitudinally of the recessed side panel rim members, and means on said side panel rim members reinforcing the corners of the box and extending externally of said recesses in covering relation thereto to prevent longitudinal displacement of said bars therein, said flexible hinge members being positioned to be moved across the upper edges of the end panel rim members when the stacking bars are moved from an inoperative position outside the receptacle to an operative position in said recesses.

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