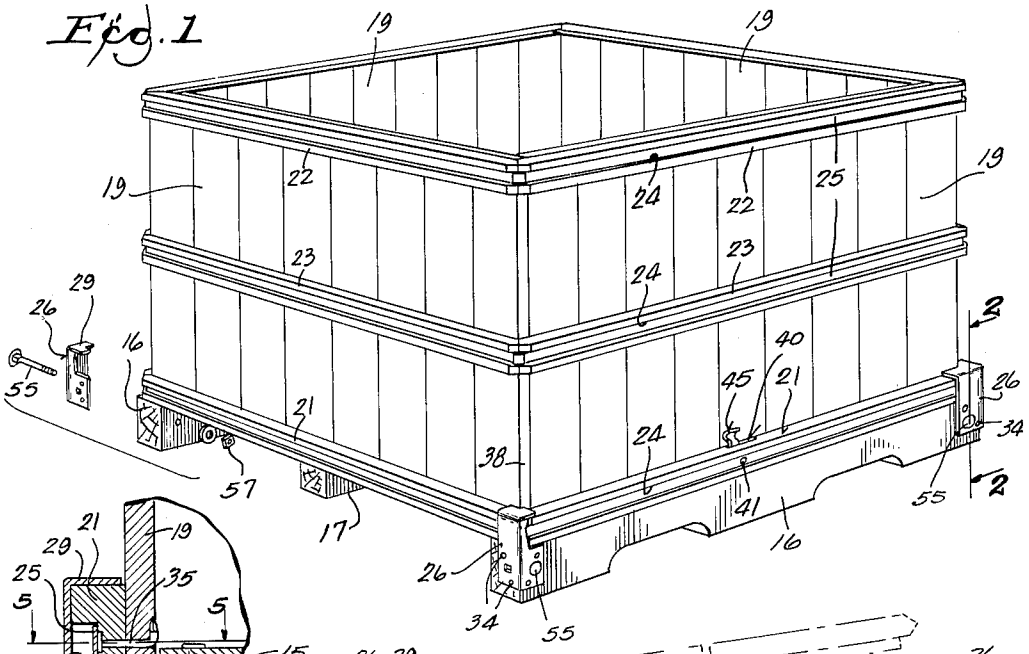
July 26, 1966 D. F. COFFEY, JR 3,262,597

DEMOUNTABLE AND RETURNABLE BULK BIN

Filed July 6, 1964 2 Sheets-Sheet 1

Fig. 1



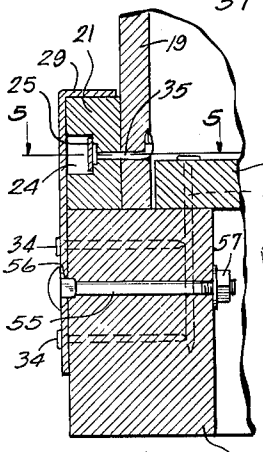


Fig. 2

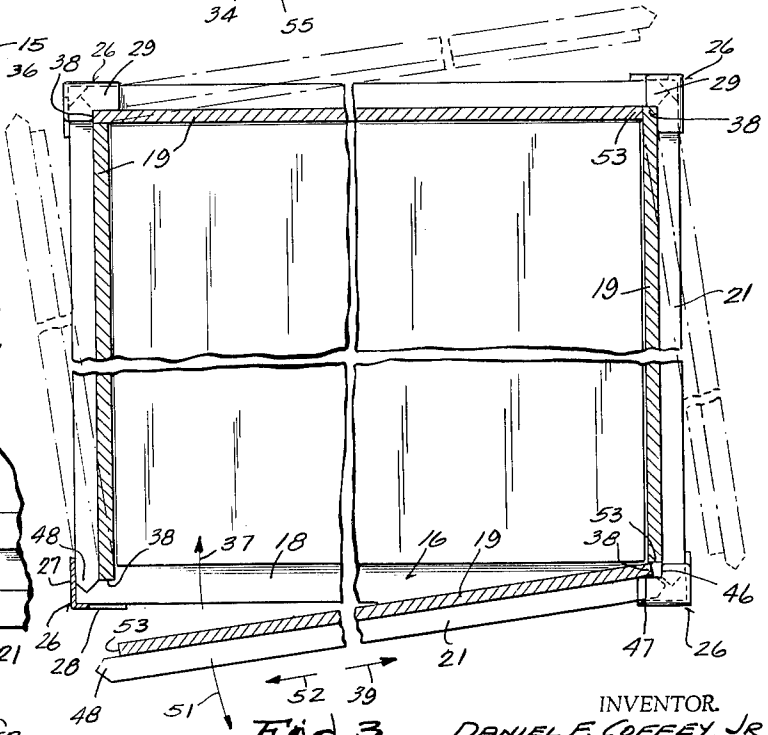


Fig. 3

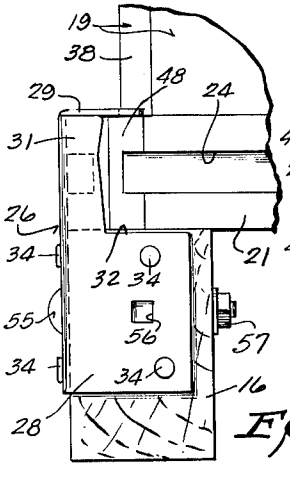


Fig. 10

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July 26, 1966 D. F. COFFEY, JR 3,262,597

DEMOUNTABLE AND RETURNABLE BULK BIN

Filed July 6, 1964 2 Sheets-Sheet 2

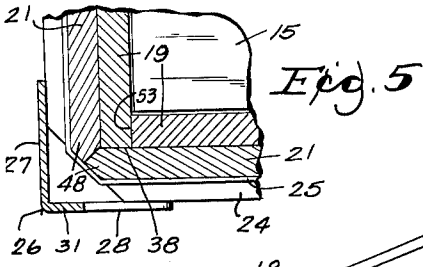


Fig. 5

Fig. 4

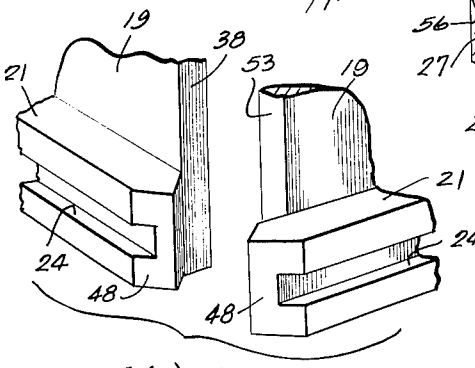


Fig. 11

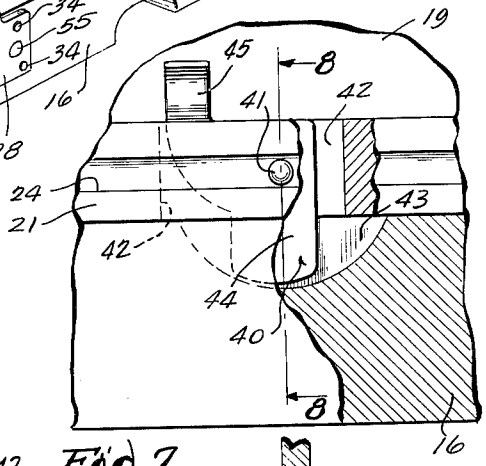


Fig. 7

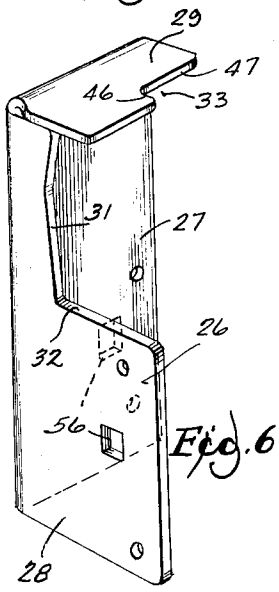


Fig. 6

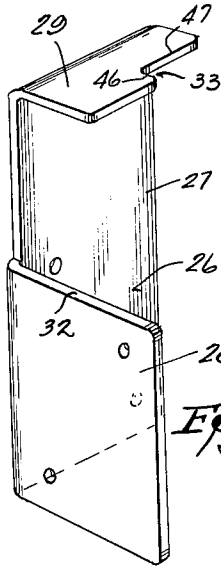


Fig. 9

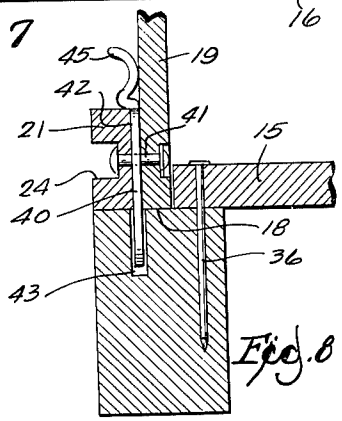


Fig. 8

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United States Patent Office 3,262,597 Patented July 26, 1966

3,262,597

DEMOUNTABLE AND RETURNABLE BULK BIN

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Filed July 6, 1964, Ser. No. 380,293
8 Claims. (Cl. 217—12)

This invention relates to a demountable and returnable bulk bin.

The bulk bin of the present invention is an improvement on the one shown in my copending application Serial No. 139,198, filed September 19, 1961, now U.S. Patent 3,159,300, in that the component parts of the bin of the present invention may readily be assembled and disassembled to facilitate shipment thereof in "knocked-down" condition, thus effectuating substantial savings in space in the course of return shipment.

Except for the provision of the novel corner brackets herein disclosed, the remaining components of the bin are similar to those shown in my copending application aforesaid. Accordingly, modification of the bin to make its components demountable and returnable involve very little extra expense over the prior bin aforesaid, and the features of the bin aforesaid are retained in the bin of the present invention.

In accordance with the present invention, the sides of the bin are completely free of any permanent connection to the bottom. The bottom is provided with novel corner brackets having flanges which overhang cleats provided along the bottom margins of the sides. The overhanging flanges of the corner brackets interlock mechanically with the side cleats to preclude vertical separation of the sides from the bottom. Bands which encircle the sides prevent lateral separation of the sides and rigidify the structure.

Accordingly, when in use to store and convey bulk material, the components of the bin are rigidly interconnected. After shipment, disassembly of the components is readily effectuated simply by cutting the bands. This permits lateral swinging movement of the sides to release them from interlocking relation with the corner brackets. When all of the sides are removed they may be stacked with respect to the bottom and tied together in a compact assembly for return to their point of origin for reassembly and reuse. Reassembly involves the converse manipulations of the sides to swing them laterally into interlocking relation with the corner brackets and rebanding thereof.

In preferred embodiments of the present invention releasable latches are provided between the lower margins of certain of the bin sides and the bottom to prevent lateral bulging of the bin sides under heavy loads.

Other objects, features and advantages of the invention will appear from the following disclosure in which:

FIGURE 1 is a perspective view of a bulk bin embodying the present invention, one of the corner brackets being removed and shown in spaced relationship to the bin.

FIGURE 2 is a fragmentary vertical cross section taken along the line 2—2 of FIGURE 1.

FIGURE 3 is a plan view of a bulk bin embodying the present invention, the mode of assembling and disassembling the sides from the bottom being illustrated in broken lines.

FIGURES 4 is a fragmentary perspective view of the bottom with the sides removed therefrom.

FIGURE 5 is a cross section taken along the line 5—5 of FIGURE 2.

FIGURE 6 is a perspective view of one of the corner brackets, per se.

FIGURE 7 is a fragmentary side elevation of a bulk bin showing the anti-bulging latch.

FIGURE 8 is a vertical cross section taken along the line 8—8 of FIGURE 7.

FIGURE 9 is a perspective view of a modified form of corner bracket.

FIGURE 10 is a fragmentary side elevation of a bulk bin showing the relationship between the lower cleat on one side and the corner bracket.

FIGURE 11 is a fragmentary perspective view showing in spaced relation sides which mate to form a corner of the bin.

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

Like parts are given the same reference characters in the several views.

As best shown in FIGURE 4, the bottom of the bin comprises a bottom panel **15** fastened to legs or runners **16** by nails **36**. Panel **15** may also be provided with an intermediate re-enforcing runner or cleat **17**.

The edges of the bottom panel **15** are offset inwardly from the outermost edges of the runners **16, 17** to provide a recess or seat **18** which extends completely around the bottom and into which the sides of the bin fit.

The bin sides consist of side panel portions **19** having parametrically aligned sets of cleats at the upper and lower margins of the side panels **19** and midway therebetween. The cleats at the lower margin are numbered **21**, those at the upper margin are numbered **22** and those intermediate the upper and lower margins are numbered **23**. The respective cleats are fastened to the side panels **19** as by nails **35** (FIGURE 2), and each has an external groove **24** formed therein. When the sides assembled with the bottom as shown in FIGURE 1, the various grooves **24** of each set are aligned to constitute a recess or trough within which tensioned metal bands **25** are received. I may optionally omit the grooves and bands from the lowermost sets of cleats **21**, where application of bands to this set would be interfered with by the corner brackets.

At each corner of the bottom there is provided a novel bracket **26** of either form shown in FIGURES 6 and 9. Bracket **26** consists of panel **27**, panel **28** at right angles thereto and an overhanging flange **29** formed by bending over the upper margins of panel **27**. Panel **28** is relieved or notched out at **32**, and flange **29** is relieved or notched at **33**. The relief at **32** is less in the embodiment of FIGURE 6 than in FIGURE 9, and a narrow re-enforcing web **31** remains in the FIGURE 6 embodiment as an upward extension of one side of panel **28**.

As indicated in FIGURES 2 and 4, brackets **26** are fastened by nails **34** or the like to the runners **16** to anchor the brackets at the outermost corners of the bin bottom. The vertical dimension of each bracket **26** is such that their flanges **29** are spaced above the tops of the runners **16** a distance just slightly greater than the height of the cleats **21** mounted on the lower margins of the side panels **19** by the nails **35**. Accordingly, when the sides **19** are mounted on the bottom as shown in FIGURES 1 and 2, the overhang of the flanges **29** with respect to the cleats **21** on the sides **19** will preclude vertical separation of the sides from the bottom and the sides and bottom are mechanically interlocked by the corner brackets. Part of flange **29** on each bracket **26** overhangs cleat **21** on one side **19** and another part of said flange **29** overhangs cleat **21** on an adjacent side **19**. Accordingly, each bracket restrains both sides which meet at a corner of the bin against vertical separation from the bottom.

When the bin is assembled as shown in FIGURE 1, the tensioned bands **25** securely hold the sides in rigid assembly and against lateral separation. As hereinbefore noted, the bands are provided at least for the upper and intermediate sets of cleats **22, 23**, and may also be provided for the lower set of cleats **21**. The brackets **26** hold the sides to the bottom against vertical separation. Accordingly, the bulk bin may be used to transport heavy loads (typically from 2,000 to 7,000 pounds of bulk material), and the rugged construction of the bin will withstand the heavy service to which it is subjected and the stacking of one loaded bin on top of another bin, as is also shown in my copending application aforesaid.

The notches **33** in the brackets **26** face inwardly and are complementary to the periphery of the side portions of the bin. The notches **33** have two edges **46, 47** which meet at a right angle and embrace corresponding edges **38** of the sides **19**.

The mode of assembly and disassembly of the component parts of the bin is shown in FIGURE 3. To assemble the parts corresponding vertical edges **38** of the respective sides **19** are moved in the direction of arrow **39** to slip them into confinement within the notches **33** in the corner brackets, and dispose cleats **21** behind the unrelieved panels **27** of the brackets **26**. The other vertical edges **53** of the sides **19** are then free to swing in an arc in the direction of arrow **37**. In the course of this movement, the edges **47** of the bracket flanges act as fulcrums for the confined edges **38** of the sides and about which the sides **19** swing into their seats **18**. In the course of this movement, the laterally projecting beveled portions **48** of cleats **21** pass through the relieved portions **32** of flanges **28** of the corner brackets, as shown in FIGURE 10.

When all sides are swung into position, the bands **25** are applied under tension to complete the assembly of the bin. As in my copending application aforesaid, the ends of the cleats **21, 22, 23** have double miters, and the bands **25** negotiate around these in two 45° bends. Moreover, the edges **38, 53** of successive sides are butt jointed as shown in my copending application and in FIGURES 1 and 3 hereof.

Disassembly is accomplished in the inverse order of assembly. The bands **25** are cut and discarded. The free vertical edges **53** of the sides **19** are then swung outwardly in the direction of arrow **51** with the confined vertical edges **38** of the sides bearing on the pivot fulcrums provided by edges **47** of notches **33** in the brackets **26**. After the free edge of each swinging side has cleared its bracket, the side may be moved in the direction of arrow **52** to withdraw it from engagement with notch **33**. The disassembled sides may then be tied to the bottom for compact shipment.

As shown in FIGURES 7 and 8, one or more of the sides **19** of the bin may be provided with an anti-bulging latch. This consists of a plate **40** pivotally connected on pin **41** to cleat **21** at substantially its longitudinal midpoint. For this purpose the cleat is provided with a vertical recess **42** to receive the latch plate **40**. Vertically aligned below recess **42** is another recess **43** in runner **16** and into which a finger portion **44** of the plate will swing when the latch plate is in its position shown in FIGURES 7 and 8. The latch plate may be manipulated by a handle portion **45** formed thereon and which overlies the upper edge of the cleat **21** when the latch is engaged.

Force exerted outwardly on the side **19** will be contained by the engaged latch finger **44**, thus to help the bin withstand the pressures of heavy loads. Prior to disassembly of the parts, the latch finger **44** is withdrawn from its socket **43** by pivoting the latch plate clockwise about the pivot **40**, as viewed in FIGURE 7, whereupon the side **19** may be swung outwardly as shown in FIGURE 3.

While the tension of bands **25** is relied on primarily to hold the sides together laterally, it is clear that the vertical edges **38** of sides **19** which are confined in the notch **33** of the bracket will also be held against lateral movement

by the bracket **26**. The opposite or free vertical edges **53** of the sides **19** are not confined laterally by the brackets **26** and rely on the bands **25** for lateral confinement. As is clear from FIGURE 10, the beveled edges **48** of cleats **21** are free to swing through the relieved notches **32** of the bracket panels **28**. Edges **48** are offset from the web **31** of the brackets **26** which do not interfere with such swinging movement.

The webs **31** provide an abutment support for the turned over flange **29** in the bracket embodiment of FIGURE 6. This protects flange **29** from being bent out of shape during return shipment when the cleats **21** are no longer therebeneath.

In addition to attaching the brackets **26** to the runners **16** with nails **34**, carriage bolts **55** may be used. To receive the squared off shanks of the carriage bolt, brackets **26** are provided with square apertures **56** in the embodiment of FIGURE 6. The threaded ends of the carriage bolts **55** receive nuts **57**.

In the disclosed embodiment, the latches **40** are provided at two opposite sides of the bin. If desired, they could be provided at all four sides of the bin, or could be omitted entirely if the bin contents do not exert sufficient pressure to bulge the bin sides.

I claim:

1. A bulk bin comprising a bottom and demountable sides, said sides being connected with both the bottom and with each other when mounted on the bottom and being free of connection with the bottom and each other when demounted therefrom, said sides having cleats at their lower margins with portions which project laterally therefrom at the corners of the bin, said bottom being provided with fixed corner brackets having flange portions disposed in a slightly spaced overhanging relation to the projecting portions of the cleats at the bin corners to interlock mechanically therewith to preclude vertical separation of the sides from the bottom, said brackets being relieved at corresponding sides thereof in lateral alignment with the projecting portions of the cleats, and severable bands which encircle the sides of the bin to preclude lateral separation of the sides and maintain said interlock when the sides are mounted on the bottom, said sides being free to move laterally when the bands are severed to move the said projecting cleat portions laterally through the relieved portions of the brackets and out of interlocked relation to the bracket flanges for demounting the sides with respect to the bottom.

2. The bulk bin of claim **1** in which said bottom comprises support legs to which the corner brackets are connected and a floor panel portion having edges which are offset inwardly from the edges of the support legs to constitute shouldered recesses around the periphery of said bottom to receive the lower edges of said sides.

3. The bulk bin of claim **1** in which the overhanging flanges of said corner brackets have inwardly facing notches complementary to the periphery of the side portions of the bin.

4. The bulk bin of claim **1** in which said brackets are provided with fulcrums about which said sides pivot in the course of assembly and disassembly of the sides with respect to the bottom.

5. The bulk bin of claim **1** in which certain of said sides and said bottom are provided with releasable latch means intermediate said corner brackets to hold said side against lateral bulging when engaged and free the side for lateral movement when released.

6. The bulk bin of claim **5** in which said latch means comprises a finger pivoted to the lower margin of a side and for which said bottom is provided with a finger receiving socket.

7. A bulk bin having a bottom with a marginal side receiving recess and upstanding brackets fixed at the corners thereof, said brackets having flanges spaced above said recess and extending inwardly to overhang said recess at the corners of the bin, demountable sides having their lower edges seated in said recesses and having cleats at

their lower margains with portions which project laterally outwardly therefrom beneath the overhanging flanges of said corner brackets whereby said sides and bottom are mechanically interlocked by said brackets against vertical separation, and severable bands which encircle the sides of the bin to preclude lateral separation of the sides and maintain said interlock when the sides are mounted on the bottom, said brackets having upright panels in right angular relation, one of which is relieved in the path of lateral movement of a laterally projecting side cleat portion at one edge of the side, said sides being free to swing laterally when the bands are severed to swing said side cleat portions through the relieved panels of the corner brackets and out of interlocked relation to the bracket flanges for demounting the sides with respect to the bottom.

8. The bulk bin of claim 7 in which said sides have

cleats also along their upper margins, the respective cleats along the upper margins of said sides being parametrically aligned and having communicating grooves therein, said bands being in the cleat grooves.

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