Sept. 13, 1955 A. J. FARRAR 2,717,716

COLLAPSIBLE TOTE BOX

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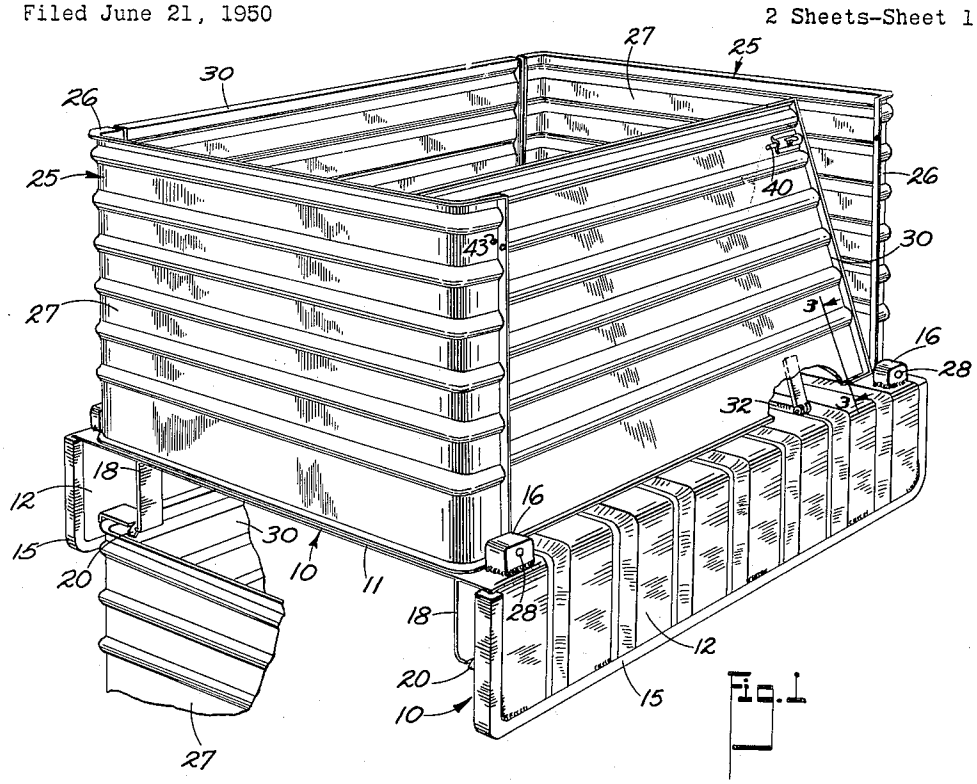


Fig. 1

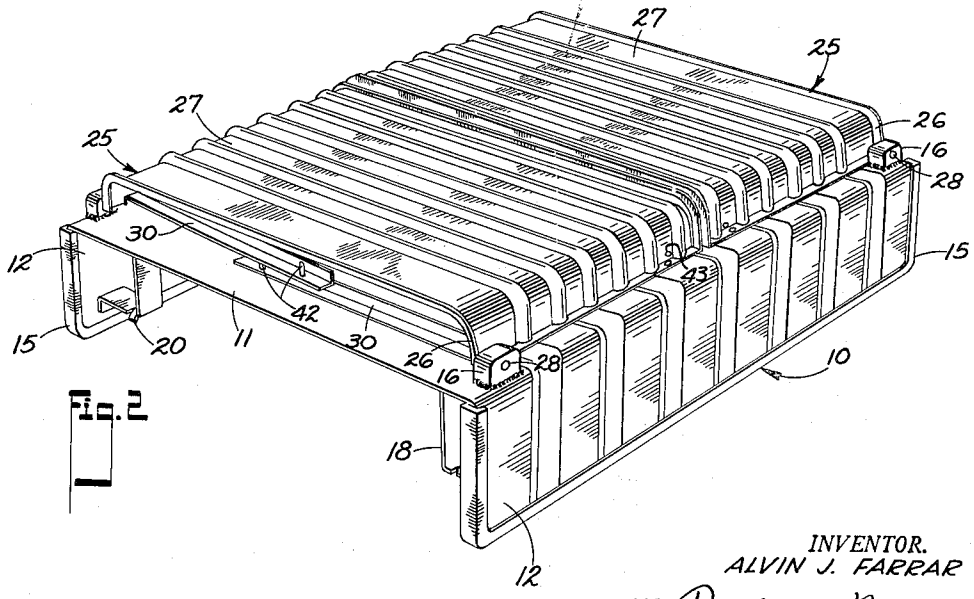


Fig. 2

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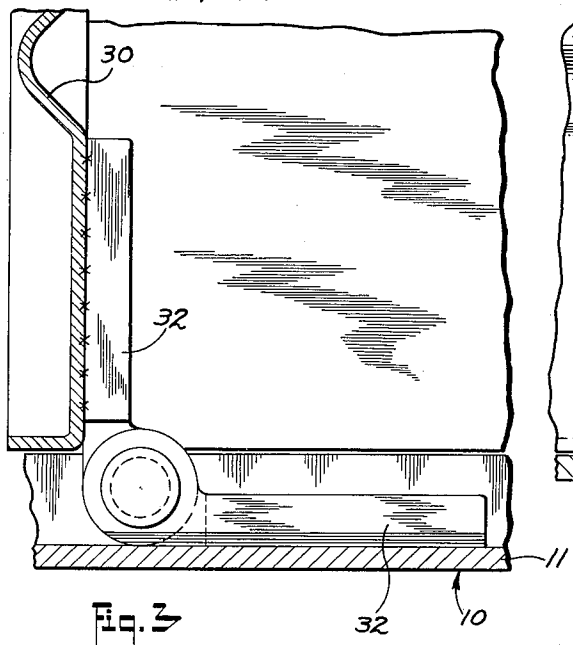


Fig. 3

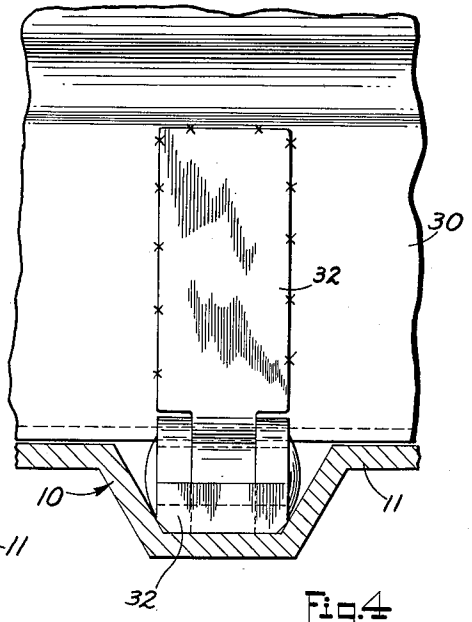


Fig. 4

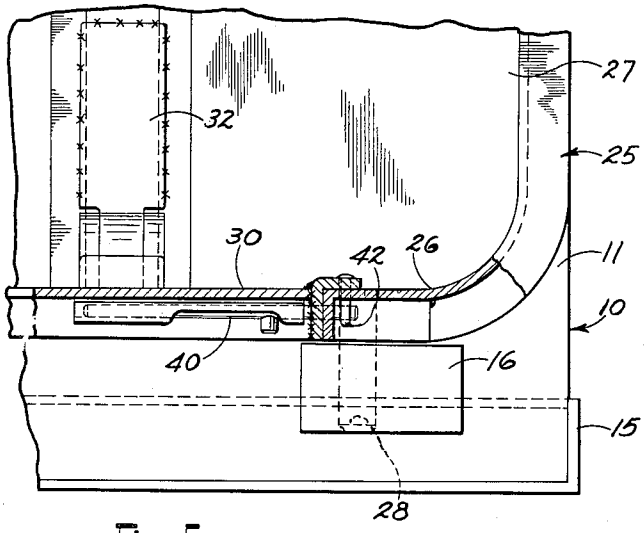


Fig. 5

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United States Patent Office 2,717,716 Patented Sept. 13, 1955

2,717,716

COLLAPSIBLE TOTE BOX

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Application June 21, 1950, Serial No. 169,410

2 Claims. (Cl. 220—6)

The present invention relates generally to material handling apparatus and is more particularly concerned with a novel collapsible vessel for carrying and storing metal articles.

In steel mills, foundries, factory shops and other places where it is necessary to transport or store metal articles of relatively small size, such as machine parts, it is customary to provide boxes or barrels for the purpose. Devices of this kind, however, are almost as difficult to handle when they are empty as when they are loaded and they take up the same amount of space in either condition and thus present serious storage problems. Furthermore, these devices are not adaptable to stacking one on top of another with any degree of safety or assurance that they will remain in the desired stacked position even when the stacks are neither moved nor subjected to impacts normally incident to their employment.

In accordance with this present invention, the foregoing difficulties and shortcomings of the prior art devices can be eliminated and certain additional advantages can be obtained for the first time to my knowledge. Not only can the present devices be collapsed for storage while they are not in use, but they may be collapsed in such a way that their more fragile parts are protected against damage in the event that anything falls on the boxes or the boxes are struck against anything. Furthermore, these present devices may be stacked one upon another to substantial height with complete stability throughout the stack due to their novel construction as will be described. Still further, while these devices of my invention are more economical to use because of their foregoing features, they are not any less capacious nor any more expensive to produce than the devices of the prior art preferred in commercial operations heretofore.

With reference to the drawings accompanying and forming a part of this specification:

Fig. 1 is a fragmentary, perspective view of a pair of tote boxes embodying this invention in a preferred form and disposed in stacked relation to each other;

Fig. 2 is a perspective view of a box of Fig. 1 in collapsed condition;

Fig. 3 is a fragmentary sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a fragmentary, sectional, side elevational view of the hinged side wall and base plate shown in Fig. 3; and,

Fig. 5 is a fragmentary plan view of a corner portion of the tote box of Fig. 1 with the end and side walls in the upright position, the upper portions of these walls being broken away to show the locking means with the bolt engaged with the end wall.

Generally, the device of this invention comprises a substantially rectangular metal base plate having opposed flange portions to rest on the floor, a pair of opposed sheet metal end walls supported by this plate and movable toward each other from a substantially upright position to a substantially horizontal position relative to

the base, a pair of opposed sheet metal side walls supported on the base to cooperate with the end walls and base to define a box, and hinge means to secure the side walls to the base so that these side walls may be folded one over the other.

More specifically, the device of this invention illustrated in the foregoing drawings comprises a channel-shaped, generally rectangular, corrugated metal base plate **10** having a relatively broad web portion **11** and short sides or flanges **12**. The edge portions of sides **12** are protected by means of channel-shaped rails **15** which receive these edge portions and are welded to said sides for direct engagement with abutting or supporting means or structures. A bearing block **16** is welded to the upper side of the base at each of its four corners for a purpose to be described. Underneath the base and within its channel section, an L-shaped bracket **18** is welded at its ends to the web and a flange or side portion of the base near each of the corners of said base. These brackets are formed with tongue portions **20** projecting downwardly from the bases of the "L's" in the direction of the adjacent ends of the base. These tongue portions, when boxes of this invention are stacked, serve to prevent the boxes from sliding relative to each other by engaging the top edge portions of end walls of the next lower boxes, the normally horizontally disposed portions of the brackets (i. e. the bases of said "L's") resting on the upper edges of the side walls of said next lower boxes, as shown in Fig. 1.

A pair of opposed, spaced, end walls **25** of corrugated, generally channel-shape, metal plate stock and having relatively short sides or flange portions **26** and relatively broad web portions **27** are disposed on top of base **10** and provided with trunnions **28** projecting outwardly from their sides adjacent to their ends for receipt in bearing blocks **16**. Thus, walls **25** are mounted for motion in vertical arcs from upright position, as shown in Fig. 1, toward each other into the position shown in Fig. 2, wherein they may engage each other and cooperate with each other and with base **10** to define a substantially continuous passageway extending longitudinally over the top of the base. The depth of these end wall channels may be varied substantially, depending upon the clearance to be provided between end walls **25** and the upper surface of the base when the walls are in the Fig. 2 position. In any event, however, these walls **25** are preferably mounted so that when they are in upright position, the lower portions of webs **27** are adjacent to the ends of the base but do not project beyond these ends so that the resulting box has no openings in the lower portions of its ends through which its contents may be lost. Also, preferably the width of flanges **26**, i. e. the depth of the end wall channels, is adjusted to insure clearance for the side wall plates when these are folded one over the other as mentioned above.

Opposed side walls **30** are also of corrugated metal plate stock and are of width substantially the same as the length of end walls **25** so that the resulting box has a top edge portion defining a plane substantially paralleling the top surface of base plate. Side walls **30** are long enough to extend from the edge portion of one flange **26** to the opposing edge portion of another flange **26** so that the box is substantially closed around its side, end and bottom walls when walls **25** and **30** are in upright position.

Side walls **30** are attached by means of several, spaced strap hinges **32** welded to the inside portions of said walls and to base **10** in corrugation grooves thereof to provide protection of these hinges from articles loaded in the box. These hinges are spaced in relation to the side edges of web **11** of the base so that the walls **30** will be aligned with the opposed flange edges of walls

25 when all these walls are disposed in upright position.

Locking means are provided to secure the side walls and end walls together in upright position so that the box will be stable and will not collapse during use. This means in each instance includes bolts **40** carried by the side walls near their upper edges and movable lengthwise thereof within certain limits to lock walls **25** and **30** together. Altogether, four of these bolts **40** are provided and opposing edge portions of flanges **26** and walls **30** are provided with apertures for registry with each other for receipt of these in locking position.

Indexing means are additionally provided to assist in the conversion of the box from collapsed condition. This means comprises a stud **42** secured to each flanged edge portion of each wall **30** near the free or upper end of said wall for receipt in apertures **43** provided for the purpose in the upper portions of flanges **26**.

Having thus described the present invention so that those skilled in the art will be able to gain a better understanding and practice the same, I state that what I desire to secure by Letters Patent is defined in what is claimed.

What is claimed is:

1. A collapsible, open-top, rigid metal box comprising a substantially rectangular sheet metal base, a pair of channel-shaped spaced sheet metal end walls supported on the base and movable toward each other from a substantially vertical to a substantially horizontal position relative to the base, the web and side portions at the lower end of each said end wall defining a substantially continuous edge portion to bear upon the top of the base and thereby limit motion of said end walls apart beyond a predetermined generally upright position, means comprising a pair of trunnions secured to and extending from the sides of said end walls at points spaced from said continuous edge portion and two pairs of spaced bearing blocks secured to the base inwardly of the edge thereof to receive and rotatably retain said trunnions for pivotally attaching the said end walls to the base, a pair of opposed, spaced, elongated sheet metal side walls supported on the base to cooperate with said end walls and base to define a box, lock means carried by the side walls and engaging the end walls to hold said side and end walls in fixed position relative to each other and hinge means to secure the side walls

to the base for folding said side walls on top of the base and in the passageway defined by the base and the end walls, said end walls having sides wider than the aggregate thickness of said side walls in folded relation and having lengths aggregating substantially the length of each side wall.

2. A collapsible, open-top, rigid metal box comprising a substantially rectangular sheet metal base, a pair of channel-shaped spaced sheet metal end walls supported on the base and movable toward each other from a substantially vertical to a substantially horizontal position relative to the base, the web and side portions at the lower end of each said end wall defining a substantially continuous edge portion to bear upon the top of the base and thereby limit motion of said end walls away from each other, said end walls facing each other when in upright position with their side edge portions and web edge portions engaging the top of the base and with their said side edge portions disposed inwardly of the side edges of the base, said end walls being formed to cooperate with each other and said base when in horizontal position to define a substantially continuous passageway over the top of said base substantially from end to end thereof, means pivotally securing the end walls to the base and engaging the side portions of the end walls adjacent the ends thereof at points spaced from said continuous edge portion, a pair of opposed, spaced, elongated sheet metal side walls supported on the base to cooperate with said end walls and base to define a box, and hinge means to secure the side walls to the base for folding said side walls on top of the base and in the passageway defined by the base and the end walls.

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