

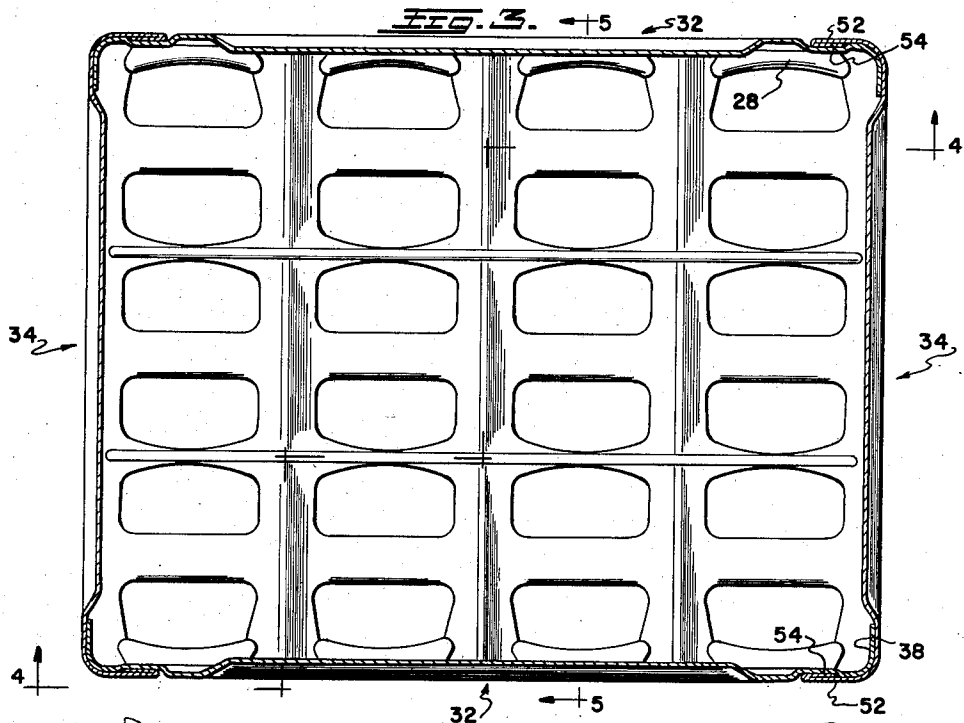
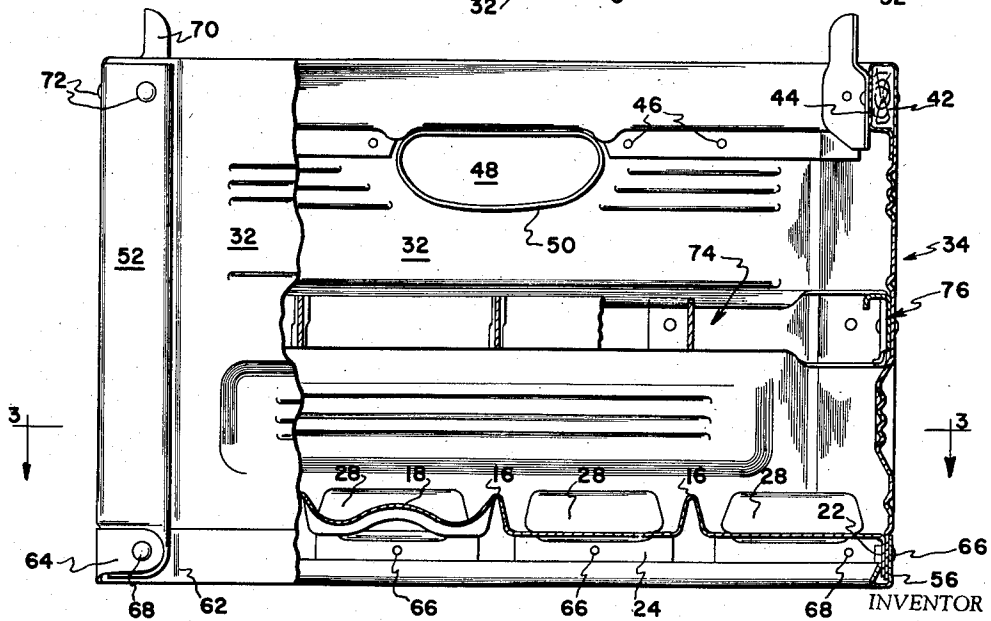
Sept. 8, 1959

H. REHRIG
BOTTLE CRATE

2,903,150

Filed March 29, 1955

4 Sheets-Sheet 2



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4 Sheets-Sheet 3

FIG. 5.

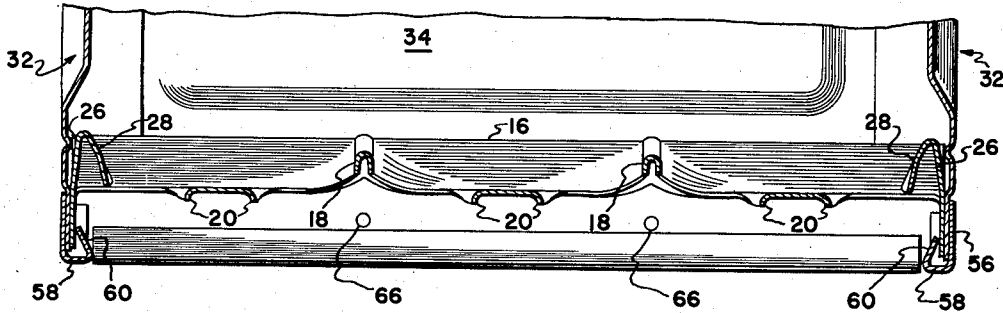
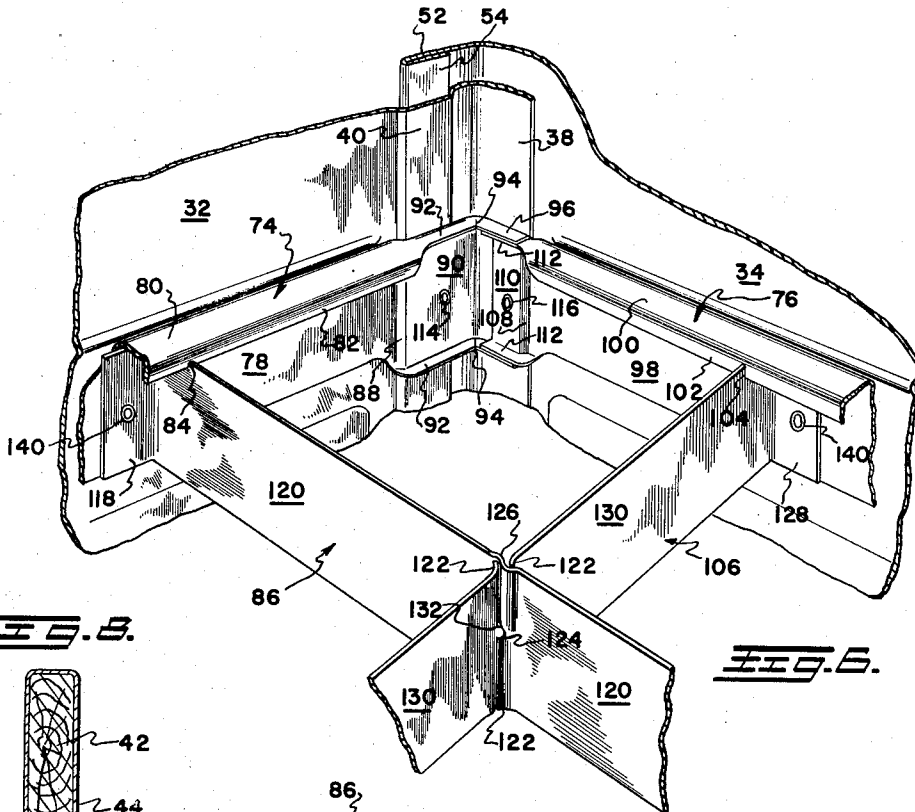


FIG. 8.

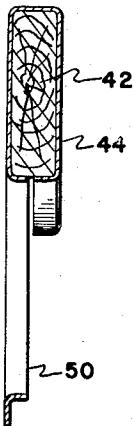
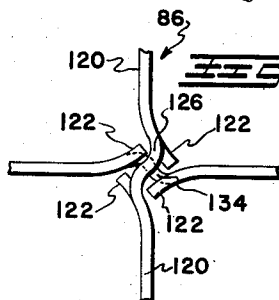


FIG. 6.

FIG. 7.



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4 Sheets-Sheet 4

FIG. 9.

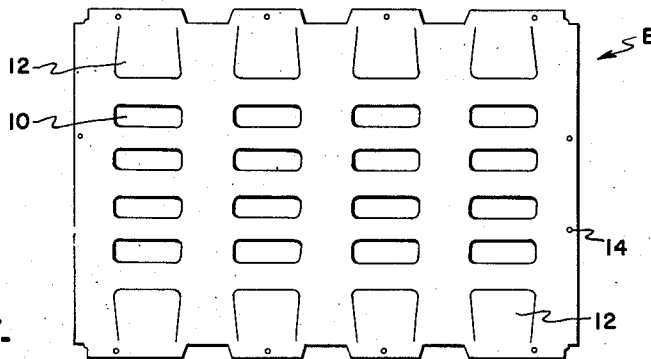


FIG. 10.

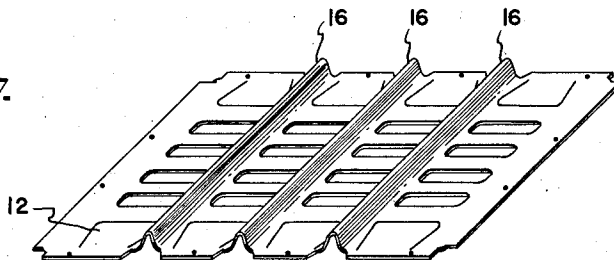


FIG. 11.

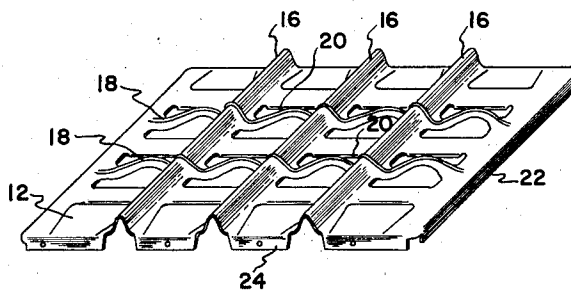
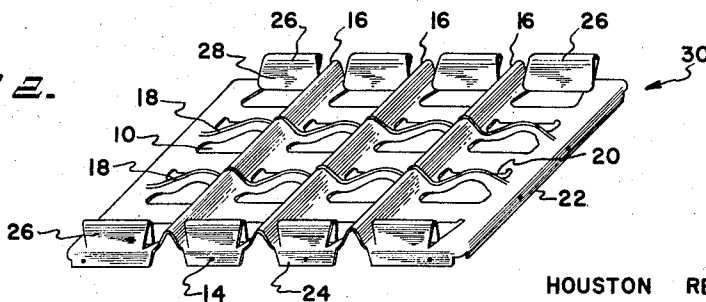


FIG. 12.



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2,903,150

BOTTLE CRATE

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Application March 29, 1955, Serial No. 497,651

3 Claims. (Cl. 220—21)

This invention relates to crates for bottles, and more particularly to a bottle crate of improved construction which is especially adapted for handling milk bottles.

Bottle crates of the type with which my invention is concerned have found wide acceptance in the milk industry. The primary features which are desirable in a crate of this type are lightness, strength and durability, and the provision of adequate protection against breakage of the bottles which are handled in the crate.

Accordingly, it is a primary object of my invention to provide a crate for bottles in which the component parts are interlocked with each other to provide an extremely rigid and rugged construction of relatively lightweight sheet material.

Another object of my invention is to provide a bottom element for a bottle crate formed from a single piece of sheet material and especially adapted to mass production.

Still another object of my invention is to provide improved structure for segregating and protecting a plurality of bottles disposed within the crate.

These and other objects are achieved in a bottle crate in which the great majority of the individual parts are formed from sheet aluminum. Parts of the crate which are formed from heavier material consist of the crate bottom, a protective strip-like bottom flange assembly upon which the crate rests, and stacking ears. With the exception of the bottom element, each of the foregoing components is of relatively small size. The weight of the bottom element is greatly reduced by employing a relatively thin gauge of sheet steel having a plurality of aligned openings which are arranged to permit the use of a lighter gauge of material than would otherwise be possible.

Structurally the bottom is formed with upstanding ridges which extend longitudinally and transversely across the bottom between the openings formed therein. Along the longitudinal edges of the bottom, a series of guard elements are constructed by making a series of three-sided cuts, bending the material surrounded by the cuts upwardly and then folding this material downwardly so that a generally V-shaped cross section is obtained.

The crate disclosed is one which is adapted to handle bottles in units of one dozen, according to standard practice in the milk industry. This necessitates a crate of rectangular shape, and since one set of side walls must be of greater length than the remaining set, and therefore requires different forming operations, I employ a different structural arrangement on the "long" side walls than that employed upon the "short" side walls. Each of the walls have extended flanges at each end which cooperatively engage flanges on adjacent walls. One set of walls is channelled to receive a double back portion of the flanges on adjacent walls.

At their upper edges, each side wall is folded downwardly over a filler strip of light wood and secured to the inner surface of the side wall below the filler strip.

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A divider assembly is mounted midway up the side walls of the crate. The divider assembly includes rail elements having interfitting channelled end portions. All of the rail elements have an integral inwardly extending flange portion which is bent downwardly along the inner edge and slotted to receive strip-like divider elements which extend between opposite rail elements. The divider elements are assembled into an intersecting grid-like structure in which the intersections are accomplished by complementary slots and connecting portions. The connecting portion of each strip is crimped so as to be received between offset ear portions defining a slot in the intersecting strip.

In order to allow a plurality of crates to be safely stacked one on each other, at each upper corner of the crate, a steel stacking ear is secured in position and so formed as to snugly abut the inner corners of the supporting flanges of a like crate. Hand holes are provided in each of the side wall elements to facilitate handling of the crate.

Other objects and advantages of my improved milk crate will become readily apparent by reference to the following specification taken in conjunction with the accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of an embodiment of my invention;

Fig. 2 is a plane view of the crate shown in Fig. 1 partially in section;

Fig. 3 is a horizontal cross sectional view of the crate of Fig. 1 taken on the line 3—3 of Fig. 4;

Fig. 4 is a side elevation of the crate of Fig. 1, partially in section as indicated by the line 4—4 of Fig. 3;

Fig. 5 is a partial vertical cross sectional view of the crate of Fig. 1 taken on the line 5—5 of Fig. 3;

Fig. 6 is a detail perspective view of an interior corner of the crate of Fig. 1, showing in detail portions of the side walls and divider assembly;

Fig. 7 is a detail plan view of the intersecting divider strips;

Fig. 8 is a partial vertical cross section taken on the line 8—8 of Fig. 2;

Fig. 9 is a plan view of the blank from which the crate bottom is formed;

Fig. 10 is a perspective view of the blank of Fig. 9 after the initial forming step has been performed;

Fig. 11 is a perspective view of the blank of Figs. 9 and 10 after a subsequent step of forming has been performed; and

Fig. 12 shows the completed bottom element after a step subsequent to that of Fig. 11 has been performed.

The construction of the bottom element of my milk crate may be best appreciated from a description of the method by which it is formed.

Referring first to Fig. 9 of the drawings, the blank B is of generally rectangular shape and has a plurality of longitudinally and transversely aligned rectangular openings, as 10, cut or punched therein. Along the "long" side of the rectangular blank a row of three-sided cuts 12 are aligned longitudinally with each other and transversely with rectangular openings 10. A plurality of small holes, as 14, are suitably disposed around the periphery of the blank B for the reception of rivets employed in assembling the crate. The first step in the shaping of the blank B is illustrated in Fig. 10 in which a plurality of upstanding ridges 16 having an inverted V-shaped cross section are formed. The ridges 16 extend transversely across the short dimension of the rectangular blank B between the aligned openings 10.

After the formation of ridges 16, a series of longitudinally extending ridges 18 are formed by bending alternate rows of the strips of metal between openings 10

upwardly into an arcuate configuration and then creasing the bent-up portion. The ridges 18, in cooperation with the ridges 16 define a series of compartments upon the crate bottom which are adapted to locate the milk bottles within the assembled crate. The remaining longitudinal strips are bent downwardly along their longitudinal edges simultaneously with the formation of ridges 18 to form strengthening flanges 20. At the same time, the peripheral edges of the blank B are bent downwardly at right angles to the original plane of the blank sheet to form mounting flanges 22 and 24 around the periphery of the blank.

The final step in the formation of the bottom element is an operation upon the material included within the three sides of the cutout 12. This material is first bent upwardly into a nearly vertical plane (see Fig. 5) and then folded downwardly to form a guard element 26. Since the longitudinal side of the three-sided cut 12 is of greater length than the distance along the portion which is integral with the bottom, that portion of the material 28 which forms the inner surface of guard element 26 can span the opening formed when this material is bent out of the plane of the sheet and, therefore, the edges of portion 28 may rest upon the sheet at either side of the opening. The portion 28 is also shaped to present a slightly concave surface adjacent the milk bottle (see Fig. 2).

Secured against the longer dimension of the completed bottom element 30 are a first pair of side wall elements generally designated 32. Each of the first pair of side wall elements 32 are identical in construction with each other but differ both dimensionally and in constructional features from end wall elements 34 which are secured to each of the shorter sides of bottom element 30. Side wall elements 32 are constructed from a single piece of sheet aluminum and may be provided with suitably disposed strengthening ribs as 36 which are stamped or otherwise pressed into the blank sheet.

Referring especially to Figs. 3 and 6, it will be noted that the ends of side wall elements 32 are extended and bent to form a flange portion 38 which is disposed in a plane at right angles to the general plane of the side wall element 32. Closely adjacent the flange portions 38, a vertically extending channel 40 is formed in side wall 32. Side walls 32 are folded downwardly along their upper edges to encase reinforcing filler blocks 42. The folded down portion 44 is bent inwardly along the underside of filler block 42 and is secured to the side wall below block 42 as by rivets 46. Immediately below the central portion of the encased filler block 42 an opening 48 is provided to assist in the handling of the crate. The edges of the openings 48 are turned inwardly as at 50 to prevent sharp edges from coming into contact with the hand of a person handling the crate.

End walls 34 are likewise identical with each other but are of different construction than side walls 32. Like side walls 32, end walls 34 are constructed from sheet aluminum and are provided with suitably disposed strengthening ribs which are stamped or pressed into the end wall blank. At either side, the vertical edge of end wall 34 is extended and bent into a plane at right angles to the general plane of the end wall. The extensions 52 are doubled back, the doubled back portion 54 thus forming a vertically extending strip of double thickness at the end of extension 52. The double thickness of material in this region is adapted to lie within the channel 40 in the adjacent side wall 32 to present a smooth and projectionless outer side surface. Along their upper edges end walls 34 are folded downwardly around filler blocks 42 and are secured against the end walls in the same manner as the folded down portion of side walls 32.

Side walls 32 and end walls 34 are secured to the bottom element 30 against mounting flanges 24 and 22 respectively. To afford a more durable supporting sur-

face for the crate, supporting strips 56 and 58 of sheet steel are secured along the lower edges of end walls 34 and side walls 32, respectively. As seen in Fig. 5, the supporting strips are extended downward below the bottom edge of end walls 32 and are then bent into a horizontal plane and extended inwardly beyond the mounting flanges as at 58 to provide a broader supporting surface than would be obtained than if the supporting strips were closely conformed to the bottom edge of the side or end walls and their respective mounting flanges. The mounting strips are bent upwardly as at 60 to eliminate any sharp corners along the edges of the supporting surfaces 58. While the cross section of supporting strips 54 is the same as that of strips 56, the strip 54 is terminated at each end of side wall 34. The end portions of mounting strips 58 are offset inwardly as at 62 (see Fig. 4) to provide a recess at each end of the strips 58 into which the extensions 52 of end walls 34 and extended securing tabs 64 which are integral with supporting strips 56 may be received. The supporting strips, walls and mounting flanges of bottom 30 are secured intermediate their end by rivets 66 which pass through all three elements. At each corner of the crate, rivets 68 extend through securing tab 64, extension 52 of end walls 34 and side walls 32 to secure the aforementioned elements together in this region.

At each of the upper corners of the crate, a stacking ear is secured to both of the abutting end wall element by rivets 72 which pass through the outer wall surface, filler blocks 42, the folded down portion of the wall elements and the stacking ear. The stacking ears 70 are shaped so as to snugly engage the inner corner surfaces of supporting strips on a similar crate to firmly hold the crates in aligned stacked relationship.

To maintain bottles placed within the crate separated from one another in an orderly arrangement, a divider assembly is secured to the interior of the crate walls at a position approximately one-half of the distance between bottom element 30 and the upper edges of the crate. The divider assembly comprises like rail elements 74 which are secured against side walls 32 and a second pair of like rail elements 76 which are secured against end walls 34. With the exception of the ends of the elements, rail elements 74 and rail elements 76 are substantially identical. Both elements 74 and 76 are formed from sheet aluminum material.

The main body portion of rail elements 74 consists of a strip-like mounting portion 78 which is disposed in a vertical plane. Integral with the upper edge of mounting portion 78, a horizontally disposed spacing flange 80 is extended inwardly of side wall 32 to a downwardly bent lip portion 82. A plurality of spaced vertical slots 84 are cut into lip portion 82 for receiving dividing strips 86. At either end, see Fig. 6, the mounting strip 78 is enlarged and offset inwardly of the crate at 88 in order that an extended flange portion 90 may lie against the inner surface of channel 40 while allowing mounting portion 78 to lie against the interior surface of side wall 32. Horizontal flanges 92 are formed on the upper and lower edges of flange portion 90 to give the flange portion 90 a channel shaped cross section. Right angled notches are cut in the flanges 92 at 94 to allow the end portion of flange portion 90 to be bent at right angles to lie against the inside of flange 38.

The main body portions of rail elements 76 are formed to have a cross section similar to that of rail elements 74 with a mounting strip 98, spacing flange 100, and lip portion 102. Like lip portion 82, lip portion 102 is provided with spaced slots 104 for the reception of divider strips 106. At each end, the body portion 98 is enlarged and offset inwardly at 108 to form an extension 110 having flanges 112 which form a channel shaped cross section of extension 110 similar to the channel shaped cross section of flange portion 90 of rail elements 74. The flanges 112 are spaced apart a distance which allows them

to snugly fit within the flanges 92 of end portion 96 on rail element 74. Rivets 114 secure rail elements 74 at flange portion 90 to channel portion 40 of side wall 32, and doubled back portion 54 of end walls 34. Rivets 116 pass through extension 110 of rail elements 76, end portion 96 of rail elements 74, flange portion 38 of side walls 32 and end wall 34 to secure these elements to each other.

Dividing strips 86 extend across the crate between opposite rail elements 74. The dividing strips 86 are formed from sheet aluminum material disposed in a vertical plane and have mounting tabs 118 bent at right angles to the end body portions 120. Dividing strips 86 have a plurality of body portions 120 which, for a given strip, are disposed in a common vertical plane. Adjacent body portions 120 terminate in offset ear elements 122 which are bent out of the plane containing the body portions 120. Adjacent ear elements 122 of adjacent body portions are oppositely bent from one another into parallel vertical planes (see Fig. 7). The inner, or opposing surfaces of adjacent ear elements 122 thus define a slot which, in the case of dividing strips 86 extends upwardly from the lower edge of the strips 86 to an enlarged opening 124 substantially midway between the lower and upper edges of the strip 86. The slot defined between the inner or opposing surfaces of adjacent ear elements 122 is thus of greater transverse length than a slot which passed across the strip 86 at right angles to the plane of body portions 120. Directly above the enlarged openings 124, a connecting or bridge portion 126 integral with both adjacent body portions 120, lies in a vertical plane which is substantially at right angles to the parallel vertical planes containing adjacent ear elements 122. When viewed from above, as in Fig. 7, adjacent body portions 120 of dividing strips 86 appear to be connected by an S-shaped offset portion since connecting portion 126 extends between points which are approximately one-half of the distance between the edges of offset ear elements 122 and the point at which the offset ear elements join body portions 120.

Dividing strips 106 are likewise formed with mounting tabs 128 similar to mounting tabs 118 on dividing strips 86. The dividing strips 106 also have offset ear elements 122 located at ends of vertically disposed coplanar body portions 130. In the case of dividing strips 106, the offset ear portions 122 extend downwardly from the upper edge of the strips 106 to an enlarged portion 132 located substantially one-half of the distance between the upper and lower edges of strip 106. A connecting bridge portion 134 connects adjacent body portions 130 in the same manner as connecting portion 126 of strip 86. When dividing strips 86 and 106 are assembled with each other, see Fig. 7, the respective connecting portions are disposed between adjacent ear portions of the intersecting strip. The offset ear portions are spaced apart an amount which causes a snug engagement between the intersecting dividing strips and horizontally interlocks them firmly in assembled relationship.

Rivets 140 secure the mounting tabs on the respective strips to their respective rail elements and walls. The dividing strips 86 and 106 are so located as to be in alignment with the upstanding ridges formed on bottom element 30 and thus, in cooperation with the upstanding ridge element serve to define a compartment-like means for locating bottles in position within the crate.

The interlocking or cooperation between the various structural elements described above is such that an extremely rigid structure is obtained even when light gauge sheet metal is employed. The employment of lighter metal allows for more efficient and economical methods of mass producing crates of this type. All of the metal components of the crate are directly formed from sheet

metal blanks and require only blank cutting and stamping or pressing operations in manufacture.

While only a single embodiment of my invention has been disclosed, it will be readily apparent that this embodiment is capable of modifications. Therefore the disclosed embodiment is to be considered exemplary rather than limiting and the true scope of my invention is that defined in the following claims.

I claim:

1. In a divider for a bottle crate, a first strip element having a plurality of body portions lying in a common vertical plane and terminating in offset ear elements, adjacent ear elements of adjacent body portions lying in parallel vertical planes intersecting said common vertical plane and defining a slot extending inwardly from one edge of said first strip element to a crimped connecting portion lying in a vertical plane substantially normal to said parallel vertical planes, an intersecting strip element having a plurality of body portions lying in a common vertical plane, ear elements and connecting portions on said intersecting strip element adapted to horizontally interlock with the connecting portion and ear elements respectively of said first strip element.

2. A divider assembly for a bottle crate comprising interconnected rail elements extending around the interior of the side walls of said crate, strip elements lying in intersecting vertical planes extending between said rail elements to define a grid-like structure for locating bottles within said crate, integral flange portions on said rail elements extending inwardly from the side walls of said crate and overlying upper edge surfaces of said strip elements, and a vertically disposed flange integral with said inwardly extending flange portions and having downwardly open notches in its free edge receiving the top edge portions of said strip elements for transverse support thereof.

3. A bottom for a bottle crate comprising a rectangular piece of sheet material having a plurality of transversely and longitudinally aligned openings therein, mounting flanges around the periphery of said piece of sheet material, upstanding ridges having an inverted V-shaped cross section extending transversely across said piece of sheet material, upstanding ridges having an inverted U cross section extending longitudinally across said piece of material and traversing said transversely extending ridges, and a plurality of guard elements integral with said piece of sheet material extending upwardly from said mounting flanges and having a folded down portion contacting said piece of sheet material between adjacent transversely extending ridges.

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