April 25, 1967 F. KATZMAN 3,315,835

COLLAPSIBLE STACKING CRATE

Filed Feb. 25, 1963 4 Sheets-Sheet 1

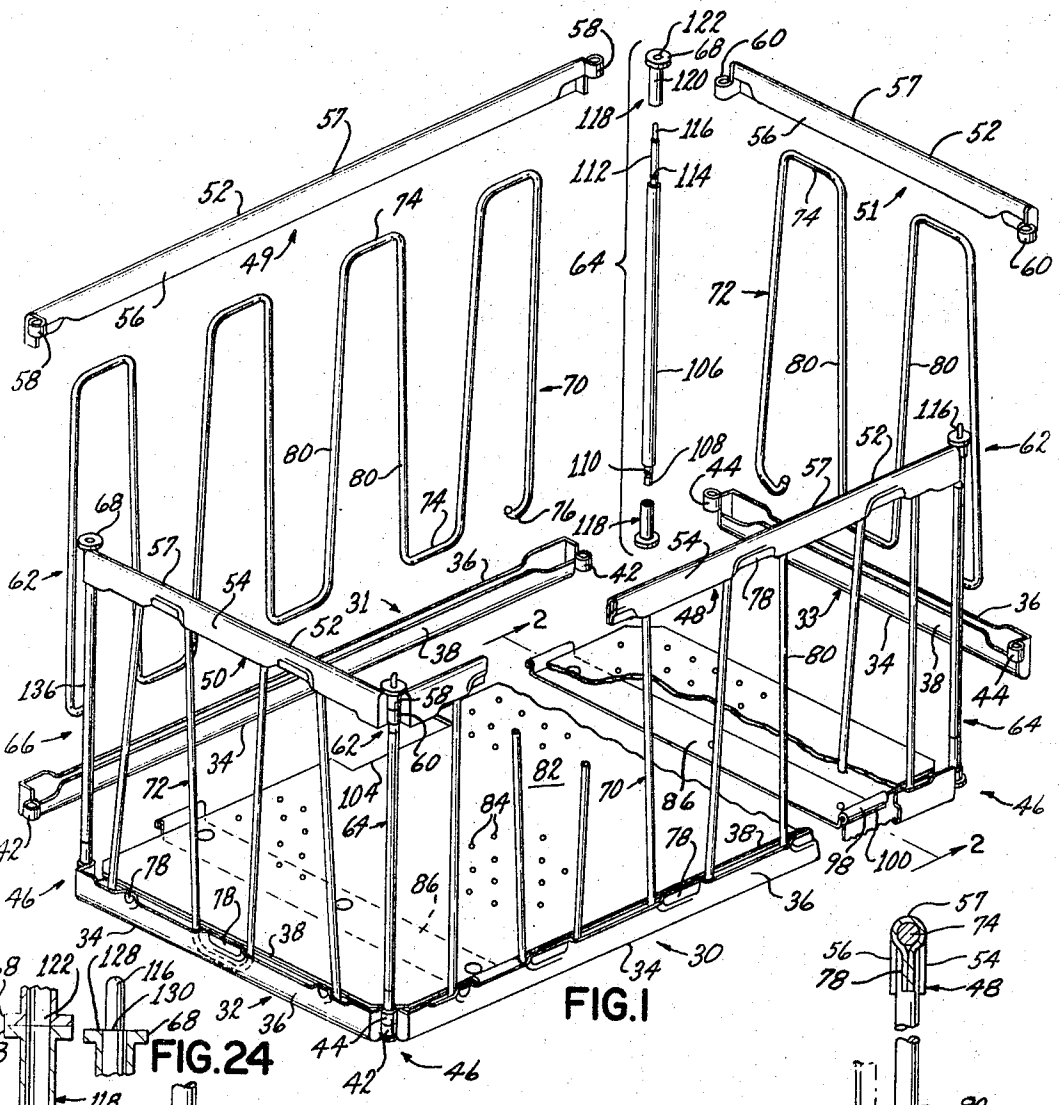


FIG. 1

FIG. 24

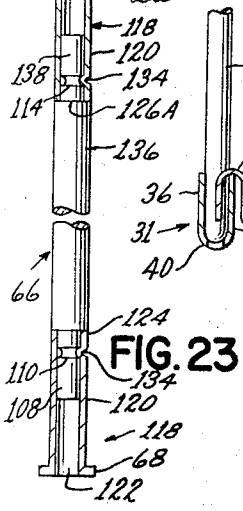


FIG. 23

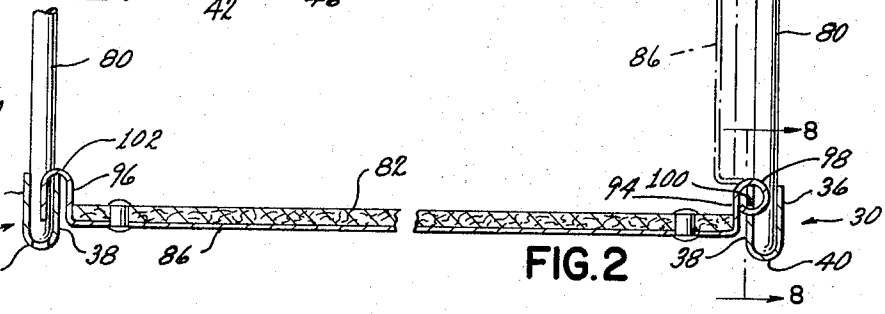


FIG. 2

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April 25, 1967 F. KATZMAN 3,315,835

COLLAPSIBLE STACKING CRATE

Filed Feb. 25, 1963 4 Sheets-Sheet 2

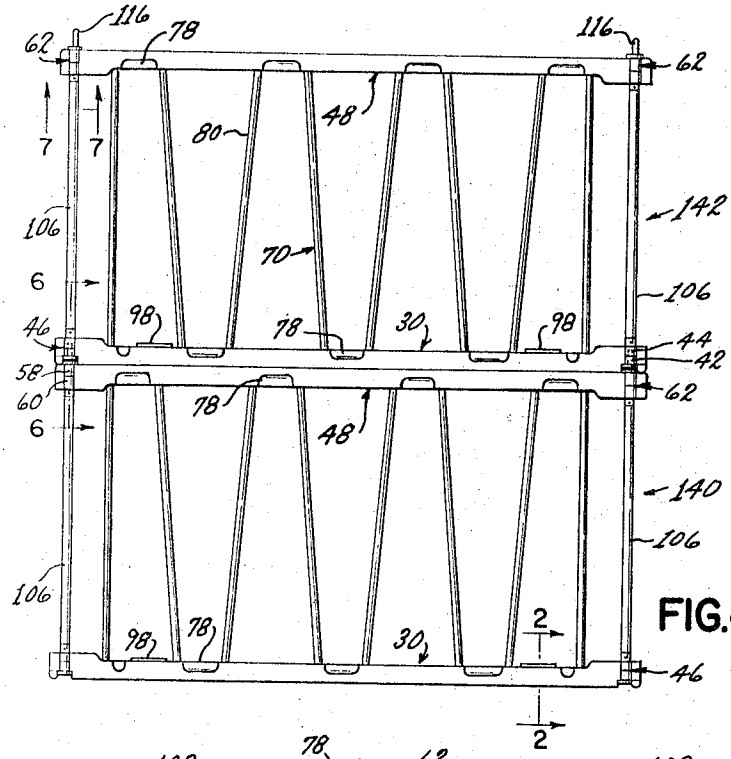


FIG.4

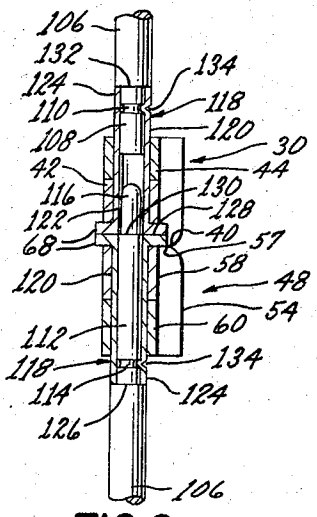


FIG.6

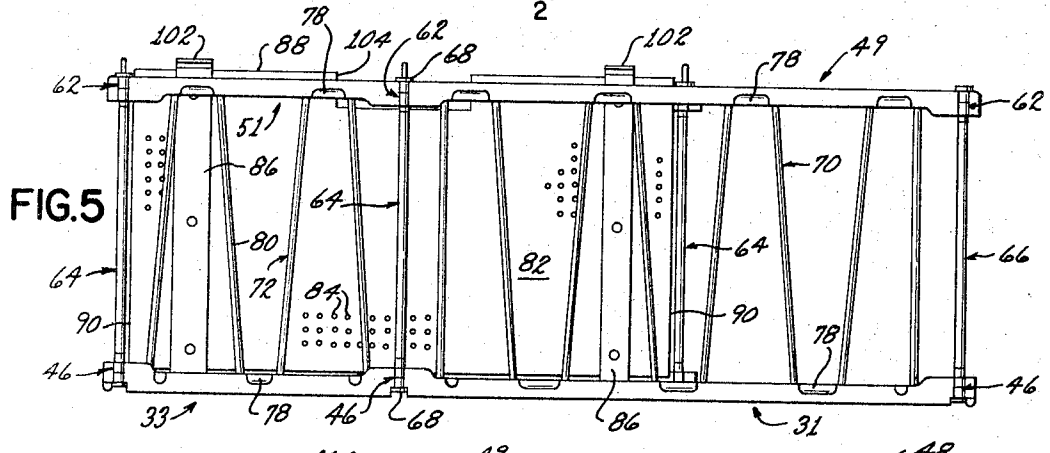


FIG.5

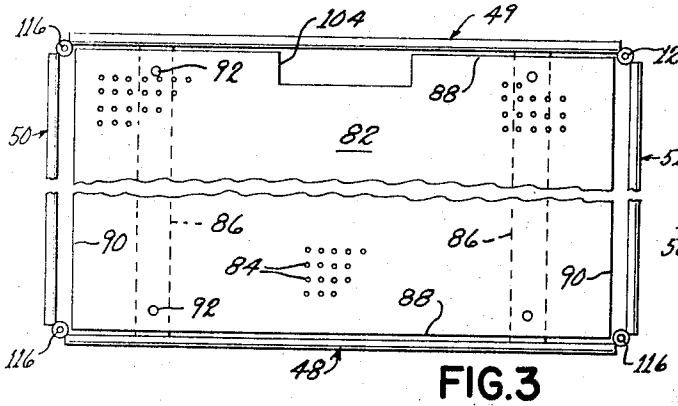


FIG.3

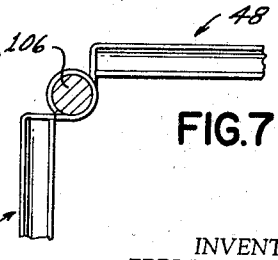


FIG.7

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April 25, 1967 F. KATZMAN 3,315,835

COLLAPSIBLE STACKING CRATE

Filed Feb. 25, 1963 4 Sheets-Sheet 3

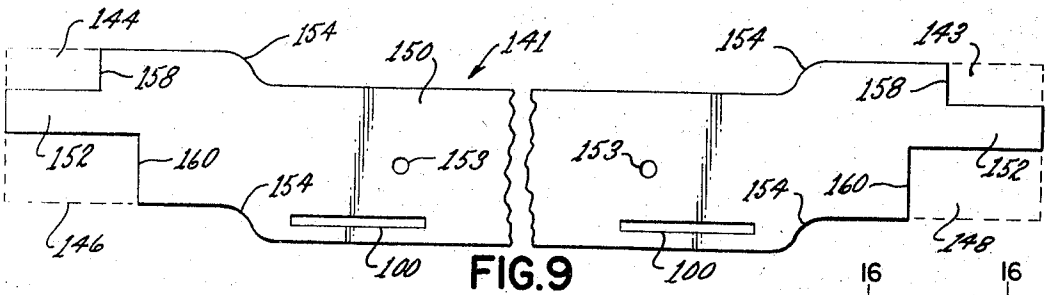


FIG.9

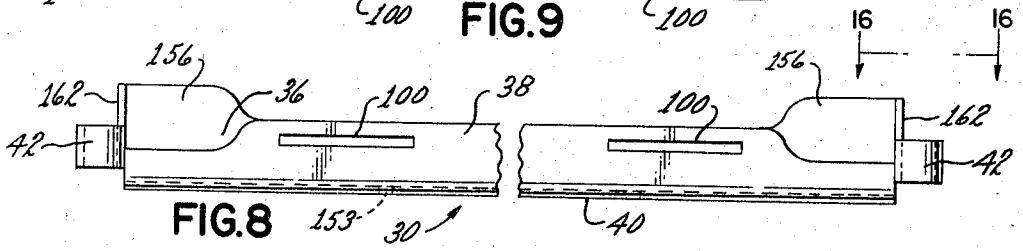


FIG.8

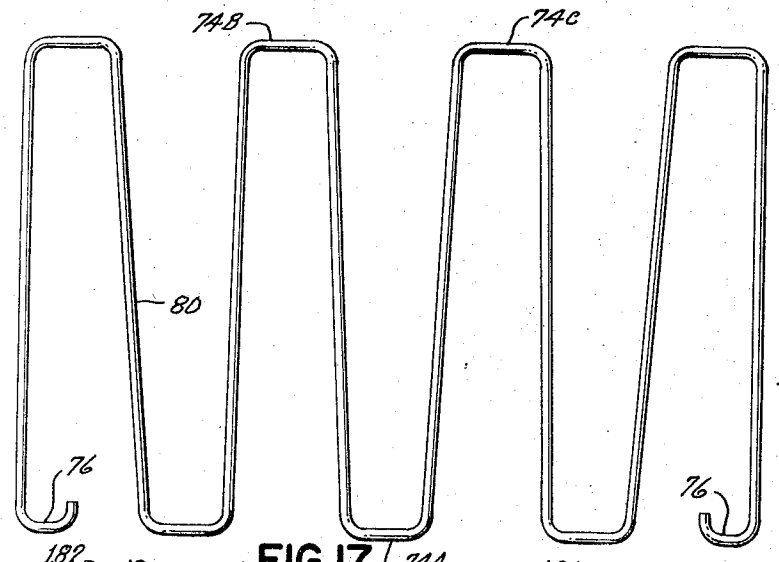


FIG.17

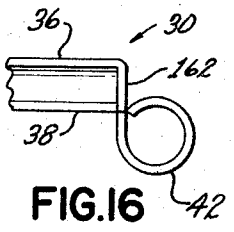


FIG.16

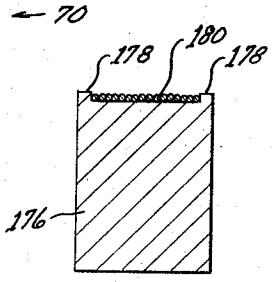


FIG.19

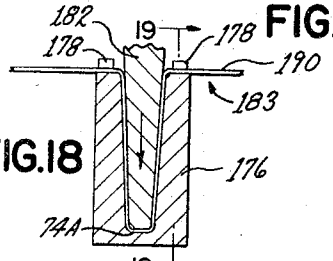


FIG.18

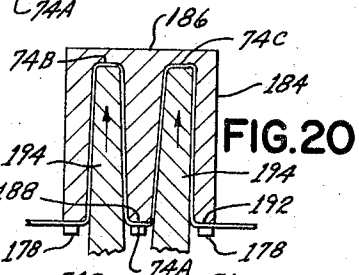


FIG.20

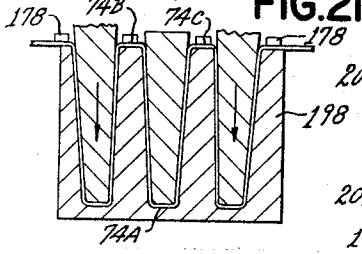


FIG.21

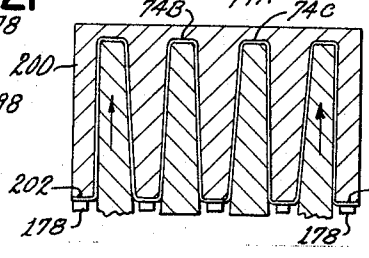


FIG.22

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April 25, 1967 F. KATZMAN 3,315,835

COLLAPSIBLE STACKING CRATE

Filed Feb. 25, 1963 4 Sheets-Sheet 4

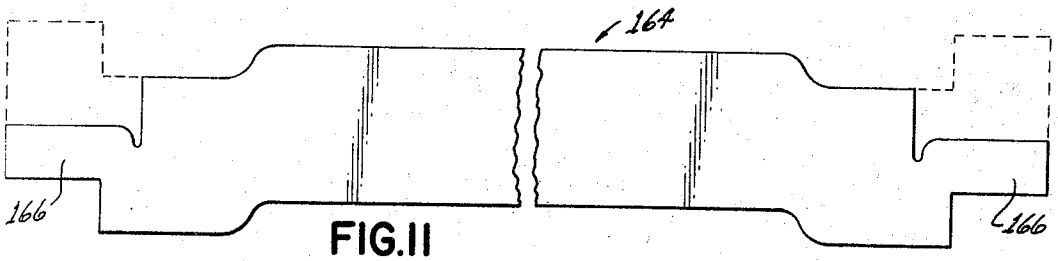


FIG.11

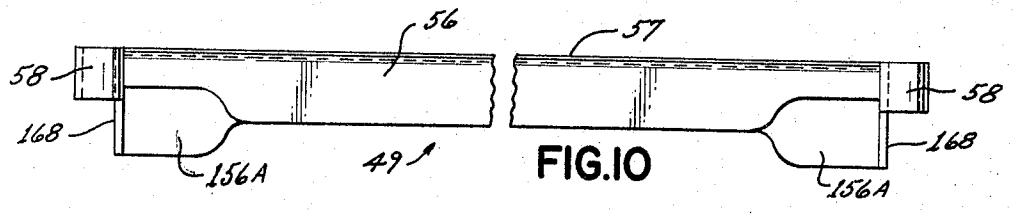


FIG.10

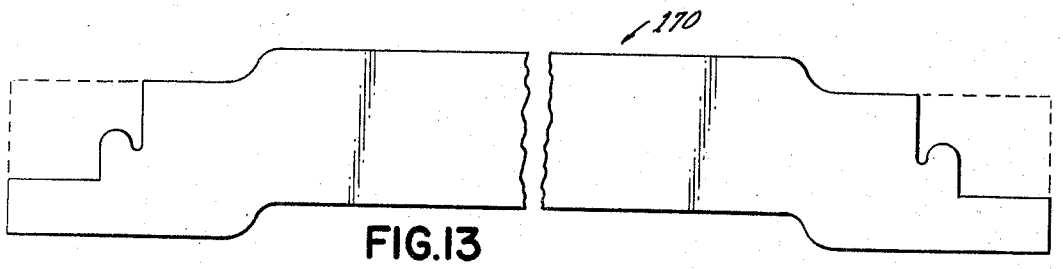


FIG.13

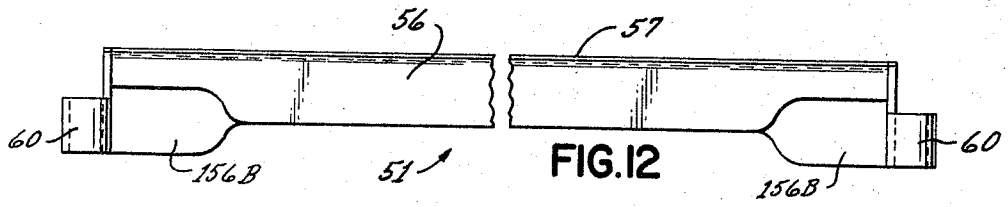


FIG.12

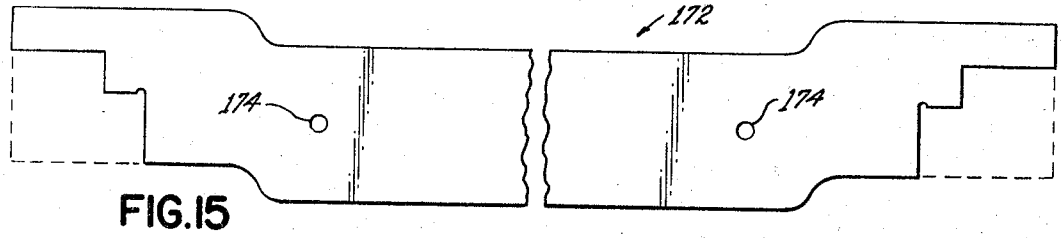


FIG.15

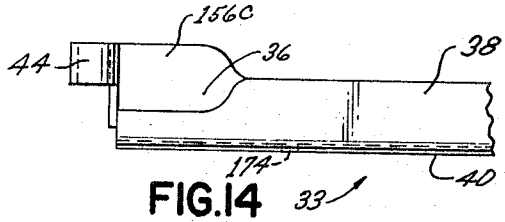


FIG.14

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United States Patent Office 3,315,835 Patented Apr. 25, 1967

3,315,835

COLLAPSIBLE STACKING CRATE

Frederick Katzman, Henrico County, Va., assignor to Reynolds Metals Company, Richmond, Va., a corporation of Delaware

Filed Feb. 25, 1963, Ser. No. 260,619
7 Claims. (Cl. 220—6)

This invention relates to a collapsible stacking crate.

One of the features of this invention is that the weight of the contents of the lowermost crate goes to the bottom member upon which the contents are placed, then to straps which support the bottom member, then to the bottom rails, then to the floor on which said bottom rails rest. When a second crate is stacked on top of the lowermost crate, the weight of the contents of the second crate goes to the bottom member of the second crate, then to its supporting straps, then to its bottom rails, then to the four corner post constructions. The entire weight of the second or uppermost crate is then transferred to the four corner post constructions of the lowermost crate, then to the floor upon which the last-named post constructions rest.

The corner posts are also used as hinges for folding the crates, and for aligning the crates one upon the other.

Other features of this invention are apparent from this description, and/or the accompanying drawings in which:

FIGURE 1 is a diagrammatic perspective view of one of the crates, with certain parts in exploded view condition.

FIGURE 2 is an enlarged vertical cross section along the lines 2—2 of FIGURES 1 and 4.

FIGURE 3 is a top view, in reduced scale, of a completely assembled crate.

FIGURE 4 is a side view of two crates of the character shown in this application, with an upper crate stacked upon a lower crate.

FIGURE 5 is a side view of a crate in folded condition.

FIGURE 6 is an enlarged view along the line 6—6 of FIGURE 4.

FIGURE 7 is an enlarged, horizontal, upward view along the line 7—7 of FIGURE 4.

FIGURE 8 is an enlarged and broken side view of one of the bottom rails, when taken along the lines 8—8 of FIGURE 2.

FIGURE 9 is a plan view of a blank used in producing the bottom rail of FIGURE 8.

FIGURE 10 is a broken, enlarged inside elevation of one of the top rails.

FIGURE 11 is a plan view of a blank used to produce the rail of FIGURE 10.

FIGURE 12 is an inside elevation of another top rail.

FIGURE 13 is a top view of a blank used in making the rail of FIGURE 12.

FIGURE 14 is a side elevation of one end of another bottom rail.

FIGURE 15 is a plan view of a blank used to produce the rail of FIGURE 14.

FIGURE 16 is an enlarged top view of one end of the rail shown in FIGURE 8, and taken from the line 16—16 of FIGURE 8.

FIGURE 17 is an elevation of a zigzag rod construction used to produce one of the side walls of the crate.

FIGURE 18 is a diagrammatic cross section of a press for initially bending a plurality of rods eventually to form a zigzag construction, such as shown in FIGURE 17.

FIGURE 19 is a diagrammatic cross section taken along the line 19—19 of FIGURE 18.

FIGURE 20 is a diagrammatic view, somewhat similar to FIGURE 18, but showing a press for producing a subsequent step in the formation of a zigzag construction as shown in FIGURE 17.

FIGURE 21 is a diagrammatic cross section of another press for forming a step subsequent to that shown in FIGURE 20.

FIGURE 22 is a diagrammatic cross section of another press for performing a step subsequent to that shown in FIGURE 21.

FIGURE 23 is a broken vertical view, partly in elevation, and partly in cross section, showing a corner post construction of the type that does not have an interlocking upward pin extending past the top.

FIGURE 24 is a top view of a corner post construction with the interlocking pin extending from the top.

A crate construction according to this invention may have a plurality of rectangularly arranged bottom rails, such as the four rails 30, 31, 32, and 33, which may be used in producing a crate according to this invention. For convenience in description, the side of the crate which has the rail 30 may be called the front side, the side of the crate which has the bottom rail 31 may be called the back of the crate, and the sides of the crate which have the bottom rails 32 and 33 may be called the "side" of the crate, and if necessary, the side which has the rail 32 may be called the left side, and the side which has the rail 33 may be called the right side. However, it is understood that this nomenclature is used merely for the sake of brevity in description, and hence the various sides may have an entirely different description, if the person viewing the crate happens to stand in a different position than the position herein implied.

Each of the bottom rails 30–33 may have a main upwardly directed channel shaped body 34 with two sides 36 and 38 and an upwardly directed bottom 40. These reference numerals have been applied to the bottom rails shown in FIGURE 2, but this description is also applicable to the rails 32 and 33.

The bottom rails 30–33 may each have curled end forming members which are designated as 42 in the case of the bottom rails 30 and 31 and as 44 in the case of the bottom rails 32 and 33. Pairs 42, 44, of said hinge forming members are aligned at each corner of the crate to form composite corner tubular hinge rod receiving members.

A plurality, such as four, rectangularly arranged top rails 48, 49, 50 and 51 may be parallel to and above respective ones of said bottom rails 30, 31, 32, and 33.

Each of the top rails 48–51 may have downwardly directed channel shaped bodies 52 with two sides 54 and 56 and with an inverted, downwardly directed bottom 57.

The top rails 48 and 49 may be provided with curled end hinge forming members 58. The top rails 50 and 51 may be provided with end hinge forming members 60. Pairs 58, 60, of said hinge forming members may be aligned to form composite corner tubular hinge rod receiving members 62.

Hinge rod constructions 64 and 66 may extend through the corner hinge rod receiving members 46 and 62. These hinge rod constructions 64 and 66 may have flat end pieces 68 at their ends.

Side walls for the crate may be formed by zigzag rod constructions 70 and 72 which may extend between the respective ones of the bottom and top rails with return ends 74 and bends 76 pinched at 78 between the rail sides 36, 38, 54 and 56.

The zigzag rod constructions 70 and 72 provide substantially straight spacing and bracing rods 80 which space the top and bottom rails and brace them to form rigid sidewall constructions for the crate.

A substantially flat, rectangular, bottom member 82, which may be made of relatively rigid material, such as that known as "Masonite" may, if desired be provided with

perforations 84. This bottom member 82 may be supported on a plurality of metal straps 86. The bottom member 82 may have its edegs 88 and 90 adjacent to and inside the inner sides 38 of the bottom rails 30, 31, 32, and 33. The straps 86 may extend under the bottom member 82, and may be parallel to each other, if desired. The straps 86 may be secured to the bottom member 82 by rivets 92 or the like. The ends 94 and 96 of the straps 86 may extend upwardly. The ends 94 may extend upwardly from one side 88 of the bottom member 82 and may be hingedly curled at 98 into slits 100 in the sides 38 of the bottom rail 30. The other ends of the straps 96 of the straps 86 may extend upwardly from the opposite side 88 of the bottom member 82 and may hook at 102 over the inner side 38 of the bottom rail 31.

The bottom member 82 may be provided with a notch 104 which provides a hand hold, so that the bottom member 82 may be pulled upwardly as it hinges about the end hinge members 98, so the bottom member 82 may be folded upwardly against the front side of the crate. The sides of the crate may then be folded as they hinge about the hinge rod constructions 64 and 66, so that all of the sides of the crate may be substantially parallel to each other, as indicated in FIGURE 5. FIGURE 5 is a rear view of the folded crate, as is obvious.

The notch 104 in the bottom member 82 also permits the crate to be folded without interference from the flat end piece 68 of the rod 64 which folds adjacent the notch 104, as shown in FIGURE 5.

The bottom 82, when made of Masonite material may be ⅜ inch thick and may be adhesively covered on both sides with tempered aluminous foil to prevent juices from the contents of the crate from penetrating into the Masonite unduly.

The perforations 84 in the bottom member 82 may be ⅜ inch in diameter with spacing which may be staggered if desired. The spacing may be 1 inch from center to center of the perforations.

Details of the corner or hinge rod constructions are shown in FIGURES 1, 6, 23, and 24.

For convenience in stacking, three of the rod constructions indicated at 64, are provided with dovetailing constructions so that the rod constructions 64 of a lower crate may dovetail with the rod construction 64 of an upper crate, to lock the same against sidewise movement with respect to each other. The fourth rod construction 66 may be made so that it does not dovetail with the fourth corner rod construction of an upper or lower crate with which it is stacked. The purpose of the lack of dovetailing construction on the fourth rod 66 is that there may be a slight variation in dimensions of the two crates which are stacked with respect to each other, and the fourth rod construction 66 allows misalignment for such variation without the necessity of its being dovetailed.

The stacking feature of this invention is illustrated in FIGURES 4, 6, and 25, while the corner rod constructions are also illustrated in FIGURES 1, 23, and 24.

The rod construction 64 is shown in exploded view at the upper corner of FIGURE 1, while the assembled ends of the rod construction 64 are shown in FIGURE 6.

The rod construction 64 may include a main rod 106. The rod 106 may have a lower reduced diameter end portion 108 with a groove 110. The rod 106 may also have a reduced upper end portion 112 which may be provided with a groove 114 and a further reduced diameter pin 116. An end cap or bushing 118 may, if desired, be made of such shape that it may be used at both ends of the corner rod or post 106. This bushing 118 may have a sleeve 120, the circular flat end piece 68, and an opening 122 which may be aligned with the inner cylindrical cavity of the sleeve 120. The length of the sleeve 120 may be such that it may be telescoped over the upper portion 112 of the pin 116. The lower end 124 of the sleeve 120 abuts the shoulder 126 which is produced between the rod 106 and its reduced diameter extension 112. When the sleeve 120 has been fully telescoped over the upper end of the rod 106, FIGURE 24, the upper surface 128 of the flat end end pice 68 may be substantially aligned with the shoulder 130 which is between the end portion 112 and the pin 116.

This same cap or bushing 118 may be used as the lower end construction of all constructions 64. The assembly of the bushing 118 with the lower end of rod 106 is shown in FIGURE 6 wherein the sleeve 120 telescopes over the lower end 108 of the rod 106, so that the sleeve end 124 abuts against the shoulder 132 of the lower end of rod 106.

When the bushings 118 have been respectively telescoped over the upper and lower ends of the rod 106, these bushings may be secured in place by a number of staking indentations 134. These indentations may be two or more in number and may be substantially 180 degrees apart more or less. Alternatively, a continuous groove may be formed in the sleeve 120 around the groove 110 and the same is true with regard to the groove 114, all as shown in FIGURE 6.

When each bushing 118, FIGURE 6, of the four corners of the crate, is telescoped over the lower end 108 of a rod 106, its flat end piece or flange 68 is slightly above the upwardly curved or upwardly directed bottoms 40 of the lower rails 30–33. When the bushing 118 is telescoped over the upper end 112 of the rod 106, its flat end piece 68 may be above the downwardly directed or inverted bottom 57 and also slightly above the upwardly directed bottom 40. The two end pieces 68 at this point contact each other, as shown in FIGURE 6, so that the weight of the upper crate is transferred along the rod members 106 from one stacked crate to another.

The fourth rod construction 66, which is shown in FIGURES 1 and 23, is substantially the same as that disclosed with respect to the rod 64, except that the main rod 136 does not have the pin 116 of the rod construction 112, but is cut off to form a flat end 138.

It is thus to be seen that when a lower crate 140, FIGURE 4, has an upper crate 142 stacked on it there will be three corner rod constructions 64 on each crate which are dovetailed and a fourth corner rod construction 66 which is not dovetailed.

The upper pins 116 of the rods 106 will telescope or dovetail into the openings 122 of the lower bushings 118 at the bottom of the rods 106 of the upper crate 142.

On the other hand, the flat end 138 of the rod 136 will not telescope into the lower flat piece 68 of the upper crate 142 and need not be absolutely aligned therewith, because of the lack of this telescoping condition. This will compensate for any slight difference in horizontal dimensions of the stacked crates.

When the upper crate 142 is stacked over the lower crate 140, substantially all of the weight of the contents which are placed on the flat bottom member 82 of the upper crate 142 is transferred by the straps 86 to the lower rails 30 and 31, as previously described. The weight from the upper crate, lower rails 30 and 31 is transferred to the lower flat end pieces or flanges 68 of bushings 118 of the upper crate 142 through the medium of the hinge forming members 42, as shown in FIGURE 6. This weight then is transferred to upper flat end pieces or flanges 68 and to the upper bushings 118 of the lower crate 140. From bushings 118 the weight of the upper crate is transferred through flanges 126 (and 126A) to the corner rods 106 (and 136) of the lower crate 140. These corner rods 106 (and 136) then transfer the weight to the lower bushings 118 of the lower crate, and to the lower flat end pieces or flanges 68 of the lower crate. A slight sliding action between these last-named bushings 118 and the lower hinge forming members 42 and 44 permit the last-named lower flanges 68 to be supported on the floor upon which the lower crate 140 rests.

A slight movement of the upper rails 48–51 of the lower crate 140, due to the slight "give" in the side walls

of the lower crate **140**, permits the sliding action of the bushings **118** described in the preceding paragraph.

The same type of weight transfer may take place from a third stacked crate, not shown, which might be placed on the crate **142** of FIGURE 4. Further and higher crates, if any, likewise may transfer their weights through the corner post constructions.

If desired, instead of the zigzag members **70** and **72**, the side wall members of the crates may be made of metal sheet of any kind, or other material. They may be made of expanded extrusions, or expanded metal, which may be inserted into the downwardly directed channel-shaped bodies between the sides **36** and **38**, and the lower rails, and may also be inserted into the lower rails, between the sides **36** and **38**. Such materials may be pinched in a manner somewhat similar as disclosed in connection with the pinching action **78**. For this purpose, suitable indentations or openings may be provided in such sheets, expanded extrusions, or expanded metal constructions.

The rail constructions **30**, **31**, **32** and **33** and **48**, **49**, **50** and **51** may be made as indicated in FIGURES 8 through 16.

Considering first FIGURES 8 and 9, which show the method of construction of the front and back rails **30** and **31**, flat blanks of metal, such as indicated at **141**, FIGURE 9, may first be produced in any desired manner. For example, these blanks **141** may be blanked out of a sheet of metal with very little loss of material. For example, they may be blanked out from a sheet of 6061–T6 x .063 inch foil stock of aluminum alloy.

Any procedure and method may be used to produce the blank **141**, for example, of the shape shown in FIGURE 9. If desired, certain portions of the sheet may be first notched out on a press, so that the blank may then be cut out from the sheet. A plurality of blanks may be made from the same sheet, with blanks of proper width serially cut, as is obvious.

For example, portions may be notched out at **143**, **144**, **146**, and **148**. The main body **150** is shown with the tongues **152** being available to produce the curled members **42** shown in FIGURE 8. A plurality of holes **153** may be cut for the purpose of producing drain holes in the bottom **40** of the finished product. The slits **100** may also be cut to receive the curled hinge member **98** of the bottom member **82**. These slits may be omitted or they may be included in the blanks for the rail **31**, although if they are included, they may not have any function, unless it is desired permanently to secure the bottom member **82** to the crate and to prevent the crate from being foldable.

After the blank **141** has been formed it may be bent into the shape shown in FIGURE 8 with the curved portions **154** producing the higher portion **156** at each end of the rail. The portions of the blank between the lines **158** and **160**, at each end of the blank may be bent to form an end wall **162**, FIGURE 16, and then the tongues **152** may be curled to produce the curled end member **42**.

The extra depth **156** at the ends of the side **36** of the rails **30** and **31**, as shown in FIGURE 8, permits the formation of hinge curls **42** of extra width with the use of substantially no extra waste of stock material from the original sheet. The same is true of the similar extra depth portions at **156A**, **156B**, and **156C** shown in FIGURES 10, 12, and 14.

If desired, the tongues **152** may be curled into the curled end members **42** before the blanks **141** are cut from the sheet, and they may be so curled in aligned condition while on the sheet.

Substantially the same procedure may be followed in the formation of the blank **164** of FIGURE 11 to produce the top rails **48** and **49** at the front and back of the crate.

The tongues **166** may be formed into the end hinge forming members **58** substantially in the same manner that was followed in connection with FIGURES 8 and 9.

The same material may be used for the blank **164**, all of the blanks in FIGURES 9, 11, 13, and 15. Perliminary cutouts may be notched out on a press, in all of these blanks, in the same manner as was done with regard to FIGURE 9. It is believed unnecessary here to repeat in detail the procedures. It is to be understood that end walls **168** may be bent in the same manner as the walls **162** were bent in FIGURES 8, 9, and 16.

The same material and procedures may also be followed in connection with blanks **170** and **172** to form the top rails and bottom rails **50** and **51** and **32** and **33**. It is believed unnecessary to repeat the description as to the procedure, since it is substantially the same, including notching out certain portions before cutting of the blanks, as shown in dotted lines, the making of end walls similar to end walls **162**, FIGURE 16, and of forming the end of pin-receiving members **60** and **44**. It is to be noted that the bottom rails **32** and **33** may have drain holes **174**, similar to the drain holes **153**. These holes **153** and **174** will eventually be produced along the bottoms such as the bottom **40** of the same character as shown in FIGURE 2.

It is to be noted that the curled members **42**, **44**, **58**, and **60** may be homogeneous with their respective rail members if desired. Also, it is to be noted that the curled end members **42**, **44**, **58**, and **60** are so formed on the rails, that the pairs of curled members may be aligned with each other. For example, the member **42** may be under the member **44** and the member **60** may be under the member **58**. This is accomplished by properly positioning the tongues **152**, etc., from which these members are made, so that when the blanks are bent into channel-shaped bodies, these curled members will be properly positioned vertically.

FIGURES 17 through 22 illustrate apparatus and method for producing zigzag crate forming sides of the character indicated at **70** and **72**. The specific illustration in FIGURES 17–22 is shown in connection with the members **70**, although the same procedure may be used for producing the member **72**, with the exception that possibly a less number of the return bends may be provided for the member **72** as compared to the number for the member **70**.

A plurality of rods of proper length and in straight condition may be placed in proper lengthwise relative position on the die members **176**, FIGURES 18 and 19, which may have side railings **178** and which are spaced apart a sufficient distance to receive desired number of rods **180**.

These rods are laid between the railings **178** originally in straight condition and then the punch member **182** may be moved down simultaneously to form the first return bend **74A** at the central portions of the rods. Thereafter, the bent rod **183** of FIGURE 18 may be placed in a die **184** which is shown in inverted condition but which actually may have the bottom **185** placed at the lower part of the die. The die **184** is illustrated upside down in FIGURE 20, so that the procedure may be compared with the large illustration of the member **70** in FIGURE 17. The bent rods **183** from the crest of FIGURE 18 may be placed in the return bend **74A** at **188**, and with the remaining straight parts of the rod **190** of FIGURE 18 extending laterally over the parts **192** of FIGURE 20. Then the punches **194** may be simultaneously brought into the die **184** simultaneously to produce further return bends **74B** and **74C**. The procedure can then be continued in the dies **198** and **200** to produce further return bends simultaneously outwardly beyond the central reverse bends **74A**, **74B**, and **74C**, in a manner which is now apparent and need not be described. The remaining end of pieces **202** may then be individually bent in a known curling machine to produce the end bends **76** shown in FIGURE 17.

The press construction shown in FIGURES 18 to 22 may be separate presses, or if desired, may be a single

press structure. However, if desired, each of the rods can be individually bent in any desired manner.

Any procedure of assembly for the crates may be used. For example, the lower bushings **118** and the rods **106** and **136** may first be assembled together to form rod constructions or assemblies **66** and **64**, and the lower bushings **118** may be slightly elevated off the floor on blocks or spacers. The front and back rails **30**, **31**, and **48**, **49** may be assembled with the zigzag wire constructions **70** or other sidewall forming members and with the pinching action **78** to produce the front and back sides of the crate.

In a like manner, side rails **32**, **33**, **50**, and **51** may be assembled together with the zigzag constructions **72** or other sidewall forming members between them, to form side walls of the crate. These front and back walls and side walls may then be threaded over the upstanding rods **106** and **136** with the curled portions **42**, **44**, **60**, and **58** sliding downwardly around the rods **106** and **136**. Thereafter, the upper bushings **118** may be inserted through the curved portions **58** and **60** until lower portions **124** of the bushings engage the shoulders **126** of the rods **106** and the shoulders **126A** of the rods **136**. Then the upper sleeves **120** may be staked or grooved at **134** to secure the upper bushings to their respective rods **106** and **136**. Then the bottom member **82** may be secured by curling the portions **98** through the slots **100** in rail **30**. If the crate is to be assembled in open position, then the hooked portions **102** may be placed over the side **38** of the back bottom rail **31**, so that the crate is ready for receiving its contents, such as oranges in bags and the like. Another crate **142** may be stacked on top of the first crate **140**, as shown in FIGURE 4, or the crates may be assembled in folded condition as shown in FIGURE 5, to be shipped to the place of use.

Without intending to be limited thereby, a crate of the character herein disclosed may have front and back sides 22.625 inches center to center from the center lines of the corner rods **106** and **136**. The shorter sides may measure 12.625 inches from the center lines of corner rods. The crates may be 13.50 inches in height from upwardly curved bottoms **40** to downwardly curved bottoms **57**. Other parts of the crate may be substantially in the proportions as shown in the drawings, although the exact proportions may not ordinarily be necessary.

The bottom member **82** may be made of sufficient thickness to support the intended weight of the contents, and the straps **86** likewise may be of strength to support the intended weight. For example, the straps may be made from 6061T6 stock .063 inch thick of aluminum alloy, and the Masonite or the like of the bottom **82** to be of sufficient thickness as elsewhere described or as may be recommended by the manufacturer thereof to support the expected weight.

Crates of the above size have been made and support a 200 pound man standing on the bottom **82** without damage.

It is thus to be seen that an extremely effective crate has been provided which may be easily made and which may be used singly or in superimposed arrangements. They may also be easily folded and unfolded as desired.

While the form of the invention now preferred has been disclosed as required by statute, other forms may be used, all coming within the scope of the claimed subject matter which follows.

What is claimed is:

1. A crate construction comprising: four continuous, straight rectangularly arranged homogeneous sheet metal bottom rails each having a main upwardly directed channel shaped body with two continuous sides and an upwardly directed bottom, and homogeneous sheet metal curled end hinge forming members with pairs of said hinge forming members aligned to form composite corner tubular hinge rod receiving members; four continuous straight rectangularly arranged homogeneous sheet metal top rails each having a main downwardly directed channel shaped body with two continuous sides and an inverted downwardly directed bottom and homogeneous sheet metal curled end hinge forming members with pairs of said hinge forming members aligned to form composite corner tubular hinge rod receiving members; hinge rod constructions extending through said hinge rod receiving members and having flat end pieces; zigzag rod constructions extending between the respective ones of said bottom and top rails with return bends pinched between the sides of said channel shaped bodies; a flat rectangular bottom members having its edges adjacent to and inside the inner sides of said bottom rails and having two supporting straps under said bottom member respectively parallel to two of said bottom rails with their ends extending upwardly from one side of said bottom member and hingedly curled and hooked into slits on the inner side of an adjacent bottom rail to form bottom member hinges, the other ends of said straps extending upwardly from the opposite side of said bottom member and hooked on and over the inner side of the adjacent bottom rail, said crate being foldable by swinging said bottom member upwardly about said bottom member hinges and then folding said top and bottom rails about said hinge rods until said rails are substantially parallel.

2. A crate construction according to claim **1** in which three of the bottom ones of said flat pieces have openings therein and in which three of the top ones of said flat pieces have pin extensions extending upwardly therefrom, and upon which crate a similar crate is mounted with the openings in its flat pieces receiving said pin extensions of said first named crate and in which the fourth of said flat pieces does not have a pin extension.

3. A crate construction according to claim **1** with said rectangular bottom member being made of relatively rigid material and with its edges being adjacent the inner sides of said bottom rails and below the upper edges of said inner sides of said bottom rails and with the ends of said supporting straps hooked on the inner sides of two opposite bottom rails rigidly to hold all four bottom rails of said crate construction in rectangular form.

4. A crate construction according to claim **1** in which certain of said sides of said channels are formed with ends of extra width and said curled end forming members are formed from extensions of said ends of extra width.

5. A crate construction according to claim **1** in which said bottom and top rails and their hinge forming members are each homogeneous and the outer sides of said rails are formed with ends of extra width and having tongues extending from said ends of extra width and portions of said ends of extra width are inwardly bent to form an end wall and said tongues are curled to produce said curled end hinge forming members.

6. A crate construction comprising four straight rectangularly arranged, homogeneous, continuous and straight sheet metal bottom rails each having a main upwardly directed channel body with two homogeneous, continuous sides and an upwardly directed homogeneous bottom; homogeneous continuous and straight sheet metal top rails each having a main downwardly directed channel main body with two homogeneous and continuous sides and an inverted, downwardly homogeneous bottom; said top rails being above and parallel to respective ones of said bottom rails; crate side wall forming members extending between said respective parallel bottom and top rails; a flat bottom member with sides adjacent said bottom rails and supported on certain of said bottom rails; circular hinge forming members homogeneous with and at the ends of said rails with pairs of said circular hinge forming members being aligned at the corners of said crate; hinge rod constructions extending through said pairs of aligned circular hinge forming members with locking

means on said hinge rod constructions, to prevent said hinge rod constructions from moving longitudinally out of said circular hinge forming members; in which said bottom member has hinge means hingedly curled and hooked into slits on the inner one of said sides of one of said bottom rails and is removably hooked on and over the inner one of said sides of the opposite bottom rail, said crate being foldable by upwardly swinging said bottom member on said hinge means and by folding said rails and side wall forming members about said hinge rod constructions so said rails and side wall forming members are substantially parallel to each other.

7. A crate construction according to claim 6 in which said locking means are flat end pieces with certain of said upper end pieces having upper dovetailing constructions and with certain of said lower flat end pieces having lower dovetailing constructions to be dovetailed with upper dovetailing extensions of a similar lower stacked crate.

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