

June 14, 1927.

W. M. VENABLE

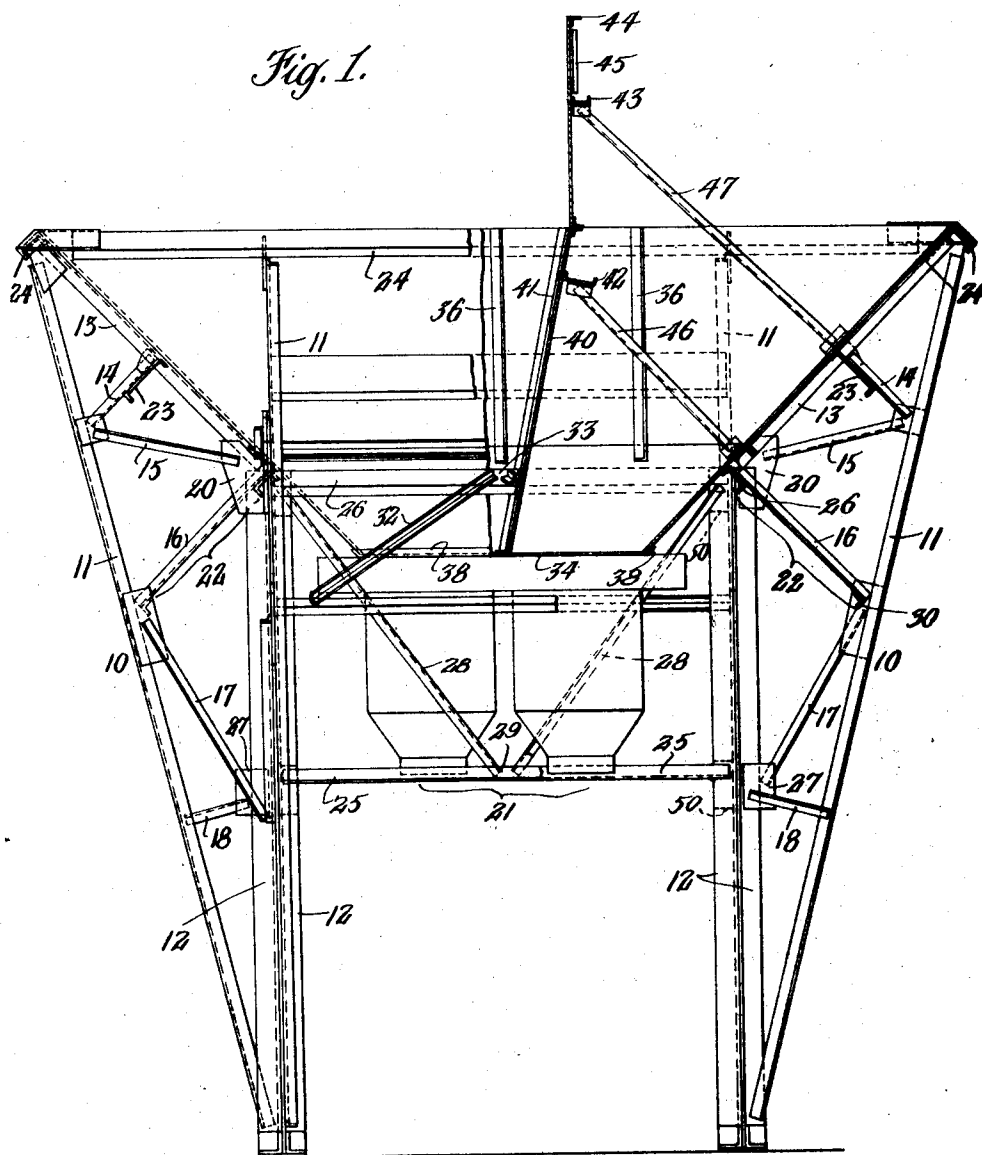
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3 Sheets-Sheet 1

Fig. 1.



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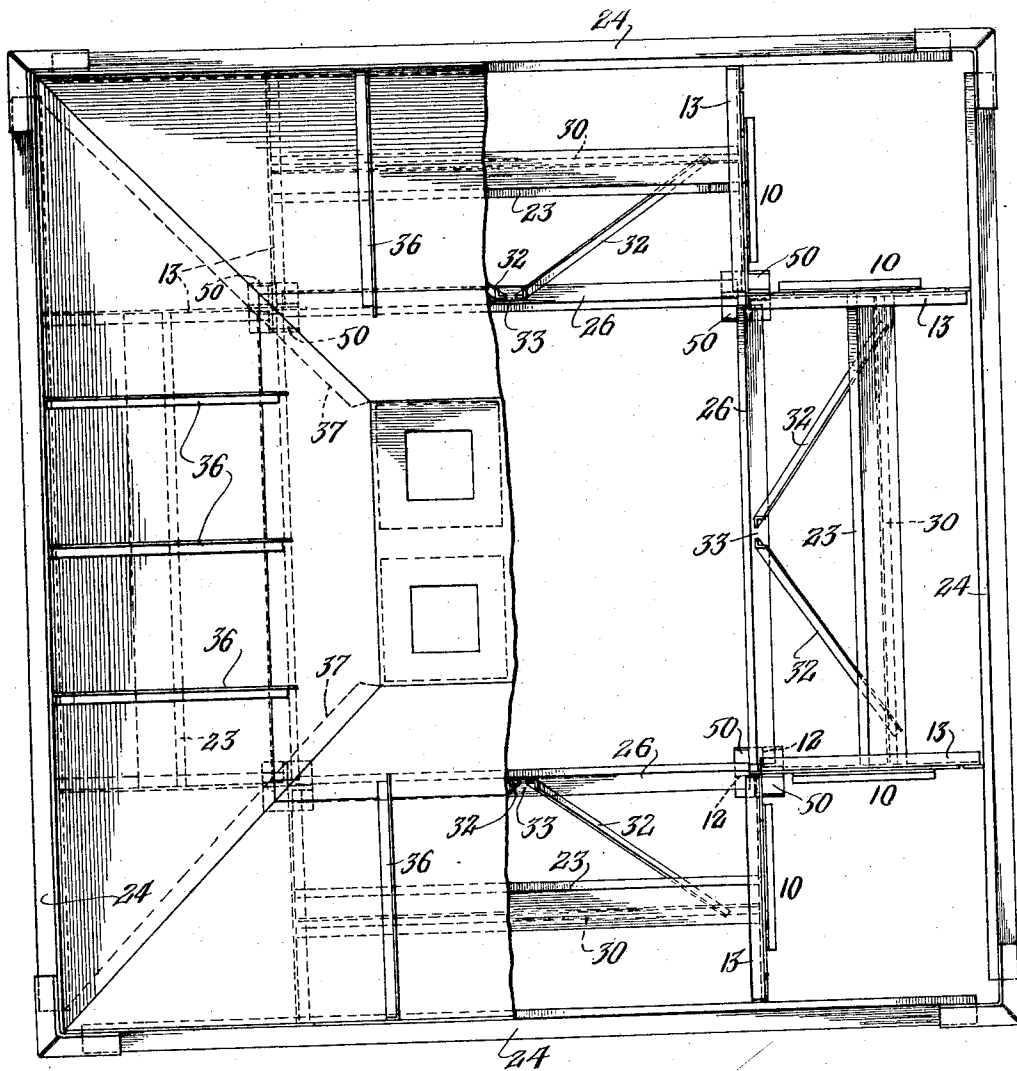
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Fig. 2.



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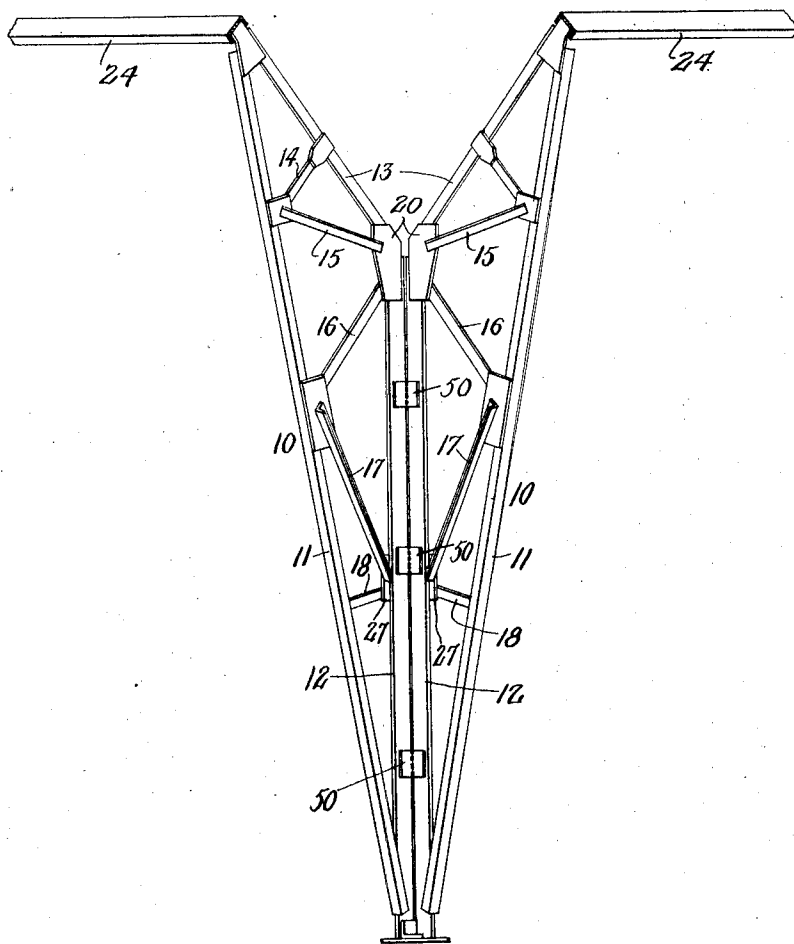
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Fig. 3.



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UNITED STATES PATENT OFFICE.

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BIN.

Application filed September 5, 1925. Serial No. 54,596.

My invention relates to bins useful for storing materials in bulk, and is more especially concerned with the stress-resisting structure or framing of such bins. Besides lightness, strength, and simplicity of construction, I aim at facilitating and cheapening the manufacture, shipment, and erection of a bin.

I have here illustrated and described my invention as applied to the general type of construction shown in my prior Patent No. 1,486,206, granted March 11, 1924.

In the drawings, Fig. 1 is a partial side view and a partial sectional view of a bin construction conveniently embodying my invention;

Fig. 2 is a plan view of Fig. 1 with a portion of the bin shell broken away; and

Fig. 3 is an elevation of the framing construction at one of the corners of the bin, taken diagonally as indicated by the arrow 3-3 in Fig. 2.

The structure shown in the drawings comprises a bin proper or shell that is sustained and held in shape by framing of structural steel, and is supported at a suitable elevation to afford head room for a truck to drive beneath. As shown in Figs. 1-3, the bin has upright supports 10 at or adjacent its corners, extending and attached to the upper portion of the bin shell, and also interconnected and braced together lower down. These supports 10 have the character of obtuse elbows, with diagonal braces 11 interconnecting their lower and upper limbs 12 and 13, and cooperating with them to form triangular trusses. The lower elbow limbs 12 serve as legs to support the bin as a whole while the upper limbs 13 serve as cantilevers for laterally sustaining the bin walls. Besides bracing its limbs 12 and 13 relative to one another, the member 11 of each support 10 is utilized to truss or stiffen these limbs 12 and 13 individually, by means of strut and diagonal members 14, 15, 16, 17 and 18 connecting and forming with them a series of triangles. The member 16, it will be observed, is common to the truss bracing of the lower and upper limbs.

In the present instance, there is a pair of the supports 10 for each corner of the quadrilateral (square) bin shown; and they are arranged in juxtaposition and secured together (at intervals) from the ground up, as well as at their bends or angles 20 whence

the upper limbs or members 13, 13 diverge. Thus their associated lower limbs 12 form (in effect) a single upright or column leg, which is braced in two planes at right angles to one another by the corresponding members 11, 11 and their trussing 16, 17, 18. The supports 10 are interconnected and braced together by horizontal framing comprising beams 21 extending between adjacent legs 12, 12 around the bin. As the supports 10, 10 are at the bin corners (as already mentioned), each beam 21 also connects a pair of opposite supports directly across the space between. In addition, the upper limbs 13, 13 at each side of the bin are interconnected by horizontal beams 22, 23, 24 which help to sustain the bin walls laterally. As shown in Figs. 1 and 2, the beams 21 are of truss construction, each comprising upper and lower chords 25, 26 interconnecting the columns 12, 12, at the elbow bends 20 and at the points 27 where the trussing members 17, 18 are attached to the members 12, 12, and also diagonals 28, 28 from the bends 20, 20 to the middle points 29 of the lower chord 25. The beams 22 are also of truss construction, each comprising chords 30, 26 connecting opposite ends of the truss members 16 and diagonals 32, 32 from the outer ends of the lower chord 30 to the middle points 33 of the upper chord 26. The beams, 23 and 24 are shown as simple channels, the former interconnecting the truss members 14, 14 and the latter extending along the upper edges of the bin shell walls.

As shown in Fig. 1, the hopper-like bin shell is of inverted frusto-pyramidal form, with its flat bottom or "small base" 34 somewhat below the elbow bends at 20. Preferably, this shell is formed of sheet metal, reinforced and stiffened with internal angle bar wales 36, paralleling the corresponding members 13, 13 at intervals between them along its sides. However, the bin shell proper may be made of wooden panels, merely resting in the steel framework. When of metal, the shell is stiffened by the angularity of its lapped corner joints 37 and bottom joints 38. Its interior is divided into compartments by a partition 40, extended to a substantial height above its upper edge to prevent materials heaped up above the top of the bin from intermingling. As shown, the edges of this partition 40 are

secured to the bin walls by angle bars 41, and it is stiffened with horizontal wales 42, 43, and 44 (the last along its upper edge). Its upper portion is also stiffened with up-
 5 right wales 45. The wales 42 and 43 are braced to one of the bin walls by diagonal members 46, 47, secured to the shell directly opposite the beams 22 and 23.

From the foregoing description, it will be
 10 apparent that the most heavily loaded strength members of the bin are the flat trussed supports 10, and that they are of convenient size and proportions for ship-
 15 pping and erecting, so that they can be completely assembled and riveted up as individual units at the fabricating plant. In service, a pair of these supports (counter-
 parts of one another, except for being "rights and lefts") are assembled with their
 20 members 12 corner to corner, as shown in Figs. 2 and 3, and secured together by angle bar clips 50 in the angle between their members 12, 12, at suitable intervals in the
 25 height of these members. This is a connection exceedingly easy to make; and when thus set up, the composite legs have prac-
 tically the same stiffness as if each leg were initially fabricated as one unit. This ad-
 30 vantage is independent, in a measure, of the exact height of the legs: e. g., it obtains even with the legs terminating at the level of the members 25, for example, and sup-
 35 ported from the ground on separate supports or piers. Of course the members 12 of the legs need not necessarily be vertical. Preferably, the bin is completely assembled before any of the bolts employed are finally
 40 tightened up. In practice, most of the structural members above referred to that are not otherwise described may advantageously be of angle-bar section.

From Fig. 1 of the drawings and the foregoing description, it will be seen that
 45 structurally the bin just described presents the various aspects referred to in my above mentioned Patent No. 1,486,206: e. g., under one aspect its framing from side to side
 50 comprises two nearly triangular trusses outlined by the members 13, 28, 25, 27, and 11, supported on the lower portions of the
 columns 12, 12 and braced together against
 55 rocking inward or outward by union at their acute lower corners 29 and by the member 26; while under another aspect, its trans-
 60 verse framing comprises a straddling lower structure represented by the beam truss 21 and the upper portions of the columns 12, 12, and cantilever trusses outlined by the
 65 members 13, 11, 17, and 12 secured to the ends of said beam truss 21 and upstanding therefrom. Here the upper portions of the
 columns 12, 12 are in a manner common to beam and cantilever trusses. These two
 aspects are presented by the bin framing
 no matter from which side it is regarded.

From still another point of view, the main framing may be regarded as composed of a horizontal polygonal central frame whose
 70 sides are the beams 21, with a couple of cantilevers upstanding from each corner of this frame, where it is supported by the columns 12, 12. From a cognate point of
 view, again, the main framing consists of U
 75 frames of truss construction (outlined by the members 12, 13, 11, 17, 26, 25, 17, 11, 13 and 12) arranged in intercrossing parallel pairs and supported at their intersections; and the
 portions of the legs below the level of the
 80 members 25 are in effect mere corner piers, such as referred to above.

I claim:—

1. The combination with a bin of a fabri-
 85 cated supporting leg for the bin having up- wardly and outwardly divergent branches laterally sustaining adjacent bin sides.

2. The combination with a bin of elbow
 90 supports therefor secured together in pairs at its corners, with their lower correspond- ing limbs extending downward to serve as legs for the bin and their other limbs di-
 95 verging upward to sustain adjacent bin sides.

3. The combination with a bin of a fabri-
 100 cated supporting leg therefor with divergent members branching upwardly and outwards therefrom for laterally sustaining the bin
 105 sides, and strut braces extending from the leg upward to said members.

4. The combination with a bin of sup-
 110 porting means therefor comprising inde- pendently assembled triangular trusses dis- posed in planes at an angle to one another
 115 with adjacent sides thereof united to form a leg for the bin and other sides thereof di-
 120 verging upwardly and outwardly to sustain adjacent sides of the bin.

5. A bin construction comprising elbow
 125 supports with lower limbs serving as legs for the bin and upper limbs sloping out- ward at the bin sides, a central frame struc-
 130 ture interconnecting and bracing said el- bow supports, and beams interconnecting the upper limbs of said supports around the
 135 bin.

6. A bin construction comprising elbow
 140 supports with lower limbs serving as legs for the bin and upper limbs sloping out- ward at the bin sides, and a central frame structure attached to said supports, and in-
 145 terconnecting opposite pairs of them direct- ly across the space between.

7. In a bin construction, a plurality of in-
 150 dependently assembled unitary triangular trusses at the bin corners, and beams inter- connecting said trusses from corner to cor-
 155 ner around the bin.

8. In a bin construction, a plurality of in-
 160 dependently assembled unitary triangular trusses formed with the upper sides thereof sloping outwardly and upwardly to support
 165

the bin sides, and a central frame structure interconnecting said trusses and bracing them together to serve as supporting members for the bin.

5 9. In a bin construction, a fabricated supporting structure at each of the bin corners, each of said structures being formed with upwardly and outwardly diverging branches, beams interconnecting said supporting structures from corner to corner
10 around the bin, and beams interconnecting said branches.

10 10. A bin construction comprising elbow supports at the bin corners with lower limbs serving as legs for the bin and upper limbs sloping outward to sustain the bin sides, and vertically spaced beams interconnecting said supports from corner to corner around the bin.

20 11. A bin construction comprising elbow supports secured together in pairs at the bin corners, with their lower limbs extending downward to serve as legs for the bin and their upper limbs diverging upward at adjacent sides of the bin, beams interconnecting the interconnected pairs of elbows
25 at the several bin corners, and beams extend-

ing between the upper limbs of said elbows.

12. A bin construction comprising legs at the bin corners, a central frame structure
30 interconnecting and bracing said legs, supporting members sloping upward and outward from each leg at adjacent sides of the bin, and braces extending from a lower point on each leg to each of its aforesaid
35 supporting members.

13. A bin construction comprising legs at the bin corners, cantilever trusses secured to each leg sloping upward and outward therefrom at adjacent sides of the bin, and
40 trusses interconnecting and bracing together the portions of opposite legs to which said cantilevers are attached.

14. A bin construction comprising a plurality of U frames with intermediate portions united in a polygon and upper portions projecting upwardly and outwardly from the corners of such polygon.

15. A bin construction comprising a plurality of intercrossed U frames with supporting legs at their intersections.

In testimony whereof, I have hereunto signed my name.

WILLIAM M. VENABLE.