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[54] **TORSIONALLY FLEXIBLE MINE CAR**
 15 Claims, 7 Drawing Figs.

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 105/1 R, 105/368 B, 105/404, 105/406, 105/410,
 213/62

[51] Int. Cl..... **B61d 11/02**

[50] Field of Search..... 105/364,
 404, 179, 406, 409, 410, 368 B, 461, 457, 458, 1,
 2, 3; 214/42 B; 213/62

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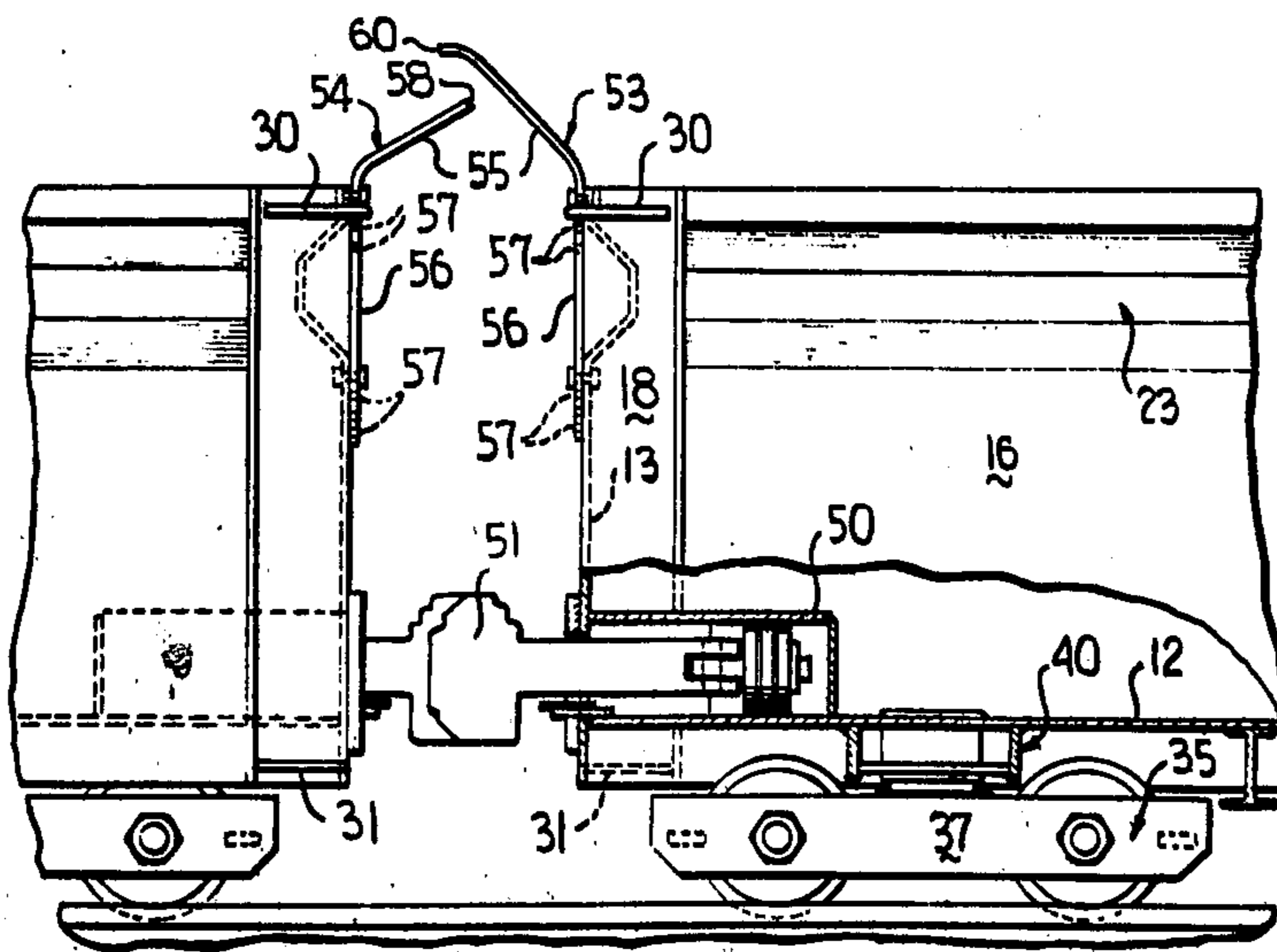
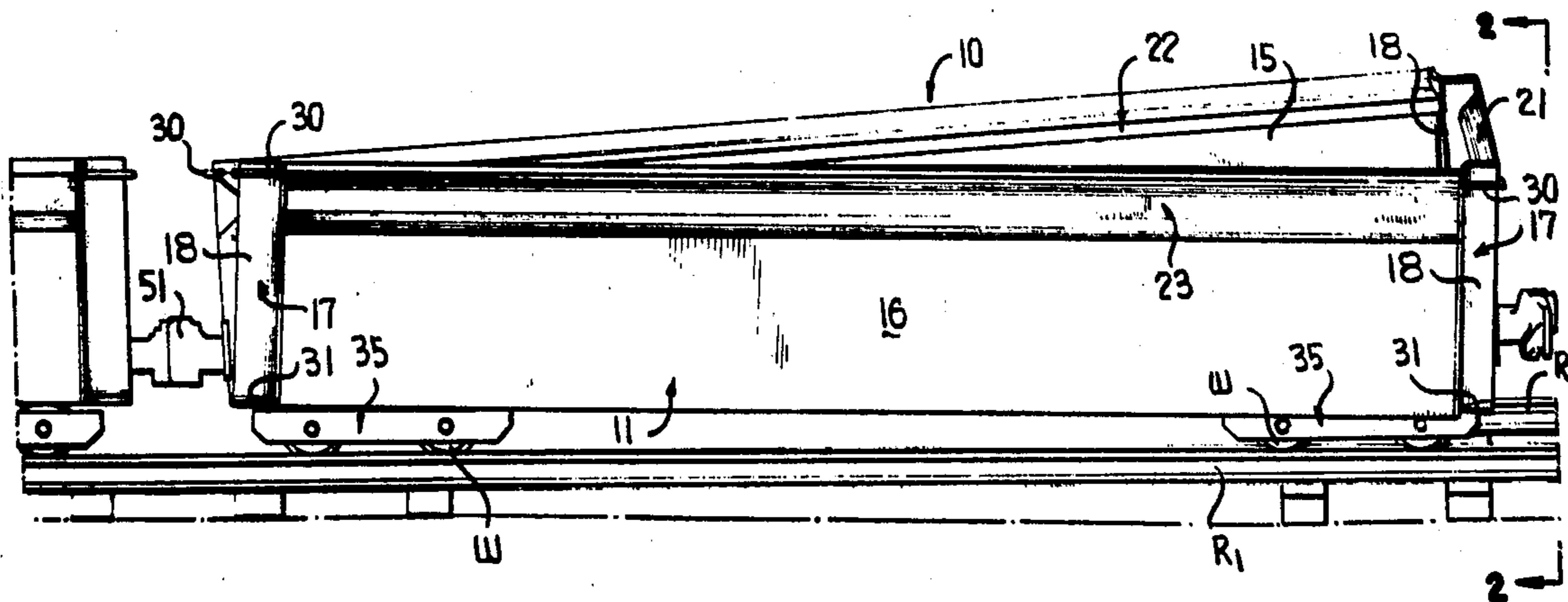
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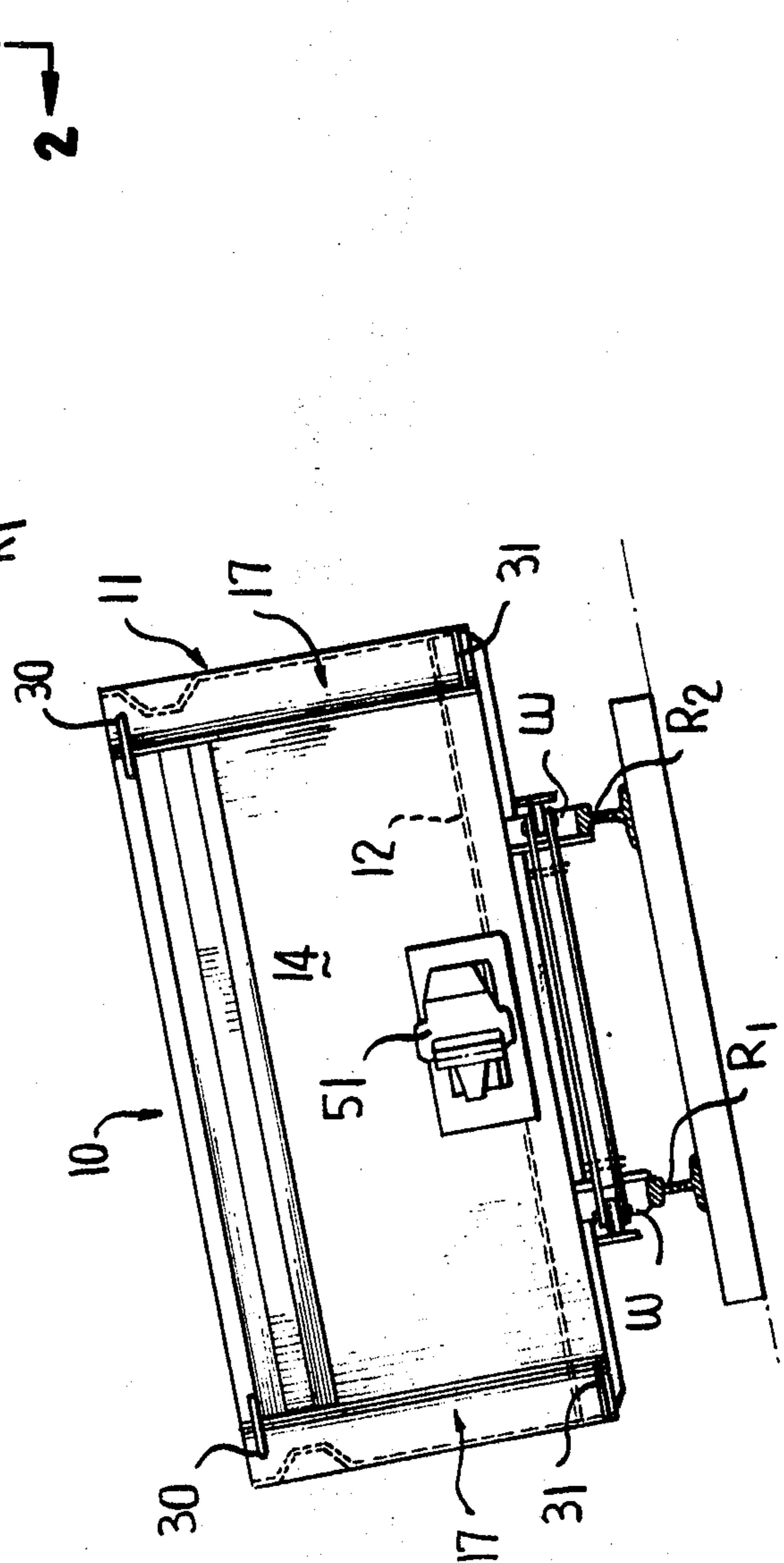
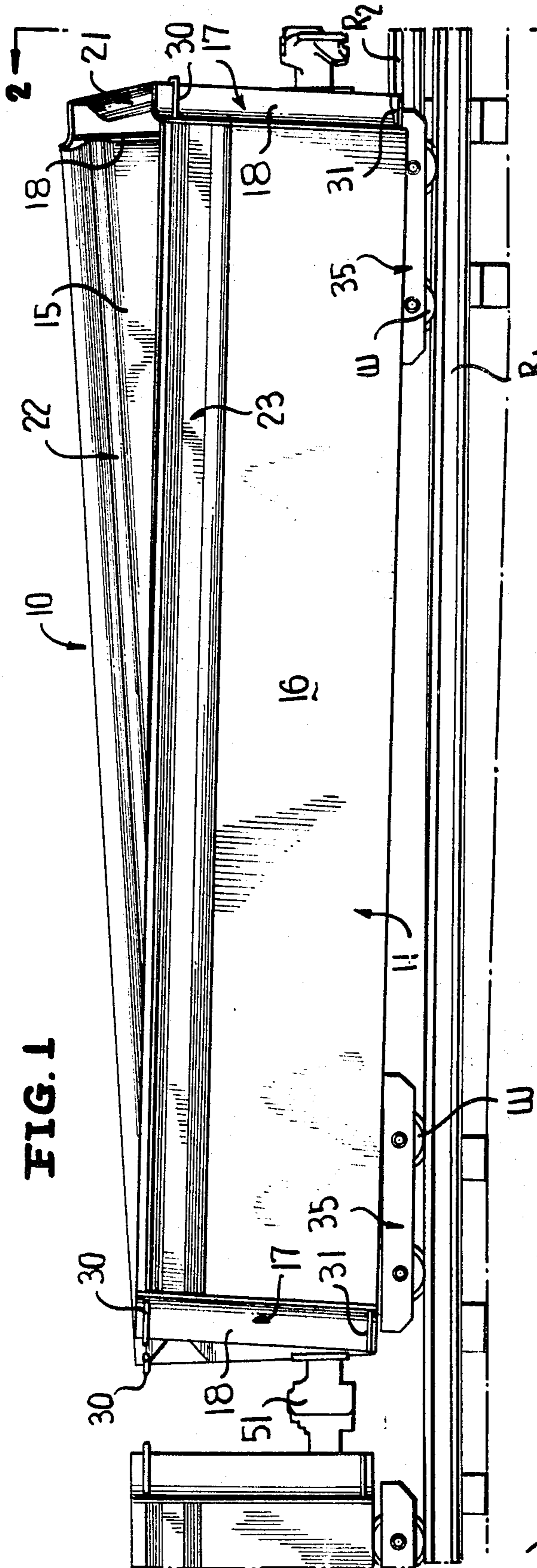
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ABSTRACT: This disclosure relates to a mine car having an outwardly opening wall at each of the four corners thereof for permitting relative torsional flexing of the car body, and further functioning to provide an area where a switchman can ride the car in a safer position than is presently conventionally provided, the latter function being produced by a supporting platform and a handle positioned within said outwardly opening wall.





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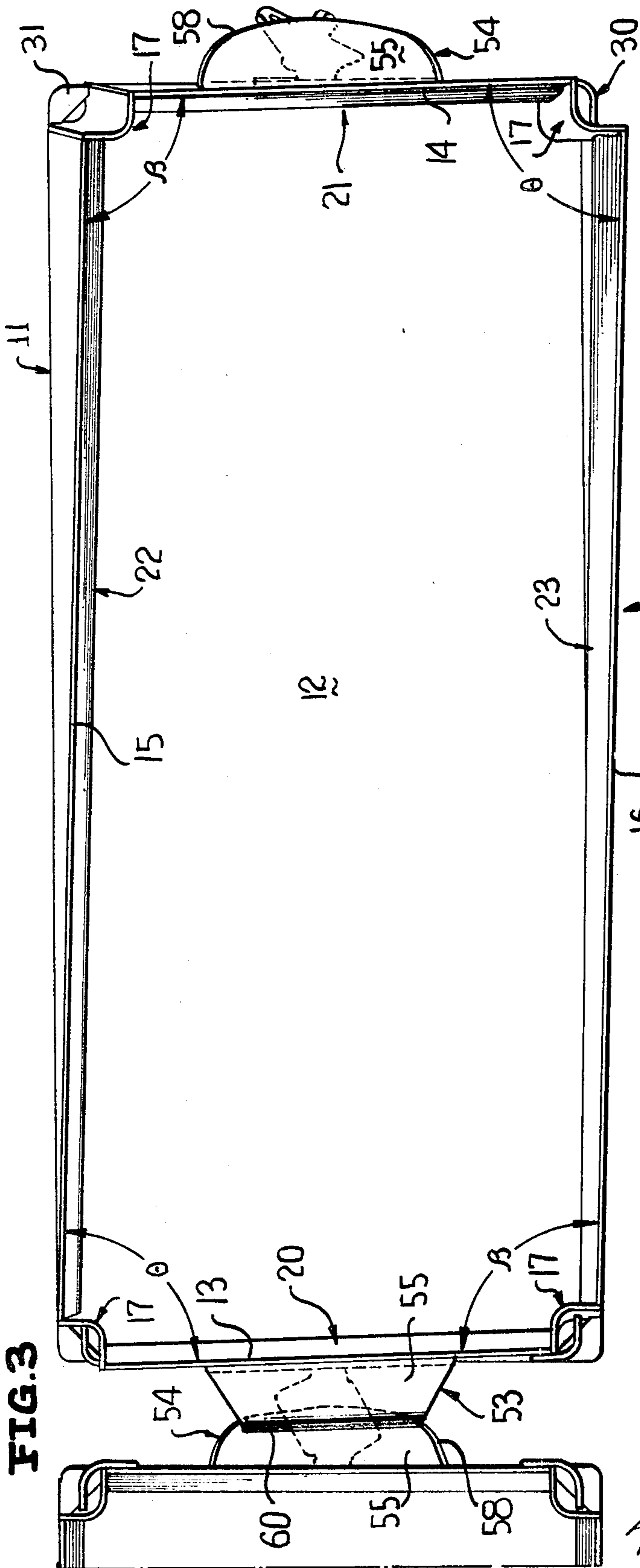


FIG. 3

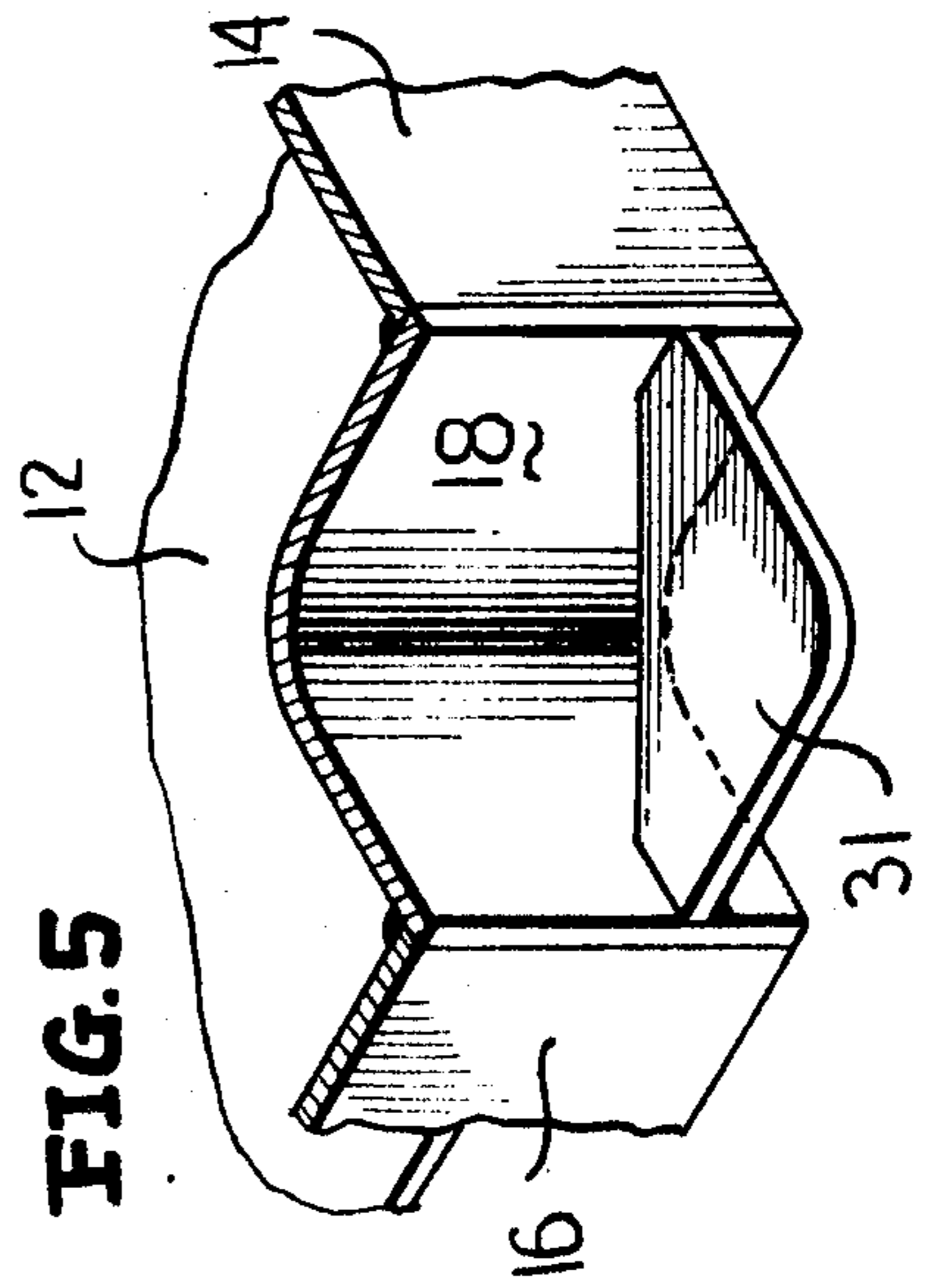


FIG. 5

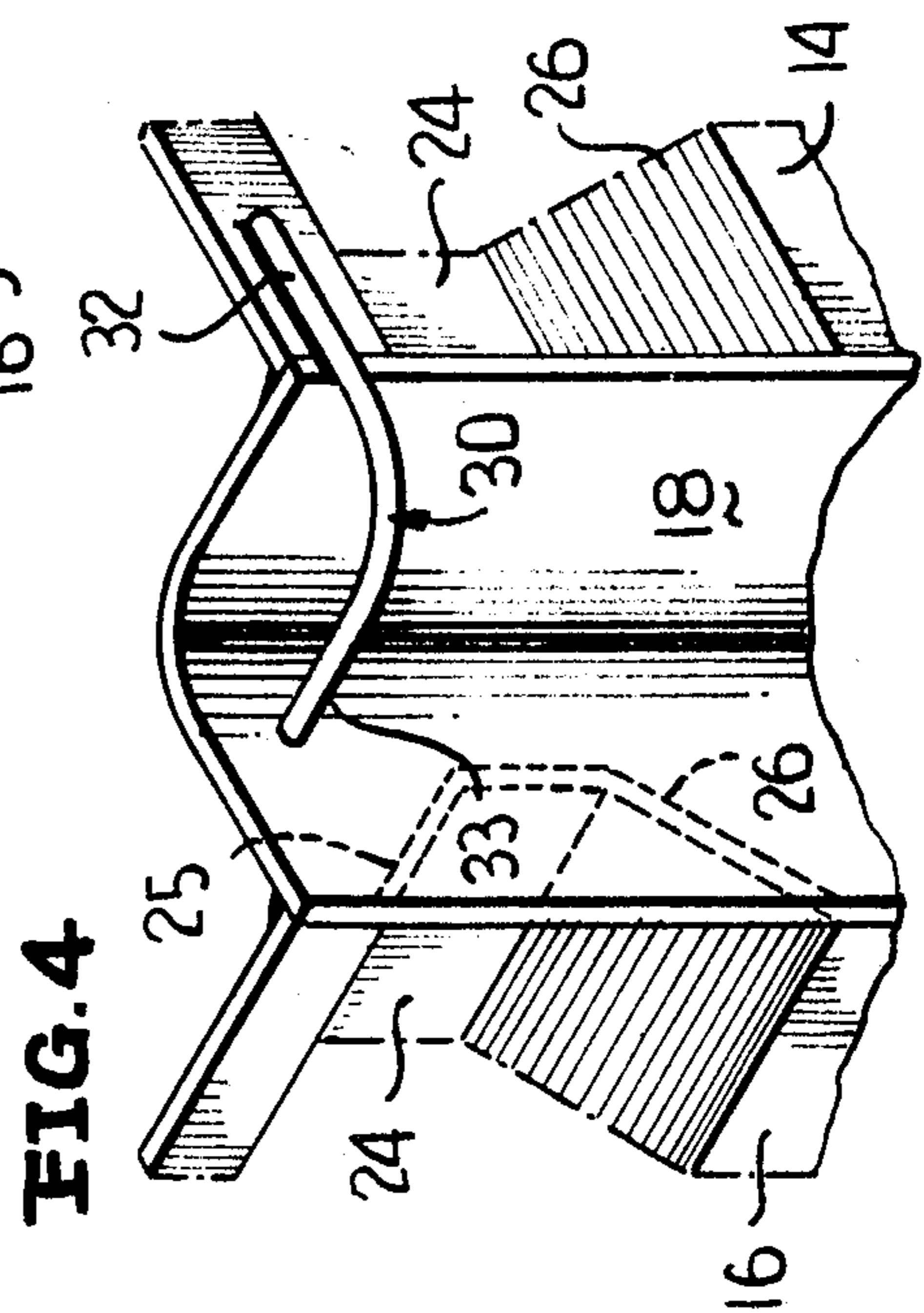


FIG. 4

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FIG. 6

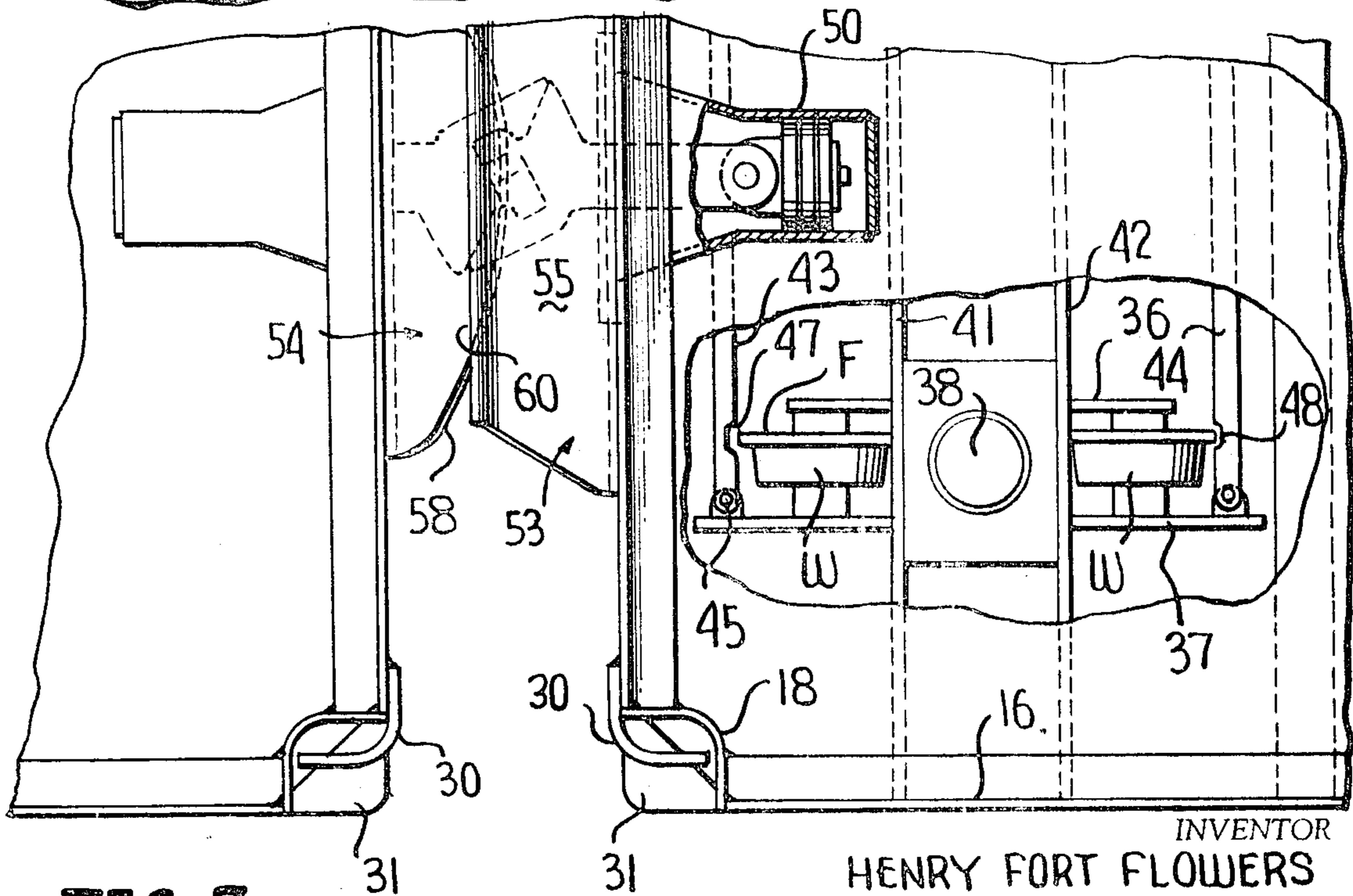
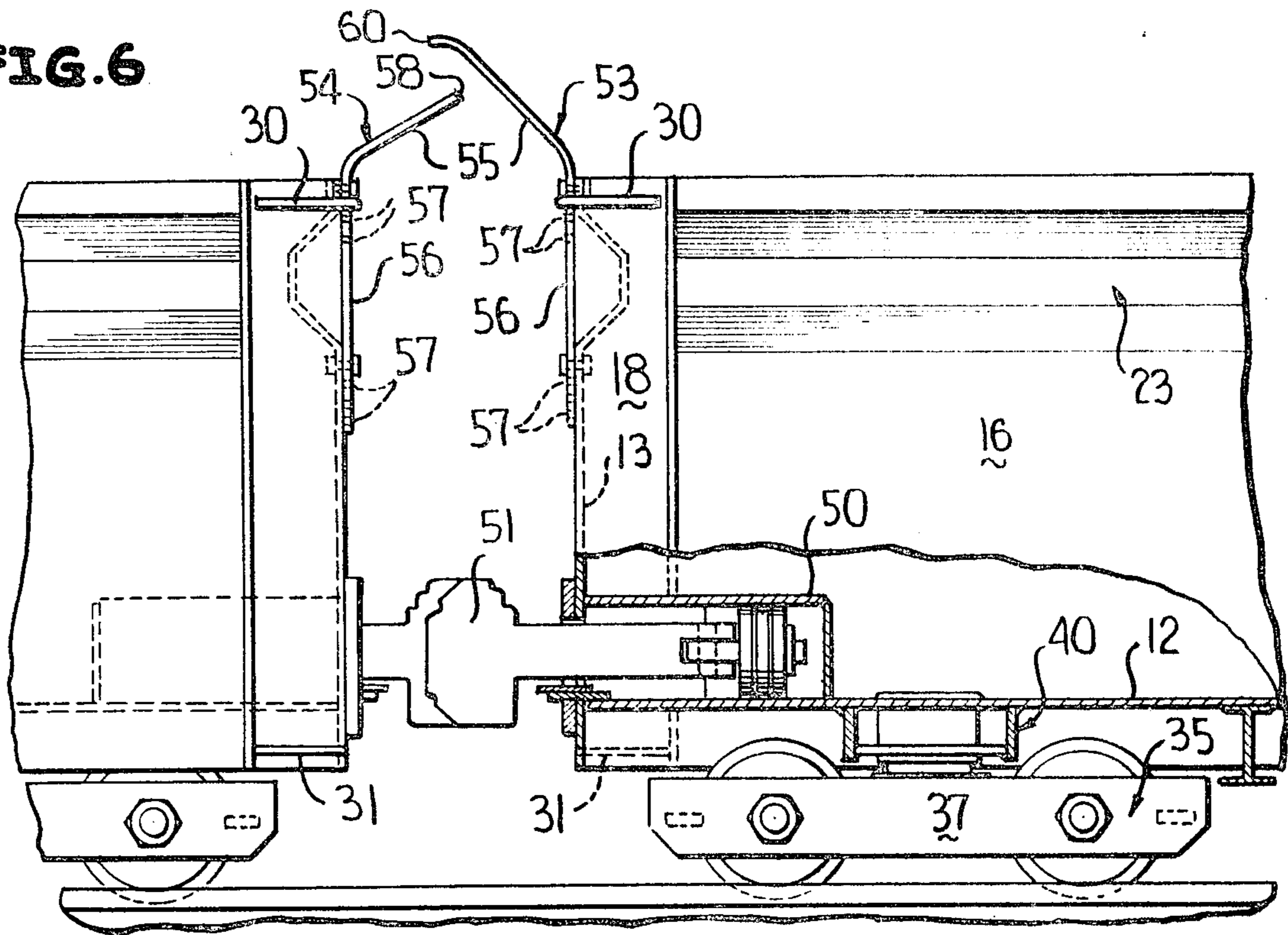


FIG. 7

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TORSIONALLY FLEXIBLE MINE CAR

A primary object of this invention is to provide a novel railroad car, particularly a mine car, which includes a car body defined by a bottom, a pair of upstanding sidewalls, and a pair of upstanding end walls, means between the ends of each adjacent side and end walls defining corners of the body and constructed and arranged for permitting relative torsional flexing of the body along its longitudinal axis, the last-mentioned means being an outwardly opening curved wall secured between and to the ends of each adjacent side and end wall.

A further object of this invention is to provide a novel railroad car as set forth heretofore wherein a handle is connected to one of the walls, the handle being directed toward the other of the walls, and a platform beneath the handle upon which a person can stand while holding the handle.

Still another object of this invention is to provide a novel railroad car constructed in accordance with the objects heretofore set forth and further including an upwardly and endwise outwardly directed deflector carried by each of the end walls, the length of one of the deflectors being greater than the length of the other of the deflectors, and the angles of the deflectors relative to the horizontal are different whereby the deflectors of coupled cars will be in overlapped relationship to prevent spillage during continuous loading.

Still another object of this invention is to provide a novel railroad car wherein a pair of wheel trucks are provided adjacent each of the corners beneath the car body bottom, a tie bar joining together transverse pairs of the wheel trucks at points outboard of the wheels thereof, and coupling means above the tie bars and the bottom to provide clearance for the tie bars.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claimed subject matter, and the several views illustrated in the accompanying drawings.

IN THE DRAWINGS:

FIG. 1 is a side elevational view of a railroad car constructed in accordance with this invention, and illustrates the manner in which the car body is torsionally flexed during the movement thereof along a pair of rails.

FIG. 2 is an end view of the railroad car of FIG. 1 taken generally along line 2-2, and illustrates the angular relationship of an end wall of the car body to the horizontal wherein the body is torsionally flexed.

FIG. 3 is a top plan view of the railroad car of FIG. 1, and more clearly illustrates outwardly opening walls disposed between and secured to the ends of adjacent side end walls which permit the torsional flexing of the car body.

FIG. 4 is a fragmentary perspective view of the lower right-handmost corner construction of FIG. 3, and illustrates a handle joined to an upper portion of the end wall and terminating within but unconnected to the outwardly opening corner wall.

FIG. 5 is a fragmentary perspective view partly in cross section of a lowermost portion of the right-handmost corner of FIG. 3, and illustrates a platform secured within the corner wall beneath the handle.

FIG. 6 is a fragmentary side elevational view of a pair of railroad cars coupled together, and illustrates a pair of adjustable deflectors in overlapped relationship to prevent spillage during continuous loading, and a coupler housing disposed wholly within each of the car bodies to provide clearance for tie bars connected between transversely adjacent wheel trucks.

FIG. 7 is a fragmentary top plan view with a part broken away for clarity of the coupled cars of FIG. 6, and more clearly illustrates the manner in which the tie bars are connected between transversely adjacent wheel trucks.

A novel railroad car which is particularly constructed as a mine car is generally designated by the reference numeral 10, and includes a body 11 defined by a bottom 12, a pair of end

walls 13, 14 and a pair of sidewalls 15, 16. In the normal nontorsionally flexed condition of the car body 11 the end walls 13, 14 are in parallel relationship to each other, as are the sidewalls 15, 16. Similarly in the nontorsionally flexed condition of the body 11 adjacent ends of the end and sidewalls define therebetween an angle of 90°.

Identical means 17 are disposed between and secured to the ends of each adjacent side and end wall to form corners of the car body 11, and the means 17 are so constructed and arranged as to provide relative torsional flexing of the car body 11 about its longitudinal axis, as is best illustrated in FIGS. 1 and 3 of the drawings. The means 17 at each of the corners is an outwardly opening generally U-shaped or V-shaped wall 18 having terminal vertically disposed edges (unnumbered) welded to the respective walls 13 through 16. A lower edge (unnumbered) of each of the outwardly opening walls 18 is similarly welded or otherwise secured to the bottom 12. It should be particularly noted that the walls 18 are completely devoid of reinforcing means while the upper end portions (unnumbered) of each of the walls 13 through 16 are reinforced by respective outwardly opening ribs 20 through 23. Each of the ribs 20 through 23 is generally of a U-shaped cross-sectional configuration, and is defined by a bight portion 24 and a pair of longitudinally extending legs 25, 26.

While the reinforcing means 20 through 23 impart desired rigidity to the car body 11 during its travel on rails R1, R2 and/or when being dumped, the nonreinforced means 17 at each of the corners permit the body 11 to be torsionally flexed about its longitudinal axis which occurs when, for example, the car is moving along sharp radius curves when the outer rail R2 (FIG. 1) is elevated or banked relative to the inner rail R1 to provide smooth, high speed operation around the curve. On short radius curves that are common in mines, the tangent or straight track is horizontal with both rails at the same elevation up to the start of the curve track but in the curve the outer rail R2 is elevated. Thus, at one end of the car body 11 which is to the left as viewed in FIG. 1, the track is horizontal while at the other end the rails are horizontally offset as viewed best in FIG. 2, and under these conditions the torsional flexing or twisting of the body 11 permits practically the same weight distribution on each of four pairs of wheels W. Thus, when the body 11 twists one pair of diagonally opposite corners opens slightly beyond 90°, as indicated by the angle beta at the lower left-hand and upper right-hand corners of FIG. 3, while the other diagonal corners close to include an angle of less than 90°, as indicated by the angle omega in the upper left-hand and lower right-hand corners of FIG. 3. In the unflexed condition of the body 11 adjacent end and sidewalls are, of course, normally disposed to include angle of 90° therebetween. Thus, when the car body 11 is torsionally flexed in the manner just described, the flexible U-shaped corner walls 18 open and/or close slightly at the tops thereof to either side of 90° to permit the opening and closing of adjacent side and body walls similarly to either side of 90°.

Reference is now made to FIGS. 4 and 5 of the drawings wherein is illustrated handle means 30 and a support or platform 31. The handle 30 includes an end 32 welded or otherwise secured to the end wall 14 and an opposite end 33 which is directed toward the sidewall 16. The end 33 of the handle 30 is not connected to either the outwardly opening wall 18 or the sidewall 16 and the torsional flexing of the body 11 is therefore unaffected as would occur if, for example, the end 33 of the handle 30 were secured to either the wall 18 or the sidewall 16. The function of the handle 30 is to provide a means which can be grasped by a switchman as he stands upon the platform 31 which is welded or otherwise conventionally secured to the wall 18 as best shown in FIG. 5 of the drawings. It should also be particularly noted that the outwardly opening configuration of the wall 18 creates an area in which a switchman can stand with more safety than that provided by conventional platforms and handles. While the handle 30 and the platform 31 have been described in conjunction with the outwardly opening wall 18 between the end wall 14 and the

sidewall 16, it is to be understood that identical handles 30 and platforms 31 can be provided at any one or all of the corners, as is shown in FIG. 3 of the drawings.

Reference is now made to FIGS. 6 and 7 of the drawings which more clearly illustrates the manner in which one of four wheel trucks 35 is supported adjacent each of the car body corners. Each of the wheel trucks 35 includes a pair of plates 36, 37 between which are conventionally journaled the wheels W. A king post 38 is conventionally secured to each of the wheel trucks 35 for limited pivoting movement along a vertical axis, and is also mounted for pivoting movement in a short box section 40 which includes a pair of transverse vertical walls 41, 42 which are welded to the bottom wall 12. A pair of tie bars 43, 44 are connected between transversely adjacent pairs of the wheel trucks 35 by conventional pivot connections 45, 46. The tie bars 43, 44 are relieved at 47, 48 to provide clearance for the wheel flanges F. It should also be noted that the pivotal connections 45, 46 between the tie bars 43, 44 and each of the trucks 35 is made at the outboard one of the plates 37, as is best illustrated in FIG. 7. This connection of the tie bars 43, 44 outboard of the wheels W is such that the length of the tie bars may be greater than the length between the king posts to offset the foreshortening of the wheel gauge on curved track.

In addition to coupling together transversely adjacent pairs of the wheel trucks 35 by means of the tie bars 43, 44, it will be noted that a housing 50 of a conventional coupler 51 is positioned wholly within and above the bottom 12 of the car body 11. Due to this construction clearance is provided for the tie bar 47 adjacent and beneath the bottom or floor plate 12, as well as a similar tie bar (not shown) at the remote right-hand portion of the car body 11 which is not illustrated in FIGS. 6 and 7. Another reason for locating the coupler housing or pocket 50 above the bottom 12 is to permit the dumping of the flexible mine car 10 by using a smaller bullwheel diameter dumper. The center of this bullwheel is located approximately at the center of the coupler so that the track through the dumper can be lower and therefore permit a higher side in a given diameter bullwheel dumper. This also provides a more favorable location of the center of gravity of the empty car by disposing the same below the center of rotation of the bullwheel while the center of gravity of the loaded car is above the center of rotation of the bullwheel.

Referring now to FIGS. 3 and 6 of the drawings, the end walls 13, 14 of the car body 11 are provided with respective upwardly and endwise outwardly directed deflectors 53, 54. Each of the deflectors 53, 54 includes an inclined portion 55 (FIG. 6) and a vertical extension 56 having a plurality of vertically aligned apertures 57. A pair of apertures are provided in the end walls 13, 14 and by employing nuts and bolts (unnumbered) the deflectors 53, 54 can be adjusted in height relative to each other in a manner readily apparent from FIG. 6. The inclined portions or sections 55, 55 of the deflectors 53, 54 are overlapped, as is best illustrated in FIG. 7, to prevent spillage of material between the cars when loading with a continuous loader, such as belt conveyor, while the cars move along the rails R1, R2. The adjustability of the deflectors 53, 54 permits the same to be bolted to the end walls as desired to provide maximum protection against spillage during loading. On short radius curves the extensions 55, 55 must clear each other and to this end the lower extension has a curved or convex outline defined by an edge 58 while the extension 55 of the deflector 53 has a straight edge 60 imparting a generally trapazoidal outline to the extension 55.

While preferred forms and arrangements of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in details and arrangement of parts may be made without departing from the spirit and scope of this disclosure.

I claim:

1. A railroad car comprising a body including a bottom wall, a pair of upstanding sidewalls, and a pair of upstanding end walls, adjacent ones of said end and sidewalls being disposed

normal to each other in an unflexed condition of said car body, corner means between ends of each adjacent side and end wall for permitting relative torsional movement of said car body along its longitudinal axis, said corner means each being defined by an upstanding outwardly opening corner wall constructed from flexible material whereby each corner wall can selectively open and close as the normal angle between adjacent side and end walls is increased and/or decreased upon the flexing of said car body, a pair of wheels trucks adjacent each of said corners beneath said bottom, a tie bar joining together transversely adjacent pairs of said wheel trucks, and coupling means above said tie bars and said bottom wall to provide clearance for said tie bars.

2. A railroad car comprising a body including a bottom wall, a pair of upstanding sidewalls, and a pair of upstanding end walls, adjacent ones of said end and sidewalls being disposed normal to each other in an unflexed condition of said car body, corner means between ends of each adjacent side and end wall for permitting relative torsional movement of said car body along its longitudinal axis, said corner means each being defined by an upstanding outwardly opening corner wall constructed from flexible material, whereby each corner wall can selectively open and close as the normal angle between adjacent side and end walls is increased and/or decreased upon the flexing of said car body, a pair of wheel trucks adjacent each of said corners, means including a king post mounting each wheel truck for pivoting movement about a vertical axis, a tie bar joining together transversely adjacent pairs of said wheel trucks, and the points of connection of said tie bars and wheel trucks being outboard of said vertical axes to thereby offset the foreshortening of the wheel gauge on curved tracks.

3. A corner construction for a railroad car comprising a sidewall and an end wall, said side and end walls being disposed at an angle of approximately 90° relative to each other, an outwardly opening upstanding corner wall between and joined to said side and end walls, said corner wall being defined by a bight portion and a pair of outwardly diverging leg portions, a handle having opposite terminal end portions, one of said terminal end portions being connected contiguous one of said leg portions, and said handle transversely spans the opening of said upstanding corner wall with the opposite terminal end portion thereof being free and unsecured.

4. The railroad car corner construction as defined in claim 3 including a support beneath said handle upon which a person can stand while holding said handle.

5. The railroad car corner construction as defined in claim 4 wherein said support is disposed at least partially within the area set-off by said outwardly opening corner wall.

6. A railroad car comprising a body including a bottom wall, a pair of upstanding sidewalls, and a pair of upstanding end walls, adjacent ones of said end and sidewalls being disposed normal to each other in an unflexed condition of said car body, corner means between ends of each adjacent side and end wall for permitting relative torsional movement of said car body along its longitudinal axis, said corner means each being defined by an upstanding outwardly opening corner wall constructed from flexible material, whereby each corner wall can selectively open and close as the normal angle between adjacent side and end walls is increased and/or decreased upon the flexing of said car body, and each of said corner walls includes an uppermost end portion devoid of reinforcing means.

7. The railroad car as defined in claim 6 including a handle having opposite terminal end portions, one of said terminal end portions being secured to said body contiguous one of said corner walls, said handle being in traversing relationship to said one corner wall, and the other of said terminal end portions being free and unsecured relative to said body.

8. The railroad car as defined in claim 6 wherein each corner wall is of a generally V-shaped configuration in transverse section with a generally large radius rounded bight portion.

9. A railroad car comprising a body including a bottom wall, a pair of upstanding sidewalls, and a pair of upstanding end

walls, adjacent ones of said end and sidewalls being disposed normal to each other in an unflexed condition of said car body, corner means between ends of each adjacent side and end wall for permitting relative torsional movement of said car body along its longitudinal axis, said corner means each being defined by an upstanding outwardly opening corner wall constructed from flexible material, whereby each corner wall can selectively open and close as the normal angle between adjacent side and end walls is increased and/or decreased upon the flexing of said car body, each of said corner walls includes an uppermost end portion devoid of reinforcing means, and said end and sidewalls each include means reinforcing uppermost end portion thereof.

10. The railroad as defined in claim 9 including a handle having opposite terminal end portions, one of said terminal end portions being secured to said body contiguous one of said corner walls, said handle being in traversing relationship to said one corner wall, and the other of said terminal end portions being free and unsecured relative to said body.

11. The railroad car as defined in claim 9 wherein each corner wall is of a generally V-shaped configuration in transverse section with a generally large radius rounded bight portion.

12. A railroad car comprising a body including a bottom wall, a pair of upstanding sidewalls, and a pair of upstanding end walls, adjacent ones of said end and sidewalls being disposed normal to each other in an unflexed condition of said car body, corner means between ends of each adjacent side and end wall for permitting relative torsional movement of said car body along its longitudinal axis, said corner means each being defined by an upstanding outwardly opening

corner wall constructed from flexible material, whereby each corner wall can selectively open and close as the normal angle between adjacent side and end walls is increased and/or decreased upon the flexing of said car body, a handle having opposite terminal end portions, one of said terminal end portions being secured to said body contiguous one of said corner walls, said handle being in traversing relationship to said one corner wall, and the other of said terminal end portions being free and unsecured relative to said body.

13. The railroad car as defined in claim 12 wherein each corner wall is of a generally V-shaped configuration in transverse section with a generally large radius rounded bight portion.

14. The railroad car as defined in claim 12 including support means secured to said one corner wall beneath said handle.

15. A railroad car comprising a body including a bottom wall, a pair of upstanding sidewalls, and a pair of upstanding end walls, adjacent ones of said end and sidewalls being disposed normal to each other in an unflexed condition of said car body, corner means between ends of each adjacent side and end wall for permitting relative torsional movement of said car body along its longitudinal axis, said corner means each being defined by an upstanding outwardly opening corner wall constructed from flexible material, whereby each corner wall can selectively open and close as the normal angle between adjacent side and end walls is increased and/or decreased upon the flexing of said car body, and each corner wall is of a generally V-shaped configuration in transverse section with a generally large radius rounded bight portion.

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