DROP BOTTOM SHIPPING CONTAINER

FIG. 1

FIG. 2
This invention relates to containers for transporting bulk materials, and more particularly to a container of the drop bottom type.

Containers of this general class are designed to be loaded through an open port in the top and discharged through an opening in the bottom. My prior patent, U.S. Patent No. 2,697,002, issued December 14, 1954, illustrates a typical prior art container, including the bottom closure mechanism used in the container forming the subject matter of this application.

Containers such as these are used to carry bulk material from the point of loading to the destination point, either by railroad car or by truck. A combination of the two transportation facilities also may be used with trucks transporting the loaded containers to and from a railroad terminal. In view of this prevalent use of trucks, certain limitations in the containers are apparent; for example, trucks are limited as to the width and also as to the weight they may carry. Accordingly, the containers must be designed to meet physical dimensions of the truck and also be as light weight as possible in order to obtain a greater payload within the weight restrictions.

An additional problem is involved, however, and that is that the containers must be of such structural strength as to withstand lifting by a crane while fully loaded at the destination point. The prior art structures have recognized the necessity of a structurally sound container, but in order to obtain the structural strength required the prior art has increased the weight and bulkiness of the containers. The result has been that trucks carrying the prior art containers have been unable to carry as great a payload as they should. Also, the cost of the containers has been excessive due to the added structural weight.

Other problems with the prior art containers have been that additional storage space has been required to store the bulky containers and the additional weight has required that a lifting hoist or crane have considerable lifting capacity in order to maneuver the loaded containers to the desired location.

In view of the problems posed by the prior art, it is an object of this invention to provide a container that has a lower total structural weight than prior containers without a sacrifice in the necessary strength.

A further object of the invention is to provide a container that will be less expensive to construct from a material standpoint.

A still further object is to provide a container which will reduce the overall dimensions without reducing the maximum cubic volume so that the containers may be more closely arranged on the vehicle than was heretofore possible.

With the problems of the prior art and the above stated objects in mind, the invention contemplates the provision of vertical angle members at each corner of the container with the legs of each angle being of a longitudinally tapering configuration. The tapered configuration of the angles is such that the greater dimension is at the lower portion of the container, thus providing a simple, yet effective, means of securely gusseting each lower corner of the container. This simple construction should be contrasted with the prior art containers which utilize a heavily formed plate at each lower corner of the container cast upper as a means of attaching the vertical angles to the container.

The container of this invention also includes Z-shaped members secured to the upper portion of each of the walls of the container thereby forming a top apron. Corner gussets interconnect the Z-shaped members and the above mentioned vertical angles. Lifting hooks are secured to each of the corner gussets, the hooks being of such a dimension as not to protrude beyond the dimensions of the container. The hooks of this invention are of a simple, welded plate construction and should be connected with the prior art hooks which were of a heavy cast configuration.

Using the tapered vertical angle members and the welded hooks, a considerable saving in expense and weight has been effected. Also, the placement of the hooks on the containers allows the containers to be more closely stacked than was heretofore possible, thus utilizing to the maximum the available space of the transporting vehicle. This combination of reduction in weight and bulkiness enables trucks to carry greater payloads without excessive weight and at less expense per unit of load.

To the accomplishment of the foregoing and related ends, the following description sets forth in detail one approved means of carrying out the invention. Such disclosed means are not to be construed but one of the various ways in which the principles of the invention may be used.

In the drawings:

FIG. 1 is a perspective view of the container as it is being lifted;

FIG. 2 is a vertical section taken at line 2—2, FIG. 1, showing a plan view of the lifting hooks secured to the corner gusset;

FIG. 3 is a side elevation, partly in section;

FIG. 4 is an end elevation, partly in section;

FIG. 5 is a partial side elevation showing more in detail the upper and lower corner construction; and

FIG. 6 is a vertical section taken at line 6—6 of FIG. 3 showing more in detail the lower corner gusset construction.

In the embodiment illustrated the container is indicated generally by the reference numeral 10. Side walls 11 and 12 and end walls 13 and 14 extend from the top region of the container and terminate short of the bottom, as shown in FIGS. 3 and 4. A hopper, discharge opening and drop bottom closure are provided at the lower region of the container. A disclosure and description of the drop bottom closure of the container are to be found in my above mentioned Patent No. 2,697,002, and since these features do not form a part of the instant invention, a detailed discussion thereof is not deemed necessary.

Disposed at each corner of the container and interconnecting adjacent marginal portions of side walls 11 and 12 and end walls 13 and 14 are vertical angle members 15, 16, 17 and 18. These angle members, as shown in FIG. 3, extend from the bottom of the container and terminate short of the upper edges of the side and end walls. Each of the legs of each angle member is of a longitudinally tapering configuration so that the upper leg dimensions are less than the lower leg dimensions. Secured to the lower portion of the vertical angles 15, 16, 17 and 18 are horizontal angles 19, 20, 21 and 22; as exemplified in detail in FIG. 6, the adjacent ends of angles 19 and 20 are secured by rivets 23 and 24, respectively, to vertical angle 16 with a flat gusset plate 25 welded at 26 and 27 to the two angles. An arrangement identical to that of FIG. 6 is used for each of the other corners.

The combination of the wide leg dimensions at the lower portion of the vertical angles and the flat gusset plate 25 provides a strong, yet greatly simplified, corner construction.

Turning to the upper portion of the container, Z-shaped members 28, 29, 30 and 31 are secured to walls 11, 12, 13 and 14, respectively, and form an apron. Each Z-shaped member, for example, member 28, includes
a lower vertical portion 32 and an upper vertical portion 33, with the lower vertical portion being secured to the upper marginal portion of side wall 11. The lower vertical portion of each Z-shaped member 28, 29, 30 and 31 extends the full length of its corresponding wall 11, 12, 13 and 14 and terminates short of either end thereof. The apron formed by the Z-shaped members is completed by lip portions 35, 36, 37 and 38 formed on each of members 28, 29, 30 and 31, respectively, with straps 39 interconnecting adjacent ends of the members.

At the juncture of adjacent ends of members 28, 29, 30 and 31 pockets or recesses are formed by channel-like members 40. Each channel-like member 40 abuts and is secured to the adjacent ends of two of the Z-shaped members and serves as a structural reinforcement therefor.

Disposed in the recesses defined by the channel-like members 40 are corner gussets 41, 42, 43 and 44 which interconnect the vertical angles 15, 16, 17 and 18 with the Z-shaped members 28, 29, 30 and 31. Lifting hooks 45 are secured to each of the corner gussets 41, 42, 43 and 44 with the hooks placed along the diagonals of the corners of the container. As shown in FIG. 2, the hooks 45 are secured to the corner gussets 41, 42, 43 and 44 by wads 47. The positioning of the hooks 45 is designed to eliminate the lateral components of force which heretofore have been present when the hooks were disposed parallel to the sides of the container.

Each hook 45 comprises a vertically disposed plate 46 having a portion cut therefrom to define a hook shape recess. Disposed in this recess and conforming to the shape thereof is a flat plate 49 which has a transverse width greater than the thickness of the vertical plate 46. Triangular gusset members 48 are secured on either side of plate 46. The structural components of the hooks are secured together by welding, thus effecting a considerable cost saving over the cast hooks heretofore used in similar containers. Hooks of this construction also eliminate the necessity for having both the right-handed and left-handed hooks formerly required. Referring to FIG. 4, it is to be noted that the dimensions of the hooks 45 are such that the hooks do not protrude beyond the outer confines of the container, nor does the vertical height of the hooks extend above the upper portion 33 of the Z-shaped members. This arrangement is designed to provide a minimum external configuration, and thus to maximize the utilization of available transportation space. The gusset hook design herein disclosed should be contrasted with the prior art hooks which utilized an expensive, heavy casting that protruded beyond the dimensions of the container, thus preventing close stacking of the containers.

For ease of description, the principles of the invention have been set forth in connection with but a single illustrated embodiment. It is not my intention that the illustrated embodiment nor the terminology employed in describing it be limiting inasmuch as variations in these may be made without departing from the spirit of the invention, but rather are desired to be restricted only by the scope of the appended claims.

1 claim:
1. A container for transporting bulk materials, said container having side and end walls defining a central cavity, releasable closure means for closing the lower portion of said central cavity, and vertically extending angle members disposed at the corners of said container and connecting the adjacent and vertical margins of said side and end walls, the legs of each of said vertical angle members being of a longitudinally tapering dimension, with the upper leg dimension being less than the lower leg dimension, horizontally disposed angle members interconnecting said vertically extending angle members at the bottom thereof, gusset means secured to adjacent ends of said horizontal angle members, a plurality of Z-shaped members, each having a vertically disposed lower leg and a vertically disposed upper leg, each of said vertically disposed lower legs of each of said Z-shaped members being secured to the upper marginal portion of one of said side or end walls and extending substantially the full width thereof, each of said vertically disposed upper legs of each of said Z-shaped members being of a length less than the extent of its respective side or end wall and disposed centrally thereof, recess forming means secured to adjacent ends of said vertically disposed upper legs, corner gusset means disposed in each of said recesses and interconnecting said Z-shaped members and said vertically extending angle members, hook means disposed in each of said recesses and secured to said corner gusset means, said hook means being of a height less than the height of said vertically disposed upper legs and being disposed entirely within the outer dimensions of said container.

2. The container of claim 1, wherein each of said hook means comprises a vertically disposed plate secured to said corner gusset means and having a portion cut therefrom to define a hook shape recess, and a flat plate having a transverse width greater than the thickness of said vertical plate and being secured to said vertical plate in said recess.

3. The container of claim 1, wherein said hook means are secured at an angle relative to said side and end walls.

4. A container for transporting bulk materials, said container having side and end walls defining a central cavity, releasable closure means for closing the lower portion of said central cavity, vertically extending angle members disposed at the corners of said containers and connecting the adjacent and vertical margins of said side and end walls, the legs of each of said vertical angle members being of a longitudinally tapering dimension with the upper leg dimensions being less than the lower leg dimensions, a plurality of Z-shaped members, each having a vertically disposed lower leg and a vertically disposed upper leg, each of said vertically disposed lower legs of each of said Z-shaped members being secured to the upper marginal portion of one of said side or end walls and extending substantially the full width thereof, each of said vertically disposed upper legs of each of said Z-shaped members being of a length less than the extent of its respective side or end wall and disposed centrally thereof, recess forming means secured to adjacent ends of said vertically disposed upper legs, corner gusset means disposed in each of said recesses and interconnecting said Z-shaped members and said vertically extending angle members, hook means disposed in each of said recesses and secured to said corner gusset means, said hook means being of a height less than the height of said vertically disposed upper legs and being disposed entirely within the outer dimensions of said container.

5. In a container for transporting bulk materials, said container having a side and end walls defining a central cavity, closure means for closing the lower portion of said central cavity, vertically extending angle members disposed at the corners of said containers and connecting the ad-
adjacent vertical margins of said side and end walls, the legs of each of said vertical angle members being of a longitudinally tapering dimension with the upper leg dimensions being less than the lower leg dimensions. a plurality of Z-shaped members, each having a vertically disposed lower leg and a vertically disposed upper leg, each of said vertically disposed lower legs of each of said Z-shaped members being secured to the upper marginal portion of one of said side or end walls and extending substantially the full width thereof, each of said vertically disposed upper legs of each of said Z-shaped members being of a length less than the extent of its respective side or end wall and disposed centrally thereof, recess forming means secured to adjacent ends of said vertically disposed upper legs, corner gusset means disposed in each of said recesses and interconnecting said Z-shaped members and said vertically extending angle members, hook means disposed in each of said recesses and secured to said corner gusset means, said hook means being of a height less than the height of said vertically disposed upper legs and being disposed entirely within the outer dimensions of said container.

9. In a container for transporting bulk materials, said container having side and end walls, releasable closure means for closing the lower portion of said container, vertically extending angle members disposed at the corners of said container and connecting the adjacent vertical margins of said side and end walls, the legs of each of said vertical angle members being of a longitudinally tapering dimension with the upper leg dimension being less than the lower leg dimension, horizontally disposed angle members interconnecting said vertically extending angle members at the bottoms thereof, gusset means secured to adjacent ends of said horizontal angle members, means defining a top apron and being secured to the upper marginal portion of said side and end walls, said apron defining means including recess forming means, gusset means disposed in each of said recesses defined by said recess forming means and secured to said container, said hook means being of a height less than said means defining a top apron and being disposed entirely within the outer dimensions of said container.

10. The container of claim 9, wherein corner gusset means are disposed in each of said recesses formed by said recess forming means, said corner gusset means interconnecting said means defining a top apron and said vertically extending angle members, said hook means being secured to said corner gusset means.

11. A container for transporting bulk materials, said container having side and end walls defining a central cavity, releasable closure means for closing the lower portion of said central cavity, vertically extending angle members disposed at the corners of said container and connecting the adjacent and vertical margins of said side and end walls, a plurality of Z-shaped members each having a vertically disposed lower leg and a vertically disposed upper leg, each of said vertically disposed lower legs of each of said Z-shaped members being secured to the upper marginal portion of one of said side or end walls and extending substantially the full width thereof, each of said vertically disposed upper legs of each of said Z-shaped members being of a length less than the extent of its respective side or end wall and disposed centrally thereof, recess forming means secured to adjacent ends of said vertically disposed upper legs, corner gusset means disposed in each of said recesses and interconnecting said Z-shaped members and said vertically extending angle members, hook means in each of said recesses and secured to said
corner gusset means, said hook means being disposed entirely within the dimensions of said container.

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