Aug. 16, 1938. F. DITCHFIELD 2,126,950

MATERIAL TRANSPORTING MEANS

Filed Aug. 24, 1935 3 Sheets-Sheet 1

FIG. 1

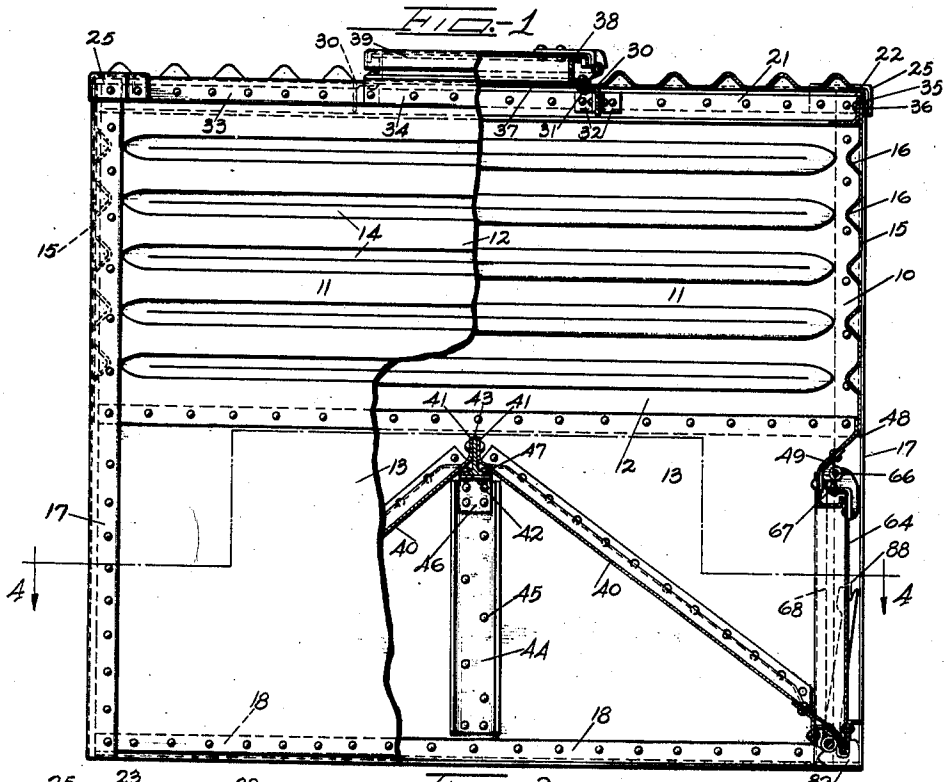
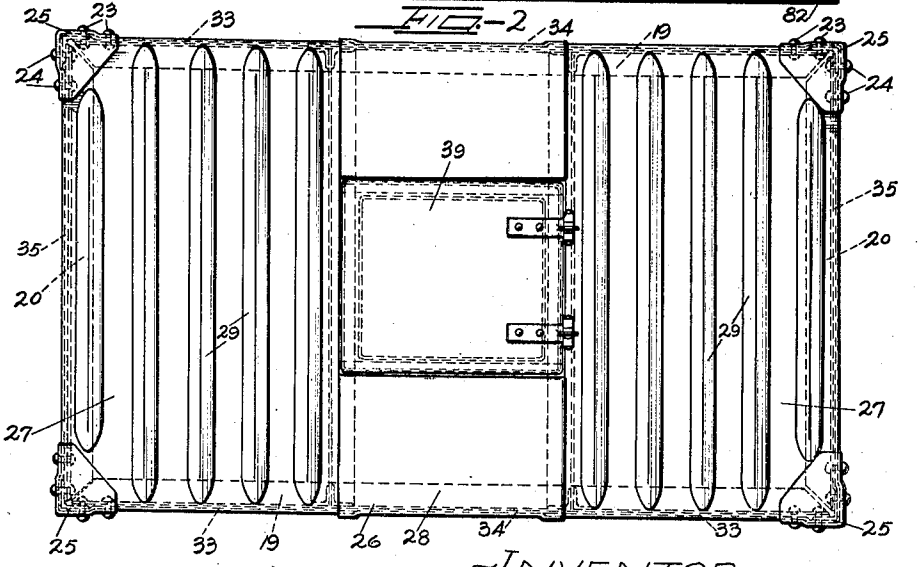


FIG. 2



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MATERIAL TRANSPORTING MEANS

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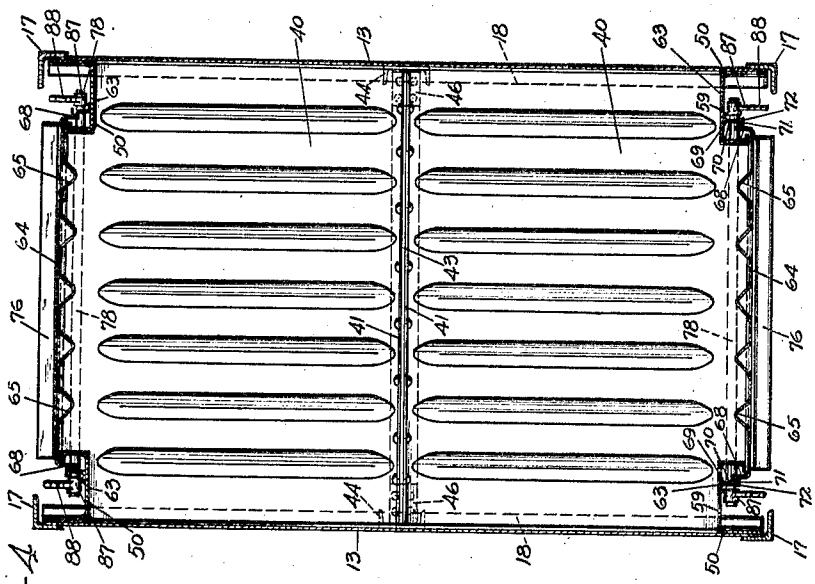


FIG. - 4

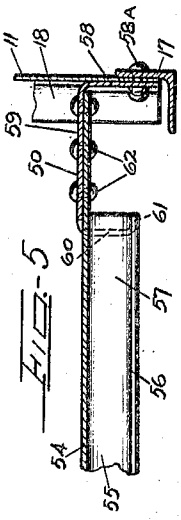


FIG. - 5

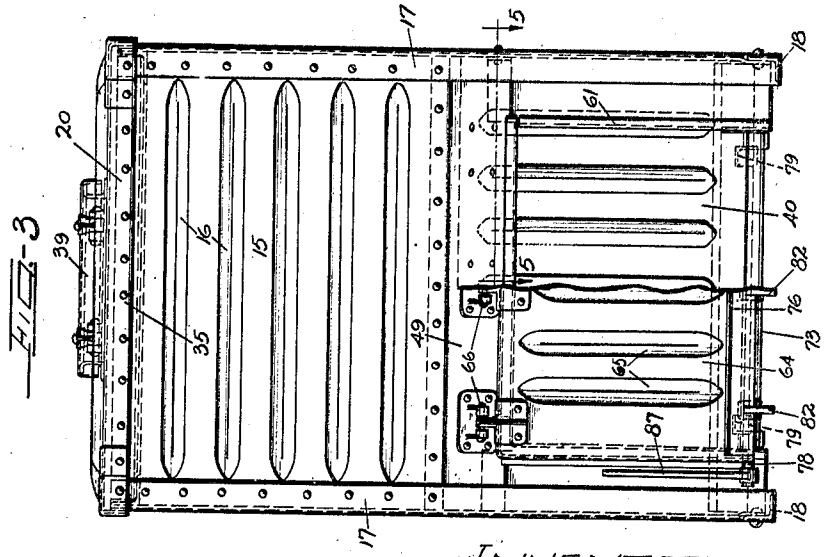


FIG. - 3

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MATERIAL TRANSPORTING MEANS

Filed Aug. 24, 1935 3 Sheets-Sheet 3

FIG.-6

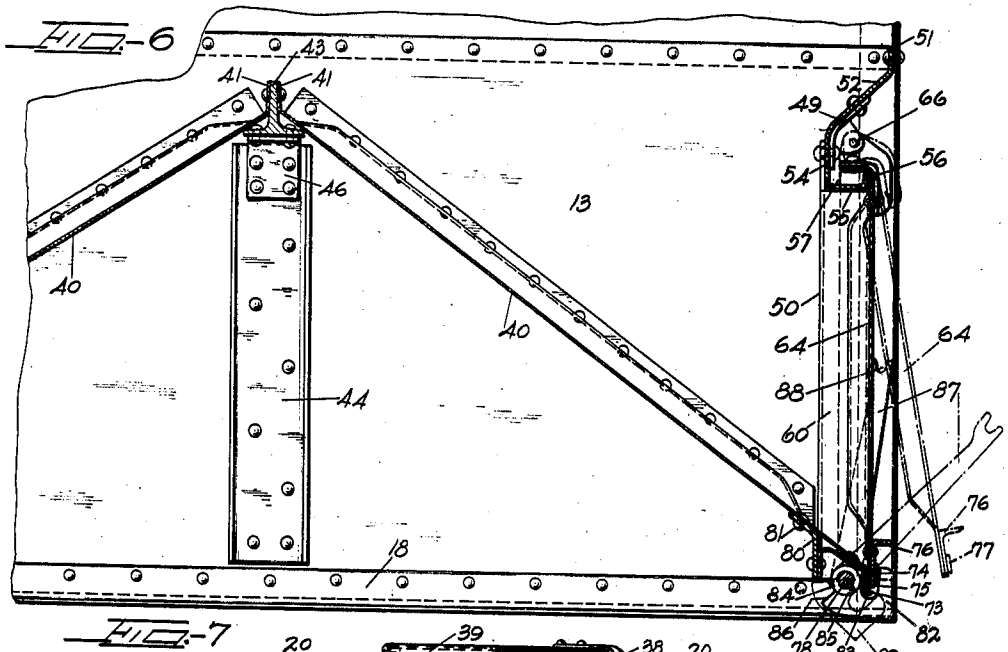
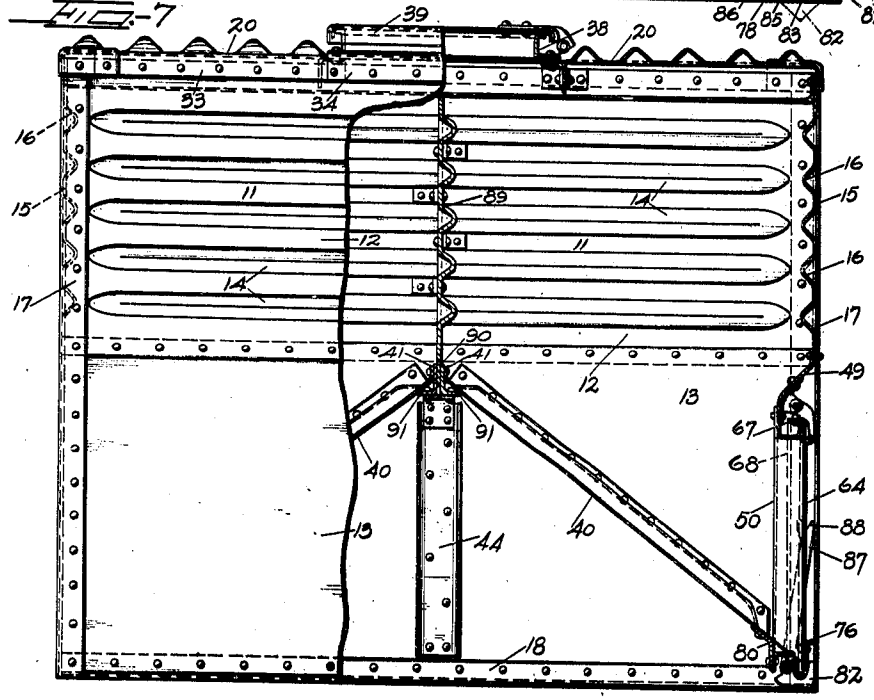


FIG.-7



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Patented Aug. 16, 1938 2,126,950

UNITED STATES PATENT OFFICE

2,126,950

MATERIAL TRANSPORTING MEANS

Frank Ditchfield, Cleveland, Ohio, assignor to The Youngstown Steel Door Company, Cleveland, Ohio, a corporation of Ohio

Application August 24, 1935, Serial No. 37,715

16 Claims. (Cl. 220—1.5)

This invention relates to material transporting means, and is directed more particularly to means for transporting bulk material such as dolomite, cement, grain and the like.

Such means, commonly referred to as containers, are usually of sturdy, metallic, box-like construction. These containers are furnished to the shipper, by whom they are loaded, whereupon they are placed upon trucks and delivered to a public carrier for transportation upon freight cars, boats and the like, to points of destination. The containers may as well be transported upon trucks over the highways. Upon reaching their destination the containers are again transferred to trucks for delivery to the consignee. The advantages of this mode of door to door delivery by public carriers are obvious. In the case of shipment of dolomite to a steel mill, for example, the container may be picked up by a crane and moved to an open hearth furnace where the dolomite may be discharged at a close and advantageous point for use in the furnace. Intermediate movements between a material dump and the furnace are thereby obviated.

Containers for the transportation of bulk materials are provided with a charging port, usually a door controlled opening formed in the top of the container and discharge ports controlled by doors formed customarily in the bottoms of containers. Lifting hooks are provided at the upper corners of the containers for engagement by hoists, cranes or the like to permit elevation in handling of the containers. In the past, by virtue of the container construction then utilized, expensive double drum hoists or cranes were required for handling and for discharge of the contents of the containers, one drum being utilized in elevating the container and the other in releasing and closing the doors for the discharge ports. The doors for the discharge ports, consequently, required positive manipulation by extraneous means to insure closing of the doors and eliminate the possibility of accidental loading of the containers while the doors are in their open position.

It is an object of this invention to provide containers, the handling of which shall require only the usual single drum hoist or crane and in which the doors for discharge ports provided in the containers shall automatically assume such position upon the discharge of the material from the containers as to insure automatic locking of the doors upon disposal of the containers upon a supporting surface.

A further object is to provide containers having doors associated with locking means effective upon placement of the containers upon supports to engage and lock said doors so long as the containers remain upon the supports and to maintain said doors in locked position upon elevation of the containers above their supports.

A further object is to provide containers having vertical doors in opposed walls thereof and carrying locking means directly and automatically engageable with said doors upon placement of the containers upon supports, thereby preventing accidental or unauthorized opening of the doors while the containers rest upon the supports.

A further object is to provide material transporting means having doors in opposed walls thereof and locking means positively actuated into operative relationship with said doors upon seating of the containers upon supports, the construction being such as to avoid modification of or addition to the truck, freight car, boat and the like upon which the containers may be shipped.

A further object is to provide material transporting means having doors in opposed walls thereof, hinged at their upper edges so that their lower edges swing outwardly in the discharge of material from the containers, and locking means carried by the containers adjacent the lower edges of the doors actuated by engagement with supports upon which the containers may be placed into locking engagement with the lower edges of the doors to prevent accidental or unauthorized opening of the doors while the containers are upon the supports, such locking engagement being maintained when the containers are elevated above the supports until released.

A further object is to provide transportation containers which shall be sturdy, light in weight in relation to the load which they are to carry, simple in construction, relatively inexpensive in cost and weatherproof.

Other objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification,

Figure 1 is an elevation, partly in section, of a container embodying the instant invention.

Figure 2 is a top plan view of the container shown in Figure 1.

Figure 3 is an elevation, partly in section, of the container shown in Figure 1, looking toward the left in said figure.

Figure 4 is a horizontal section taken on line 4—4 of Figure 1.

Figure 5 is a horizontal section taken on line 5—5 of Figure 3.

Figure 6 is an enlarged vertical sectional view of the lower portion of the container illustrating parts thereof in the closed and in the open positions of the door.

Figure 7 is a view similar to Figure 1 illustrating a modified form of the invention.

Referring to the drawings, and particularly to the embodiment of the invention illustrated in Figures 1 to 6 inclusive, the numeral 10 designates the container in its entirety. As clearly illustrated, the container 10 is constructed of metal and embodies opposed metallic walls 11—11, each of which is preferably formed of a pair of metallic sheets 12 and 13. The sheets 12 are reinforced by means of integral horizontal corrugations 14, while the sheets 13 may advantageously be plain. The container embodies, additionally, opposed walls 15—15 which extend between the opposed walls 11—11 and, together with the latter, constitute a substantially rectangular construction. The walls 15—15 may be designated as adjacent with respect to the walls 11—11. The walls 15 are substantially similar in construction and each is comprised of sheet metal and provided with horizontally extending integrally formed reinforcing corrugations 16.

The walls 11—11 and 15—15 are secured together at their adjacent edges by means of vertical corner angles 17. These corner angles extend substantially the entire height of the container. An angle member 18 disposed in parallel relationship to the walls 11—11 extends between the lower ends of the corner angle members 17, as clearly appears in Figure 3 of the drawings. These angle members constitute the bearing surfaces for the container.

The upper margins of the walls 11—11 are reinforced by means of angle members 19—19 which extend between angle members 20—20 secured to the adjacent walls 15—15 of the container. The corner angles 17 extend upwardly into overlapping relationship with the vertically disposed legs 21 of the reinforcing angles 19 and the vertically disposed legs 22 of the reinforcing angles 20 and are secured to these legs as by means of rivets 23—23 and 24—24. These rivets, additionally, are utilized to secure reinforcing castings 25 to the upper corners of the container.

The container is provided with a roof 26 formed in the present instance by means of the metallic end sheets 27—27 and the intermediate sheet 28. The end sheets are preferably provided with integral stiffening corrugations 29, while the intermediate sheet 28 is left plain. The intermediate sheet is overlapped upon the adjacent margins of the end sheets and the joints thus formed are reinforced by means of angle members 30—30 extending between the walls 11—11 and fastened to the overlapping sheets as by rivets 31. The ends of the reinforcing angles 30—30 are fastened to the walls 11—11 by means of angle clips 32—32. The roof sheets 27 and 28 are provided with marginal flanges indicated at 33, 34 and 35, these flanges being turned downwardly and fastened to the adjacent walls as by means of rivets 36.

The roof or top of the container is provided with an opening 37 through which the container may be loaded. An angle frame 38 is secured to the roof around the opening 37 and to this frame is hinged a door 39 adapted to close the roof opening.

Downwardly diverging slope sheets 40—40 extend between the walls 11—11 of the container. The upper margins of the slope sheets are provided with flanges 41—41 arranged on opposite sides of an inverted T-shaped member 42. The flanges 41—41 are secured to the stem 43 of the T-shaped member which extends continuously between the opposed walls 11—11. The load which will normally be carried to the T-shaped member by the slope sheets 40—40 is transmitted from the T-shaped member to the walls 11—11 of the container, which are, consequently, reinforced by means of channel-shaped standards 44—44. These standards are riveted to the plain sheets of the walls 11—11 as indicated at 45. The inverted T-shaped member 43 is fastened to these standards by means of angle clips 46—46 which are riveted to the oppositely extending flanges of the inverted T-shaped member as indicated at 47.

The opposed walls 11—11 extend substantially the height of the container while the opposed walls 15—15 terminate, as indicated at 48, a substantial distance above the bottom of the container. There is, thus, provided in the walls 15—15 openings through which the material in the containers may be discharged. The slope sheets 40—40 are inclined downwardly from their securement from the inverted T-shaped member 43 to these openings.

Each discharge opening provided in the walls 15—15 is defined at its upper end by means of a header 49 secured to the lower margin of the wall 15 and extending substantially continuously across the opening. The lower margin of the discharge opening is defined by means of the lower margin of the slope sheet. The vertical margins of the discharge opening in each wall 15 are defined by means of cheek plates 50—50.

The header 49 is provided with a vertical flange 51 by means of which said header is secured to the wall 15. From this flange the header extends downwardly and inwardly as indicated at 52 and below this portion is formed integrally a substantially J-shaped portion. This latter portion comprises a vertical flange 54, a horizontal flange 55 and a relatively short upstanding outer vertical flange 56, these flanges, as clearly appears from Figure 6 of the drawings, providing a trough 57.

Each of the cheek plates 50 is formed with a vertical flange 58 by means of which the cheek plate is riveted, as indicated at 58—A to the adjacent wall 11 and the adjacent corner angle member 17. From this vertical flange 58 a vertical flange 59, disposed at substantially right angle to the first-mentioned flange, extends toward the opening provided in the wall 15. The flange 59 is provided with an outwardly extending vertical flange 60 which is bent toward the flange 58 in order to provide a short flange 61. Each cheek plate 50 is fastened as by means of rivets 62 to the header 49 and to this end the flanges 60 and 61 of the cheek plate are coped so as to terminate below the trough forming a portion of the header 49, as clearly appears from Figure 5 of the drawings. This trough extends above and somewhat beyond the vertical flange 60 of the cheek plate, thereby insuring the drainage of any water which may accumulate in the trough outwardly of the container.

The lower margins of the slope sheets 40—40 are provided with angular copes 63—63, as indi-

cated in Figure 4 of the drawings, in order to permit the extension of the cheek plates downwardly to the desired extent.

The opening thus formed in each of the walls 15—15 is adapted to be closed by means of a door 64. The door illustrated is formed of sheet metal and is provided with integral stiffening corrugations 65. The door 64 is hinged at its upper margin to the header 49, as indicated at 66. It is to be observed that each door 64 is so hinged as to swing about an axis displaced inwardly relative to the main body portion of the door. By this relationship the door when swung outwardly is constantly biased toward its closed position. Each door 64 is provided with an upper horizontal flange 67 extending across the trough formed in the header 49 and inwardly turned vertical marginal flanges 68—68 disposed in overlapping relationship with the flanges 60 and 61 provided on the cheek plates 50. This construction of the door 64 provides for weatherproofing of the door and in order to enhance the weatherproofing feature thereof, an angle member 69 is secured to the vertical flange 59 of each cheek plate so that one leg 70 of each of said angle members extends outwardly. An angle member 71 is secured to each of the inwardly turned vertical marginal flanges of the door 64 and is disposed so as to present an outwardly extending flange 72 lying in overlapping relationship with the adjacent flange 70 when the door is in its closed position.

In this position of the door its lower edge is disposed slightly above an outwardly extending flange 73 provided on an angular member 74 secured to the lower margin of each slope sheet 40. The flange 73 is formed on a vertically disposed flange 75 of said member. By virtue of this construction escape of the material in the container when the door is in its closed and locked position is substantially avoided inasmuch as any material which may find its way between the vertical flange 75 and the lower margin of the door will be packed between these members by reason of the provision of the outwardly extending flange 73. There is, thus, afforded a seal preventing the escape of the material within the container and, in addition thereto, the flange 73 will be effective to prevent rain and other foreign matter being blown upwardly into the container around the lower edge of the door.

The lower margin of the door is reinforced by means of an angle member 76 to the vertical leg of which is secured a plurality of spaced wear plates for a purpose hereinafter indicated.

According to the present invention, means is provided for engaging and automatically locking each of the doors 64 in its closed position whenever a container is placed upon a support. Such means is effective, as long as the container remains upon the support, to prevent accidental or unauthorized opening of the doors and the consequent escape of the material in the container. The construction of this means and its association with each door is such that it is effective in conjunction with the pressure of the material within the container exerted against the doors to maintain the doors in their closed position, even when the container is elevated above its support.

One embodiment of such means is illustrated in the drawings. According to this embodiment, a shaft 78 is provided, this shaft being journaled adjacent each end within bearings 79—79 secured below the lower margin of a slope sheet 40 and to an angle member 80 fastened to the bottom of a slope sheet, as indicated at 81. The ends of the shaft 78 extend through suitable openings provided in the vertical flanges 60 of the cheek plates 50. Fastened upon the shaft so as to rotate therewith is a plurality of locking dogs 82, the spacing of these dogs corresponding to the spacing of the wear plates 77 secured to the lower margin of the door. The locking dogs in their operative position thus engage the wear plates 77. Each of the dogs 82 comprises a substantially solid member formed with a throat 83 within which the lower margin of the door and the vertical flange 75 of the angular member 74 fastened to the lower margin of the slope sheet are adapted to be received in the operative position of the dogs in order to secure the door in its closed position. Each of the dogs is formed, additionally, with a hollow boss 84 adapted to be slid upon the shaft 78 and fastened to the shaft as by means of a key 85. The locking dog extends outwardly from this boss in order to provide a surface 86 which is adapted to engage the lower edge of the angle member 80 when the dog is in its inoperative position to limit rotation of said dog. An operating bar 87 is fastened upon each end of the shaft 78 in order to permit actuation of the shaft from either end thereof. The upper end of each operating bar 87 is forked, as indicated at 88, so that this end of an operating bar may be engaged by means of a rod, while the container is elevated, to release the locking dogs and obtain discharge of the material from the container.

From the foregoing it will be apparent that by virtue of the limiting position of the locking dogs when they are disengaged from the doors 64, these dogs will, upon placement of the container upon a support, be actuated during such placement so as to be rotated into door engaging and locking position. This engagement between the locking dogs and the lower margin of the door is insured by reason of the hereinabove described pivotal mounting of the door. It will be evident, therefore, that the doors 64 will be automatically locked when the container is placed upon a support and be in condition for loading. The doors may, of course, be locked by hand if desired. It clearly appears from Figure 1 of the drawings that in its closed position each door, as well as the operating bars therefor, will lie inwardly of the adjacent corner angles 17 and, hence, be protected by these angles. Moreover, the shaft 78 upon which the dogs are mounted is so disposed as to be protected by the lower margin of the slope sheet and by the vertical flange 75 of the angular member 74 secured to said margin of the slope sheet.

The embodiment of the invention illustrated in Figure 7 of the drawings illustrates a container by the construction of which substantially half of the contents of the container may be retained therein while the other half may be discharged. A degree of controlled discharge of the contents is, therefore, obtained. In addition, by virtue of this construction, it is possible to transport within the same container two different kinds of materials. The construction of this embodiment of the invention includes a bulkhead 89, preferably terminating somewhat below the roof of the container and secured at its vertical margins to the walls 11—11, in any desired manner. At its lower margin the bulkhead 89 is secured to the inverted T-shaped member to which the flanges at the ends of the slope sheets 40 are fastened. For this purpose the inverted T-shaped member

90 is formed of a pair of angle members 91—91 arranged in back to back spaced relationship. Within the space thus provided the lower margin of the bulkhead 89 is disposed. The rivets, by means of which the flanges 41—41 at the upper ends of the slope sheets 40 are secured to the inverted T-shaped member, are utilized as well in the securement of the lower margin of the bulkhead 89 to said member. In all other respects the construction of the container illustrated in Figure 7 of the drawings remains substantially the same as the construction of the container illustrated in Figures 1 to 6 of the drawings.

It will be apparent that numerous changes and modifications of the details of the instant invention may be resorted to by those skilled in the art. It is, therefore, intended to comprehend all such changes and modifications within the purview of the invention, which is to be limited only by the appended claims.

I claim:

1. Transportation means comprising a metallic body having side and end walls, a door opening formed in one of said walls, a hinged metallic door for closing said opening, locking means carried by said transportation means adjacent the lower margin of said door, said locking means comprising a shaft below said door opening, a plurality of spaced locking dogs secured to said shaft for rotation therewith, said dogs in their inoperative position extending below said transportation means and being actuated into locking engagement with said door by engagement with the support upon which said transportation means is placed and means for rotating said shaft and releasing said dogs from said door.

2. Transportation means comprising a metallic body having side and end walls, a door opening formed in one of said walls, a hinged metallic door for closing said opening, locking means carried by said transportation means adjacent the lower margin of said door, said locking means comprising a shaft below said door opening, a plurality of spaced locking dogs secured to said shaft for rotation therewith, said dogs in their inoperative position extending below said transportation means and being actuated into locking engagement with said door by engagement with the support upon which said transportation means is placed and means for rotating said shaft and releasing said dogs from said door, said latter means comprising a member secured to each end of said shaft.

3. Transportation means comprising a metallic body having side and end walls, a door opening formed in one of said walls, a hinged metallic door for closing said opening, locking means carried by said transportation means adjacent the lower margin of said door, said locking means comprising a shaft below said door opening, a plurality of spaced locking dogs secured to said shaft for rotation therewith, said dogs in their inoperative position extending below said transportation means and being actuated into locking engagement with said door by engagement with the support upon which said transportation means is placed and means for rotating said shaft and releasing said dogs from said door, said latter means comprising a member secured to each end of said shaft, each of said members having a forked free end.

4. A metallic transportation container for shipment of bulk materials, comprising a top having a charging port and a door for said port, a sloping bottom, opposed walls, an opening provided in one of said walls, a header secured to said one wall and extending across said opening, said header comprising an outwardly extending trough terminating inwardly of the outer plane of said one wall, a door hinged at its upper margin to said header, said door being offset inwardly from the outer plane of said wall and having a flange extending across said trough.

5. A metallic transportation container for shipment of bulk materials, comprising a top having a charging port and a door for said port, a sloping bottom, opposed walls, an opening provided in one of said walls, a header secured to said one wall and extending across said opening, said header comprising an outwardly extending trough terminating inwardly of the outer plane of said one wall, a vertically extending cheek piece secured adjacent to the end of each adjacent wall and extending into said opening, an outwardly projecting vertical flange provided on each cheek piece in spaced relation to the corresponding adjacent wall, a door hinged at its upper margin to said header, said door having inwardly directed flanges along the top and vertical margins thereof disposed respectively in overlapping relationship to said header trough and said flanges of said cheek pieces.

6. A metallic transportation container for shipment of bulk materials, comprising a top having a charging port and a door for said port, a sloping bottom, opposed walls, an opening provided in one of said walls, a header secured to said one wall and extending across said opening, said header comprising an outwardly extending trough terminating inwardly of the outer plane of said one wall, a vertically extending cheek piece secured adjacent to the end of each adjacent wall and extending into said opening, an outwardly projecting vertical flange provided on each cheek piece in spaced relation to the corresponding adjacent wall, a door hinged at its upper margin to said header, said door having inwardly directed flanges along the top and vertical margins thereof disposed respectively in overlapping relationship to said header trough and said flanges of said cheek pieces, and cooperating weatherproofing members secured respectively to said cheek pieces and said inwardly directed vertical flanges of said door.

7. A metallic transportation container for shipment of bulk materials, comprising a top having a charging port and a door for said port, a sloping bottom, opposed walls, an opening provided in one of said walls, a door for said opening, said door being hinged at its upper edge to said wall so that the lower edge thereof swings outwardly from said sloping bottom to discharge material from the container, the bottom of said container being provided with a downwardly extending flange and an outwardly extending flange, said former flange lying in proximate relationship to the inner face of said door and said latter flange extending across the lower edge of said door in proximate relationship therewith when said door is closed.

8. A metallic transportation container for shipment of bulk materials, comprising a top having a charging port and a door for said port, a sloping bottom, opposed walls, an opening provided in one of said walls, a header secured to said one wall and extending across said opening, said header comprising an outwardly extending trough terminating inwardly of the outer plane of said one wall, a door hinged at its upper mar-

gin to said header, said door being offset inwardly from the outer plane of said wall and having a flange extending across said trough, said trough having open ends disposed beyond said opening in said one wall.

9. Transportation means comprising a metallic body having side and end walls, a door opening formed in one of said walls, a hinged metallic door for closing said opening, locking means carried by said transportation means adjacent the lower margin of said door, said locking means in its inoperative position extending below the transportation means, said locking means being actuated into locking engagement with said door by engagement with the support upon which said transportation means is placed and means for releasing said locking means when said transportation means is elevated above said support, said releasing means comprising an elongated operating member, said member in the operative position of said locking means lying within the plane of said one wall.

10. A transportation container comprising a metallic body portion having a top, opposed walls, and a sloping bottom, a door opening formed in one of said walls, a metallic door for closing said opening, said door being hinged at its upper margin to said one wall, locking means for said door swingingly mounted below and adjacent to the lower end of said sloping bottom, said locking means in its inoperative position extending below said container and being actuated into locking engagement with the lower margin of said door by engagement with the support upon which said container is placed, said door being biased to a position to insure locking engagement thereof by said locking means when said container is placed upon said support.

11. A metallic transportation container for shipment of bulk materials, comprising a top having a charging port and a door for said port, a sloping bottom, opposed walls, an opening provided in one of said walls, a vertically extending cheek piece secured adjacent to the end of each adjacent wall and extending into said opening, a door for said opening hinged at its upper margin to said one wall and overlying said cheek pieces, a shaft journaled in said cheek pieces and lying below and adjacent to the lower end of said sloping bottom of said container, locking dogs mounted upon said shaft for rotation therewith, said dogs automatically engaging and locking said door upon placement of said container upon a support, said door being biased into position to insure said locking engagement, and means for rotating said shaft to release said locking dogs when said container is elevated above said support.

12. A transportation container comprising a metallic body portion having a top provided with a charging port, opposed walls and a bottom, said bottom including downwardly diverging metallic sheets secured to opposed walls of said container to provide hoppers, door openings formed in the adjacent walls, doors for said openings hinged at their upper margins to said adjacent walls, locking means for the lower margins of said door carried by said container below said metallic sheets, said locking means being actuated into locking engagement with the lower margins of said doors by engagement with the support upon which said container is placed.

13. A transportation container comprising a metallic body portion having a top provided with a charging port, opposed walls and a bottom, said bottom including downwardly diverging metallic sheets secured to opposed walls of said container to provide hoppers, a metallic diaphragm extending upwardly from the upper ends of said diverging metallic sheets substantially to said charging port, door openings formed in the adjacent walls and doors for closing said openings.

14. A transportation container having a metallic body including side and end walls and a door opening formed in one of said walls, a hinged metallic door for closing said opening, a lock carried by said container body adjacent the bottom of said container, said lock being adapted to be operated to engage and lock said door, said lock being so located and arranged on the container body as to be acted upon by the support upon which the container is placed and be moved to engage and lock said door.

15. A transportation container having a metallic body including side and end walls and a door opening formed in one of said walls, a hinged metallic door for closing said opening, a lock carried by said container body adjacent the bottom of said container, said lock being adapted to be operated to engage and lock said door, said lock being so located and arranged on the container body as to be acted upon by the support upon which the container is placed and be moved to engage and lock said door, said lock maintaining its engagement with said door when said container is elevated above said support, and means for disengaging said lock from said door.

16. Transportation means comprising a metallic body having side and end walls and a door opening formed in one of said walls, a hinged metallic door for closing said opening, locking means carried by said transportation means adjacent the lower margin of said door, said locking means comprising a shaft below said door opening, a plurality of spaced locking dogs secured to said shaft for rotation therewith, said dogs being so located and arranged as to be acted upon by the support upon which the transportation means is placed and be moved to engage and lock said door, and means for rotating said shaft and releasing said dogs from said door.

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