

March 7, 1933.

M. OLDS

1,900,867

CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

Filed Oct. 26, 1927

18 Sheets-Sheet 1

Fig. 1.

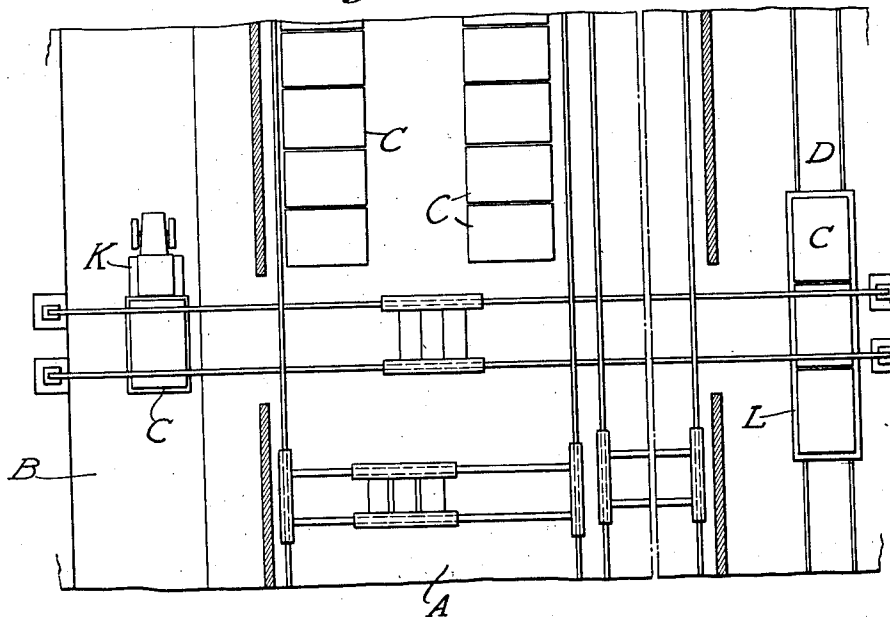
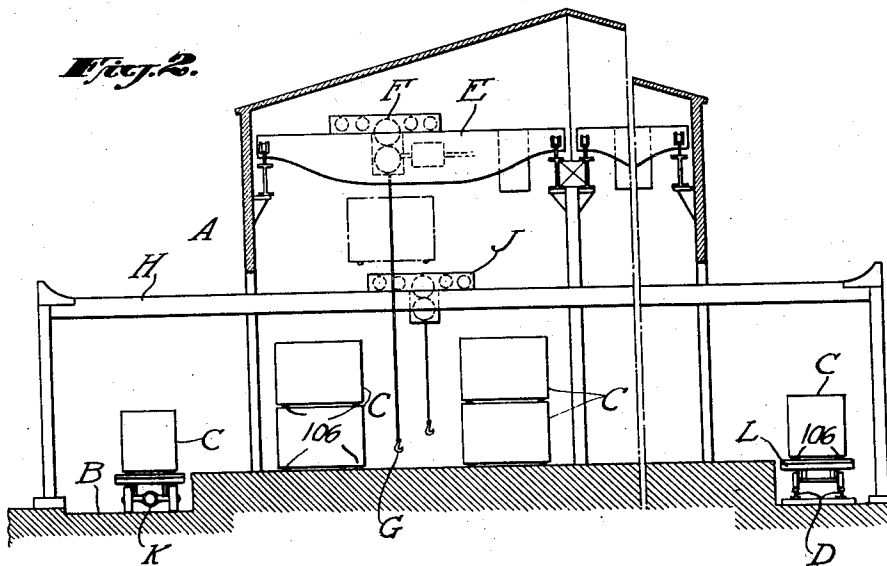


Fig. 2.



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By His Attorney

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March 7, 1933.

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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 3.

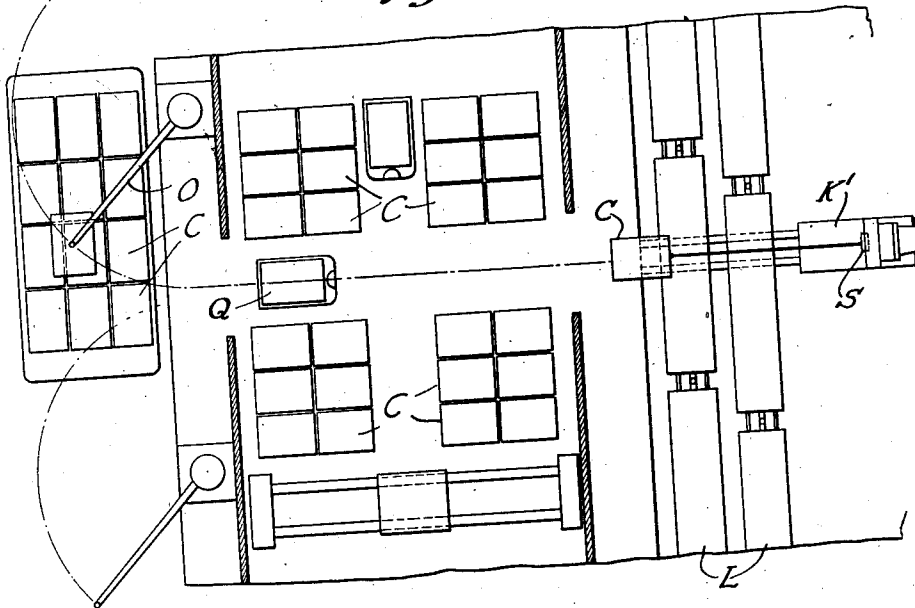
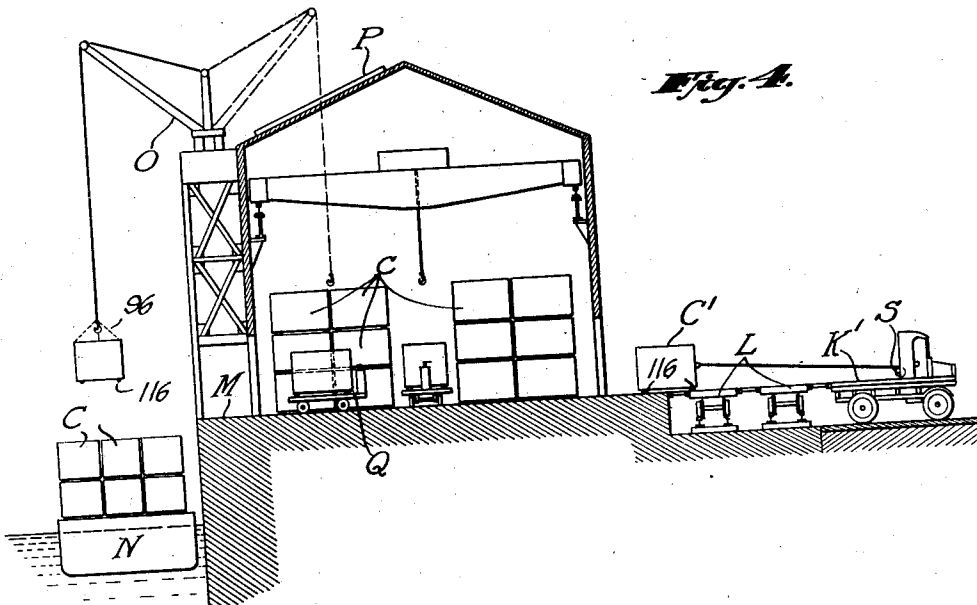


Fig. 4.



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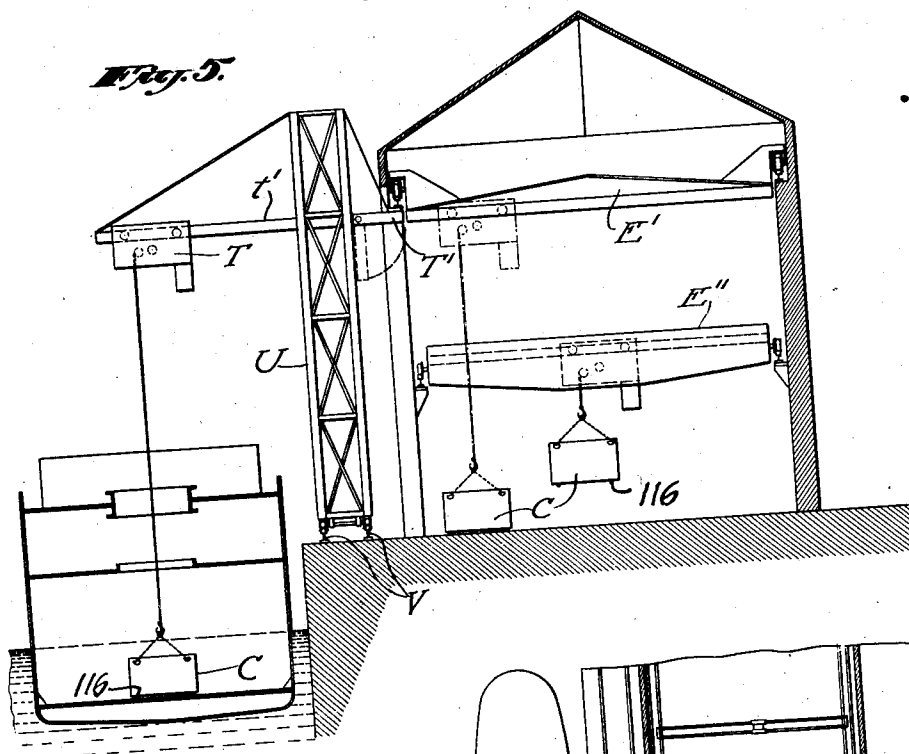
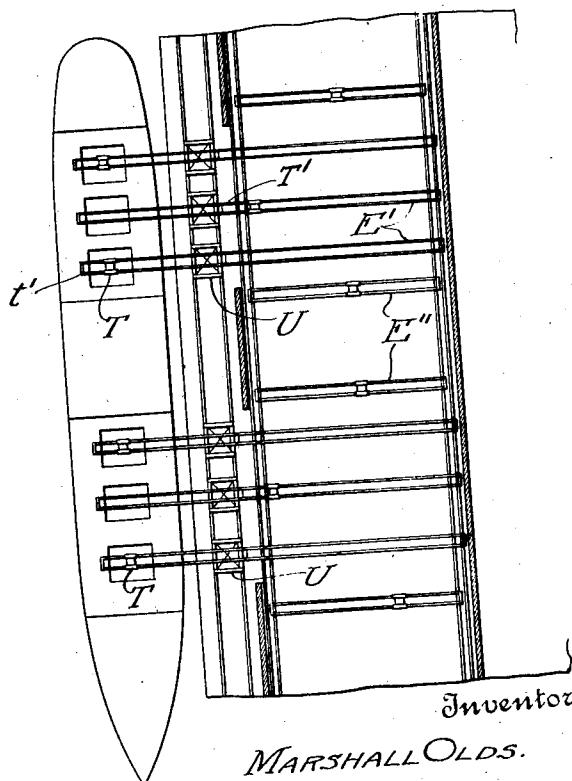


Fig. 6.



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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 7.

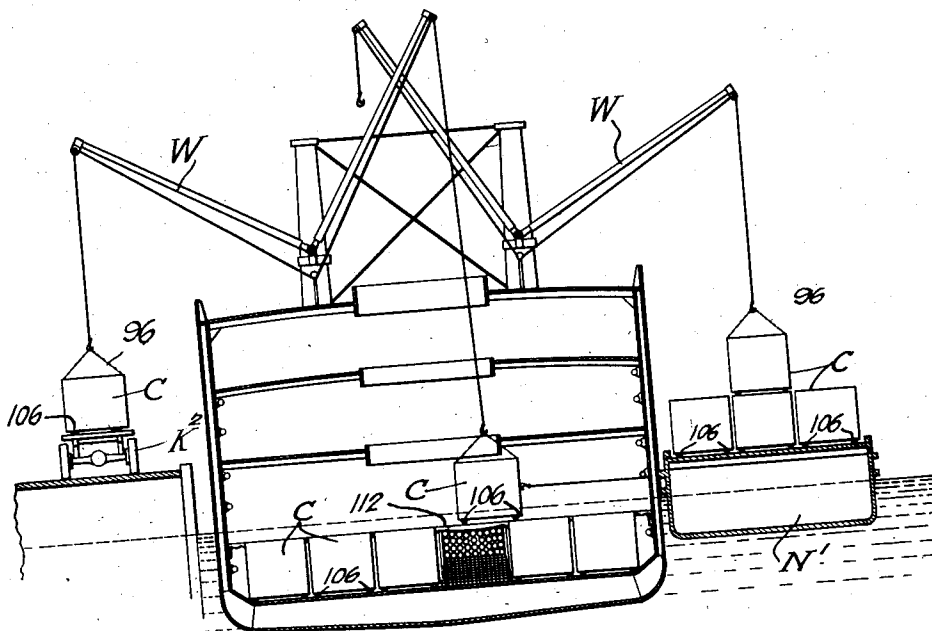
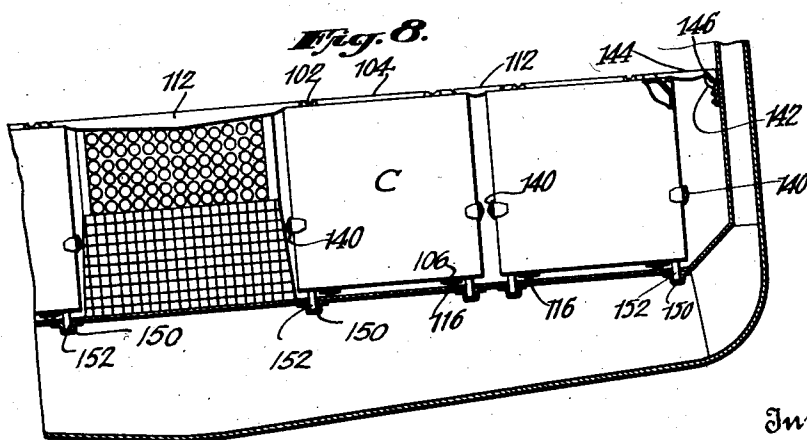


Fig. 8.



Inventor

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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 9.

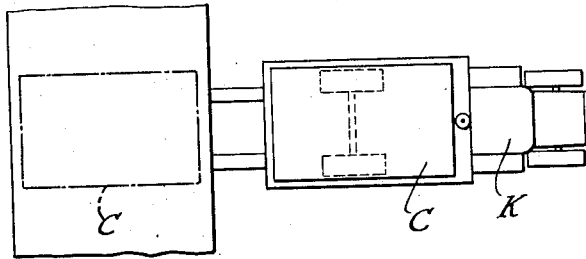


Fig. 10.

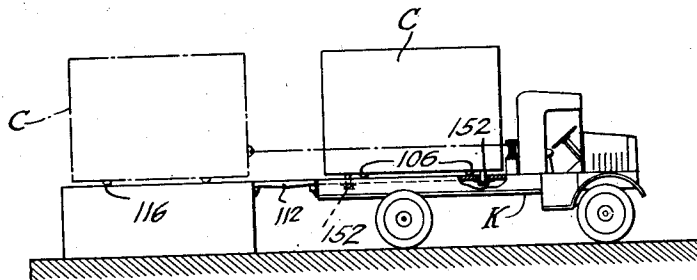
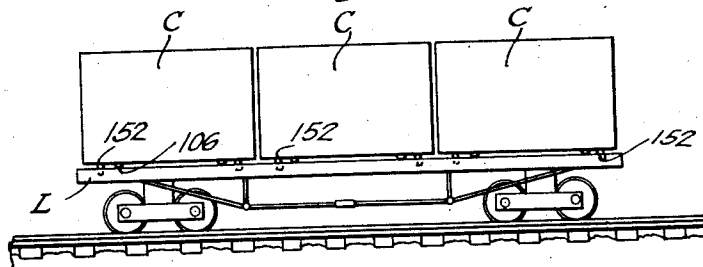


Fig. 11.



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W. Anthony Kama

March 7, 1933.

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Fig. 12.

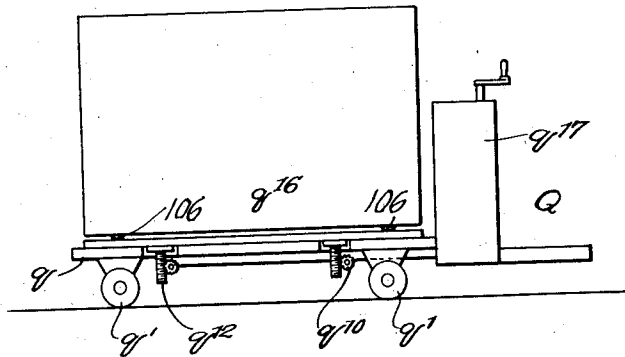


Fig. 13.

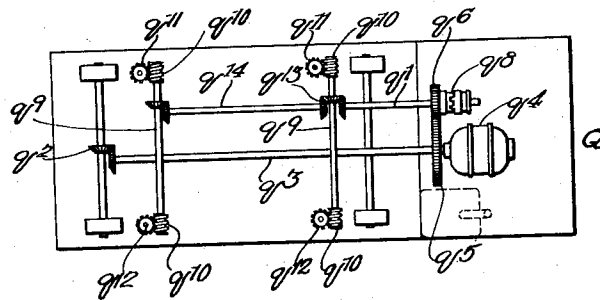
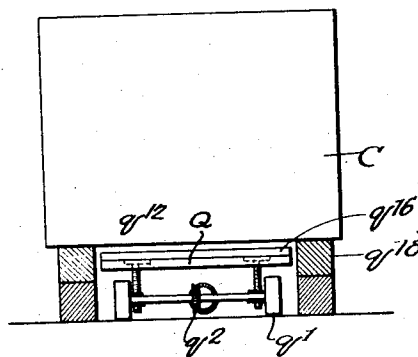


Fig. 14.



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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 15.

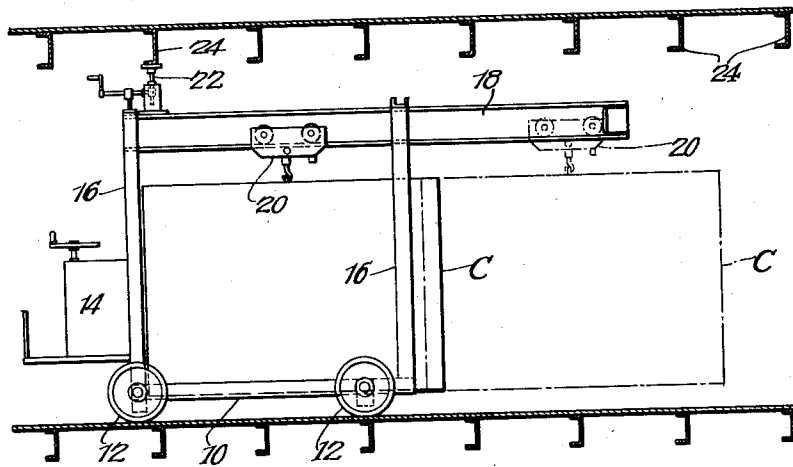
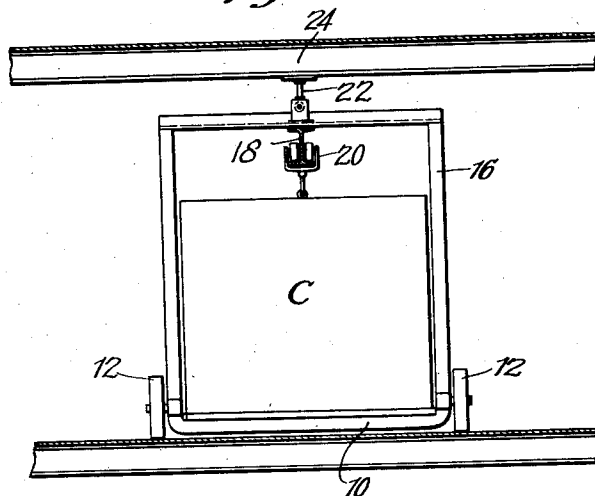


Fig. 16.



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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 19.

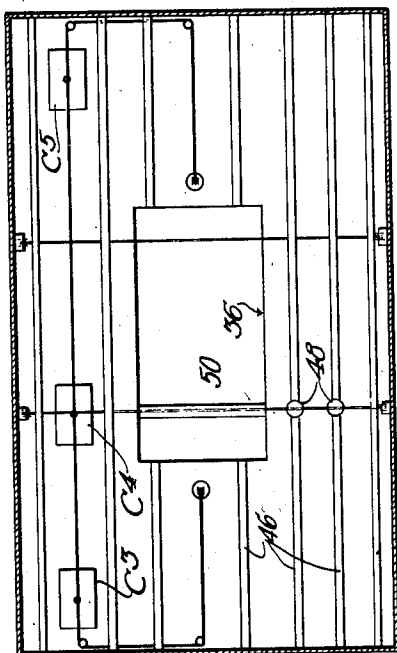


Fig. 20.

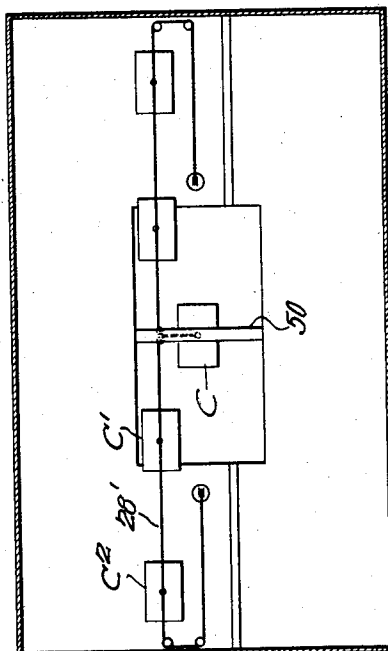
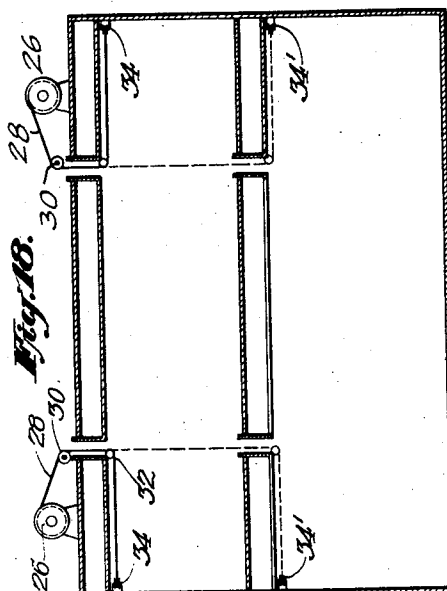
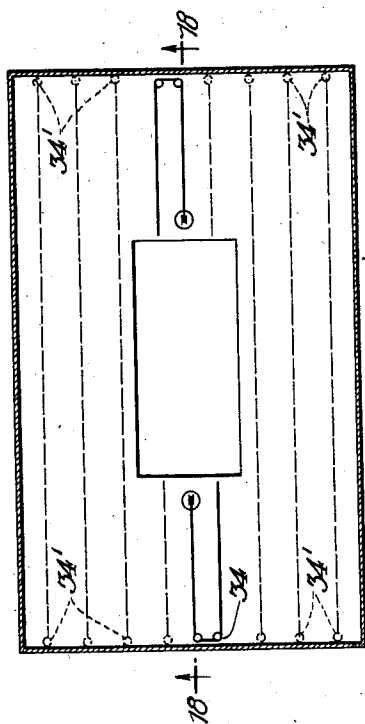


Fig. 17.



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March 7, 1933.

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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 21.

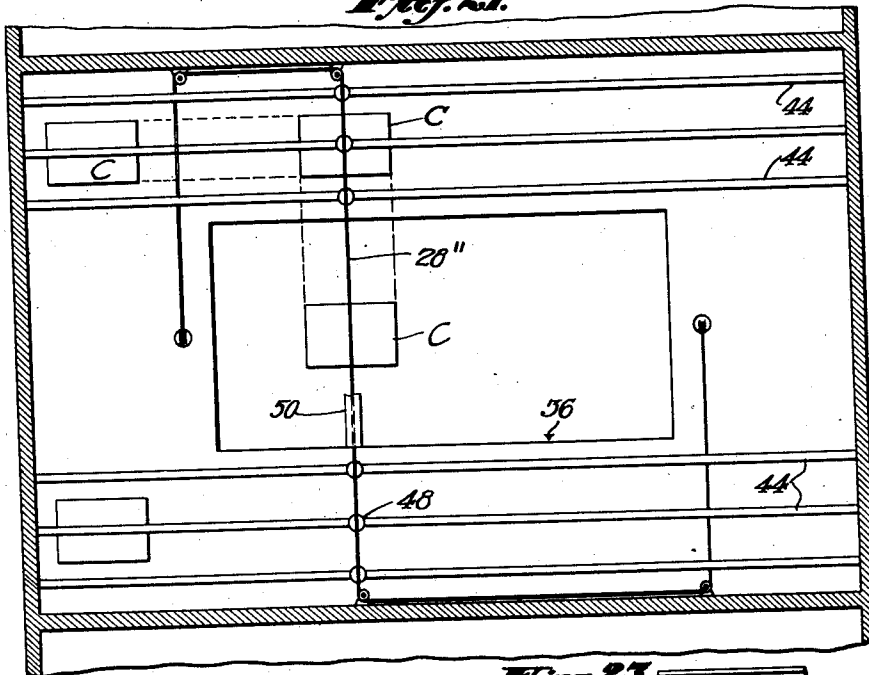


Fig. 22.

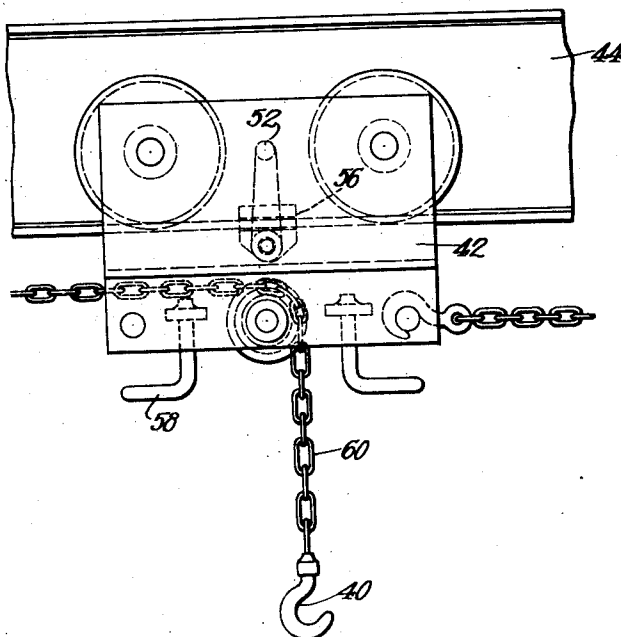
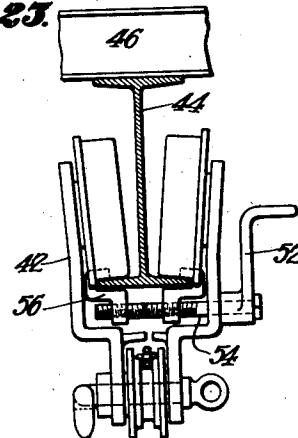


Fig. 23.



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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 24.

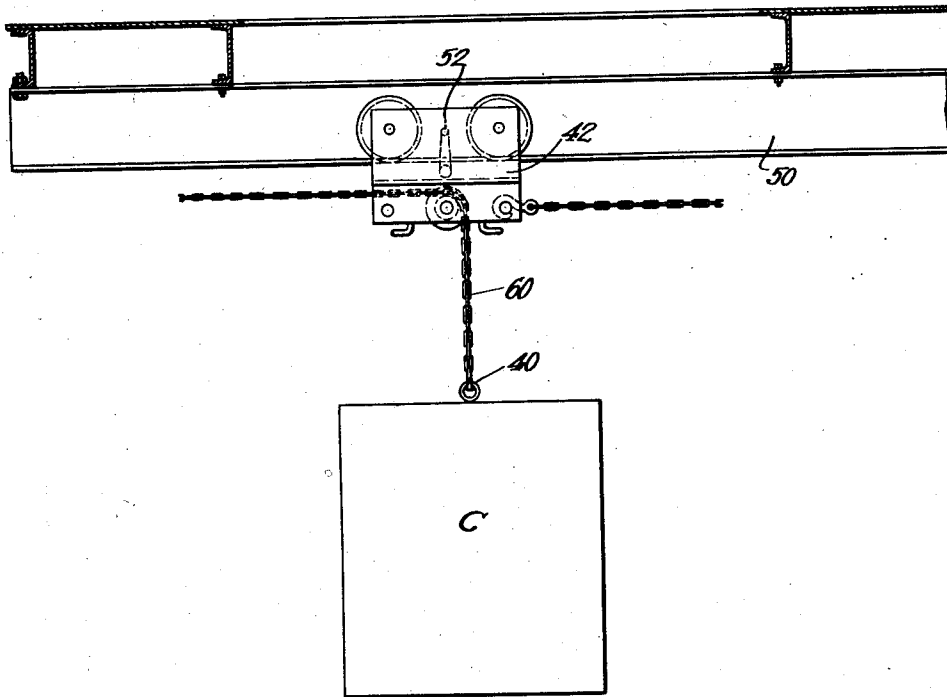
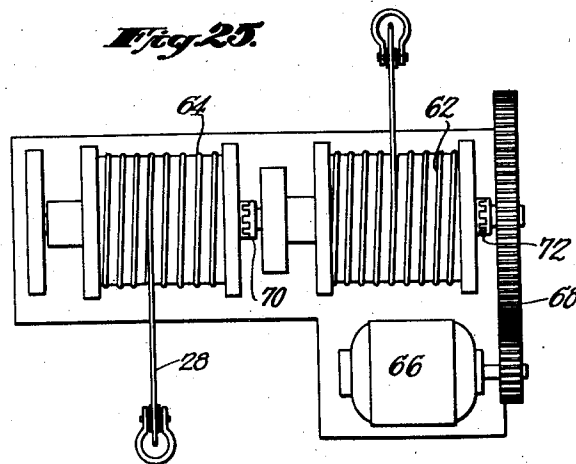


Fig. 25.



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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 26.

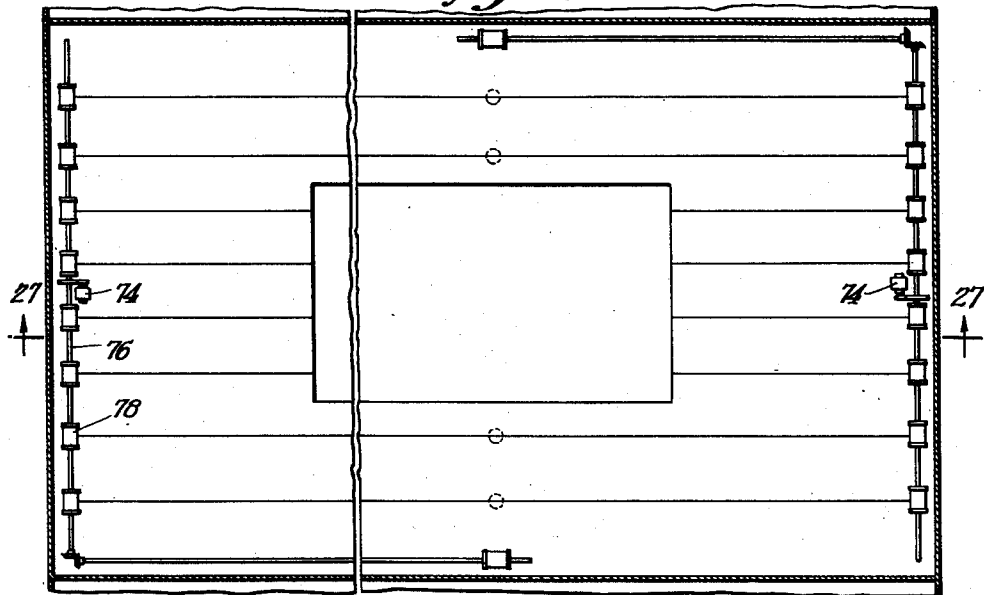
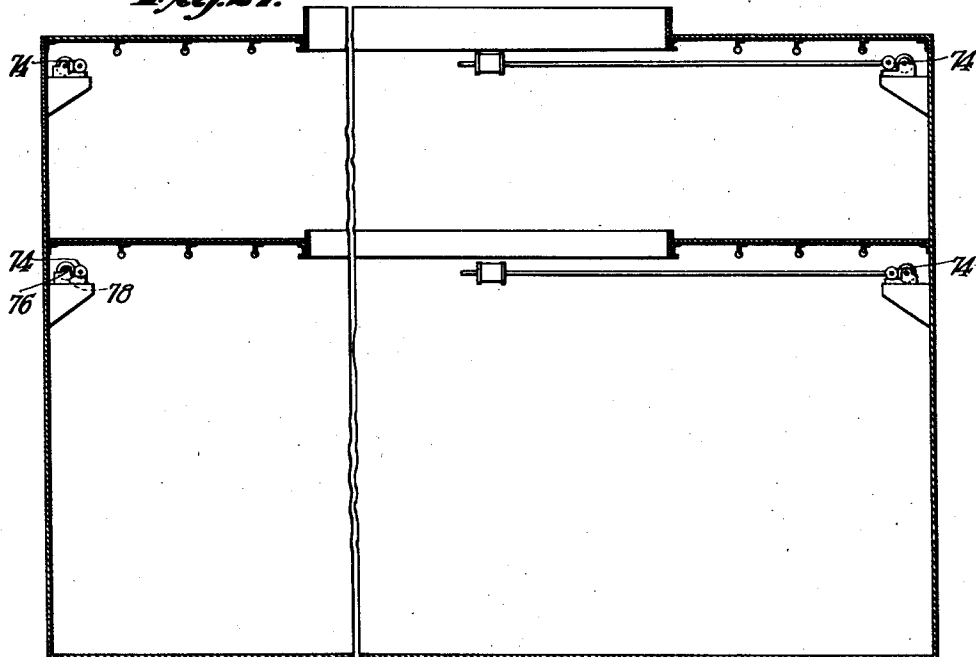


Fig. 27.



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1,900,867

CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 28.

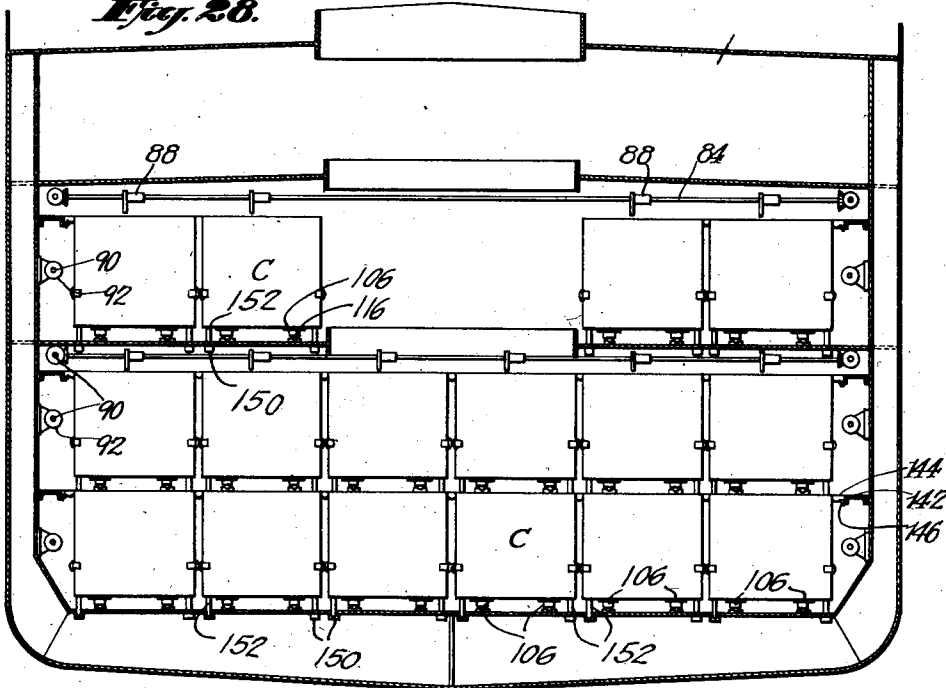
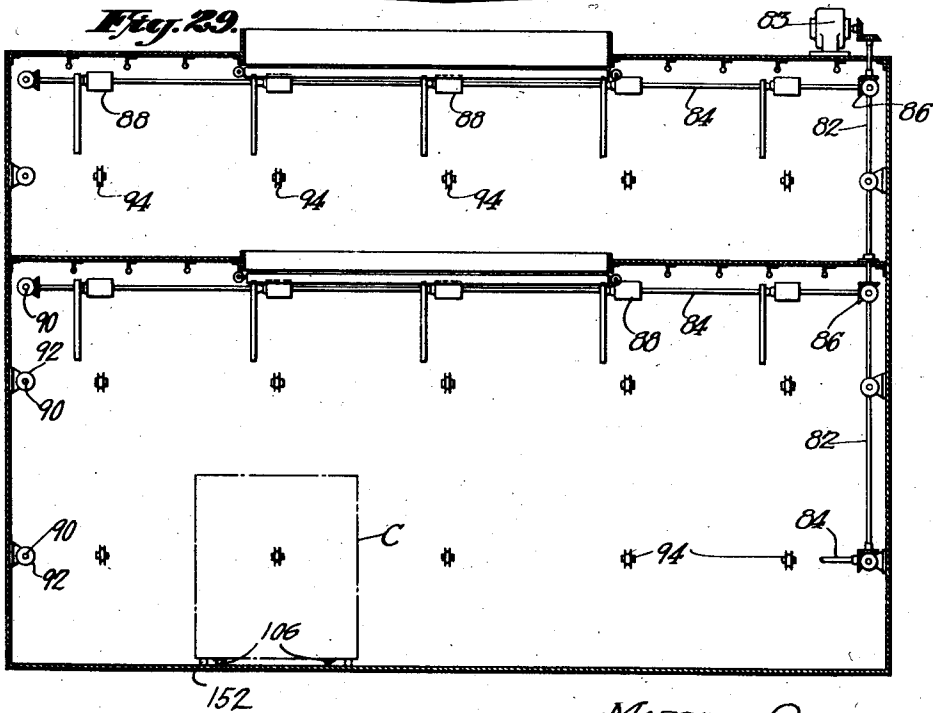


Fig. 29.



By *His Attorney* **MARSHALL OLDS.**
D. Anthony Kama

March 7, 1933.

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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 32.

Fig. 33.

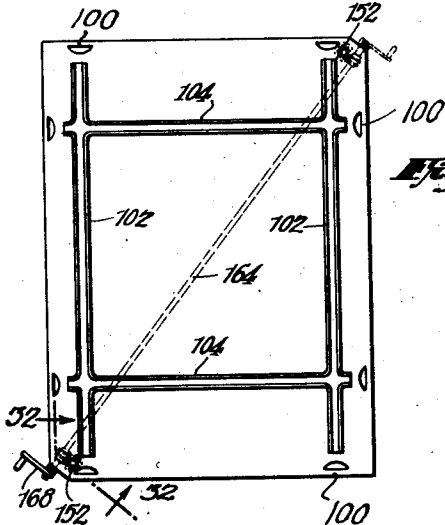
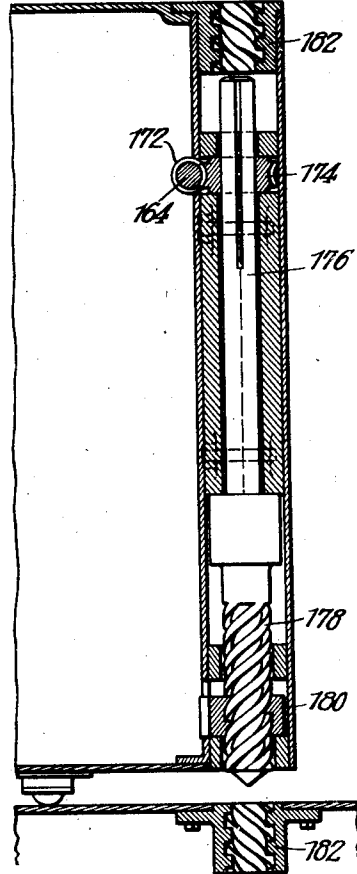
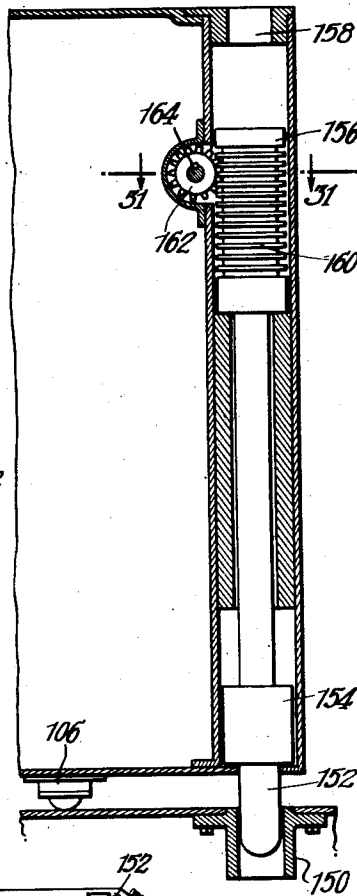
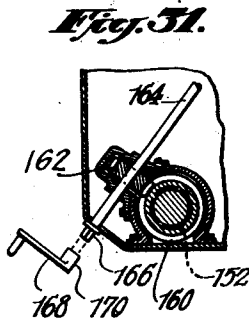
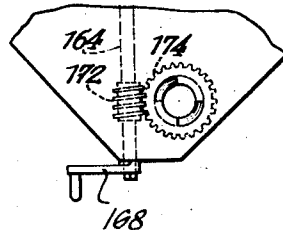


Fig. 34.



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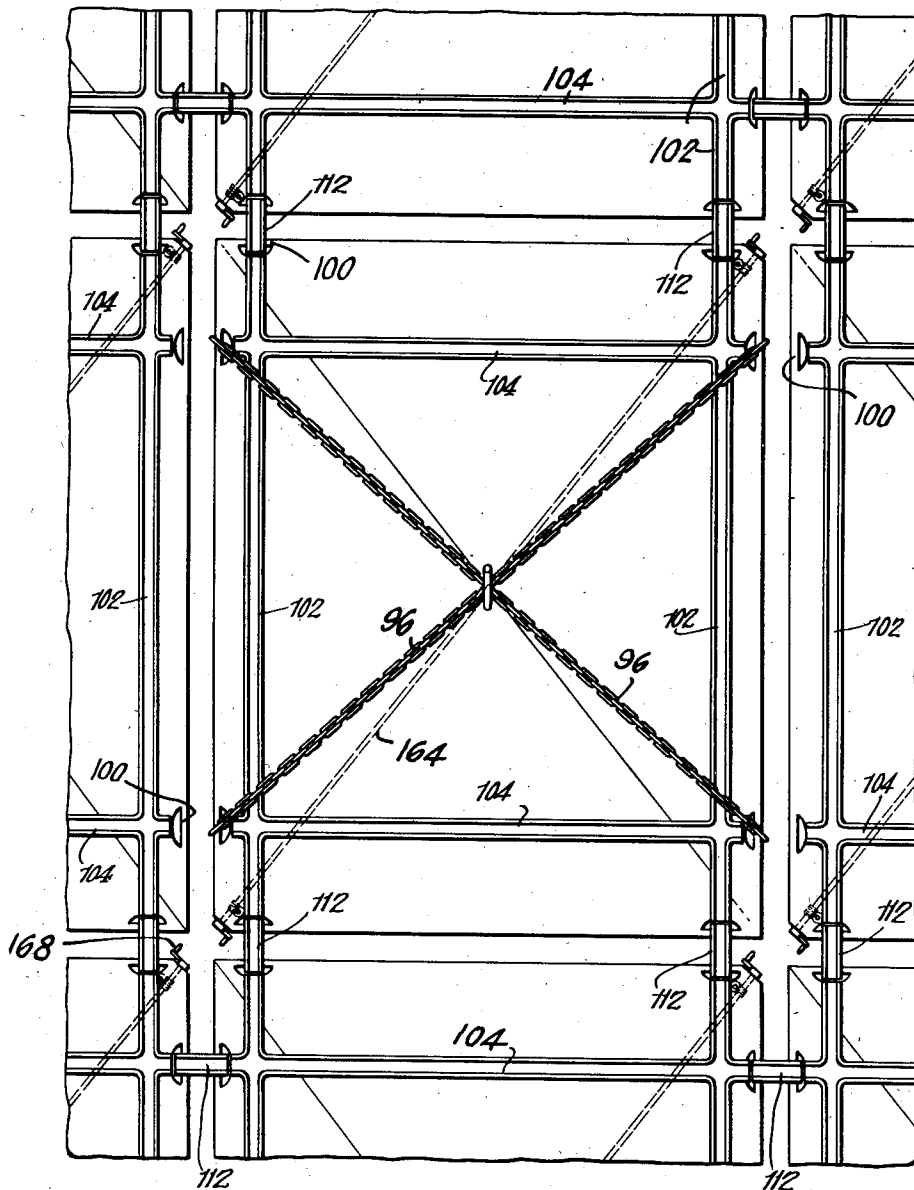
1,900,867

CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 55.



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BY *MARSHALL OLDS.*
D. Anthony ATTORNEY

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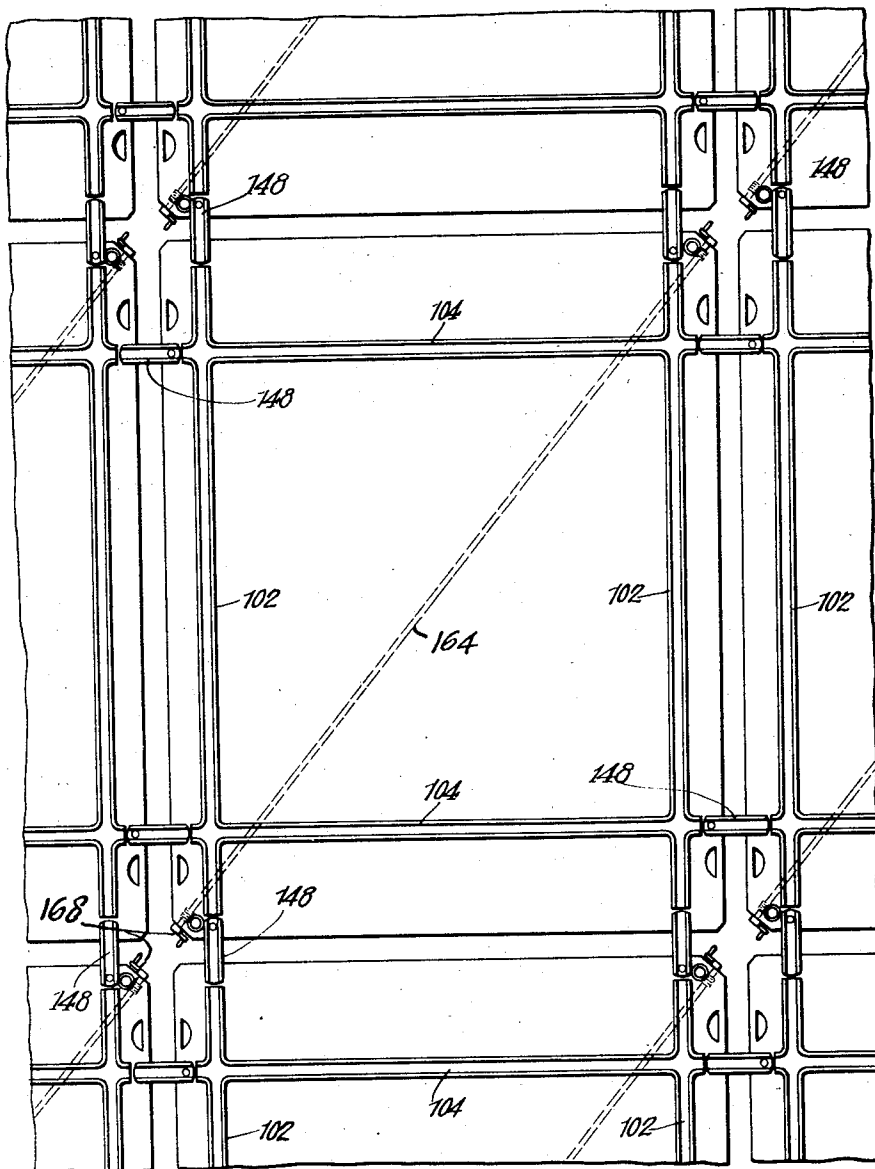
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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 36.



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By His Attorney

D. Anthony Reina

March 7, 1933.

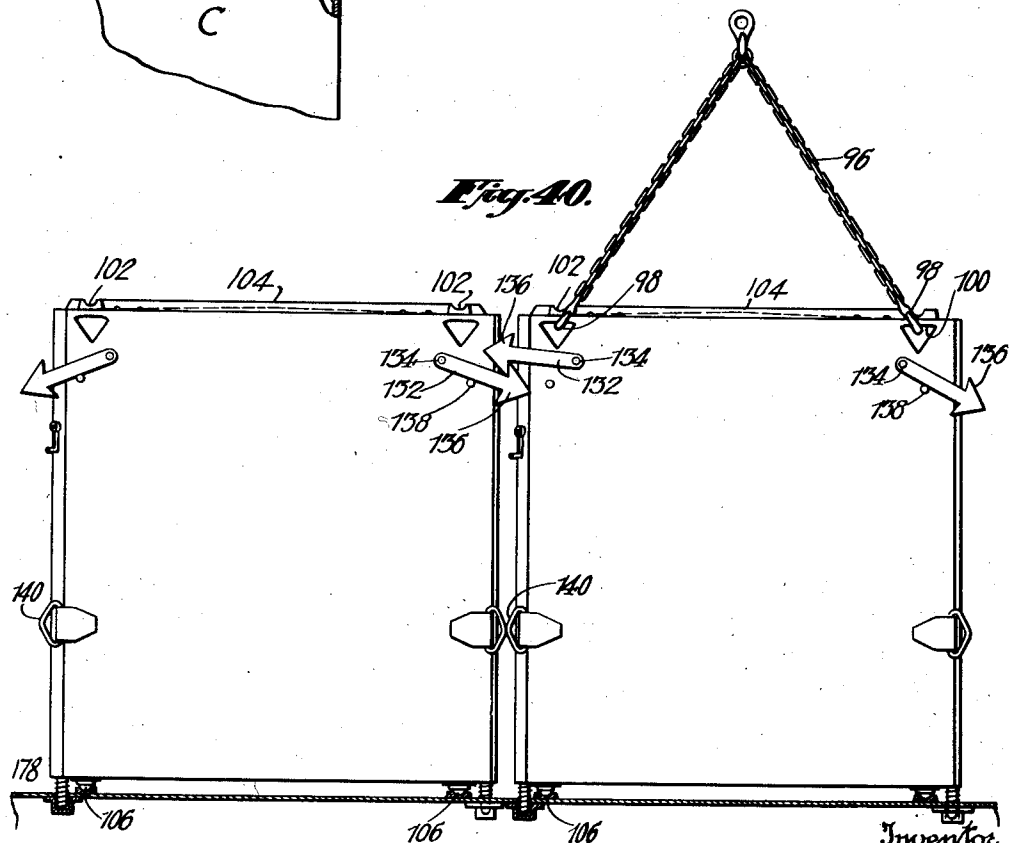
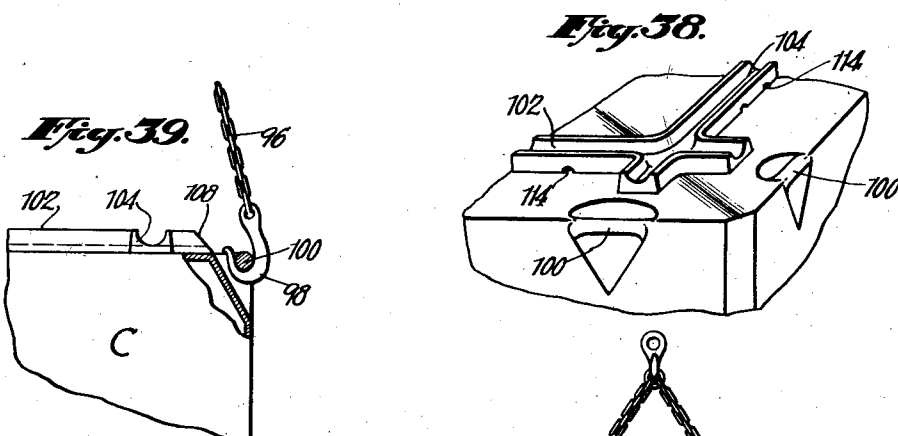
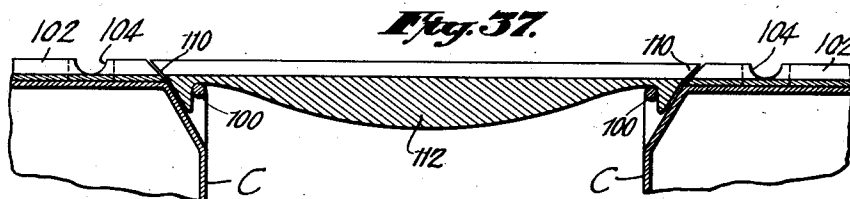
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1,900,867 *

CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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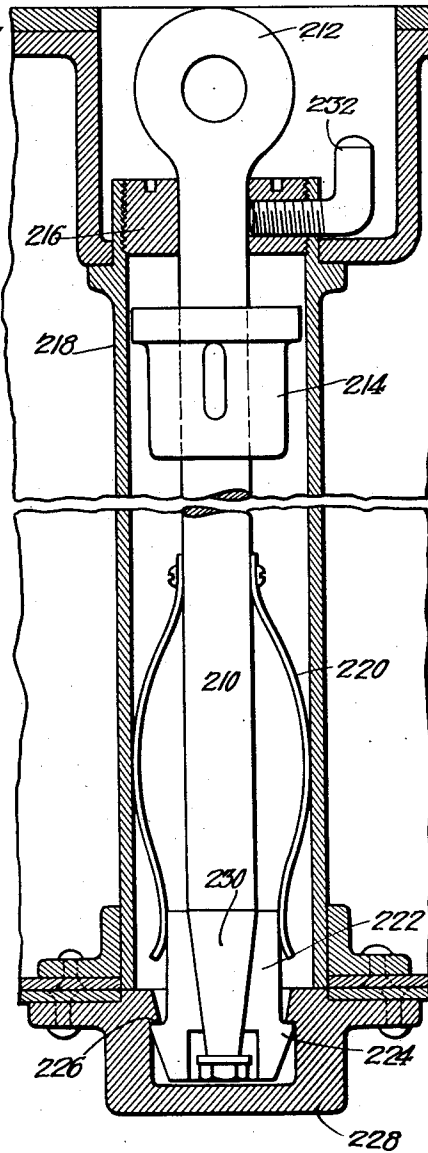
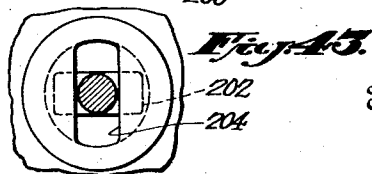
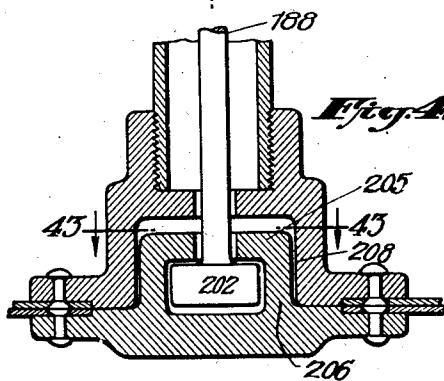
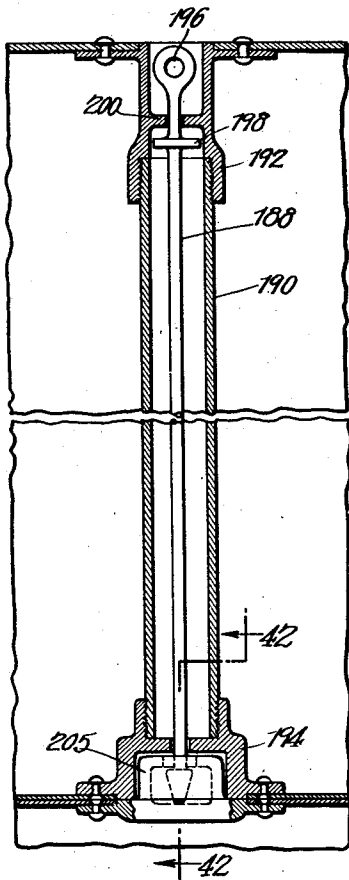
1,900,867

CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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Fig. 41. **Fig. 44.**



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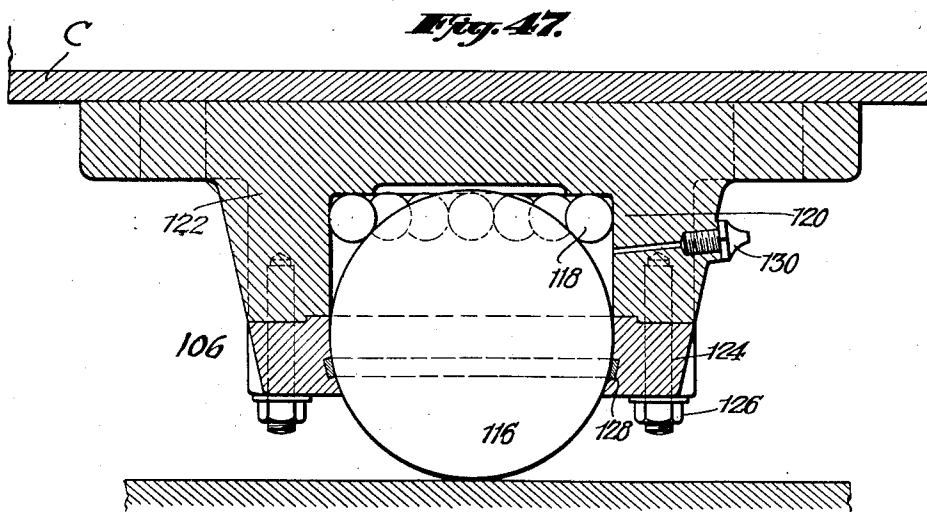
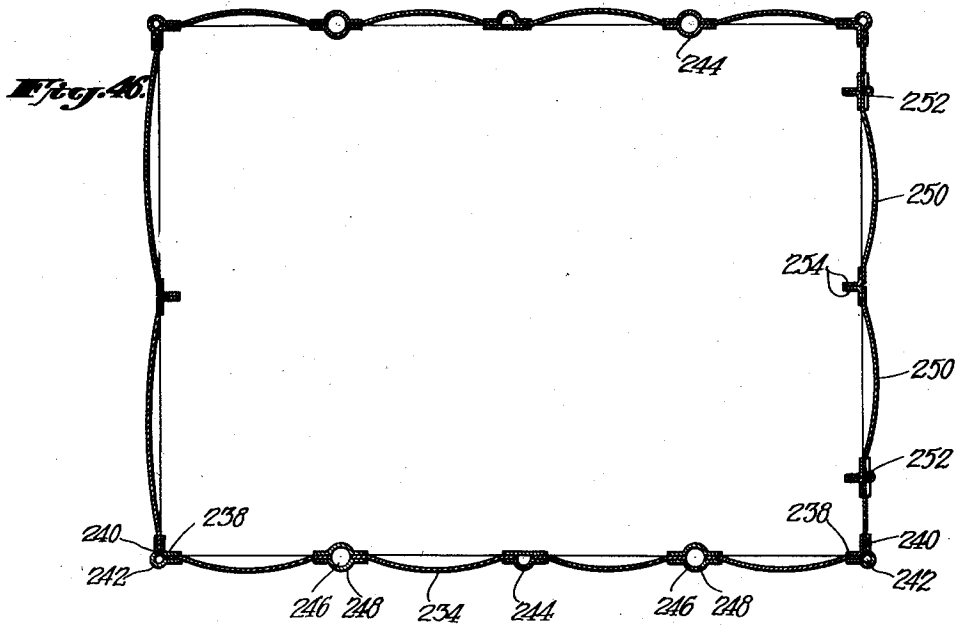
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CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

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18 Sheets-Sheet 18



Inventor

MARSHALL OLDS

By His Attorney

By His Attorney
B. Anthony Weiss

UNITED STATES PATENT OFFICE

MARSHALL OLDS, OF MOUNTAINSIDE, NEW JERSEY

CONTAINER AND METHOD AND MEANS FOR HANDLING CARGO BY SUCH CONTAINERS

Application filed October 26, 1927. Serial No. 228,822.

Miscellaneous cargo, which consists of barrels, bales, boxes, crates and similar packages of merchandise and which comprises a large proportion of the world's total commercial traffic, is in general under present conditions the most difficult of all classes of traffic to handle and the most expensive to transport.

My invention consists of an improved method of transporting miscellaneous cargo and handling it in transport through the use of certain new and improved devices and combinations of devices, whereby such cargo can be shipped from any given locality to any other locality in the same or any other country which can be reached by motor-truck, railroad or water-carrier, or any combination of such carriers, without the need of rehandling or repacking the individual packages of such cargo.

Existing equipment for the transportation of merchandise of all kinds and for its handling in transport represents a considerable proportion of the total wealth of civilized nations. Moreover, the distribution of such equipment and the system under which it is operated are governed by vital social and economic facts, and the continuous full and efficient operation of such equipment is fundamental to our social and economic welfare. Any invention, therefore, which applies broadly to the field of transportation must, in order to be practical and useful, take into consideration these inherent facts and the facts which flow from them.

My invention has the practical advantages of:

1. Providing a means of using efficiently each of various principal types of carriers;
2. Providing a means of making use of existing equipment including freight handling facilities as well as carriers;
3. Doing this without rendering such equipment unfit for handling other classes of freight or freight by present methods;
4. Coordinating with existing methods of handling freight;
5. Meeting both the conditions under which freight must be handled in congested traffic centers and those which are inherent in its handling in isolated places; and

6. Providing such means so that they will not only operate practically under existing conditions but are susceptible of coordination with the trend of development and improvement of our transportation system as a whole.

My invention aims broadly to make it possible to transfer miscellaneous freight from any original point of shipment to any desired destination without the need of repacking or otherwise rehandling the individual packages of merchandise, thus saving time, labor, breakage and other loss or expense. Various other features of the invention will be apparent as the description proceeds and the same will be defined with particularity in the appended claims.

My standard cargo containers may be packed with merchandise at the factory where such merchandise is manufactured. Such container may then either be lifted or rolled on ball casters over my bridge-tracks (hereinafter described) onto a motor truck onto which it is locked and which carries it to the railroad freight receiving station. If this railroad freight receiving station handles enough freight to warrant such cost, it will be equipped with cranes for rapidly lifting the container from the motor truck, handling it within the freight receiving station and loading it onto the railroad flat car. If, however, this station handles little freight so that expensive equipment would not be warranted, the container may be rolled over bridge-tracks from the truck to the station platform, rolled on a hard floor or over inexpensive countersunk U beam tracks, about the station as desired, and over bridge-tracks onto the railroad flat car to which it may be locked as hereinafter described. I may also provide a suitable windlass or its equivalent by means of which the containers can thus be rolled onto or off trucks, freight cars or about freight sheds.

At congested freight centers or in the hold of a ship, it will be necessary, in order to conserve space, to be able to store and move one tier of containers on top of another. This may be done by overhead crane or trolley system or by a system of tracks upon the top of each container which are connected

to similar tracks on adjacent containers by bridge-tracks over which superimposed containers may travel or dwell on their ball-casters. I prefer to secure such ball-casters on the bottom of the container in such relationship that they can be readily moved longitudinally or latitudinally over tracks of the same gauge.

I prefer to make the containers of a substantially uniform standard or interchangeable size so that three of them will fit conveniently on a standard American railroad flat car, and two on an average European railroad flat car, and one on a motor truck. Thus, my container constitutes a standard interchangeable attachable and detachable motor truck body; a standard interchangeable attachable and detachable section of a railroad freight car body and a standard interchangeable attachable and detachable unit compartment in a ship.

When loaded onto a railroad flat car, the container may be carried to its point of railroad destination, where it may be lifted or rolled onto a motor truck for final delivery, or to a railroad transfer point where it may be lifted or rolled onto the flat car of another railroad and this process may be repeated as many times as necessary without the need of handling or disturbing the contents of the container. Thus, one-third carload lots may be handled with all the advantage of full carload shipments and in addition the cars may be loaded and unloaded in a few minutes so that the car may return at once to other service instead of held idle often for days, as at present.

The handling of "way-freight" is a serious problem and expense in modern railroading; more and more local freight is being handled by motor-trucks and many railroads are considering the possibility of handling their "way-freight" by a combination of railroad and motor truck service. My container may be loaded with freight for any given geographical section, carried by railroad to a local center of distribution transferred to a motor truck without rehandling or other delay and distributed by the motor truck wherever desired.

In sending freight to foreign countries or elsewhere by water-carriers, my containers may be loaded and transferred as described to any port. There they may be rapidly handled by a crane system and stored in tiers or transferred directly into the ship. This may be done by lowering the container through any hatch to the hold to the desired deck of the ship where it will be moved by an overhead trolley system or by being rolled on its ball-casters, into its desired place in ranks and files with other containers. Preferably, the floor of the hold will be fitted with countersunk U-bar tracks so arranged that the containers can be quickly and direct-

ly rolled over them into compact juxtaposition or the over-head rails will be so arranged as to accomplish the same end. When the given section of the ship is thus filled with one tier of containers a second tier may be superimposed upon these. This may be done by an overhead carrier system as described or the tracks on the top of each container of the lower tier may be connected by bridge-tracks or swivel tracks (as described in detail later) to the tracks on each adjacent container and superimposed containers rolled into place over them. Containers may be similarly loaded on the various "in-between decks" but only one tier high.

As the width of a vessel varies a given number of containers will not always fill the full space from side to side. Thus, in certain parts of the ship aisles of varying width, but less than the width of a container, will be left probably at the center. These, of course, may be filled with cargo or left as alley ways. In either event they will be bridged by bridge-tracks of the proper length over which superimposed containers may be rolled.

Because of the curvature of the ship's side, rows or files of containers will rarely set flush against it. Each such container, however, may be braced against the ship's sides by bulkheads or bridge tracks. Thus, the whole mass of containers filling substantially the whole of any given section of the ship, arranged in rows and files and tiers in close juxtaposition, and thus supporting each other, further braced in relation to each other by the bridge-tracks between the various containers and the whole body similarly braced on all sides against the ship's sides and bulkheads forms a unit which cannot shift, either in part or whole, with the motion of the ship at sea. Moreover, each such container may be further locked, as will be described later, to the floor or to the container below.

Such a system of loading cargo into vessels in great standard units, of perhaps ten tons each, and rapidly moving and locking each such unit into place so that it cannot shift will obviously mean a great saving of time and labor over the present methods of loading cargo into vessels and stowing it piece by piece.

When the port of destination is reached any number or all of such containers may be rapidly unloaded by reversing the process of loading. Each may then be sent by railroad as already described to its city of destination and by motor truck to final destination.

Thus, any such container can, and if its contents are examined by consular agent and the consular seal placed upon its lock at original point of shipment, may be sent from any shipping point in any country to any shipping point in any other country without its contents being disturbed.

When and wherever such container is unloaded it may be reloaded with any other miscellaneous merchandise and either sent back or sent to some other locality or country, thus following traffic demands as a standard unit of national and international transportation whether by ship, railroad or motor truck as a railroad car is now the standard unit of national railroad transportation.

Having thus described the general characteristics of the invention, I will now set forth in detail the construction of my improved cargo container and the method of handling the same, reference being made to the accompanying drawings in which—

Figs. 1 and 2 represent, respectively, a plan and vertical section of a warehouse, factory or other station from which merchandise is initially shipped in my improved container and in accordance with my method;

Figs. 3 and 4 are, respectively, a plan and elevation of a wharf and associated freight handling equipment for handling containers;

Fig. 5 is a vertical section illustrating an alternative arrangement of wharf and freight handling equipment;

Fig. 6 is a plan of Fig. 5 on a smaller scale;

Fig. 7 is a view illustrating the method of transferring cargo containers from either motor truck or barge to the hold of a vessel;

Fig. 8 shows my improved containers locked in place on a vessel;

Figs. 9 and 10 are, respectively, plan and side views showing the method of transferring my improved cargo container from a platform or wharf to a motor truck;

Fig. 11 is a diagrammatic side view showing a plurality of my improved cargo containers in position for shipment over land by freight car;

Fig. 12 is a side view of a jacking truck adapted for use in stowing away my improved cargo containers;

Fig. 13 is a skeleton plan of the operating mechanism of the truck shown in Fig. 12;

Fig. 14 is a diagram illustrating the operation of the truck in depositing the cargo container on fixed supports;

Fig. 15 is a view showing a special form of truck adapted for use in stowing away cargo containers on board ship, the view also illustrating adjacent portions of a ship;

Fig. 16 is an end view of Fig. 15;

Fig. 17 is a diagrammatic plan of a portion of a ship illustrating means for moving a cargo container to different parts thereof;

Fig. 18 is a section thereof on line 18—18;

Figs. 19, 20 and 21 are diagrammatic plans similar to Fig. 17 illustrating the movement of the cargo container to different locations in the hold of a ship;

Fig. 22 is a side view of an I-beam trolley adapted for transferring the cargo container to different parts in the hold of a ship;

Fig. 23 is an end view thereof;

Fig. 24 is a diagrammatic view illustrating the use of the trolley of Figs. 22 and 23;

Fig. 25 is a plan view of a winch adapted for hoisting and lowering cargo containers in the hold of a ship and also for moving them about the hold so as to stow them away;

Fig. 26 is a plan of a portion of a ship illustrating a central hatch opening and an arrangement of motor driven drums for moving the cargo containers about the hold of a ship;

Fig. 27 is a transverse section on line 27—27 of Fig. 26;

Fig. 28 is a cross-section through the hold of a ship illustrating a plurality of cargo containers stowed away therein and illustrating a mechanism for moving the containers;

Fig. 29 is a section similar to Fig. 28 at the same scale showing an arrangement of mechanism whereby the containers may be transferred either longitudinally or transversely;

Fig. 30 is a plan view of one form of container embodying certain features of my invention;

Fig. 31 is an enlarged horizontal section on line 31—31 of Fig. 32 of a corner of a container illustrating features of construction;

Fig. 32 is a fragmentary detail section on line 32—32 of Fig. 30;

Fig. 33 is a sectional view showing a lock for preventing shifting of the container;

Fig. 34 is a detail plan of certain parts shown in Fig. 33;

Fig. 35 is a plan of one complete container and parts of several adjacent cargo containers showing container supporting tracks carried thereby and bridge members spanning the spaces between some of the adjacent containers;

Fig. 36 is a similar view showing modified bridge members;

Fig. 37 is a view showing a bridge track spanning the space between two adjacent containers of the type shown in Fig. 35;

Fig. 38 is a perspective view of a corner of one form of container with a container-supporting-track mounted thereon showing a connecting member adapted for co-operation with the bridge member;

Fig. 39 is a detail view illustrating the manner of lifting the container of Fig. 38;

Fig. 40 is a view in elevation of two adjacent containers showing a latch for locking them to one another when bridge members of Fig. 37 are not used;

Fig. 41 is a vertical section showing a combined lifting stanchion and locking device for a container;

Fig. 42 is an enlarged view of the lower end of the locking device of Fig. 41 illustrating how it coacts with a socket member pro-

vided on a common carrier or on another container;

Fig. 43 is a section on line 43—43 of Fig. 42;

5 Fig. 44 is a detail view in vertical section showing a modified form of locking coupling adapted to prevent shifting of the container;

Fig. 45 is a plan of part of the locking device shown in Fig. 44;

10 Fig. 46 is a horizontal section illustrating a desirable construction of cargo container adapted to resist buckling;

Fig. 47 is an enlarged detail illustrating a roller bearing caster with which my improved container is provided.

15 Referring first to Figs. 1 and 2, I show diagrammatically a factory or warehouse A having a motor truck driveway or loading berth B at one side thereof and a railway spur track D at another side thereof. The factory or warehouse shown is provided with a suitable longitudinally travelling overhead crane E on which runs a trolley F carrying a suitable crane hook G. The crane E and trolley F are capable of picking up containers C and transferring them longitudinally to and from different points lengthwise and cross-wise of the factory or warehouse building. The building shown is provided with run-out tracks H which extend above the loading berth B and above the railway spur D. A trolley J rides on the tracks and is capable of transferring the containers either to a motor truck K or railway car L. The containers C are provided with means hereinafter more fully described whereby they can be interlocked either with the motor truck, railway car, portion of a ship or with other similar containers.

40 Figs. 3 and 4 illustrate how a number of containers C arriving at a wharf M may be transferred from a barge N by means of a derrick O through a movable hatch P in the roof of the building and stored in the building shown. This view illustrates how the containers C may be arranged in tiers according to points to which they are to be shipped and also shows a power operated truck Q for distributing the containers. This truck will preferably be in the form hereinafter to so that it can be jacked up and down to readily relieve itself of its load. Fig. 4 shows a container C1 in the act of being transferred across flat cars L and onto a motor truck K1 provided with a power driven winch S.

50 Figs. 5 and 6 illustrate how the containers C may be transferred to or from the hold of a barge or ship by means of a trolley T which runs on an arm extending outwardly from a gantry crane U travelling on suitable tracks V. The track T^1 of the gantry is provided with a hinged section T1 which can be swung over into position to permit the trolley to be transferred to an overhead crane E1. A sim-

ilar crane E'' located at a lower level may be provided to facilitate moving the container C to different desired locations.

Fig. 7 illustrates the manner in which the containers C may be transferred from auto truck K2 to the hold of a ship or from the deck of a barge N1 to the hold of a ship by means of suitable derricks W. Various means hereinafter more fully described are provided for pulling the containers around the hold of a ship so as to easily stow them. Figs. 9 to 11 show the container in position for transport by truck and freight car.

70 Figs. 12 to 14 inclusive show details of the jacking truck Q above referred to. This includes a suitable frame work q , traction wheels q^1 which may be driven through bevelled gearing q^2 from shaft q^3 connected with the motor q^4 . The shaft q^3 carries a gear q^5 meshing with a gear q^6 on shaft q^7 having a clutch q^8 by means of which the shaft can be operatively connected or disconnected with the drive gear q^5 at will. Cross shafts q^9 and q^{10} carry worms q^{10} which mesh with worm gears q^{11} carried by jack screws q^{12} . The arrangement is such that when the clutch q^8 is engaged the several worms q^{10} are rotated through gearing indicated at q^{13} , shaft q^{14} and gearing q^{15} so as to lift the truck platform q^{16} . The truck can be positioned between suitable skids or supporting timbers q^{18} by slightly elevating the platform q^{16} . The motor q^4 can then be reversed by suitably manipulating the comptroller q^{17} so as to lower the platform q^{16} . This will leave the container C resting on the skids q^{18} whereupon the truck can be run out from under. In this way, it will be understood that the containers can be readily distributed.

105 In Figs. 15 and 16 I have shown a different form of transfer car for handling the container C, this car being particularly adapted for placing or distributing containers at desired locations on board ship. As illustrated in these figures, the transfer car includes a suitable chassis 10 carried by wheels 12 adapted to be suitably driven preferably by an electric motor governed by a comptroller 14. The chassis of this transfer car carries uprights 16 which support an overhead I-beam 18 on which rides a trolley 20 which can be moved from the full line to the dotted line position shown in Fig. 15. To prevent overturning or tipping of the transfer car when the container is run out to the dotted position at which it is adapted to be discharged, the car is provided with a hand operated screw jack 22 secured to the beam 18 and adapted to engage an overhead deck beam 24 of the ship. With this arrangement, it will be understood that the containers can be moved from place to place, the containers being held in the full line position during transport. To discharge or pick up containers the trolley 20 is moved to the dotted position shown. 130

This trolley will be provided with a differential lifting block of such character that one man can readily lift an enormous load.

My improved method relates to the manner in which the containers are loaded and distributed or stowed away on ship board, and the drawings show certain desirable apparatus for accomplishing this result. When the containers are made without casters of any sort by which they can be rolled about they are preferably handled on board ship by means of the truck of Figs. 15 and 16 or overhead trolley shown in Figs. 22 and 23. When the containers are provided with roller casters such as hereinafter described they can be hauled longitudinally and transversely of the hold of the ship by suitably placed winches and idler blocks or guide sheaves.

One such arrangement is illustrated diagrammatically in Figs. 17 to 20 inclusive. Fig. 18 shows a winch 26 for operating a cable 28 which passes over idlers 30 and 32 and around the detachably so-called snatch blocks 34 which can be hooked in various positions indicated by the circles 34' in Figs. 17 and 18.

When the containers are hauled around in this way, they will be provided on their underside with casters such as hereinafter described and on their upper surfaces with tracks adapted to guide the casters on adjacent tracks.

Figs. 19 to 23 inclusive show another way of moving the containers either longitudinally or transversely of the ship. During such movement the containers are adapted to be suspended from a hook 40 of an I-beam trolley 42 (Figs. 22 and 23) adapted to ride on I-beams 44 suspended from the deck beams 46.

The beams 44 extend transversely of the ship and suitable switches 48 are provided by means of which the trolley can be transferred from any of the transverse beams 44 to a longitudinally extending removable or portable beam 50 indicated in Fig. 19. When handled with this apparatus the container will be lowered into the hold through the hatchway 36 as indicated in Figs. 19 and 20. One of the portable beams 50 will then be placed over the center of the container. The container will then be moved longitudinally of the ship, the trolley riding on the beam 50. The container will then be moved transversely, for example, to either position indicated at C¹ or C² in Fig. 20 by means of the cable 28' actuated by a winch similar to that shown in Fig. 15. Fig. 19 shows other positions at C³, C⁴ and C⁵ to which the containers can be moved.

Fig. 21 diagrammatically shows another arrangement of idler shieves and traction cable 28'' for pulling the container longitudinally of the ship along the portable beam 50. It will be readily understood that the

container C can be moved longitudinally to required location on the ship and can then be moved transversely along the transverse trolley supporting beams 44, suitable switches being provided as indicated diagrammatically at 48.

When the container is being hoisted it is desirable to clamp the trolley to the supporting beam and for this purpose I show a hand crank 52 (Fig. 23) for operating a right and left screw 54 which engages the jaws 56 adapted to grip the opposite flanges of the beam 44.

The trolley 42 carries chain clamps 58 by means of which the chain 60 to which the suspension hook 40 is secured may be rigidly clamped to the trolley so as to hold the container at the desired elevation while the trolley is being moved from place to place.

The lifting chain 60 may pass around suitable idlers and it is adapted to be actuated by a hoisting drum 62 of the deck winch shown in Fig. 25, this winch also being provided with a hold stowing drum 64 for winding in the cable 28. This winch is driven by a suitable motor 66 through gearing indicated at 68 and clutches 70 and 72 are provided so as to control the operation of the drums.

Figs. 26 and 27 illustrate another arrangement for moving the containers. As shown best in Fig. 26, electric motors 74 located fore and aft will be provided near the top of each deck on suitable supports, and these motors will drive transversely extending shafts 76 carrying rope drums 78 adapted to pull the I-beam trolleys along the various longitudinally extending trolley supporting beams.

Figs. 8, 28 and 29 show the manner of stowing the containers away on board ship when said containers are provided with roller casters and supporting tracks of the kind described in detail hereinafter.

With this arrangement there will be a vertical shaft on shipboard as indicated at 82 in Fig. 29. This shaft will be driven by a suitable electric motor 83 or steam donkey engine or the like on deck. Transversely extending horizontal shafts 84 will be driven through bevelled gearing 86. These horizontal shafts will carry a plurality of drums 88 by means of which a traction cable may be operated. In some cases there will also be longitudinally extending shafts 90 carrying suitable traction drums 92. Idler guide sheaves 94 will be provided at suitable intervals and preferably detachably secured in position so that by selection of appropriate traction drums 88 and guide sheaves 94, the cargo containers can be moved to practically any desired part of any deck on the ship.

In the foregoing description little has been said about the detail construction of the container inasmuch as several types of container may be advantageously transported by auto

truck, railway car and water craft and these several types may be used alternatively on such carriers. Preferably, the containers will be of such size that three of them will
 5 constitute a full load for a standard size freight car as used in the United States. While of course, I do not limit myself to this size of container, in my judgment a container of this size will adapt itself most
 10 readily to motor, railway and ship transportation. It is contemplated that the method of transporting goods will in time be adopted quite uniformly throughout the United States and also in continental Europe and
 15 other countries. In the United States the standard freight car at the present writing is approximately thirty-four feet long by about a trifle over eight feet wide. I, therefore, propose to build the containers in substantially
 20 rectilinear form approximately seven or eight feet high by eight feet wide and eleven feet in length. Three such containers will constitute a full load for a standard American railway flat car and such container will readily be received by the chassis
 25 of motor trucks now on the market and the containers of this size can be readily passed through hatchways in ocean-going and other vessels. On the European Continent the
 30 standard size of freight car is a trifle over twenty-two feet, therefore, two containers of the size mentioned will constitute a load for such cars. It is estimated that a loaded container of the size mentioned will weigh from
 35 six to twelve tons depending, of course, on the character of miscellaneous freight carried.

Details of suitable containers for use in my method above described are shown in
 40 Figs. 30 to 47 inclusive.

The type of container illustrated in Figs. 30 and 40 is adapted to be grappled or lifted by a chain sling or trackle such as indicated at 96 having hooks 98 which engage members
 45 100 secured to the container.

The container is substantially rectangular in plan and is provided on top with tracks 102 extending longitudinally thereof and tracks 104 extending transversely. The
 50 spacing between the two tracks 102 and tracks 104 is the same gauge so that regardless of which way the container is stowed away, the track gauge will be uniform. On the underside, the container is provided with
 55 four roller bearing casters 106 which are located at points corresponding to corners of a square defined by the center lines of the tracks 102 and 104 on top of the container. As thus arranged it is apparent that the
 60 spacing of the rollers 106 on one container will be of a proper gauge to ride on either transverse or longitudinal tracks 102 or 104 of another container. The tracks 102 and 104 are of substantially U or channel shape
 65 in cross-section as indicated in Figs. 37 to 39.

These tracks terminate short of the ends of the container and are preferably bevelled as indicated at 108 to coact with the bevelled portions 110 of the bridge members 112 which
 70 are adapted to engage the members 100 so as to span the spaces between adjacent containers and to furnish a continuation of the container track over which another container may be moved, for example, when storing
 75 the same on board ship or in a warehouse.

The roof or top of each container is preferably slightly pitched or canted so as to shed water. The highest point of the roof preferably not being higher than the upper
 80 surface of the rails or tracks 102, 104. Suitable openings 114 will be provided in the tracks to permit drainage or escape of water while the containers are in transit either on railway or motor truck.

The containers and their contents will
 85 weigh from approximately six to twelve tons, hence, it is desirable to support the same on free running casters. For this purpose, I have designed a caster such as illustrated in
 90 Fig. 47 which includes a hardened steel ball 116, the upper part of which coacts with a series of bearing balls 118 carried in a cage 120 formed in the caster housing 122 which is bolted or otherwise secured to the under-
 95 side of the container C. A cap 124 is fitted to the lower part of the housing 122 by means of cap screws 126. A suitable gasket 128 of felt or similar yieldable material is fitted to the cap 124 so as to exclude dirt
 100 and moisture and other foreign matter from the ball cage. The interior of the ball cage may be packed with grease or other lubricant forced, for example, through a fitting 130 by means of a suitable grease gun. Means are
 105 preferably provided for locking the containers against movement relative to the common carrier on which they are being conveyed such as motor truck, railway car or water craft. It is also preferable to provide suitable latch
 110 or latches on each container whereby several adjacent containers can be locked against movement relative to one another when they are not interlocked by the bridge members 112.

In Fig. 40 I have shown arrow-shaped
 115 hooks 132 pivoted at 134 having teeth 136 adapted to engage similar teeth on a hook carried by an adjacent container. Stop pins 138 are provided to limit the downward movement of the hooks. This form of hook is desirable because after one container has been
 120 located in place, for example, on a freight car, another container may be lowered down alongside of it and the teeth 136 of the respective hooks will engage so as to prevent
 125 relative lateral movement between two adjacent containers.

The containers when located side by side and end to end as indicated, for example, in
 130 plan in Fig. 35, may be additionally locked

against relative movement by the bridge members 112. These bridge members as shown constitute track extensions which will enable other containers to be pushed or pulled about on their roller casters, it being understood that when the containers are to be stowed away on board ship, the various winches or drums referred to may be employed to furnish the power. The containers are provided with convenient pulling shackles 140. It will be understood that by proper manipulation of the hauling tackle, the containers may be arranged in rows or tiers on board ship, for example, as indicated in Fig. 28, the upper containers riding on top of those in the lower tier. The ship, if desired, may be provided with suitable U-shaped tracks for coaction with the lower casters. The containers are also preferably locked to the ship so as to prevent shifting of the cargo at sea. This locking may be accomplished by inter-locking the several adjacent containers to one another by means of the bridge members 112 and also if desired by the interengaged hooks 132, the outermost containers being locked to longitudinally extending beams 142 by means of members 144 (Fig. 8) similar to the bridge members 112 shown in Fig. 37, the members 112 having hooked ends for engaging the members 100 on the containers and engaging similar members 146 secured to the beams 142.

Instead of bridging the space between the adjacent containers by removable bridge sections 112, I may provide each container with a plurality of pivotally mounted extension bridge sections such as indicated at 148 in Fig. 36. These pivoted bridge sections 148 are located tangentially adjacent the four corners of rectilinear tracks 102 and 104 and the arrangement is such that regardless of the manner in which the containers are oriented, the bridge members 148 will when swung outwardly align with the U-shape tracks 102 and 104 of an adjacent container.

When the containers are being transported either by motor truck, freight car or ship, it is desirable to lock them against movement relatively to such common carrier. It is advantageous to lock the container at a plurality of points so as to prevent the same from pivoting or shifting around the locking member. It is also desirable to provide means for simultaneously operating the locks from a single point. To these ends, I have devised suitable locking devices shown in Figs. 31 to 34 and 41 to 45.

Referring first to Fig. 32, the motor truck, railway car or ship is provided with a socket 150 and at diagonally opposite corners, the container is provided with vertically movable locking members 152, the lower ends of which are adapted to coact with sockets 150. The locking member 152 as illustrated in detail in Fig. 32 is in the form of a rod having

a stop collar 154 near the lower end thereof and having an enlarged head 156 at the upper end thereof. Each head 156 is provided with a number of circular rack teeth 160 which mesh with a corresponding pinion 162 carried on the diagonally extending shaft 164. This shaft 164 is formed with a square end 166 as indicated in Fig. 31 for coaction with a hand crank 168 having a socket portion 170 by means of which the shaft 164 can be turned so as to simultaneously disengage both of the locking members 152. One end of the shaft 164 will always be readily accessible from the space between the adjacent containers. Socket members 158 will be provided on the upper surface of each container for coaction with locking portions 152 of superposed containers so that when several containers are stacked one over the other they can be readily locked against relative movement.

In Figs. 33 and 34, I have shown a modified arrangement of container lock in which the shaft 164 carries a worm 172 which meshes with a worm wheel 174 splined on a locking shaft 176 having a worm thread 178 secured to the lower end thereof. This thread works in a nut 180 secured to the lower corner of the container. When the shaft 164 is turned, worm wheel 174 will turn the member 176 and cause the threaded member 178 to travel endwise and into engagement with a threaded socket 182 secured to the truck car, ship or other carrier, or to the top of another container. In the locking device of Fig. 33, the nut 180 performs the double function of providing means for forcing the locking member longitudinally when the same is turned and also insures that the threads of the locking member will properly line up with the threaded socket of a mating container or carrier.

The containers above described are adapted to be lifted by a suitable sling engaging the suspension members 100 near the four top corners of the same. This requires that there be a considerable head-room above the container for accommodation of the sling or other overhead tackle. The amount of head-room required can be materially lessened if the container is grappled at one point instead of at four points.

Fig. 41 illustrates a container having a central combined suspension rod and locking member. The suspension rod indicated at 188 is located in the center of the container and is housed in a suitable tubing 190 secured at the top and bottom to casings 192 and 194 suitably fastened to the top and bottom walls of the container. At the top the member 188 is provided with a lifting eye 196 adapted to be engaged by a tackle. A collar 198 secured to the member 188 is adapted to engage shoulders 200 when the container is lifted. At its lower end, the

member 188 carries a locking head 202 of substantially rectangular form in plan as shown in Fig. 43, this locking head being adapted to be inserted through a substantially rectangular opening 204 in a bracket 206 secured to a truck, railway car or other carrier. When the rod 188 is given a quarter turn, the parts will be locked against upward movement. The boss or hub 205 of the bracket 206 forms sort of a dowel for engagement with the socket 208 formed in the casing 194.

Fig. 44 shows a further modified form of lock employing a container suspension rod 210 having a lifting eye 212 at one end and having a collar 214 secured thereto which is adapted to strike a block 216 secured in the casing member 218 when the container is lifted. The rod 210 carries springs 220 which press against jaw members 222 having teeth 224 adapted in locked position to engage shoulders 226 of a socket member 228 secured to a motor truck, railway car or other carrier. The lower end of the rod 210 is tapered as indicated at 230 and when the rod is in the lower position illustrated, the teeth 224 are forced outwardly into engagement with the shoulders 226. The rod 210 may be locked in this lower position by means of a hand clamp screw 232. Thus, the jaws 222 are locked in engagement with the socket. By releasing the clamp 232 and lifting the rod 210 springs 220 will collapse the jaws and permit the container to be lifted.

It is desirable to make the walls or shell of the container of extremely durable construction because of the strains involved in lifting and transporting the same. While not limited thereto I prefer to construct the shell of buckle plates such as shown at 234 in Fig. 46. At the corners the buckle plates are joined to upright angle frame members 238 and similar members are provided across the top, bottom and end of the structure. Outside gusset corner pieces 240 each having a rounded nose 242 form rigid corner connections which serve to protect the walls of the container when it strikes fixed objects in grappling or lowering it into the holds of vessels. At suitable intermediate points the buckle plates are connected by reinforcing bars 244. I find it convenient to utilize connecting members such as indicated at 246 formed with substantially half circular portions 248 so as to form an inclosure or housing for the locking rods such as those above referred to.

Preferably at the end of each container I provide doors 250 hinged at 252 and adapted to be locked against suitable upright angles 254. The joints between the plates are preferably provided with thin gaskets or otherwise made water-tight. The roof or top of the container is preferably pitched and made water-tight. This is important because the

container is transported in the open on flat cars and motor trucks frequently stored on board ship in locations where there is apt to be leakage of water from one deck to the other. The water-tight construction of the container thus guards against damage to merchandise by the elements as will be understood.

From the foregoing it is clear that by use of apparatus hereinbefore described a new method of transporting merchandise is readily initiated. Such a method involves shipping various articles of merchandise, for example, from their point of origin to their ultimate point of destination in the same container. This is made possible because the design of the container is such that it can be readily fastened to motor truck, it can be readily handled by cranes, derricks and somewhat similar apparatus such as gantry cranes. The containers are designed to interlock with motor trucks, railway cars and suitable anchorage devices on board ship. They are also adapted to be interlocked with one another so as to prevent shifting of the cargo when the ship encounters rough seas. After the ship arrives at port, the containers can readily be transferred by railway cars and motor trucks to their ultimate destination. After being emptied the same container can be reshipped with a different load of merchandise. It is clear that the method will effect considerable economy by eliminating the time usually required for examination and routing comparatively small lots of individual pieces of merchandise. The work of loading a ship with its cargo will be greatly facilitated by use of the method described and damage to cargo will be prevented by interlocking the containers to one another and with the ship itself. In making shipments to foreign countries great savings in time will be effected because the containers can be sealed by the customs officer at the original point of shipment if desired, thus not causing delay when the goods arrive at the frontier.

It is apparent from the foregoing that such use of my container and of the devices and methods of so handling it will:

1st. Reduce to a minimum the loss and cost of the frequent piece by piece rehandlings of miscellaneous freight at numerous points in its transportation that is necessary under the present system.

2nd. Do away with the necessity of present very expensive piece by piece unloading and loading and "stowing" of such cargo out of and into vessels.

3rd. Eliminate the danger of shifting of cargo at sea.

4th. Eliminate the loss or breakage of cargo due to rehandling.

5th. Make it possible to pack individual

units of merchandise much less elaborately and expensively.

6th. Eliminate the separation of parts of the same shipment.

5 7th. Permit the sealing of freight by the shipper and its unsealing by the consignee on less than car load lots and on ocean cargo and the passage of such cargo across international boundaries without inspection at the
10 frontiers.

8th. Make it possible so to handle miscellaneous cargo that the expensive vehicles of transportation, whether trucks or freight cars or vessels, could be loaded and unloaded
15 in a minimum time and their overhead costs to the carrier and demurrage and similar charges to the shipper would be reduced accordingly.

9th. Make many other savings.

20 Part of the subject matter herein illustrated and described, but not embraced in the following claims, will form the substance of divisional patent applications to be filed before the date of publication of this patent.

25 Various modifications of the invention may be made by those skilled in the art without departing from the invention as defined in the following claims.

What I claim is: —

30 1. The method of loading a ship which includes stowing away a multiplicity of cargo containers in spaced relationship and in substantial or approximate alinement with one another, bridging the spaces between adjacent
35 containers and hauling other containers over the tops of said bridged containers.

The method of handling cargo containers which consists in arranging a multiplicity of containers in quadrilateral juxtaposition
40 with spaces between them, bridging the spaces between the containers at the tops thereof and supporting other containers on the juxtaposed containers and hauling them over the tops of the juxtaposed group of
45 containers located at a lower level so as to stow away the containers in superposed levels.

3. In the handling of cargo, the method which consists in providing a multiplicity of cargo containers having supporting tracks
50 on their tops and roller casters on their bottoms, arranging a multiplicity of containers in quadrilateral juxtaposition with spaces between them, bridging the spaces between the containers with track extensions, shifting
55 other containers over the tracks and track extensions secured to the tops of the containers at a lower level.

In witness whereof, I have hereunto signed my name.

60 MARSHALL OLDS.