

May 31, 1960

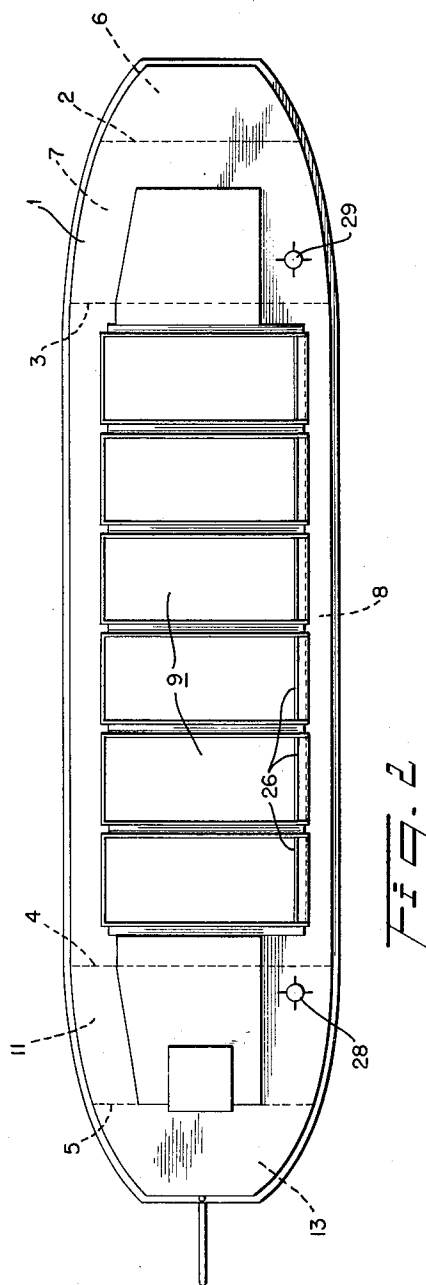
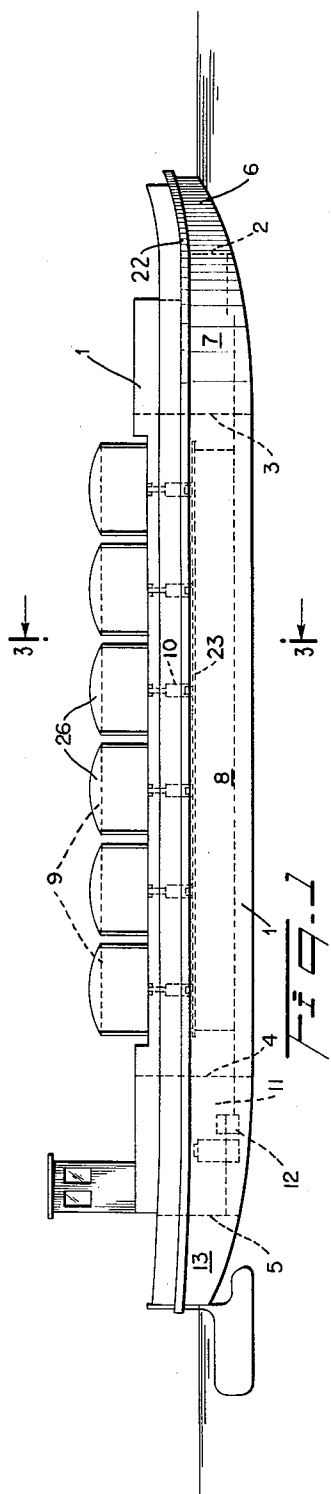
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VESSEL WITH INDIVIDUALLY DUMPABLE CONTAINERS FOR BULK MATERIAL

Filed April 26, 1956

2 Sheets-Sheet 1



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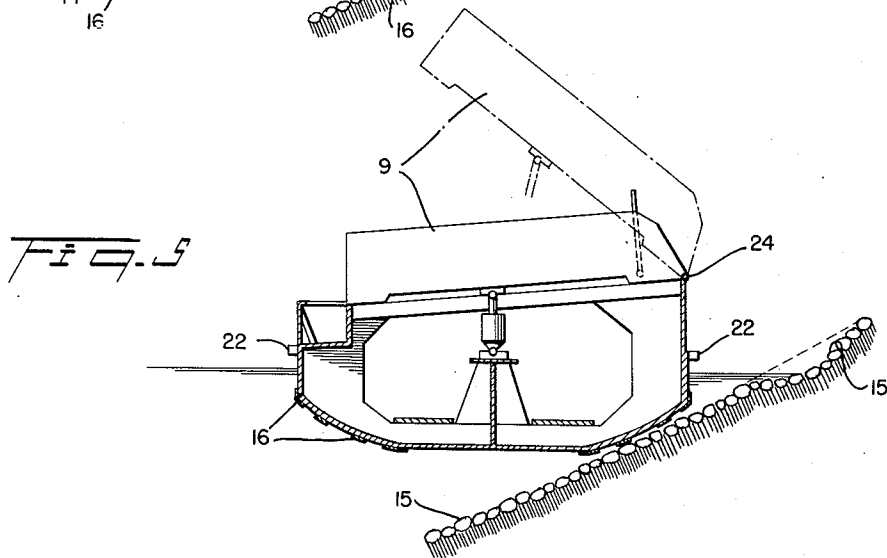
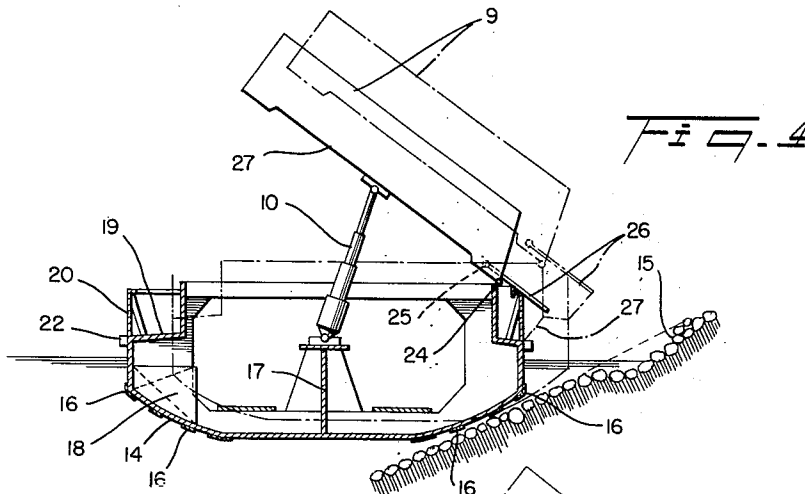
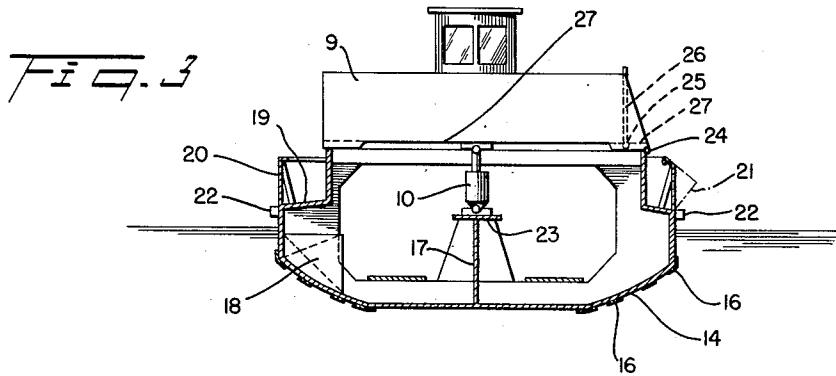
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VESSEL WITH INDIVIDUALLY DUMPABLE CONTAINERS FOR BULK MATERIAL

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5 Claims. (Cl. 114—32)

This invention relates to vessels and more particularly to a vessel with individually dumpable containers for bulk materials.

Building materials required for water construction work can in most cases not be brought up to the site by land, because such building sites are generally remote from the ordinary land routes. As a rule the building material must therefore be brought right up to the site by water craft. Where the building sites lie deep enough under water side-dump scows are used, which make possible a simple and economic discharge of the cargo. But if the construction is to be built up just under water, or at the height of the water level or higher, building pontoons must be used from which the cargo of building material has to be discharged by means of grab cranes, belt conveyors or by hand-drawn barrows. These methods are disadvantageous because they take much time, increase the risk of accidents and are expensive.

A principal object of the present invention is the elimination of the aforementioned disadvantages for such a water craft.

According to the invention the vessel is provided with several individual cargo containers, tiltable outwardly and are arranged above the water-line over the upper deck in a single row in a fore-and-aft direction. The cargo containers are fitted with hydraulic tipping or tilting devices, for dumping each container individually, such as are known and used in freight car construction. To drive the hydraulic tipping devices required for the tilting or dumping process there is provided, at a suitable point on the vessel a Diesel engine with hydraulic pump means.

Usually when using tipping cargo devices on freight cars there is no problem as to the stability of the whole plant. However, with floating vessels very special attention must be paid to the stability of the floating hull. In order to obtain favorable or desired deposition of the building materials the loads must be stored as high as possible. As a consequence, during the tipping process the building material at times exerts a heavy one-sided list moment on the hull of the vessel. All questions as to the choice of dimensions and of the whole setup must be considered in the first place from the point of view of the stability of the hull of the vessel. Therefore as a rule the whole cargo should not be tipped or dumped in one single working operation, otherwise the stability of the vessel would thereby be seriously endangered. Moreover the machinery plant for carrying out the dumping would have to be far too big.

According to the present invention the whole cargo is divided up into a number of individual loads that are dumped separately. The hydraulic units, jacks and, if need be, even the dumpable containers may to a great extent be of the types used in freight car construction, so as to ensure safe working conditions and a simple and cheap construction due to standardization. The dumpable containers can be made interchangeable if there are several vessels of the same kind and size, in order to reduce the turn-about time of the vessels. Finally, the whole plant can be so arranged as to allow dumping to starboard or to port, as may be needed.

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Other features and advantages of the vessel in accordance with the invention will be better understood as described in the following specification and appended claims in conjunction with the following drawings in which:

Fig. 1 is a side view of a vessel provided with individually dumpable cargo containers according to the invention,

Fig. 2 is a plan view of the vessel of Fig. 1,

Fig. 3 is a sectional view taken along section line 3—3 of Fig. 1,

Fig. 4 is a sectional view as in Fig. 3 illustrating a dumpable container in position for dumping the load thereof,

Fig. 5 is a sectional view of a different embodiment of the vessel without a starboard walkway and illustrates the manner in which the vessel can be positioned relative construction being carried on and illustrates the dumping of a container as in Fig. 4.

In order to illustrate the invention an example of a vessel embodying it is shown in the drawings. This vessel has a carrying capacity of from sixty to seventy tons.

According to the drawings the vessel has a hull 1 whose dimensions are as follows:

	M.
Length	abt. 25.00
Breadth	abt. 6.10
Moulded depth	abt. 1.55
Draft when loaded	abt. 1.15

The hull 1, similar to the type of deck pontoon used in water construction work, is made of steel. It is provided with four transverse bulkheads 2, 3, 4, 5 dividing the vessel into five compartments of which the front or forward compartment 6 provides storage for the bow anchor chains and the next compartment 7 serves as quarters for the crew. The next compartment 8, below a plurality of dumpable containers 9, is long and easy of passage. This compartment houses hydraulic jacks 10 for individually dumping the containers 9 as hereinafter described, and the following compartment 11 has hydraulic pump units 12 for operating the jacks 10. The pump 12 is connected by conduits, not shown, to the jacks 10 in an arrangement permitting individual operation of each jack in known manner. A stern compartment 13 provides storage space for the ship's inventory. The hull (Figs. 3-5) is provided with flattened bilges 14, adapted approximately to the inclination, in this instance 1:2, of the embankment 15 to be served. As the vessel of this type construction will touch down with its starboard side on the stone edge, the flat bilge is stiffened or protected by longitudinal members 16 such as half-round iron, and if necessary, also by a covering of oak. Under each of the cargo containers are provided strong web frames, not shown. The jacks stand on a center girder 17, which is provided with a top plate 23 and other local stiffening members, not shown.

On the port side is provided a water ballast tank 18 with a capacity of about eight tons of water. By filling this tank it is possible to reduce the vessel's list when dumping the cargo while the vessel is floating free of the embankment. Thus without ballast tank 18 the list of the vessel is about 6° and with the ballast tank 18, the list is about half of that, 3°. If the pontoon is to be able to dump cargo to both sides, another tank, such as tank 18, not shown, is provided on the opposite side.

With the help of the water ballast it is possible to bring the starboard side of the pontoon or vessel higher up onto the embankment, so that the bulk material can be discharged at the desired spot. Moreover such a favor-

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able position can be attained by successive discharging of the containers as may be seen on the lower righthand side of Fig. 4 in which the dotted line position represents the state or position of the vessel after the discharging of four containers.

The cargo containers 9, are built of steel for bulk cargo and rest on the strong superstructure strengthened locally by the web frames already mentioned. The hull is provided on both sides with walkways 19 having strong guard bulwarks 20. The bulwark on the starboard side also serves as a support for a chute of the cargo container when it is inclined as hereafter described. Another hinged support 21 rests on a side wall 22.

In the drawing the containers are shown as being able to dump their load over the starboard side. The individual cargo containers are inclinable about pivot means 24 and discharge their contents over the flap surface 26 that is lowered over the pivot means 25 and serves as a chute. The opened flap 26 thereby covers walkway 19. The pivots 24 are constructed to be removable to allow the containers to be removed and made interchangeable.

As it is generally desirable to dump the building material onto as high a point as possible, the pivot point must on the one hand be as high as possible, on a high superstructure, and on the other hand as near to the side of the hull as possible. Therefore the starboard side of the superstructure is disposed closer to the starboard side of the hull than is the case on the port side. If it is desired to do without the starboard walkway a further improvement is possible by placing the pivot point still closer to the side of the hull and at the same time having the cargo container higher and on an inclined plane in the manner shown in Fig. 5.

Since the vessel, when underway, must be on an even keel in spite of the unsymmetrical arrangement of the cargo containers, the containers have, on the starboard side, the flap 26 disposed symmetrical with the opposite end relative to the fore-and-aft axis and not at the extremity of the container floor 27, which is asymmetrical to the amidships plane. The free portion of the floor 27 serves, for example, on the starboard side, only as a slide plane or surface.

The dumping operation of the containers is effected in the well-known way hydraulically with individual respective presses 10 connected to the pump unit 12 in such a manner that the presses are individually operable.

As indicated heretofore the containers are removably mounted to permit interchangeability of the containers. The pump unit 12 is diesel driven and the diesel engine is usable for propelling the vessel rendering possible an increase in the economy of operation of the vessel.

On deck the vessel has the same equipment as is usually found on a pontoon. Aft there is a warping drum 28, hydraulically driven by the pump unit 12 through means and connections not shown. With this warping drum and a rotatable forward pulley 29, or with winches, not shown, erected forward-and-aft, it is possible, for example, to bring the vessel or pontoon right up to the point at which the work is to be done, and also to warp it during the dumping operation and between dumping operations.

It will be understood by those skilled in the art that the vessel is suitable for use on both inland and sea waterways. While a preferred embodiment of the invention has been shown and described, it will be understood that many modifications and changes can be made within the scope of the invention.

What I claim is:

1. In a vessel to transport and dump bulk material, in combination, a plurality of alike individually dumpable containers aligned in a single row along the fore-and-aft axis of the vessel and each disposed extending symmetrically transversely thereof and above the water-line when the vessel is fully loaded, means forming a

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pivot axis for one end of each of said containers adjacent a side of the vessel to which the containers are to be dumped, and means for individually and successively tilting said containers about said pivot axis thereby to individually dump said containers.

2. In a vessel to transport and dump bulk material, in combination, a plurality of alike interchangeable individually dumpable containers aligned in a single row along the fore-and-aft axis of the vessel and each disposed extending symmetrically transversely thereof and above the water-line when the vessel is fully loaded, means forming a pivot axis for one end of each of said containers adjacent a side of the vessel to which the containers are to be dumped, means removably mounting the containers individually thereby to allow interchanging the containers, and means for individually and successively tilting said containers about said pivot axis thereby to individually dump said containers.

3. In a vessel to transport and dump bulk material, in combination, a plurality of alike individually dumpable containers aligned in a single row along the fore-and-aft axis of the vessel and each disposed extending symmetrically transversely thereof and above the water-line when the vessel is fully loaded, means forming a pivot axis for one end of each of said containers adjacent a side of the vessel to which the containers are to be dumped, each container being mounted so that the end thereof adjacent the pivot axis is disposed on a higher plane than the opposite side end thereof, and means for individually and successively tilting said containers about said pivot axis thereby to individually dump said containers.

4. In a vessel to transport and dump bulk material, in combination a plurality of individually dumpable containers aligned in a row along the fore-and-aft axis of the vessel and each disposed transversely thereof and above the water-line when the vessel is fully loaded, means forming a pivot axis for one end of each of said containers adjacent a side of the vessel to which the containers are to be dumped, means for individually and successively tilting said containers about said pivot axis thereby to individually dump said containers, and said vessel having a hull provided with ballast tanks to take on board ballast and disposed to compensate for a change of position of the center of buoyancy of the vessel when dumping the containers thereby to minimize heeling of the vessel during dumping operations.

5. In a vessel to transport and dump bulk material, in combination, a plurality of individually dumpable containers aligned in a single row along the fore-and-aft axis of the vessel and each disposed extending symmetrically transversely thereof and above the water-line when the vessel is fully loaded, means forming a pivot axis for one end of each of said containers adjacent a side of the vessel to which the containers are to be dumped, means for individually and successively tilting said containers about said pivot axis thereby to individually dump said containers, and said vessel having a hull provided with substantially flat bilges and a substantially flat bottom thereby to allow the vessel to move into shallow waters and closely adjacent a point to where the bulk material is to be dumped.

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