June 9, 1931. H. W. PETERSON 1,808,862

UNLOADING DEVICE

Filed March 7. 1929 3 Sheets-Sheet 1

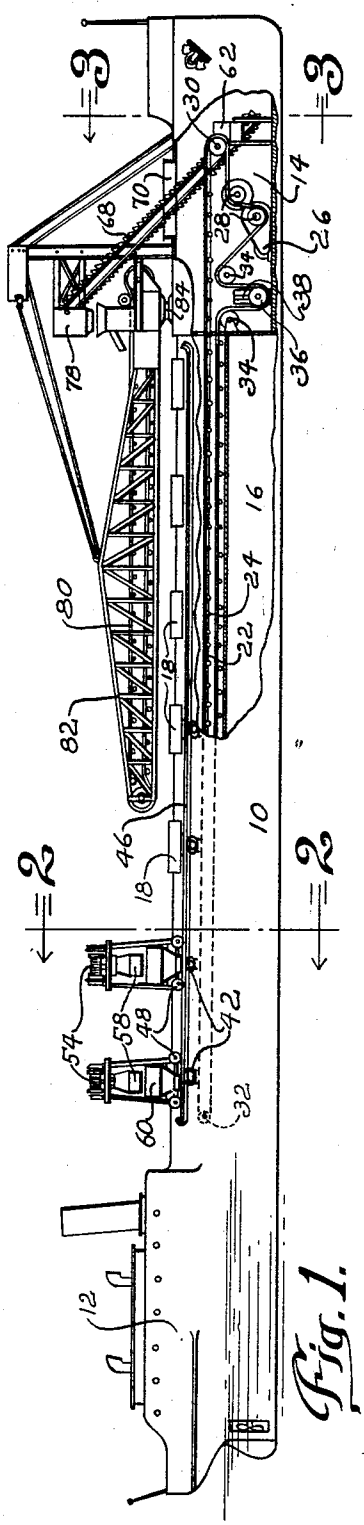


Fig. 1.

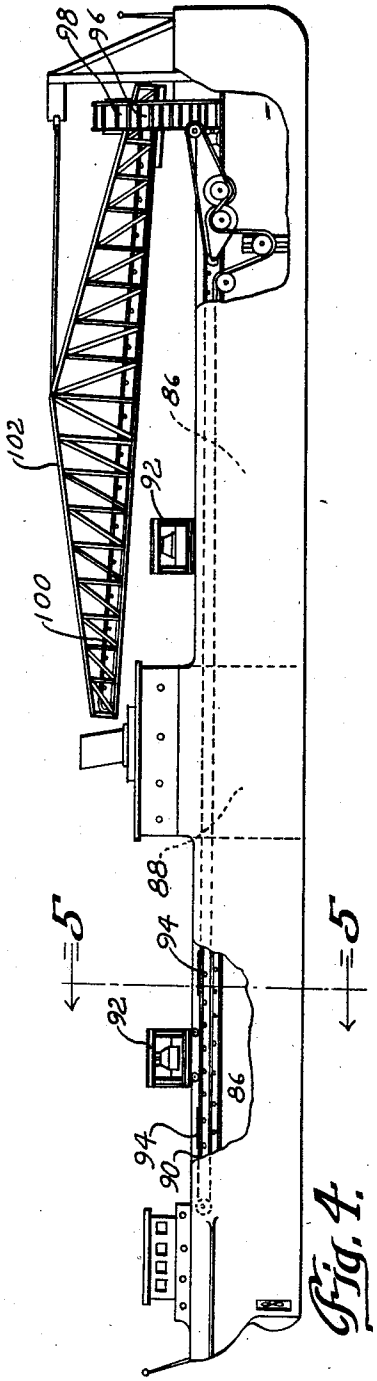


Fig. 4.

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Filed March 7, 1929 3 Sheets-Sheet 2

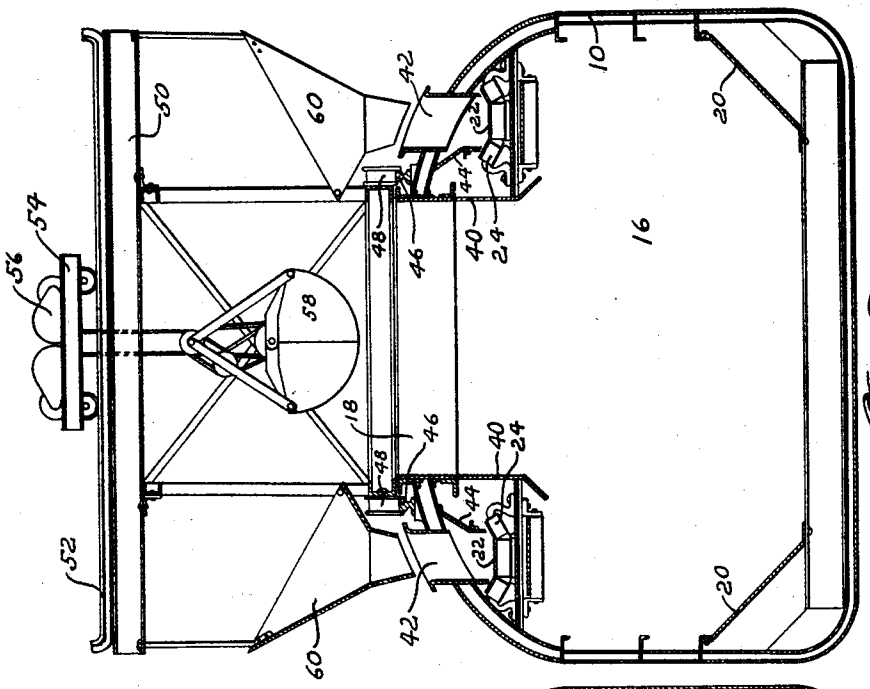


Fig. 2.

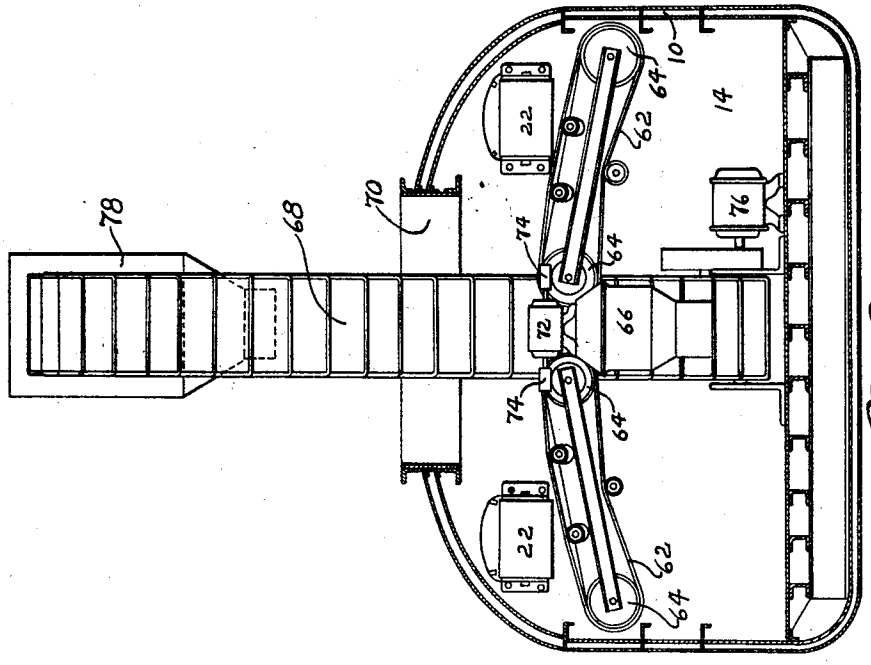


Fig. 3.

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UNLOADING DEVICE

Filed March 7, 1929 3 Sheets-Sheet 3

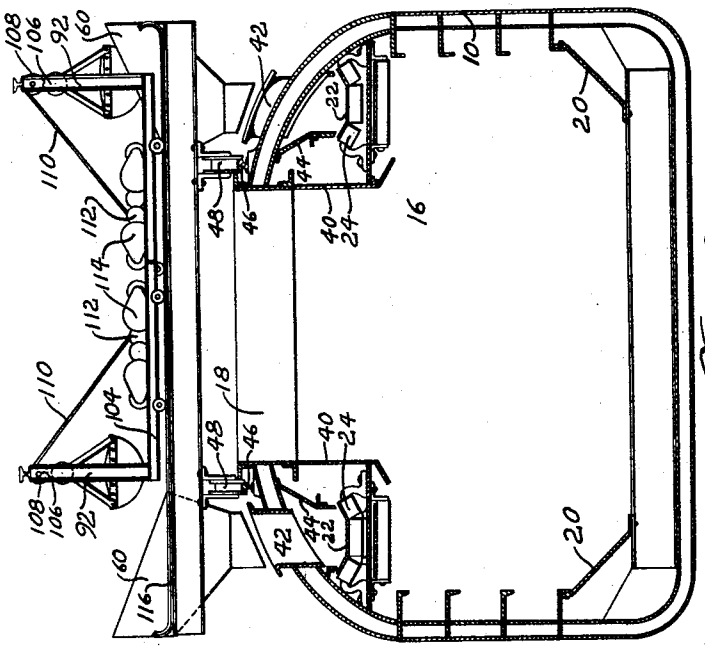


Fig. 6.

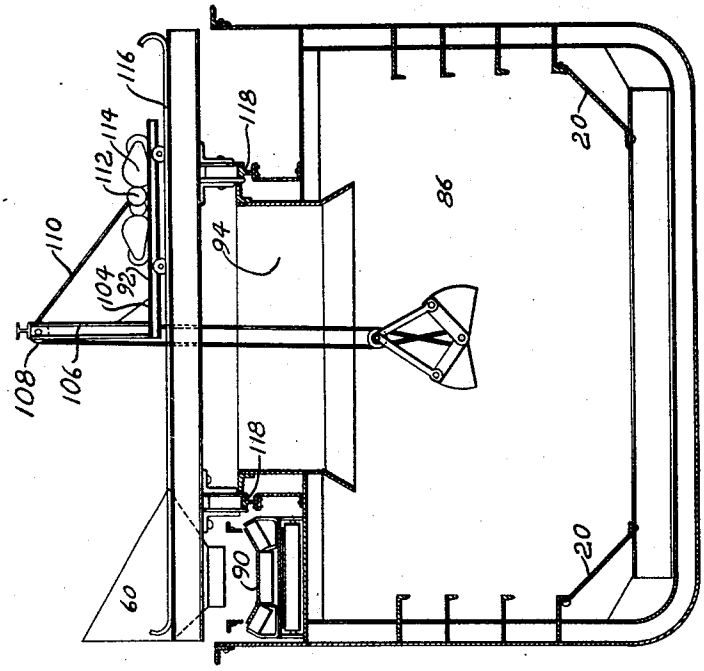


Fig. 5.

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UNITED STATES PATENT OFFICE

HARRY W. PETERSON, OF DETROIT, MICHIGAN

UNLOADING DEVICE

Application filed March 7, 1929. Serial No. 344,943.

This invention relates to the arrangement of equipment and to a novel method for unloading freight boats.

The invention has been illustrated as embodied in self-unloading freighters using the equipment to convert old vessels into self-unloading freighters.

Heretofore longitudinal tunnels built into the bottom of the regular hold have been provided for conveying the material to a boom, which discharges the material from the boat. However, these constructions are expensive and the carrying capacity of the ship has been materially reduced and the expense in reconstructing the ship is prohibitive.

It is an important object of this invention to provide suitable conveying means in the upper portion of the hold for conveying the material to a boom, thereby increasing the capacity of the hold and improving the efficiency of the ship.

Another object of the invention is to arrange the conveying means in the upper corner of the hold and deliver the material to be removed to the conveyor by means of a plurality of cranes movable longitudinally on the deck of the ship.

More specifically stated, the invention consists in removing the material through hatches in the deck of a ship by means of cranes, dumping the material into hoppers movable with the cranes, discharging the material through the hopper into other hatches at the side of the ship onto a continuously moving longitudinal conveyor. The material is then carried to one end of the ship where it is delivered to transverse conveyors, which deliver the material into a centrally located elevating conveyor, which in turn delivers the material into a boom adapted to convey the material from the ship to the dock.

Other objects and advantages of the invention will more fully appear from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of a ship of the whaleback type illustrating an application of my invention, parts being broken away and in section.

Fig. 2 is a sectional view on line 2—2 of Fig. 1.

Fig. 3 is a sectional view on line 3—3 of Fig. 1.

Fig. 4 is a side elevation showing a modification of my invention, in which an engine room is located in the center of the boat, parts being broken away and in section.

Fig. 5 is a sectional view on line 5—5 of Fig. 4.

Fig. 6 is a view similar to Fig. 2, showing a modification of the crane.

Referring to the drawings and particularly Figs. 1, 2 and 3, the reference numeral 10 designates a ship of the whaleback type having an engine compartment 12 and a compartment 14 for the driving mechanism of my improved equipment. The major portion of the ship is provided with a hold 16, which receives material, such as grain, sand, gravel, coal, etc., through hatches 18. At the bottom of the hold adjacent the outer corners I have provided plates 20 at an angle of approximately 45 degrees, which serve to keep the material from remaining in the corners and directly to the center of the ship. Adjacent the upper outer corners of the hold I have provided a continuously traveling conveyor 22 in the form of a belt riding on rollers 24. The belt runs longitudinally of the ship from one end of the hold to the other. In Fig. 2 I have shown a conveyor on each side of the ship to increase the unloading capacity, but it is to be understood that only one such conveyor may be used and that in the following only one conveyor will be described as both conveyors are identical.

As a means for driving the belt I have shown a motor 26 driving a pair of pulleys 28 over which the belt travels. Pulleys 30 and 32 are located at the opposite ends of the conveyor and idler pulleys 34 have been provided, between which is located a third idler pulley 36 movable in a vertical position through slots 38 to maintain a tight belt at all times, it being understood that the weight of the pulley 36 takes up the slack in the belt. The conveyors have been arranged at the sides of the ship and do not extend into the region of the central hatches 18, and plates

40 prevent the material from coming in contact with the conveying mechanism.

At the outer edges of the deck I have provided hatches 42, directly over the conveyor 22, adapted to deliver material to the conveyor. Skirt boards 44 have been provided between the conveyor 22 and the under surface of the deck to confine the material within the region of the conveyor.

Longitudinal tracks 46 have been provided on the upper surface of the deck to receive a suitable crane mechanism, which may be moved forward or aft of the ship. Each crane consists of a frame work having wheels 48 for engagement with the track 46. As shown in Fig. 2, an upper beam 50 carries another pair of track members 52, which receive a lifting device 54. Suitable driving mechanism is shown at 56 adapted to raise or lower a bucket 58. A hopper 60 is arranged on the frame work of the crane and is movable therewith.

At the forward end of the conveyors 22 I have provided transverse conveyors 62, which are also shown in the form of endless belts around pulleys 64. These conveyors are adapted to deliver the material from the conveyors 22 to the central portion of the ship and deliver the material into a central hopper 66. The hopper 66 delivers the material into a bucket conveyor 68, which conveys the material above the deck of the ship through a hatch 70.

A suitable drive for the transverse conveyors 62 has been diagrammatically illustrated as at 72, consisting of oppositely disposed worm gears 74 driving the inner pulleys 64 of the conveyors 62. The drive for the bucket conveyor is illustrated as at 76.

The material from the hopper 66 is delivered into the bucket conveyor 68, which delivers the material to a hopper 78 and from there the material is delivered to an endless belt conveyor 80 on a swinging boom 82. It will be understood that the boom 82 is pivoted as at 84 and may be swung over either side of the ship to convey the material to a dock or wherever it is to be deposited.

Referring now to Figs. 4 and 5 wherein I have illustrated my invention as applied to another type of ship, in which I have shown two holds 86 and an engine compartment 88 between the two holds 86. In this type of ship it is practically impossible to equip the same with internal longitudinal conveyors.

In this form of my invention I have provided an endless belt 90 on the deck of the ship and cranes 92 have been arranged at the opposite ends of the engine compartment 88. These cranes 92 convey the material from the hold 86, through hatches 94 and deliver it to the endless belt conveyor 90. The material is then delivered to a transverse conveyor 96, from there to a hopper 98, where it is delivered onto an endless belt conveyor 100 on a swinging boom 102. In this construction the capacity of the ship is maintained due to the fact that all of the conveying mechanism is outside of the holds and it is unnecessary to reconstruct the ship to accommodate the self-unloading device. In both of the installations as shown in Figs. 1 and 4, the parts have been so arranged that the hoppers, conveyor and mechanism may be cleaned and inspected regardless of whether the ship is loaded or not. The objection of re-claiming the conveyors below the cargo has been eliminated.

Referring particularly to Figs. 5 and 6, I have illustrated a modified form of crane in which the height thereof has been reduced to prevent listing of the ship. In this form of crane a frame work 104 is provided with an upright 106 adapted to receive a pulley 108 at its upper end, over which rides the cable 110, wound on drum 112, and driven through suitable gearing and drive 114. The crane 92 is movable transversely of the ship on tracks 116, which are movable longitudinally on tracks 118 on the deck of the ship. In Fig. 5 I have shown a conveyor 90 at one side of the ship, whereas in Fig. 6 I have illustrated a pair of conveyors, one at the opposite sides of the ship, and have arranged the cranes in opposite directions so that one crane operates to deliver the material from the hold to one of the conveyors and another crane, as shown in Fig. 6, at the rear of the first mentioned crane, delivers the material to the conveyor at the opposite side of the ship. It will be understood that a plurality of these cranes may be provided on the deck of the ship, arranged in opposite directions so that every other crane delivers the material to one side of the ship, thus balancing the ship and preventing too much material being delivered at one spot on a conveyor as might occur if all the cranes delivered the material to the conveyor at one time.

It will be obvious that the application and arrangement of parts in carrying out the system of my improved construction maintains the rated capacity of the ship, improves the efficiency of the ship at lower maintenance and is simple in its application.

Various changes, including the size, shape and location of parts, may be made without departing from the spirit of my invention and it is not my intention to limit its scope other than by the terms of the appended claims.

What I claim is:

1. In a freight boat including a hull having a deck substantially inclosing the top thereof, a plurality of longitudinally spaced filling hatches located at the central portions of said deck, a longitudinally extending substantially horizontal platform in said hull having outer edge portions supported by the side thereof, supporting structure de-

pending from said deck for supporting the inner edge portions of said platform independently of the floor of said hull, a longitudinal conveyor mounted on said platform extending substantially from one end to the other end of said hull, a plurality of aligned small hatches extending through said deck, each located in related proximity to one of said filling hatches and in registration with said conveyor, means for removing material from said filling hatches and discharging the same through said small hatches upon said conveyor; and elevating conveying mechanism at the discharge end of said conveyor for receiving material therefrom.

2. In a freight boat including a hull having a deck substantially inclosing the top thereof, a plurality of longitudinally spaced filling hatches located at the central portions of said deck, a longitudinally extending substantialy horizontal platform in said hull having outer edge portions supported by the side thereof, supporting structure depending from said deck for supporting the inner edge portions of said platform independently of the floor of said hull, a longitudinal conveyor mounted on said platform extending substantially from one end to the other end of said hull, a plurality of aligned small hatches extending through said deck, each located in related proximity to one of said filling hatches and in registration with said conveyor, tracks on the upper side of said deck extending longitudinally thereof, a frame extending transversely of said deck having rollers seated upon said tracks and adapted to travel longitudinally of said deck, a hopper mounted on said frame having a discharge end located in alignment with said small hatches and adapted to be registered therewith, bucket excavating mechanism shiftably mounted on said frame for transferring material from said hull to said longitudinal conveyor and located with respect to said hopper so as to register with a filling hatch when the hopper is in registration with the corresponding small hatch, and elevating conveying mechanism at the discharge end of said conveyor for receiving material therefrom.

HARRY W. PETERSON.