United States Patent

Ponsen

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[54] DOCK SIDE CARGO HANDLING APPARATUS

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[73] Assignee: **Colin Craig,** Westminster, Calif. ; a part interest

[22] Filed: **July 15, 1970**

[21] Appl. No.: **54,907**

Related U.S. Application Data

[60] Division of Ser. No. 812,537, March 12, 1969, Pat. No. 3,543,953, which is a continuation of Ser. No. 754,175, Aug. 21, 1968, abandoned.

[52] **U.S. Cl.** **214/14,** 212/16

[51] **Int. Cl.** **B63b 27/10**

[58] **Field of Search** ..... 214/14, 1 S, 1 B, 15 C, 15 D, 214/15 E; 212/13–15

[56] **References Cited**

UNITED STATES PATENTS

1,327,071	1/1920	Taylor	214/38.42 X
1,207,226	12/1916	Schilling	212/15 X
749,860	1/1904	Harding	214/14
3,091,188	5/1963	Graham	214/14 X

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[57] **ABSTRACT**

Cargo handling apparatus for transferring cargo between a cargo-receiving area on a dock and the hold of a ship moored alongside such dock. The apparatus includes a frame carried on mount means disposed on the dock and formed with a boom projecting outwardly over the side of the dock and over the hold of the ship. An endless track is carried from the frame and is formed with a pair of turned back loops connected together by a pair of coextensive side portions, one of the side portions projecting over the cargo-receiving area and one of the loops projecting over the hold. The other side portion of the pair of side portions cooperates with the other loop of the pair of loops to form a return from the one loop to the one side portion. A plurality of trolley devices are mounted on the track and carry respective hoists having cargo engaging means suspended therefrom. Operator platforms are carried from the respective trolleys and control means is provided so the operators can move the trolleys into position on the loop disposed over such hold and the respective hoists actuated to lower the load engaging means into such hold to retrieve cargo from the hold and then advance the trolleys over the return and onto the one side portion for lowering the cargo retrieved onto the load-receiving area.

6 Claims, 8 Drawing Figures

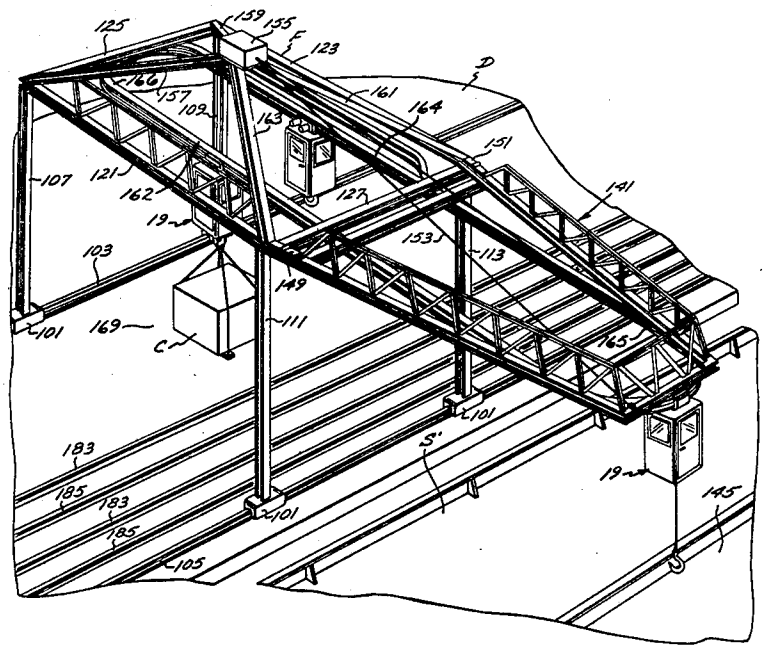


FIG. 1

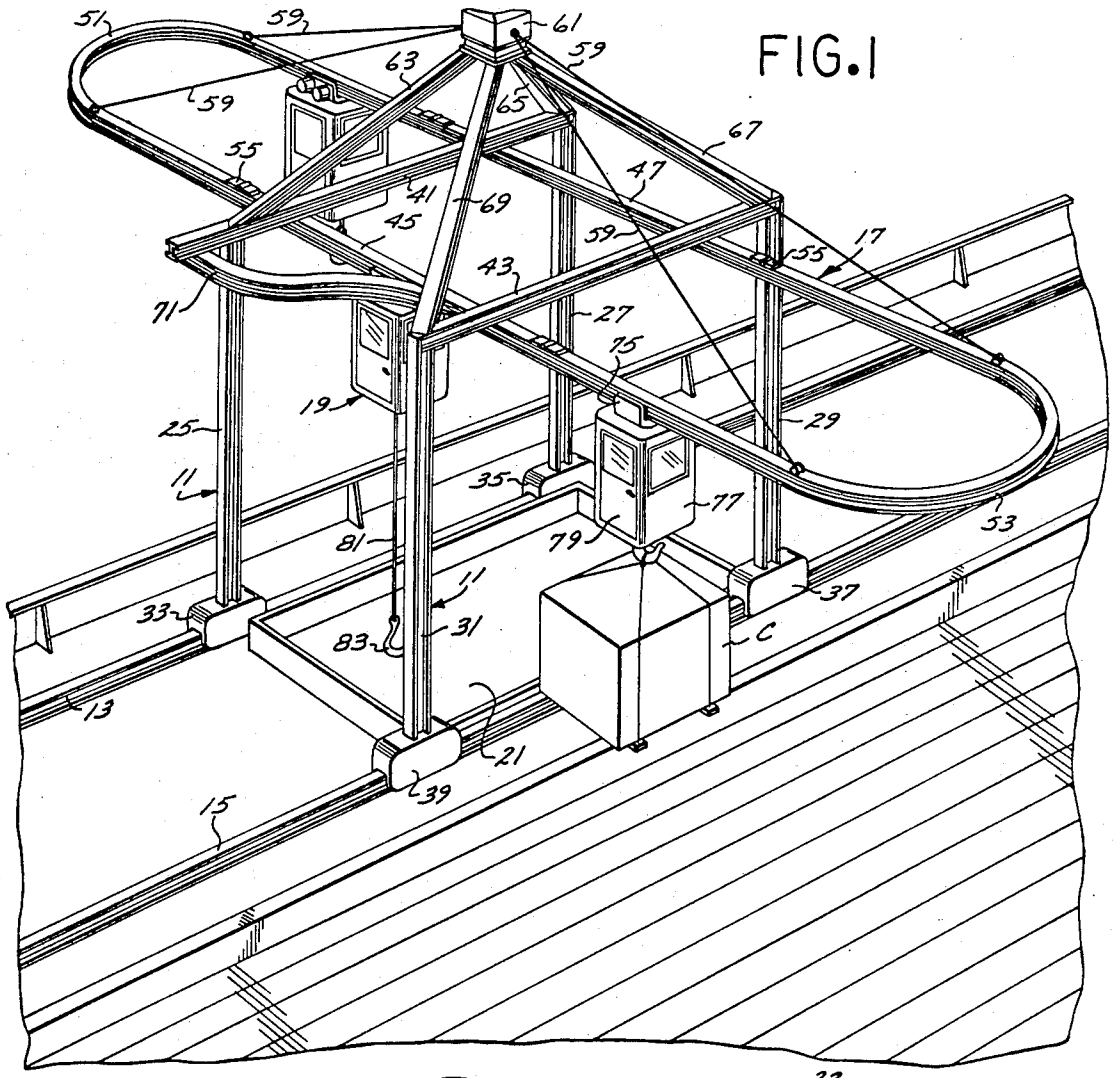
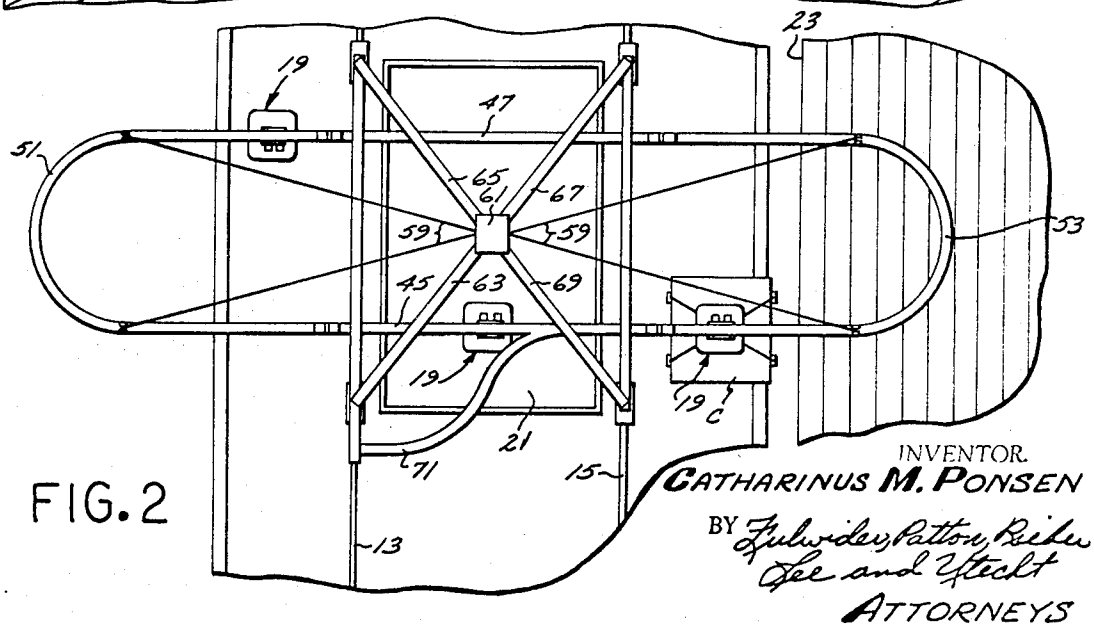


FIG. 2



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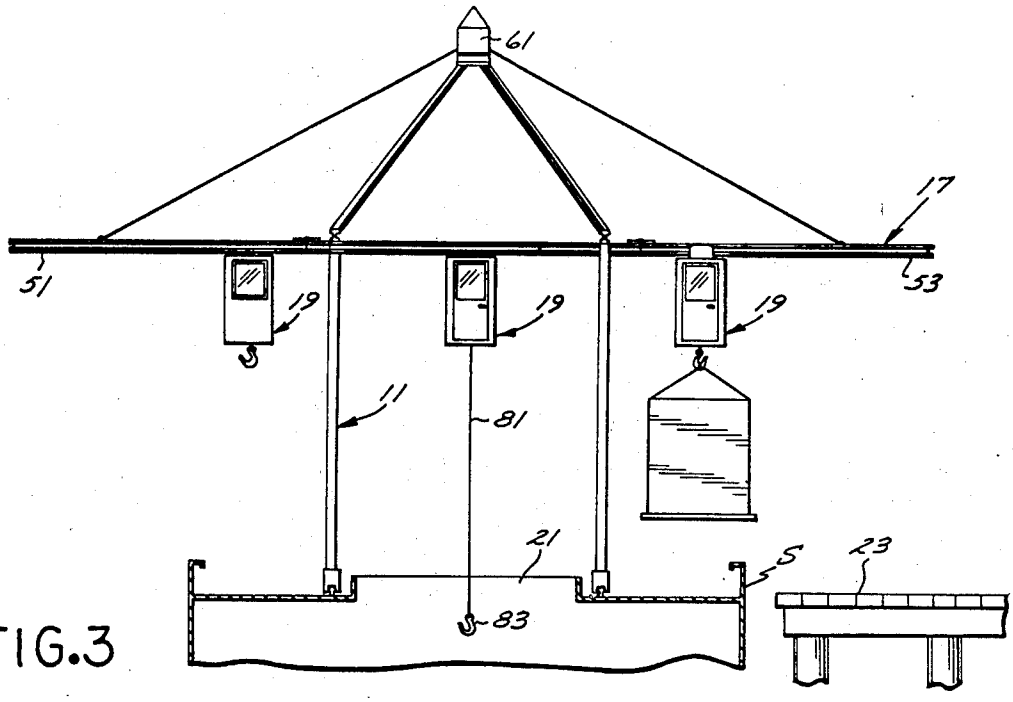


FIG.3

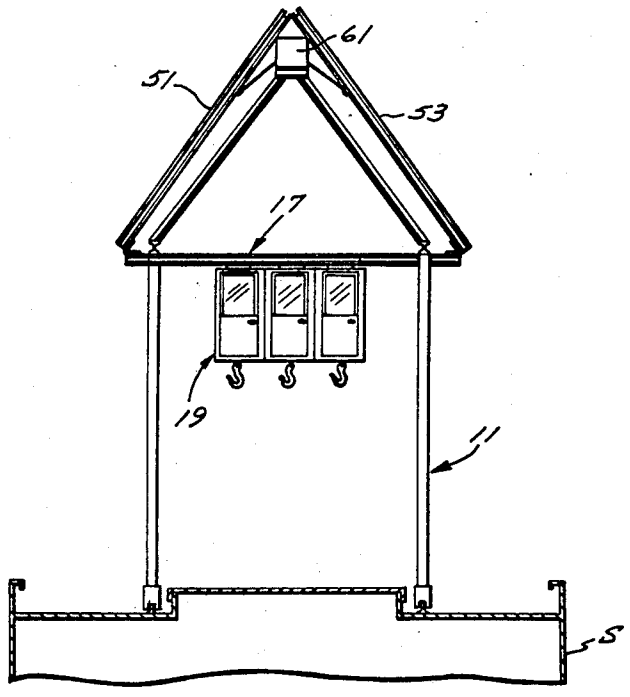


FIG.4

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FIG. 5

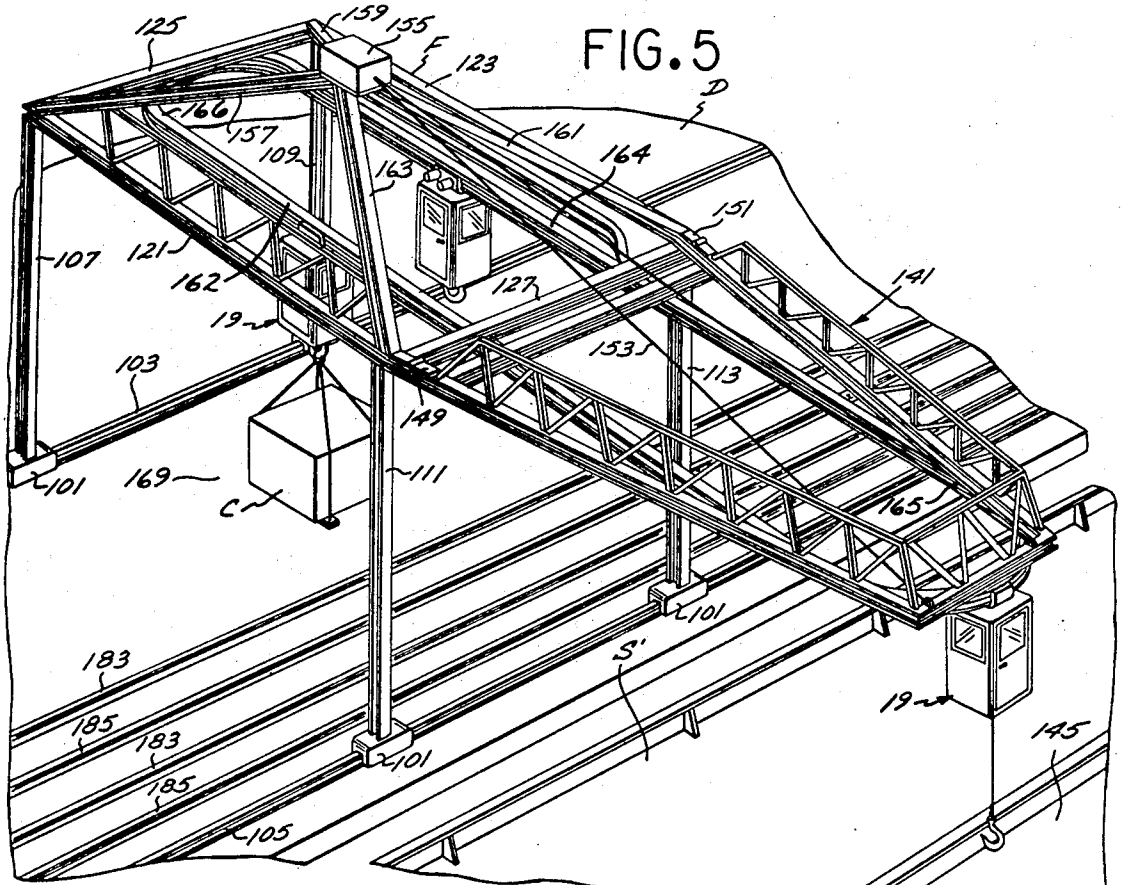
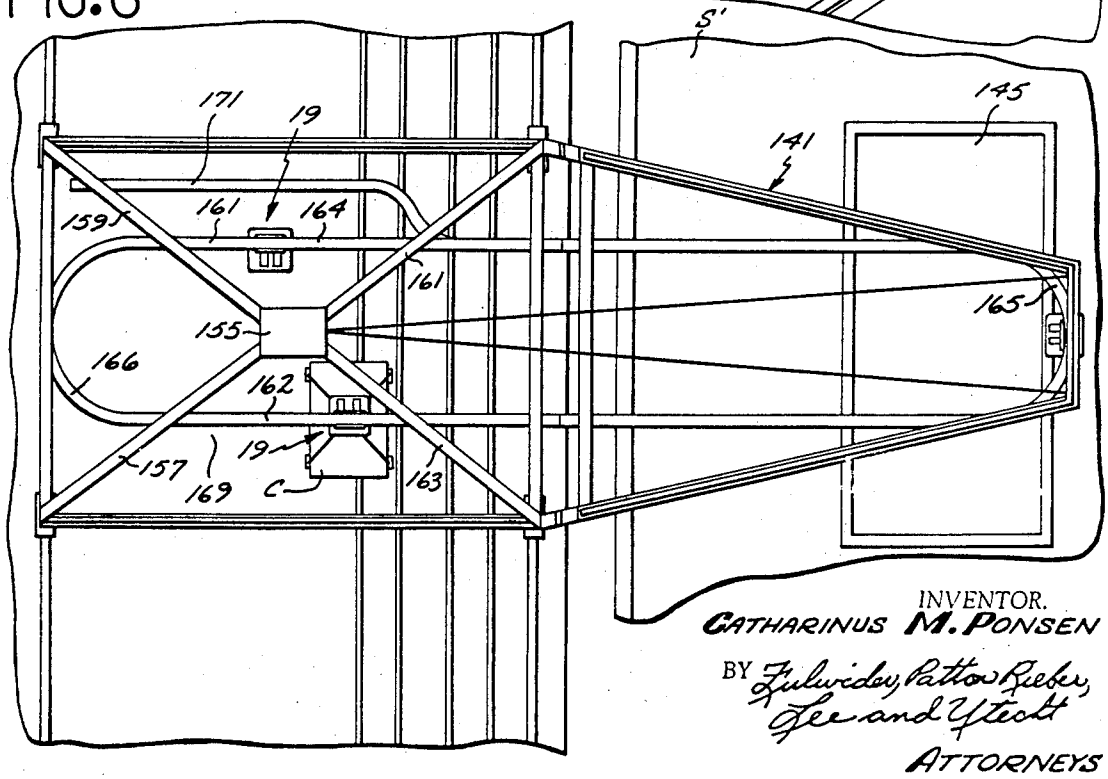


FIG. 6

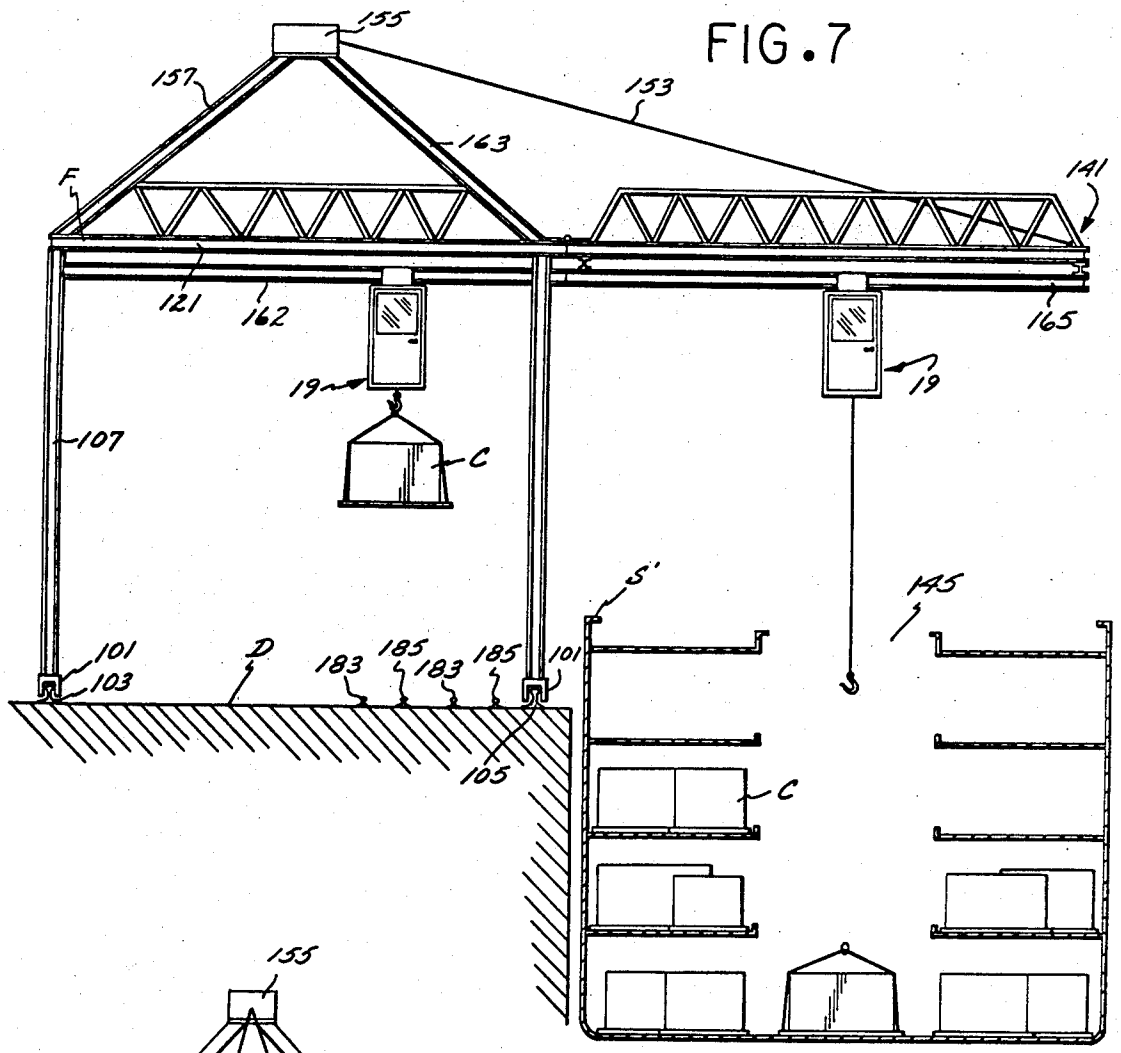


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FIG. 7



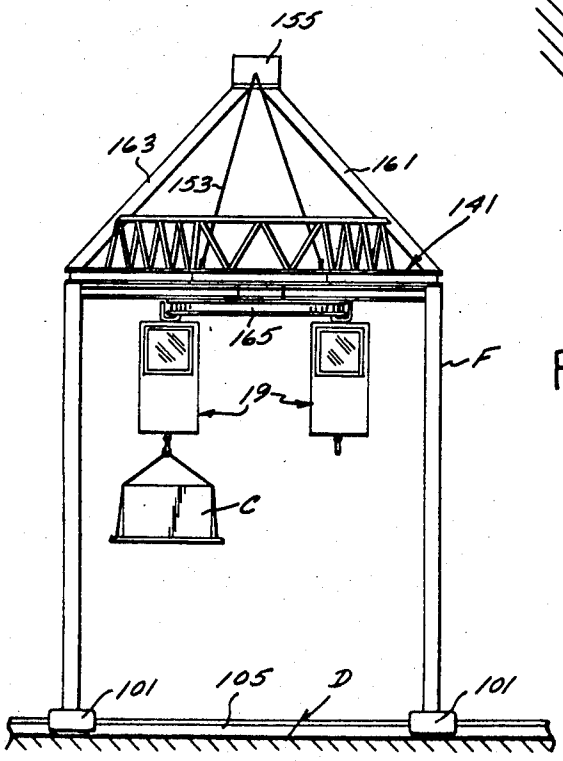


FIG. 8

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DOCK SIDE CARGO HANDLING APPARATUS

CROSS REFERENCES TO RELATED APPLICATIONS

This application is a divisional application of U.S. application Ser. No. 812,537, filed Mar. 12, 1969 now U.S. Pat. No. 3,543,953 which, in turn, was a continuation-in-part of Ser. No. 754,175, filed Aug. 21, 1968 now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The cargo handling apparatus of present invention relates to a dock mounted device for loading and unloading cargo ships.

2. Description of the Prior Art

It has been common practice to provide cargo ships with cargo handling booms which unload cargo from the hold of a ship and dispose it on a dock or, alternatively, receive cargo from the dock and dispose it within the hold of the ship. Cargo handling mechanisms of this type have proven rather cumbersome, unwieldy, and inefficient since it is impractical to have any number of booms working on one hatchway. In an attempt to overcome disadvantages of the aforedescribed booms, hoists carried on tracks which extend over the hatchway and project over the dock have been proposed. A device of this type is shown in U.S. Pat. No. 1,327,071. Such devices suffer the shortcoming of being inefficient because only one hoist can be utilized at any one time.

Other cargo handling devices have been proposed which incorporate an endless track mounted on a barge for disposition alongside a moored ship to transfer cargo therefrom and onto the adjacent dock. A device of this type is shown in U.S. Pat. No. 749,860. Devices of this type are inacceptable for the relatively heavy cargo normally transported by ships because of the relatively large barges that would be required to provide the stability necessary for operation of the device.

SUMMARY OF THE INVENTION

The present invention is characterized by an endless track supported from a dock and formed with a first portion projecting over a load-receiving area and a second portion projecting beyond the edge of the dock and over the hold of a ship moored at such dock. A plurality of trolleys are carried on the endless track and have operator compartments suspended therefrom. Hoists are also carried by the trolleys and have load engaging means for being lowered into the hold of the ship to retrieve cargo therefrom whereby the operators riding on the platforms may sequentially advance such hoist over the hold to retrieve cargo therefrom and then convey such trolleys sequentially to the cargo-receiving area for depositing the cargo retrieved.

The objects and advantages of the present invention will become apparent from a consideration of the following detailed description when taken in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partial perspective view of a cargo handling apparatus embodying the present invention;

FIG. 2 is a top view, in reduced scale, of the cargo handling apparatus shown in FIG. 1;

FIG. 3 is a front view of the cargo handling apparatus shown in FIG. 1;

FIG. 4 is a front view similar to FIG. 3 and showing the track folded on itself;

FIG. 5 is a perspective view of a second embodiment of the cargo handling apparatus of present invention;

FIG. 6 is a top plan view of the cargo handling apparatus shown in FIG. 5;

FIG. 7 is an elevational side view of the cargo handling apparatus shown in FIG. 5; and

FIG. 8 is an elevational front view of the cargo handling apparatus shown in FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The embodiment of the cargo handling apparatus shown in FIG. 1 includes a frame, generally designated 11, mounted on a pair of longitudinal rails 13 and 15 and supporting an endless track, generally designated 17. A plurality of hoisting devices, generally designated 19, are carried on a track 17 for sequential movement into position over the hatchway 21 for retrieving cargo C from the hold of the ship S and disposition thereof on the dock 23 (FIGS. 2 and 3) alongside such ship.

The frame 11 includes four corner posts 25, 27, 29 and 31 mounted on individual trucks 33, 35, 37 and 39, respectively. The trucks 33, 35, 37 and 39 have wheels (not shown) which roll on the respective tracks 13 and 15 for convenient movement of the apparatus longitudinally on the deck of the ship S. A pair of longitudinal beams 41 and 43 are supported on top of the posts 25, 27, 29 and 31 and have the endless track 17 supported thereunder.

The track 17 includes two coextensive straight portions 45 and 47 extending transversely over the rails 13 and 15 and further includes a pair of oppositely disposed portions 51 and 53 joining the ends of the portions 45 and 47. The ends of the loop portions 51 and 53 are connected with the straight portions 45 and 47 by means of hinges 55 and the outer ends of such loop portions 51 and 53 are suspended from cables 59 which are connected on their inner ends with winches carried in a housing 61 supported from the frame 11 by means of struts 63, 65, 67, and 69.

A shunt track 71 is carried at the forward end of the frame 11 having its one end disposed adjacent the longitudinal beam 41 for selective receipt of the hoist devices 19 therefrom. A conventional switching mechanism (not shown) is included for selectively pulling the track 71 into position for receiving the hoist devices 19 from the endless track 17 or, alternatively, directing them back onto such track 17.

The hoist devices 19 are suspended from trolleys 75 having rollers received on opposite sides of the track 17 for holding such trolleys captive thereon. Cabs 77 are suspended from the trolleys 75 and include doors 79 for entrance of the operator. Housed within the cabs 77 are controls for manipulating a hoist which raises and lowers cables 81 having cargo-receiving hooks 83 on the bottom ends thereof.

It will be clear that the rails 13 and 15 may extend over several hatchways 21 whereby the cargo handling apparatus may be selectively utilized for unloading car-

goes from several different hatchways. Further, the apparatus may be driven on the rails 13 and 15 by means of electric motors (not shown) which receive power from power lines leading from the ship's generators. Also, the trolleys 75, and hoists receiving the cables 81 may be electrically powered from the ship's generators.

In operation, when the ship S has been maneuvered into position alongside a dock 23, the loop portions 51 and 53 of the track 17 are lowered into the positions shown in FIGS. 1 and 2. This may be accomplished by hydraulic cylinders (not shown) which push the upper extremities of the loop portions 51 and 53 outwardly from their folded position shown in FIG. 4. The cables 59 are then extended by unwinding their respective winches to lower the loop portions 51 and 53 to the positions shown in FIG. 1.

The hoist devices 19 are each individually operated by their own operator and are moved sequentially into position over the hatchway 21 and the respective hooks 83 lowered for receiving cargo C. The cargo C is then raised and the hoisting device 19 moved on around the track 17 under its own power to bring such cargo into position on the dock 23. The cargo C is then lowered onto the dock 23 and the hoisting device 19 will then move back into position over the hatchway 21 for receiving another load of cargo C.

The number of hoist devices 19 being utilized on the track 17 will vary depending on the amount of cargo to be discharged and the rapidity with which the hold crew can ready the cargo C for discharge. Consequently, hoisting devices 19 not being used may be diverted to the shunt track 71 thereby enabling the hoisting devices 19 remaining on the track 17 to sequentially and continuously move into position over the hatchway 21 for receiving cargo C to be disposed on the dock 23. It will be clear that the cargo handling apparatus may likewise be utilized to receive cargo from the dock 23 for disposition in the ship's hold through the hatchway 21.

When the ship has been loaded and is to get under way the frame 11 may be moved to one end of the tracks 13 and 15 and secured. The projecting track portions 51 and 53 will be folded back to the position shown in FIG. 4 to retract them from projection beyond the sides of the ship's hull.

Referring to FIGS. 5 through 8, the cargo handling apparatus shown therein includes two pairs of trucks 101 which are mounted on rails 103 and 105 installed on a dock D and extending longitudinally of a ship S' moored at such dock. The trucks 101 mount a frame F comprising four corner posts 107, 109, 111 and 113. The posts 107, 109, 111 and 113 are secured together on their upper ends by means of a rectangular frame including transverse beams 121 and 123 which are connected together on their opposite ends by longitudinal beams 125 and 127.

A U-shaped boom, generally designated 141, is mounted from one side of the frame F and extends over the hatchway 145 of a ship S'. The U-shaped boom 141 is connected on its inner end to the frame F by means of a pair of hinge assemblies 149 and 151. The free end of the boom 141 is supported by a pair of suspension cables 151 and 153 which are selectively unreeled from a retraction winch housed in a box structure 155 supported centrally over the frame F by means of upwardly and inwardly converging beams 157, 159, 161 and 163.

Suspended beneath the frame F and boom 141 is an endless track including a pair of coextensive side portions 162 and 164 which are connected together on their opposite ends by U-shaped loops 165 and 166, the side portion 162 projecting over a load-receiving area 169 of the dock D, the loop 165 projecting over the hatchway 145 and the portions 164 and 166 forming a return to the load-receiving portion 162.

A shunt track 171 (FIGS. 5 and 6) is provided for shunting unused ones of the hoisting devices 19 off the main track.

Operation of the cargo handling apparatus shown in FIGS. 5 through 8 is substantially the same as that for the device described above except that the boom 141 is lowered into position over the ship S' and the hoisting devices 19 are selectively operated to remove the cargo C from the ship S' or to load such cargo thereonto. When the cargo from one section of the hold has been completed the frame F may be advanced along the tracks 103 and 105 on the trucks 101 to the next hold 145 for removal of the cargo therefrom.

When the cargo transfer is completed the boom 141 is raised to clear the way for the ship S' and for arrival of a different ship. It will be noted that the frame F straddles two pairs of railroad tracks 183 and 185 extending through the load-receiving area 169 whereby the cargo may be transferred directly to or from railroad cars.

From the foregoing, it will be apparent that the cargo handling apparatus of present invention provides means for rapidly loading and unloading cargo from a ship's hold whereby the ship may be rapidly unloaded and re-loaded to avoid the expense of waiting at the dock while conventional inefficient unloading devices are utilized.

Various modifications and changes may be made with regard to the foregoing detailed description without departing from the spirit of the invention.

I claim:

1. Cargo handling apparatus for transferring cargo between a load-receiving area on a dock and the hold of a ship, said apparatus comprising:

mounting means disposed on said dock;

a frame mounted on said mounting means and including a boom projecting beyond the edge of said dock;

an endless track carried solely from said frame and boom and formed with a pair of turned-back loops connected directly together by a pair of coextensive side portions to form a substantially oval track, one of said side portions projecting over said load-receiving area, one of said loops being carried from said boom and projecting over said hold and said other side portion of said pair of side portions cooperating with said other loop of said pair of loops to form a return from said one loop to said one of said side portions;

a plurality of trolley devices mounted on said track;

trolley drive means for driving said trolleys independently around said track;

a plurality of hoists suspended from the respective trolley devices and including cargo engaging means;

hoist motors for operating said hoists individually;

operator platform carried from said respective trolleys; and

control means accessible from the respective platforms for controlling said trolley drive means and said hoist motors whereby operators on said platform may actuate said trolley drive means to move said trolleys sequentially onto said one loops, said hoist motors selectively actuated to lower said respective cargo engaging means into said hold and cargo loaded thereonto, said hoist motors actuated to hoist said cargo out of said hold, said respective trolley drive means actuated to advance said trolleys along said return to said one of said sides and said respective hoist motors actuated to lower said cargo to said load-receiving area.

2. Cargo handling apparatus as set forth in claim 1 wherein:

said mounting means includes a plurality of rails extending along said dock and a plurality of trucks mounted on said rails whereby said apparatus may be moved along said rails to dispose said first loop portion over different hatchways of said ship.

3. Cargo handling apparatus as set forth in claim 2 that includes:

hinge means connecting said boom portion to the remainder of said truck; and

retraction means mounted on said frame and connected with said boom whereby said boom may be retracted for said ship to be moored at said dock.

4. Cargo handling apparatus as set forth in claim 1 that includes:

hinge means connecting said boom portion to the remainder of said truck; and

retraction means mounted on said frame and connected with said boom whereby said boom may be retracted for a ship to be moored at said dock.

5. Cargo handling apparatus as set forth in claim 1 wherein:

said mounting means includes truck means supporting said frame from said dock whereby said apparatus may be moved along said dock for moving said boom from one hatchway to another of said ship.

6. Cargo handling apparatus as set forth in claim 5 that includes:

hinge means connecting said boom portion to the remainder of said truck; and

retraction means mounted on said frame and connected with said boom whereby said boom may be retracted for a ship to be moored at said dock.

* * * * *