United States Patent [19]

Ide

[11] **3,796,325**

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[54] **SELF-CONTAINED SHIP LOADING APPARATUS**

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[73] Assignee: **Metropolitan Stevedore Company**, Wilmington, Calif.

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[52] **U.S. Cl.** ..... **214/15 E**

[51] **Int. Cl.** **B63b 27/28**

[58] **Field of Search** ..... 214/14, 15 R, 15 D, 15 E, 214/17 CB

[56] **References Cited**

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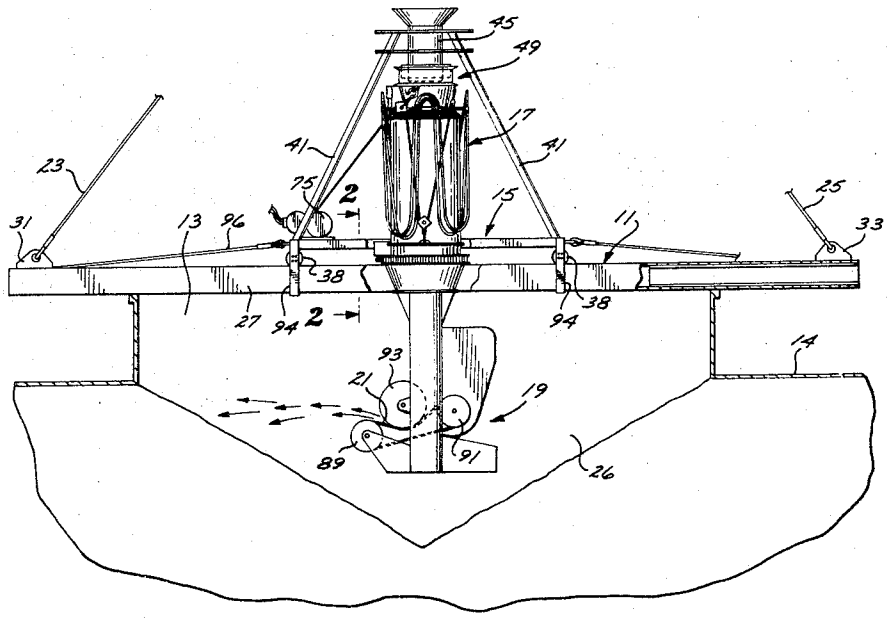
Primary Examiner—Frank E. Werner

Attorney, Agent, or Firm—Fulwider, Patton, Rieber, Lee & Utecht

[57] **ABSTRACT**

A self-contained ship loading apparatus for loading granular substances onto a ship and including a portable track for disposition athwartship over the hatchway of a ship to be loaded. A trolley frame is mounted captively on the track and mounts a vertically extending telescopical chute for selective lowering into the hold of such ship. A trimmer is mounted on the lower extremity of the chute and includes conveyor means which may be rotated to direct the discharge therefrom to selected sides of such chute. Hoisting means is connected to the track whereby the boom of a crane may be connected with the track and the track hoisted and swung over the hatchway of such ship and lowered into position. The chute may then be lowered to lower the trimmer into the hold of the ship and the granular substances then fed down the chute and onto the trimmer for discharge to the side of the chute. Concurrently, the trimmer may be rotated about to direct such granular substances at different directions from such chute.

11 Claims, 6 Drawing Figures



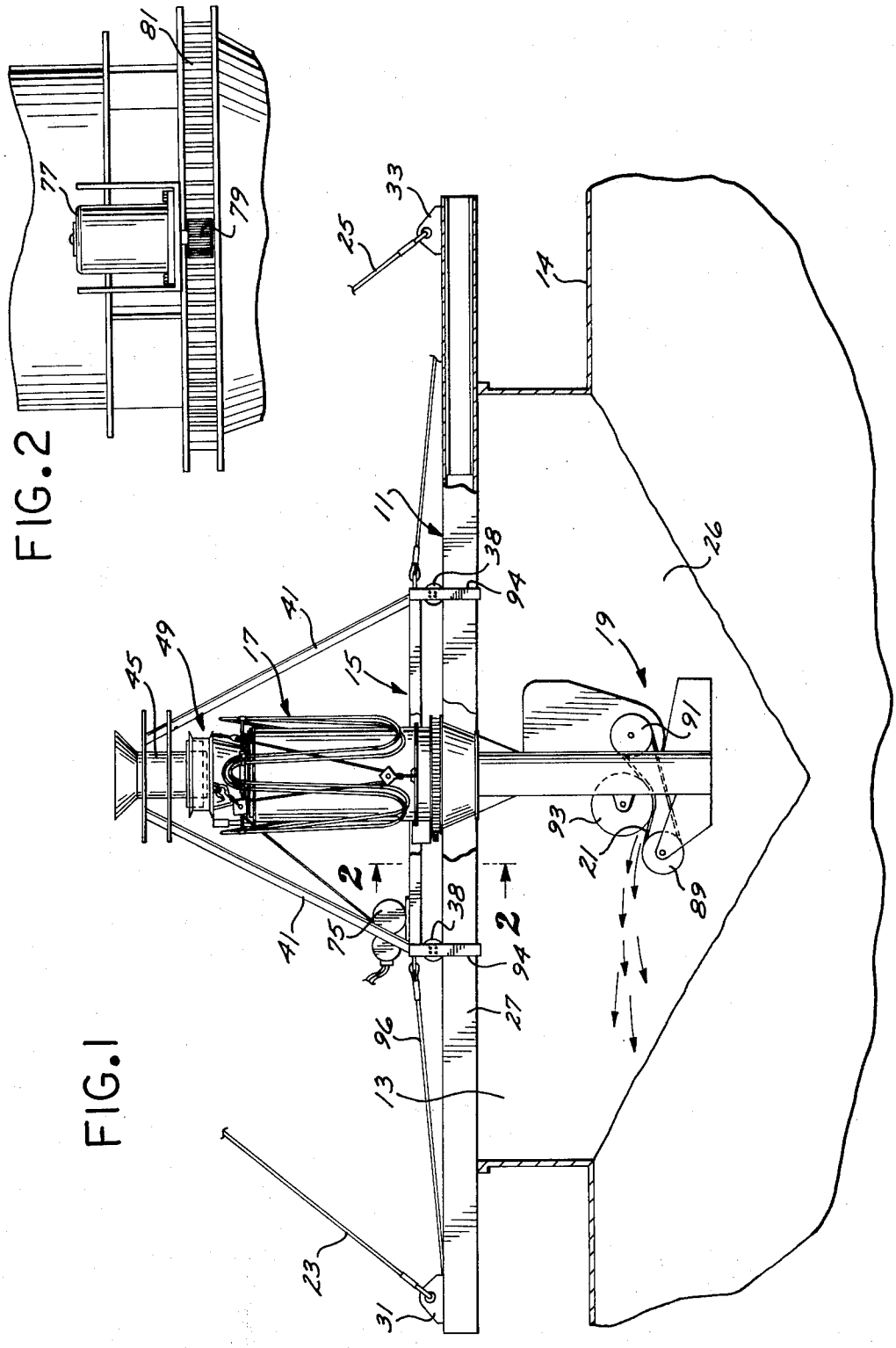

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FIG. 2

FIG. 1

FIG. 4

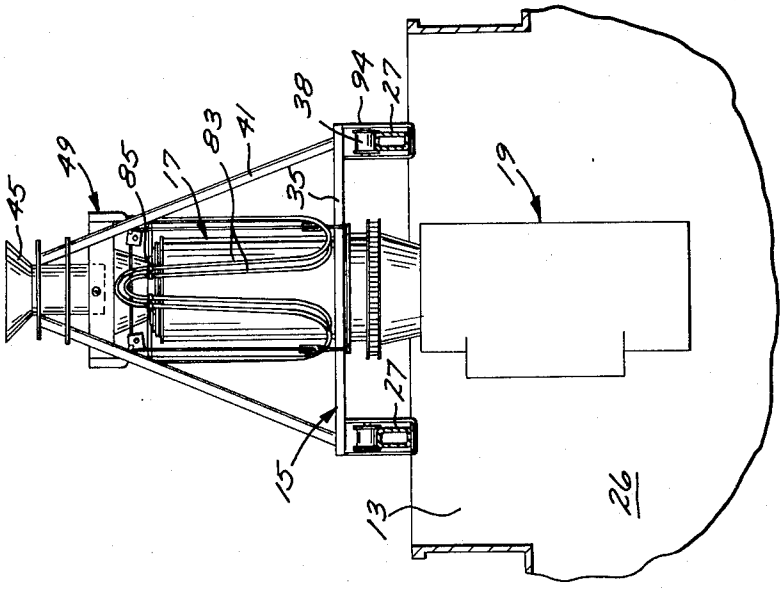

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FIG. 3

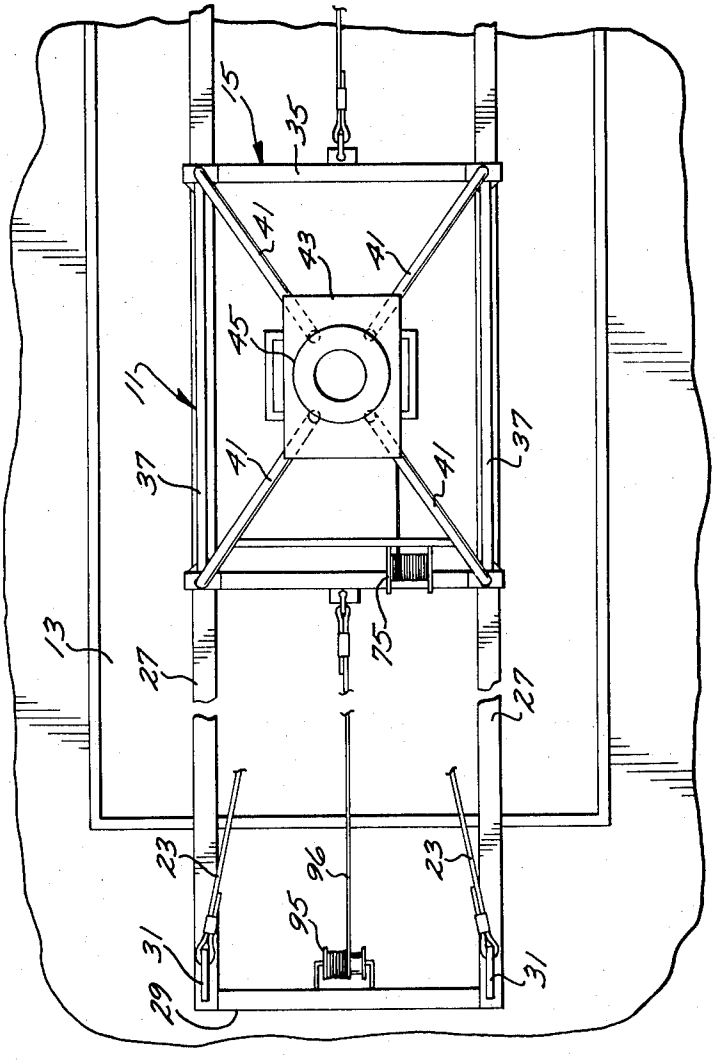
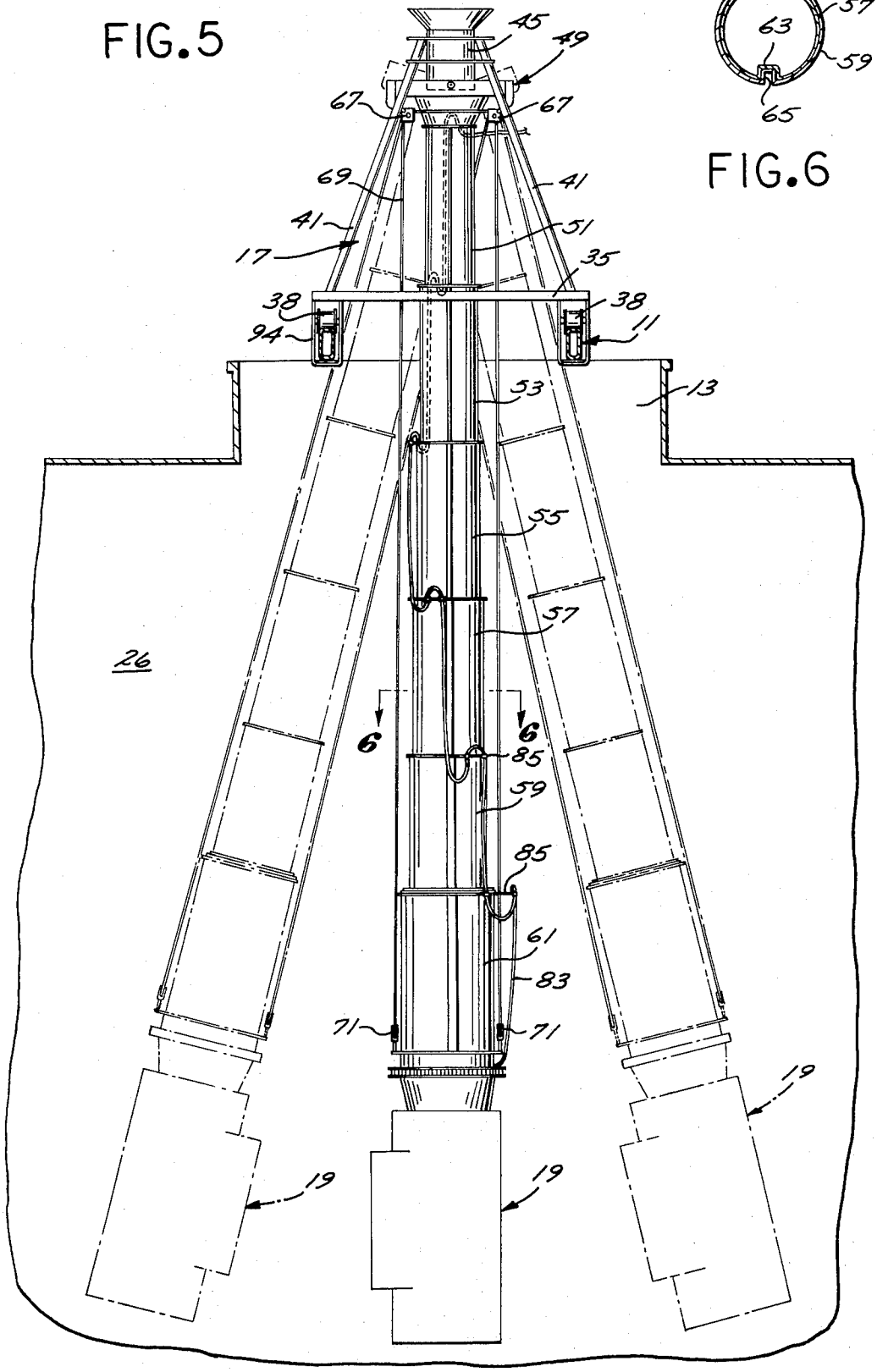

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FIG.5


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FIG.6

SELF-CONTAINED SHIP LOADING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to devices for loading grain and the like into the hold of a ship.

2. Description of the Prior Art

Grain elevators have been proposed which include telescopical pipes having trimmers carried from the bottom end thereof for directing grain exiting the bottom of such pipes in different directions therefrom. A device of this type is shown in U.S. Pat. No. 1,708,176. However, devices of this type suffer the shortcoming that the telescopical pipes are not carried from a frame for convenient movement of the chute athwartship. Further, such devices do not normally provide for 360° rotation of the trimmers to provide for highly flexible placement of the substance discharged from such trimmers. Others grain loading devices have been proposed which include massive frames for placement on the deck of a ship and including athwartship tracks. Trolleys carrying telescopical chutes are then positionable on the tracks but such devices suffer the shortcoming that they require two separate operations of a loading crane to place both the track frame and the trolley on the ship, and such track and trolley must then be reassembled on the ship thereby consuming an undue amount of time.

SUMMARY OF THE INVENTION

The self-contained ship loading apparatus of present invention is characterized by a lightweight frame forming tracks for extension athwartship over the hatchway of a ship to be loaded and having a trolley mounted in captive position on such rails. Suspended from the trolley is a telescopical chute which may be telescoped downwardly into the ship's hold. Carried rotatably from the bottom of such chute is a trimmer having a side opening discharge which may be rotated to face in any direction for discharging grain to any selected side of the chute. Hoisting means is mounted on the track whereby the boom of a crane may be connected with the track frame and the entire apparatus lifted as a unit and deposited on the deck of a ship with the tracks extending athwartship so the chute may be lowered to disposed the trimmer at a desired level in the hold of the ship and such trolley moved back and forth on the track as the trimmer is operated and rotated to discharge grain at different locations in such hold.

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 an elevational side view of a self-contained ship loading apparatus embodying the present invention;

FIG. 2 is a vertical sectional view, in enlarged scale, taken along the line 2—2 of FIG. 1;

FIG. 3 is a top view of the self-contained ship loading apparatus shown in FIG. 1;

FIG. 4 is an end view of the self-contained ship loading apparatus shown in FIG. 1;

FIG. 5 is an end view similar to FIG. 4 but showing the chute in its fully telescoped position; and

FIG. 6 is a horizontal sectional view taken along the line 6—6 in FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 5, the self-contained ship loading apparatus of the present invention includes, generally, a portable frame 11 which may be positioned arthwartship over a hatchway 13 of a ship to be loaded. Still speaking generally, held captive on the frame 11 is a trolley 15 which has a telescopical chute device 17 suspended therefrom. Mounted rotatably from the lower end of the chute 17 is a trimmer, generally designated 19, which has a horizontally extending conveyor belt 21 mounted thereon. Referring to FIGS. 1 and 3, hoisting cables 23 and 25 are attached to the four corners of the frame 11 and lead upwardly to a hoisting hook (not shown) lowered from a crane boom whereby the entire self-contained ship loading apparatus may be lifted as a unit from the dock to be placed athwartship across the hatchway 13. The chute 17 may then be lowered to the desired level within the hold 26 of the ship and the trimmer 19 rotated to direct the grain discharged from the conveyor belt 21 in any selected direction at the side of such chute for distributing grain being discharged about the hold of such ship.

The frame 11 is rectangular in plan view and includes a pair of transversely extending rails or tracks 27 which are connected together at their opposite ends by means of frame members 29. Referring to FIG. 3, mounted at the four corners of the frame 11 are hoisting ears 31 and 33 for connection with the hoisting cables 23 and 25.

Referring to FIGS. 1 and 3, the trolley 15 includes a rectangular base formed by frame members 35 and 37 and rides on wheels 38. Rising up from the base members 35 and 37 is a pyramidal framework formed by four vertically extending and inwardly angled struts 41 which attach at their respective upper extremities to a horizontally disposed mounting plate 43 having an upwardly opening funnel 45 carried centrally therein.

The upper extremity of the chute 17 is connected with the lower end of the funnel 45 by means of a gimbal joint, generally designated 49, to provide for gimballing in all directions of such chute.

The chute 17 is constructed of multiple sections of inter-fitting telescopical pipes 51, 53, 55, 57, 59 and 61 which become progressively larger in diameter to telescope over one another and which are formed in their walls with longitudinally extending interfitting keys 63 and keyways 65 (FIG. 6) to maintain such pipes in their same clocked position with respect to one another.

Carried from the upper portion of the framework formed by the vertically extending angled struts 41 are pulleys 67 which have a lowering cable 69 threaded thereover and connected with corresponding pulleys 71 mounted on the lower extremity of the lowermost pipe section 61, one extremity of such cable being anchored to the trolley 15 and the opposite extremity thereof being secured to a winch 75 (FIG. 3) mounted on such trolley. Consequently, the cable 69 may be wound on the winch 75 to selectively raise and lower the chute 17.

Mounted on the side of the lowermost pipe section 61 is a electrical drive motor 77 having a pinion 79 mounted on its drive shaft for meshing with an external

ring gear 81 mounted on the upper extremity of the rotatable trimmer 19.

Referring to FIG. 5, an electrical cable 83 leads upwardly from the electric motor 77 and loops over respective cable mounting brackets 85 mounted from the respective upper extremities of the respective pipe sections 51, 53, 55, 57, 59 and 61. Consequently, upon retraction of the chute 17, the cable 83 forms multiple festoons as shown in FIG. 1 for convenient stowage of such cable until the chute is subsequently telescoped to the extended position shown in FIG. 5.

The trimmer 19 includes a pair of elongated end rollers 89 and 91 having the opposite extremities of the endless conveyor belt 21 wrapped thereover. A tensioning roller 93 is positioned over the central portion of the top rung of the conveyor belt 21 and rotates therewith.

The trolley frame 15 is held captive on the tracks 27 by means of brackets 94 (FIGS. 1 and 5) surrounding such tracks to thereby prevent such frame 15 from upsetting during loading of the apparatus onto a ship.

Electric winches 95 are mounted on the opposite ends of the frame 11 and have cables 96 extending therefrom for connection with the opposite sides of the trolley frame 15 to selectively draw such trolley to one side or the other of the hatchway 13.

In operation when it is desirable to load a ship 14, the hoisting cable from a crane boom is connected with the upper extremities of the hoisting cables 23 and 25, and the entire self-contained apparatus hoisted from the dock and swung over the deck of the ship 14. The boom cable is then fed out to lower the entire apparatus onto the deck of such ship with the tracks 27 extending athwartship over the hatchway 13 for convenient lowering of the chute 17 into such hatchway.

The loading apparatus is then ready for use and the chute 17 is lowered by unreeling the lowering cable 69 from the winch 75 (FIG. 3) to telescope such chute to its lowest position shown in FIG. 5.

The trolley locating winches 95 may then be operated to draw the trolley 15 to one side or the other of the hatchway 13 to locate the trimmer 19 at one side of the hold 26 for discharge of grain into such one side thereof.

The trimmer control motor 77 may then be actuated to direct the trimmer 19 in the desired direction to discharge the grain, for instance, first to the near side of the ship, then forward and aft of the chute itself and finally toward the central portion of the ship. It will be appreciated that the high volume of grain being discharged from the trimmer 19 creates a substantial force reaction thereon thus resulting in the chute gimballing about the gimbal joint 49 to accommodate such force reaction.

After the one side of the ship has been filled to the desired level and weight, the trolley location winches 94 may be actuated to draw the trolley 15 to the opposite side of the hatchway 13 and the discharge of grain continued to continue filling of the ship hold in a progressive and regular manner.

As the hold fills, the chute lowering winch 75 may be actuated to raise the chute 17 to maintain the trimmer 19 above the level of the grain filling the ship's hold 26.

It will be appreciated that telescopical retraction of the chute 17 automatically loops the electrical cable 83 in the festoon shown in FIG. 1 for convenient storage thereof without the necessity of incorporating unwieldy and inconvenient retraction spools for receiving such cable.

When filling of the ship's hold has been completed, the chute 17 will be in a fully retracted position and a crane boom may be again connected to the hoisting cables 23 and 25 and the entire self-contained apparatus convenient and rapidly lifted from the ship's deck for return to the dock or positioning over a second hatchway.

From the foregoing it will be apparent that the self-contained ship loading apparatus of present invention provides an economical and convenient means for loading grain into the hold of a ship without the necessity of assembling such apparatus on the deck of a ship.

I claim:

1. Self-contained ship loading apparatus for loading granular material and comprising:
   - portable track means for positioning athwartship over the hatchway of a ship to be loaded;
   - a trolley frame including wheels carried on said track means and including retaining means for holding said wheels captive on said track means;
   - drive means for driving said trolley frame back and forth on said track means;
   - a vertically extending telescopical chute means;
   - gimbal means mounting the upper extremity of said chute from said trolley frame;
   - lowering means connected between said trolley frame and chute means for selectively extending and retracting said chute means;
   - a trimmer mounted rotatably on said chute and including conveyor means extending transversely of said chute means to discharge said granular material to the side of said chute;
   - rotary drive means for rotating said trimmer relative to said chute means to direct said granular material to different sides of said chute means; and
   - connecting means on said track whereby said connecting means may be connected to the boom of a crane, said track means raised and swung into position over said hatchway and lowered onto the deck of said ship, said lowering means activated to extend said chute to lower said trimmer to a selected level within the hold of said ship, granular material fed into the upper end of said chute, and said rotating means activated to selectively discharge said granular material to selected sides of said chute.

2. Self-contained ship loading apparatus as set forth in claim 1 wherein:
   - said rotating means includes a 360° ring gear and a drive motor including a pinion meshing with said ring gear.

3. Self-contained ship loading apparatus as set forth in claim 1 wherein:
   - said chute means includes telescopical sections formed in their adjoining walls with interfitting longitudinally extending key and keyway means for preventing rotation of said sections with respect to one another.

4. Self-contained ship loading apparatus as set forth in claim 1 wherein:
   - said rotary drive means includes an electric motor disposed on the lower extremity of said chute means for rotating said trimmer about the longitudinal axis of said chute means and said apparatus includes electrical cable means leading from said trolley frame to said motor and looped back on it-

self at each chute section to form respective festoons and including hangers carried from each of said chute sections for hanging said electrical cable therefrom whereby said cable will automatically extend and retract with extension and retraction of said chute means.

5. Self-contained ship loading apparatus as set forth in claim **4** wherein:

said rotating means includes a 360° ring gear and a drive motor including a pinion meshing with said ring gear.

6. Self-contained ship loading apparatus as set forth in claim **4** that includes:

gimbal means interposed between said chute means and trolley frame.

7. Self-contained ship loading apparatus as set forth in claim **4** wherein:

said chute means includes telescopical sections formed in their adjoining walls with interfitting longitudinally extending key and keyway means for preventing rotation of said sections with respect to one another.

8. Self-contained ship loading apparatus as set forth in claim **1** that includes:

positioning means for moving said trolley frame on said track means.

9. Self-contained ship loading apparatus as set forth in claim **8** wherein:

said positioning means includes winch means connected between said trolley frame and said track means.

10. Self-contained ship loading apparatus for loading granular material and comprising:

portable track means for positioning athwartship over the hatchway of a ship to be loaded;

a trolley frame including wheels carried on said track means;

vertically extending chute means projecting downwardly from said trolley frame;

universal pivot means mounting the upper extremity of said chute means from said trolley frame for free swiveling of said chute means about horizontal axes;

lowering means connected between said trolley frame and chute means for selectively lowering and raising said chute means;

trimmer means mounted on the lower extremity of said chute and opening to one side thereof for discharging grain to said one side;

rotary means for rotating said trimmer to direct said grain to different sides of said chute means; and

connecting means on said track whereby said connecting means may be connected to the boom of a crane, said track means raised and swung into position over said hatchway and lowered onto the deck of said ship, said lowering means activated to extend said chute to lower said trimmer to a selected level within the hold of said ship, granular material fed into the upper end of said chute, and said rotating means activated to selectively discharge said granular material to selected sides of said chute.

11. Self-contained ship loading apparatus as set forth in claim **10** wherein:

said trimmer is rotatable with respect to said chute means and said rotary means includes an electric drive motor mounted on the lower extremity of said chute means and engaged with said trimmer for rotation thereof and said apparatus includes electrical cable means leading from said trolley frame to said motor and looped back on itself at each chute section to form respective festoons and including hangers carried from each of said chute sections for hanging said electrical cable therefrom whereby said cable will automatically extend and retract with extension and retraction of said chute means.

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