Aug. 28, 1962 R. BELLINGER 3,051,322

SHIP OR BARGE UNLOADERS

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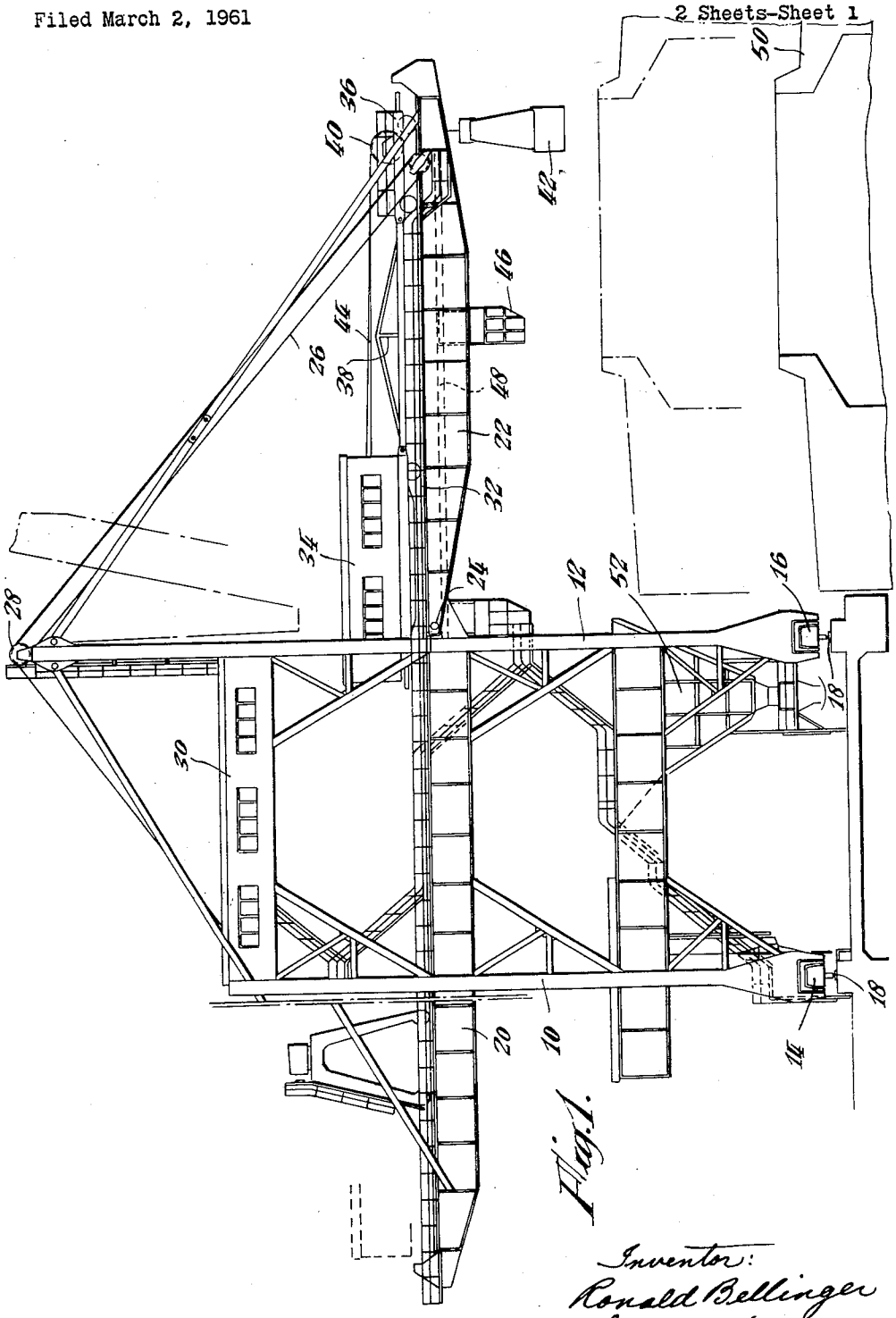


Fig. 1.

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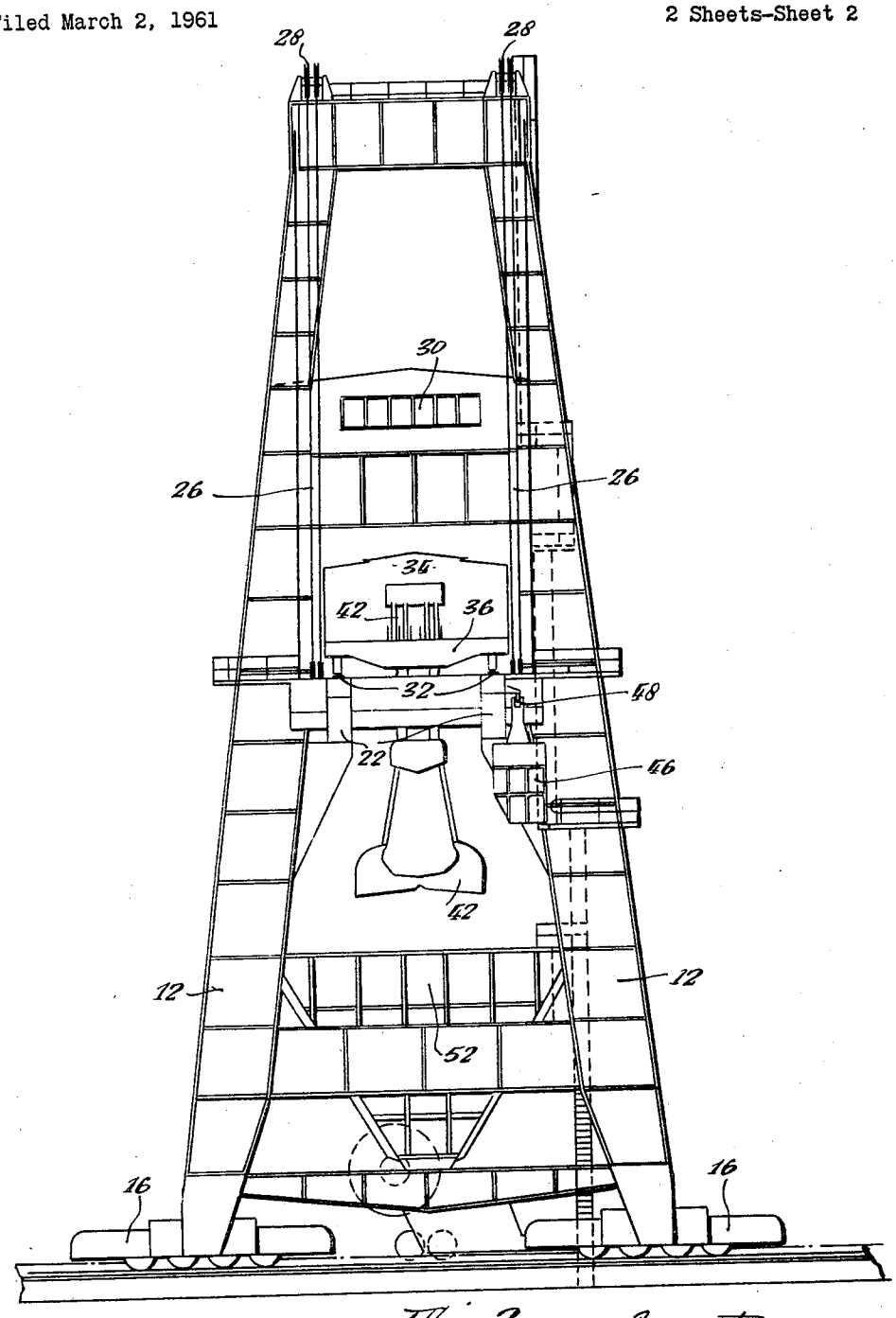


Fig. 2.

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United States Patent Office

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SHIP OR BARGE UNLOADERS

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7 Claims. (Cl. 212—15)

This invention relates to ship or barge unloaders of the kind having a cantilever beam or jib projecting over the ship or barge, and a crab or hoisting mechanism capable of being travelled or traversed to the extremity of the cantilever beam or jib for the purpose of handling materials into and out of holds. A ship or barge unloader of the above mentioned kind will hereinafter be referred to as "a ship or barge unloader of the kind described."

Hitherto with ship or barge unloaders of the kind described when large ships or barges have to be unloaded the crab containing the hoisting gear has had to be moved right out to the end of the cantilever beam or jib in order to reach the far side of the cargo hold of the ship. This means that when the grabs are lifting a heavy load from the end of the cantilever beam or jib great stress is put into the main structure of the ship unloader since the weight of the grab is added to that of the load at the end of the beam.

It is an object of the present invention to partially or wholly overcome the above disadvantage which makes it necessary to use an unnecessarily heavy construction for the structure of the ship unloader.

According to the present invention there is provided a ship or barge unloader of the kind described wherein the crab is provided with an extension including a trolley member having means mounted thereon for the supporting of the hoist cables for the grab, the arrangement being such that the trolley member moves in advance of said crab towards that end of the cantilever beam or jib which is over the ship or barge.

The trolley may run on the same track as the crab. A cab for the operator may be mounted on the crab or trolley or may be suspended from a carriage movable on a rail or rails independent of the rails for the crab and/or trolley, said rails being mounted on said cantilever beam.

One preferred embodiment of the present invention will now be described in greater detail with reference to the accompanying drawing wherein:

FIG. 1 is a side elevation view of a ship unloader according to the present invention, and

FIG. 2 is a front elevation view of FIG. 1.

The main structure of the ship unloader is mounted on legs 10 and 12 supported by bogies 14 and 16 respectively, running on a pair of rails 18 for movement parallel to the edge of the wharf.

Mounted on the leg structure 10, 12 is a cantilever beam 20, having a jib 22 which is pivoted at 24. The jib 22 can be raised to the position shown in dotted lines by means of cables 26, which pass over pulleys 28, mounted at the top of legs 12, to the jib winch contained within the control gear house 30.

The cantilever beam 20 and jib 22 are provided with a rail track 32 which extends the entire combined length thereof. A crab 34 and a trolley 36 are joined together by a suitable girder structure 38 and are adapted to be moved along the beam 20 and jib 22 by means of control gear mounted within the crab 34. Alternatively the control gear may be mounted elsewhere. The overall combined length of the crab 34, connecting structure 38 and trolley 36 is such that they can be easily accommodated on the beam 20 when it is desired to raise the jib 22, and is also such that when the trolley 36 is at the remote

end of jib 22 the centre of gravity of the crab 34 will be close to the legs 12.

Mounted on the trolley 36 are pulleys 40 from which the grab 42 is suspended by means of the usual cables 44. An operating cabin 46 is suspended from a monorail 48, which extends the length of the jib 22 and a small distance along the beam 20, so that the cabin 46 can be run off the jib 22, when it is desired to raise the jib. Interlocking means is provided to ensure that the cabin 46 is clear of the jib 22 before it can be raised (as shown in chain lines). The contents of the grab 42 which have been taken from the cargo hold of a ship 50 are discharged into a hopper 52 mounted between the legs 12. The ship 50 is shown in full lines when it is laden at low tide, and in dotted lines when it is unladen at high tide.

Current conductor rails (not shown) for the crab 34 are mounted on the cantilever beam 20 alongside the rail track 32.

In operation when the ship docks, the crab 34 and trolley 36 are positioned on the beam 20 and the jib 22 is raised to its fullest extent in order to be clear of the ship's superstructure. As soon as the ship has tied up the crane is moved into position and the jib lowered. The crab 34 and trolley 36 are moved to such a position that the grab 42 is immediately over the cargo hold of the ship. The operator has in the meantime moved his cabin 46, so that he can see into the hold, and be able to direct the grab to any part of the hold. The grab having collected its load is raised clear of the ship and the crab 34 moves back toward the far end of the beam 20, so as to allow the grab to discharge its load into the hopper 52. When unloading is finished the crab 34 moves back to its starting position at the inland end of beam 20 and the jib 22 is raised to allow the ship to leave the dock.

It will be appreciated that with this arrangement only the weight of the trolley, pulleys and grab and load have to reach out to the extremity of the jib, since the crab which is the heaviest structure remains partly on the main structure. By this means it is possible for the grab to carry heavier loads without imposing undue stress on the jib, and main structure of the ship unloader. Another advantage is that the current collection is effected from rails on the main structure by means of collector shoes which are fixed to the inland end of the crab. Since the rails are provided only on the beam 20 the difficult transition problem from the cantilever beam 20 to the jib is avoided.

In an alternative arrangement a rack rail is provided wholly on the main structure for engaging a driven cog in the crab for traversing said crab, thereby attaining greater acceleration and deceleration of the crab than would be possible when driving by friction through the wheels.

What I claim and desire to secure by Letters Patent is:

1. A ship unloader comprising, in combination, a mobile structure mounted for movement substantially parallel to the ship being unloaded, a jib pivotally connected to said structure at the front thereof and adapted when in its lowermost and horizontal position to project over the ship being unloaded, a crab mounted for horizontal movement on said structure and the rearwardmost part of said jib, a grab for conveying the material being unloaded, a trolley rigidly coupled to said crab frontwardly of the latter and adapted to travel jointly therewith so as to be at the outermost and front end of said jib when said crab is at the rear end of said jib, a plurality of pulleys mounted on said trolley, mechanism arranged in said crab for operating and hoisting said grab, and a plurality of cables connected to said grab and passing over said pulleys on said trolley and operatively connected to said operating and hoisting mechanism.

2. A ship unloader comprising, in combination, a mobile structure mounted for movement substantially parallel to the ship being unloaded, a jib pivotally connected to said structure at the front thereof and adapted when in its lowermost and horizontal position to project over the ship being unloaded, a crab mounted for horizontal movement on said structure and the rearwardmost part of said jib, a grab for conveying the material being unloaded, a trolley rigidly coupled to said crab frontwardly of the latter and adapted to travel jointly therewith so as to be at the outermost and front end of said jib when said crab is at the rear end of said jib, a set of rails extending from the inlandmost rear of said structure to the front end of said jib and defining the path of travel for both said crab and said trolley, a plurality of pulleys mounted on said trolley, mechanism arranged in said crab for operating and hoisting said grab, and a plurality of cables connected to said grab and passing over said pulleys on said trolley and operatively connected to said operating and hoisting mechanism.

3. A ship unloader comprising, in combination, a mobile structure mounted for movement substantially parallel to the ship being unloaded, a jib pivotally connected to said structure at the front thereof and adapted when in its lowermost and horizontal position to project over the ship being unloaded, a crab mounted for horizontal movement on said structure and the rearwardmost part of said jib, a grab for conveying the material being unloaded, a trolley rigidly coupled to said crab frontwardly of the latter and adapted to travel jointly therewith so as to be at the outermost and front end of said jib when said crab is at the rear end of said jib, a set of rails extending from the inlandmost rear of said structure to the front end of said jib and defining the path of travel for both said crab and said trolley, a plurality of pulleys mounted on said trolley, mechanism arranged in said crab for operating and hoisting said grab, a plurality of cables connected to said grab and passing over said pulleys on said trolley and operatively connected to said operating and hoisting mechanism, a separate rail mounted on said jib, and a traveling operator's cab suspended from said separate rail.

4. A ship unloader comprising, in combination, a mobile structure mounted for movement substantially parallel to the ship being unloaded, a jib pivotally connected to said structure at the front thereof and adapted when in its lowermost and horizontal position to project over the ship being unloaded, means mounted on said structure and operatively connected to said jib for raising and lowering the same, a crab mounted for horizontal movement on said structure and the rearwardmost part of said jib, a grab for conveying the material being unloaded, a trolley rigidly coupled to said crab frontwardly of the latter and adapted to travel jointly therewith so as to be at the outermost and front end of said jib when said crab is at the rear end of said jib, a set of rails extending from the inlandmost rear of said structure to the front end of said jib and defining the path of travel for both said crab and said trolley, a plurality of pulleys mounted on said trolley, mechanism arranged in said crab for operating and hoisting said grab, a plurality of cables connected to said grab and passing over said pulleys on said trolley and operatively connected to said operating and hoisting mechanism, a separate rail mounted on said jib, and a traveling operator's cab suspended from said separate rail.

5. A ship unloader according to claim 4, the length of that portion of said set of rails which is located on said structure being sufficient to accommodate both said crab and said trolley when the same are moved off said jib and onto said structure to permit raising of said jib.

6. A ship unloader comprising, in combination, a mobile structure mounted for substantially horizontal movement parallel to the ship being unloaded, a jib pivotally connected to said structure at the front thereof and adapted when in its lowermost and horizontal position to project over the ship being unloaded, a crab mounted for horizontal movement on said structure and the rearwardmost part of said jib, a grab for conveying the material being unloaded, a trolley rigidly coupled to said crab frontwardly of the latter and adapted to travel jointly therewith so as to be at the outermost and front end of said jib when said crab is at the rear end of said jib, a set of rails extending from the inlandmost rear of said structure to the front end of said jib and defining the path of travel for both said crab and said trolley, current collector rails arranged on said structure parallel to said set of rails, collector shoes secured to the rear end of said crab in sliding contact with said collector rails, a plurality of pulleys mounted on said trolley, mechanism arranged in said crab for operating and hoisting said grab, and a plurality of cables connected to said grab and passing over said pulleys on said trolley and operatively connected to said operating and hoisting mechanism.

7. A ship unloader according to claim 6, further comprising a rack rail mounted on said structure, and a driven cog carried by said crab and arranged in meshing engagement with said rack rail, said cog and rack rail coacting to effect the linear traverse of said crab toward and away from said jib.

References Cited in the file of this patent

UNITED STATES PATENTS

2,366,574 Taylor ---------- Jan. 2, 1945