Nov. 24, 1959 J. D. KÖHNENKAMP ET AL 2,914,193

LOADING DEVICES OF SHIPS

Filed Feb. 8, 1955 3 Sheets-Sheet 1

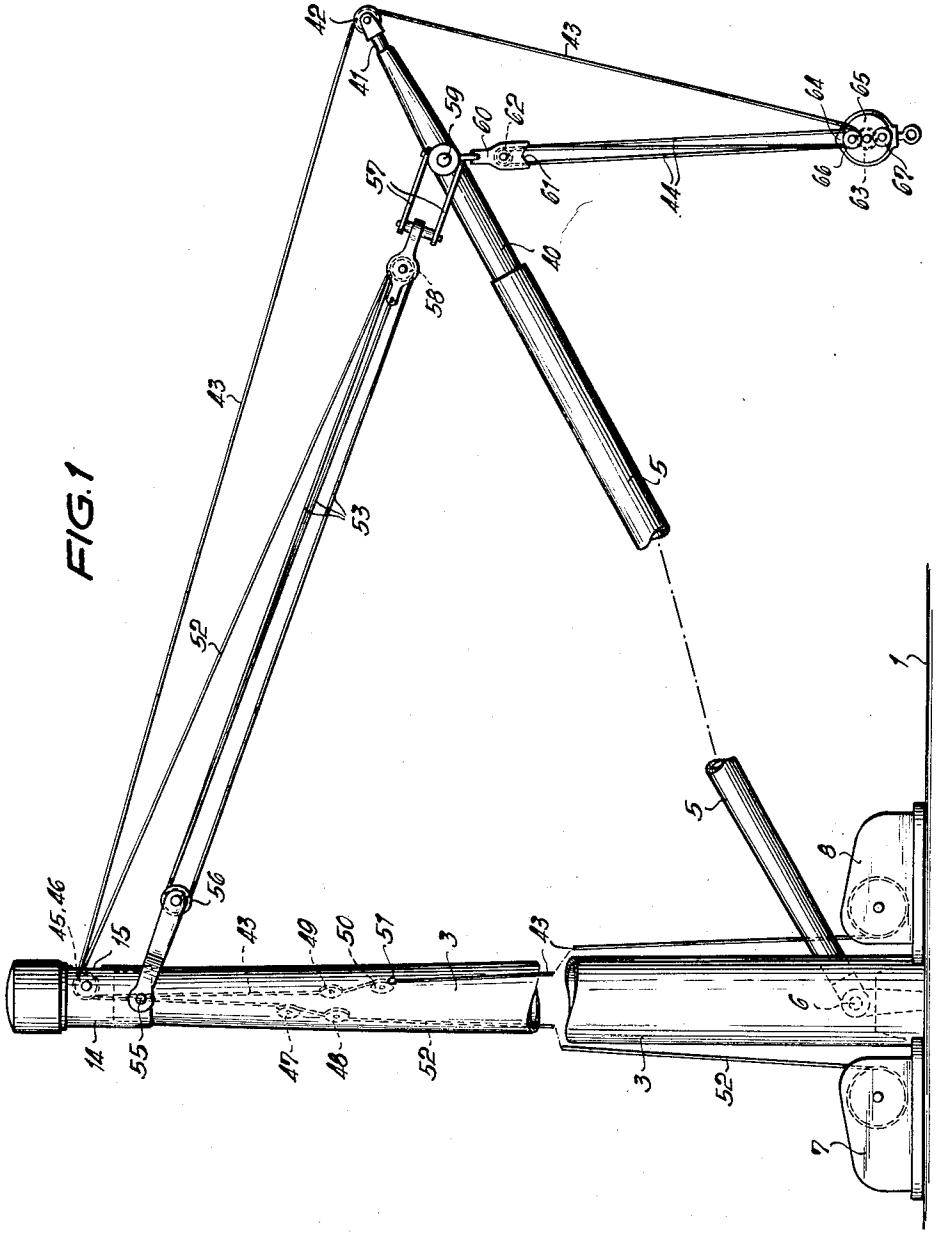


FIG. 1

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LOADING DEVICES OF SHIPS

Filed Feb. 8, 1955 3 Sheets-Sheet 2

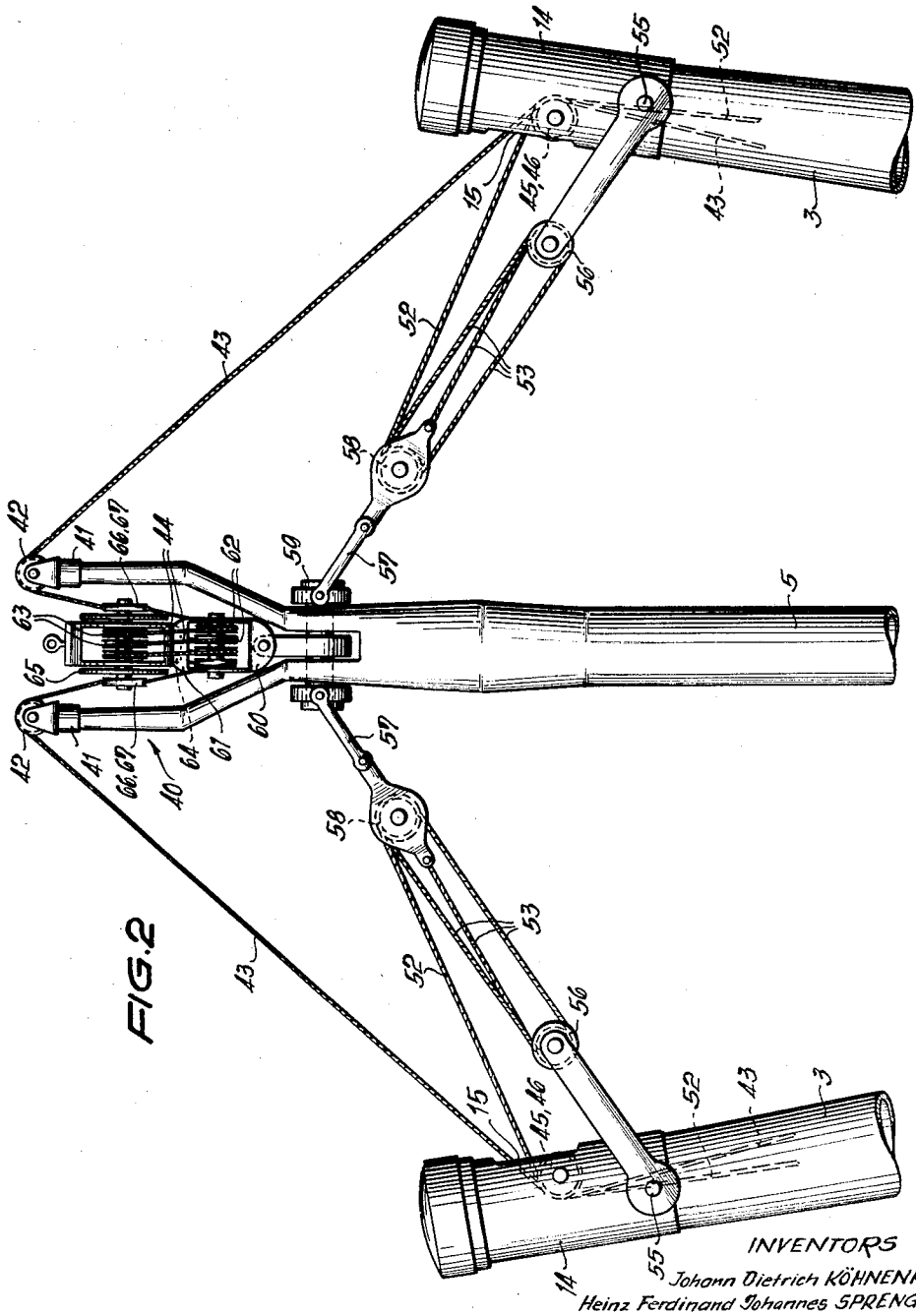


FIG.2

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LOADING DEVICES OF SHIPS

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FIG. 3

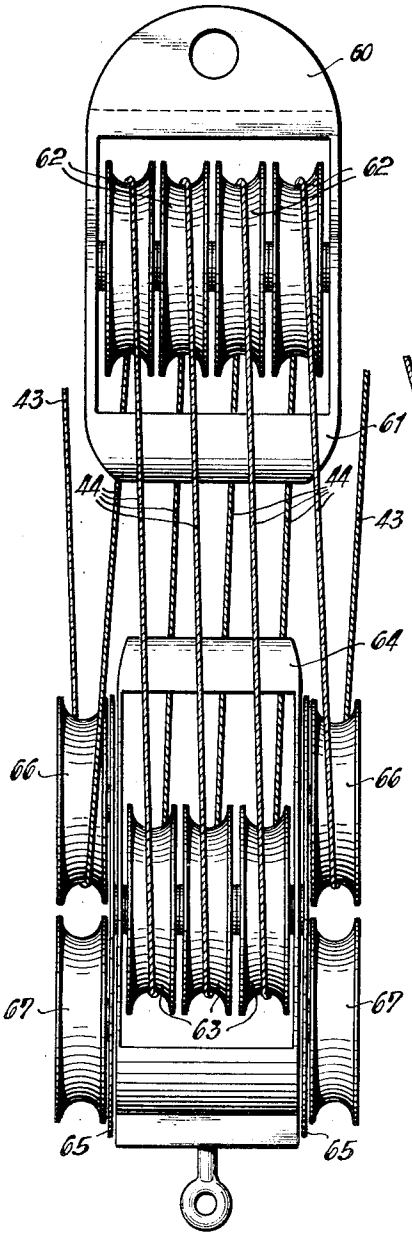
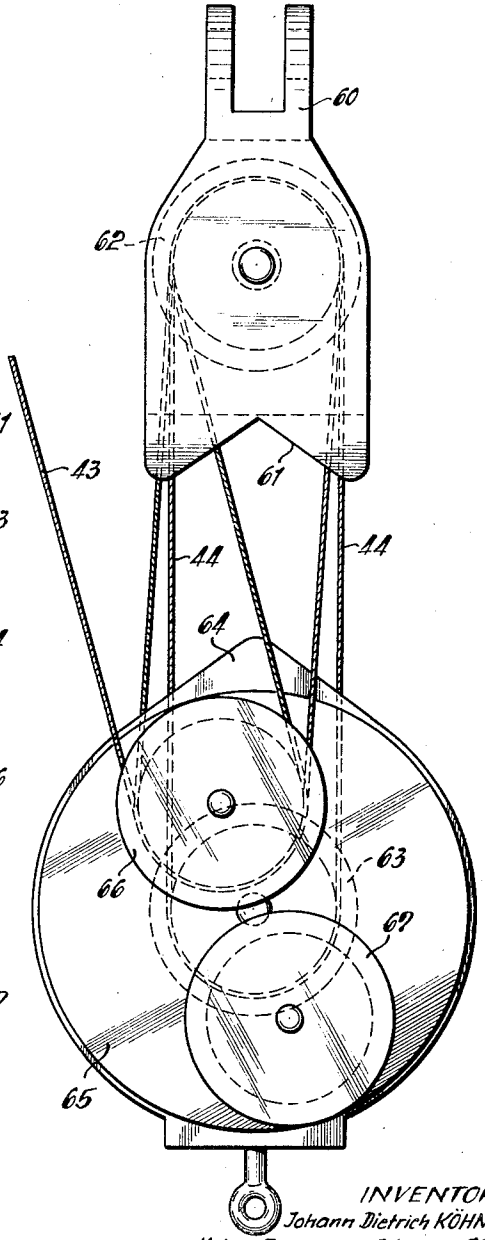


FIG. 4



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Patented Nov. 24, 1959

2,914,193

LOADING DEVICES OF SHIPS

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Application February 8, 1955, Serial No. 486,934

Claims priority, application Germany February 11, 1954

7 Claims. (Cl. 212—3)

This invention relates to a ship's loading device having a boom with two hangers which can be swung between two uprights, and two independent hanger winches.

Such a loading device is erected between two neighbouring hatches so that goods can be taken into or out of the hatch lying in front of or behind it with only one boom which is designed accordingly.

It is the object of the present invention to provide a device in which the boom can be swung easily from one side to the other, in a simple manner and without the inconvenience of removing and replacing its tackles and particularly of the running rigging and which, because of its double hangers, works like a crane, the cargo load being as great as desired.

In order to solve this problem the invention provides a ship's loading device having a boom with two hangers, said boom being articulately mounted on deck and adapted to be swung between two uprights, and two hanger winches which are independent of one another, guide devices adapted to automatically guide the control tackles of the hanger and of the load free of the uprights, and which are provided at the head of the boom and at the heads of the uprights.

One feature of the invention is that the boom has a rotatable end to which the hanger blocks and the upper load blocks are fixed, and the uprights have rotatable heads to which the control blocks are fixed.

A further feature of the invention consists in the fact that the hanger tackles are conveyed over a guide pulley on the rotatable head of the uprights, into the inside of the hollow uprights, and axially through the uprights, over guide pulleys, and from thence to the outside, and to their hanger-winches.

Preferably, the boom is constructed at its upper end in the form of a fork, and on each of the ends of the fork there is mounted a rotatable head with a guide pulley for the hauling parts of the load tackles, and both the upper and lower load blocks are arranged for swinging through the fork while the hauling parts of the load tackles are guided to their load winches by guide devices which keep them free of the uprights.

A further feature of the invention is that both in the head of the uprights and inside them, guide pulleys are provided, over which the hauling parts of the load tackles and hanger-tackles are guided to their winches.

A further feature of the invention consists in the fact that, for their joint swinging through the fork, the upper and lower load blocks have a centering device which acts automatically as a result of the tension of the hauling parts of the load tackle, and which holds the two load blocks together, while the shackle of the upper load block is pivotally mounted on a bolt provided in the fork.

Yet another feature of the invention provides for the holding and centering device for the two load blocks to be constructed as a claw-like coupling and for the two hauling parts of the load tackles to be guided by a guide device provided on the lower load block.

A further feature of the invention is that, on each end of the journal for the sheaves of the lower load block a disc is mounted for free rotation, on each of which there are mounted for free rotation two diametrically opposed guide pulleys, between which the hauling part of the load tackle runs in such a manner that only one of the two guide pulleys is loaded at any one time.

The uprights are erected athwartships, preferably sloping obliquely outwards.

In the accompanying drawing, one embodiment of the invention is illustrated by way of example.

Figure 1 is a partial side view of the ship's loading device according to the present invention;

Figure 2 is a partial end view of the ship's loading device as illustrated in Figure 1 and drawn to an enlarged scale;

Figure 3 is an end view of the load tackles as shown in Figure 2 drawn to a further enlarged scale; and

Figure 4 is a side view of these load tackles.

Like structural elements of the device are given the same reference numerals in the figures.

Description of the embodiment shown by way of example in Figures 1 to 4:

Two hollow uprights 3, sloping obliquely outwards, are arranged athwartships on the deck 1, between two cargo hatches not shown in the drawing. Between the two posts 3, a hollow boom 5 is articulately mounted in a derrick socket 6 of known type (Figure 1). Not only can the boom be swung between the uprights, but it can also be extended athwartships as usual. Two hanger-winches 7 and two load winches 8, both of known construction, are mounted on the deck 1, only one of each of the winches are shown in the drawing.

The boom 5 is made in the form of a fork 40 at its upper end, and carries on each end of the fork a head 41 which can rotate through 360°, each head having a guide pulley 42 for the hauling parts 43 of the load tackles 44.

The ends of the uprights 3 are equipped with hollow heads 14 which can rotate through 360° and which have each a slot 15. In each head 14 there are provided free running guide pulleys 45, 46 and inside each of the hollow uprights 3 two pairs of guide pulleys 47, 48 and 49, 50. The hauling part 43 of the load tackle is guided over the upper guide pulley 45 and the pair of guide pulleys 49, 50, through the inside of the upright 3, and through a slot 51, to the outisde, and to the load winches 8. The hauling part 52 of the hanger-tackle 53 is guided over the guide pulley 46 and the pair of guide pulleys 47, 48 through the inside of the hollow upright 3, and through a slot 51, to the outside and to the hanger winches 7. The blocks 56 for the hanger tackles of the boom are fixed at 55 to the rotatable heads 14. The hanger tackle-blocks 58 are movably mounted at 57 to swivel on the fork 40 of the boom 5 in any desired manner.

Rigidly mounted in the lower portion of the fork 40 is a bolt 59, about which the upper load block 60 is pivotally mounted. A wedge-shaped claw 61 is mounted on the load block 60. Several sheaves of the upper load block are designated 62 and several sheaves of the lower load block designated 63, over which sheaves the load tackles 44 run, as best shown in Fig. 3. The lower load block has a wedge 64 which fits in the wedge-shaped claw 61 of the upper load block. Claw and wedge form a centering device for the two load blocks; its method of operation will be described below. Outside the set of sheaves 63 of the lower load block, a disc 65 is mounted for free rotation about the pivotal axis of the set of sheaves. This disc can be seen in Figures 4 and 5. A pair of guide pulleys 66, 67, is mounted for free rotation on each of the two discs 65. The two guide pulleys

66, 67 are diametrically opposite to one another and between them runs the hauling part 43 of the load tackles 44 in such a manner that only one of the two guide pulleys 66, 67 is loaded at any one time. This will be described in more detail below.

The ship's loading device as described above is operated as follows:

In Figure 1 the boom 5 is shown in an operating position located to the right side of the plane defined by the two uprights 3. When it is now desired to swing the boom from the operating position as shown in Figure 1 between the two uprights 3 to the operating position to the left side of these uprights, as viewed in Figure 1, this is done as follows:

The load winches are set in operation so that the lower load block is pulled towards the upper load block by the two hauling parts 43 of the load tackle 44 until the wedge 64 engages in the claw 61. The upper and lower load blocks are then locked together. As the hauling parts 43 are wound further on to the load winches, the two locked load blocks are swung upwards together in clockwise direction and finally arrive between the fork 40 of the boom. The boom is then topped at the same time. With further pulling by the load winches, the boom 5, with the load blocks, tops between the fork into a neutral position between the two uprights 3, and is then substantially in a state of unstable equilibrium, apart from a few degrees caused by the trim of the ship. In the course of this the guide pulleys 42 of the hauling parts of the load tackles have turned through 90°.

At the same time the upper guide pulley 66 is relieved from the load of the hauling part 43 of the load tackle, and the hauling part 43 passes between the two guide pulleys 66, 67, without loading either of the two pulleys. In the unstable state of the neutral position described, the boom can be pulled by an operator either to the left or to the right by a slight pull. In order to bring it into an operating position, it is pulled over to one side of the plane passing through the axis of the uprights 3 and the hauling parts 43 of the load tackle 44 are payed out.

During the described topping of the boom 5 from the operating position at one side of the plane passing through the axis of the uprights 3 and its swinging between the uprights 3 into the operating position at the other side of said plane the winches of the hanger-tackles 52, 53 have no work to do except that up to the topping of the boom they have to take up the slack in the hanger-tackles and during the easing off from the neutral position to the operating position, they have to let the hanger-tackles run off their winch drums without any load. When the boom has reached the final operating position, the two hanger winches are locked, that is to say they now hold the boom in the desired operating position. As the load winches pay out further, the load blocks, which are still locked together, swing downwards. The loading device is then ready for use. In this operating position, the guide pulley 67 is now at the top and loaded by the hauling part 43, while the guide pulley 66 is now at the bottom and unloaded.

What is claimed is:

1. A ships loading device comprising, in combination, a pair of uprights adapted to be mounted spaced from each other on the deck of a ship, said uprights defining between themselves a plane, and each of said uprights having a longitudinal axis; a head turnably mounted on the upper end of each of said uprights for turning movement about the axis of the same; a guide roll mounted in each of said turnable heads; a support adapted to be mounted in said plane on the deck of said ship; an upright boom mounted for universal pivotal movement at the lower end thereof on said support and being tiltable to either side of said plane; a forked member mounted on the upper end of said boom, said forked member having a pair of branches extending in the longitudinal direction of said boom and having each a free end portion turnable about axis substantially parallel to the axis of said boom; a guide roll mounted on each of said turnable end portions; a pair of hauling winches respectively located adjacent said uprights; a load tackle tiltably mounted between said branches of said forked member and including a cable having a pair of hauling portions respectively guided over said guide rollers on said turnable end portions of said forked member and respectively connected at the free ends thereof to said hauling winches; a pair of hanger winches respectively located adjacent said uprights; a pair of hanger tackles, each comprising a first tackle block connected to said forked member, a second tackle block, and a hanger cable, said second tackle blocks being respectively connected to said turnable heads and said hanger cables being respectively operatively connected at one end portion thereof to one of said tackle blocks and at the other end portion thereof to one of said hanger winches and being guided intermediate said end portions over said guide rolls in said turnable heads.

2. A ships loading device comprising, in combination, a pair of uprights adapted to be mounted spaced from each other on the deck of a ship, said uprights defining between themselves a plane, and each of said uprights having a longitudinal axis; a head turnably mounted on the upper end of each of said uprights for turning movement about the axis of the same; a guide roll mounted in each of said turnable heads; a support adapted to be mounted in said plane on the deck of said ship; an upright boom mounted for universal pivotal movement at the lower end thereof on said support and being tiltable to either side of said plane; a forked member mounted on the upper end of said boom, said forked member having a pair of branches extending in the longitudinal direction of said boom and having each a free end portion turnable about axis substantially parallel to the axis of said boom; a bolt fastened to and extending transversely between said branches of said forked member adjacent the lower ends thereof; a guide roll mounted on each of said turnable end portions; a pair of hauling winches respectively located adjacent said uprights; a load tackle comprising a first load block mounted for universal tilting movement on said bolt between said branches of said forked member, a second load block, and a cable operatively connected to said blocks, said cable having a pair of hauling portions respectively guided over said guide rolls on said turnable end portions of said forked member and respectively connected at the free ends thereof to said hauling winches, and said load blocks being movable by said cable and said hauling winches between a first position in which said load blocks are spaced from each other and a second position in which said load blocks abut against each other; aligning means provided on said blocks for aligning said blocks in said second position, whereby the aligned blocks will swing about said bolt through the space between the branches of said forked member upon winding of said cable on said hauling winches; a pair of hanger winches respectively located adjacent said uprights; and a pair of hanger tackles, each comprising a first tackle block connected to said forked member, a second tackle block, and a hanger cable, said second tackle blocks being respectively connected to said turnable heads and said hanger cables being respectively operatively connected at one end portion thereof to one of said tackle blocks and at the other end portion thereof to one of said hanger winches and being guided intermediate said end portions over said guide rolls in said turnable heads.

3. A ships loading device comprising, in combination, a pair of uprights adapted to be mounted spaced from each other on the deck of a ship, said uprights defining between themselves a plane, and each of said uprights having a longitudinal axis; a head turnably mounted on the upper end of each of said uprights for turning move-

ment about the axis of the same; a guide roll mounted in each of said turnable heads; a support adapted to be mounted in said plane on the deck of said ship; an upright boom mounted for universal pivotal movement at the lower end thereof on said support and being tiltable to either side of said plane; a forked member mounted on the upper end of said boom, said forked member having a pair of branches extending in the longitudinal direction of said boom and having each a free end portion turnable about axis substantially parallel to the axis of said boom; a bolt fastened to and extending transversely between said branches of said forked member adjacent the lower ends thereof; a guide roll mounted on each of said turnable end portions; a pair of hauling winches respectively located adjacent said uprights; a load tackle comprising a first load block mounted for universal tilting movement on said bolt between said branches of said forked member, a second load block and a cable operatively connected to said blocks, said cable having a pair of hauling portions respectively guided over said guide roll on said turnable end portions of said forked member and respectively connected at the free ends thereof to said hauling winches, and said load blocks being movable by said cable and said hauling winches between a first position in which said load blocks are spaced from each other and a second position in which said load blocks abut against each other; aligning means provided on said blocks for aligning said blocks in said second position, whereby the aligned blocks will swing about said bolt through the space between the branches of said forked member upon winding of said cable on said hauling winches; guide means mounted on said second load block for guiding said hauling portions of said cable during the swinging of said blocks through the space between said branches; a pair of hanger winches respectively located adjacent said uprights; and a pair of hanger tackles, each comprising a first tackle block connected to said forked member, a second tackle block, and a hanger cable, said second tackle blocks being respectively connected to said turnable heads and said hanger cables being respectively operatively connected at one end portion thereof to one of said tackle blocks and at the other end portion thereof to one of said hanger winches and being guided intermediate said end portions over said guide rolls in said turnable heads.

4. A ships loading device comprising, in combination, a pair of uprights adapted to be mounted spaced from each other on the deck of a ship, said uprights defining between themselves a plane, and each of said uprights having a longitudinal axis; a head turnably mounted on the upper end of each of said uprights for turning movement about the axis of the same; a guide roll mounted in each of said turnable heads; a support adapted to be mounted in said plane on the deck of said ship; an upright boom mounted for universal pivotal movement at the lower end thereof on said support and being tiltable to either side of said plane; a forked member mounted on the upper end of said boom, said forked member having a pair of branches extending in the longitudinal direction of said boom and having each a free end portion turnable about axis substantially parallel to the axis of said boom; a bolt fastened to and extending transversely between said branches of said forked member adjacent the lower ends thereof; a guide roll mounted on each of said turnable end portions; a pair of hauling winches respectively located adjacent said uprights; a load tackle comprising a first load block mounted universal tilting movement on said bolt between said branches of said forked member, a second load block and a cable operatively connected to said blocks, said cable having a pair of hauling portions respectively guided over said guide rollers on said turnable end portions of said forked member and respectively connected at the free ends thereof to said hauling winches, each of said load blocks including a shaft, a plurality of sheaves turnably mounted adjacent each other on said shaft, and said load blocks being movable by said cable and said hauling winches between a first position in which said load blocks are spaced from each other and a second position in which said load blocks abut against each other; aligning means provided on said blocks for aligning said blocks in said second position, whereby the aligned blocks will swing about said bolt through the space between the branches of said forked member upon winding of said cable on said hauling winches, guide means on said second load block for guiding said hauling portions of said cable during the swinging of said load tackle through said space between said branches of said fork member, said guide means comprising a pair of plates respectively turnably mounted on opposite ends of said shaft, a pair of stud shafts on each of said plates and extending spaced from said shaft and parallel thereto outwardly of said plates, and a guide roll mounted on each of said stud shafts; a pair of hanger winches respectively located adjacent said uprights; and a pair of hanger tackles, each comprising a first tackle block connected to said forked member, a second tackle block, and a hanger cable, said second tackle blocks being respectively connected to said turnable head and said hanger cables being respectively operatively connected at one end portion thereof to one of said tackle blocks and at the other end portion thereof to one of said hanger winches and being guided intermediate said end portions over said guide rolls in said turnable heads.

5. A ships loading device comprising, in combination, a pair of uprights adapted to be mounted spaced from each other on the deck of a ship, said uprights defining between themselves a plane, and each of said uprights having a longitudinal axis; a head turnably mounted on the upper end of each of said uprights for turning movement about the axis of the same; a guide roll mounted in each of said turnable heads; a support adapted to be mounted in said plane on the deck of said ship; an upright boom mounted for universal pivotal movement at the lower end thereof on said support and being tiltable to either side of said plane; a forked member mounted on the upper end of said boom, said forked member having a pair of branches extending in the longitudinal direction of said boom and having each a free end portion turnable about axis substantially parallel to the axis of said boom; a bolt fastened to and extending transversely between said branches of said forked member adjacent the lower ends thereof, said bolt having a pair of end portions respectively extending in opposite directions beyond said branches of said forked member; a guide roll mounted on each of said turnable end portions; a pair of hauling winches respectively located adjacent said uprights; a load tackle comprising a first load block mounted universal tilting movement on said bolt between said branches of said forked member, a second load block and a cable operatively connected to said blocks, said cable having a pair of hauling portions respectively guided over said guide rolls on said turnable end portions of said forked member and respectively connected at the free ends thereof to said hauling winches, and said load blocks being movable by said cable and said hauling winches between a first position in which said load blocks are spaced from each other and a second position in which said load blocks abut against each other; aligning means provided on said blocks for aligning said blocks in said second position, whereby the aligned blocks will swing about said bolt through the space between the branches of said forked member upon winding of said cable on said hauling winches; a pair of hanger winches respectively located adjacent said uprights; and a pair of hanger tackles, each comprising a first tackle block, a second tackle block, and a hanger cable, said first tackle blocks being respectively connected by universal joints to said end portions of said bolt, said second tackle blocks being respectively connected to said turnable heads and said hanger cables being respectively

operatively connected at one end portion thereof to one of said tackle blocks and at the other end portion thereof to one of said hanger winches and being guided intermediate said end portions over said guide rolls in said turnable heads.

6. A ships loading device comprising, in combination, a pair of uprights adapted to be mounted spaced from each other on the deck of a ship, said uprights defining between themselves a plane; a support adapted to be mounted in said plane between said uprights on the deck of said ship; an upright boom mounted at the lower end thereof for universal pivotal movement on said support, said boom being in neutral position in said plane and being movable to inclined operating positions extending laterally to either side of said plane; a supporting member mounted on the upper end of said boom and including attaching means movable about an axis normal to the longitudinal axis of said boom; load tackle means including a first tackle block mounted by said attaching means on said supporting member for tilting movement about an axis substantially normal to the boom axis, and a second tackle block operatively connected to said first tackle block; first operating means operatively connected to the upper ends of said uprights and to the upper end of said boom for adjusting and holding said boom in any operating position on either side of said plane and for returning said boom from an operating position on one side of said plane to said neutral position so that said boom may then be easily tilted by an operator to an operating position on the other side of said plane; and second operating means operatively connected to said tackle means for moving said second tackle block relative to said first tackle block and for aligning said tackle blocks in said plane when said boom is in said neutral position so that said tackle blocks may be swung from a position aligned in said plane together with the boom to a position on one side of said plane when said boom is tilted from the neutral position to an operating position.

7. A ships loading device comprising, in combination, a pair of uprights adapted to be mounted spaced from each other on the deck of a ship, said uprights defining between themselves a plane; a support adapted to be mounted in said plane between said uprights on the deck of said ship; an upright boom mounted at the lower

end thereof for universal pivotal movement on said support, said boom being in neutral position in said plane and being movable to inclined operating positions extending laterally to either side of said plane; a forked member mounted on the upper end of said boom and having a pair of branches extending spaced from each other in longitudinal direction of said boom; a pair of guide rollers respectively turnably mounted on the free ends of said branches of said forked member; load tackle means including a first tackle block mounted for tilting movement about an axis substantially normal to the boom axis between said branches of the forked member, a second tackle block, and a cable operatively connected to said tackle blocks and having a pair of hauling portions respectively guided over said guide rollers on said ends of said forked member; first operating means operatively connected to the upper ends of said uprights and to the upper end of said boom for adjusting and holding said boom in any operating position on either side of said plane and for returning said boom from an operating position on one side of said plane to said neutral position so that said boom may then be easily tilted by an operator to an operating position on the other side of said plane; and second operating means operatively connected to said hauling portions of said cable of said tackle means for moving said second tackle block relative to said first tackle block and for aligning said tackle blocks in said plane when said boom is in said neutral position so that tackle blocks may be swung through the space between said branches when said boom is tilted from the neutral position to an operating position.

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(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,914,193 Dated November 24, 1959

Inventor(s) Heinz Ferdinand Johannes Sprengel

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Delete from Col. 1, line 12, the date "February 11, 1954" and substitute therefor --April 5, 1954--.

Signed and sealed this 30th day of May 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents