Dec. 19, 1967 M. M. MONTGOMERY, JR 3,358,854

CRANE

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FIG_1

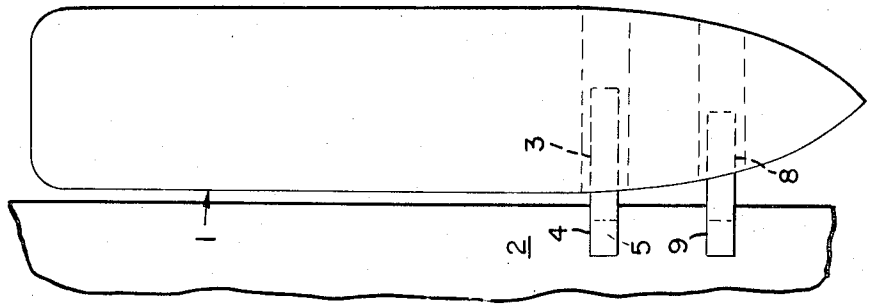


FIG_2

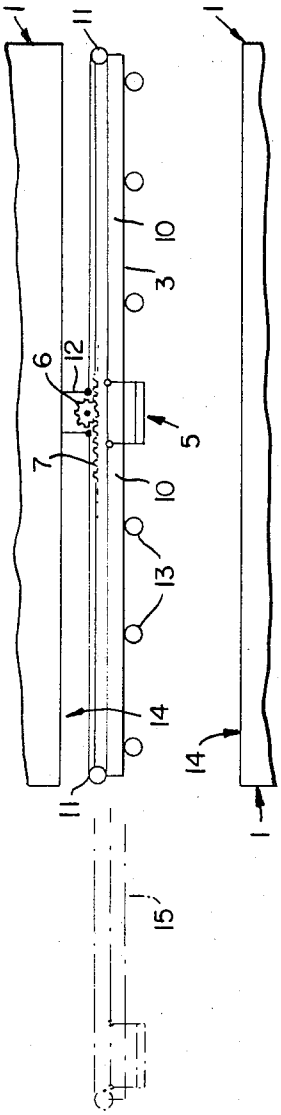


FIG_3

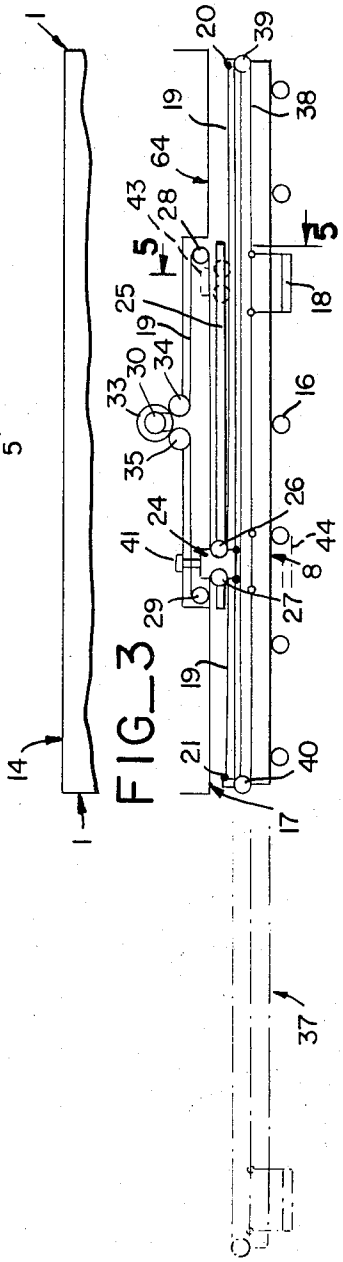
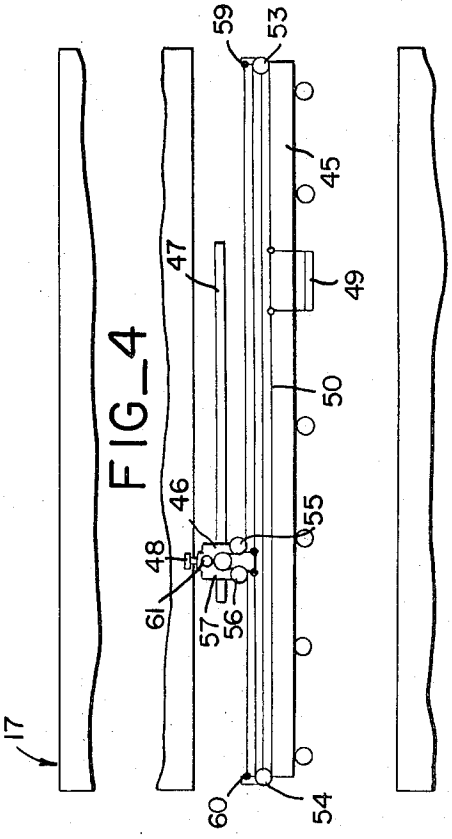


FIG_4



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CRANE

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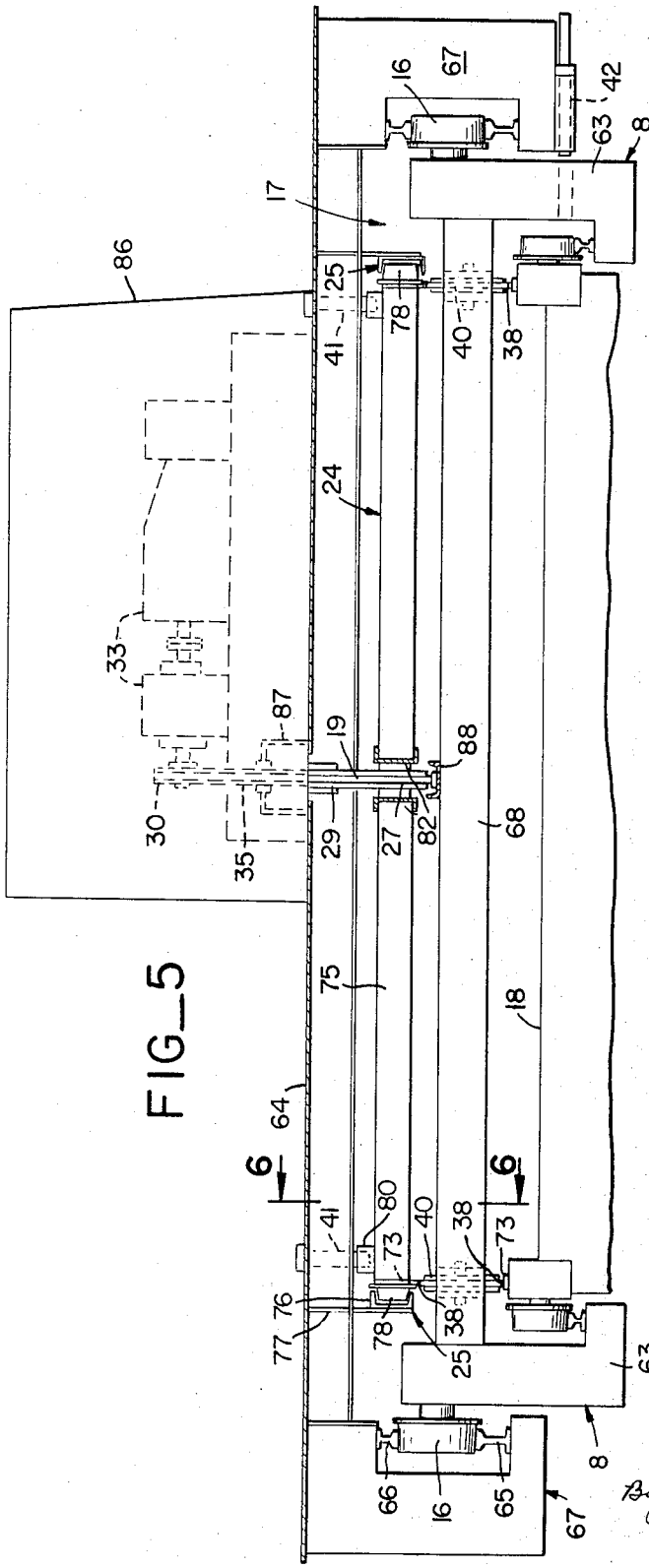


FIG_5

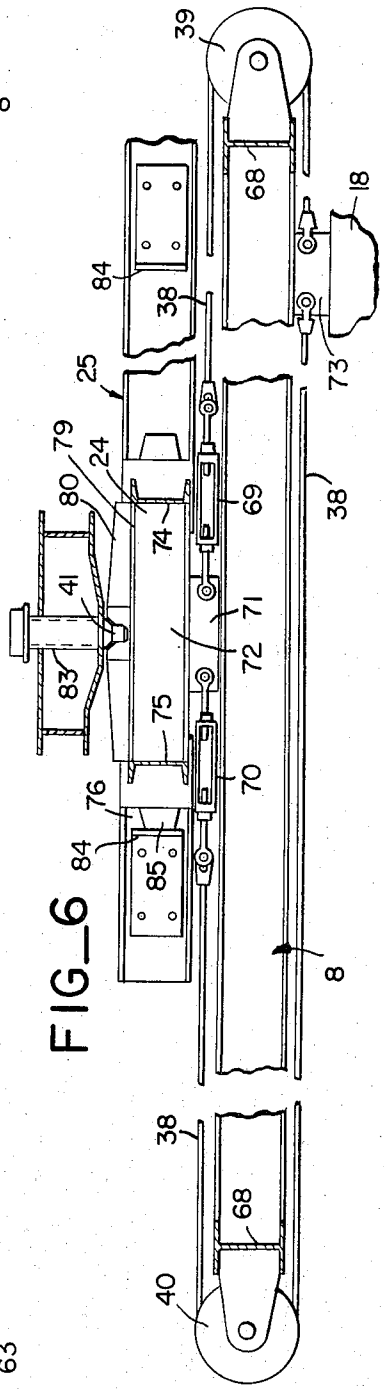


FIG_6

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FIG_7

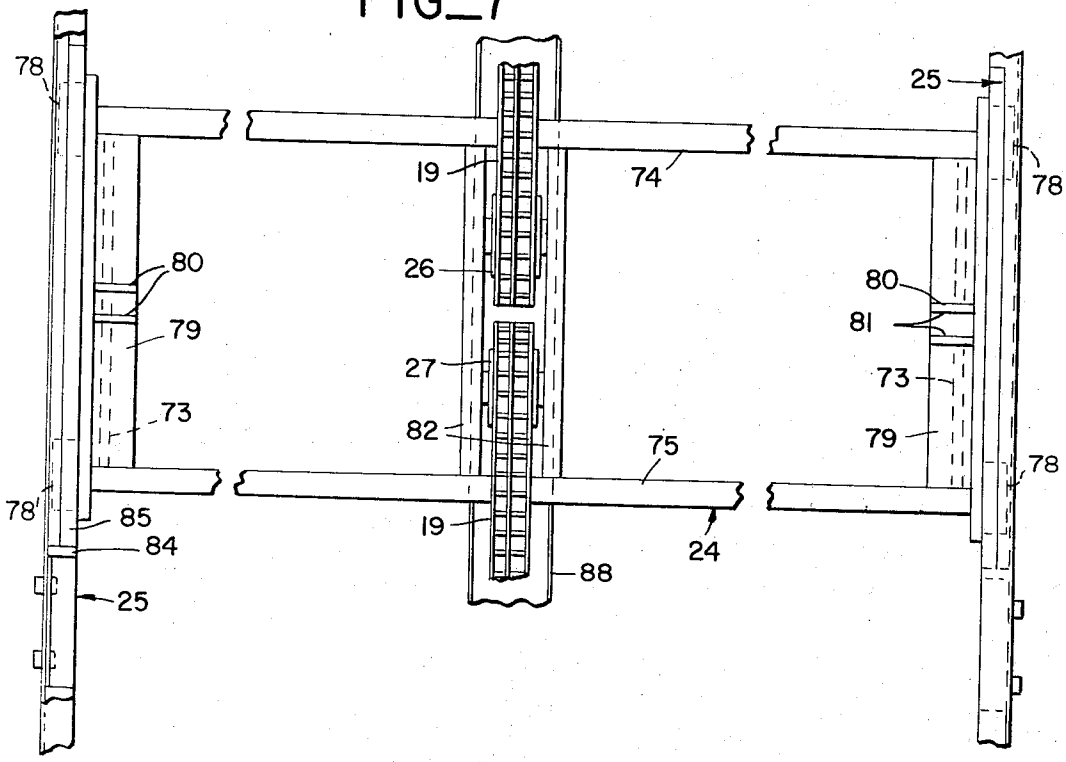
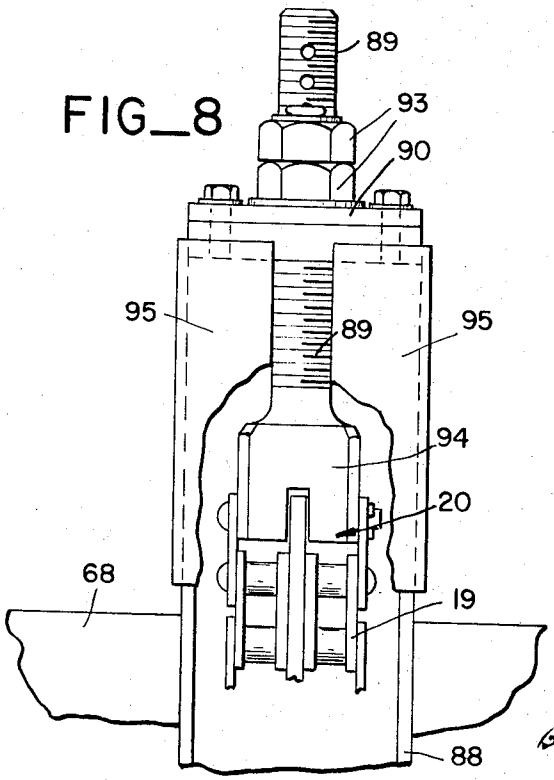


FIG_8



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CRANE

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6 Claims. (Cl. 214—15)

This invention relates to cranes, generally, and more specifically to the type installed on a ship, and which crane includes a horizontally disposed boom extending thwartwise of the ship supported from a position within the confines of the outline of the ship to a position projecting outwardly from one side or the other of such ship. The boom, in turn, normally supports a trolley movable thereon longitudinally thereof and which trolley includes hoisting means for engaging and supporting a load.

The "outreach" of the boom is the distance the boom is adapted to project outwardly from a side of a ship, and where a single boom has heretofore been used, its outreach has a direct relation to the width of the ship at the point where the boom is positioned for the reason that the boom is preferably of maximum length permitting sea storage.

Heretofore, in order to obtain an increased outreach, a plurality of telescopically related booms have been used in side-by-side relation or one over the other. This invention provides for additional outreach for a single boom.

The reference herein to a "single boom" relates to booms that may comprise several connected boom members, which are normally in parallel, spaced, side-by-side relation and constitute the sole support for the load carrying trolley, as distinguished from multiple booms extensible relative to each other in the direction of their movement or longitudinally of the booms.

One of the objects of this invention is the provision of means for increasing the horizontal outreach of a single trolley-supporting boom at each of two opposite sides of a ship, or supporting structure, beyond that heretofore accomplished. Another object of the invention is the provision of a single, horizontally disposed boom, and a trolley thereon, actuatable for simultaneous movement of the boom and trolley longitudinally of the boom to each of two opposite directions greater distances relative to a stationary support on which said boom is mounted, than heretofore.

An added object is the provision of a stationary support for supporting a horizontally disposed trolley-supporting boom for movement of the latter longitudinally thereof in opposite directions projecting from either one side or the other of said support, upon said movement in one direction or the other, and means on said support movable in said opposite directions to fixed points of securement to said support, and operably connected to said boom, for increasing the outreach of said boom to one side or the other of said support according to the position of the point of securement of said means to said support.

A still further object of the invention is the provision of a single horizontally disposed, trolley-supporting boom supported thwartwise on a ship for movement of the boom longitudinally thereof to positions projecting from one side or the other of the ship, and a control member movable to different positions for increasing the outreach of the boom from one side or the other of the ship, and which boom, trolley and control member are actuatable for their said movement from a single source of power.

Other objects and advantages will appear in the description and drawings.

In the drawings:

FIG. 1 is a diagrammatic top plan view of a ship having a pair of cranes thereon, one being a conventional crane positioned at a point intermediate the bow and stern portions of the ship at a point of approximately the maximum width of the ship, and the other being a crane embodying the present invention, and positioned in the bow portion, both cranes being shown in maximum extended positions from the starboard side of the ship and with their trolleys positioned over a dock at the outermost end of each crane.

FIG. 2 is diagrammatic enlarged view of a conventional crane of the same type as the one embodying the present invention, the crane being viewed from the foreside, and broken lines indicate the projecting portion of the boom when in maximum extended position from the starboard side of a ship.

FIG. 3 is a view similar to that of FIG. 2 showing a crane incorporating the present invention, and which crane includes a boom in full line in stowed position with broken lines indicating the projecting portion of the boom when in maximum extended position from the starboard side of a ship.

FIG. 4 is a diagrammatic view similar to that of FIG. 3 showing a modified form of the invention shown in FIG. 3.

FIG. 5 is a simplified vertical part cross-sectional and part elevational view taken through a crane and the portion of the ship in which the crane is supported along approximately line 5—5 of FIG. 3 to show the relationship between the boom, ship and trolley and the boom actuating means. The parts of the ship are diagrammatic and greatly simplified to avoid confusion.

FIG. 6 is an enlargement of a portion only of the structure shown in FIG. 5 taken generally along line 6—6 of FIG. 5.

FIG. 7 is a fragmentary simplified top plan view of the shuttle device of the present invention, broken in width to accommodate the view of the sheet, and showing the supporting means for the shuttle device.

FIG. 8 is a fragmentary enlarged top plan view of a portion of the crane showing one connection between one end of the chain for driving the boom and an end cross member at one end of the boom.

A brief reference to FIG. 1 illustrates one problem that is solved by the present invention, although the advantage of a single boom arrangement providing for an additional outreach at either of the opposite sides of a ship over conventional single boom structure is highly desirable where the present invention is substituted for conventional single boom structure.

In FIG. 1 a ship is generally indicated at 1, which ship has the usual converging opposite sides at the bow. A dock 2 is along the starboard side of the ship, the latter being in unloading or loading relation to the dock, the ship normally being spaced from the dock, as indicated.

A conventional horizontally disposed boom is shown at 3 (FIG. 1) in fully extended position with its projecting end 4 extended over the dock 2 so that the usual trolley 5 thereon will be in a position to deposit a load onto the dock or to pick up a load, when the trolley is at the outer end of said projecting end.

A power driven pinion 6 (FIG. 2) on the longitudinal centerline of the ship engages a rack 7 on the boom for racking the latter in and out of the ship an equal distance to either side of the latter. In order to project an adequate distance from either side of the ship, the length of the boom is approximately equal to the width of the ship at the location of the boom to enable sea stowage of the latter within the ship.

The distance between the sides of the ship in the bow

portion is substantially less than the distance at boom 3, due to the convergence of said sides, making it impossible to use the boom of FIG. 3 in the bow portion and still provide sea stowage for the boom. A boom of the present invention is generally indicated at 8 in FIG. 1 which boom, although substantially shorter than the boom 3 in FIG. 1, is shown in fully extended position so that its outer end 9 projects over the dock a distance adequate to deposit a load onto dock 1 in a position of safety equal to that of the boom 3. The present invention enables the boom 8 to extend the same distance from the opposite side of the ship if the dock is on the port side, as will later be explained more in detail.

Where the boom structure of the present invention is installed amidship, or in the position of boom 3, it would be equal to the length of boom 3, and the outreach would be considerably greater in that position than the outreach of boom 3. In FIG. 3, for example, boom 8 is the same length as boom 3, in order to clearly show the additional outreach where boom 8 is of the same length as that of conventional boom 3.

The trolley 5 in FIG. 2 is connected at one of the ends of cables 10 that extend oppositely outwardly of the trolley to the ends of the boom 3 and over pulleys 11 on said latter ends, and then over the boom and back to a stationary member 12 on the ship.

In FIG. 2, boom 3 is shown as having wheels 13 that support it for movement within passageway 14 below the upper deck, which passageway is normally closed at its open ends at the opposite sides of the ship by the usual doors (not shown) when the boom is stowed within the latter, and when the doors are open the boom is adapted to be projected to either side of the ship an equal distance.

While the illustrations show booms that are shown and described as being within a passageway within a ship, it is obvious that the booms may be similarly positioned on a gantry above the deck for moving each of the booms longitudnally of the ship to different positions over different hatches in the upper deck, as is customary in the ship building industry, and in which case the booms, trolleys etc. would be the same as described, except supported on the gantry, and whatever is described as being in fixed positions on the ship would be in fixed positions on the gantry.

In the conventional arrangement as shown in FIG. 2, the trolley 5 is positioned centrally between the ends of the boom when the latter is stowed on the ship, and upon rotation of pinion 6 in one direction the boom 3 will be racked to the broken line position 15, and the trolley 5 will be automatically moved to the outer end of the outwardly projecting portion of the boom when the inner end of the latter is adjacent to fixed point 12 where cables 9 are deadended. The fixed member 13 defines the limit of outward movement of the boom, and the travel of the trolley is limited by cables 10 to half the length of the boom.

Referring to FIG. 3, the boom 8 of the present invention is substantially the same as boom 3 in FIG. 2, and is supported on rollers 16 (FIGS. 3, 5) for movement thwartwise of the ship in passageway 17. The latter also extends thwartwise of the ship and its ends are normally closed by the usual doors (not shown) that may be opened for projecting the boom outwardly of one side or the other of the ship.

A trolley 18 (FIGS. 3, 5) corresponding to trolley 5, is supported on boom 8 for movement longitudinally of the latter, which trolley may carry the usual load carrying or engaging means and the means for hoisting and lowering such load carrying or engaging means.

A chain 19 (FIGS. 3, 5, 7, 8) is connected at one end 20 thereof to the right end of boom 8, as seen in FIGS. 3, 8, and the other end of the chain is connected to the opposite end of the boom at 21.

A shuttle member generally designated 24 (FIGS. 3, 5, 7) is horizontally movable on horizontally elongated shuttle supporting means 25 that, in turn, extends parallel with boom 8 to predetermined distances to opposite sides of the longitudinally extending centerline of the ship, or predetermined distances to opposite sides of a point centrally between the ends of the boom 8 which the latter is stowed.

This shuttle member 24 rotatably supports a pair of sprocket wheels 26, 27 (FIGS. 3, 7) that are in horizontally spaced relation and in the same vertical plane as chain 19 is disposed.

A pair of sprocket wheels 28, 29 (FIGS. 3, 5) are rotatably supported on a fixed portion of ship 1 above boom 8 and in the same plane as sprocket wheels 26, 27. Said wheels 28, 29 are horizontally spaced apart and are positioned at points adjacent to the opposite ends of the shuttle supporting means 25.

A power driven sprocket wheel 30 is positioned in the same vertical plane as wheels 28, 29 at a fixed point above sprocket wheels 28, 29, and wheel 30 is operably connected with any suitable source of power 33 for being driven thereby. Also rotatably supported at horizontally spaced fixed points below said sprocket wheel 30 is a pair of adjacently positioned sprocket wheels 34, 35 (FIGS. 3, 5).

The length of chain 19 extending from point 20 at the right-hand end of boom 8, as seen in FIG. 3, extends horizontally over boom 8 to sprocket wheel 26, and then upwardly between sprocket wheels 26, 27 (FIGS. 3, 5) and in engagement with the former and back to sprocket wheel 28 (FIG. 3) and around the latter in engagement therewith to the upper side of said wheel 28. From wheel 28, chain 19 extends back to sprocket wheel 34 and upwardly between sprocket wheels 34, 35 in engagement with wheel 34, and over power-driven sprocket wheel 30 in engagement with the latter, and then again downwardly between wheels 34, 35 and in engagement with wheel 35. From wheel 35 the chain extends horizontally to and over sprocket wheel 29, and then back to and downwardly between sprocket wheels 26, 27 (FIGS. 3, 5) in engagement with the latter. From sprocket wheel 27 the chain extends to the point 21 at the end of boom 8 that is opposite to point 20 and where it is deadended on the boom.

By this arrangement it is seen that upon driving the sprocket wheel 30 clockwise as seen in FIG. 3, and with the shuttle member 24 locked in place at the left end of the shuttle support 25, the boom 8 will be driven to the left out of the open end of passageway 17 in the side of the ship to the extended dot-dash line position 37. In this position, it is apparent from a comparison between the dot-dash line position 15 in FIG. 2 and position 37 in FIG. 3, that the boom will project from the side of the ship in FIG. 3 farther than in FIG. 2 by a distance equal to the distance between the shuttle slide member 24 and the centerline of the ship. Also the boom will project from the opposite side of the ship the same added distance upon movement of the shuttle member 24 to the right as seen in FIG. 3 to the opposite end of the shuttle support 25 upon counterclockwise rotation of the sprocket wheel 30.

The trolley 18 is connected to one end of the corresponding ends of a pair of cables 38 (FIGS. 3, 5, 6) each of which substantially corresponds to cable 10 in FIG. 2, and which cables 38 extend over pulleys 39 on the end of the boom that is adjacent to point 20, and from pulleys 39 back and over pulleys 40 that are at the opposite end of the boom. From pulleys 40, cables 38 extend to and are connected with trolley 18. The cables 38, 40 extend below and adjacent to the ends of the shuttle device that are adjacent to the sides of passageway 17.

By the above arrangement, upon movement of the boom 8 to the left, as viewed in FIG. 3, the trolley 18, at the start and when the boom is stowed within the ship, will be positioned at a point spaced from pulleys 40 a distance substantially equal to twice the distance the boom projects when in broken line position 37, and the shuttle member 24 and trolley will be spaced at opposite sides of a point centrally between the ends of boom 8.

The shuttle member is releasably locked to a stationary part of the ship at either end of its movement on each of the supports **25** by a locking pin **41** (FIGS. 3, 5, 6) that extends through a pin support in the deck of the ship and into a recess in the shuttle slide, as will later be shown more in detail.

The boom itself may be locked in a stowed position by means of a removable pin **42** (FIG. 5) that may extend through an opening in one side of the passageway in which the boom is positioned, and into a hole or recess in the boom.

In order to move the shuttle slide from one end of the shuttle support to the other, for projecting the boom its maximum distance out of the side of the ship opposite to the one indicated in FIG. 3 it is only necessary to lock the boom in its stowed position by pin **42**, and unlock the shuttle slide by removal of pin **41**. Upon actuating power sprocket **30** counterclockwise, as seen in FIG. 3, the shuttle member **24** will be moved to dotted line position **43** and the trolley will be automatically moved to dotted position **44**. The shuttle member will then be locked against movement and the boom will be unlocked to enable the boom and trolley to be projected from the port side of the ship to a position corresponding to the position **37**, but at said port side.

With the arrangement described, a single power actuated means is adapted to move the single boom, trolley and shuttle member, which is an advantage, but the advantage of obtaining the added outreach of a single boom at opposite sides of the ship providing means for varying the dead ends of the trolley actuating chain, is an important advantage independently of the boom actuating arrangement.

FIG. 4 is a diagrammatic view that shows a boom **45**, and a shuttle member **46** supported on a shuttle support **47** for movement of the shuttle member to opposite ends of the support **47** where it may be locked by locking means **48** corresponding to the locking pin **41**. A trolley **49** is supported on the boom for movement on the latter longitudinally thereof. The boom is supported for movement longitudinally thereof in the same manner as boom **8** and cable **50** corresponds to cable **38** for moving the trolley upon longitudinal movement of the boom **45**. Cables **50** extend over the pairs of pulleys **53**, **54** on the respective ends of boom **45** and are connected to one of their ends to the trolley and at their opposite ends to the shuttle **46** as described for cables **10** in FIG. 2.

The shuttle **46**, in FIG. 4, carries sprocket wheels **55**, **56** that are similar to sprocket wheels **34**, **35** in FIG. 3, and a power driven sprocket wheel **57** is on the shuttle **46** in a position above and between sprocket wheels **55**, **56**. A chain **58** is threaded around sprocket wheels **55–57** in the manner in which chain **19** is threaded around wheels **30**, **34**, **35** and which chain **58** is secured at one end to one end **59** of the boom while the other end of the chain is secured at **60** to the opposite end of the boom.

Said shuttle member **46** may carry the power and driving means **61** for driving the shuttle member from one end of the support **47** to the other end, instead of the driving means being at a fixed point on the ship, as described for FIG. 3. This is the principal distinction between the arrangement in FIG. 3 and that of FIG. 4.

To describe boom **8** more in detail, said boom may comprise a pair of horizontally elongated, parallel, horizontally spaced boom members **63** (FIGS. 5, 6) respectively disposed along the opposite sides of passageway **17**, and below the deck **64**. The wheels **16** are on each of the boom members, and are supported between vertically spaced lower and upper horizontally extending rails **65**, **66** (FIG. 5) that are secured to fixed portions **67** of the ship along the sides of the passageway **17**, said wheels being supported on the lower tracks **65**. Said boom members **63** may be connected by any suitable cross frame members **68** (FIG. 5), positioned between corresponding ends of the pair of boom members **63** and at points intermediate said ends, and the pairs of pulleys **39**, **40** may be carried by end cross frame members **68** (FIG. 6), and one of the corresponding ends of each of said cables **38** is connected with turnbuckle **69** (FIG. 6) while the other end is connected with turnbuckle **70**. Turnbuckles **69**, **70**, in turn, are each connected to a downwardly projecting portion **71** of each end frame member **72** of the shuttle member **24** and extend oppositely from said portion. The other end of each cable **38** is connected with a portion **73** that is rigid with the trolley **18** (FIG. 6).

The shuttle member **24** comprises a pair of horizontally disposed frame members **74**, **75** (FIGS. 5, 6, 7) that are spaced apart in side-by-side parallel relation and that extend between the boom members **63**, but short of the latter and at a level adjacent to the upper sides thereof.

The shuttle support **25** comprises a pair of opposedly opening horizontally extending channel members **76** which are rigid with portions **77** that, in turn, are fixed on ship **1** below deck **64**. Channel members **76** are parallel with boom members **63**, and slide elements **78** at the ends of the shuttle frame members **74** extend into the open sides of the channel members and are slidable longitudinally thereof (FIG. 7).

The shuttle frame members **75** of the pair thereof are connected by cross pieces **79** (FIG. 7) and each of these pieces **79** has a pair of upwardly projecting keepers **80** rigid therewith, which keepers are spaced apart (FIG. 7) to provide a space **81** between them to receive the lower end of a locking pin **41**. Locking pin **41** (FIG. 6) is vertically movable in a vertical barrel or sleeve **83** extending through and rigid with deck **64** so that its lower end will be held between keepers **80**. A locking pin is at each end of the shuttle support for releasably locking the the shuttle member in the full line position shown in FIG. 3 or in the dotted position **43** (FIG. 3).

Intermediate the sides of the shuttle member, or at a point approximately intermediate the boom members **63**, the pair of sprocket wheels **26**, **27** are rotatably supported between frame members **82** (FIGS. 5, 7) and at a level above said sprocket wheels, at positions adjacent to the limits of travel of the shuttle member **24**, are the sprocket wheels **28**, **29**, which wheels are supported by members rigid with the deck **64**.

The shuttle member **24** is limited in its movement between the ends of channel members **76** by stop elements **84** (FIGS. 6, 7), which are adapted to be engaged by elements **85** rigid with the shuttle member.

The sprocket wheel **30**, as already explained, is above deck, in the present instance, in machine house **86** (FIG. 5), in which house the power means **33** is located, and a tunnel housing **87** covers the portions of the chains **19** that may be above deck.

Deck **64** is formed with a slot covered by the tunnel housing extending substantially the length of the travel of the shuttle member to enable movement of said shuttle member between the limits provided.

An upwardly opening horizontally elongated channel member **88** (FIGS. 5, 7) extends between the ends of the boom **8** parallel with and approximately midway between the boom members **63** to provide a trough in which the upper run of chains **19** is slidably supported. Said chain is indicated in FIG. 8 as being a double chain and the sprocket wheels over which it extends are double sprockets, although it is to be understood that the invention is not restricted to such chain.

The connection between the ends of said chain and each of the ends of the boom **8** are seen in FIG. 8 in which each connection comprises an externally threaded bar **89** extending through plates **90** that are rigid with the ends of channel member **88**, the latter being rigid with end cross members **68** of the boom. Nuts **93** are on the outwardly projecting end of each bar **89** and the inner end of each bar is formed with a head **94** to which the end of chain **19** is pivotally connected. A pair of cover plates

95 rigid with the end of channel member 87 may partially cover the end of the chain and head 94.

In operation, assuming loading or unloading of the ship is at the starboard side and the single boom 8 is fully within the ship, the door (not shown) closing the starboard end of the passageway 17 is opened. The boom is then unlocked by retraction of one or more pins 42.

If the operation is one for loading the ship, the sprocket wheel 30 is actuated by powder means 33 for rotating said sprocket wheel counterclockwise as viewed in FIG. 3, and the boom will be moved to the left through the open end of passageway 17 to any desired distance up to the limit permitted by the position of the shuttle member 24, or to the broken line position 37 of FIG. 3. This assumes that the shuttle member is in the full line position shown in FIG. 3 or spaced from the center line of the boom to the side thereof to which the boom is to be projected.

Should the trolley be one that is self-powered independently of the power source 33, the trolley may be moved along the boom to whatever distance may be desired. In the drawings, however, the arrangement of cables 38 will effect a simultaneous movement of the trolley with the boom, but at twice the rate of movement of the boom, so that the trolley will reach the outer end of the boom at the same time as the latter reaches its outermost position.

Whether the crane is within the ship or on a gantry, the trolley 18 may always be moved to a position for lowering the load into the hold or for taking a load out of the ship through the hatch or opening in any deck at the boom. It should also be noted that, in the present instance, a greater advantage in loading and unloading is provided, since the trolley may be moved by the same power means as drives the boom, a substantially greater distance within the ship than heretofore, thwartwise of the latter, without projecting the boom to the side of the ship opposite to the loading or unloading side thereof.

As has already been mentioned, the shuttle device or member 24 may be shifted from the position indicated in full line in FIG. 3 to the dotted-line position 43 for maximum extension of the boom to the port side of the ship by locking the boom stationary by pin or pins 42 and unlocking the shuttle device by removal of pin or pins 41 and actuating the sprocket wheel 30 (FIG. 3) in a counterclockwise direction until the shuttle device is in the dot-dash line position 43, where it can be locked to a stationary part by pin 41, after which the boom is again unlocked.

The trolley 18 will now be at the opposite side of the centerline of the ship in the dotted line position 44, and after opening the port side door of passageway 17 and driving sprocket wheel clockwise, the boom and trolley 18 will be projected to the port side of the ship to the same degree as indicated by the broken line position 37.

It is to be understood that the above detailed description is not to be considered limiting, and that changes and modifications may be made that come within the spirit of the invention and within the scope of the appended claims.

Also, it should be noted that while the claims refer to a pair of cables dead ended at one of their ends on the trolley and at their opposite ends on the shuttle member, it is to be understood that a continuous cable may be clamped along its length to the trolley or to the shuttle member for dead ending the lengths of the cables between the trolley and shuttle member, and the claims are intended to cover such structure.

Many different arrangements may be provided for moving the boom, but where the power means is above the passageway 17 as in FIG. 3, less head room is required within the passageway than where structure such as in FIG. 4 is used.

I claim:

1. In a crane that includes a boom support structure, a horizontally elongated boom supported on said boom support structure for movement of said boom longitudinally of the latter in opposite directions from a predetermined retracted position, a load trolley mounted on said boom for reciprocable movement thereon longitudinally thereof, a pair of sheaves respectively on opposite ends of said boom, a pair of cables dead ended at one of their ends on said trolley and respectively reeved over said sheaves and dead ended at their opposite ends on a member on said boom support structure, the improvement that comprises:

(a) member-supporting means supporting said member on said boom support structure for movement from a point on said boom support structure adjacent to and intermediate the ends of said boom when the latter is in said retracted position to an offset position between said one end of said boom and said point;

(b) member-locking means for releasably locking said member-supporting means stationary relative to said boom support structure at said operative position, to thereby provide a greater outreach of said boom and trolley in the direction in which said member is offset than when said member is at said point, upon movement of said boom relative to said member in said last-mentioned direction.

2. In a structure as defined in claim 1,

(c) power means operably connected with said boom for moving said boom in said one direction from said retracted position and back again whereby said load trolley will automatically be moved simultaneously with said boom in the direction of movement of said boom;

(d) means connecting said power means with said member for moving said member from said point to said offset position by said power means, and vice versa, when said member-locking means is released to enable movement of said member on said member-supporting means from said offset position to said point, and when said boom is locked in said retracted position against movement thereof, and

(e) boom locking means for releasably locking said boom in said retracted position.

3. In a structure as defined in claim 1,

(c) said boom including a pair of parallel horizontally spaced boom members extending longitudinally of the boom in side-by-side relation and cross pieces rigid therewith connecting said boom members at their ends;

(d) means including an elongated flexible element connected with said boom for moving said boom in said one direction from said retracted position and back again, said flexible element being disposed substantially centrally between said boom members parallel therewith and connected with said end pieces;

(e) power actuated means connected with said element for moving the latter longitudinally thereof in opposite directions to thereby move said boom in said one direction from said retracted position and back again;

(f) said pair of sheaves being at opposite ends of one of said boom members and a second pair of corresponding sheaves on said boom at the opposite ends of the other of said boom members, and a second pair of cables reeved over said second pair of sheaves dead ended at one of their ends on said trolley and dead ended at their opposite ends on said member;

(g) said member including means for dead ending the ends of said second pair of cables that are opposite to the ends dead ended on said trolley at points adjacent to the boom member having said second pair of sheaves at its ends.

4. In a crane that includes a boom support structure, a horizontally elongated boom supported on said boom support for movement of said boom longitudinally of the latter in opposite directions from a predetermined retracted position, a load trolley mounted on said boom for reciprocable movement thereon longitudinally thereof, a pair of sheaves respectively on opposite ends of said boom, a

pair of cables dead ended at one of their ends on said trolley and respectively reeved over said sheaves and dead ended at their opposite ends on a member on said boom support structure, the improvement that comprises:

(a) member-supporting means supporting said member on said boom support structure for movement from a fixed point on said boom supporting structure substantially centrally between the ends of said boom when the latter is in said retracted position, to offset positions spaced longitudinally of said boom to opposite sides of said point;

(b) member-locking means for releasably locking said member stationary relative to said boom support structure at each of said offset positions of said member thereby providing a greater otureach of said boom and trolley to one side or the other of said fixed point according to the side to which said member is offset than when said member is at said point, and

(c) boom-moving means operatively connected with said boom for moving it longitudinally thereof in opposite directions.

5. In a structure as defined in claim 4,

(d) boom-locking means for releasably locking said boom stationary relative to said boom support structure when said boom is in said retracted position;

(e) said trolley being on said boom in a position offset longitudinally thereof to the side of said point opposite to the offset position of said member when said boom is in said retracted position;

(f) said boom-moving means including power means for moving said member on said member-supporting means from one of said offset positions to the other upon releasing said member-locking means and locking said boom stationary by said boom-locking means and then actuating said power means for moving said boom were the latter not held by said boom locking means.

6. In a structure as defined in claim 4,

(d) said boom support structure including stationary rigid ship structure along the sides of a passageway within a ship extending thwartwise of the latter with the ends of said passageway at opposite sides of the ship for projecting the boom from one or the other of said sides;

(e) said boom being wholly enclosed within said passage way extending longitudinally of the latter when in said retracted position with said fixed point being substantially on the centerline of said ship, and means rigid with said ship along opposite lateral sides of said passageway supporting said boom for its movement, and supporting said member-supporting means for movement of said member in the same directions as said boom;

(f) said element being a sprocket chain, and sprocket wheels in driving engagement with said chain, one of which sprocket wheels is said power actuated means;

(g) said member-locking means and said boom-locking means being pins carried by said boom supporting structure movable into and out of positive locking engagement with said member and with said boom.

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