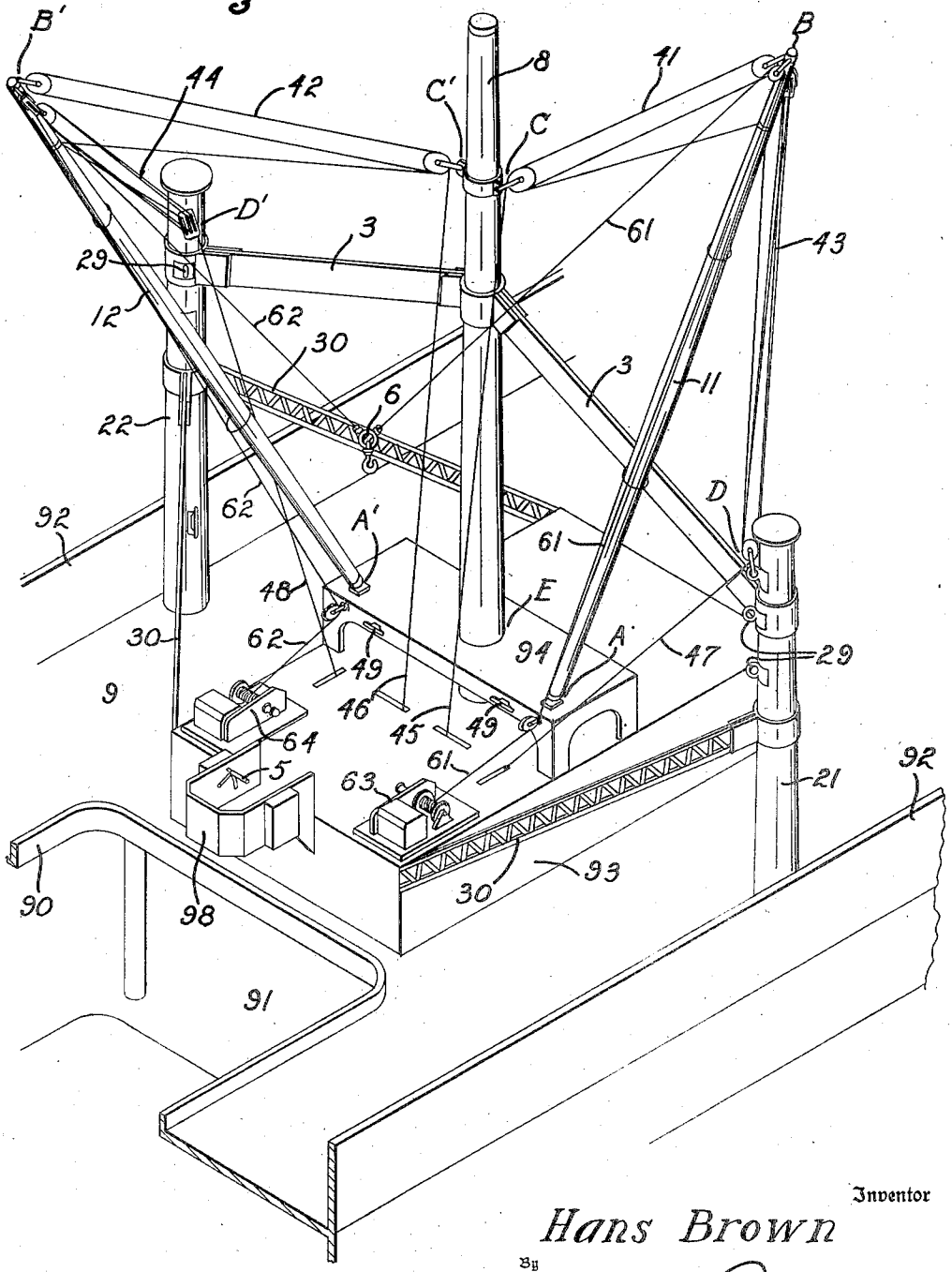
Nov. 19, 1940. H. BROWN 2,222,066

DECK HOISTING GEAR

Filed Dec. 27, 1938 2 Sheets-Sheet 1

Fig. 1



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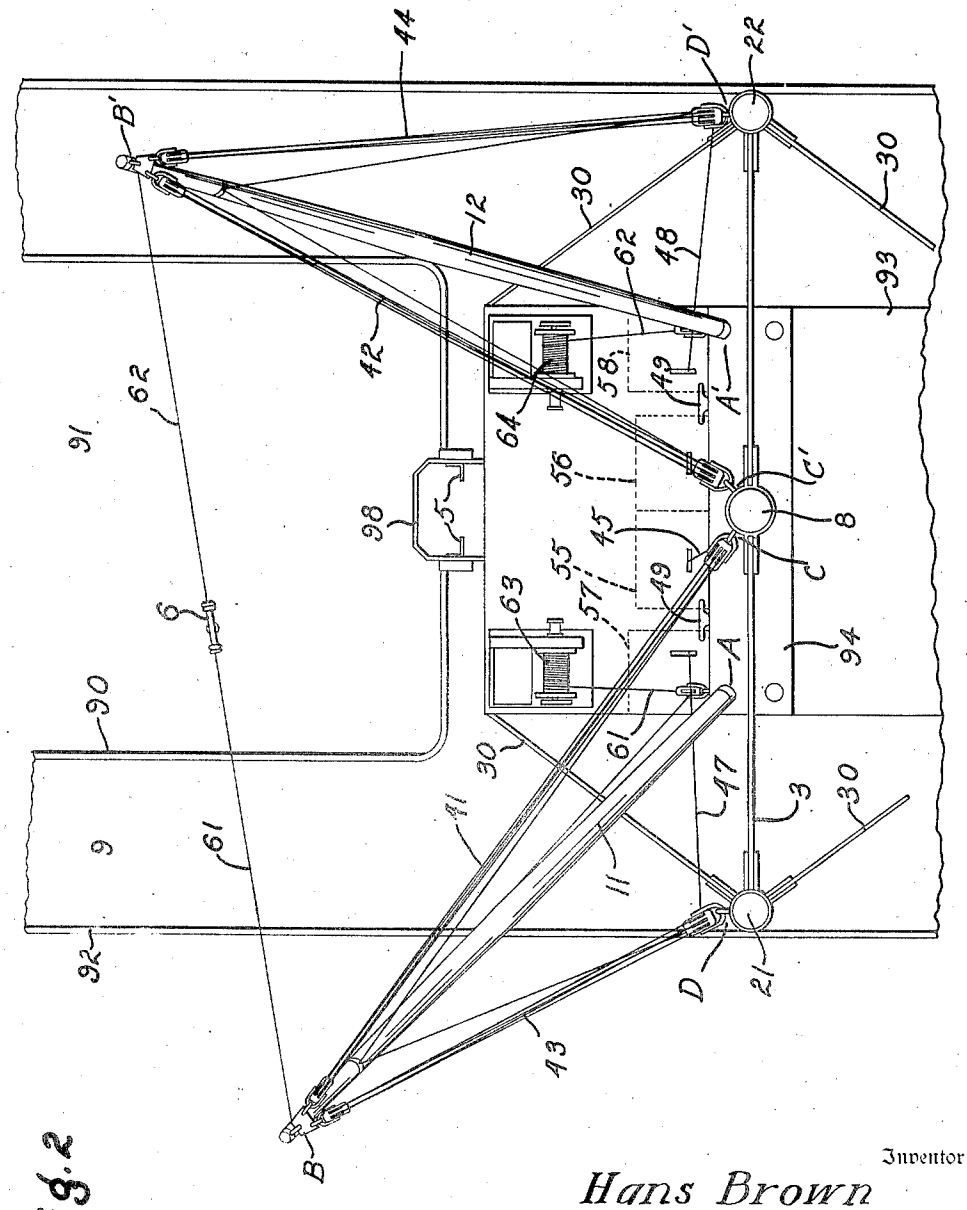


Fig. 2

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UNITED STATES PATENT OFFICE

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DECK HOISTING GEAR

Hans Brown, Seattle, Wash.

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3 Claims. (Cl. 212—3)

My invention relates to deck gear for handling cargo aboard ships. More specifically it relates to the manner of rigging the cargo booms of vessels, for the purpose of handling freight between ship and dock or lighter. However, it will be borne in mind that the invention is also applicable to the handling from one point to an adjacent point of heavy loads by rigged cargo booms, as for instance in yarding logs, and the following specification is therefore to be read as illustrative of the general principle, rather than as restrictive to a particular installation or use, notwithstanding that it is hereafter described as applied to the specific use first indicated.

Cargo vessels normally handle freight by means of two cargo booms, stepped at the foot of a mast placed generally inboard some distance from the rail or side of the ship, which booms are lifted and controlled in elevation by a single boom lift line running from the swinging end of the boom to the mast, the sole function whereof is to support and control the elevation of the boom's swinging end. The mast, the boom stepped at its foot, and the boom lift line from the mast to the swinging end of the boom combine to define a triangle in one plane, and always the plane of the triangle, and the elements defining it, may swing freely about the fixedly positioned mast which constitutes its one side, unless such swinging is prevented by restraining means inclined at an angle to the plane of such triangle. It has been considered necessary, in order to fix the boom in any selected position or the triangle in any selected plane, and to prevent swinging from side to side about the mast as an axis, to employ guy lines running from the swinging end of the boom to convenient points of securement on deck. Two such guy lines are absolutely essential, one usually running forward and the other aft, but in addition, in order that the boom may not, upon sudden release of a load, fly upward toward the mast and then, falling, snap the boom lift line and itself fall on deck, a third guy is usually employed, dropping downward from the swinging end of the boom, and secured on deck. Thus there are three lines which necessarily have surpluses of length, since the booms must be differently rigged for different situations, and from time to time, and these guy lines are usually left lying about on deck, constituting a nuisance certainly, and usually a hazard. Moreover, if the ship carries any deck load, the difficulty of securing them or releasing them for a shift in the rigging of the booms, with the attendant danger, is very great.

Moreover, the booms are not always kept rigged and raised, but must be shifted from time to time to swing them at different angles to the keel line, to raise them to greater or lesser angles of elevation, and the like. All swinging in azimuth, that is, angularly with respect to the keel line, must be accomplished by hand through manipulation of the guy lines, which in any event is difficult and somewhat dangerous, and which is rendered particularly difficult by the presence of any deck load. Any change in elevation is usually accomplished by a winch, but in order to rig the booms initially from their shipped position to their loading position (a somewhat difficult task) the guy lines must be manually handled to steady the boom and to control its position in azimuth during its elevation. If any change must be made in its position after it has been once raised to an operative position it again requires time and considerable effort to accomplish a shift in its position.

A large share of the difficulties thus encountered, and heretofore accepted as necessary evils of the present rigging of cargo vessels, is due to the necessity of handling and securing the several guy lines, and is due to their necessary presence, and to the confusion caused by such lines on deck.

It is a principal object of the present invention to improve and simplify the rigging of such cargo booms, to simplify and speed up the initial rigging and any shifting thereof, and in the course of so doing to eliminate completely all guy lines running to the deck or capable of lying about the deck in confusion.

More specifically it is an object of the present invention to substitute for the guy lines, and for the normal single boom lift line heretofore used, two boom lift lines radiating in plan view from the swinging end of the boom, and which cooperate with each other to support the entire load of the boom and its share of the freight being lifted, so that each such boom lift line is always tensioned to some degree, and the cargo boom is thereby guyed in effect by the two boom lift lines, the ends of which are anchored or secured to, or which run to, points elevated above the deck, and thence to suitable winches for handling them, and for accomplishing initial rigging and shifting of the boom. While the number of boom lift lines is thereby increased, guy lines may be wholly eliminated, and the total number of lines is reduced; all lines running to or requiring manual handling from the deck are eliminated.

My invention is accomplished by means of the deck gear or rigging system shown in the accompanying drawings, described in this specification, and as particularly pointed out by the claims terminating the specification, it being understood that the drawings and description are illustrative rather than restrictive, and the principles of the invention may be incorporated in other forms, within the scope of the claims.

In the accompanying drawings I have shown my invention embodied in a typical installation.

Figure 1 is a perspective view of the rigging as applied to a cargo vessel, illustrating the hatch, a deck house, and a mast, in relationship to each other and to the deck and rails of a vessel, and Figure 2 is a plan view of the same.

The deck 9 is provided with the hatch 90, admitting to the hold 91, and rising above the deck, adjacent the hatch, is a mast 8, which is usually placed substantially centrally athwartships, in other words, along the keel line, midway between the rails 92. Not infrequently also such an arrangement involves a deck house 93 housing or supporting winches for the operation of the winch fall lines and the boom lift lines. All these arrangements are or may be such as are usually found in such vessels.

Likewise, as in previous arrangements, I provide two cargo booms 11 and 12, which are substantially identical, and which are differently numbered merely for convenience of reference. However, instead of stepping the lower ends of these booms close up to the foot of the mast 8, as is almost universally the custom, according to my invention these booms are stepped at points A and A', spaced appreciably outwardly or athwartships from the foot of the mast 8, which latter point is designated E. The steps may be carried on the top of the deck house 93 or upon an elevated false deck 94, as may be most convenient. Normally the steps are elevated somewhat to clear deck loads and for more convenient access, both to the booms and of the latter to the hatch.

Spaced athwartships from the central mast 8, and preferably adjoining each rail 92, are stub masts 21 and 22, which again are alike but which are thus designated in order that they may be readily distinguished. These stub masts may serve additional functions, as for instance to ventilate the hold. Preferably they are suitably braced against bending inwardly, as for instance by the braces 3 between the upper end of each stub mast and the central mast 8 (which braces limit swinging of the boom beyond a line athwartships through the mast 8), and from the fore and aft ends of the deck house by diagonal braces 30, which likewise brace the stub mast fore and aft.

Each cargo boom is supported in part by a line running from the central mast 8, and in part by a line running from the stub mast on its own side of the ship. Thus the boom 12 is supported in part from the mast 8 and in part from the stub mast 22, and the boom 11 is supported in part from the mast 8 and in part from the stub mast 21. To this end each such boom is supported by two boom lift lines 41 and 43, or 42 and 44, each of which is secured at the point B or B', which is at or adjacent the swinging end of the corresponding boom. Thus the boom lift line 41 of the boom 11 extends from the point B, at the end of the boom 11, to the point C on the mast 8, but elevated well above the deck. The second boom lift line 43 of the same boom 11 extends from the point B to the point D, at or adjacent the upper end of the corresponding stub mast 21.

Each such boom lift line is suitably rigged between blocks, and terminates in a vertical run which winds on or off winches within the deck house 93 or otherwise suitably located, by which the boom lift lines may be separately or cooperatively paid out or hauled in. Thus the boom lift line 41 has its down run 45 received upon the winch 55, the boom lift line 42 has its down run 46 received upon the winch 56, the boom lift line 43 has its down run 47 received upon the winch 57, and the boom lift line 44 has its down run 48 received upon the winch 58.

It is believed to be clear that in any possible position of one of the cargo booms, as for instance the boom 11, until it is almost precisely athwartships, there will be in vertical plan, as seen in Figure 2, a triangle A—B—C between the boom and the boom lift line 41, so that if there is any tendency for the boom to swing to the left as seen in Figure 2, such tendency will be resisted by the boom lift line 41. Likewise there is in plan view a triangle A—B—D, which will resist any tendency for the boom 11 to swing to the right as seen in Figure 2, this tendency being resisted by the boom lift line 43. Accordingly, if the two boom lift lines are taut, as they will naturally be, by reason of the weight of the boom plus any load it may carry, the boom will tend to swing downwardly, but will not tend to swing either to right or left, these tendencies being cooperatively and mutually resisted by the two boom lift lines 41 and 43, which therefore act as guy lines. The amount of strain or load that will be placed upon each of these lines will vary in accordance with the position in azimuth of the boom. In the position of the boom 11, as seen in Figure 2, the greater share of the load will be placed upon the line 41, and the line 43 will be but lightly loaded. In the position of the boom 12, however, as seen in the same view, a considerably greater load will be placed upon the line 44, and the load upon the line 42 will be correspondingly reduced.

It may be considered that the boom may have a tendency to rise upon sudden release of the load from the swinging end of the boom. However, the point D, as also the point C, are sufficiently far below the normal level of the swinging end D or D' of the booms that they exert some downward tendency upon the boom, and both alone and cooperatively they resist any tendency for the boom to fly back against the mast. The boom lift line 43, for instance, as shown in Figure 1, will not permit the boom 11 to fly back against the mast, but will largely restrain it from any movement, in cooperation with the line 41.

In large measure these advantages are due to the displacement of the steps A and A' from the point E to a point laterally outward therefrom, that is, to a point intermediate the foot of the mast 8 and the foot of the stub mast 21 or 22, and to the triangular effect thus produced and as explained above, in which there is a mutual guying of the swinging end of the boom by the two boom lift lines, the angle between which lines for any given boom is intersected by the boom itself, as viewed in plan and as viewed in transverse section or elevation. It may be pointed out, too, that for such instances as require the boom to be lowered materially, a plurality of vertically spaced points of securement 29 are provided along the stub mast, permitting shifting upwardly or downwardly, as required, of the point D. It may also be pointed out that cleats 49 are pro-

vided for emergency securement of the boom lift lines, or their down runs, in case the winch breaks or it is otherwise desired to handle or secure these lines by hand.

The winch fall lines are rigged substantially in accordance with normal present practice. Thus the winch fall line 61 runs from a winch 63 on the deck house 93 to the point A and thence upward along the boom 11 to the point B, and thence athwartships to the ring and cargo hook at 6. In similar fashion the winch fall line 62 runs from the winch 64 to the point A', thence along the boom 12 to the point B', and thence generally athwartships to the ring and hook 6.

The winch tender is provided with a station 98, provided with suitable winch controls 5, by means of which he can control the winches 55, 56, 57, and 58, while observing the hook 6 either within or without the hold. By means of suitable controls he may operate any one or more of these winches, separately or in cooperation with another or others, and by similar controls, from the same station, he may control the winches 63 and 64 that operate the winch fall lines.

There are, as will be seen, no guys whatsoever upon deck or necessary to be handled by hand. All guying of each boom is accomplished by the two cooperating boom lift lines, and these are elevated at all points well above the deck, except for the down runs that run direct to the winches on or within the deck house. The booms may be shipped by proper handling of the boom lift lines to lower them into cradles, as is customary, and the boom lift lines may be left attached or may be unshipped and stowed. To raise the boom no manual labor is necessary, it being necessary only to reship the boom lift lines, if they have been unshipped, and then by operation of the proper winches, employing the two boom lift lines for either boom cooperatively, to lift the boom, and in lifting it is properly guyed by these two boom lift lines, so that it may not sway and swing about on deck. The operation is performed quickly, conveniently, and safely. If it is necessary to shift the position of a boom, after it has once been positioned, this is accomplished in the same manner by cooperative operation of the two boom lift lines. No manual labor is required, the boom is under control at all times, and all gear is elevated above the deck and out of the way.

The general plan and arrangement described will naturally vary in different installations, dependent upon special conditions met with in individual cases. The stub masts may be omitted, for instance, and the points of securement D and D' may be supported on a conveniently located cabin, bridge, or other superstructure. Such variations, and others of similar nature, are within the intended scope of my invention.

What I claim as my invention is:

1. Gear for use in handling cargo, of the character described, comprising in combination a mast, two stub masts spaced athwartships from and at opposite sides of the mast, a cargo boom stepped intermediate the mast and each stub mast, two boom lift lines extending from the swinging end of each boom to the mast and to the adjacent stub mast, respectively, separate means to pay out and haul in each such boom lift line, to rig and secure the corresponding boom in operative position, and winch fall lines rigged from the respective booms.

2. Deck gear for handling cargo including a principal mast, a stub mast spaced athwartships from the principal mast, the two defining a vertical athwartships plane, a cargo boom, stepped to swing about its lower end, approximately in such plane, two boom lift lines secured to the swinging end of the boom and extending, one to the principal mast, well above the deck, and the other to the stub mast, likewise well above the deck, the boom and the two boom lift lines being all located at one side of such plane, with the boom intersecting the angle, in plan, of said boom lift lines in all positions of the boom, and tensioning each boom lift line, whereby each boom lift line cooperates with the other line to bear the load of the boom and any cargo supported thereby, and separate means to pay in and haul out each such line, by said means exclusively controlling the position and movements of the boom.

3. Deck gear for use in handling cargo, of the character described, comprising in combination a principal mast disposed generally centrally athwartship, two sheaves carried by said mast elevated well above the deck level, two outboard sheaves likewise supported well above the deck level, and spaced widely athwartships from and at opposite sides of the first two sheaves, a cargo boom stepped in the vicinity of the deck level, at each side of the mast, and generally intermediate, in plan, between the mast-carried sheaves and the respective outboard sheaves, and two boom lift lines extending from the swinging end of each boom to a mast-carried sheave and to an outboard sheave, respectively, at the corresponding side of the vessel, and separate means to pay out and haul in each such boom lift line.

HANS BROWN.