The present invention relates to a load carrying device for use on board ships for handling loads and cargo in the loading and unloading of ships.

The present invention is particularly directed to improvements in the mounting of a derrick mast. Conventionally, a derrick mast is pivotally connected at its lower end to an upright supporting mast and has its upper end adjustably supported by a peak-halyard sling which is adjustably carried by the supporting mast. By virtue of such construction, the derrick mast is swivelling mounted for a swivel movement about a vertical axis parallel to the supporting mast.

It is a primary object of the present invention to provide a more compact, sturdy and simpler means of attaching the peak-halyard sling to the supporting mast. A feature of such construction includes at least one boom forming member which is pivotally carried by the supporting mast for movement about a vertical axis and to which the peak-halyard sling is attached. Another feature of such construction includes a pair of control ropes which are passed over sheaves attached to the projecting end of a bracket means, which caps the top of the supporting mast, such ropes controlling the swivel action of the derrick mast and the bracket means supporting one end of the peak-halyard sling.

Another important object of the present invention is to provide a self-supported supporting mast, the mounting of which obviates the use of guy ropes and the like stabilizing elements, and to which mast a derrick boom is pivotally supported at its lower end and is supported at its upper end by a peak-halyard sling which is attached to the supporting mast by a novel swivel bracket means.

A further important object of this invention is to provide a main or supporting mast on a ship and to provide a capping member on the upper end thereof, such capping member carrying vertically spaced and aligned supporting arms on which a pivot mount is supported; a vertically spaced and aligned pivot mount being disposed below the first and directly secured to the mast and such pivot mounts pivotally supporting a bracket means to which the peak-halyard sling is attached and which is controlled by cables.

A still further important object of this invention is to provide simply constructed and operated means for laterally displacing the point of attachment of a peak-halyard sling to the supporting mast in order to facilitate the displacement of the load carried by the derrick mast.

The foregoing and ancillary objects are attained by this invention, the preferred embodiments of which are set forth in the following description and illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevational view of the swivel bracket means for supporting the peak-halyard sling;

Fig. 2 is a top plan view of the swivel bracket means;

Fig. 3 is a side elevational view of the derrick mast assembly, showing the swivel bracket means attached to the top of the supporting mast and showing the attachment of the lower end of the derrick mast to the supporting mast and the control and operating cables and ropes for the bracket means, derricks mast and load;

Fig. 4 is a side elevational view of a modified form of supporting mast, wherein such mast is self supporting and to which the derrick mast, peak-halyard sling and appurtenant structure are attached;

Fig. 5 is a front elevational view of the structure of Fig. 4, and;

Fig. 6 is a top plan view thereof.

Referring now more particularly to the accompanying drawings and initially to Figures 1 to 3, the numeral 10 designates a derrick mast which is pivoted at its lower end by a horizontal pin 12 for vertical swinging movement, the pivot pin 12 being carried by a vertical pivot pin 14 which is supported by a bearing bracket 16, the bracket 16 outstands directly from the lower end of a vertical supporting mast 18 which upstands from the deck 20 of a ship (not shown). Thus, the derrick mast is swingable vertically and movable about the vertical pivot pin.

At its upper or outer end the derrick mast 10 is supported by a peak-halyard sling 22 which includes pulleys 24 and 26, the former being connected by a connection 28 to the upper or outer end of the derrick mast and the latter being connected to the supporting mast, as will be described. The rope 30 of the sling is passed over the pulleys and over a sheave 32 which is carried by the supporting mast. The rope is passed from the sheave 32 to the drum of a winch 35 shown in Fig. 3 and used for lifting the derrick mast.

The load is lifted and lowered by a hoisting rope 34 which is passed over a sheave 36 carried by the upper or outer end of the derrick mast. The rope is guided by a sheave 37 on the lower end of the derrick mast and is actuated by a winch 38 mounted on the deck, as shown, for example, in Fig. 3.

The derrick mast is raised by the winch 35 and rope 30 and a rope 40 controls the lowering of the derrick mast. The rope 40, controlling the return movement of the derrick mast, when unloaded, is anchored to the deck at 42 (Fig. 3) and is passed over a pulley 44 secured by a clamp 46 to the derrick mast, adjacent its upper end. The rope 40 is passed over a guide pulley 48 on the lower end of the supporting mast and is actuated by a winch 50 fastened to the supporting mast above the pulley 48.

The sling 22 has its pulley 26 attached by a bracket means 52, shown more particularly in Figures 1 and 2, to the upper end of the supporting mast. The bracket means is carried by the mast, as will be described, for horizontal swinging movement from the dotted line position A of Fig. 2 to laterally displaced positions B and C through an angle of about 120°.

The top of the supporting mast is capped by a cap plate 54 which is fixedly superimposed thereon and projects laterally therefrom in opposite directions, as shown in Fig 2. The cap plate has triangular bracket forming plates 56 and 58 secured to the undersides of its projecting ends. The plates 56 and 58 are vertically disposed and are arranged in pairs to opposite sides of the derrick mast and have their outer free ends 60 and 62 converging inwardly and upwardly. The outer ends 60 and 62 are formed with aligned apertures 64 to receive hooks for guide sheaves 66.

An upper pair of vertically spaced apart and horizontally disposed gussets 68 and 70 is carried by the plates 56 and 58. The gussets are notched to fit around the mast and are welded thereto and to the plates 56 and 58. The gussets are rigidified by vertical brace plates 72 disposed therebetween and extending between the gussets and the supporting mast. The gussets have outer apex ends which are vertically apertured to receive a
pivot pin 74 that is held against axial dislodgment by a retain pin 76 in its lower end. A lower pair of vertically spaced apart and horizontally disposed gussets 78 and 80 is provided below the upper pair. The lower gussets 78 and 80 are secured directly to the mast and are provided with vertical rigidifying webs 82. The gussets 78 and 80 are apertured to support a vertical pivot pin 84 which is in axial alignment with the pin 74 and mounted in an identical manner. The bracket means 52 includes a vertically disposed tubular member 86, a horizontal upper tubular member 88 and a diagonally disposed interconnecting tubular member 90. The tubular members form the triangular bracket means and the corners thereof are provided with reinforcing plates 92. Axially aligned sleeves 94 and 96 are welded to the extending ends of the horizontal member 88 and the diagonal member 90, beyond the vertical member, and are vertically disposed and circumposed on the pivot pins 74 and 84. Another sleeve 98 is welded in vertical position to the members 88 and 96 by a vertical plate 100 which connects the members. The sleeve 98 carries a pivot pin 102 which supports a U-shaped support 104 having a horizontally apertured, vertically disposed and outstanding web portion 106 to which the pulley 26 is attached by a connection 108. The support 104 is provided with horizontally disposed ears 110 which project rearwardly therefrom to each side of the member 88 to support ropes 112 for swivelling the bracket means, as will be described. The ropes 112 are passed over the guide sheaves 66 in extending from the ears 110 and extend downwardly along opposite sides of the supporting mast. The ropes terminate in chain extensions 114 which are adjustably anchored to retaining pins 116 secured to the deck, as shown in Fig. 3. By such means, the ropes may be easily adjusted to control the extent of swivel movement of the bracket means and its appurtenant structure.

In the embodiment illustrated in Figures 4 to 6, the main or supporting mast 118 consists of two companion legs 120 and 122 which are slightly divergent with respect to the longitudinal medial plane of the ship and which lie in a common transverse plane. The legs are anchored at their lower divergent ends on a support 124 and are connected at their upper ends by a cross member 126. A web 128 is secured between the convergent upper ends of the legs to rigidify the legs.

A derrick mast or boom 10a is pivotally attached to the legs, the masts extending outwardly and upwardly in opposite directions, as shown in Fig. 4. Since the monomeric operating structure of each derrick mast is the same, only one is shown in detail and since such structure is the same as that shown in Figures 1-3 and, afordescribed, it will not be described in detail. The only differences are matters of relocation, such as the winch 38 and the anchored end 42 of the rope 40. The derrick mast 10a is carried, at its upper end by the yard stinger 22a which has its rope reeved over a guide pulley 130 on the bracket member 52a. Such bracket member is pivotally supported by pivot pins 74a and 84a which are carried by the upper portion of the cross member 126. When in its operative position, the bracket member will be normal to the plane of the cross member, as shown in Fig. 6. The bracket member is controlled by the ropes 112a and 112b which pass over pulleys 66a on the cross member and are attached to the bracket member at 132 and 134, see Fig. 5.

If desired, the support 124 may be made movable by mounting it, for example, on a hatchway cover that can be moved along the hatchway coaming. Of course other changes and embodiments will become apparent to those skilled in the art, the above described and illustrated forms are to be considered only as exemplary and the practice of the invention is only limited by the scope of the appended claims.

What I claim is:

1. Means for handling loads on board ship comprising a mast, an angle member pivotally mounted on the top portion of said mast for movement about a vertical axis in parallel relationship with the axis of the mast, a boom having one end secured to said mast for movement about a horizontal axis and a vertical axis, a halyard sling for suspending said boom from the extreme end of said angle member opposite said mast, flexible elements each having an end attached to the said extreme end of said angle member and extending on opposite sides of said angle member for causing it to be pivotally displaced about its vertical axis, a stationary capping member secured at the upper end of said mast extending in the central part and two aligned lateral projections extending on each side of the mast and substantially in perpendicular relationship with respect to the plane of said angle member when the latter occupies a symmetrical position with respect to said flexible element, pulley means positioned on each end of said lateral projections and adapted to guide said flexibleelement and means for securing said flexible elements to maintain said angle member in various angular positions.

2. Means for handling loads on board ship comprising a mast, an angle member pivotally mounted on the top portion of said mast for movement about a vertical axis in parallel relationship with the axis of the mast, a boom having one end secured to said mast for movement about a horizontal axis and a vertical axis, a halyard sling for suspending said boom from the extreme end of said angle member opposite said mast, flexible elements each having an end attached to the said extreme end of said angle member and extending on opposite sides of said angle member for causing it to be pivotally displaced about its vertical axis, a stationary capping member secured at the upper end of said mast extending in the central part and two aligned lateral projections extending on each side of the mast and substantially in perpendicular relationship with respect to the plane of said angle member when the latter occupies a symmetrical position with respect to said flexible element, pulley means positioned on each end of said lateral projections and adapted to guide said flexible element and means for securing said flexible elements to maintain said angle member in various angular positions.

3. Means for handling loads on board ship comprising a mast, an angle member pivotally mounted on the top portion of said mast for movement about a vertical axis in parallel relationship with the axis of the mast, vertically superelevated bracket means secured on said mast for pivotally supporting said angle member, a boom having one end secured to said mast for movement about a horizontal axis and a vertical axis, a halyard sling for suspending said boom from the extreme end of said angle member opposite said mast, flexible elements each having an end attached to the said extreme end of said angle member and extending on opposite sides of said angle member for causing it to be pivotally displaced about its vertical axis, a stationary capping member secured at the upper end of the mast comprising a central part and two aligned lateral projections extending on each side of the mast and substantially in perpendicular relationship with respect to the plane of said angle member when the latter occupies a symmetrical position with respect to said flexible element, pulley means positioned on each end of said lateral projections and adapted to guide said flexible element and means for securing said flexible element to maintain said angle member in various angular positions.

4. A sloping arrangement for handling loads more particularly on board ships comprising a self sustaining mast, a base for said mast, securing means directly connecting said base and mast, at least one derrick pivotally mounted
about a vertical axis on said mast, an angle member pivotally mounted on the top portion of said mast for movement about a vertical axis parallel to the axis of said mast, a yard sling suspended from the extreme end of said angle member opposite said mast, flexible elements each having an end attached to the said extreme end of said angle member and extending on opposite sides of said angle member for causing it to be pivotally displaced about its vertical axis, a stationary capping member secured at the upper portion of the mast comprising a central part and two aligned lateral projections extending on each side of the mast and substantially in perpendicular relationship with respect to the plane of said angle member when the latter occupies a symmetrical position with respect to said flexible element, pulley means positioned on each end of said lateral projections and adapted to guide said flexible element and means for securing said flexible element to maintain said angle member in various angular positions.

5. An arrangement according to claim 1 wherein said angle member consists of three assembled tubular members forming a rectangular triangle, one side of the right angle being parallel, the other being perpendicular with respect to the axis of the mast.

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