June 11, 1963 R. H. WALLACE ETAL 3,092,856

HYDRAULIC POWER ARRANGEMENT FOR MECHANICAL DAVITS

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FIG. 1

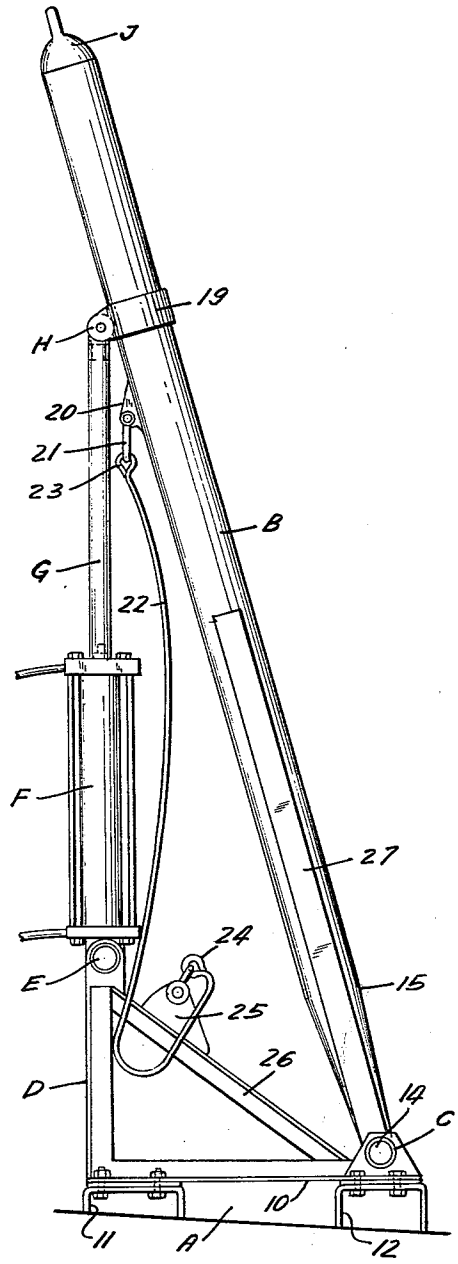
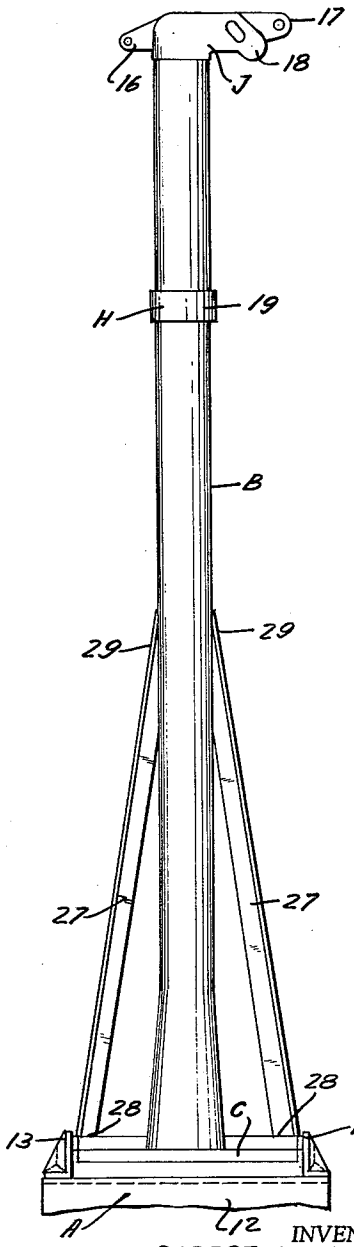


FIG. 2



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FIG.4

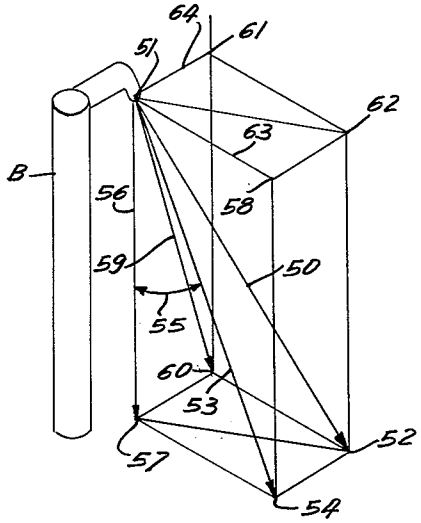


FIG.3

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HYDRAULIC POWER ARRANGEMENT FOR MECHANICAL DAVITS

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2 Claims. (Cl. 9—39)

The present invention relates to a hydraulic power arrangement for mechanical davits. It is among the objects of the present invention to provide a mechanical davit construction having a hydraulic power means which will reliably permit actuation of the davit from the deck of a ship and which may be readily installed in relatively small space.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:

FIG. 1 is a side elevational veiw of a mechanical davit construction having a hydraulic actuating cylinder in position and showing the device in inboard location.

FIG. 2 is a front elevational view.

FIG. 3 is a side elevational view similar to FIG. 1, showing the davit in outboard position.

FIG. 4 is a stress diagram indicating the application of forces during the operation in the various positions of the davit.

Referring to FIGS. 1, 2 and 3, there is shown the deck of a ship indicated at A, with the mechanical or boom davit B pivotally connected thereto by the swinging mounting C.

The triangular rear support structure D has a pivotal connection at E to the lower end of a hydraulic actuating motor or piston cylinder combination F, having the actuating or connecting rod or link G, which is pivotally connected at H to the upper end of the boom davit B.

Referring specifically to FIGS. 1, 2 and 3, the deck structure is shown as having the top plate **10** with the pedestal members **11** and **12**. The side angle members **13** carry the shaft **14**, upon which the lower end **15** of the boom davit is pivotally mounted.

The boom davit B, for example, may consist of heavy 8 inch pipe and it may have a length of 200 to 400 inches. At the upper end of the davit there will be provided the pad member J, having the pad-eye **16** to be attached to a preventer stay extending to the deck pad-eye on the deck of the ship (not shown).

The other side of the element J may carry the pad-eye **17** for the life-span, also to be connected to a deck element together wtih the extension **18**, to receive a connection for carrying the boat or other object which is to be lifted or lowered upon swinging movement of the boom davit B.

The collar **19** receives the eye connection or pivot connection H to the rod G of the hydraulic cylinder F.

Below the collar **19** is the eye **20**, which has a link connection **21** to the safety stay guy wire **22**, which may be of wire rope to limit the outward movement of the boom B to the position as shown in FIG. 3.

It will be noted that each end of the safety stay wire **22** has the eyes **22** and **23** with the lower eye **24** being connected to the bracket **25** mounted on the diagonal member **26** of the base structure D.

The side support structures **27** extend from the lower pivotal structure at **28** up to the sides **29** of the boom davit B.

Referring to the stress diagram indicated in FIG. 4, the force indicated by the diagonal line **50** between the corners **51** and **52** of the box is the resultant of one half of the working load, plus the line pull from the winch (not shown).

The force **53**, which extends from the corner **51** to the corner **54** at a 15 degree angle **55** to the vertical line of force **56** is the component of the force **50**, causing bending in the plane **51—57—54—58**.

The force **59** extending from the corner **51** to the corner **60** is the component of the force **50**, causing bending in the plane **51—57—60—61**.

The force **50** will equal a component of the force indicated by the line **56**, causing resultant compression in the boom B in the plane **51—57—52—62**.

The force indicated by the line **63** will be a component of the force **50**, causing torsion.

The bending in the two principal planes, as set forth above, will be calculated by utilizing the forces **53** and **59** and this will account for the bending resulting from the forces indicated by the lines **56**, **64** and **56**.

As the boat is lowered by the boom B, the force **50** will approach its component force **63** to obtain the most unsatisfactory condition in the plane **51—52—54—58** when the force **53** is taken as equal to the force **50**.

The most unsatisfactory condition will obtain in the plane **51—57—60—61** when the boom is outboard but the boat is not yet lowered.

These two last mentioned unsatisfactory forces will not occur at the same time and therefore there will at all times be a satisfactory bending operation which will permit the boom to operate to lower its load and raise its load without any danger of collapsing or undue release.

The important feature of the present invention resides in the system of triangles set forth in FIG. 1 where there is a bottom right angle triangular base structure having a horizontal base leg at **10**.

The ends of the shaft extend between the ends of the side angle members **13** of the base leg at **10** which is supported upon the inverted U-shaped pedestals **11** and **12**.

Upon the right angular triangular structure is superimposed flat triangle formed by the oblique hypotenuse arm or boom davit B at the base of the triangle of the vertical inside arm composed of the link G and the hydraulic cylinder F with the oblique hypotenuse arm **26** being common to both triangles.

The low inboard vertical member G—F and the high outboard vertical member B act as beam members and both triangles are supported upon the base plate **10** which in turn is supported on the inverted low U-cross section beam member **11** and relatively high outboard beam member **12**.

The lower end of the inside vertical member G—F forming the vertical leg of the flat inverted triangle has a pivot mount at the lower end of the hydraulic cylinder to the end of the short leg of the triangular base structure as indicated at E while the boom davit B has the lower pivot **14** at the end of the long horizontal leg of the triangular base structure.

The boom davit B has the side upwardly convergent

brace members **27** which extend down to the end of the shaft **14**. The plane through the center or longitudinal axis of the boom davit member B and the hydraulic cylinder member F will be transverse to the longitudinal axis of the boat.

It is noted that the boom davit B converges at an acute angle both in the inboard position of FIG. 1 as well as the outboard position of FIG. 3 with the connecting rod G so that the longitudinal axes of the rod G and the boom davit B will always converge at an acute angle to each other.

There is thus provided a simple, reliable, readily installed boom construction which may be utilized in dredge or other small ship constructions or without the need of utilizing full sized heavy davits.

As many changes could be made in the above hydraulic power arrangement for mechanical davits, and many widely different embodiments of this invention could be made without departure from the scope of the claims, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. A hydraulically powered mechanical boom davit having a deck support structure including inverted high and low inboard and outboard longitudinal U cross section beam members to give a horizontal base, a triangular beam structure having a horizontal transversely extending base member supported at its ends upon said beam members in horizontal position above the deck, a vertical inboard upwardly extending leg and a hypotenuse member extending obliquely outwardly and downwardly from the upper end of the vertical leg to the outer end of the transversely extending base member, a lower end hydraulic cylinder pivot mount on the upper end of the vertical inboard leg, a hydraulic cylinder having a piston pivotally mounted at its lower end on said pivot mount, spaced boom davit pivot mounts on each side of said horizontal base member and on the top sides of the ends of the outboard U-cross section beam member, obliquely upwardly and inwardly extending boom pivot and brace members extending from the davit pivot mounts to a boom carried by said brace members intermediate its sides and extending downwardly to midway between said spaced pivot mounts and pivoted thereon and upwardly to substantially beyond the upper end of said hydraulic cylinder, a piston driven connecting rod extending from the upper end of the hydraulic cylinder to the upper portion of the boom below the upper end thereof and means to limit the outboard movement of the boom.

2. The davit of claim 1, said last mentioned means consisting of eye members mounted on the hypotenuse member adjacent the lower end of the hydraulic cylinder and on the boom below the connection of the connecting rod thereto and a stay wire connecting said eyes, the axis of the boom, the axis of the stay wire and the axis of the hydraulic cylinder, all being in a plane transverse to the boat on the deck of which the boom is supported.

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