METHOD FOR MANEUVERING A VESSEL WITH RESPECT TO ITS STATION

Filed April 24, 1968

INVENTOR
JACK LOVELL

BY Semmes and Semmes

ATTORNEYS
METHOD FOR MANEUVERING A VESSEL WITH RESPECT TO ITS STATION

Filed April 24, 1968

INVENTOR

by Semmes and Semmes

ATTORNEYS
ABSTRACT OF THE DISCLOSURE

Method for maneuvering a vessel with respect to its station, particularly a method for fending the vessel horizontally and vertically with respect to a rigid station, such as an offshore oil well drilling platform. According to the method disclosed herein, the support boom and suctorial cup assembly mounted upon a station is used to draw a vacuum upon integral portion of a maneuvering vessel freeboard. The boom is raised and lowered in horizontal alignment with the maneuvering vessel prior to drawing of the vacuum and is supported for free vertical movement corresponding to boat action after drawing the vacuum. The boom is telescoped with respect to the station, so as to control movement of the vessel about the station through the boom.

SUMMARY OF THE INVENTION

Applicant's method for station keeping involves a plurality of extensible boom and suctorial cup devices, so as to position or fend a work boat with respect to its station. Once the vacuum is drawn through the boom and the suctorial cups, the boom is released vertically so as to be movable with respect to swells in the sea and corresponding movement of the work boat. Maneuvering is terminated by breaking of the vacuum, resulting in a disengagement of the extensible boom with the vessel being maneuvered. Refinements of the method consist in pneumatically shock absorbing the boom assembly, supporting the boom for free vertical movement, while limiting lateral movement of the boom, with respect to its station.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a work boat being maneuvered with respect to an offshore drilling rig by a pair of extensible booms; FIG. 2 is a top plan, partially in section, showing a single extensible boom and suctorial cup assembly; FIG. 3 is a side elevation of the assembly; FIG. 4 is a sectional view, taken along section line 4—4 of FIG. 2; FIG. 5 is a sectional view taken along section line 5—5 of FIG. 3; FIG. 6 is a fragmentary vertical section of the telescoping boom end fitting within its housing; FIG. 7 is a sectional view taken along section line 7—7 of FIG. 6; FIG. 8 is a sectional view taken along section line 8—8 of FIG. 6; FIG. 9 is a front elevation of the vertically movable steel truck 26 supporting boom and suctorial cup elements 88 and 90; FIG. 10 is a like front elevation with the extensible boom and suctorial cups removed; FIG. 11 is an enlarged side elevation, partially in section, showing the dish 96 and skirt 104 defining vacuum chamber 112 in the suctorial cup assembly; FIG. 12 is an enlarged fragmentary section of the suctorial cup skirt element; FIG. 13 is a fragmentary perspective, showing installation of a proposed station keeping device within a canal lock so as to assist in locking of the vessel; FIG. 14 is a fragmentary end elevation, showing the FIG. 13 device wherein the truck 26 containing suctorial cups 88, 90, 92' and 94' is lifted above the lock upon inclined tracks 16" and 18" when not in use, tracks 16" and 16" being set or recessed within the concrete lock walls when parallel to the vessel freeboard; FIG. 15 is a fragmentary front elevation of truck 26' containing the suctorial cups; FIG. 16 is a fragmentary top plan thereof with the suctorial cups in retracted position; and FIG. 17 is a top plan thereof with the suctorial cups in extended freeboard engaging position.
DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1, a station keeping device generally designated as 2 is shown vertically movably positioned in offshore drilling rig platform 6 by means of vertical channels or tracks 16, 18, 20 and 22 secured to the rig superstructure 24.

The station keeping device includes a pair of like extensible boom assemblies 12 and 14 having at their respective ends sectorial cups 88, 90, 92-94 engaging the freeboard of work boat vessel 4.

A suggested assembly for carrying out the method is illustrated in FIGS. 2, 3, 9 and 10 as comprising truck 26 vertically movable in tracks 16 and 18 by means of radially extending rollers 28, 30, 32 and 34 mounted respectively in radially extending arms 36, 37, 38 and 39, secured at the corners of the truck assembly 26. Additionally, top rollers 40, 42, lower middle rollers 44, 46 and bottom rollers 48, 50 may be positioned at the truck sides at right angles to the corner rollers 28, 30, 32 and 34. Rollers 40, 42, 46, 48 and 50 engage the interior walls of track or channels 16 and 18.

The extensible boom assembly 12 is more particularly illustrated in FIGS. 2 and 3, as comprising housing 52 secured pivotally at one end to truck 26 by means of ears 56 engaging lugs 58 and secured thereto by means of pin 60. Extensible piston rod 54 is supported rotatably within the housing 52 by means of outer rollers 114 and 116 mounted, respectively, upon pins 118 and 120 supported in housing 52 and inner rollers 122 and 124 secured on piston 54 inner end by means of pins 126 and 128. Stops or lugs 130 and 132 secured respectively to the interior wall of housing 52 and the exterior of piston 54 may be positioned for limiting horizontal extensibility of rod 54.

A pneumatic shock absorber assembly housing 70 supplied by line 64 includes extensible piston rod 82 secured to piston 54 by means of ears 78 and pin 80 at one end and secured to housing 52 by means of ears 74, 76 and pin 76 at the other end. Piston rod 54 is extended horizontally by means of hydraulic fluid fed through supply line 62.

Piston rod 54, as illustrated in FIGS. 2 and 3, terminates in clevis assembly 138 which movably supports yoke 134 by means of pin 136. At either end of yoke 134, sectorial cups 88 and 90 are universally mounted by means of brackets 144 and 146 secured by identical pins 140 and 142. The cups 88 and 90 include rear brackets 98 and 98' secured respectively to brackets 144 and 146 by pins 148 and 150.

Each sectorial cup consists of dish 96, outer or peripheral rubber or neoprene skirt 104 defining an inner vacuum chamber 112, vacuum being drawn through internally threaded conduit 102 by means of vacuum fitting 100 to which the vacuum lines 112 and 112' may be secured. Skirt 104 may include inner serrations 106, middle flange 110 and outer peripherally extending flange 108, the serrations and flanges enabling the cup to seal with respect to the irregularities of the work boat freeboard, each such sectorial cup being rigidly secured with respect to truck 26 by means of vertically extending strut 68, secured to the truck by means of lug 66, and laterally extending strut, secured to truck 26 by means of lug 86.

In FIG. 1 control house 10 is generally illustrated as including a winch, such as a 5,000 pound constant tension winch positioned vertically the extensible booms 12 and 14 prior to engagement of the work boat freeboard and drawing of the vacuum. Drawing of the vacuum through the cup assembly may be accomplished by a ten horsepower 177 cubic foot per minute 29 inches mercury vacuum device having a 15 cubic foot vacuum tank. The hydraulic system for extending and retracting piston rods 54 may include a 5 g.p.m. at 1,500 p.s.i., two to three gallon piston accumulator for shock absorp-

3,463,114
Manifestly, the extensible boom and vertically movable truck assemblies may be varied, for example by mounting on a vessel, without departing from the spirit and scope of invention.

1. Method for maneuvering a vessel with respect to its station comprising the steps of:

(A) horizontally telescoping a rigid boom and sectorial cup, which is mounted upon the boom end for universal movement, with respect to said station, so as to contact said vessel;

(B) raising and lowering said boom in horizontal alignment with said vessel;

(C) differentiating pressure between ambient and an integral portion of said vessel which is in contact with said station by means of said rigid boom and sectorial cup by drawing a vacuum through said sectorial cup;

(D) supporting said boom for free vertical movement corresponding to boat action, as said vacuum is drawn;

(E) shock absorbing said boom by fluid means; and

(F) controlling movement of said integral portion of said vessel about said station through said boom.

2. Method for maneuvering a vessel with respect to its station as in claim 1, including distending said boom with respect to said station.

3. Method for maneuvering a vessel with respect to its station as in claim 2, including drawing a vacuum within a plurality of spaced integral portions of said vessel in contact with said station via a plurality of rigid booms.

4. Method for maneuvering a vessel with respect to its station as in claim 3, including limiting lateral movement of said boom within said station, while supporting said boom for free vertical movement.

5. Method for maneuvering a vessel with respect to its station as in claim 4, including breaking said vacuum as a termination of controlling movement of said vessel.

References Cited

UNITED STATES PATENTS

2,920,597 1/1960 Dick 114—230
3,322,091 5/1967 Stanwick 114—235

FOREIGN PATENTS

797,653 7/1958 Great Britain.

TRYGVE M. BLIX, Primary Examiner