

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: **85201196.4**

(51) Int. Cl.⁴: **E 02 F 3/90**
B 63 B 23/10, B 66 C 23/52
B 66 C 23/54

(22) Date of filing: **15.07.85**

(30) Priority: **15.07.84 NL 8402240**

(43) Date of publication of application:
29.01.86 Bulletin 86/5

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

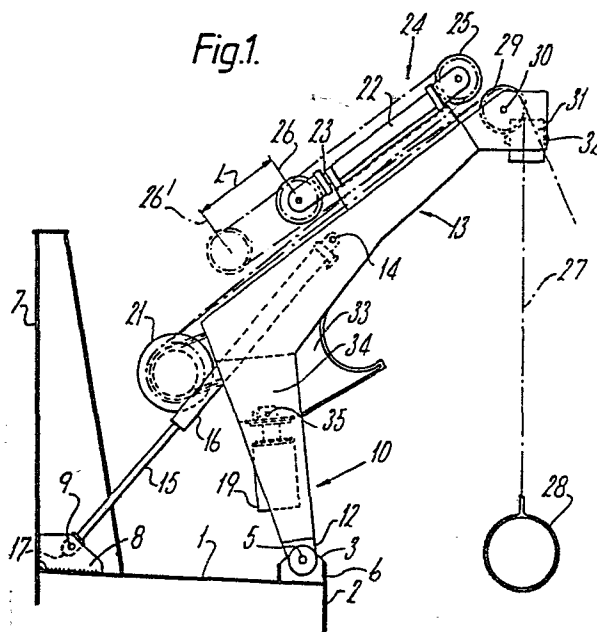
(71) Applicant: **Hydromeer B.V.**
Nijverheidsweg 5 Postbus 329
NL-4900 AH Oosterhout(NL)

(72) Inventor: **Koot, Bastiaan Cornelis Maria**
Kuipersveer 15c
NL-3297 ZG Puttershoek(NL)

(74) Representative: **Van Assen, Jan Willem Bernhard**
Octrooibureau van Assen Assenpatent B.V. Konijnenlaan
22
NL-2243 ER Wassenaar(NL)

(54) **Derrick crane for dredgecraft.**

(57) The invention relates to a derrick-crane for a dredging vessel, having a compact operating mechanism and a hydraulic system integral with the derrick-crane and which is completely independent of the hydraulic system of the vessel on which the derrick-crane has been installed. According to the invention therefore there is provided on the one hand a hydraulic cylinder (15) which is completely accommodated within the body of the derrick-crane in its rest position and on the other hand is provided with a hydraulic-medium supply tank (34) and a pump (35) which is affixed between the supporting feet (11, 11a) and driven by an electric pump-motor (19) which can be connected to vessel's electrical system. In addition hereto, the crane's body carries an hydraulically-operated swell compensator (22-26) on its rear side and which is also connected to its own hydraulic system and from which the displaceable cable-sheave (26) moves vertically downward to a maximum payout distance (L). The hoisting winch (21) is affixed to the external underside of the derrick-crane.



A derrick-crane for a dredging vessel.

The invention relates to a derrick-crane for a dredging vessel and which is arranged to displace a movable tubular portion of a towed suction-dredging equipment between its rest position inboard and its dredging position outboard and in which the derrick-crane of tubular construction and closed form is enabled to pivot to a substantially horizontal position about axes arranged parallel with the deck and under the control of at least one operating mechanism herefor and in which the said operating mechanism is pivotably hinged between a first hinge-arrangement affixed to the derrick-crane and a second hinge-arrangement affixed to the vessel.

A derrick-crane of this type is known from NL-B-168.291. In side-elevation, the short leg of this particular derrick-crane lies on the deck in its rest position and pivots about the axis of a hinge-pin located in a position nearby to the outboard extremity thereof.

This pivoting displacement is effected under the control of an operating mechanism incorporating at least one hydraulically-operated piston and cylinder assembly. Through this arrangement, the inboard located, or second, hinge-arrangement is positioned at a considerable distance behind the derrick-crane itself.

Such an arrangement leads to objections hereto inasmuch that on the one hand the rearward extending operating-mechanism occupies a very considerable amount of deck space and is difficult to install on some vessels having an insufficient width of passageway along the deck, and inasmuch on the other hand that access through the passageway is impeded.

Furthermore, the hydraulically-operated members of the mechanism are operatively dependent on the vessel's own hydraulic system to which the mechanism would necessarily have to be connected to carry out its displacing function.

The object of the invention is to remove these objections and to provide a derrick-crane having a compact operating mechanism and a hydraulic system integral with the derrick-crane itself and which is completely independent of the hydraulic system of the vessel on which it is installed.

In accordance with the invention this object is achieved by the fact that the first hinge-arrangement is accommodated in a slot in the inboard side of the long leg and the second hinge-arrangement is affixed in a position nearby the position assumed by the lower end of the derrick-crane in its rest position, and that the operating mechanism in its rest position extends mainly into the slot in the derrick-crane.

By the application of the invention, the derrick-crane occupies a minimum of deck space both in rest position and the operating position so that on installation on both new vessels and existing vessels with small passageways along the deck is possible.

According to a preferred embodiment of the invention employed in a derrick-crane of substantially 'L' form in side-elevation and which is pivotably affixed to the deck at the lower extremity of the short leg, the surface area of the underside of the short leg is provided with a slot-hole to permit passage of the operating mechanism therethrough.

The invention is now to be described further with reference to the accompanying drawings of an embodiment of the invention and in which:

Fig. 1 shows a side-elevation of the derrick-crane according to the invention and in its operating position.

Fig. 2 is a front-elevation of the derrick-crane shown in fig. 1.

The derrick-crane according to the invention is destined for fixing to the deck 1 and surrounded by the side of the vessel 2, the hatch coaming 7 and the hold H of the dredging vessel (not shown). Two separate pairs of parallel arranged hinge-ears (3, 3a) and (4, 4a) bordering the edge of the vessel's side are welded to the deck and through which two substantially-horizontal and co-axial hinge-pins 5 and 5a are arranged parallel to the vessel's side 2 to which support-plates 6 and 6a are fixed. A second hinge-arrangement comprising hinge-ears 8 and 8a are welded to the deck 1 against the superstructure 7 on the inboard side and through which a hinge-pin 9 is arranged and which runs parallel to the hinge-pins 5 and 5a.

Fig. 1 shows a side-elevation of a derrick-crane of substantially 'L' form and having a short lower-arm generally indicated by the reference numeral 10, and a long upper-arm generally indicated by the reference

numeral 13. Fig.2 shows that the crane arm 10, 13 is of a boxlike or tubular form and preferably constructed of plate material, and it will be seen that it tapers somewhat in the vertical direction.

The short under-arm is provided with two diverging feet 11, 11a, the drilled and parallel extremities 12, 12a of which extend between the pairs of ears 3, 4 and 3a, 4a respectively and pivot about the axis of the hinge-pins 5, 5a.

The rear and underside of the derrick-crane are provided with a slot (not shown) for accomodating the operating mechanism.

The hinge-pin 14 is fixed in the upper portion of this slot in the long leg 13 and runs parallel with hinge-pins 5, 5a. The operating mechanism for the derrick-crane is hinged at its upper end to pivot about the axis of hinge-pin 14, this mechanism is preferably constituted by a hydraulically-operated reciprocating piston 15 operatively arranged in a cylinder 16. For the purpose of performing its function, the free lower-end 17 of the piston is coupled to the hinge-pin 9. The derrick-crane is shown in its operating position in the drawings and in which the piston 15 is shown in its extended position from the cylinder 16. On withdrawal of the piston 15 back into the cylinder 16, the long arm 13 is displaced at a small angle to the vertical between the side of the vessel 2 and the superstructure 7.

An electric motor 19, for driving a hydraulic pump 35 for a hydraulic system with a hydraulic accumulator (not shown) located on the inner side of the crane arm, is arranged between the supporting feet 11, 11a of the short lower-arm and on the exterior side thereof.

The coaxially arranged hydraulic driving motor 20 and the cable-winch 21 coupled thereto are affixed to the exterior side of the derrick-crane under the short leg 10.

The swell-compensator, generally indicated by the reference numeral 24, is affixed on the exterior of the derrick-crane under the long crane leg 10. This swell-compensator comprises the hydraulic cylinder 22 in which the hydraulically-operated piston 10 reciprocates.

A number (say 2 for example) of cable-sheaves 25 are rotatably mounted on the upper side of the cylinder 22 and a set (say 2 for example) of

cable-sheaves 26 are rotatably mounted on the lower end of the piston 23. The set of cable-sheaves can extend outward from the position defined by the dashed-line in fig. 1 to a maximum distance defined by the dashed-line 26' that is to say over a distance defined by 'L'. With this stroke-length 'L' multiplied by 4 and with 2 upper sheaves 25 and two lower sheaves 26, the hoisting-cable 27 can be shortened or lengthened according to the vertical movement of the dredging vessel and/or the suction pipe 28 resulting from wave motion.

A cable-sheave 29 is rotatably mounted on a hinge-pin 30 at the upper end of the long crane-leg 13 and which hinge-pin 30 is arranged parallel to the hinge-pins 5, 5a. A guide roller 31 is rotatably mounted on a spindle 32 which crosses the hinge-pin 30 perpendicular thereto. This spindle 32 lies substantially in a horizontal position when the derrick-crane is in the operating position shown in fig. 1. The guide roller 31 serves to guide the cable 27 which makes an angle α to the horizontal when in the operating position and as shown in fig. 2. The angle α made by the cable 27 to the horizontal changes just as do the angles of the derrick-crane hinges 10, 13 about the axes of the hinge-pins 5, 5a when the cable 27 is hoisted in and/or paid out.

A suction-pipe cradle 33 for accomodating the suction-pipe 28 in its rest position is provided in the cavity between the short leg 10 and the long leg 13.

The supply-tank 34 for the hydraulic medium is accomodated in the short arm 10, this supply-tank 34 forms part of the hydraulic system together with the hydraulic-pump 35 driven by the electric motor 19. This hydraulic system feeds the piston and cylinder assembly 15, 16, the winch-motor 20 and the piston and cylinder assembly 23, 22 of the swell-compensator. Due to this form of construction, the derrick-crane has a completely integral hydraulic system which is entirely independent of the hydraulic system of the dredging vessel on which the derrick-crane has been installed.

Only power-supply cables for the electric motor 19 and for the operating-valves (not shown) for the hydraulic system need be provided for the derrick-crane from a power source exterior thereto.

13.0000

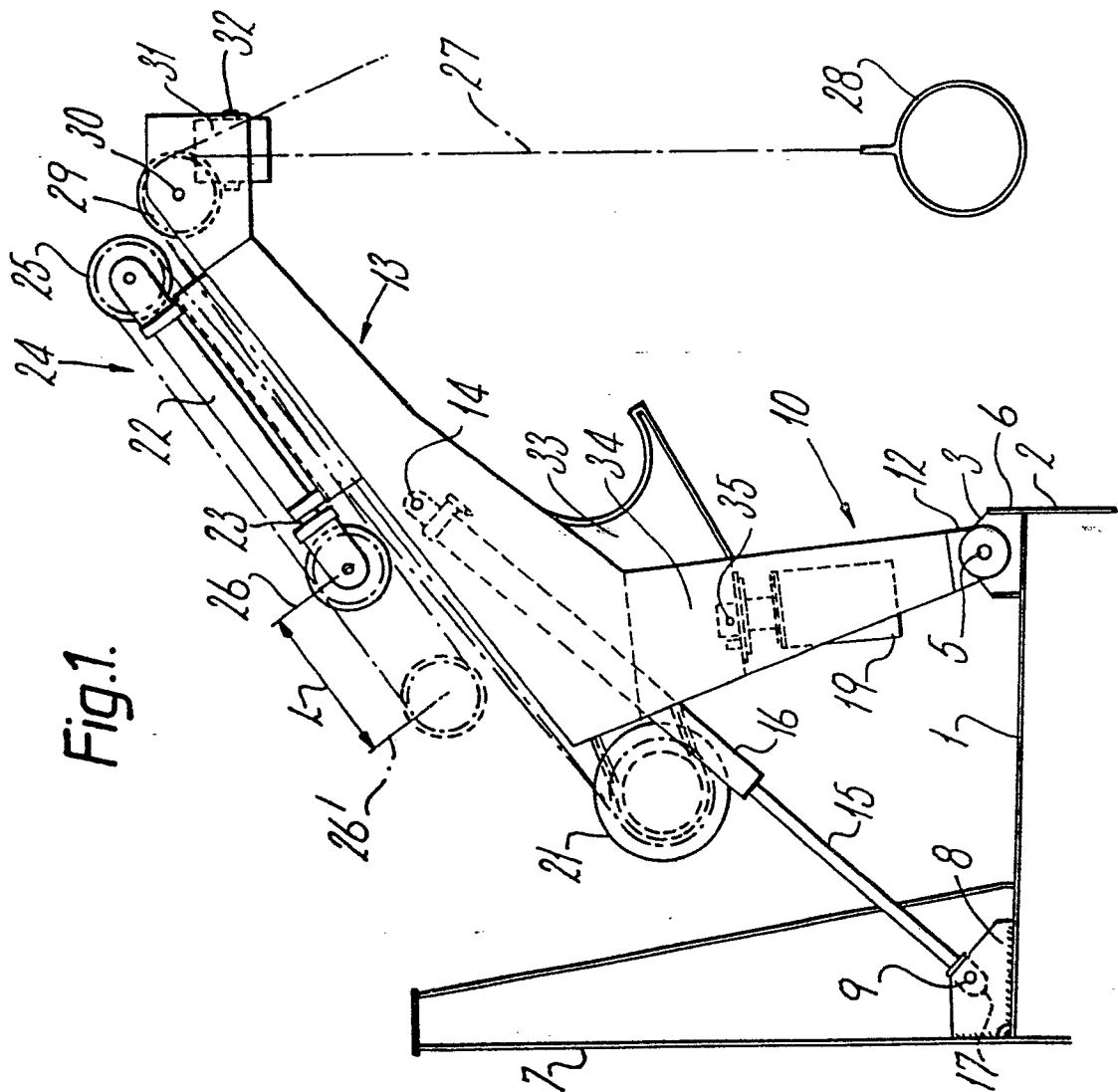
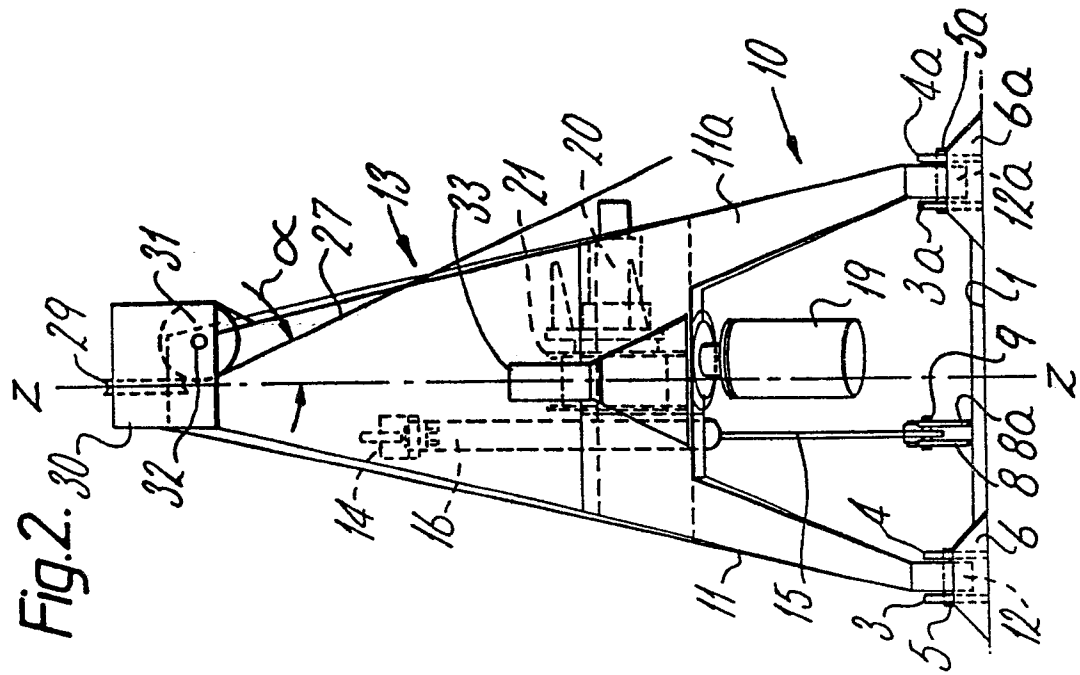
-5-

0169616

As shown in fig. 2, the central-plane of the piston and cylinder assembly 15, 16 and the central-plane of the electric motor 19 are coincident with the vertical symmetrical plane Z-Z of the derrick-crane so neither of these elements are a hindrance to one another whilst deck space is also saved.

What we claim is:

1. A derrick-crane for a dredging vessel, which said derrick-crane is arranged to displace a movable tubular portion of a towed suction-dredging equipment between its rest position inboard and its dredging position outboard and in which the said derrick-crane of tubular construction and closed form is enabled to pivot to a substantially horizontal position about axes arranged parallel with the deck and under the control of at least one operating mechanism herefor, and in which the said operating mechanism is pivotably hinged between a first hinge-arrangement affixed to the derrick-crane and a second hinge-arrangement affixed to the vessel, characterised in this that the said first hinge-arrangement (14) is accomodated in a slot on the inboard side of the long leg (13), in which the second hinge-arrangement (8, 8a, 9) is affixed in a position nearby the position assumed by the lower end of the derrick-crane (10, 13) in its rest position, and in which the said operating mechanism in its rest position extends mainly into the said slot of the derrick-crane (10, 13).
2. A derrick-crane as claimed in claim 1 in which the derrick-crane in side-elevation is of mainly of 'L'form and which is pivotably affixed to the deck at one end of the short leg thereof, characterised in this that the under surface of the short leg (10) is provided with a slot-hole to permit passage of the said operating mechanism (15, 16) there-through.
3. A derrick-crane as claimed in claim 1 or claim 2 in which the said short leg is provided with two separate and mutually parallel extremities for the second hinge-arrangement, characterised in this that the said extremities are arranged on supporting-feet (11, 11a) which form a considerable part of the length of the short leg (10).
4. A derrick-crane as claimed in any one of claims 1, 2 or 3 inclusive provided with a hydraulic system for driving a hoisting-winch and the operating mechanism, characterised in this that a supply-tank (34) for the hydraulic medium together with the other part of the hydraulic system are integrally incorporated in the derrick-crane.
5. A derrick-crane as claimed in any one of claims 1, 2, 3 or 4 inclusive, characterised in this that an electric motor (19) for driving a hydraulic pump (35) is arranged between the supporting feet (11, 11a) of the short leg (10) on the outside thereof.





European Patent
Office

EUROPEAN SEARCH REPORT

0169616

Application number

EP 85 20 1196

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
Y	US-A-4 326 346 (VAN DEE) * Column 1, line 53 - column 2, line 24; figures * & NL - B - 168 291 (Cat. D)	1-3	E 02 F 3/90 B 63 B 23/10 B 66 C 23/52 B 66 C 23/54
Y	FR-A-1 356 379 (BENNES MARREL) * Figures *	1-3	
A	US-A-3 764 020 (BATSON) * Abstract; figures 1,4,5 *	1-3	
A	US-A-3 071 254 (STILLEY)		
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			E 02 F B 63 B B 66 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21-10-1985	Examiner RAMPPELMANN J.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	