

[72] Inventor **August Hendrik Maria Smulders**
Wassenaar, Netherlands
 [21] Appl. No. **783,797**
 [22] Filed **Dec. 16, 1968**
 [45] Patented **Nov. 10, 1970**
 [73] Assignee **N.V. Industriële Handelscombinatie**
Holland
 [32] Priority **Dec. 28, 1967**
 [33] **Netherlands**
 [31] **67/17744**

[50] Field of Search..... 14/0.5, 230;
 9/8, 80(P)

[56]

References Cited

UNITED STATES PATENTS

2,771,617 11/1956 Brackx 9/8(O.P)UX
 3,187,355 6/1965 Wassenaar et al. 9/8(O.P)UX

Primary Examiner—Trygve M. Blix

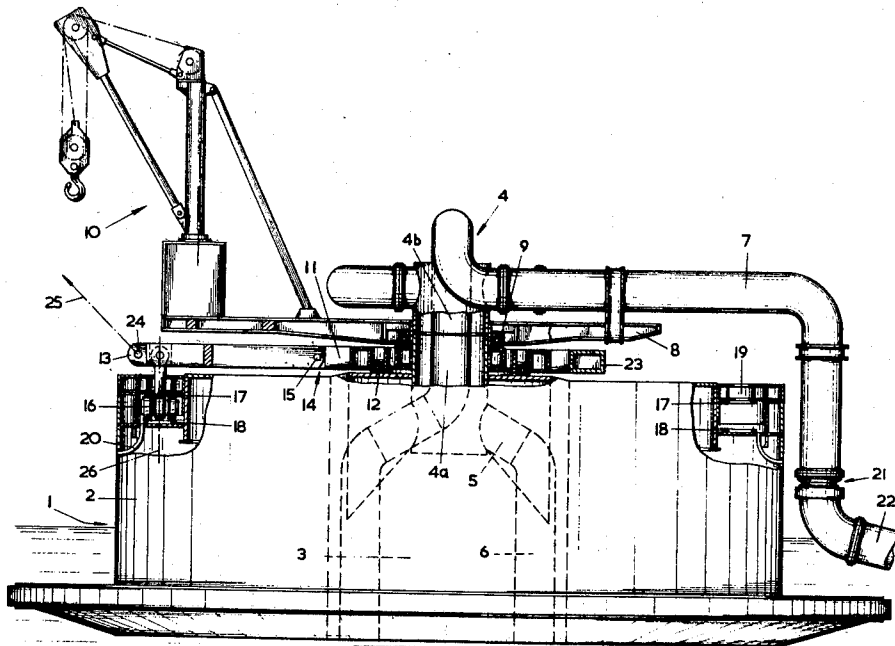
Attorney—Young and Thompson

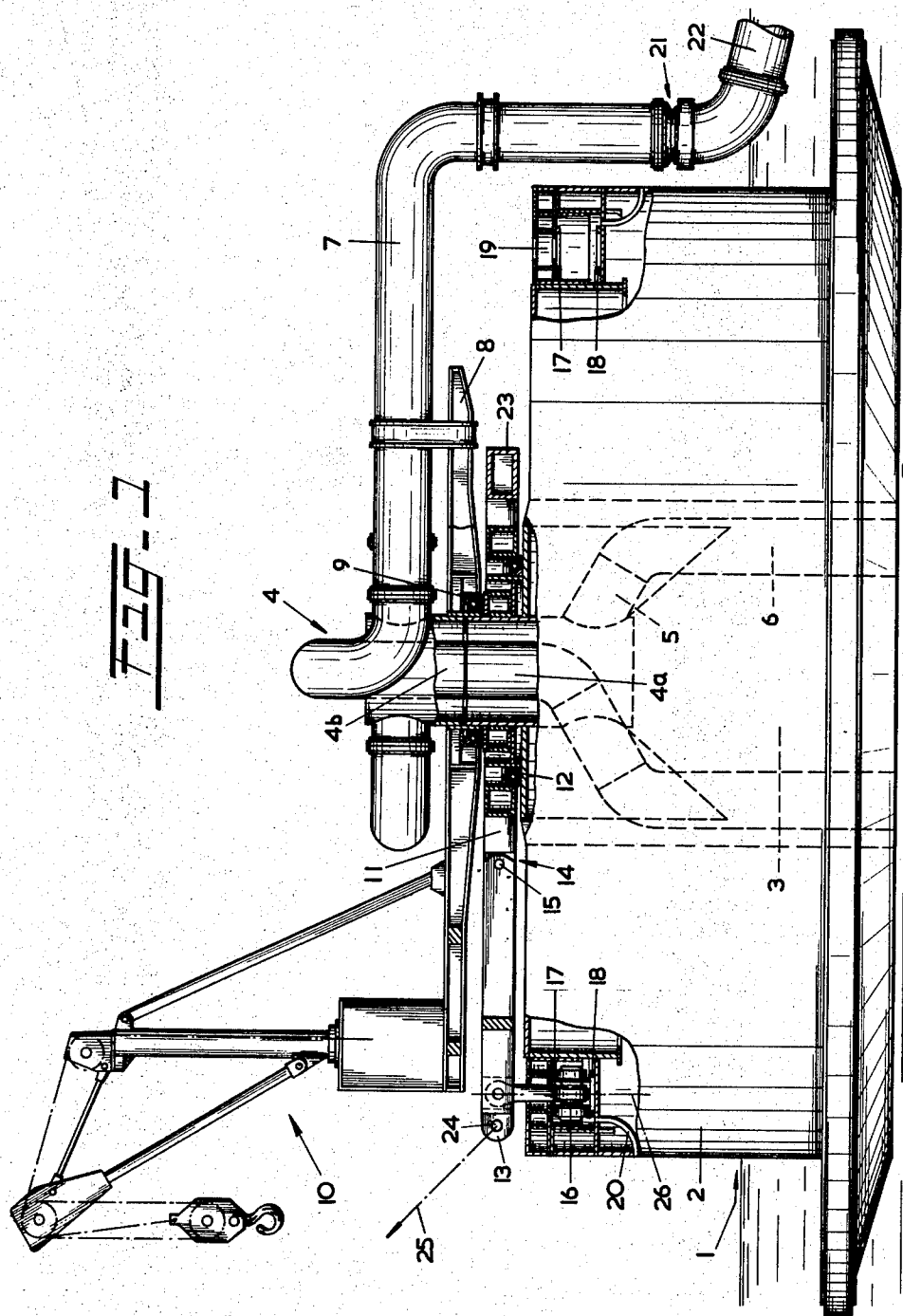
[54] **APPARATUS FOR TRANSFERRING FLUIDS
 BETWEEN A VESSEL AND THE SHORE**
 7 Claims, 2 Drawing Figs.

[52] U.S. Cl. 114/230,
 9/8

[51] Int. Cl. B63b
 21/00, B63b 21/52

ABSTRACT: Apparatus for transferring fluids between a vessel and the shore comprises a buoy anchored to the bottom of the body of water on which it floats, and a pair of individually rotatable turntables carried by the buoy. One turntable provides mooring for the vessel, while the other turntable provides a connection for the conduits through which the fluid passes.





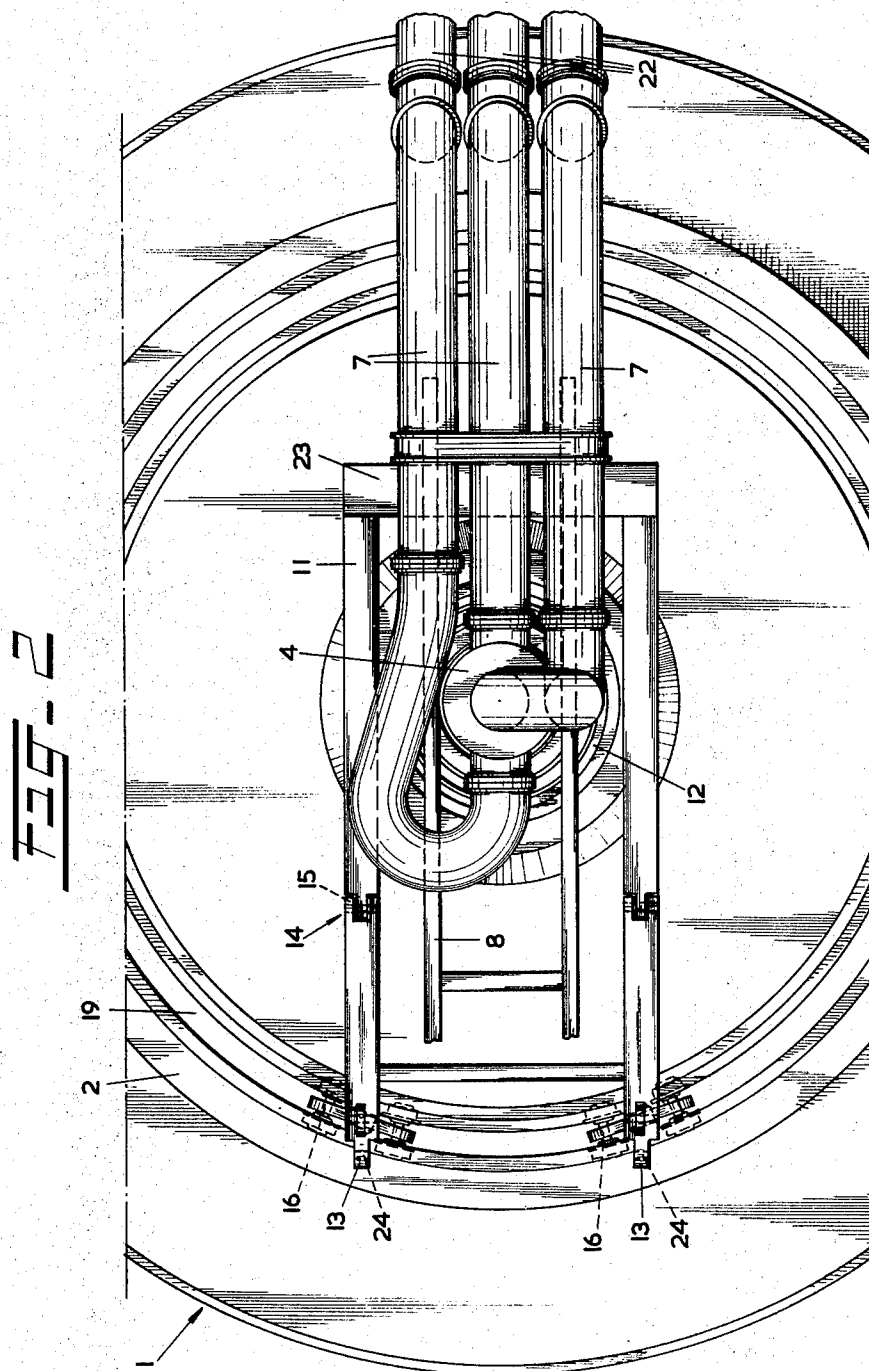
INVENTOR

AUGUST HENDRIK MARIA SMULDERS

BY

Young + Thompson

ATTORNEYS



INVENTOR

AUGUST HENDRIK MARIA SMULDERS

BY

Young & Thompson

ATTORNEYS

APPARATUS FOR TRANSFERRING FLUIDS BETWEEN A VESSEL AND THE SHORE

The present invention relates to apparatus for assisting in the transfer of fluids in either direction between a vessel and the shore, more particularly of the type in which an anchored buoy provides mooring for the vessel and also a connection for the conduits through which the fluid flows.

It is known to provide a floating body for this purpose and to anchor the floating body to the bottom of the body of water on which it floats. It is also known to provide a turntable on such floating body, which turntable is provided with mooring means for the vessel and with a support for the conduit connections. Said conduit connections at the one side comprise a means to which the shore conduits can be fixed, the other side means to which floating lines can be fixed, the free end of which can be coupled to the piping on a vessel to be loaded or unloaded.

Said turntable becomes a very heavy structure when large vessels have to be moored to it. When no vessel is moored said heavy turntable cannot be swung by the force exerted on it by the floating lines as result of wind, currents and waves. By this said floating lines will flex acutely with resulting damage to said lines and/or their connections.

It is an object of the present invention to provide such apparatus which overcomes the above and other difficulties and disadvantages of the prior art in this field.

Another object of the present invention is to provide such apparatus which will be relatively simple and inexpensive to construct, easy to operate, maintain and repair, and rugged and durable in use.

Other objects and advantages of the present invention will become apparent from a consideration of the following description, taken in connection with the accompanying drawing, in which:

FIG. 1 is a side elevational view, partly in section, of apparatus according to the present invention; and

FIG. 2 is a partial top plan view of the structure of FIG. 1, with parts broken away for clarity.

In the drawing for clarity the corrections for the floating lines and the mooring means define an angle of 180°. In use this angle will be about 90°.

Briefly, the present invention overcomes the above difficulties by providing the conduit connections and the vessel mooring means each with its own turntable.

Referring now to the drawings in greater detail, there is shown a frame adapted to be secured to the bottom of a body of water. In the illustrated and preferred embodiment, the frame is in the form of a buoy 1 adapted to be anchored to the bottom of the body of water and to float thereon. Buoy 1 comprises a floating annular body 2 having a central upright opening 3. Connections 5 and 6 are carried by body 2 within central opening 3, for the purpose of connecting with the shore. These connections can be of conventional nature and need not be further described.

Connections 5 and 6 to the shore are interconnected with connections 7 to the vessel through a rotary head 4 that has a part 4a that is stationary with annular body 2 and in communication with the connections 5 and 6, and a rotating part 4b that is rotatable relative to part 4a about a vertical axis and which is fixed to and in communication with connections 7.

Connections 7 are fixedly secured to a turntable 8 which rotates about a vertical axis coaxial with rotary head 4 by means of a bearing 9 the inner race of which is carried by the outer side of stationary part 4a and the outer race of which is secured to turntable 8. Opposite the point of securement of turntable 8 to connections 7, the turntable 8 carries a counterweight 10 which decreases the moments of force on the bearing 9. In the illustrated embodiment, the counterweight 10 consists of a hoist, but it may have any other suitable functional or nonfunctional form.

Beneath but coaxial with turntable 8 is a second turntable 11 disposed between turntable 8 and body 2. Turntable 11 rotates by means of a bearing 12 the inner race of which is fast with the body 2 and the outer race of which is fast with the

turntable 11. Turntable 11 has an oblong rectangular shape and has a pivot 14 between its ends. To provide the pivot 14, a pair of coaxial pins 15 interconnect segments of the horizontal arms which form a part of the rectangular frame of turntable 11. Thus, the outer ends of these arms swing vertically about the pivot 14; and as they are rigidly interconnected by a cross-piece, this vertically swinging portion of turntable 11 functions in effect as a crosshead. The axis of the pins 15 is horizontal and perpendicular to but horizontally spaced from the upright axis about which the portions of head 4 rotate.

The ends of the arms of the crosshead that swings about pivot 14 are shown at 13; and these are traversed by openings 24 to receive mooring devices for a vessel. The direction in which the mooring ropes of such a vessel may for example pull is indicated at 25. It will be seen that there can be a substantial upward component of force thus applied by the vessel to turntable 11 and the provision of pivot 14 ensures that the resulting moments imparted to bearing 12 will be at a minimum. To counter even these moments, however, a counterweight 23 is provided on the side of turntable 11 opposite pivot 14. Both counterweights also serve to keep the apparatus horizontally.

Further to minimize the effects of upward thrust exerted by the vessel on turntable 11, there is provided a guide means in the form of a roller assembly 16 pivotally interconnected with the outer end of the crosshead that swings about pivot 14. Roller assembly 16 rides between guide means provided by upper and lower rails 17 and 18 that are vertically spaced apart and that are carried by body 2 and that are disposed in pairs on opposite sides of the centerline 26 of roller assembly 16. Roller assembly 16 depends through a slot 19 for this purpose. The guideway in which roller assembly 16 runs is drained by discharge channels 20 for the water that would otherwise collect.

It will thus be seen that the turntable 11 can be made as heavy as necessary for being able to moor even the largest vessels, without altering the turntable 8. As a result the turntable can be as light as possible and is able to swing under the influence of the forces exerted to it by the floating lines, when no ship is connected to them. Thus, the floating lines are protected against acute flexing and the damage caused by it.

In use it is preferred, and also it is common practice, that the mooring cables and the conduits connected to the ship define an angle of about 90° for instance. For this reason the turntable 8 manually can be rotated until connections 7 and mooring means 13 are suitably angularly spaced from each other about their common axis of rotation. Also this can be effected by an operator in a small boat adjacent the buoy. Alternatively, the turntables 8 and 11 can be interconnected by gears (not shown) to maintain or position them in a desired orientation.

It is also possible to avoid undesirable cantilever effects in turntable 8, particularly when the device 10 is used for supporting a heavy load, by supporting the cantilevered weight of turntable 8 on body 2 or on a subjacent portion of turntable 11.

From a consideration of the foregoing disclosure, therefore, it will be evident that all of the initially recited objects of the present invention have been achieved.

Although the present invention has been described and illustrated in connection with a preferred embodiment, it is to be understood that modifications and variations may be resorted to without departing from the spirit of the invention, as those skilled in this art will readily understand.

Such modifications and variations are considered to be within the purview and scope of the present invention as defined by the appended claims.

I claim:

1. Apparatus for transferring fluids between a vessel and the shore, comprising a frame adapted to be anchored to the bottom of a body of water, a first turntable carried by the frame and rotatable relative to the frame about an upright axis and having connections for conduits between the vessel and the

shore, and a second turntable carried by the frame and rotatable relative to the frame and relative to said first turntable about an upright axis, and means on said second turntable for mooring a vessel that floats on the body of water, said first and second turntables being coaxial, said first turntable being disposed above said second turntable.

2. Apparatus for transferring fluids between a vessel and the shore, comprising a frame adapted to be anchored to the bottom of a body of water, a first turntable carried by the frame and rotatable relative to the frame about an upright axis and having connections for conduits between the vessel and the shore, and a second turntable carried by the frame and rotatable relative to the frame and relative to said first turntable about an upright axis, means on said second turntable for mooring a vessel that floats on the body of water, and means mounting a portion of said second turntable for vertical swinging movement about a horizontal axis, said mooring means being disposed on said portion of said second turntable.

3. Apparatus for transferring fluids between a vessel and the shore, comprising a frame adapted to be anchored to the bottom of a body of water, a first turntable carried by the frame and rotatable relative to the frame about an upright axis and having connections for conduits between the vessel and the shore, and a second turntable carried by the frame and rotatable relative to the frame and relative to said first turntable about an upright axis, means in said second turntable for mooring a vessel that floats on the body of water, means interconnecting said connections and said turntable on one side of said first turntable axis, and a counterweight on said first turntable on the opposite side of said first turntable axis.

4. Apparatus for transferring fluids between a vessel and the shore, comprising a frame adapted to be anchored to the bottom of a body of water, a first turntable carried by the frame and rotatable relative to the frame about an upright axis and having connections for conduits between the vessel and the shore, and a second turntable carried by the frame and rotatable relative to the frame and relative to said first turntable about an upright axis, means on said second turntable for mooring a vessel that floats on the body of water, and a counterweight on said second turntable on the side of said second turntable axis opposite said mooring means.

5. Apparatus as claimed in claim 2, and guide means carried by said portion of the second turntable and engaging with guide means carried by said frame to limit vertical swinging movement of said portion of the second turntable and to transmit vertical thrust from said portion of the second turntable to said frame.

6. Apparatus as claimed in claim 5, said guide means carried by said portion of the second turntable comprising a roller assembly interconnected with said portion of the second turntable for swinging movement about a horizontal axis parallel to the horizontal axis of swinging movement of said portion of the second turntable, said guide means carried by said frame comprising rails carried by said body and disposed above and below said roller assembly.

7. Apparatus as claimed in claim 6, said rails being disposed in pairs on opposite sides of the vertical center line of said roller assembly.

35

40

45

50

55

60

65

70

75