OPIC
Office de la propriété intellectuelle du Canada

CIPO
Canadian Intellectual Property Office

(12) (19) (CA) **Demande-Application**

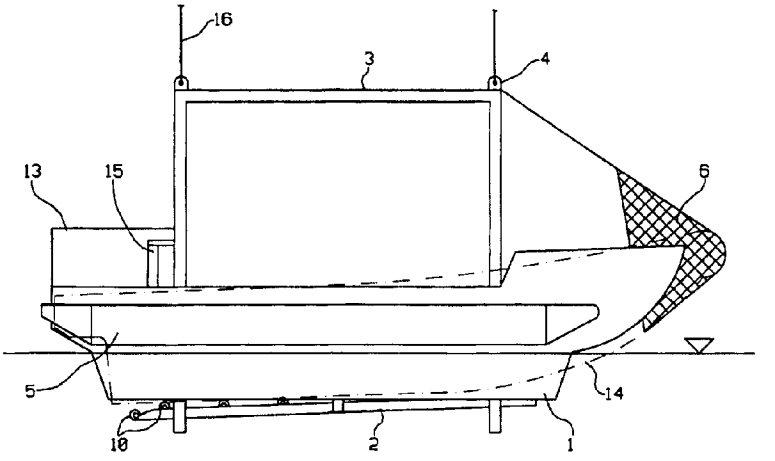
(21) (A1) **2,252,922**
(86) 1997/04/18
(87) 1997/10/30

(72) GRÖNSTRAND, Jan, SE
(71) GRÖNSTRAND, Jan, SE

(51) Int.Cl.[6] B63B 23/00
(30) 1996/04/22 (9601535-9) SE

(54) **APPAREIL POUR METTRE A L'EAU ET RECUPERER DES CANOTS**

(54) **APPARATUS FOR LAUNCHING AND LANDING OF BOATS**



(57) L'invention concerne un appareil, appelé ici ensemble châssis de support, pour mettre à l'eau des bateaux ou des canots de sauvetage, ainsi que d'autres petites embarcations, depuis un vaisseau, une plate-forme flottante ou une autre installation fixe, et permettre leur récupération. Le canot (14) est normalement retenu dans l'ensemble châssis. Ce dernier comprend des éléments flottants (1) fixés à un châssis (3). Le canot (14) est supporté dans un berceau (2) dans le châssis (3). Au moment de la mise à l'eau et de la récupération du canot (14), l'ensemble châssis est abaissé pour venir dans une position de flottement sur la surface de l'eau.

(57) The present invention relates to an apparatus, here designated a dock, for launching and recovery of a lifeboat, rescue boat or like small boat on a vessel, a floating platform or some fixed installation. The boat (14) is normally stored in the dock. The dock is provided with buoyant elements (1) fixed to a frame construction (3). The boat (14) is supported in a cradle (2) within the frame (3). On launching and recovery of the boat (14), the dock is lowered to a floating position on the surface of the water. In order to fix the boat (14) to the dock, a locking device (9, 15) is provided. By modifying the configuration and size of the

OPIC
Office de la propriété intellectuelle du Canada

CIPO
Canadian Intellectual Property Office

(21) (A1) **2,252,922**
(86) 1997/04/18
(87) 1997/10/30

Pour fixer le canot (14) à l'ensemble châssis, on prévoit un dispositif de verrouillage (9, 15). En ajustant la structure et la taille des éléments flottants, on obtient un ensemble châssis dont le roulis et le tangage coïncident étroitement avec ceux du vaisseau (14). L'ensemble châssis et le canot (14) vont donc avoir à peu près le même comportement en mer, ce qui rend relativement facile l'introduction du canot (14) dans l'ensemble châssis, même par gros temps. Quand le canot (14) est entièrement dans l'ensemble châssis, il est en contact avec ce dernier en deux points au moins et, à ce moment, le canot (14) et l'ensemble châssis sont fixés ensemble à l'aide du dispositif de verrouillage (9, 15). Le c anot (14) et l'ensemble châssis forment ainsi rapidement une unité qui résiste à la séparation.

buoyant elements, the dock is given rolling and pitching periods which as closely as possible coincide with those of the boat (14). The dock and the boat (14) will thereby behave in approximately the same manner in the sea, which makes it relatively simple to run the boat (14) into the dock even in a very heavy sea. When the boat (14) has been run wholly into the dock, it is in contact with the dock at at least two points, in which event both boat (14) and dock are fixed to one another with the aid of the locking device (9, 15). The boat (14) and the dock thus rapidly form a cohesive unit.

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : B63B 23/00 — A1

(11) International Publication Number: **WO 97/39940**

(43) International Publication Date: 30 October 1997 (30.10.97)

(21) International Application Number: PCT/SE97/00657

(22) International Filing Date: 18 April 1997 (18.04.97)

(30) Priority Data:
9601535-9 22 April 1996 (22.04.96) SE

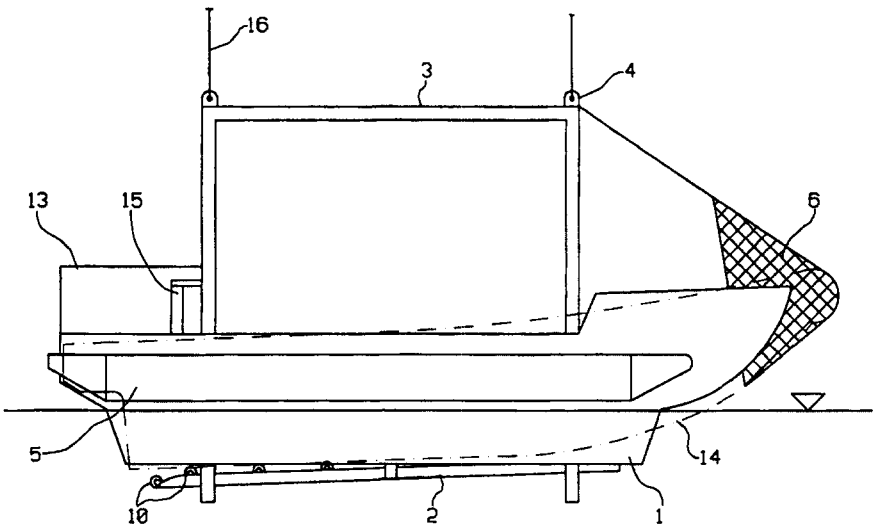
(71)(72) Applicant and Inventor: GRÖNSTRAND, Jan [SE/SE]; Kråkbärsgatan 7, S-234 43 Lomma (SE).

(74) Agents: MAGNUSSON, Gustav et al.; Magnupatent AB, P.O. Box 6207, S-200 11 Malmö (SE).

(81) Designated States: AU, BR, CA, CN, EE, IL, JP, KR, LT, LV, NO, NZ, PL, RU, SG, TR, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.
In English translation (filed in Swedish).

(54) Title: APPARATUS FOR LAUNCHING AND LANDING OF BOATS



(57) Abstract

The present invention relates to an apparatus, here designated a dock, for launching and recovery of a lifeboat, rescue boat or like small boat on a vessel, a floating platform or some fixed installation. The boat (14) is normally stored in the dock. The dock is provided with buoyant elements (1) fixed to a frame construction (3). The boat (14) is supported in a cradle (2) within the frame (3). On launching and recovery of the boat (14), the dock is lowered to a floating position on the surface of the water. In order to fix the boat (14) to the dock, a locking device (9, 15) is provided. By modifying the configuration and size of the buoyant elements, the dock is given rolling and pitching periods which as closely as possible coincide with those of the boat (14). The dock and the boat (14) will thereby behave in approximately the same manner in the sea, which makes it relatively simple to run the boat (14) into the dock even in a very heavy sea. When the boat (14) has been run wholly into the dock, it is in contact with the dock at at least two points, in which event both boat (14) and dock are fixed to one another with the aid of the locking device (9, 15). The boat (14) and the dock thus rapidly form a cohesive unit.

Apparatus for launching and landing of boats

The present invention relates to an apparatus for launching and recovery of a lifeboat, rescue boat or like small boat on a vessel, a floating platform or a fixed installation such as, for example a harbour pier. In order to facilitate this description, the expressions "boat" and "vessel" will be principally employed below, it being understood that the expression "boat" encompasses pick-up boats, lifeboats, rescue boats etc. and that the expression "vessel" also encompasses a platform, pier etc.

One problem in the launching and recovery of boats on vessels is that, because of the difference in size, the vessel and the boat move differently in the water. As a result, there will be large relative movements between the vessel and the boat. In addition, waves are often built up to a greater height along the side of the vessel than they would otherwise do, which gives additional large relative movements between the vessel and the boat.

Today, boats on board vessels are normally suspended in davits with whose aid the boats are launched in the water. Conventional davits are primarily intended for launching and function less satisfactorily when retrieving a boat in a high sea. On some vessels, a crane may be used for launching and recovery of a boat.

Lifeboats are normally suspended at two points wires operated by the davit winch. In a number of systems for pick-up boats, a single-point attachment is employed. When, on launching and recovery of a boat, hooks are attached or released from the boat, there is a risk that the generally heavy hooks and blocks connected to them may hit the boat because of the large relative movement between the vessel and the boat. Moreover, in systems employing two lifting points, there is the risk that only one hook is disengaged/engaged, in which event the boat runs the risk of being left hanging vertically along the side of the vessel, depending upon what direction the relative vertical movement between

the boat and the vessel takes. Even if the crew is successful in attaching or disengaging the hooks from the boat, there is moreover the risk that wires are slack to such an extent that these hit the boat. This applies as long as the boat has not been raised free above the crests of the waves.

If the mother vessel is to be kept under control, it must be under way somewhat in a forward direction, which entails that the engagement and disengagement operations as described above must be able to be put into effect while moving forwards. This makes it even more difficult to execute a launching or recovery operation of a boat using the conventional systems.

There is, thus, a need in the art for a system for the launching and recovery of boats in which the above-outlined drawbacks are obviated or at least reduced to a minimum.

The present invention comprises an apparatus, here designated a dock, in which the boat is stored on board a mother vessel, the dock being floating. The dock is connected to davits or the like and the boat may be run out of and into the dock when the dock has been lowered to the floating position.

From publications NO 141 929 and NO 162 184, systems are already previously known in which boats in a lowered floating position are run into or out of special apparatuses for recovery and launching, respectively. These prior art apparatuses suffer, however, from the disadvantage that they must be lifted a relatively long distance before the boat proper begins to be lifted. As a result of the large waves which may be built up along the side of the vessel, the risk is then great that the boat moves in relation to the apparatus, in which event it may strike against parts of the apparatus, assume an oblique position inside the apparatus and capsize when the apparatus is lifted, or that hooks, lines and the like hit the boat. From the above-mentioned publication NO 162 184, it is previously known to employ a net for lifting the boat. This functions satisfactorily as long as the vessel is dead in the water, but if the vessel is under way or if there is a current, the

risk is great that the net does not maintain its intended configuration, but behaves roughly like a trawler net. If the net is in the incorrect position, this naturally causes problems when lifting the boat.

One wish is that the floating dock and the boat should have as similar seakeeping properties as possible, which entails that the boat relatively simply may be run into and out of the dock, since the boat and the dock will have the same pattern of movement, i.e. the relative movement between the dock and the boat is slight. The dock should answer to a wave just as quickly as the boat.

The above needs and wishes are satisfied by an apparatus according to appended claim 1.

Yet a further wish in systems of this type is that the boat and its associated dock or the like must rapidly be able to form a unit in order to minimize the risks of relative movement between dock and boat.

Another wish is that the system should be capable of simple adaptation to existing vessels. This is achieved in the present invention in that conventional davit systems may be employed. As a result, only minor modifications to the mother vessel are normally required. The apparatus according to the above cited NO 162 184 requires that a special two-armed crane be used.

Employing the apparatus according to the present invention, it is possible to handle all types of boats in existence today.

Expedient embodiments of the present invention are disclosed in the appended subclaims.

When, in the description below, mention is made of the forward portion of the various parts, this is taken to signify that part which, in normal use, co-operates with or is located in the forward region of the boat, and the corresponding situation applies to the rear part and similar expressions.

The present invention will now be described in greater detail here below, with particular reference to various embodiments shown on the accompanying drawings. In the accompanying drawings:

Fig. 1 is a side elevation of one embodiment of the present invention;

Fig. 2 is a top plan view of a modified embodiment of the present invention;

Fig. 3 is a section taken along the line III-III in Fig. 2;

Fig. 4 is a section taken along the line IV-IV in Fig. 2;

Fig. 5 is a detailed view showing one embodiment of the cradle in which the boat is received; and

Fig. 6 is a section corresponding to that of Fig. 4 of an alternative embodiment.

The dock has one or more buoyant elements which support a cradle 2 intended for supporting and carrying a boat 14. The cradle 2 rests in a frame construction or frame 3, the frame 3 being fixed to the buoyant elements in a suitable manner.

In the illustrated embodiment, the buoyant elements consist of two buoyant bodies or pontoons 1 disposed on either side of the frame 3. In other embodiments (not shown), the buoyant elements consist of a continuous hull, two or more buoyant bodies on either side of the frame, etc.

Irrespective of the configuration and number selected, the buoyant elements must have a total displacement which is sufficient to support the dock together with a fully loaded boat 14. The buoyant elements must ensure that the dock (or more precisely the cradle) assumes the correct floating position so that the boat 14 may simply be run into and out of

the dock. In addition, the buoyant elements must be of such configuration and have such displacement that the dock in its entirety has the same seakeeping properties as the boat 14. The seakeeping properties, floating position etc. of the dock are influenced by modifying the configuration and size of the buoyant elements. The dock must be given rolling and pitching periods which as closely as possible correspond to those of the boat in order to achieve similar seakeeping properties. It is not possible to state the exact configuration and size generally, but these must be arrived at by test for each specific embodiment of dock and boat 14.

Fenders 5 are disposed on the outer sides of the buoyant elements in order to damp any possible collisions against the side of the vessels. The fenders 5 are suitably made displacing, i.e. they constitute a part of the buoyant elements. One example of suitable fenders is inflated rubber fenders. The fenders 5 are provided on the outside with a wear surface, for example rubber.

The cradle 2 disposed in the dock is adapted to the bottom shape of the boat 14. The boat 14 may be flat-bottomed, round-bottomed with different curvatures, or be provided with a keel of different angles, or a combination of these. In, for example, water-jet powered boats, the bottom is flat at the stern but may be rounded further forwards. In the embodiment shown in Figs. 4 and 5, the cradle 2 is constructed from two or more transversely placed elements each consisting of a bottom beam 17, two oblique struts 18 and two edge stays 19. The inclination of the oblique struts 18 is adapted to the bottom configuration of the boat. Midway in the cradle 2, there is a set of rollers 10 disposed facing towards the boat and, on the sides of the oblique struts 18 facing towards the boat 14, one or more sliding strips 11 are disposed. Both the sliding strips 11 and the set of rollers 10 are disposed in the longitudinal direction between the elements consisting of the bottom beam 17, the oblique struts 18 and the edge stays 19. The concept is that the boat 14 should, if necessary, be capable of sliding on the rollers 10 and the sliding strips 11 when the boat is manoeuvred into or out of the dock. In Figs. 2 and 3, rollers 10 are shown as disposed for cooperation with the outer sides of the boat in order to steer the boat

in position. A person skilled in the art will perceive that, in other embodiments (not shown), use is made exclusively of rollers 10 or exclusively of sliding strips 11 or that the rollers or sliding strips, respectively, are disposed in other positions as compared with that shown in the illustrated embodiment. In order to damp the collision loading against the bottom of the boat on running into the dock, the cradle too is, in one embodiment, resiliently mounted (Fig. 5) in the frame 3. The resilient mounting is effected by means of a number of springs 12, rubber elements or other resilient devices disposed between the bottom beams 17 of the cradle 2 and the frame construction 3. In one alternative embodiment (not shown), the cradle 2 is suspended with resilient elements in the frame construction 3.

In one alternative embodiment, the cradle consists of a net 26 (Fig. 6) tensioned in the frame 3 by means of springs 27 in such a manner that the net forms a cradle. In such instance, there are no rollers 10 or sliding strips 11, but the boat instead slides on the net itself. In one embodiment, the net consists of glass fibre rods interwoven with belts or lines of a suitable fibre material, including synthetic fibre of, for example, polyamide, polyester and aramide.

In further alternative embodiments (not shown) the cradle 2 consists of a bottom beam on which two or more upstanding posts are disposed. The posts normally slope somewhat inwards and are provided with rollers or support sliding strips. A person skilled in the art will perceive that the cradle 2 may be constructed in many different ways as long as it is adapted to the configuration of the boat 14.

In the illustrated embodiment, the frame construction 3 includes two or more tranversely placed elements consisting of a bottom beam 20, two side beams 21 and a crosspiece 22 which are interconnected to form a rectangle.

Between these two or more transversely placed frame elements 20-22 at least one upper interconnection beam 23 and one lower interconnection beam 25 are disposed longitudinally and connected with the side beams 21. In a number of embodiments, one or more interjacent interconnection

beams 24 are moreover provided. The side beams 21 of the frame 3 are fixed to the buoyant bodies 1. A person skilled in the art will perceive that this fixing may be put into effect in a number of different ways, but given that this feature does not constitute any germane part of the present invention, it will not be described in greater detail here.

A person skilled in the art will further perceive that the construction of the frame 3 may also be varied in many ways, for example in one embodiment, the frame 3 consists only of the lower parts as described above, and in another embodiment, the cradle 2 forms the lower part of the frame 3. Furthermore, the side beams may be disposed with an inclination and/or the interconnection beams may be disposed cruciformly. In a number of embodiments, the upper or interjacent interconnection beams 23, 24 are moreover employed to suspend other details and parts such as nets, seat places, railings, etc.

In the upper part of the frame 3, anchorages 4 are provided for cooperation with winch wires 16. Provision of a permanent coupling between the winch wire 16 and the anchorages 4 eliminates the need for providing heavy hooks which, in previously employed apparatuses, were connected to the boat proper and then constituted a hazard for those persons located in the boat. In order to take up any possible slack in the wires , the winches which are employed are self-tensioning and/or so-called heave compensation is employed. As a rule, the heave compensation is based on the concept that the wires run over a spring-loaded block where the ability to take up slack is determined, int. al. by the maximum stroke lengths of the springs. As an extra safety provision, the frame construction 3 is provided, in a number of embodiments, with a roof (not shown) on which a slack cable can be received. The anchorages 4 are placed high so as to minimize the risk if the wires become slack more than the self-tensioning winches and/or heave compensation is able to take up.

In the forward part of the dock, the buoyant bodies 1 are provided with stops 7 which are directed inwards. The stops 7 are designed in correspondence with the bow section of the boat 14. The function of the

stops 7 is to both guide the boat 14 so that it assumes the correct position in the cradle 2 and to prevent the boat 14 from entering in too far.

In order to facilitate running into the dock, in a number of embodiments the dock is provided with screens 13 and/or rollers 10 which co-operate with the outer sides of the boat in order to steer the boat into the dock.

In one embodiment, the stops 7 are supplemented by a catchment net 6 placed in the forward part of the dock, the net 6 receiving the prow of the boat 14. The net is designed and journalled such that the boat is arrested gently. The catchment net is only employed together with such boats 14 in which people cannot sit furthest forward in the prow.

The boat 14 and the dock are provided with suitable, co-operating locking devices 9, 15 for fixing the boat 14 to the dock. The locking devices prevent the boat from sliding out uncontrollably from the cradle. In the illustrated embodiment, the locking devices consist of rotary hooks 9 disposed on the boat, the hooks co-operating with pins 15 disposed in the buoyant bodies 1. A person skilled in the art will perceive that this locking feature may be provided in various different ways and that the different co-operating parts may be disposed on many different points (in many different positions). In the simplest case, the locking devices consist of a rope end and a co-operating bitt or the like.

In the illustrated embodiment, the cradle 2 is journalled sloping in the frame 3, where the highest portion of the cradle 2 in relation to the water surface lies forwards in the dock. In other embodiments, the cradle 2 does not slope. Further, in certain embodiments, the cradle 2 is rotatably journalled in its forward portion, in which event a lifting device 8 is provided which lifts the rear end of the cradle 2 and, therewith, the stern of the boat 14, such that the boat 14 wholly or partly leaves the water and thereby will rest stably in the cradle 2. In yet a further embodiment, the entire cradle 2 is journalled movably in the vertical direction, in which the lifting device 8 lifts the en-

tire cradle 2 and not only its rear portion. The lifting device 8 consists of one or more rams, actuators, etc. driven by compressed air vessels, hydraulic accumulators or electric batteries. When the catchment net 6 is employed its lines may be directly coupled to the cradle 2 in such a manner that, when the boat 14 is run in and the catchment net 6 is tensioned, the entire cradle 2 or its rear portion is lifted and locked in a raised position with the aid of a locking device (not shown). In this case, the inherent kinetic energy of the boat is thus utilised for lifting the cradle. The above applies also to those embodiments in which the cradle consists of a net. In a number of embodiments, contact devices are provided in connection with the stops 7, the contact devices automatically activating the lifting device 8 when the boat 14 runs against the stops 7.

In addition to the winch wires 16 which come from the davit, the dock is connected to the mother vessel also by mooring and guide lines (not shown). On the frame 3, suitable anchorages (not shown) are provided for the mooring and guide lines . With the aid of the mooring and guide lines, the boat 14 is held in a suitable position in relation to the mother vessel and accompanies the mother vessel's possible movement forwards. The guide and mooring lines are connected to winch devices on the dock and/or the mother vessel or the guide and mooring lines have fixed connections on the dock or vessel, respectively, in which event these lines are of a fixed length.

The dock including the boat 14 and the davit is placed anywhere optionally on the vessel where it is considered suitable. It is also possible to place it in the stern, which makes for more reliable and safer towing.

When the boat 14 is to be launched, the dock is lowered with the aid of the winch devices of the davits. When the dock reaches the surface of the water and is freely floating, in embodiments provided with lifting devices as described in the foregoing, the boat 14 (or more precisely the cradle) is first lowered. The locking device 9 is then released, whereafter the boat 14 slides or backs out of the cradle 2. The buoyant elements are of a design to enable the cradle 2 to be held in such a

position that, when the boat 14 has been released, it lies sufficiently deep in order, if necessary, to allow the boat 14 to reverse out from the dock. Normally, the boat 14 is in a floating position whereupon it is moved out of the dock in that the dock accompanies the mother vessel's forward movement. Moreover, the buoyant elements are designed such that, when the boat 14 has been wholly run into the dock (i.e. so far that its prow abuts against the stops 7 and possibly the catchment net 6), the boat 14 abuts against the dock at at least two points. In such instance, the boat 14 is supported at least intermittently in at least at one point of the cradle 2. The short distance between boat 14 and cradle 2 entails that, in the lifting movement proper of the dock, there will be at most but a slight relative movement between the cradle 2 and the boat 14. The dock is held at the side of the vessel and in a suitable position with the aid of the mooring and guide lines. Thus, the dock remains in position and floats or is in attendance in the water ready to receive the boat 14 when a mission is completed.

By providing the dock with suitable railings and possible seating places in connection to the buoyant bodies and a net beneath the cradle (or that the cradle consists of a net), it is possible to employ the dock alone for retrieving people in distress on board the mother vessel. These parts can be supported in the interconnection beams 23-25 over the frame 3. The dock may then be hoisted up without the boat being in position in the dock. This may be employed for transferring people in distress to the mother vessel at the same time as the boat 14 is used for retrieving or searching for others in distress.

When the boat 14 is once again to be taken on board the vessel, it is run into the dock. Given that the dock and the boat 14 have almost entirely the same seakeeping properties, thanks to the buoyant elements of the dock, it is relatively simple to run the boat 14 into the dock even in a very heavy sea. When the dock is floating in the sea without the boat, the cradle 2 lies sufficiently deep for the boat 14 to be able to be run into the dock. At the same time, the cradle 2 does not lie deeper than that it intermittently supports the bottom of the boat 14 at at least one point when the boat 14 has been run in so that its prow abuts against the stops 7 and possibly against the catchment net

6. If necessary, the cradle 2 is pressed down by the boat 14 when it is run into the dock. Immediately when the boat 14 has made contact with the stops 7 or the catchment net 6, the boat 14 is locked in position in the dock with the aid of the locking devices 9. The boat 14 and the dock thus rapidly form a cohesive unit in that they are in contact at at least two points and do not run the risk of being jolted against one another when the dock is lifted up to the vessel. If the dock is provided with lifting devices 8 for lifting up the boat 14 wholly or partly from the water, these lifting devices 8 are activated (if they have not already been activated) with the aid of the catchment net 6 or the contact devices of the stops 7. The next stage is to lift the dock with the boat 14 in the cradle 2 on board the mother vessel.

The above detailed description has referred to but a limited number of embodiments of the present invention, but a person skilled in the art will readily perceive that the present invention encompasses a large number of embodiments without departing from the scope of the appended claims.

CLAIMS

1. An apparatus for launching and recovery of a lifeboat, a rescue boat or like small boat (14) with the aid of davits or cranes, the apparatus including buoyant elements and a device for supporting the boat (14) from beneath, on lifting and storing of the boat (14), c h a r a c t e r i z e d in that the apparatus is given seakeeping properties which are as like the boat's (14) seakeeping properties as possible in that the configuration and displacement of the buoyant elements are adapted in compliance with the boat in question; and that it has a reserve displacement at least so great that it can carry a fully loaded boat (14) of the type for which it was designed and constructed.

2. The apparatus claimed in claim 1, c h a r a c t e r i z e d in that when the boat (14) has been wholly run into the apparatus, the boat (14) abuts against the apparatus at at least two points; and that means (9,15) are provided for locking the boat (14) fast to the apparatus.

3. The apparatus as claimed in any of the preceding claims, c h a r a c t e r i z e d in that the buoyant element consists of two or more buoyant bodies or pontoons (1), or that the buoyant element is a cohesive hull.

4. The apparatus as claimed in any of the preceding claims, c h a r a c t e r i z e d in that the device for supporting the boat (14) from beneath forms a cradle form adapted to the configuration of the bottom of the boat (14); and that the cradle (2) is formed of transversely placed elements (17-19) and displays rollers (10) and/or sliding surfaces facing towards the bottom of the boat (14).

5. The apparatus as claimed in any of claims 1-3, c h a r a c t e r i z e d in that the device for supporting the boat (14) from beneath consists of a net which is tensioned such that it forms a cradle (2).

6. The apparatus as claimed in any of claims 4-5, c h a r a c t e r i z e d in that the cradle (2) is disposed sloping, with its forward end higher than its rear end; that the cradle (2) is movably journalled in the vertical direction in at least its rear part and/or that the cradle (2) is journalled via spring means (12,27) in the apparatus.

7. The apparatus as claimed in any of claims 4-6, c h a r a c t e r i z e d in that the frame (3) is provided for supporting the cradle (2) and the buoyant elements; and that the frame (3) is provided with anchorages (4) for co-operation with wires (16) from the crane or davit.

8. The apparatus as claimed in any of the preceding claims, c h a r a c t e r i z e d in that lifting devices (8) are provided for lifting the cradle (2) so that the boat (14) is wholly or partly lifted up out of the water and thereby lies stably in the cradle (2), where the lifting device (8) is one or more pistons, actuators etc., driven pneumatically, hydraulically or electrically.

9. The apparatus as claimed in any of the preceding claims, c h a r a c t e r i z e d in that stops (7) are provided forwardly in the apparatus and are turned to face inwards and designed in response to the bow portion of the boat (14) in order to guide the boat correctly in the cradle (2) and prevent it from entering too far into the apparatus; and that the stops (7) are provided with contact devices which, when the boat (14) runs against the stops (7), activate the lifting device (8) and/or that screens (13) and/or rollers (10) are provided in the apparatus for guiding in the boat (14).

10. The apparatus as claimed in any of the preceding claims, c h a r a c t e r i z e d in that a catchment net (6) is tensioned in the forward part of the apparatus for preventing the boat (14) from entering too far in; and that the catchment net (6) is journalled in lines which are connected to the cradle (2) so that it is lifted

up with the aid of the kinetic energy of the boat (14) when the boat is caught by the net (6).

11. The apparatus as claimed in any of the preceding claims, c h a r a c t e r i z e d in that fenders (5) are provided on the outsides.

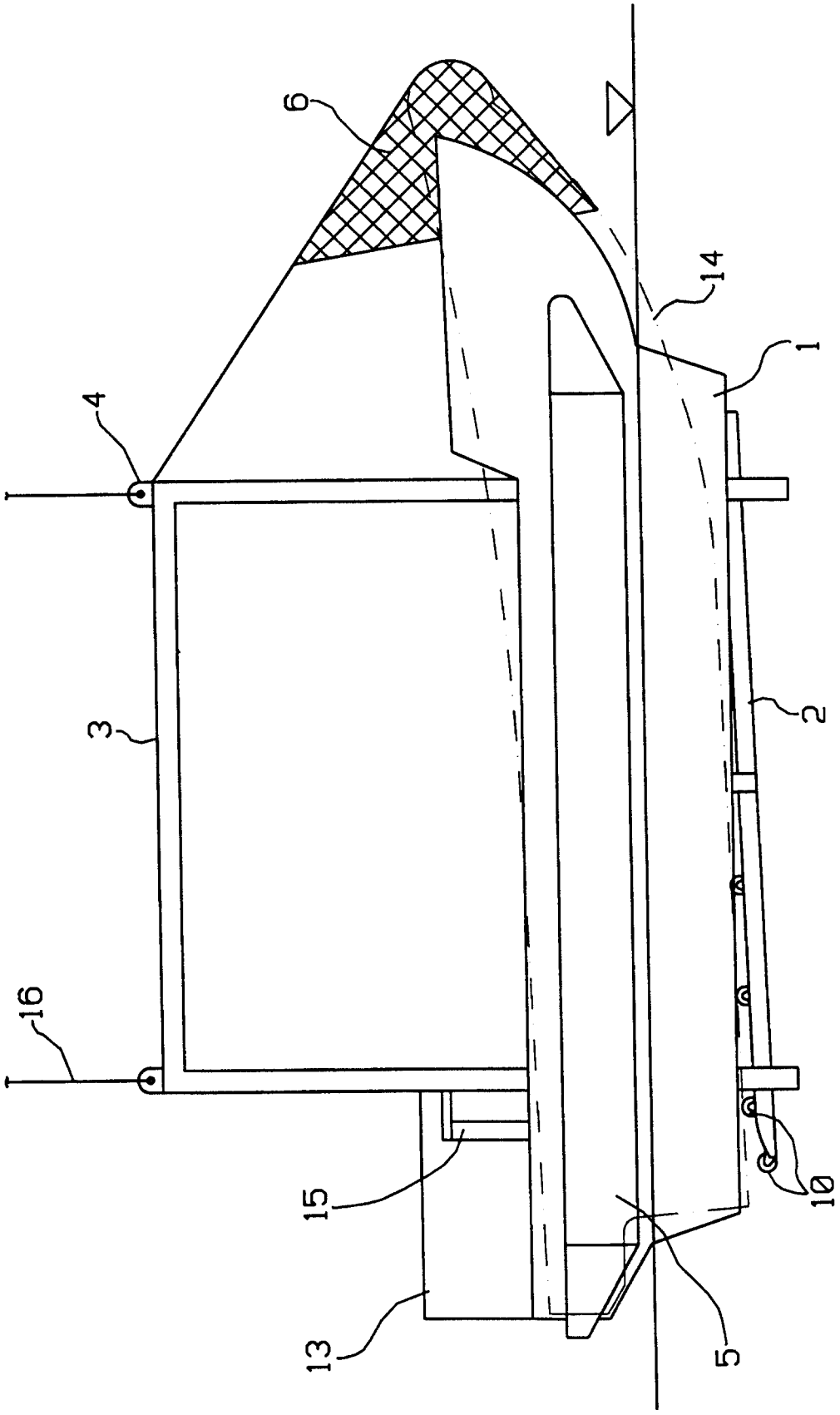


Fig.1

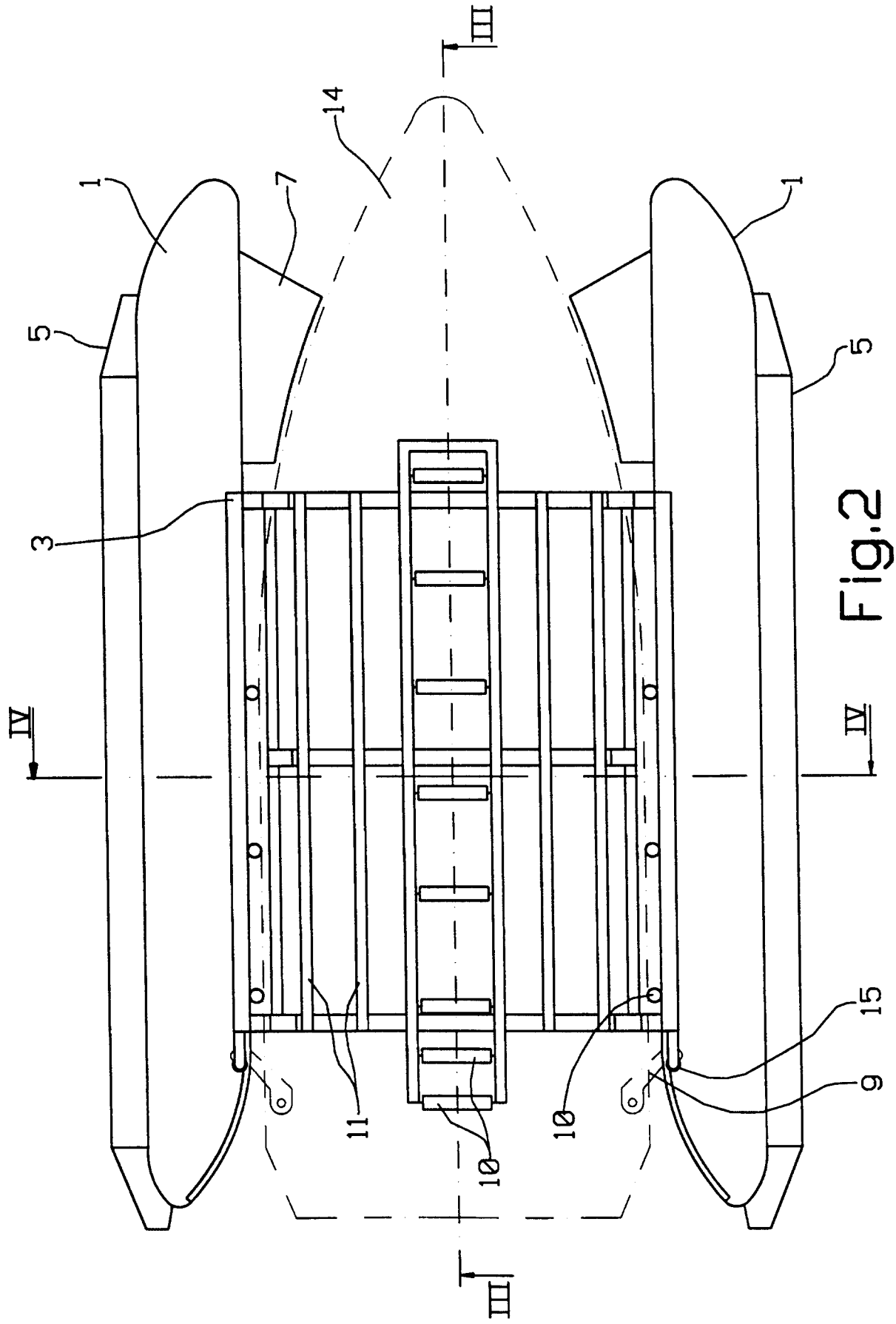


Fig.2

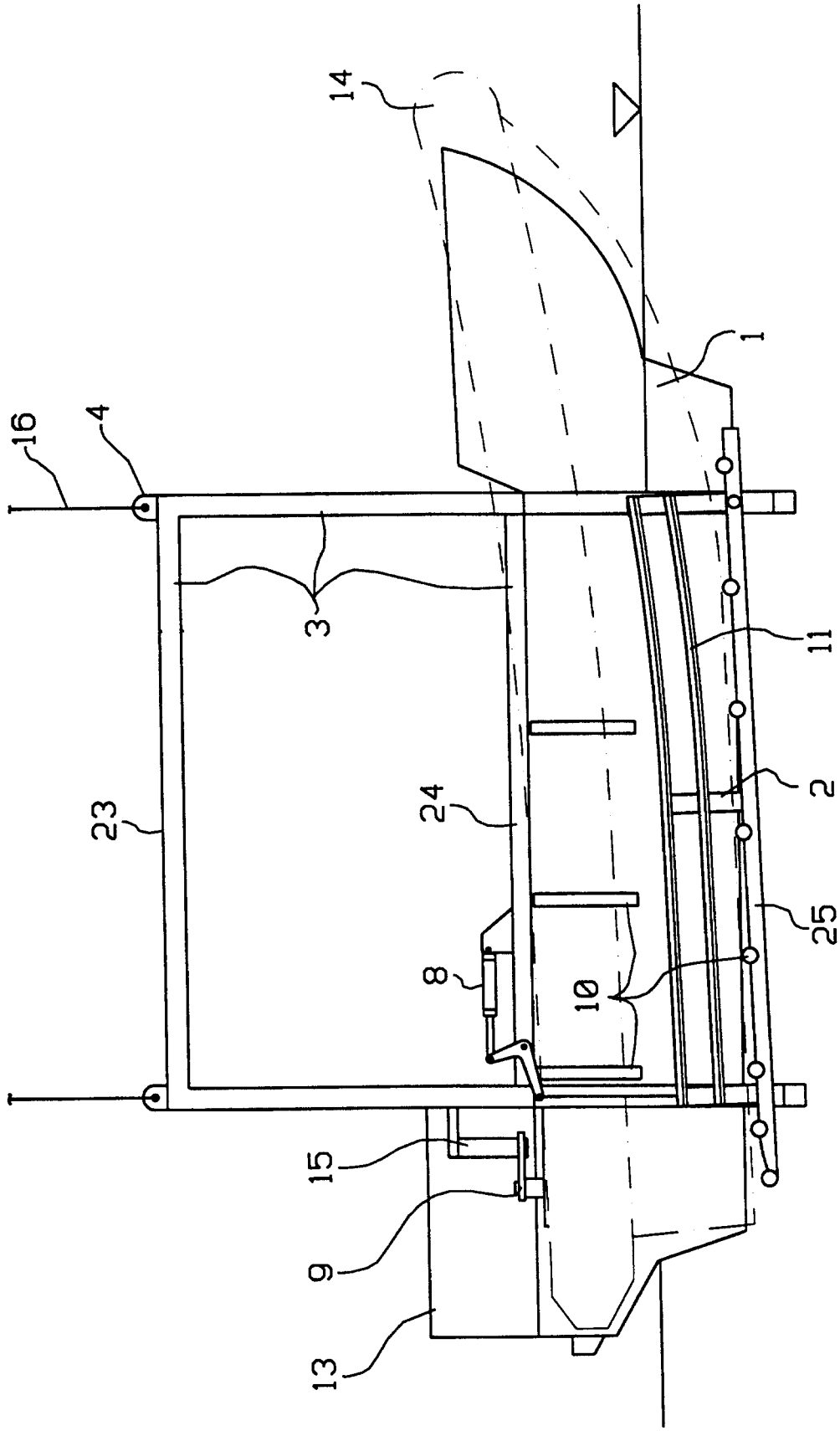


Fig.3

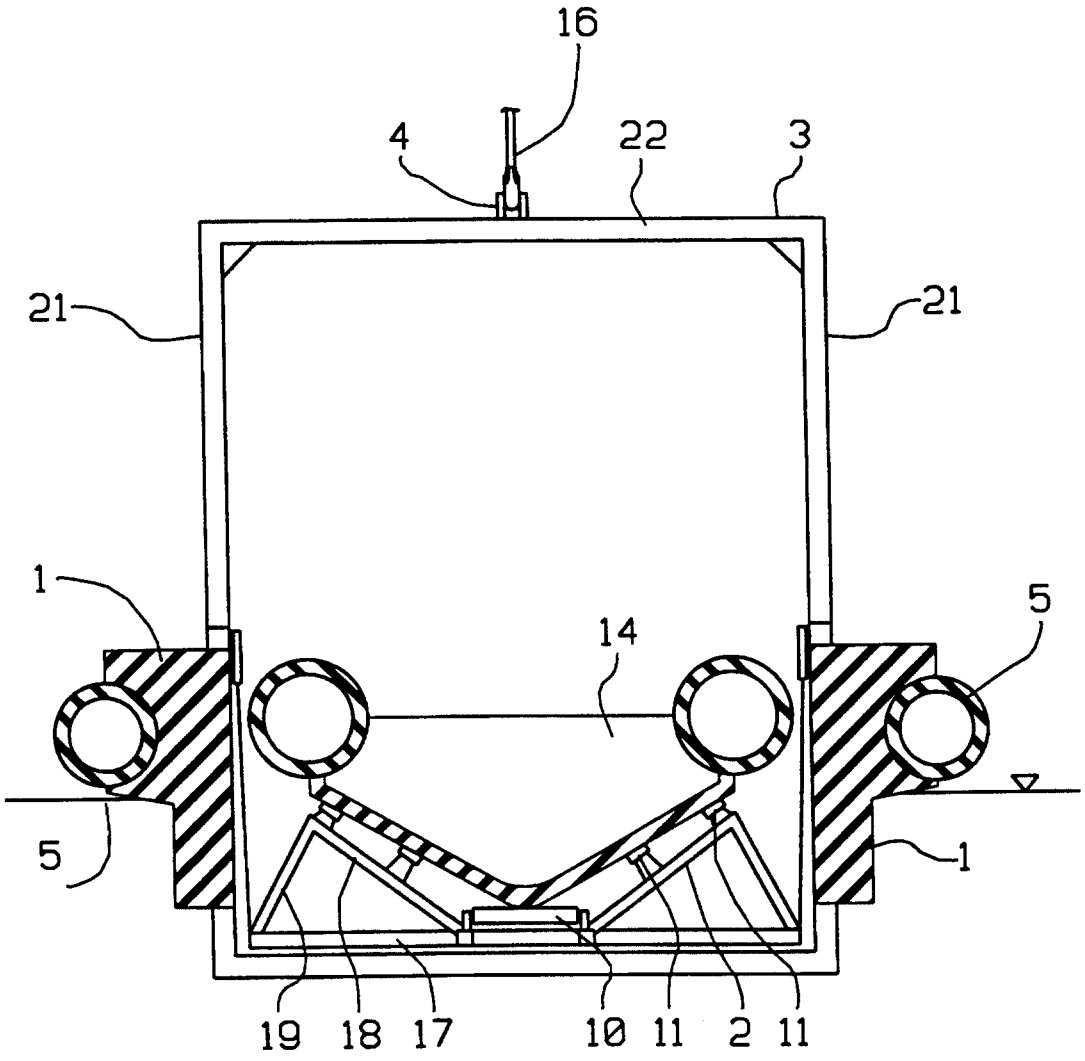


Fig.4

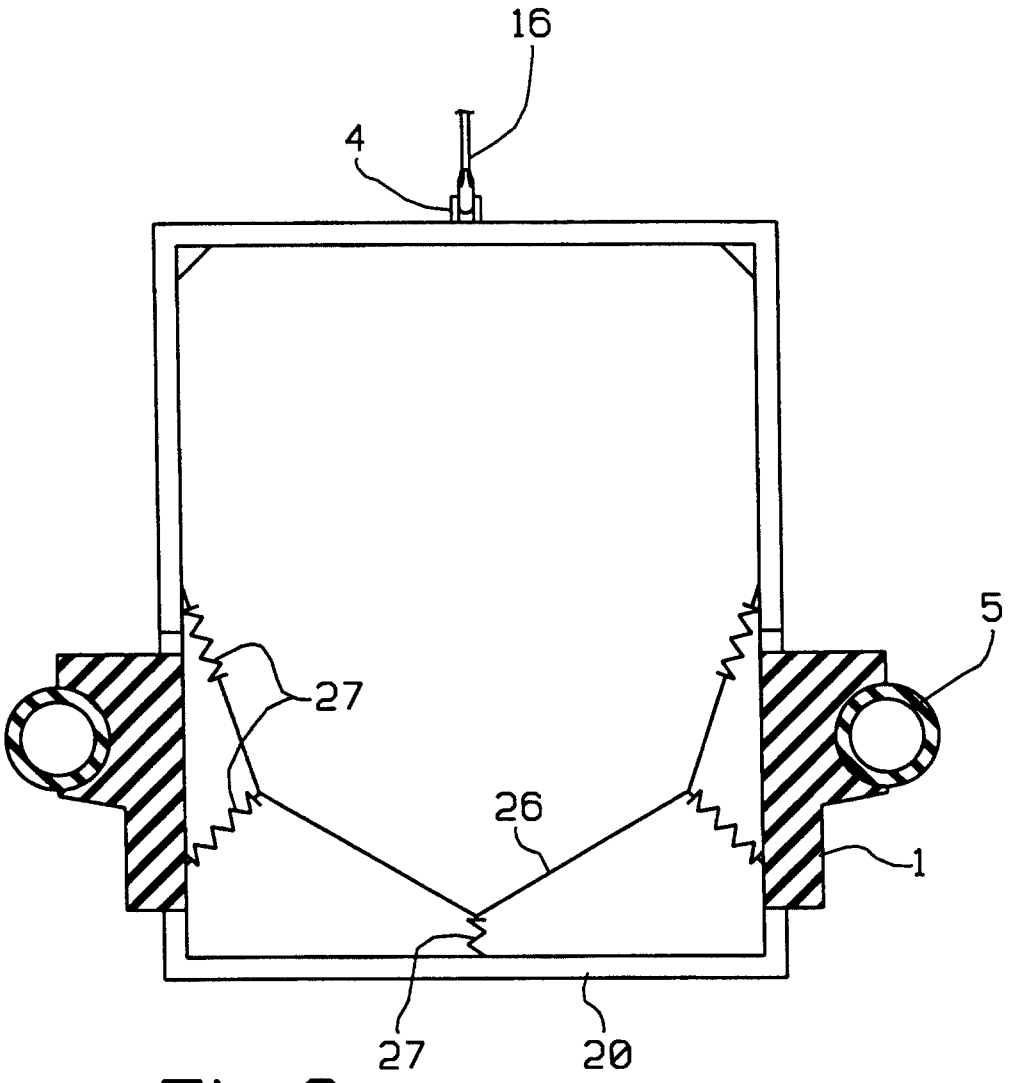


Fig.6

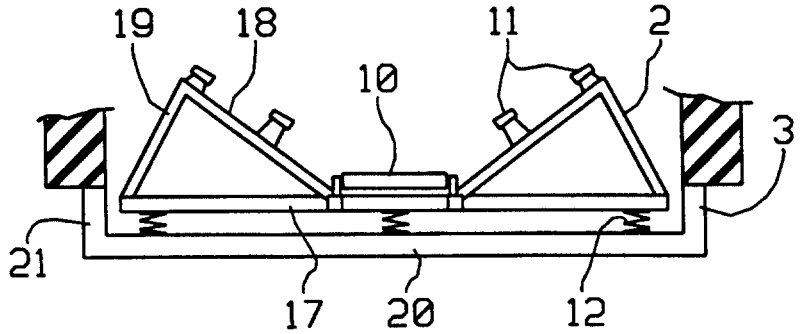
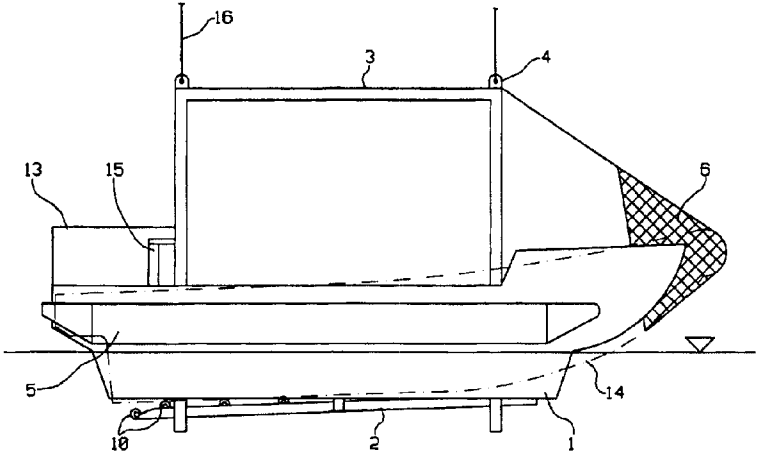


Fig.5


16
3
4
13
15
6
5
14
10
2
1