(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 639 496 A2**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: **94111832.5**

(51) Int. Cl.[6]: **B63B 7/08**, B63B 7/02

(22) Date of filing: **29.07.94**

(30) Priority: **19.08.93 IT AL930003**

(43) Date of publication of application:
22.02.95 Bulletin 95/08

(84) Designated Contracting States:
DE ES FR GB

(71) Applicant: **Montanari, Mario**
Via Don Giovine 44
I-15100 Alessandria (IT)

(72) Inventor: **Montanari, Guido**
Via Nizza 29
I-10100 Torino (IT)

(54) **A boat, particularly a service-boat for crafts, ships, or the like.**

(57) A boat, particularly a service-boat for crafts, ships or the like having at least a central part of the hull made like a rigid shell (1, 1') and being combined with hollow peripheral floating elements (2, 2', 22). According to the invention, the peripheral floating elements (2; 2', 22) are secured to a central shell-like rigid part (1, 1') of the hull, in a overturning way, alternatively in a active floating position, in which they are placed outside over the rigid part of the hull (1, 1') and in a storage or transport position in which said floating elements (2', 22) are placed inside the rigid part (1, 1') of the hull.

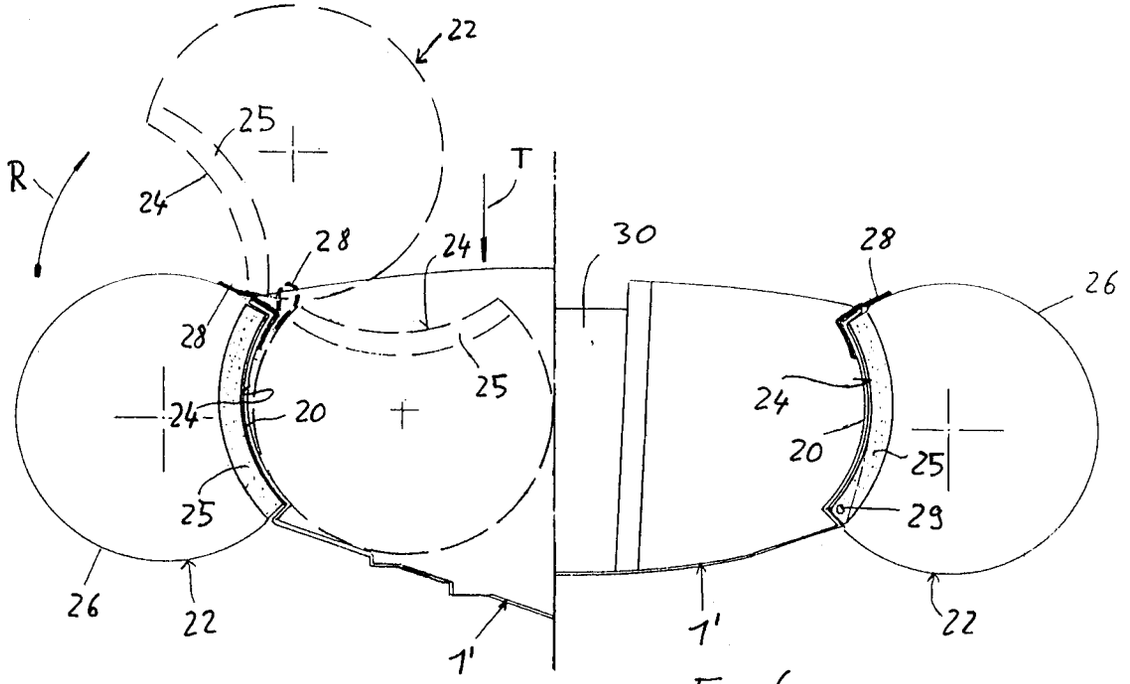

Fig. 6

EP 0 639 496 A2

The invention relates to a boat, particularly to a service-boat for crafts, ships, or the like, having at least a central part of the hull made like a rigid shell and at least two peripheral floating elements.

For the pleasure-crafts there is the need of using small service-boats for moving to land or other kinds of services. Actually boats are used which are known under the name of rubber boats. In their actual construction, however, these rubber boats are bulky and during the navigation they are transported being susepended over the stern by means of small cranes or being towed. Exspecially in the case of sailing boats, particularly in the middle-sized boats, where for dimensional reasons there is not the possibility to provide cranes astern, the transport of this service-boats is particularly affected with problems. Also the towing of the service boats, besides being uncomfortable, is notably affected with problems.

The dimensional problems are considerable also in using such boats as proper pleasure boats, which are pullable on roads with a trailer. In fact, there are limitations of the allowed maximum width for the transport on a trailer (for example 2500 mm). In this case, for boats like the so called rubber boats, and when these boats have notable dimensions, it is necessary to resort to trickery, like for example the deflation of the peripheral floating bodies during the transport.

With the boat according to the invention it is aimed to obviate in a simple and economic way to the above mentioned problems, in making the boat less bulky and heavy and solving widly the problems of transport.

In consequence, the invention provides a boat of the above mentioned kind, having peripheral floating elements which are secured to the central rigid part of the hull in an overturning way, alternatively in an active position, in which they are placed outside over the rigid part of the hull and in a storage or transport position, in which the said floating elements are placed inside the said central, rigid part of the hull.

The floating elements can be locked in the active position by means of any releaseable means.

As floating elements it is preferably to use floating bodies formed by substantially cylindrical, inflatable chambers of rubberized canvas.

Preferably two floating elements are provided, which are hinged along one longitudinal edge, at the respective broadside of the central rigid part of the hull, preferably at least along a straight section of it.

The hinging means can be of any kind and for example of a kind similar to the usual hinges of metallic material or of plastic, too.

Preferably and advantageouseably the floating elements are hinged to the rigid part of the hull by means of longitudinal stripes of rubberized canvas made of one or more layers and being glued on one side to the floating element and on the other side to the adiacent longitudinal edge of the rigid part of the hull.

The hinging means can be secured directly to the inflatable floating elements of rubberized canvas or with the interposition of stiffeners, as longitudinal members, or the like, which are incorporated in or fixed to the said floating bodies of rubberized canvas. This is particularly advantageous when the boat has considerable dimensions, like in the case of using it as a pleasure-boat, or when particular qualities of stability and strength are required.

Thus, during transport, the transversal dimensions of the boats is notably reduced, in turning over the floating elements inwards, inside the rigid part of the hull.

When the boat is used only as a service-boat for big-sized crafts, thus having to held the dimensions under very narrow limits, the said rigid part of the hull can show a width substantially corresponding to the double of the diameter of the floating elements.

When, the boat is used essentially as a pleasure-boat, particularly of the kind known with the denomination of rubber-boat, then it is advantageous to provide a central rigid part of the hull showing a width greater than the double of the diameter or the transversal dimension of the lateral floating bodies. In this case, indeed, in the inactive transport position, a free space is left between the two floating bodies for the stable or removable fittings and equipments, as for example the steering devices and the associated drivers' compartment, the different safety equipments and other kinds of equipments.

The construction and the building of the before described boat according to the invention are simple and less expensive. In the active floating condition, the boat shows a reliability equal to that of the similar conventional boats. In the inactive storage or transport condition, the floating elements overturned inside the shell, fill up a substantial part of the shell itself, avoiding also the disadvantage of burdening due to the considerable amount of water taken aboard by shipping waves in the case of following sea or in consequence to a lateral heeling of the boat.

The invention will appear more clearly from the following description of two non limitative embodiments which are illustrated in the annexed drawings.

Figure 1 shows a perspective view of a first embodiment of the boat according to the invention.

Figures 2 and 3 are respectively a side view and a top view of the locking means for the floating elements in the active floating position.

Figure 4 is a cross sectional view of the boat according to the preceding figures and with the floating elements in the active and inactive position.

Figure 5 is a perspective view of a second embodiment of the boat according to the invention.

Figure 6 is a cross-sectional view of the boat according to fig. 5.

Figures 7 and 8 show the boat according to the invention in its position of transport, being suspended to a particular device for lifting and lowering away a boat, particularly advantageous for thr sailing boats.

In a first embodiment according to figures 1 to 4, a boat, particularly a service-boat for crafts, is formed by a rigid central part 1 of the hull comprising the part of the keel or underbody and the central part of the bow and of the stern. The rigid part of the hull can be built of any material, for example of plastic, of light alloy, or the like. The broadsides of the boat are formed by two inflatable lateral floating elements, wich are tubular shaped and of rubberized canvas and which extends themselves along a substantial section of the broadsides of the boat, the section being substantially straight.

The floating elements 2 are hinged to the rigid part of the hull, i. e. to the longitudinal side edge 3 of the rigid parti 1 of the hull corresponding substantially to the lower edge of the broadsides, in an overturning way from the inside to the outside and viceversa, around an axis coinciding with the said longitudinal edge 3.

The hinging of each floating element 2 is provided by means of a longitudinal stripe 4 of rubberized canvas, or the like, formed by one or more layers, this stripe reaching from the bow to the stern of the boat and being glued to the adjacent, facing, internal bands of the floating elements 2 and of the corresponding lateral, longitudinal edge 3 of the rigid part 1 of the hull. The hinge 4 of rubberized canvas has also the funcion of connecting watertight the floating elements 2 to the rigid part 1 of the hull. At the bow and astern of the boat, the central rigid part of the bow and of the stern are connected to the corresponding ends of the floating elements 2 in a pliable and watertight manner, by means of correspondingly shaped walls 5 being also made out of rubberized canvas, or the like and which are glued to the peripheral edges facing eachother of the rigid part of the bow and of the stern and of the floating elements 2.

The locking of the floating elements 2 in the active floating position, in which they are overturned outwards the rigid part 1 of the hull, is provided by four kinematic mechanisms, particularly scissors-like mechanisms, which are indicated with the reference number 6 and which are articulated between the ends at the bow and astern of each floating element and the corresponding rigid part of the bow and of the stern of the boat.

The kinematic mechanisms are built in such a way, as to lock the floating elements 3 in a releaseable manner, both in the active floating position and in the inactive storage or transport position, in which they are overturned inwards, into the rigid part 1 of the hull. As it appears from fig. 4 and being indicated with 2', in this position the floating elements occupy a volume of space with a transversal dimension corresponding substantially to the transversal dimension of the rigid part 1 of the hull.

The kinematic locking mechanisms 6 being shown in detail in figures 2 and 3, comprise an L-shaped arm 7 which is pivotally mounted in 8, swinging around a logitudinal, horizontal axis parallel to the floating element 2 and a second arm 9 pivotally mounted in 10, oscillating around an axis parallel to the axis of oscillation of the L-shaped arm 7. Levers 13, 14 are articulated in 11 and 12 at the free ends of the arms 7 and 9 and swing around axis which are perpendicular to the axis of oscillation of the arms 7 and 9, the levers 13 and 14 being further linked toghether, swingably around an axis parallel to the axis of oscillation in 11 and 12, at an intermediate point between the two arms 7 and 9. A stop pin 16 is secured to the floating element 2, the said stop pin being substantially parallel to the free branch of the L-shaped arm 7 to which the lever 13 is articulated. In the locked condition of the active position according to figures 2 and 3, the levers are aligned one with respect to the other and the L-shaped arm 7 abutes against the stop pin 16. In this case, the kinematic mechanism acts like a strut, locking the floating elements 2 against swinging inwards, into the hull. The relative angular displacement of the levers 13 and 14 cause the swinging of the floating elements 2 inwards into the rigid part 1 of the hull, in their inactive storage or transport position.

The suitable arrangement of the pivot points 7, 10, 11, 12, 15, causes the levers 13, 14, to assume a vertical position relatively to the longitudinal axis of the boat in a protractor-like folded condition.

Advantageously, at the longitudinal zone of hinging, the floating elements 2 can be provided with a longitudinal rigid bar 17 which for example is glued to the part of rubberized canvas and which is provided with a substantially vertical extension 18 at its ends at the bow and astern and to which the L-shaped arm 7 of the locking mechanism is articulated.

Advantageously a boat of the above described kind can show the following dimensions:

length 2400 mm, width in the active floating position 1500 mm, width in the inactive storage or

transport position 800 mm, height in the inactive position: 500 mm.

With reference to figures 5 and 6, the rigid part 1' of the hull comprises the keel or underbody, the broadsides, the complete transom and the entire bow of the boat, forming a small boat being completely closed at the bottom, at the bow, astern and along the boradsides.

On their sides abuting against the broadsides 20 of the central rigid small boat 1', the floating elements are provided with a concave recess 24 having a cross-section shaped substantially like a sector of a circle. On its side leaning against the broadsides 20 of the rigid small boat 1', the floating elements 22 are provided with a longitudinal stiffening element 25 being complementary shaped to the concave recess and reaching almost to the bow-end of the floating elements 22, whose bow-head is placed, in particular at the zone, at which the broadsides of the shell begins to taper in order to form the bow itself. In particular, said stiffening element 25 is hollow-made. It can be made out of plastic material, for example fiberglass and it can be filled with plastic foam and/or it can be provided with internal stiffening rips. The other part of the floating elements 22 being inflatable is made of rubberized canvas. The rubberized canvas is joined in such a way as to form a cylindrical, tubular body 26 and is glued to the stiffening element 25 in a manner to cover the external side of the same one. Alternatively, the tubular body 26 can be glued to the internal side of the stiffening element.

In a further embodiment, the rubberized canvas is not joint toghether in a tubular shaped body, but it is glued airtight with its opposite longitudinal edges to the upper and to the lower edges of the stiffening element 25, which forms a section of the peripheral wall of the tubular inflatable airtight body itself.

The broadsides 20 of the rigid small boat 1' are shaped complementary to the stiffening element 25 so that, in the active floating position of the floating elements 22, the convex part of the broadsides fits in the concave recess of said stiffening element 25. The convex part of the broadsides 20 forms the bottom of a cavity which is shaped complementary to the stiffening element 25 so that in the active floating position of the floating elements 22 the stiffening elements 25 fits substantially completely in said complementary cavity in the broadside 20 of the rigid small boat 1', the lower and the upper walls of the cavity superposing in a predetermined measure on the peripheral upper and lower edges of the stiffening element 25. Astern, the floating elements 22 are close by half-shell shaped heads 27 of rigid material, for example of plastic, which are preferably built in one piece with the stiffening element 25, the end edge of the inflatable tubular body 26 being glued airtight to the peripheral edges of said heads.

The hinging of the floating elements 22 to the rigid central shell 1' is provided by a stripe of rubberized canvas 28 made of one or more layers, the stripe being glued to the upper band of the floating elements 22 adjacent to the upper edge of the corresponding broadside 20 and to the upper band of the inner face of said broadside 20. The hinging stripes 28 reaches from astern to the bow and allow an opening and closing motion of the boat, during which the floating elements 22 performs an angular displacement combined with a traslation respectively upward and downward, with respect to the central rigid small boat 1' (see figure 6, arrow R, T).

The locking of the floating elements 22 can be achieved in any way. Particularly, for example connecting the rigid small boat 1' and the floating elements 22 by means of eccentric pins or bolts engaging coinciding holes 29 of the floating element 22 and of the broadside 20 of the rigid small boat 1', or by means of eccentric pins or bolts being fastened to the floating element 22 and engaging holes in the broadside 20 of the rigid small boat 1'.

With reference to figures 5 and 6, the floating elements 22 are locked in the region at the bow by means of a transversal pin, carried by the same ones and engaging a hole 29 of the broadsides 20, preferably watertight, while astern the broadside 20 and the stiffening element 25 show coincident holes 29 for the engagement of a longitudinal pin or fastpin, the holes being provided in surfaces which are oriented transversally to the longitudinal axis of the hull.

Advantageously a boat according to this embodiment can show the following dimensions: length 2500 mm, witdth in the active floating position 1500 mm, width in the inactive storage or transport position 860 mm, hight in the inactive position 500 mm.

In both the illustrated embodiments the rigid part of the transom is provided with a central recess 30 for fitting an outbord motor. The recess 30 reenters on the inner side of the transom while the astern ends of the floating elements 2, 22 are shaped in a such way as to fit in complementary with the same one, in their inactive storage or transport position in which they are overturned inwards, inside the rigid shell 1, 1'. This allows to transport the boat with the outbord motor being placed in its operative position. Thus the boat can be lowered form the suitable supporting device, with the motor being just ready for use.

The floating elements can be hinged to the rigid part 1, 1' of the hull also by means of traditional made hinges, for example comprising female

elements being guided by a longitudinal pin or bar and being the hinge placed on the broadsides of the central rigid part. The hinge can extend itself along the entire broadside or a long a limitate section of it, for example at the ends of the hinging connection.

In the figure 7, a boat according to the invention is shown in its transport condition being suspended to a lifting and lowering device. This device 31 is particularly conceived for sailing boats with a slanted transom. It comprises a couple of parallel guides 32 being slanted from the upper to the bottom correspondingly to the transom. The guides 32 are formed by section bars with a C-like cross-section beign oriented with their open sides facing eachother. A cantilever bridge 33 is supported by two rods 34 being engaged in the guides 32. A coating of suitable antifriction material on the inner sides of the guides 32, for example gibs of antifriction sinthetic material, as PTFE, or the like, ensures the sliding. The lifting of the bridge 33 can be achieved in using one of the various lifts, or the like being provided on the sailing-boats, or by means of a suitable lifting device with a winch driven manually or by a motor. The projection of the bridge 33 over the stern of the boat reaches so far, that the boat according the invention fits under said bridge, in its inactive storage condition. Any kind of means can be provided for securing the boat to the lower side of the bridge 33.

A possible gangway or the like can be hinged to the bridge 33, in an outwardly overturning way, over the astern side of the same one.

Claims

1. A boat, particularly a service-boat for crafts, ships or the like having at least a central part of the hull made like a rigid shell (1, 1') and being combined with hollow peripheral floating elements (2, 2', 22) characterized in that the peripheral floating elements (2; 2', 22) are secured to a central shell-like rigid part (1, 1') of the hull, in a overturning way, alternatively in a active floating position, in which they are placed outside over the rigid part of the hull (1, 1') and in a storage or transport position in which said floating elements (2', 22) are placed inside the rigid part (1, 1') of the hull.

2. A boat according to claim 1, characterized in that releaseable means (6, 29) are provided for locking the floating elements (2, 2', 22) at least in the active floating position, one first part of these locking means being secured to the floating elements (2, 2', 22) themselves and the other second part cooperating with the first part of them being provided on the central rigid part (1, 1') of the hull.

3. A boat according to claims 1 or 2, characterized in that the floating elements (2, 2', 22) consists in substantially cylindrical inflatable chambers of rubberized canvas.

4. A boat according to one or more of the preceding claims, characterized in that two floating elements (2, 2', 22) are provided which are hinged to a respective longitudinal edge (3) at a broadside of the rigid part (1, 1') of the hull, preferably along an essentially straight section of the same one and from the stern to the bow of said rigid part (1, 1') of the hull, the hinging means being connectable directly to the two floating elements (2, 2', 22) of rubberized canvas or with the interposition of stiffening elements (17, 25) fastened to or incorporated in the said floating elements.

5. A boat according to one or more of the preceding claims, characterized in that the floating elements (2, 2', 22) are hinged by means of longitudinal stripes (4, 28) of rubberized canvas made of one or more layers and being glued with one side to the floating element (2, 2', 22) and with the opposite side to the adjacent longitudinal, lateral, external edge of the rigid part (1, 1') of the hull.

6. A. boat according to one or more of the preceding claims, characterized in that the two floating elements (2, 2', 22) can be secured to the rigid, shell-like, central part (1, 1') of the hull by means of any kind of traditional made hinge, for example by means of female elements being guided by a longitudinal pin, and being the hinge placed on the broadsides (20) of the central rigid part (1, 1') and extending along the entire broadside (20) itself or along a limited section of it, for example at the ends of the hinging connection.

7. A boat according to one or more of the preceding claims, characterized in that the floating elements (2, 2') forms at the same time the broadsides of the rigid part (1) of the hull.

8. A boat according to claim 7, characterized in that the rigid part (1) of the hull comprises the keel or underbody of the hull and a central part of the bow and of the stern, while the floating elements (2, 2') are hinged to the lateral, longitudinal edge (3) of the underbody and, at the bow and astern of the boat each floating element (2, 2') is connected watertight to the central rigid part of the bow and of the stern

by means of a wall (5) of pliable material, for example of rubberized canvas, which is glued to the lateral edge of the bow and of the stern and to the facing side of the corresponding floating element (2, 2').

9. A boat according to claims 7 or 8, characterized in that the means (6) for locking in position the floating elements (2, 2') constist in a scissor-like lever-system, at the bow of the boat and astern, which system is articulated with one end to the floating element (2, 2') and with the opposite end to the rigid part of the bow and of the stern, particularly at the central zone of the same ones.

10. A boat according to claim 9, characterized in that the scissors-like lever-system comprises two arms (7, 9) pivotally mounted (8, 10) respectively on the floating element (2, 2') and on the central zone of the rigid part of the bow and of the stern, and oscillating around axis parallel to eachother and oriented in the longitudinal direction of the boat, which arms (7, 9) are connected toghether by means of two levers (13, 14) being articulated to the corresponding arm (7, 9) at their opposite ends (11, 12) and the one to the other at an intermediate point (15), preferably approximately at a central point between the two arms (7, 9), in such a way as to oscillate around axis parallel to each other and perpendicular to the axis of oscillation of the arms (7, 9), while the arm (7) articulated to the floating element (2, 2') is L-shaped and oriented vertically and the region of its angle cooperates with a stop element (16) on the side of the floating element (2, 2') itself.

11. A boat according to one or more of the preceding claims 1 to 6, characterized in that the rigid part (1') of the hull is made like a small boat and comprises the underbody, the bow, the stern and the broadsides (20) of the hull, while the broadsides are straight for a substantial part of their length and the floating elements (22) are hinged to the upper edge of the respective broadside (20).

12. A boat according to claim 11, characterized in that on the side leaning against the broadsides (20) of the small boat (1') the floating elements (22) are provided with a concave recess (24) preferably with a constant radius like a sector of a circle, while the broadsides (20) show a complementary cavity with a convex wall portion and with surfaces at the upper and lower ends superposing in a predeterminate measure on the peripheral upper and lower edges of the said concave recess (24) forming a joint.

13. A boat according to claim 12 characterized in that the concave recess (24) of the floating elements is formed by a longitudinal rigid stiffening element (25).

14. A boat according to claim 13, characterized in that the rigid stiffening element (25) is made of plastic material, particularly of fiberglass and is substantially hollow, while the remaining part of the floating elements (22) is made out of rubberized canvas which can be glued watertight with its longitudinal edges to the upper and lower edges of the stiffening element (25).

15. A boat according to claim 14, characterized in that the floating elements (22) consists in a tubular body (26) of rubberized canvas which is closed on itself and covers the rigid stiffening element (25) on its internal or external side, being glued to the same one.

16. A boat according to claims 14 or 15, characterized in that, the tubular floating body (26) of each floating element (22) is tightly closed on itself in such a way to form an air tight chamber independent from the stiffening element (25) and which can be secured or which is secured to the same one.

17. A boat according to claims 13 to 16, characterized in that the rigid stiffening element (25) is hollow and can be filled with plastic foam and/or be provided with internal stiffening ribs.

18. A boat according to one or more of claims 11 to 17 characterized in that the hinging stripe (28) of rubberized canvas is glued to the free upper side of the floating element (22) being directly adjacent to the upper edge of the broadside (20) of the rigid small boat (1') and to the upper band of the internal side of the said broadside (20), in such a way as to overlap the upper edge of the said broadside (20) in the active floating position of the floating elements (22), allowing besides the swinging a vertical traslative displacement of the floating elements (22) during the overtunring in the inactive storage or transport position.

19. A boat according to one or more of the preceding claims 11 to 18, characterized in that the releaseable locking means of the floating elements (22) to the broadsides (20) of the rigid small boat (1') consist in pins, flatpins, bolts or similar means connecting toghether

and watertight the rigid stiffening elements (25) or the tubular body (26) of the floating elements (22) and the broadside (20) of the rigid small boat (1') at the bow and astern through coincident holes (29).

20. A boat according to one of the claims 11 to 19, characterized in that the back ends of the floating elements (22) is formed by a rigid head (27) which is hollow and particularly made of plastic or fiberglass and which can be built in one piece with the corresponding stiffening elements (25) of the floating elements (22) and to which the opend head ends of the tubular body 26 or the head ends of an independent floating body being tightly closed on itself can be tightly joint, for example by glueing.

21. A boat according to one or more of the preceding claims, characterized in that the rigid part of the transom is provided with a central recess (30) for fitting an outbord motor, the recess reentering inside the boat, the corresponding head ends (27) of the floating elements being shaped in such a way as to fit in complementray with the said recess (30) in their inactive storage or transport position.

22. A boat according to one or more of the preceding claims, characterized in that the width of the rigid part (1) of the hull is substantially corresponding to the double of the transversal dimensions, for example to the double of the diameter, of the floating element (2, 2', 22).

23. A boat according to one or more of the preceding claims 1 to 21, charaterized in that the width of the central rigid part (1) of the hull is greater than the transversal dimensions of the floating elements (2, 2', 22), in so far as to leave a free space at the central zone of the said rigid part (1) of the hull for stable or removable fittings of the boat, like for example tanks, the drivers' compartment with the steering devices, or the like, the safety equipments and other fittings, while in the inactive transport position the entire width of the boat does not exceed a possible width limit for the transport on the road.

24. A service-boat according one or more of the preceding claims, characterized that it is provided in combination with a cantilever bridge (33) which is supported at the transom of a boat sliding vertically along the sameone by means of a couple of parallel C-shaped guides (32) whose inner surfaces are coated with an antifriction material and which guides engages slidably in their longitudinal direction two rods (34) supporting the bridge (33), while lifting and lowering means are provided which are of the rope-like kind or the like, and consisting for example also in lifts, or the like, of the boat, means being also provided on the lower side of the bridge (33) for hanging the service-boat and the projection of the bridge (33) over the astern end of the boat being substantially corresponding to the width of the service-boat in the inactive storage or transport condition.

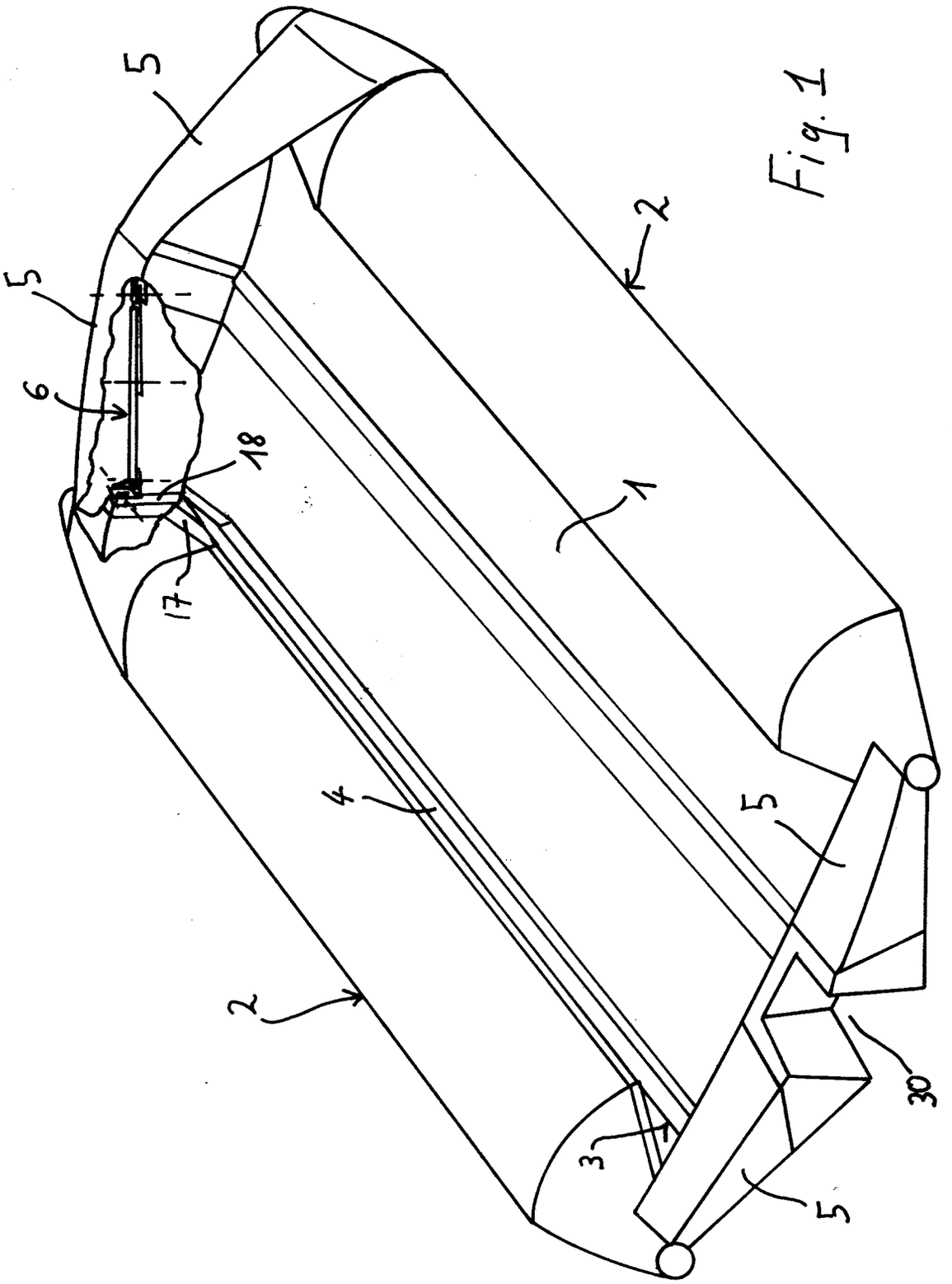

Fig. 1

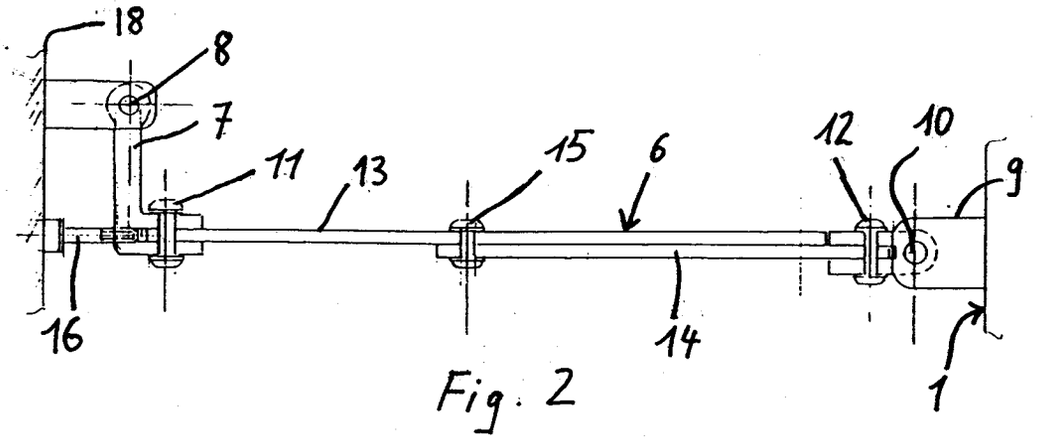

Fig. 2

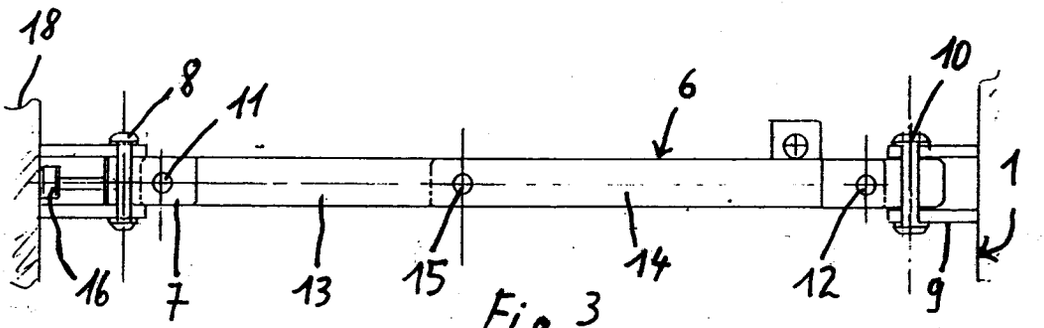

Fig. 3

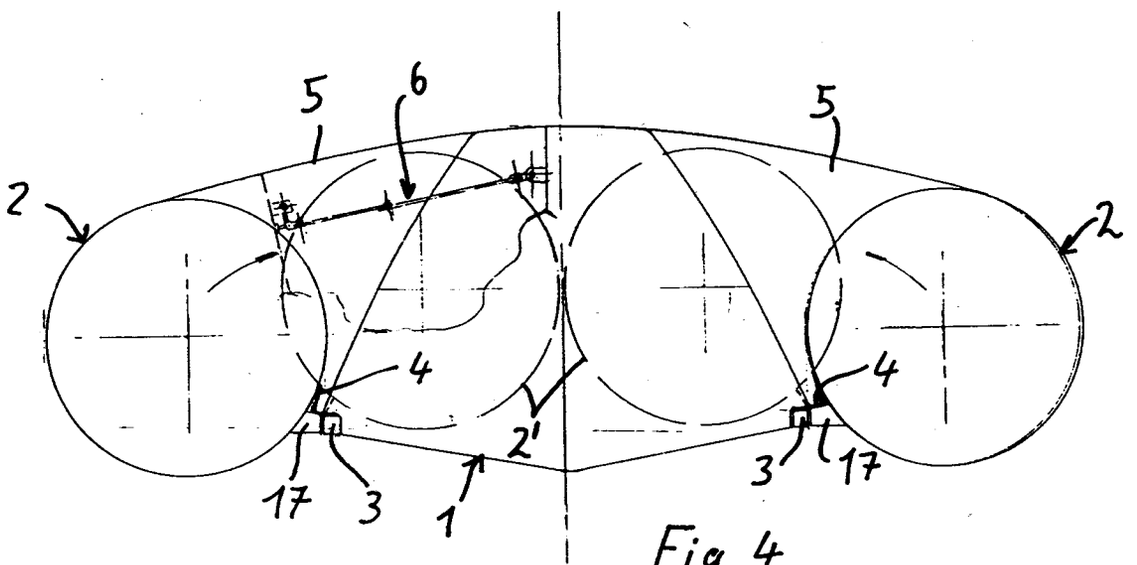

Fig. 4

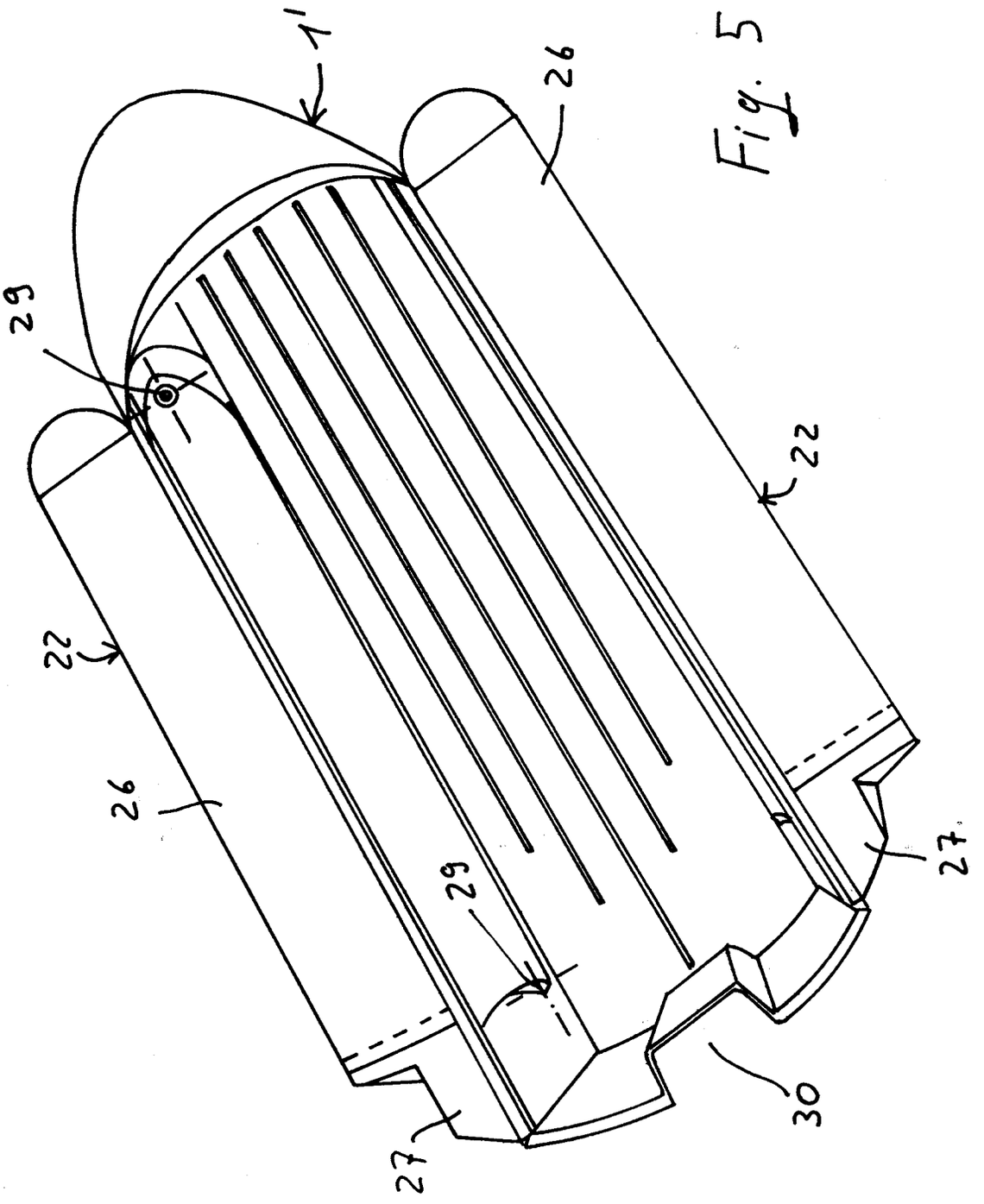

Fig. 5

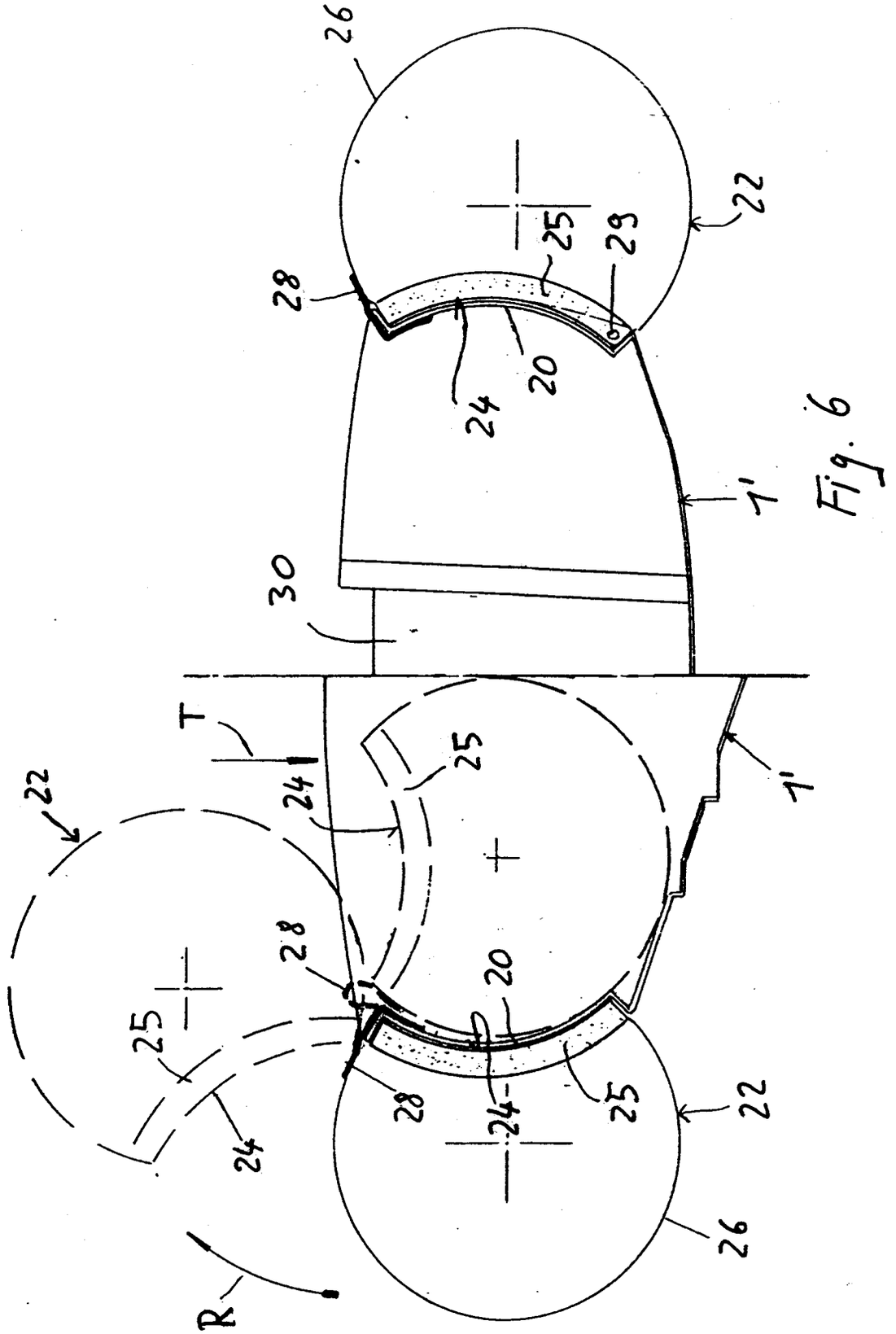

Fig. 6

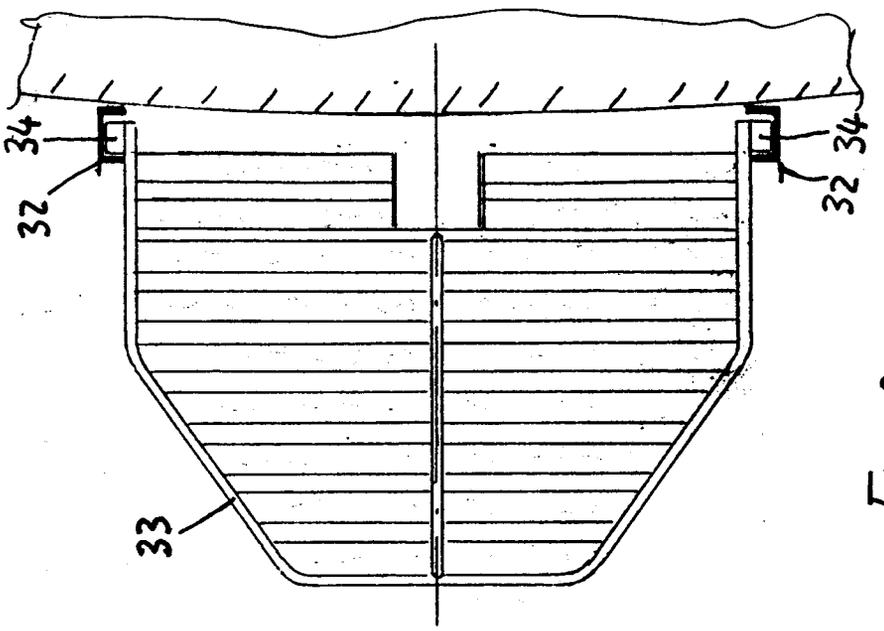

Fig. 8

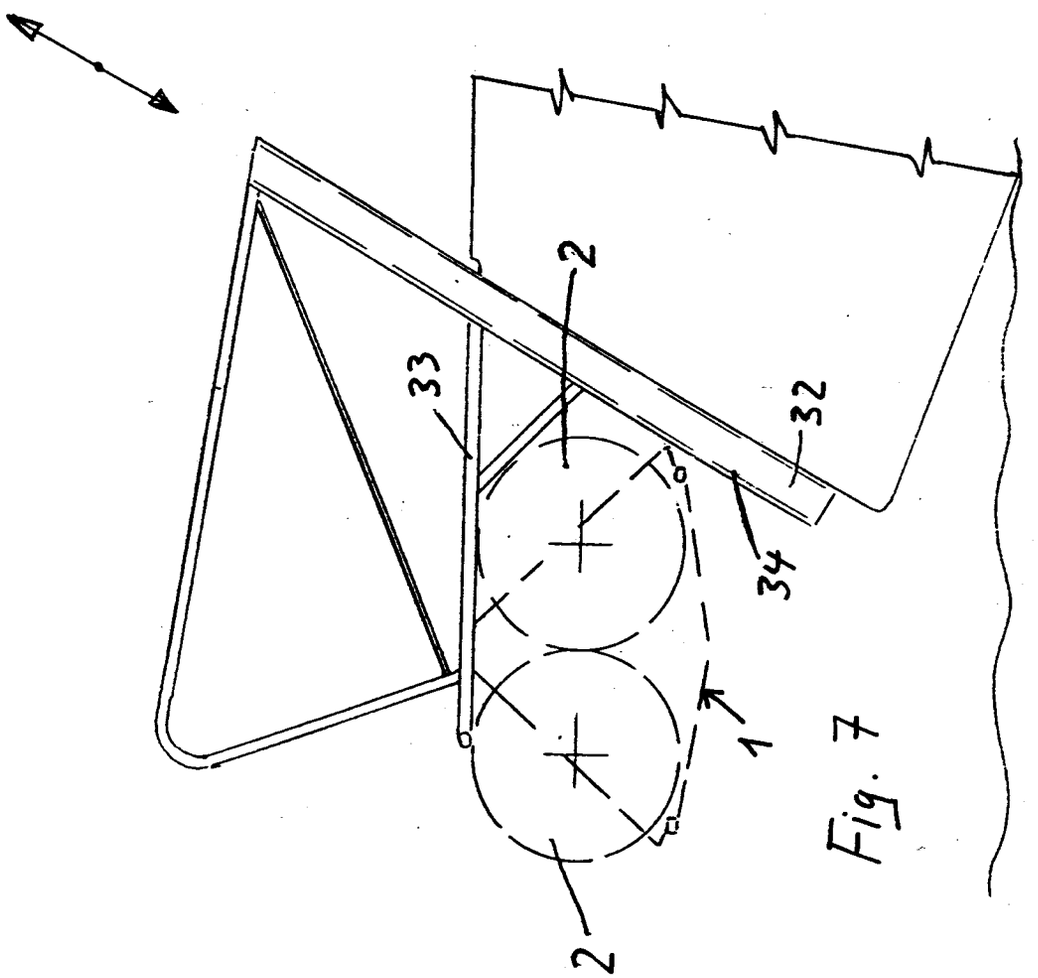

Fig. 7