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(54) Title: SYSTEM COMPRISING A LIFEBOAT AND ARRANGEMENT FOR LAUNCH OF THE LIFEBOAT FROM OFFSHORE INSTALLATIONS

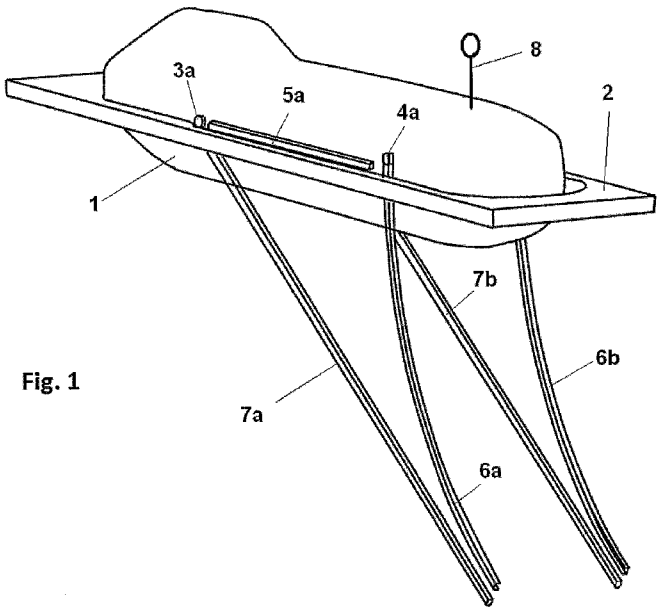


Fig. 1

(57) Abstract: A free-fall lifeboat (1) for use on offshore platforms, wherein the lifeboat is releasably secured in a launching arrangement and is configured with a closed, elongated hull provided with an elongated slide means (5 a, 5b) secured to each side of the hull along the longitudinal direction of the hull. The slide means (5a, 5b) extend from a forward point (4a, 4b) close to the bow to a realpoint (3a, 3b) astern of the lifeboat's centre of gravity (9). The launching arrangement is provided with elongated rear guide means (7a, 7b) and an arc-shaped forward guide means (6a, 6b) arranged in an inclined position from the platform and extending obliquely down towards the sea surface in a direction away from the platform. The lifeboat's forward support point (4a, 4b) is designed to slide inside the guide means (6a, 6b) so as to allow the lifeboat to fall along the whole length of the forward guide means (6a, 6b) of the launching arrangement whilst the stern end slides along the rear guide means (7a, 7b).

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System comprising a lifeboat and arrangement for launch of the lifeboat from offshore installations

The invention relates to a free-fall lifeboat, and more specifically, a lifeboat for use on offshore installations, which during evacuation can be launched from the platform in a free fall into the sea, as is set forth in the preamble of claim 1.

Background

In order to be able to evacuate an offshore platform, various solutions have been provided for lowering a lifeboat from the platform into the sea. The lifeboats are typically secured along the edge of the platform with their bow in a vertical position lower than their stern. Furthermore, such lifeboats are often provided with sliding surfaces such that, when launched, the boat will have a certain forward velocity component in addition to the vertical velocity component. In this way, the boat will hit the sea and have a greater possibility of moving clear of a platform which, for example, is on fire or about to capsize.

An example of such a lifeboat is described in Norwegian patent no. 325263, which teaches a free-fall lifeboat with a stern equipped with a platform to promote forward propulsion as the boat hits the water and penetrates the sea surface.

Another example of a free-fall lifeboat of this kind is described in JP patent publication 2001-063680. Also in this case, the lifeboat is arranged in an inclined position with the bow pointing down towards the sea surface so as to enable the lifeboat to move as far clear of the ship or platform as possible. Slide rails are attached to each side of the boat from the bow towards the stern along about 60% of the total length of the boat, so that the boat, when being lowered, can slide along corresponding sliding surfaces on the platform itself. The JP publication endeavours to make the contact faces as short as possible to minimise friction.

Another example of lifeboats of this kind is described in JP-A-11129982 (JP-B-3239208). This lifeboat, too, is secured in an inclined position on the mother vessel so as to be capable of being launched obliquely into the sea and of moving as far as possible from the evacuation site. However, this boat is provided with two sliding surfaces arranged on each side of the lifeboat but spaced apart in the vertical direction so as to reduce rotation of the boat as it leaves the launching arrangement.

A disadvantage of the prior art is that boarding the lifeboats in an emergency situation must take place through an access point in the lifeboat, typically at the stern, because the lifeboat is mounted in an inclined position in the launching arrangement on the mother vessel, typically 35°. This makes the evacuation more time-consuming than

it would have been with a horizontally arranged boat with more entrances. Another disadvantage of the prior art is that it is more difficult to move inside a boat that is inclined at 35° than in a horizontal boat. Furthermore, the seats in such lifeboats are arranged leaning backwards in relation to the lifeboat itself, so that personnel during the actual boarding of the boat will sit horizontally relative to the direction of gravity, but after the boat has hit the sea surface, the seats will slope backwards. A sitting position of this kind will be uncomfortable if the personnel must remain in the boat for a longer period of time, especially in rough seas. Yet another disadvantage of the prior art is that the lifeboats start with zero fall speed, so that in extreme weather conditions with a contrary wind of gale force or stronger, problems may arise with the release of the lifeboat from the launching arrangement into the sea.

Object of the invention

There is therefore a need for a lifeboat that overcomes the problems of the prior art as described above. An object of the invention is to provide a free-fall lifeboat for use on offshore installations which allows evacuation and boarding of the lifeboat in a horizontal position. Another object of the invention is to provide a free-fall lifeboat which can be safely launched into the sea even when there is an extreme contrary wind. Yet another object of the invention is to provide a free-fall lifeboat which hits the sea surface at a speed in the axial direction of the lifeboat and with a motion component in a direction as far away as possible from the mother vessel.

The invention

These objects are achieved by means of a free-fall boat as set forth in the characterising clause of claim 1. Additional advantageous features are set forth in the associated dependent claims.

The invention relates to a free-fall lifeboat for use on vessels or offshore platforms, particularly on platforms for the production of oil and gas, wherein the lifeboat is releasably secured in a launching arrangement and is configured with a closed elongated hull provided with an elongated slide means attached to each side of the hull and extending along at least a part of the longitudinal direction of the hull.

According to the invention, the launching arrangement on the vessel or platform is provided with a first or rear guide or slide means arranged in an inclined position from the platform and extending obliquely down towards the sea surface in a direction away from the platform, and a second or forward guide or slide means that is arc-shaped, wherein the upper ends of the first and second guide means are arranged

essentially at the same level in the horizontal direction, and that the arc shape of the forward guide means is formed so that the forward guide means terminates essentially tangentially to the rear guide means.

The slide means attached to each side of the lifeboat extends from a forward support point at or close to the bow of the lifeboat to a rear support point astern of the centre of gravity of the lifeboat and is arranged to be movable along the rear guide means of the launching arrangement.

The forward support point is movably connected to the forward guide or slide means on the launching arrangement, so that it can slide or be moved along the entire length of the forward guide means of the launching arrangement from an initial essentially horizontal position downwards along the arc shape of the forward guide means, thereby enabling the lifeboat to leave the launching arrangement in a direction essentially parallel to the rear guide means.

The invention has a number of advantages over the known structures. Since the boat is suspended by the bow and will at first fall essentially vertically, the boat does not need to overcome static friction, and it will be ensured that the boat is released from the mother vessel or the platform even in extreme contrary wind. Another advantage of the present invention is that the lifeboat will have a greater exit speed as it begins its free fall down towards the sea surface. The increased exit speed will minimise rotation and ensure that the lifeboat hits the sea surface at maximum forward direction of movement and also increase the boat's propulsion away from the launch site. Yet another advantage of the present invention is that evacuation and boarding of the lifeboat can take place whilst the boat is in a horizontal position, such that personnel do not have to negotiate obstacles in the interior of the boat in a steep position and can reduce evacuation time. Evacuation and boarding in a horizontal position also makes it possible to incorporate several entrances in the lifeboat which will further help to reduce the time it takes to evacuate, for example, a platform. Horizontal boarding also makes it possible to fit the lifeboat with seats in a normal horizontal position, so that the passengers will sit in a normal position after the lifeboat has hit the water. Yet another advantage with horizontal support of the lifeboat is that it will simplify inspection and maintenance.

The invention is described below with the aid of figures, which illustrate an example of an embodiment of a free-fall lifeboat according to the invention.

Figures

The invention is described in more detail below by means of an exemplary embodiment and with the aid of figures, wherein

Figure 1 is a perspective view of a lifeboat according to the present invention arranged in a launching arrangement on a platform and in a position ready for the boarding of personnel;

Figure 2 is a view corresponding to Figure 1 but illustrates, in a side view, the lifeboat with the evacuation deck in cross-section;

Figures 3a-3e show the sequence of the boat's journey during its launch from the mother vessel during evacuation;

Figure 4 shows, in a side view, the lifeboat in the situation illustrated in Figure 3b, but in more detail;

Figure 5 is a view corresponding to Figure 4, but showing the position of the lifeboat in more detail according to Figure 3d; and

Figure 6 shows, in a side view, the lifeboat when it is about to leave the launching arrangement on the mother vessel, as illustrated in Figure 3e.

In the figures like reference numerals are used to identify like components, and whilst the reference designations a and b are used to refer to the starboard and port sides of the lifeboat, the figures show, for the sake of simplicity, only the starboard side (a). Consequently, the left-hand part of the lifeboat represents the stern whilst the right-hand part of the boat represents the bow.

Figure 1 is a highly schematic perspective view of a free-fall lifeboat 1 for evacuation of personnel from a vessel or an offshore platform. The lifeboat is arranged in a cut-out on an evacuation deck 2 and is preferably provided with several openings (not illustrated) for the boarding of personnel during evacuation.

The lifeboat is arranged in an essentially horizontal position and rests against a rear slide means 7a, 7b connected to the launching arrangement on the mother vessel by means of a rear support point with the aid of support means 3a, 3b connected to the lifeboat itself. The slide means 7a, 7b are essentially straight and are arranged at an angle relative to the horizontal plane, for example 35°. More, specifically, the rear support means 3a, 3b are designed to be able to bear the weight of the lifeboat 1 until it is launched, and to be able to slide along the rear slide means 7a, 7b when the lifeboat is launched on its journey towards the sea surface. The support means 3a and 3b can therefore be configured as blocks or lugs of a low-friction material, for example a plastic material, so that they can slide on or inside the respective slide means 7a and 7b on the mother vessel during launch. It is also conceivable that the support means 3a and

3b are made in the form of wheels which, during launch, can roll on the slide means 7a, 7b or roll inside a hollow channel configured inside the rear slide means 7a and 7b. A person skilled in the art, with the support of the present description and his general technical knowledge, will be able to arrive at a number of alternative embodiments of the rear slide means 7a, 7b and the rear support means 3a and 3b.

Referring still to Figure 1, it can be seen that the launching arrangement on the mother vessel is equipped with forward guide means 6a and 6b, arranged with their upper end spaced from the upper part of the respective rear guide means 3a, 3b in the direction of the bow of the lifeboat. The forward guide means at first project essentially vertically but are later arc-shaped, so that they terminate essentially tangentially to the respective rear guide means 6a, 6b. The forward guide means 4a and 4b of the lifeboat are designed so that in a launch situation they will run along their respective guide means until they leave the guide means. To achieve this, the forward guide means 6a, 6b are preferably channel-shaped, and the support means 4a, 4b of the lifeboat may therefore be formed as wheels capable of rotating inside the channel-shaped guide means 6a, 6b or may be formed as blocks, lugs or the like of a low-friction material which can carry the boat down towards the launch point with minimum friction. However, a person skilled in the art, with the support of his general technical knowledge and the present description, will be able to derive other equivalent solutions which will give the same effect.

The lifeboat 1 may be releasably supported at the respective support points 4a and 4b, but it is however preferred that the support points 4a, 4b only serve as guide means for the lifeboat itself and that the lifeboat is supported at a single point 8. The support point 8 will in this embodiment be the only point which holds the lifeboat in place, and may, for example, be designed as a pivot which can release the support of the boat when operated from both the outside and the inside of the lifeboat. Details of such a releasable support are considered to be available technology for those skilled in the art and are therefore not discussed more fully here.

Figure 2 illustrates a free-fall lifeboat according to the present invention corresponding to Figure 1, but in a side view. In the figure the evacuation deck 2 is illustrated in cross-section by means of a dotted line. The centre of gravity of the lifeboat is indicated by the reference numeral 9. As can be seen from the figure, the rear support point 3a, 3b is located close to the centre of gravity 9 of the lifeboat, but still some distance behind the centre of gravity 9.

On the one hand, the rear support point 3a, 3b should be located as close to the lifeboat's centre of gravity as possible; this will minimise the rotation of the boat after it has left the launching arrangement. This will reduce the extent of the forces acting on

the bottom of the lifeboat when it hits the sea surface and hence minimise the load on both the personnel and the equipment on board. The lifeboat will, in other words, hit the sea surface with its bow and in a direction of motion along the axial direction of the lifeboat.

On the other hand, it is desirable to have sufficient potential energy available to ensure that the boat is easily released from the support at the forward part of the boat and that it reaches sufficiently high speed out of the launching arrangement. This is important in order to enable the boat to move as far away as possible from the mother vessel in an emergency situation. (The mother vessel may be on fire, in danger of capsizing or there may be a wreck in the sea close to the mother vessel that could damage the lifeboat).

Figure 3 shows, highly schematically, the sequence of the lifeboat's journey in the launching arrangement in five stages, from its starting position in Figure 3a until it leaves the launching arrangement in Figure 3e. From Figure 3b it can be seen that the forward support point 4a has managed to fall about one third of the arc length of the forward guide means 6a on the launching arrangement, whilst the rear support means 3a on the lifeboat 1 has only managed to slide about one tenth of the length of the rear guide means 7a on the launching arrangement. In Figure 3c it can be seen that the bow has fallen further and given the lifeboat greater acceleration, and in Figure 3d it can be seen that the velocity components in respectively the rear and the forward support point 3a and 4a are almost parallel, owing to the tangential termination of the forward guide means 6a vis-à-vis the rear guide means 7a on the launching arrangement. Figure 3e shows the lifeboat as it is about to lose contact with the launching arrangement, and the rear support point 3a is at the mouth of the guide means 3a and 4b and starts a free fall down towards the sea surface. At this time the lifeboat will have reached a large forward velocity component with a minimum degree of rotation compared with known launching arrangements.

Figure 4 illustrates the same as Figure 3b but in greater detail, and shows the boat at a time when the fall is about to be ended and the velocity components in the lifeboat's forward and rear support points 4a and 3a approach a horizontal direction. The rear support means 3a of the lifeboat is illustrated here sliding or rolling on the rear guide means 7a of the launching arrangement, and the rear part of the lifeboat's elongate slide means 5 is in sliding contact with the rear guide means 7a. The lifeboat's forward support means 4a is illustrated here sliding or rolling inside the forward guide means 6a of the launching arrangement.

According to Figure 5, the fall of the centre of gravity is complete and the lifeboat's slide means 5 now lies essentially parallel to and in sliding contact with the

rear guide means 7a of the launching arrangement. The velocity components of the respective support points 3a, 3b and 4a, 4b in this position are parallel and directed forwards along the longitudinal axis of the lifeboat. The forwards support point 4a is now about to lose contact with the forward guide means 6a and is ready to leave the same.

In Figure 6, it can be seen that the lifeboat is in the process of leaving the launching arrangement, and the rear support means 3a on the lifeboat is at the mouth of the guide means 6a and 7a.

Example

This calculation example shows that the present invention is capable of achieving higher release speed than a traditional free-fall lifeboat mounted at an angle of 35°.

An energy consideration indicates that an increase in exit speed acts as the root of the increase in the fall height of the centre of gravity:

$$mgh = \frac{1}{2}mv^2$$
$$v = \sqrt{2gh}$$

The fall height for a traditional (h2) and horizontal (h1) mounting is as follows:

$$h_1 = l\tan(\alpha)$$
$$h_2 = l\sin(\alpha)$$

The increase in height will thus be

$$\frac{h_1}{h_2} = \frac{l\tan(\alpha)}{l\sin(\alpha)} = \frac{1}{\cos(\alpha)}$$

and hence the increase in speed

$$\frac{v_1}{v_2} = \sqrt{\frac{1}{\cos(\alpha)}}$$

Consequently, the increase in speed at 35 degrees is equal to 10%.

Patent claims

1. A system comprising a lifeboat (1) and an arrangement for the launch of the lifeboat from offshore installations, particularly platforms for the production of oil and gas, wherein the lifeboat is releasably secured in a launching arrangement and is configured with a closed, elongated hull provided with an elongated slide means (5a, 5b) secured to each side of the hull and extending along at least a part of the longitudinal direction of the hull,

characterised in

that the launching arrangement on the vessel or the platform is provided with a first or rear guide or slide means (7a, 7b) arranged in an inclined position from the platform and extending obliquely down towards the sea surface in a direction away from the platform, and a second or forward guide or slide means (6a, 6b) that is arc shaped, wherein the upper ends of the first and second guide means (7a, 7b; 6a, 6b) are arranged at essentially the same level in the horizontal direction, and that the arc shape of the forward guide means (6a, 6b) is so formed that the forward guide means (6a, 6b) is terminated essentially tangentially to the rear guide means (7a, 7b), wherein

the lifeboat's slide means (5a, 5b) extends from a forward support point (4a, 4b) at or close to the bow of the lifeboat to a rear support point (3a, 3b) astern of the centre of gravity (9) of the lifeboat, and is arranged to be movable along the rear guide means (7a, 7b) of the launching arrangement; and that

the forward support point (4a, 4b) is movably connected to the forward guide or slide means (6a, 6b) on the launching arrangement, so that it can slide or be moved along the whole length of the forward guide means (6a, 6b) of the launching arrangement from an initial essentially horizontal position and downwards along the arc shape of the forward guide means (6a, 6b), thereby enabling the lifeboat (1) to leave the launching arrangement in a direction essentially parallel to the rear guide means (7a, 7b).

2. A system according to claim 1, **characterised in** that the rear end (3a, 3b) of the slide means (5a, 5b) is secured close to the centre of gravity (9) of the lifeboat but still sufficiently far behind the centre of gravity to enable the lifeboat to attain a sufficiently high exit speed.

3. A system according to claim 1, **characterised in** that the lifeboat is connected to the launching arrangement at a releasable attachment point (8) close to the bow of the lifeboat.

4. A system according to claim 1, **characterised in** that the forward guide means (6a, 6b) is formed of a guide rail with an open lower end and that the lifeboat is equipped with roller wheels or slide means (4a, 4b) that are designed to move along the inside of the guide rail.

5. A system according to claim 4, **characterised in** that the guide rail and/or slide means (6a, 6b) are provided with a surface of a low-friction material.

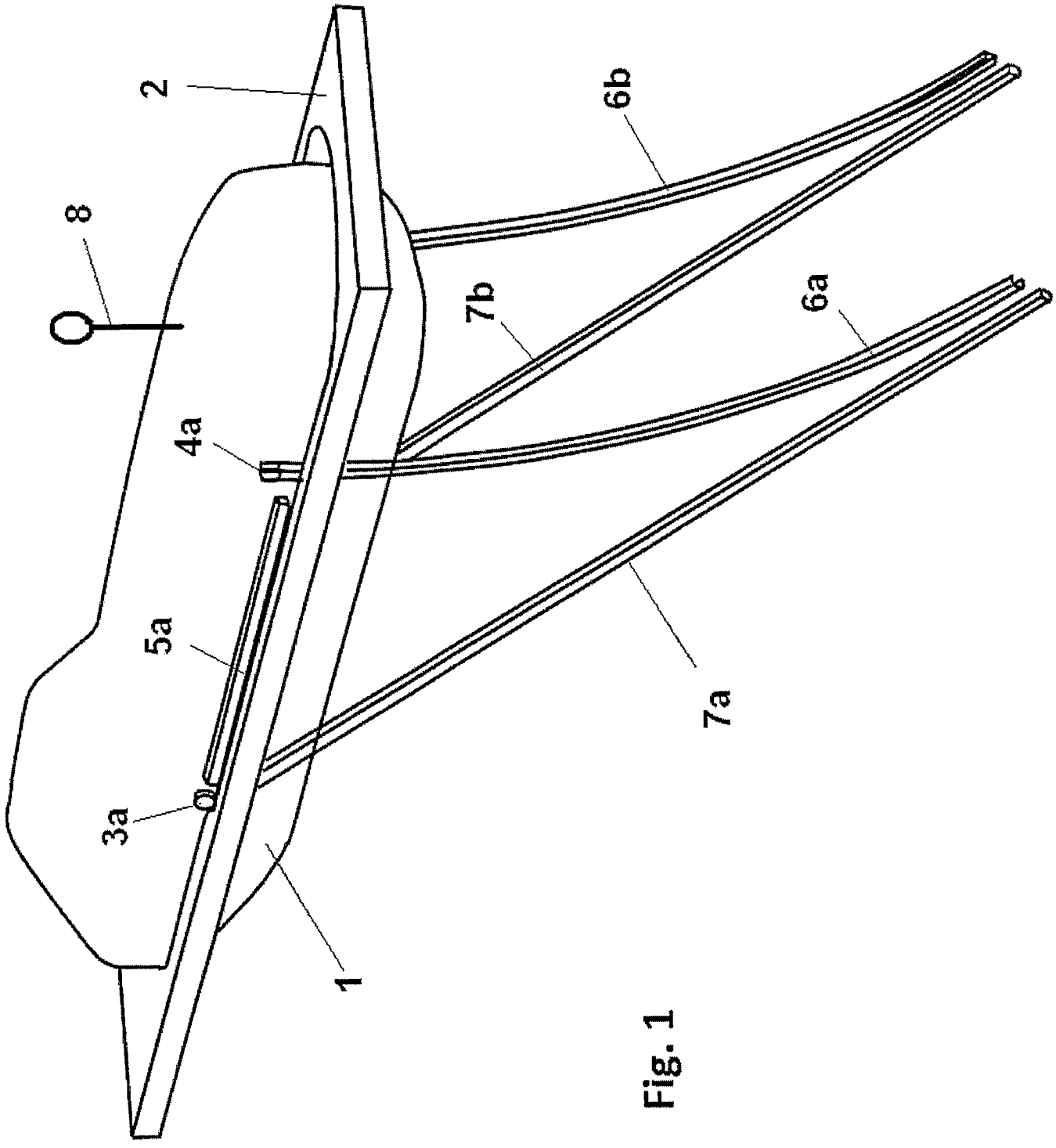


Fig. 1

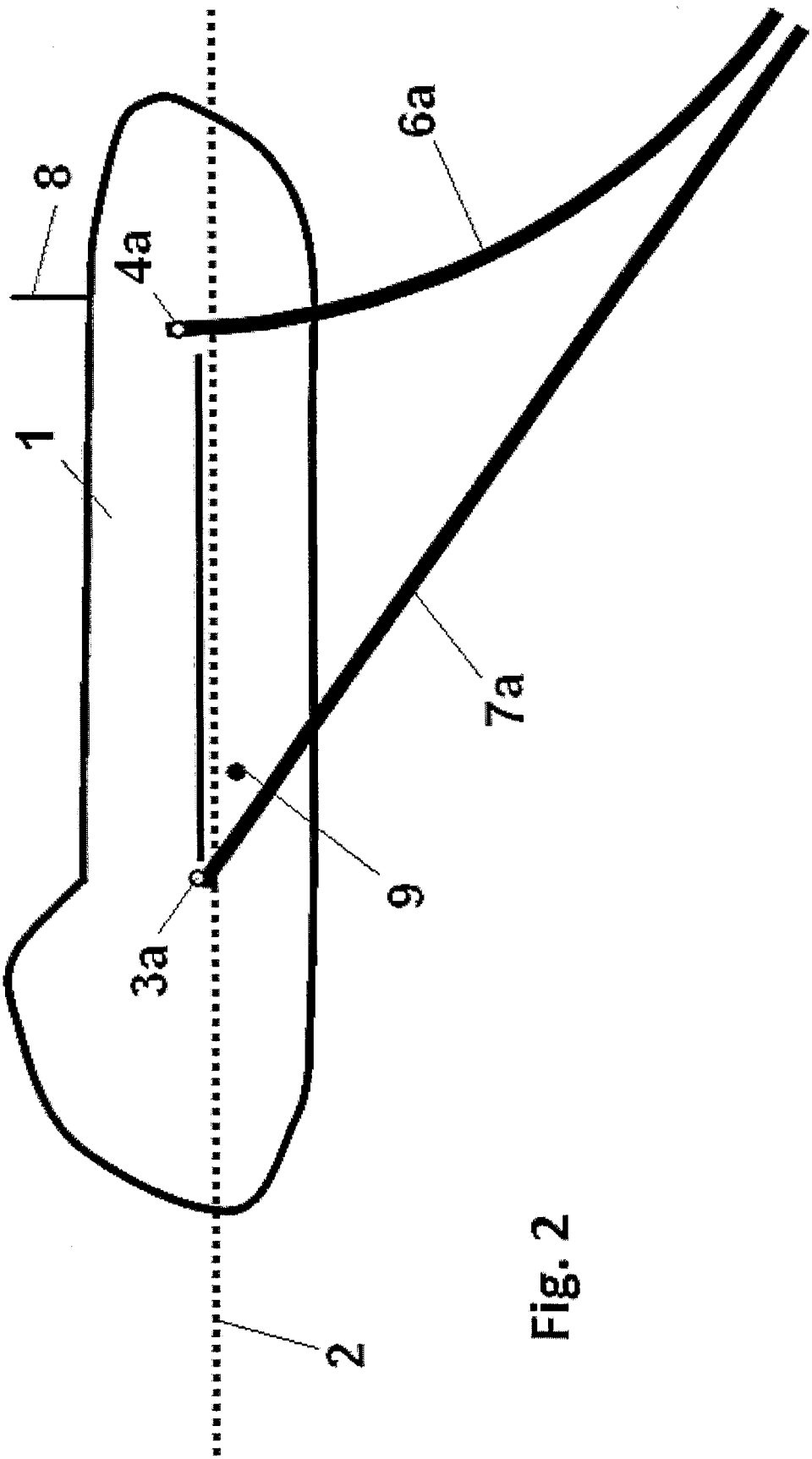


Fig. 2

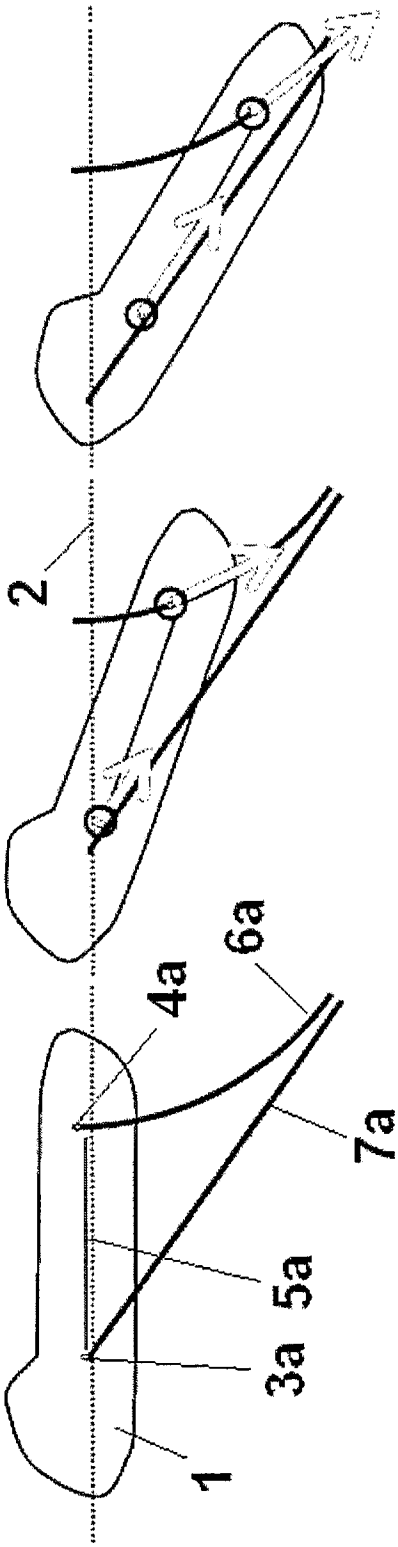


Fig. 3a

Fig. 3b

Fig. 3c

Fig. 3d

Fig. 3e

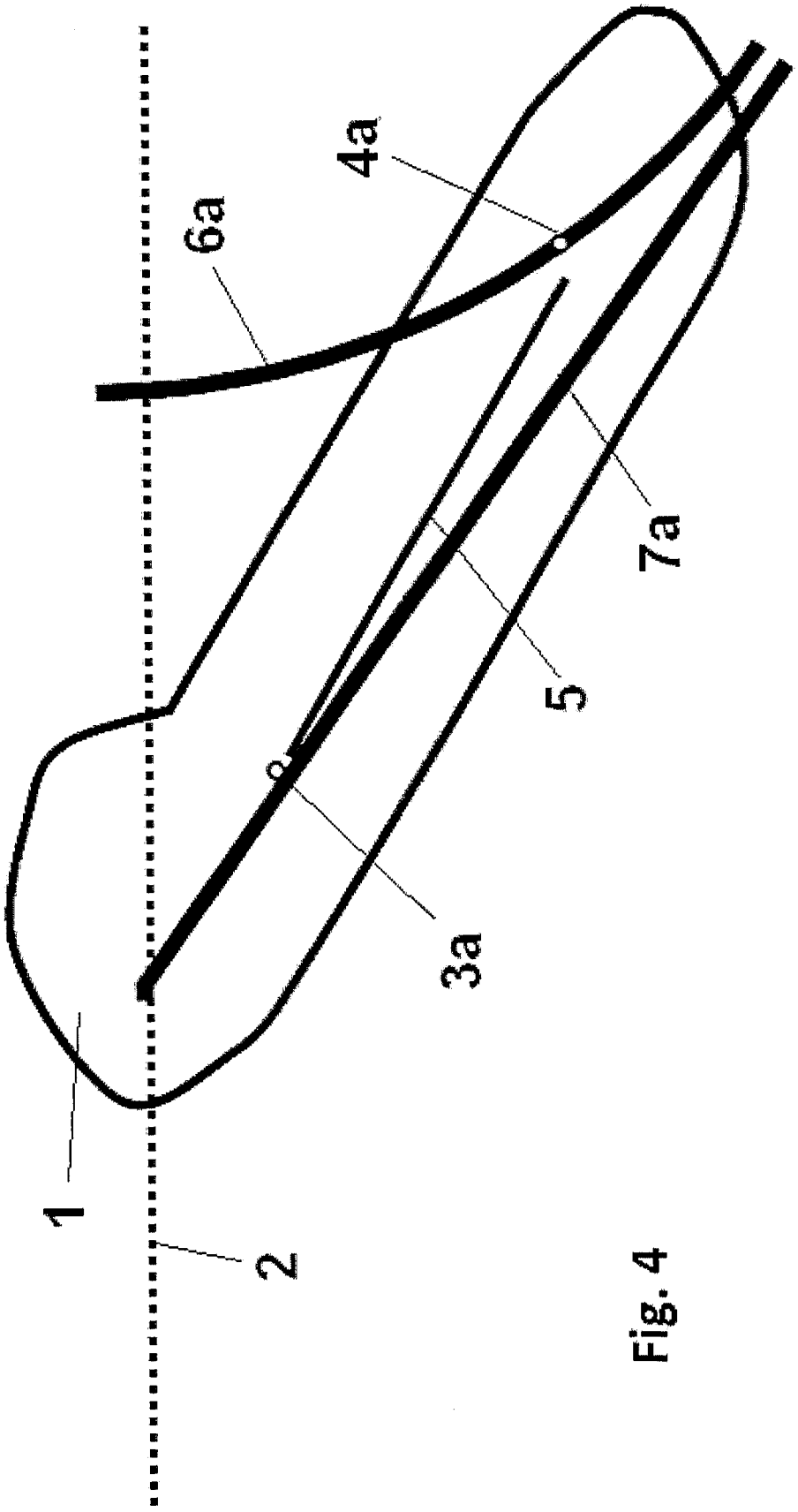


Fig. 4

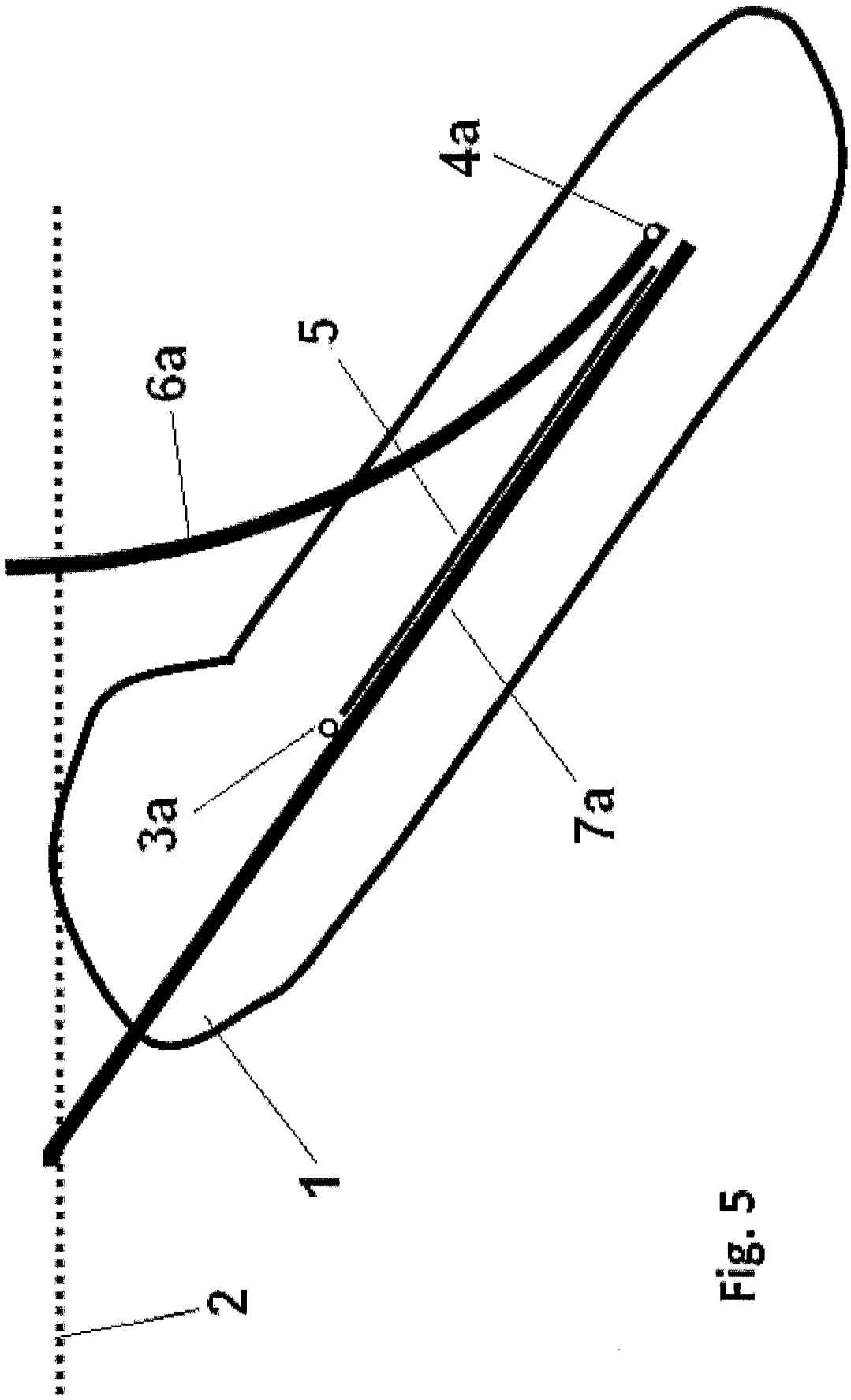


Fig. 5

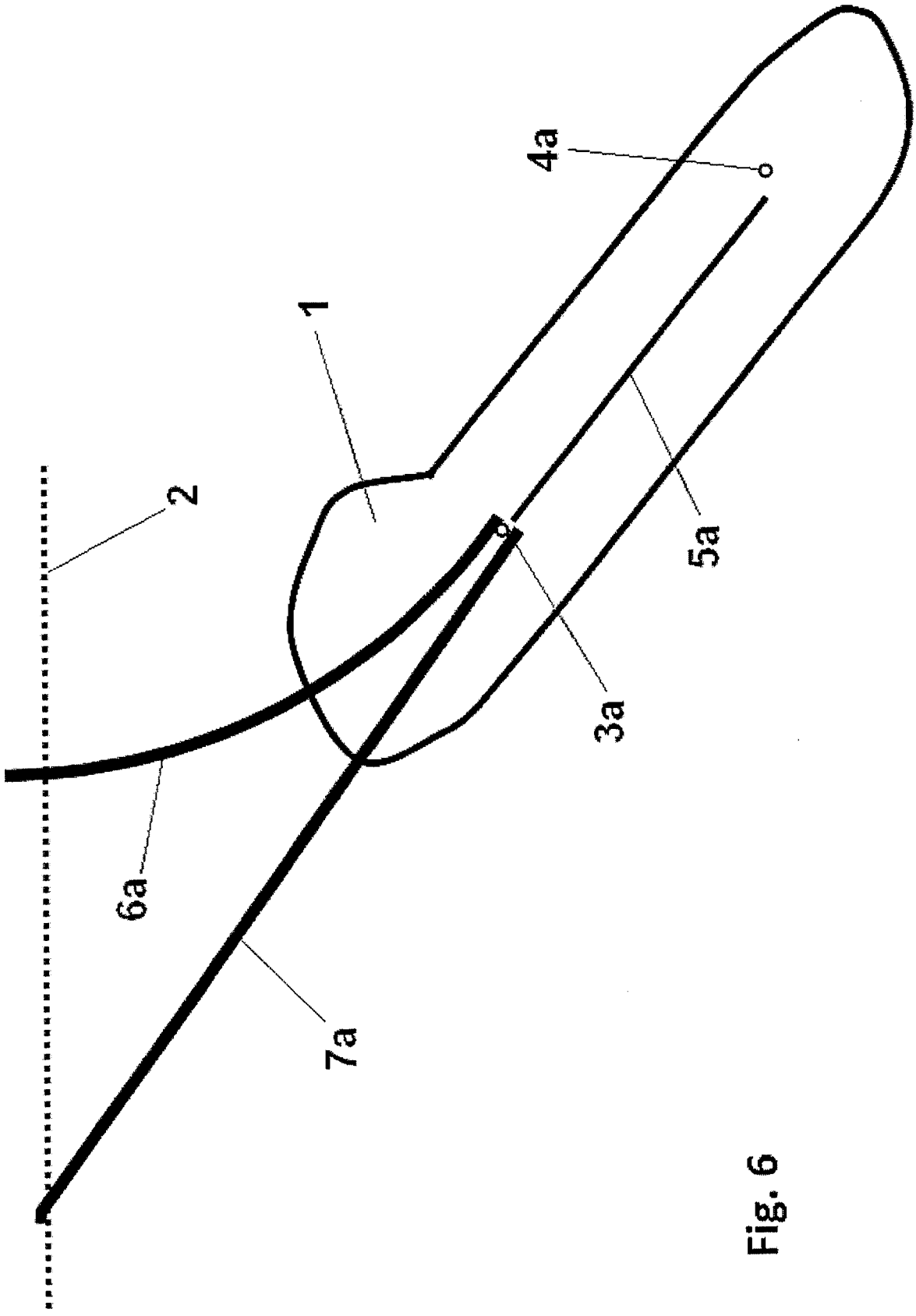


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2010/000046

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B63B, B63C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 200106380 A, SHIN KURUSHIMA DOCKYARD CO LTD, 2001-03-13: (abstract) Retrieved from: PAJ database --	1
A	JP 11129982 A, OKAZAKI KAZUNARI, 1999-05-18: (abstract) Retrieved from: PAJ database --	1
A	GB 1200710 A (ROSENDO CHORRO ONCINA), 29 July 1970 (29.07.1970), whole document --	1
A	WO 2008054223 A2 (AKER KVAERNER ENGINEERING & TECHNOLOGY AS ET AL), 8 May 2008 (08.05.2008), whole document --	1

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
12 May 2010	12 -05- 2010
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Erik Lundell / JA A Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2010/000046

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DD 297377 A5 (WARNOWWERFT GMBH), 9 January 1992 (09.01.1992), whole document -- --------	1

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Cited literature, if any, will be enclosed in paper form.

GB	1200710	A	29/07/1970	NONE
WO	2008054223	A2	08/05/2008	NONE
DD	297377	A5	09/01/1992	NONE