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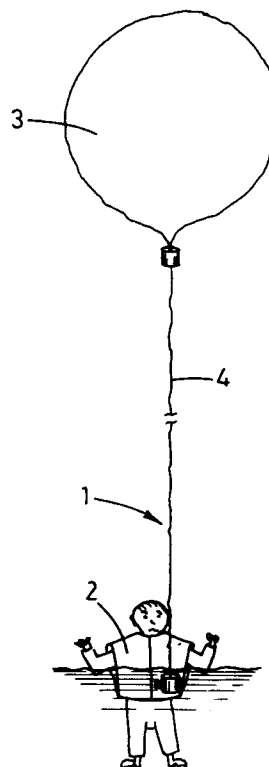
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NL-1000 HB Amsterdam (NL)(54) **Rescue device for bodies, like human beings or cargo, fallen into the sea.**

(57) A rescue device for bodies, such as of human beings or cargo load, fallen into the sea, includes a body part for attachment to the body, a long line attached to the body part on one end and to the other hand. The balloon is folded to a small size in its inoperative position and may be inflated to an operative position in which it exerts an upward lift in air. Preferably, the balloon is radar reflecting. A lightweight gas effects the inflation of the balloon from the inoperative to the operative position. There is provided a valve which can be opened to allow the gas into the balloon.

**Fig.3****EP 0 581 340 A1**

The present invention relates to a rescue device for bodies, like human beings or cargo, fallen into the sea.

The most well-known rescue device for drowning persons is the swimming or life jacket serving to lend additional buoyancy to the drowning person in order to keep the person's head above water and to prevent immediate drowning. In small waters such as rivers and lakes such a swimming jacket may save the life of a person because the swimming jacket enables the person to swim more easily to the shore or to keep the person floating long enough to be picked out of the water by others. At sea or in other great waters such a conventional swimming jacket saves life of a drowning person only in very exceptional cases. The reason for this is that drowning persons die due to undercooling before they are found. Depending on the temperature undercooling sets in already after fifteen to sixty minutes after which the drowning person dies quickly. Hence, in most cases a swimming jacket saves a drowning person from drowning, but does not offer sufficient changes to give others the possibility to save the drowning person. When the drowning person has gone overboard from a ship, the distance between the ship and the drowning person increases quickly most of the time and it takes some time before the ship is able to return to the drowning person, if this is possible anyhow. Tracing by airplanes or helicopters is extremely difficult due to the small surface area of the drowning person, while the tracing operation is often extra complicated by bad weather. Many efforts to improve and further develop swimming jackets have not led to an effective survival means.

Another big problem with which the present invention is concerned, is the problem of many millions of tons of ship's load disappearing into the sea every year and which cannot be found back anymore. This not only leads to a destruction of capital goods, but often causes risks of environmental pollution.

The object of the present invention is to provide a rescue device for bodies fallen into the sea, with which an effective solution to the problems described is offered.

For this purpose the rescue device according to the invention is characterized by a body part attached to the body by attachment means, a flexible elongate connecting member fixed to the body part on one hand and to a rising means on the other hand, said rising means having a small size in its inoperative position and is expandable to an operative position in which it exerts an upward lift in air and is preferably radar reflecting, expansion means for bringing the rising means from the inoperative to the operative position, and actuating

means for activating the expansion means.

According to these features and in case of a drowning person, the rescue device will be made operative automatically or by actuation by the drowning person, after which the rising means releases from the body and will float at a distance above the sea level and fixed to the connecting member. Due to this rising means floating high in the sky and which may also have a large surface area, it is much easier to locate the drowning person optically while, in particular when the rising means is equipped with special radar reflecting means, it also enables an effective radar tracing operation. In this way the chances of a drowning person being found before undercooling of the body occurs, are substantially increased.

In case of attachment to ship's load the actuating means of the rescue device should function automatically and the connecting member should have such a length that, when the load has sunk to the bottom, the rising means is still able to float above sea level. In practice this means that the length of the connecting member may vary from several dozens of meters up to many hundreds of meters depending on the sea over which the load should be transported. In any case, the rising means floating above the sea will simplify the location of the position where the load has sunk to a large degree.

In the most practical embodiment, the rising means consists of a balloon preferably coated with lacquer. This metal lacquer may serve to make the balloon gastight on the one hand and to give the balloon excellent radar reflecting properties on the other hand. Of course also other radar reflecting techniques may be used instead or in addition. The shape of the balloon may be selected depending on the requirements.

The expansion means conveniently comprises a container to fill up the balloon with gas which is lighter than air at ambient pressure, said container being connected to the balloon through a valve actuated by the actuating means and containing a pressurized gas or a solid material producing hydrogen by its reaction with water.

For pressurized gas one may consider helium or hydrogen, while the hydrogen producing solid material is for example an alkali metal and/or hydrides thereof.

In case of drowning persons the rescue device may be operated manually or be actuated automatically, for example by contacting water, or by the pulling force of a life line with which a person is connected to the ship. The actuating means of a rescue device for load may respond by its contact with water or by the pressure which it undergoes when it sinks.

In particular in the embodiment for drowning persons the rescue device includes a cylindrical casing which contains in a practical embodiment three exchangeable parts: a first part containing the rising means, a joining second part having the expansion means and a third part containing the connecting member. The exchangeability of the parts may be used both for replacing a part by an equal, but new part and for selectively combining parts having a different volume.

Of course it is possible to equip the rescue device according to the invention with conventional rescue or survival means such as a signal transmitter, preferably a radio beacon, connected to the rising means, a fishing line, a colouring cartridge and the like. Receiving a signal from a radio beacon suspended from the rising means in emergency cases is much more effective than a radio beacon fixed to the body of the person which can be received for only a part of the time because the radio beacon will often be under water.

Although the rescue device according to the invention may also be attached to the body of a person in another way, for example by means of belts or the like, it is favourable to combine the rescue device with a life jacket, wherein the rescue device may both be attached to the life jacket later on or be integrated in the design of the life jacket. Of course it is an object to make the rescue device as small and lightweight as possible so that it gives a minimum hindrance when it is worn. The balloon will then be collapsed to a minimum volume, the gas within the container will be compressed to a minimum volume and the connecting member will be wound such that a reliable unwinding is guaranteed. For these three parts well-known techniques are available which may be used with some modifications.

With respect to the rescue device which is particularly intended for use with cargo load it is noted that it is very favourable when it is also provided with engagement means connected to the load and to which a hoisting means may engage which is guided along the connecting member to the load.

In this way the rescue device not only serves for locating the load but also for recovering it eliminating the need for divers or diving equipment.

The invention will hereafter be elucidated with reference to the drawings very schematically showing embodiments of the invention by way of example.

Fig. 1-3 illustrate the principle of the rescue device according to the present invention in use with a drowning person.

Fig. 4 shows on an enlarged scale and in front view the rescue device of Figs. 1-3.

Fig. 5-9 illustrate the principle of the rescue device according to the invention in an embodiment for ship's cargo load.

The drawings show embodiments of the rescue device according to the invention which is intended to rescue bodies fallen into the sea, wherein there is made a distinction between bodies of living souls, in particular human beings, and of objects, in particular goods transported overseas, that is by boat, aeroplane or the like.

First of all, the embodiment of the rescue device for human beings is illustrated with reference to Figs. 1-4. In Figs. 1-3 there is shown a rescue device generally indicated with reference numeral 1 and attached to a swimming or life jacket 2 which is tightly worn around the body of a person which, in this case, is involuntary fallen into the sea one way or another and who should be rescued by others. For this purpose the rescue device can be actuated automatically or as a result of operation by the drowning person self. Then, according to Fig. 2, a balloon 3 of the rescue device 1 is inflated with a gas which has less density than air, such as hydrogen, helium or the like, which balloon may rise and remains connected to the drowning person through an elongate connecting member, in particular a line 4, at a sufficient distance above the drowning person - a height of 10-30 meter above the water level is conceivable - in order to be well detectable both optically and by a radar installation. For the purpose of a tracing operation by means of radar the balloon 3 may be constructed such or may be equipped with such means that radar beams are being reflected. It is for instance possible to spray the balloon with a metal lacquer having the further advantage of making the elastic balloon gastight. On the other hand it is also possible to use other techniques, such as aluminium strips or the like. Also a signal transmitter may be suspended from the balloon 3 in order to transmit emergency signals, for example radio signals, high above the water level, which signals may be continuously and well received due to the high point of transmission. If a balloon or other rising means is used causing sufficient upward lift in the air, an additional effect may be obtained in that the drowning person is pulled up partly out of the water as a result of which undercooling starts less quick, in particular if the whole breast portion is above water. Consequently, the invention not only increases the chances of a drowning person being found, but also provides more time to pick up a drowning person from the water alive.

Fig. 4 schematically shows a possible embodiment of the rescue device according to the invention. In this exemplary embodiment, the rescue device is housed within a cylindrical casing consisting of three parts: a first part 5 containing the

collapsed balloon 3, a second part 6 containing the means to blow gas into the balloon and a third part 7 in which the line 4 is wound. This third part 7 may also be indicated as body part which remains in contact with the body of the drowning person, in this case through the life jacket 2, while both other parts get up into the air together with the balloon 3 and remain connected to the body part 7 through the line 4. The body part 7 may be attached to the life jacket 2 or to the body of the person with belts or other attachment means, but it is of course also very well possible to integrate the rescue device 1 fully in the life jacket.

The first part 5 of the casing of the rescue device 1 consists in this embodiment of two radial halves each comprising a half ring 8 having a groove in circumferential direction thereof. When not in use, both halves of the first part 5 are kept together in a manner to be described later on, but after actuating the rescue device both halves are released and the balloon 3 is set free to be expanded. The balloon 3 may be made from elastic material such as rubber or a plastic and may be kept folded to a very small size for a longer period of time. The balloon 3 has a collar 9 near its inflating opening, with which the balloon 3 is removably attached to the second part 6, such as by means of screw threads or a bayonet catch. With this releasable connection, the first part 5 and the second part 6 may be exchanged or replaced independent of each other.

In this case, the second part 6 is constructed as a pressurized container for a compressed gas having a lower density in comparison with air, such as helium or hydrogen, which may arrive in the balloon 3 through an exit opening (not shown) which is closed and can be opened when the rescue device is actuated. The valve 10 or the like which can be opened is not shown in detail in Fig. 4, but is operated in this case by a pull pin 11. Also around the second part 6 is a fixed ring or rib 12 having a circumferential groove in the outer surface thereof.

The third part 7 is partially pushed onto the second part 6 and the line 4 which is wound within the third part 7 is fixed with its one end to an eyelet 13 on the underside of the second part 6 and is connected with its other end to the third part 7. The line 4 is preferably made with a minimum weight and thickness and is for example a dracon cord and is wound within the third part in a reliable and tight manner in order to be able to unwind in a reliable manner when the balloon rises together with the second part 6. The third part 7 also has a ring or rib 14 having a circumferential groove.

The three parts 5-7 are held together by a coupling element 15 comprising three part-circular clamps 16, 17, 18 elastically clampingly engage

through an angle of more than 180° in the grooves of the rings 8, 12, 14 of the parts 5, 6, 7. The parts 5-7 are uncoupled by pulling of the clamps 16-18 of the coupling element 15 from the rings 8, 12, 14. Since also the pull pin 11 is removably connected to the coupling element 15 at 19, the removal of the coupling element 15 simultaneously causes the opening of the valve 10 of the pressurized container of the second part 6 through the pull pin 11 so that the rescue device is actuated. The removal of the coupling element 15 can be effected manually, but it is also possible to attach a line to an eyelet 20 of the coupling element 15, the line being connected with its other end to a sailing boat for example so that when the person wearing this rescue device 1 gets overboard, the coupling element 15 is immediately pulled off. In this manner the rescue device is automatically actuated.

Of course it is also possible to equip the rescue device 1 with another automatic actuating means, for example in the form of a cartridge containing a material, such as phosphorus or alkali, reacting through contact with water, this reaction automatically activating the valve 10 of the pressurized container of the third part.

Furthermore it will be clear that the rescue device 1 may comprise further survival or signal means, such as a radio beacon, a fishing line, a colouring cartridge and the like. The balloon 3 may also be replaced by or be combined with a kite-like member, which may even cause the drowning person to be carried along with the wind. The balloon may be inflated to a volume of example one or several cubic meters.

Figs. 5-9 show a further use of the rescue device according to the present invention for ship's load or other cargo, such as containers, boxes, rolls and the like. In this case the rescue device 1 is sunk down on top of a container 21. The construction of the rescue device 1 may be very different from that shown in Fig. 4, but the rescue device 1 again comprises the rising means in the form of a balloon 3, the connecting member in the form of a line, cable, chain, tube 4 or the like and expansion means in the form of a pressurized container (not shown) for inflating the balloon 3. The line 4 is, however, longer in this case since the balloon 3 should still float at a distance above the water surface also if the container 21 has sunk to the bottom. In practice, the line 4 may hence have a length of many hundreds of meters.

Figs. 5-7 show the operation of the rescue device 1 which is similar to the operation of the rescue device according to Figs. 1-3. However, in this case the actuating means of the rescue device 1 will react to the contact with water or by the high pressure existing under water. According to Fig. 8 and 9, the rescue device 1 according to the inven-

tion may also be used to recover the sunk container 21 such that it is not necessary to dive to the sunk container 21. Then, the line 4 may be used to guide a gripper 23 suspended from a hoisting cable 22 down, said gripper may engage an engagement means 24 connected to the lower end of the line 4 and for example consisting of an eyelet or the like, so that the sunk container 21 may be lifted by the hoisting cable 22 from a ship.

It will be clear that the rescue device according to the invention may save huge amounts of money, while environmental disasters may be prevented by recovering dangerous load lying on the bottom of the sea.

The invention is not restricted to the embodiment shown in the drawing and described herein before, which may be varied in different manners within the scope of the invention.

Claims

1. Rescue device (1) for bodies, such as of human beings or loads, fallen into the sea, **characterized** by a body part (7) attached to the body by attachment means (2), a flexible elongate connecting member fixed to the body part on one hand and to a rising means on the other hand, said rising means having a small size in its inoperative position and is expandable to an operative position in which it exerts an upward lift in air and is preferably radar reflecting, expansion means for bringing the rising means from the inoperative to the operative position, and actuating means for activating the expansion means.
2. Rescue device according to claim 1, wherein the rising means is a balloon (3), preferably covered with a metal lacquer.
3. Rescue device according to claim 2, wherein the expansion means (6) comprise a container for filling the balloon (3) with gas which is less dense than air at ambient pressure, said container (6) communicates with the balloon (3) through a valve (10) openable by the actuating means (11) and containing a pressurized gas or a solid material producing hydrogen through a reaction with water.
4. Rescue device according to one of the preceding claims, wherein the actuating means (11) is manually operated.
5. Rescue device according to claim 4, wherein the manual actuating means (11) consists of a pulling means.
6. Rescue device according to one of claims 1-3, wherein the actuating means is activated automatically, for example by contacting water.
7. Rescue device according to claim 6, wherein the actuating means includes an alkali, phosphorus or such cartridge activated by water.
8. Rescue device according to one of the preceding claims, comprising a cylindrical casing (5-7).
9. Rescue device according to claim 8, wherein the cylindrical casing includes three exchangeable parts: a first part (5) containing the rising means (3), a joining second part (6) containing the expansion means and a third part (7) containing the connecting member (4).
10. Rescue device according to claims 5 and 9, wherein the parts (6, 7) for the expansion means and the connecting member (4) are kept together by a coupling element (5) combined with the actuating means (11) and being simultaneously operable with it.
11. Rescue device according to one of the preceding claims, wherein a signal transmitter, preferably a radio beacon, is connected to the rising means (3).
12. Rescue device according to one of the preceding claims, for use with human beings, comprising additional survival means, such as a fishing line, a colouring cartridge and the like.
13. Rescue device according to one of the preceding claims, for use with human beings, comprising means for attachment to a life jacket.
14. Life jacket comprising a rescue device according to one of the preceding claims.
15. Rescue device according to one of claims 1-11, for use with cargo load (21), wherein the connecting member (4) has a very great length of more than hundred meters, for example.
16. Rescue device according to claim 15, further comprising an engagement means (24) connected to the cargo load and with which a hoisting means (22, 23) may engage which is guided along the connecting member (4) to the cargo load (21).

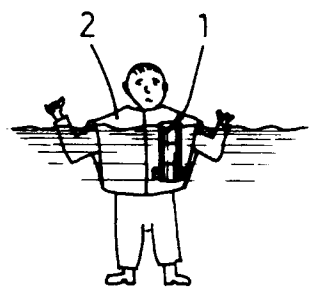


Fig.1

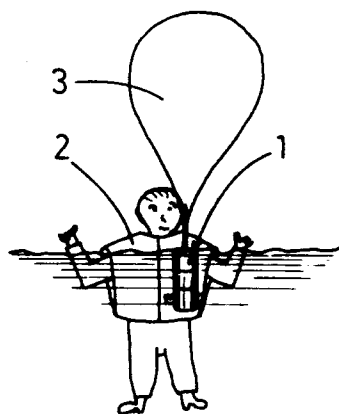


Fig.2

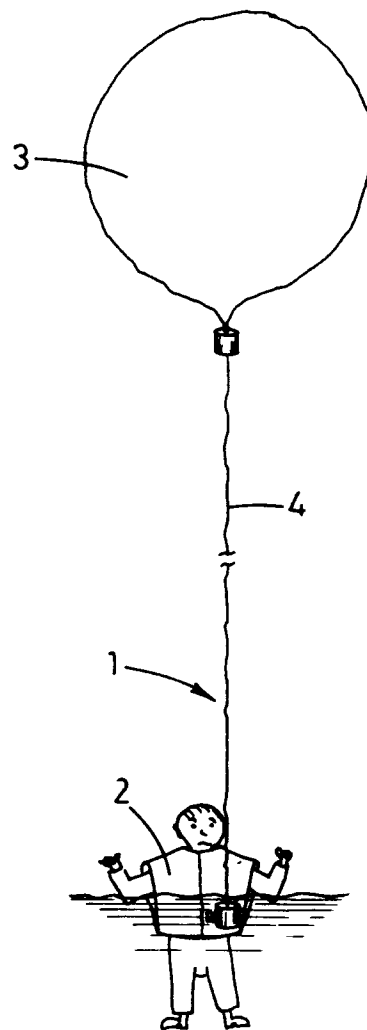
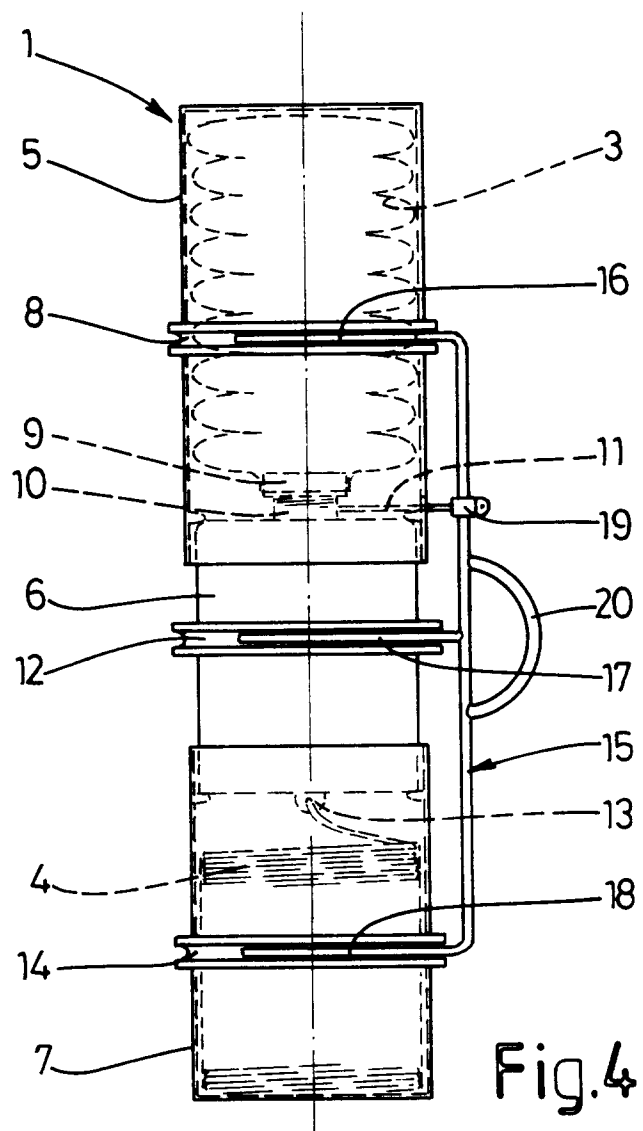


Fig.3



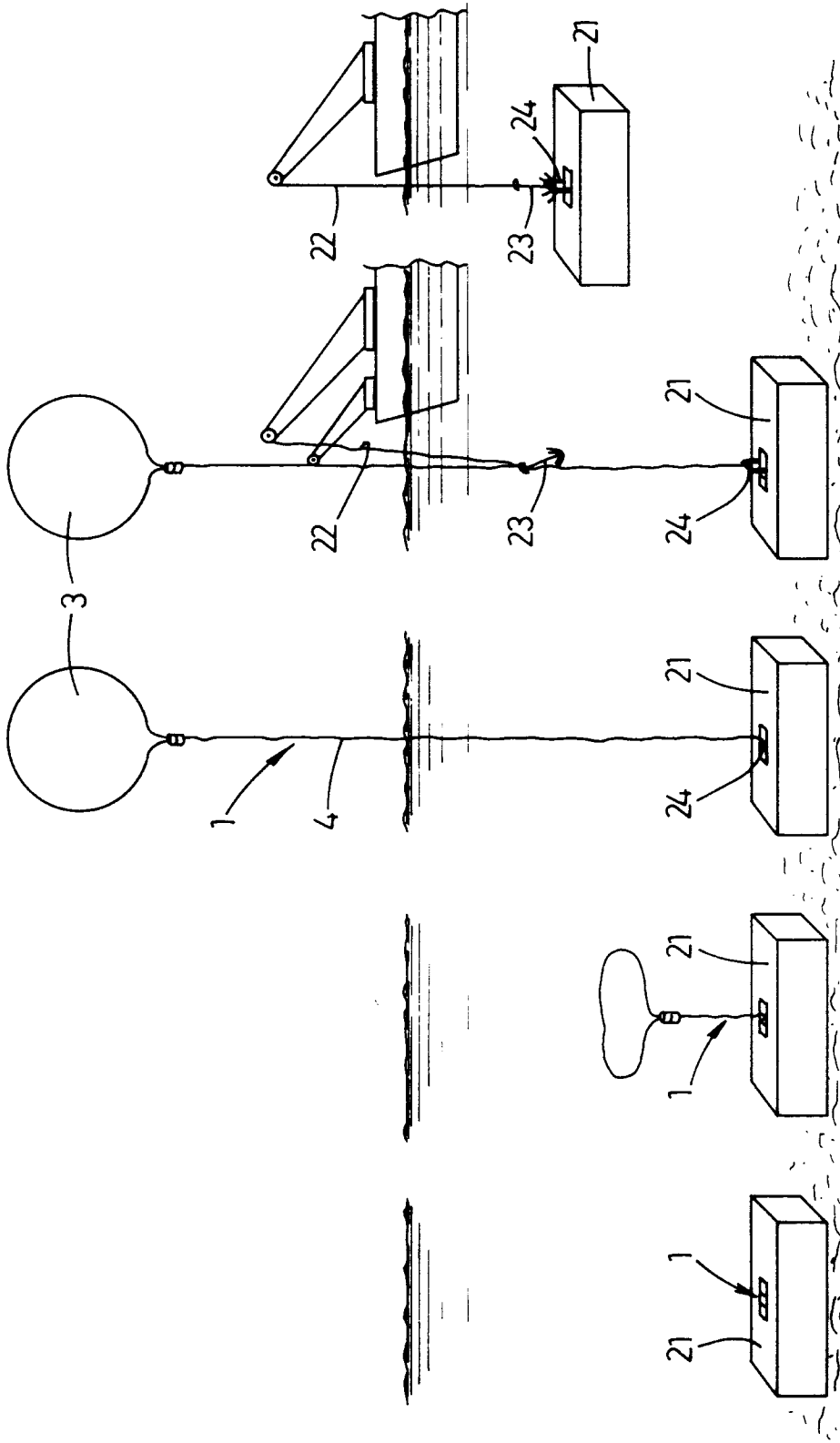


Fig.5

Fig.6

Fig.7

Fig.8

Fig.9



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EUROPEAN SEARCH REPORT

Application Number

EP 93 20 1360

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-A-3 931 690 (SCHONWÄLDER)	1-4, 8-11,13, 14	B63C9/20 B63C9/15 B63C7/26
Y	* the whole document *	6,7,15, 16	
X	FR-A-2 573 382 (CLAULIN)	1-3,8, 10,13,14	
X	* page 3, line 1 - line 3; figures 1-7 *	4,5	
X	* page 2, line 24 - line 25; figures 1-7 *		
X	CH-A-643 194 (RAUNA A.G.)	1,2,6	
X	* the whole document *		
X	US-A-2 629 115 (HANSEN)	1,12,14	
X	* the whole document *		
X	DE-A-3 625 812 (MÜLLER)	1,12,13	
X	* column 1, line 62 - line 68 *		
X	DE-A-3 427 805 (LINDE)	1	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
X	* the whole document *		
Y	GB-A-1 172 691 (HELLIER AIRBORNE LTD)	7	B63C
A	* the whole document *	1,6,13	
Y	DE-C-2 854 093 (SCHMIDT)	6	
A	* column 5, line 12 - line 31; figures 1,2 *	1,7,13	
Y	FR-A-2 442 180 (BOURCIER DE CARBON DE PREVINQUIERES)	15,16	
A	* the whole document *		
A	US-A-5 083 953 (RICHARDSON)	1,16	
A	* the whole document *		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 27 OCTOBER 1993	Examiner DE SENA A.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, hut published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	