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(54) **EXTENSIBLE LIFE-PRESERVING DEVICE**

ERWEITERBARE LEBENSERHALTUNGSVORRICHTUNG

DISPOSITIF EXTENSIBLE DE SAUVETAGE

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Description

[0001] This invention refers to an extensible inflatable life-preserving device capable of supporting one or more persons at the same time and of automatically opening and inflating once in contact with water.

[0002] Various devices are known for the rescue of people who accidentally fall into the water or who are shipwrecked such as the ring-shaped life belt, life jacket, collar or life vest, which can be either rigid or inflatable.

[0003] The ring-shaped life belt (or less commonly life-buoy) is a floating device whose presence, by virtue of international conventions, is provided for in the safety equipment of pleasure vessels, boats and ships with the purpose of being used to rescue shipwrecked people or those who have fallen in the water, in order to keep them afloat and avoid drowning. It is usually of a toroidal shape and is tied to a rope that allows the body of the person to be rescued to approach the lifeboat.

[0004] In addition, there are non-rigid and self-inflating life preservers, manufactured to guarantee a certain safety and comfort and can be considered the best choice for offshore sailing.

[0005] The life jacket is equipped with floating means and laces for fastening and must be worn by the person.

[0006] The life jacket, as well as the collar or the belt, may be of the self-inflatable type being equipped with an air chamber which, through the use of compressed gas contained in a metal cylinder connected thereto, is inflated. There are several other models with one or more air chambers, manual or automatic inflation mechanisms using gas (for example, carbon dioxide cylinder), oral inflation tube, fastening belts and safety harness. The air chambers are made of durable nylon fabric, with double or single welds, while the straps or safety harness, if provided, ensure a better wearability.

[0007] For example, in the patent No. US2004 / 0157514 A1 an inflatable life preserver is illustrated which is rolled around a cylindrical body and is maintained in this condition by bands. Inside the roll thus formed there is also a tank for inflating the life preserver and devices designed to trigger such inflation when the life preserver is thrown into the water. US2006148346, JP2015085917, KR20100111073, KR20110135569, US2015298780, US2004157514, WO2014200136 constitute other prior art documents.

[0008] However, such devices of the state of art have some drawbacks. The ring-shaped life belt and rigid vests allow the floating in water of a single person for which they must be of sufficient number in relation to the number of people that must be saved. They also require some time before they can be used by people in the water who have to wait for the rescue means to be recovered and launched into the water from the boat or aircraft. In addition, they occupy a certain space on the craft resulting, therefore, rather cumbersome and not simple to store.

[0009] Other devices, such as collars and inflatable life jackets, are also able to allow the floating of a single

person so that, if it is necessary to save more than one person at the same time, a sufficient number would be required. People in the water must, however, wait for a certain amount of time before having the available floating means while, very often, because of the sea conditions, the physical condition of the shipwrecked person or simply because they cannot swim, they need instead a floating means in a very short time.

[0010] Said devices of the state of art, to ensure a certain safety, must also be worn by the shipwrecked person, but this operation is not at all easy especially if the persons to be rescued are in the water without the aid of other means of buoyancy.

[0011] Moreover, it is often difficult for a shipwrecked person to remain attached to these life buoys for long because they are not in the right shape or do not have comfortable and safe supports.

[0012] The object of the present invention is to obviate the aforesaid drawbacks by providing an inflatable life-preserving device according to what is indicated in claim 1. In particular, said inflatable life preserver is of reduced size when inactive, so it can be stored in a small space inside a locker or in any space on the deck of the boat, while it becomes large when it is activated in water, so as to allow simultaneous rescue of more people.

[0013] It is useful for the rescue of people who accidentally fall from a boat or from piers or docks but also, and above all, in case of shipwreck of a boat with more people on board. In such cases, it is necessary, in fact, to provide the survivors, in a very short time, with a means of support that is suitable to allow the floating of several people at the same time.

[0014] The invention will be better explained by the following description, in which the preferred embodiments of the invention are described, made with the aid of the attached figures which respectively illustrate:

Figure 1 illustrates the side view of an automatic activation device of the state of art;

Figure 2 illustrates the top view of the life-preserving device in open position according to a first embodiment of this invention;

Figure 3 illustrates the side view of the life-preserving device in the open position according to the first embodiment of Figure 2;

Figure 4 illustrates the top view of the life-preserving device in the open position according to a second embodiment of this invention;

Figure 5 illustrates the side view of the life-preserving device in the open position according to the second embodiment of Figure 4;

Figure 6 illustrates the side view of the device wound around the cylinder according to this invention.

[0015] With reference to the aforementioned figures, the life-preserving device according to this invention comprises at least one substantially tubular structure 1 of variable length, capable of accommodating com-

pressed air or other gas. Said tubular structure 1 is made of an expandable material, preferably nylon, welded at its terminal end with single or double welds and the opportunely tapered opposite end is connected to at least one inflating cylinder 2 suitable for its complete filling. Said inflating cylinder 2 is provided with at least one automatic activation device 3 which, upon contact with the water, triggers the inflating action of the life preserver, consisting of a salt tablet contained inside said device 3 which, melting after a few seconds of immersion in water, releases a striker which pierces the cylinder by injecting the gas inside the life preserver. Manual activation is also envisaged which requires the intervention of man so that the perforation of the cylinder takes place by pulling a special cord 4 which releases the striker.

[0016] It is evident that the gas (for example carbon dioxide) contained in the inflation cylinder 2 must be able to fully inflate the tubular structure 1, so that the pressure is variable according to the volume of the said tubular structure 1 by the installation of a pressure regulator able to supply said tubular structure 1 with the right pressure, suitable to keep it inflated in water.

[0017] Said tubular structure 1, when deflated, is wound (rolled up) around the inflation cylinder 2, to which it is firmly connected by means of restraint and held in closed position by means of one or more bands or buckles 5, provided with Velcro fastening.

[0018] In this way, the tubular structure 1 and the inflation cylinder 2 are retained by the band or buckle 5, forming a life-preserving device of reduced dimensions that can be easily stored in a limited space of any boat or aircraft.

[0019] During the release phase, the thrust generated by the inflation of the tubular structure 1 is able to release one or more bands or buckles 5 allowing the unrolling of the tubular structure 1. Alternatively, said one or more bands or buckles 5 can be opened by the operator before its launch into the water, in order to allow a faster opening of the life preserver which is, however, able to maintain its compact shape during the launch phase.

[0020] Moreover, it is easy and effective to use compared to known rescue means as it is much simpler, faster and more precise to throw into the water, requiring the use of only one of the operator's hands.

[0021] The life-preserving device, according to this invention, is also large when in its active phase or when, in water, it inflates due to the activation of the inflation cylinder, becoming a means of rescue capable of supporting several people at the same time.

[0022] The tubular structure 1 comprises a substantially tubular central body 11 on which are provided a plurality of wings or protrusions 12 which extend substantially in a direction perpendicular to said body acting as stabilisers. In the embodiment of Figure 2, these protrusions 12 can be made in one piece with the central body and inflate with it, or they can always be obtained in one piece but are rigid or semi-rigid so they do not need to be inflated.

[0023] In the embodiment of Figure 4, these wings or protrusions 12 are made of semi-rigid or flexible material able to float (for example, polystyrene and/or plastic) and are inserted in a special through hole 24 made in the central body 11 of just larger width, in the central part, with respect to that of said wings or protrusions 12 so that the latter remain firmly connected to said central body 11.

[0024] When the life-preserving device is deflated, the wings or protrusions 12 of semi-rigid or flexible material are rolled, together with the central body 11, around the inflation cylinder by virtue of their flexibility.

[0025] In a still alternative solution, said wings or protrusions 12, made of semi-rigid or flexible material, are joined to the central body 11 by way of constraining means (for example, welding, gluing, binding).

[0026] The protrusions 12 have the double effect of making the unrolled and inflated life-preserving device more stable in the water avoiding the rotation on its axis when one or more people try to grasp it and also constitute a convenient point of rest and support for shipwrecked persons.

[0027] The tubular structure 1 can be of any desired size and can be divided into two or more separate chambers in which each chamber is joined to an inflating cylinder 2 capable of filling it. By using this solution, inflation is even faster and it is possible to obtain the desired length of the life preserver taking into consideration the fact that the greater its extension, the greater the number of people that can be saved.

[0028] The tubular structure 1 is made of a fairly rigid and elastic material, for example nylon and of any cross-section and dimension, preferably such as to allow the support of people in the water. Furthermore, it is provided with a gas release safety valve 23 when the pressure is excessive inside it while the inflation cylinder 2 can be equipped with a pressure sensor capable of compensating for any loss of pressure of the life-preserving device.

[0029] Reflector strips and a light buoy can be applied to the life-preserving device, so as to make it more visible in conditions of poor visibility as well as a satellite indicator contained in a pocket (not shown) applied to the tubular structure, in order to allow the retrieval of the life preserver in difficult weather and sea conditions or poor visibility.

[0030] Finally, it can also have, in its terminal part, an eyelet with a lanyard (not shown) attached to allow easy retrieval from a boat.

Claims

1. Extensible life-preserving device comprising:

- at least a substantially tubular structure (1) in expansible material which is empty inside and closed, capable of receiving compressed air or gas;

- at least one cylinder (2) containing compressed air or gas, able to completely inflate said tubular structure (1) to which is joined permanently by means of at least one automatic activation device (3) of the cylinder (2) which allows the spillage of the compressed air or gas and the inflation of the tubular structure (1), when in contact with water,

said device is in a condition of inactivity in which it is wrapped around the inflation cylinder (2), wherein said tubular structure (1) and said inflation cylinder (2) are gathered together by means of one or more bands (5) allowing the storing in any limited space of the boat or of the aircraft and in a condition of activity, when it is in contact with water, wherein the tubular structure (1) inflates presenting itself in the form of elongated tubular element, the structure (1) comprises a central substantially tubular body (11) on which a plurality of wings or protrusions (12) are provided which extend substantially in the direction perpendicular to said body and that roll up with it when the device is the condition of inactivity,

characterized by the fact that said wings or protrusions (12) are made in one piece with the central body (11) and inflate with it and the tubular structure (1) is fitted with a safety valve (23) which allows the release of the gas when the pressure is excessive inside it.

2. Life-preserving device according to claim 1, **characterised by** the fact that said wings or protrusions (12) are made in one piece with the central body (11) but they are rigid or semi-rigid and do not need to be inflated.
3. Life-preserving device according to claim 1, **characterised by** the fact that said wings or protrusions (12), made of semi-rigid or flexible material, are constrained to the central body (11) by insertion in a suitable through hole (24) and rolled up with it to the inflation cylinder by virtue of their flexibility in the inactive phase.
4. Life-preserving device according to claim 1, **characterised by** the fact that said wings or protrusions (12) are made with a material which is able to float in water like, for example, Styrofoam or plastic.
5. Life-preserving device according to claim 1, **characterised by** the fact that the tubular structure (1) is of any convenient section or size and is made of a quite rigid and elastic material, for example, nylon.
6. Life-preserving device according to claim 1, **characterised by** the fact that the inflation cylinder (2) is fitted with a pressure regulator able to offset any loss

in pressure of the life-preserving device.

7. Life-preserving device according to claim 1, **characterised by** the fact that the activation device (3) of the cylinder (2), which allows the spillage of the compressed air or gas and the inflating of the tubular structure (1), is equipped with a cord (4) for manual activation by pulling.
8. Life-preserving device according to claim 1, **characterised by** the fact that a luminous signalling and/or a satellite signaller device are applied to it.

15 Patentansprüche

1. Ausziehbare Rettungsvorrichtung, umfassend:

- mindestens eine im Wesentlichen röhrenförmige Struktur (1) aus ausdehnbarem Material, die innen leer und geschlossen und in der Lage ist, druckbeaufschlagte Luft oder Gas aufzunehmen;
- mindestens einen Zylinder (2), der druckbeaufschlagte Luft oder Gas enthält und fähig ist, die gesagte röhrenförmige Struktur (1) vollständig aufzublasen, mit der er mittels mindestens einer automatischen Aktivierungsvorrichtung (3) des Zylinders (2) dauerhaft verbunden ist, die das Entweichen der druckbeaufschlagten Luft oder des Gases und das Aufblasen der röhrenförmigen Struktur (1) erlaubt, wenn sie im Kontakt mit Wasser ist,

die gesagte Vorrichtung ist in einem Zustand der Inaktivität, in dem sie um den Aufblaszylinder (2) gewickelt ist, wobei die gesagte röhrenförmige Struktur (1) und der gesagte Aufblaszylinder (2) mittels eines oder mehrerer Bänder (5) zusammengebunden sind, die die Lagerung auf engstem Raum im Boot oder Flugzeug erlauben, und in einem Zustand der Aktivität, wenn sie im Kontakt mit Wasser ist, wobei die röhrenförmige Struktur (1) aufgeblasen wird und die Form eines länglichen röhrenförmigen Elements aufweist,

die Struktur (1) umfasst einen zentralen, im Wesentlichen röhrenförmigen Körper (11), auf dem eine Mehrzahl von Flügeln oder Vorsprüngen (12) vorgesehen ist, die sich im Wesentlichen in eine Richtung senkrecht zu dem gesagten Körper erstrecken und sich mit ihm aufrollen, wenn die Vorrichtung sich in dem Zustand der Inaktivität befindet,

dadurch gekennzeichnet, dass die gesagten Flügel oder Vorsprünge (12) einstückig mit dem zentralen Körper (11) hergestellt sind und mit ihm aufgeblasen werden und die röhrenförmige Struktur (1) mit einem Sicherheitsventil (23) ausgestattet ist, das die Freisetzung des Gases bei übermäßigem Druck

im Inneren erlaubt.

2. Rettungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Flügel oder Vorsprünge (12) einstückig mit dem zentralen Körper (11) hergestellt sind, aber starr oder halbstar sind und nicht aufgeblasen werden müssen. 5
3. Rettungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die gesagten Flügel oder Vorsprünge (12), die aus halbstarrem oder flexiblem Material hergestellt sind, an dem zentralen Körper (11) durch Einsetzen in ein geeignetes Durchgangsloch (24) festgelegt und dank ihrer Flexibilität in der inaktiven Phase mit ihm zum Aufblaszylinder aufgerollt sind. 10 15
4. Rettungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die gesagten Flügel oder Vorsprünge (12) aus einem schwimmfähigen Material, beispielsweise Styropor oder Kunststoff, hergestellt sind. 20
5. Rettungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die röhrenförmige Struktur (1) jeden geeigneten Querschnitt oder Größe aufweisen kann und aus einem ziemlich starren und elastischen Material, beispielsweise Nylon, hergestellt ist. 25
6. Rettungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Aufblaszylinder (2) mit einem Druckregler ausgestattet ist, der fähig ist, jeden Druckverlust der Rettungsvorrichtung auszugleichen. 30
7. Rettungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Aktivierungsvorrichtung (3) des Zylinders (2), die das Entweichen der druckbeaufschlagten Luft oder des Gases und das Aufblasen der röhrenförmigen Struktur (1) erlaubt, mit einer Schnur (4) zur manuellen Aktivierung durch Ziehen ausgestattet ist. 35 40
8. Rettungsvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** eine Leuchtsignal- und/oder Satellitensignalgebervorrichtung daran angebracht ist. 45

Revendications

1. Dispositif de sauvetage extensible comprenant: 50
 - au moins une structure sensiblement tubulaire (1) en matériau expansible qui est vide à l'intérieur et fermée, capable de recevoir de l'air ou du gaz comprimé ;
 - au moins un cylindre (2) contenant de l'air ou

du gaz comprimé, capable de gonfler complètement ladite structure tubulaire (1) à laquelle il est relié en permanence au moyen d'au moins un dispositif d'activation automatique (3) du cylindre (2) qui permet le déversement de l'air ou du gaz comprimé et le gonflage de la structure tubulaire (1), lorsqu'il est en contact avec l'eau, - ledit dispositif est dans un état d'inactivité dans lequel il est enroulé autour du cylindre de gonflage (2), dans lequel ladite structure tubulaire (1) et ledit cylindre de gonflage (2) sont rassemblés au moyen d'une ou plusieurs bandes (5) permettant le stockage dans un espace limité quelconque du bateau ou de l'aéronef et dans un état d'activité, lorsqu'il est en contact avec l'eau, dans lequel la structure tubulaire (1) se gonfle en se présentant sous la forme d'un élément tubulaire allongé, - la structure (1) comprend un corps central sensiblement tubulaire (11) sur lequel sont prévues une pluralité d'ailes ou protubérances (12) qui s'étendent sensiblement dans la direction perpendiculaire audit corps et qui s'enroulent avec celui-ci lorsque le dispositif est dans l'état d'inactivité,

caractérisé par le fait que lesdites ailes ou protubérances (12) sont réalisées d'une seule pièce avec le corps central (11) et se gonflent avec celui-ci et la structure tubulaire (1) est équipée d'une soupape de sécurité (23) qui permet la libération du gaz lorsque la pression est excessive à l'intérieur de celui-ci.

2. Dispositif de sauvetage selon la revendication 1, **caractérisé par le fait que** lesdites ailes ou protubérances (12) sont réalisées d'une seule pièce avec le corps central (11) mais elles sont rigides ou semi-rigides et n'ont pas besoin d'être gonflées. 35
3. Dispositif de sauvetage selon la revendication 1, **caractérisé par le fait que** lesdites ailes ou protubérances (12), réalisées en matériau semi-rigide ou souple, sont contraintes au corps central (11) par insertion dans un trou traversant approprié (24) et enroulées avec celui-ci au cylindre de gonflage grâce à leur flexibilité dans la phase inactive. 40
4. Dispositif de sauvetage selon la revendication 1, **caractérisé par le fait que** lesdites ailes ou protubérances (12) sont réalisées avec un matériau qui est apte à flotter dans l'eau, comme par exemple du Styrofoam ou du plastique. 50
5. Dispositif de sauvetage selon la revendication 1, **caractérisé par le fait que** la structure tubulaire (1) est de toute section ou dimension pratique et est réalisée en un matériau assez rigide et élastique, par exemple en nylon. 55

6. Dispositif de sauvetage selon la revendication 1, **caractérisé par le fait que** le cylindre de gonflage (2) est équipé d'un régulateur de pression apte à compenser toute perte de pression du dispositif de sauvetage. 5
7. Dispositif de sauvetage selon la revendication 1, **caractérisé par le fait que** le dispositif d'activation (3) du cylindre (2), qui permet le déversement de l'air ou du gaz comprimé et le gonflage de la structure tubulaire (1), est équipé d'un cordon (4) d'activation manuelle par traction. 10
8. Dispositif de sauvetage selon la revendication 1, **caractérisé par le fait qu'on lui applique une signalisation lumineuse et/ou un dispositif de signalisation par satellite.** 15

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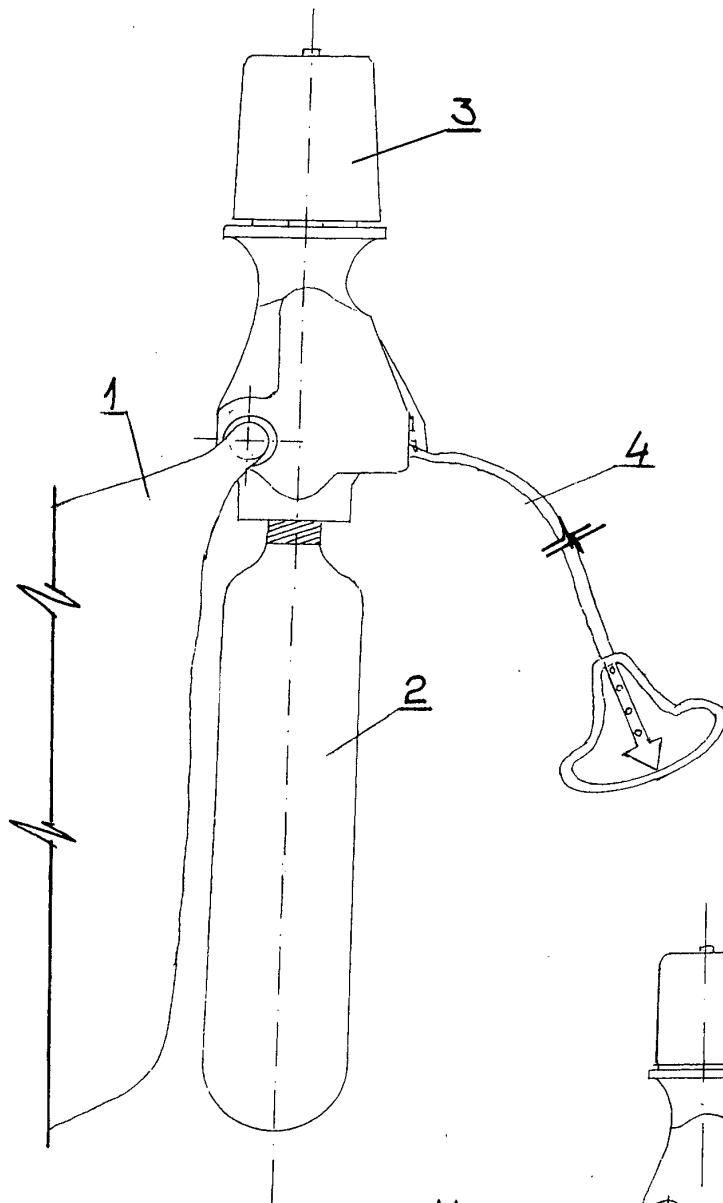
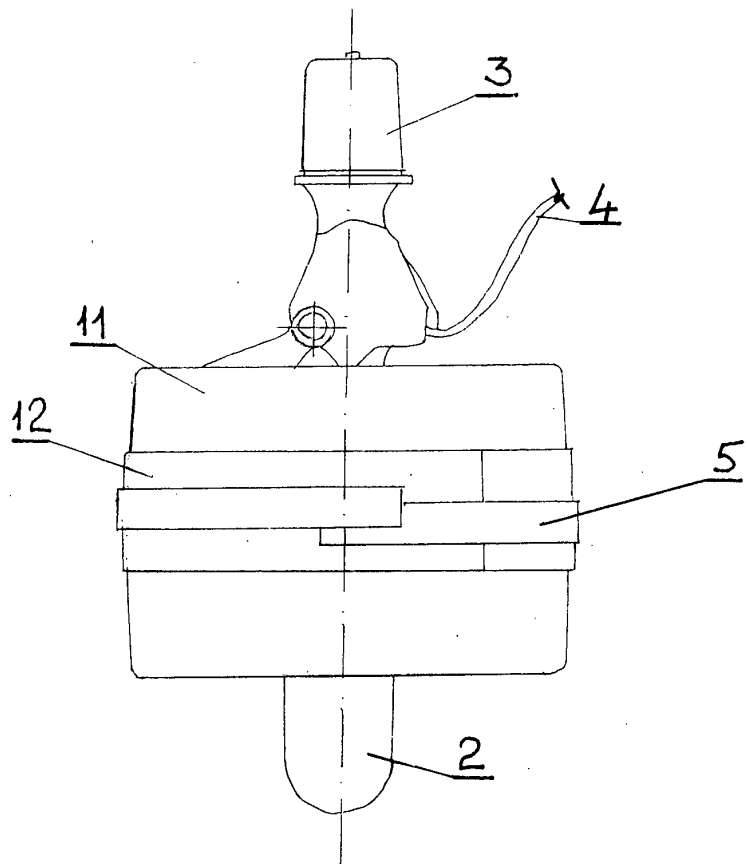


Fig. 6



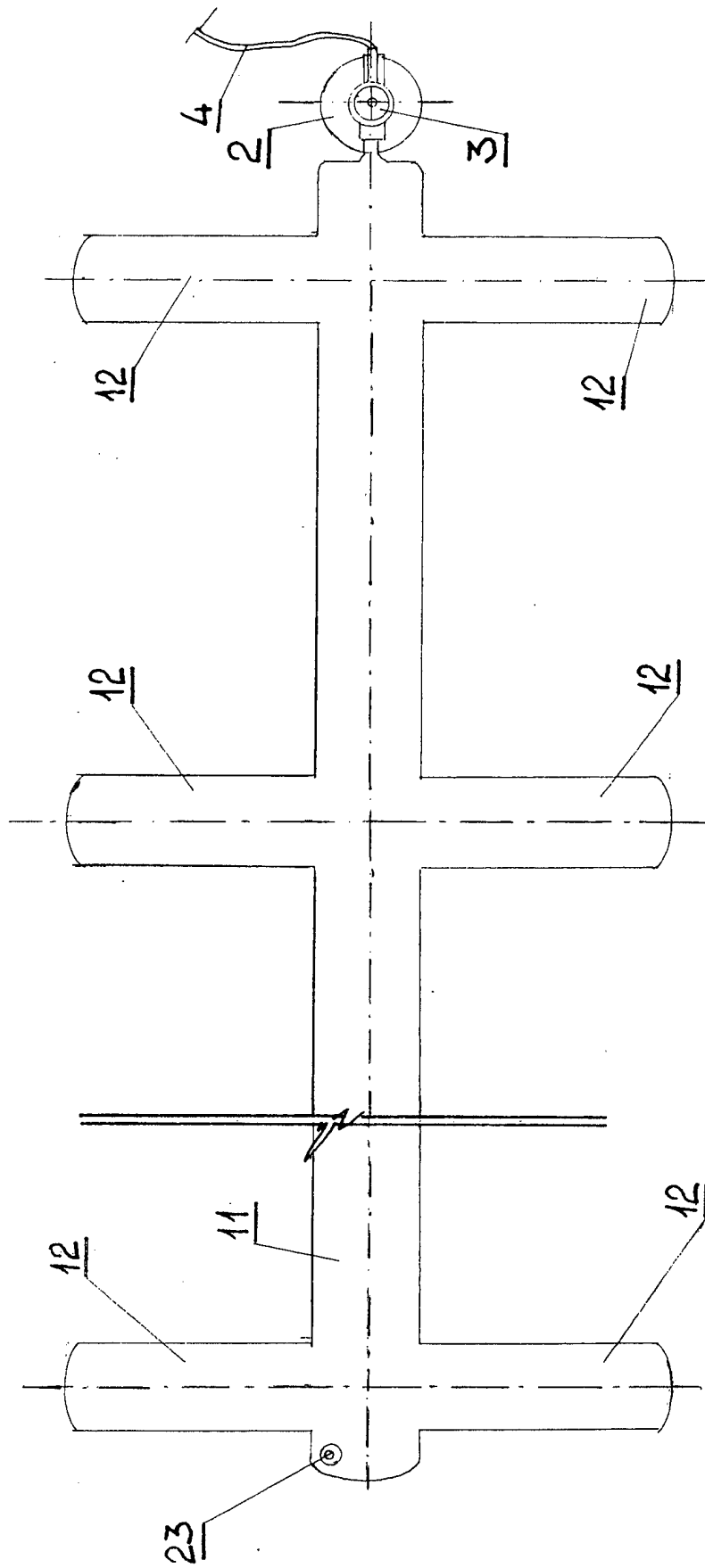


Fig. 2

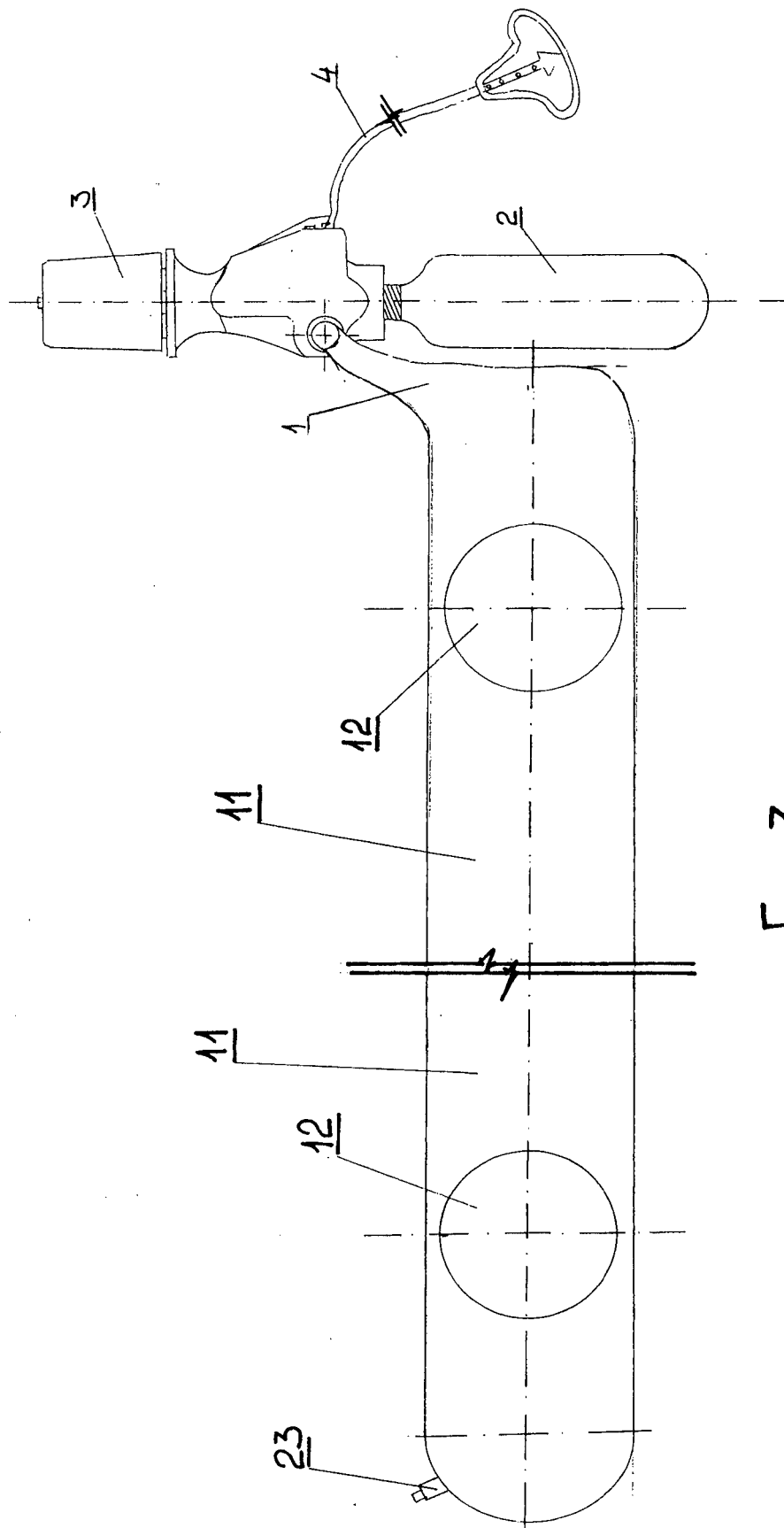


Fig. 3

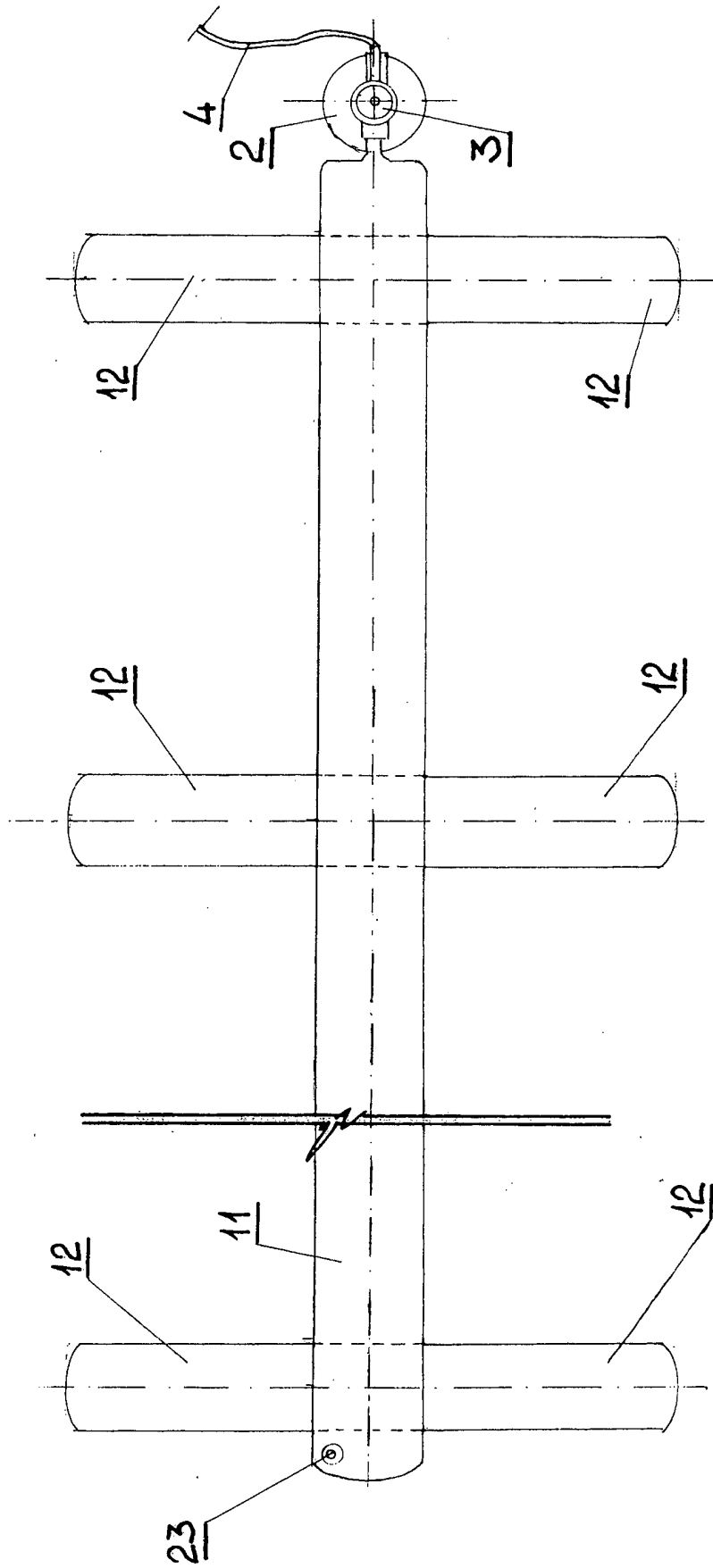


Fig. 4

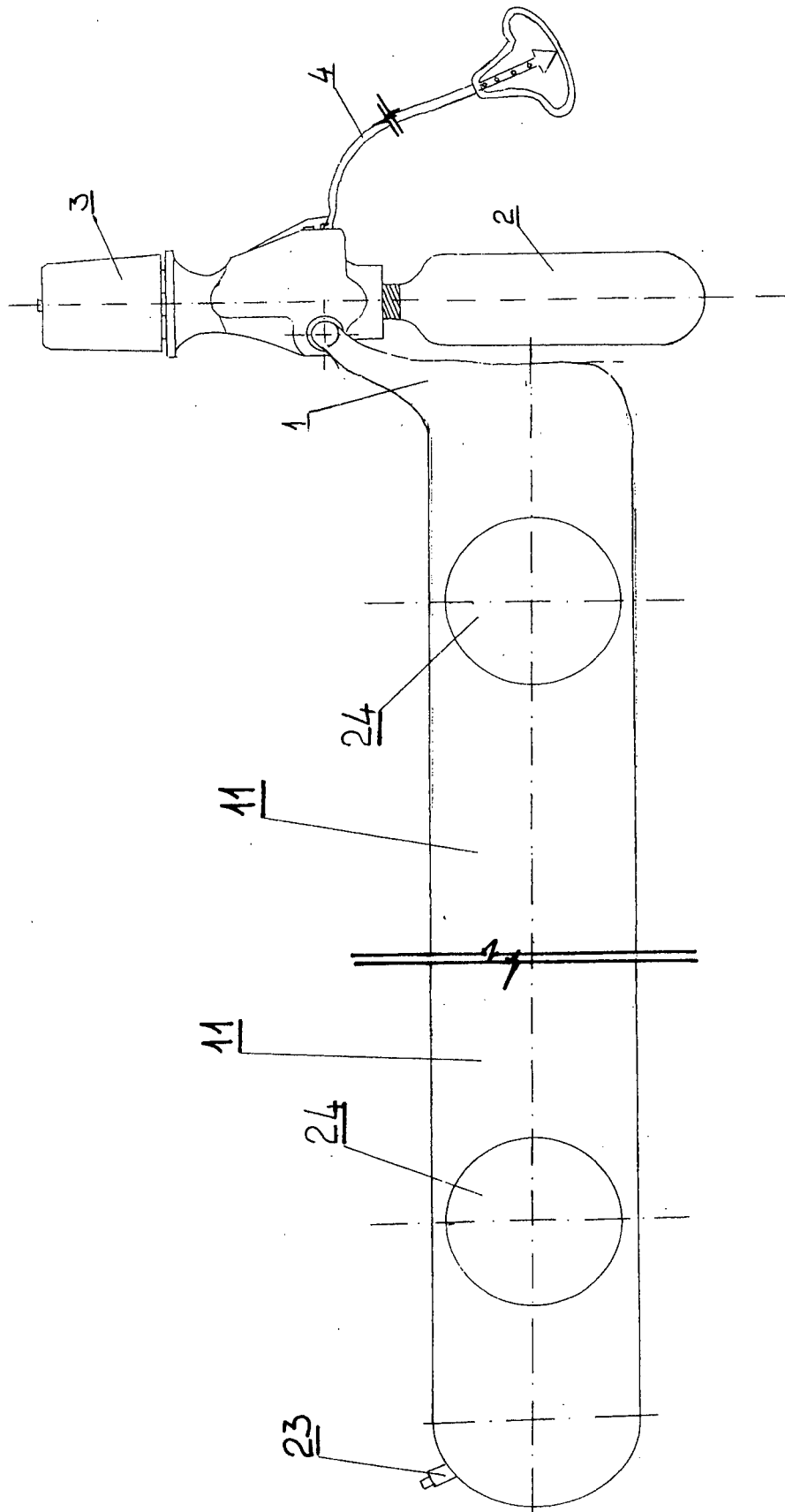


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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