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(72) Inventor: **Spagnuolo, Vito**
20025 Legnano (Milano) (IT)

(74) Representative: **Lecce, Giovanni**
Dott. Giovanni Lecce & C. S.r.l.
Via Fratelli Ruffini, 9
20123 Milano (IT)

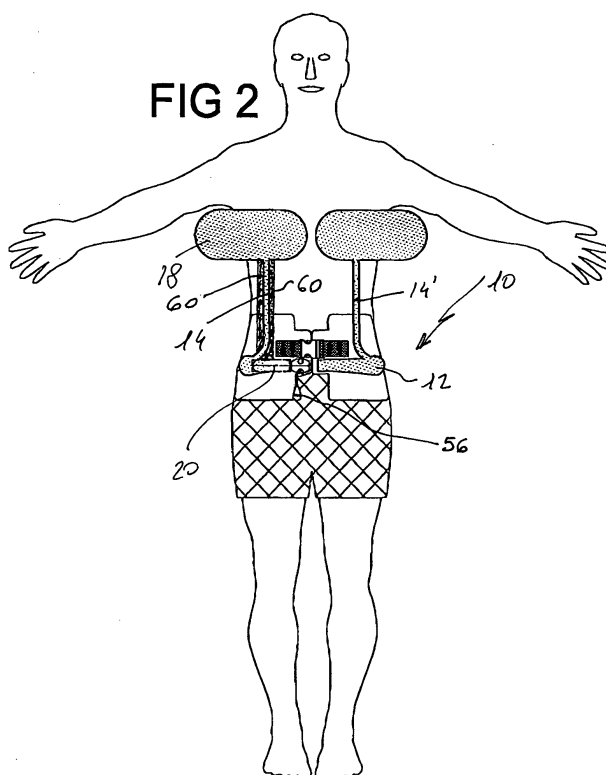
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(71) Applicant: **The Life Belt S.r.L.**
20090 Trezzano Sul Naviglio (Milano) (IT)

(54) **Inflatable safety apparatus**

(57) An inflatable safety apparatus (10) that can be used in water comprising at least one pressurized fluid container (20) provided with a valve assembly (32) that extends into a tang (32') of a punctiform or pin-shaped body (44) operated by a lever (48) towards the mouth-piece (42) of the same container (20) and by a tie rod (54) connected to the lever (48) and matched with a grasp knob (56) on the opposite end, characterised in

that it comprises a first tubular chamber (12) and a second tubular chamber (18) being tight connected between them expanding and communicating by means of two couples of integral flexible ducts (14-14') and (16-16'), said at least one container (20) being fastened by heat sealing and/or adhesive collars (58) to the first tubular chamber (12) in correspondence of a hole obtained on it by said tang (32').



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Description

[0001] The present invention refers to an inflatable safety apparatus.

[0002] More particularly, the present invention refers to a safety apparatus to be used in water, that can be inflated if necessary and is advantageously embedded into the garment used by the bather or in an accessory such as a belt placed around the waist. Said garment is generally constituted by bath suit, particularly a short or bath trunk/bikini bottom; therefore the opportunity of embedding the inflatable safety apparatus to other kinds of garments such as diving suits and/or accessories thereof is not excluded.

[0003] It is known that, when in water, bathers fear of finding themselves in difficulties due to unforeseeable events; these kinds of situations may occur due to physical tiredness that could cause muscular cramps, illness or panic. In these cases bathers cannot swim and reach the shore by their own means and in absence of prompt rescue the drowning danger could occur.

[0004] On the other hand, it cannot be conceivable that bathers, especially experienced swimmers, could always wear lifebuoys, belts or jackets inflated with air or made of material such as cork; these accessories are an obstacle for the bather that, due to them, is forced to swim in an unnatural position with part of the body afloat.

[0005] In addition to the uneasiness, the use of such devices makes the bather feel ill at ease. If, on one hand it is normal that the safety jackets are used also by experienced swimmers in particular conditions such as races, this does not occur when they simply bathe, but it is in these circumstances that the most serious dangers may occur.

[0006] To this purpose, various inflatable devices worn by the user and fastened to the waist or to other parts of the body are known; these devices, for example, are described in US patents no. 2.970.326, no. 3.144.667, no. 3.414.920 and in the German and European patents no. DE198.50.187, no. DE2.202.902 and no. EP 0.325.994. These solutions substantially refer to simple inflatable lifebuoys that do not assure a proper stabilization and floating effect and, moreover, they comprise complex activation systems of the inflating means.

[0007] Object of the present invention is to remedy the above-mentioned drawbacks.

[0008] More particularly, object of the present invention is the provision of an inflatable safety apparatus that can be usually worn by the bather without hampering his/her movements; unnaturally change his/her body position when bathing, or being cumbersome.

[0009] A further object of the present invention is the provision of an inflatable safety apparatus as described above the user can activate only when necessary and being invisible outside.

[0010] A further object of the invention is the provision of an inflatable safety apparatus that can assure a high

resistance and reliability level in time and it is easily manufactured at low costs.

[0011] These and other purposes are reached by the inflatable safety apparatus of the present invention that can be used in water, comprising at least one pressurized fluid container provided with a valve assembly extending into a tang, a punctiform of a punctiform or pin-shaped body operated by a lever towards the mouth-piece of the same container and of a tie rod connected to the lever and matched, on the opposite side, with a grasp knob, mainly characterised in that it comprises a first expandable tight tubular chamber and a second expandable tight tubular chamber connected between them and communicating through two couples of integral flexible ducts, said at least one container being fastened by heat sealing and/or adhesive collars to the first tubular chamber in correspondence with a hole obtained on it through said tang.

[0012] The building and functional features of the inflatable safety apparatus of the present invention can be better understood by the detailed description that follows wherein reference is made to the attached tables of drawings representing an embodiment that is given only by way of non-limitative example wherein:

Figure 1 is a schematic view of the inflatable safety apparatus of the present invention worn by the user at rest;

Figure 2 is a schematic view of the front side of said safety apparatus worn by the user in operation;

Figure 3 is a schematic view of the opposite rear side of the same safety apparatus worn by the user in operation;

Figure 4 is a schematic partial section front view of the case containing the inflatable safety apparatus;

Figure 5 is a schematic cross-section view of the case of the previous Figure;

Figure 6 is a schematic partial section view of the safety apparatus and of its case;

Figure 7 is a schematic front partial section view of the inflatable safety apparatus activation means of the present invention.

[0013] With reference to the above-mentioned Figures, the inflatable safety apparatus of the present invention, marked in its whole with 10 in Figures from 2 to 5, comprises a substantial circular section first tubular chamber 12, made of an extensible plastic material open ring extending in two opposite couples of integral ducts 14-14' and 16-16'; the latter are vertically oriented and develop in this direction with respect to the first tubular chamber 12 and they seamlessly connect to a second tubular chamber 18 with a slightly higher section than said first chamber 12.

[0014] The second tubular chamber 18 is also open ring-shaped and directly communicates with the first tubular chamber 12 through said ducts 14-14' and 16-16'.

[0015] At least one known pressurised fluid container

20 made of inert gas such as atmospheric air is connected to the first tubular chamber 12. Said container comprises a known valve assembly 32 applied to the threaded mouthpiece of the same container 20. The latter and the relevant valve assembly 32 are briefly described here below in order to better understand the way the apparatus of the present invention operates. The container 20 is provided with a threaded end 34 placed at the mouthpiece whereupon said valve assembly 32 embedding a mobile plug 36 is screwed and elastically tensioned by a helical spring 38 sliding into a chamber 40 that is orthogonally obtained into the same valve assembly 32 with respect to the exposed surface of the mouthpiece of the container 20, marked with 42. The latter is shielded by a membrane made of plastic or other suitable material forming the cap of the container 20 that is properly dimensioned and stabilised to form a barrier preventing the pressurised fluid exit; the latter is pumped from the same container 20 only after a proper action is carried out by the user. To this purpose, the usual valve assembly 32 comprises a punctiform or pin-shaped body 44 directed towards the mouthpiece 42 of the container 20 tensioned by a helical spring and axially operated by a lever 48 connected to the same valve assembly 32 and placed on it. As shown in detail in Figure 7, one of the ends of the lever 48, marked with 50, is aligned with the longitudinal axis of the pin 44, while the other end, marked with 52, is free and connected to a tie rod 54 whereupon a grasp knob 56 or the like is fastened. Said knob freely protrudes from the valve assembly 32 to be grasped and pulled by the user if necessary. It is easily understood that the pull exercised on the knob 56 connected to the lever 48 makes the latter swing so that the pin 44 pierces the mouthpiece 42 of the container 20 releasing the pressurised fluid contained in it. To this purpose and according to the present invention, the valve assembly 32 is tightly fastened to the first tubular chamber 12, for example by means of heat sealing and/or adhesive collars 58; this constraint is obtained in correspondence of a tang 32' of the valve assembly 32 partially engaging into a hole made on the same first tubular chamber 12. Therefore, the pressurised fluid inside the container 20 fills said first tubular chamber 12, the ducts 14-14', 16-16' and the second tubular chamber 18 after the pin 44 has pierced the mouthpiece 42 of the same container 20.

[0016] The latter, according to a preferred embodiment shown in Figures from 1 to 6, is housed into the mentioned first chamber 12 in correspondence with one of its ends as shown in particular in figures 2 and 4. The opposite free ends of the first tubular chamber 12 as the one of the second tubular chamber 18 are tight closed for instance by heat sealing and/or adhesive materials; said ends of the first tubular chamber 12, wherein in correspondence with one of them the container 20 is housed, face in the opposite direction on the front side of the user body along the abdominal area.

[0017] As shown in the attached Figures, according

to a preferred and non-limitative embodiment, the inflatable safety apparatus is advantageously embedded into a ribbon-shaped case 26 shown in particular in Figures 1, 4 and 5; said case made of any suitable material and preferably of natural or synthetic fabric, in its development, defines a ribbon folded onto itself along its larger sides; the edges or end laps 26'-26" of said case 26 are at least partly overlapped and reciprocally fastened between them in one or more points through temporary approaching stabilization means.

[0018] Said means, marked with 28 in Figure 5, are preferably made of one or more "Velcro" or removable adhesive strips. The ribbon-shaped case 26, that substantially forms a belt the user can wear around the waist, is provided with a connection and alignment means of its opposite free ends being for example constituted by a small connecting frame or by an elastic clip in buckle 30 made of plastic or other suitable material; the material making the ribbon-shaped case 26 is preferably at least partly an elastic or elasticised material to make the positioning and the stabilisation around the user's waist of the same case embedding the safety apparatus 10 and relevant pressurised fluid container 20 easier. From the ribbon-shaped case 26 a pull means or knob 56 protrudes, if necessary, two matched knobs in presence of two containers 20 forming the grasping means allowing the user to pull the tie rod 54 piercing and opening the mouthpiece 42 of the container 20 releasing the pressurised fluid contained in it are provided.

[0019] As it can be noticed particularly from Figures 4 and 5, at least the second tubular chamber 18 of the safety apparatus 10 is preferably compressed on itself inside the case 26 by repeated bellows folds being therefore understood that both said chamber 18 and the first tubular chamber 12 and the relevant connection ducts 14-14' and 16-16' can be casually compressed into the same case. The latter can be obviously integrated along the upper edge of a bath suit or other similar garment that is substantially placed around the waist.

[0020] According to a preferred and non-limitative embodiment, a ribbon 60, having an appropriate width and the purpose of stabilizing along the user's body the same ducts when inflated, is associated to each of the ducts 14-14' and/or 16-16' connecting the tubular chambers 12 and 18 and allowing their communication. Said ribbons, one of which is shown in Figure 2 are advantageously made of flexible plastic material and fastened to the ducts 14-14' and 16-16' by heat sealing; preferably to make the ribbons 60, the same material the ducts are made of is used. Ribbons 60 are placed in such a way to be in contact with the user's body both along the front abdominal area and on the back area and their opposite free ends are respectively fastened to the first tubular chamber 12 and to the second tubular chamber 18 by heat sealing or adhesives.

[0021] From the above-mentioned description, it is easily understood the way the safety apparatus object of the present invention operates; once it is activated, it

creates a complete rescue harness around the bust of the bather wearing it. In emergency situations, the user pulls outwards the knob 56 and the tie rod 54 connected to it operate the lever 48 and the punctiform or pin-shaped body 44 piercing the mouthpiece 42 of the container 20. After this activation, the fluid goes out from the container 20 and immediately distributes in the first tubular chamber 12 and reaches the second tubular chamber 18 through the ducts 14-14' and 16-16'; when said first chamber starts expanding due to the gas effect inflating it, the case 26 opens overcoming the resistance of the "Velcro" type or adhesive strips allowing unwinding and inflating the remaining part of the apparatus made of said ducts and second tubular chamber 18. Figures from 1 to 3 schematically show the safety apparatus worn by the user when it is not inflated (Figure 1) and in operation (Figures 2 and 3); from the latter the whole position and configuration of the inflated apparatus are shown. The user is provided with a first reduced-section lifebuoy corresponding to the first tubular chamber 12 that ties his/her waist and also with a second broader lifebuoy corresponding to the tubular chamber 18 that extends and ties his/her body at the armpit height.

[0022] It can be noticed that the advantages obtained by the present invention are clear.

[0023] The inflatable safety apparatus of the present invention can be always worn without hampering the user as its bulk, when it is not inflated, is very limited; moreover, as said apparatus is put into a case 26 that substantially gives shape to a belt or can be directly embedded into the bath suit, it does not make the user wearing it feel ill at ease and, if necessary, it is a suitable rescue means.

[0024] Even though the present invention has been described above with reference to one embodiment that is given only by way of non-limitative example, people skilled in the art can make many changes and variants according to the above description.

[0025] It is therefore clear that the present invention is meant to include all the changes and variants falling within the spirit and the protection scope of the following claims.

Claims

1. An inflatable safety apparatus (10) that can be used in water comprising at least a pressurized fluid container (20) provided with a valve assembly (32) that extends into a tang (32') of a punctiform or pin-shaped body (44) operated by a lever (48) towards the mouthpiece (42) of the same container (20) and a tie rod (54) connected to the lever (48) and matched with a grasp knob (56) on the opposite side, **characterized in that** it comprises a first expandable tight tubular chamber (12) and a second expandable tight tubular chamber (18) that are re-

ciprocally connected and in communication between them by two couples of integral flexible ducts (14-14') and (16-16'), said at least one container (20) being fastened by heat sealing and/or adhesive collars (58) to the first tubular chamber (12) in correspondence of a hole obtained on it through said tang (32').

2. The safety apparatus according to claim 1, **characterized in that** it comprises a ribbon-shaped case (26) such as a belt that is, if necessary, integrated into a garment such as a bathing trunk or the like embedding said tubular chambers (12-18), the relevant connection ducts (14-14'), (16-16') and the pressurized fluid container/containers (20).
3. The safety apparatus according to the previous claims, **characterized in that** said ribbon-shaped case (26) is made of a natural or synthetic fabric strip folded onto itself along the larger sides whose edges (26'-26'') can be at least partly overlapped and reciprocally fastened with temporary stabilization means (28) such as "Velcro" or removable adhesives.
4. The safety apparatus according to any of the previous claims, **characterized in that** said ribbon-shaped case (26) is provided with an elastic clip in buckle (30) or a small connecting frame of the same ends in correspondence with the opposite free ends.
5. The safety apparatus according to any of the previous claims **characterized in that** the ribbon-shaped case (26) is at least partly made of elastic or elasticised material.
6. The safety apparatus according to any of the previous claims, **characterized in that** a flexible plastic material ribbon (60) is associated to said ducts (14-14') and/or (16-16') connecting the tubular chambers (12) and (18) extending for the whole length of said ducts to which it is integrated by heat sealing.
7. The safety apparatus according to any of the previous claims, **characterized in that** said ribbons (60) are made of the same material as the ducts (14-14') and (16-16') and are fastened to the opposite free ends, to the first tubular chamber (12) and to the second tubular chamber (18) by heat sealing and/or adhesive materials.

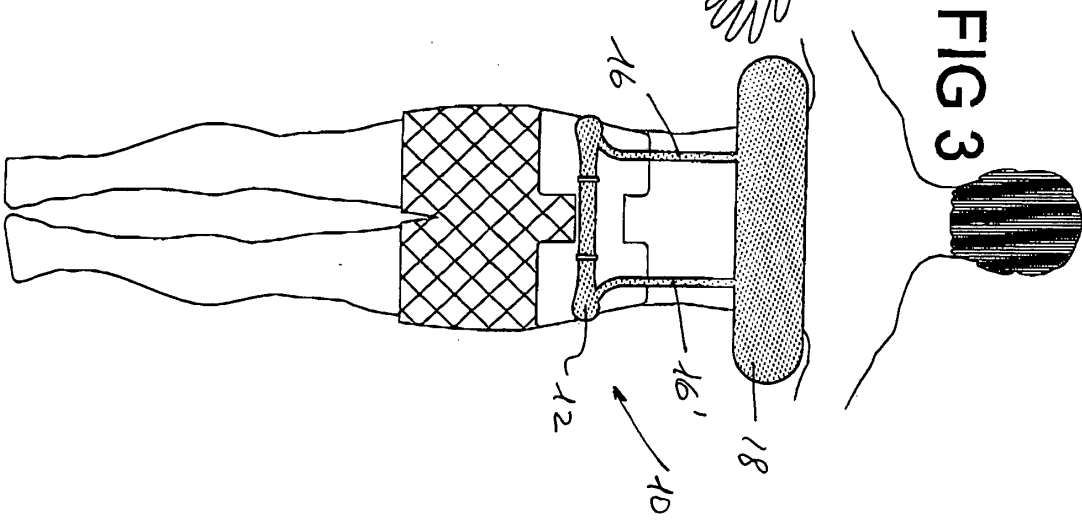
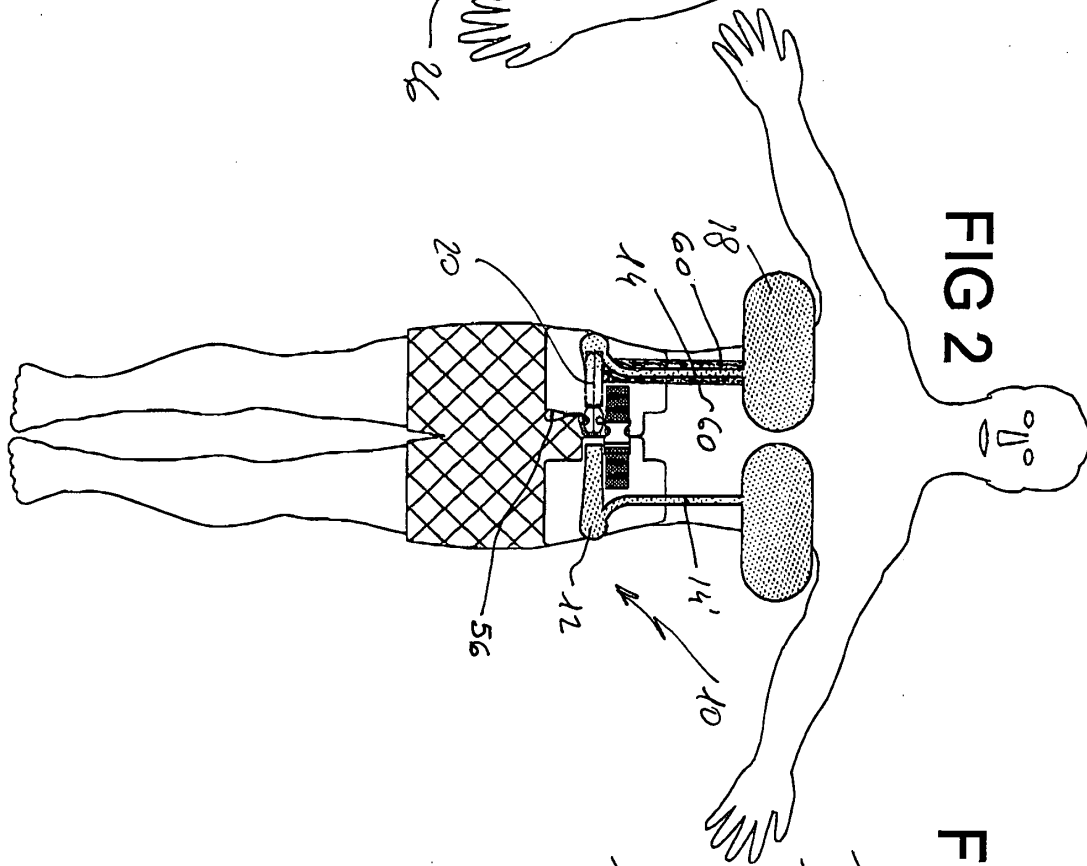
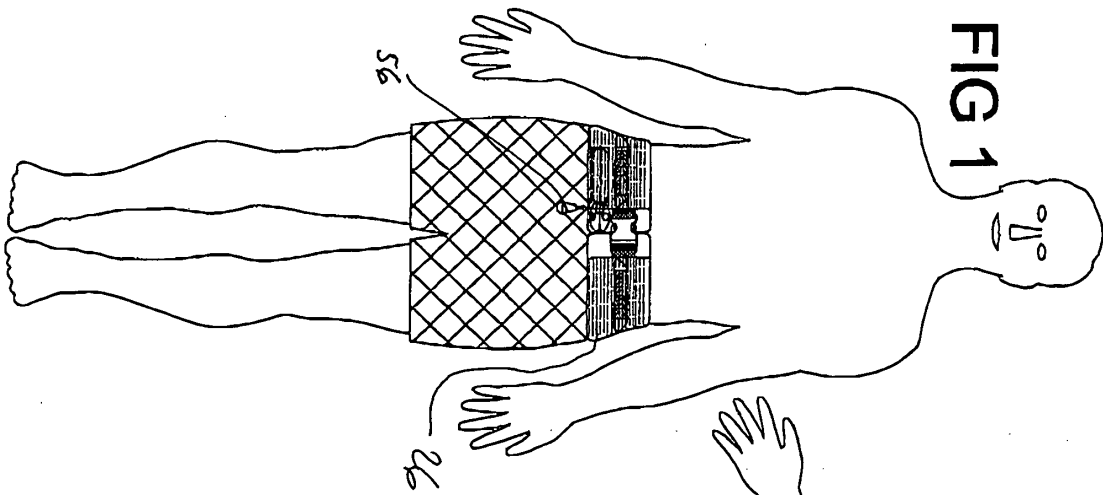


FIG 6

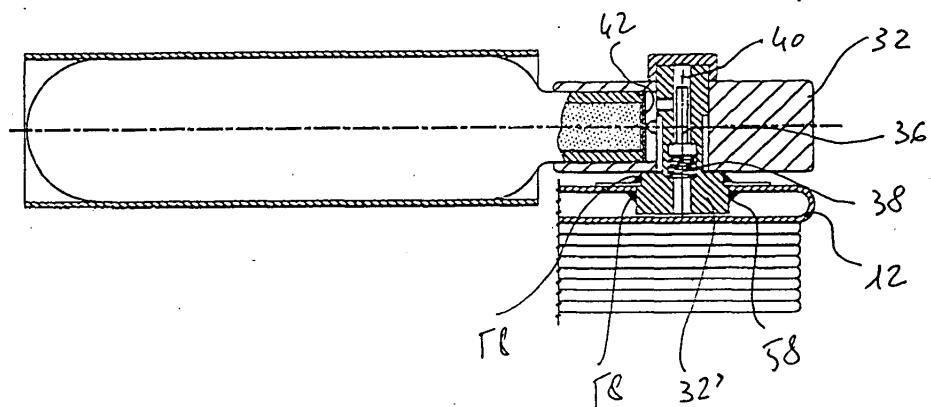


FIG 5

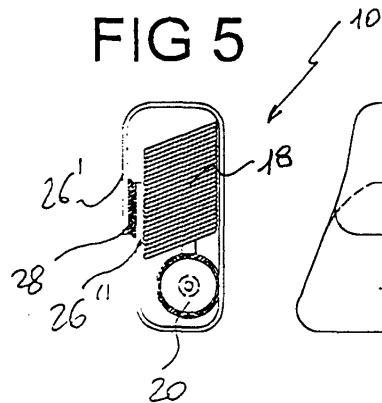


FIG 4

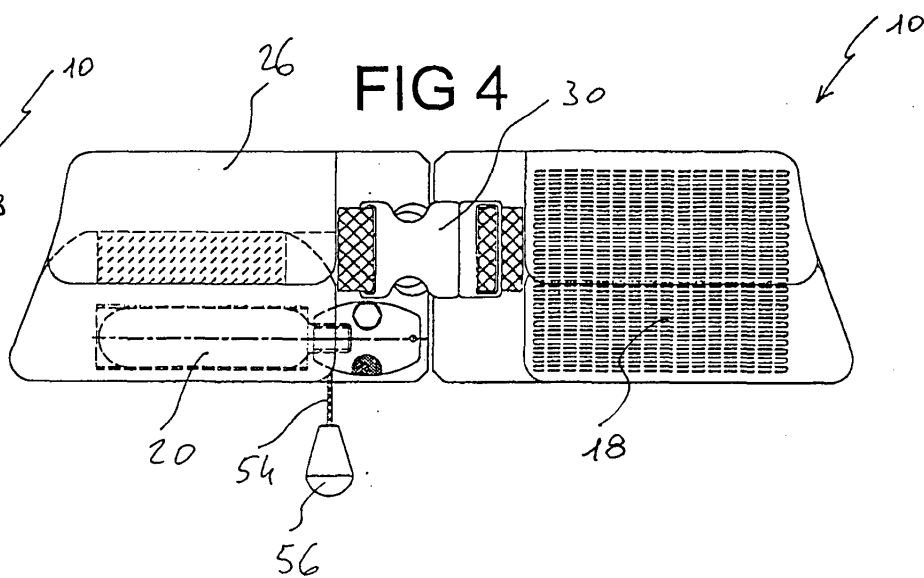
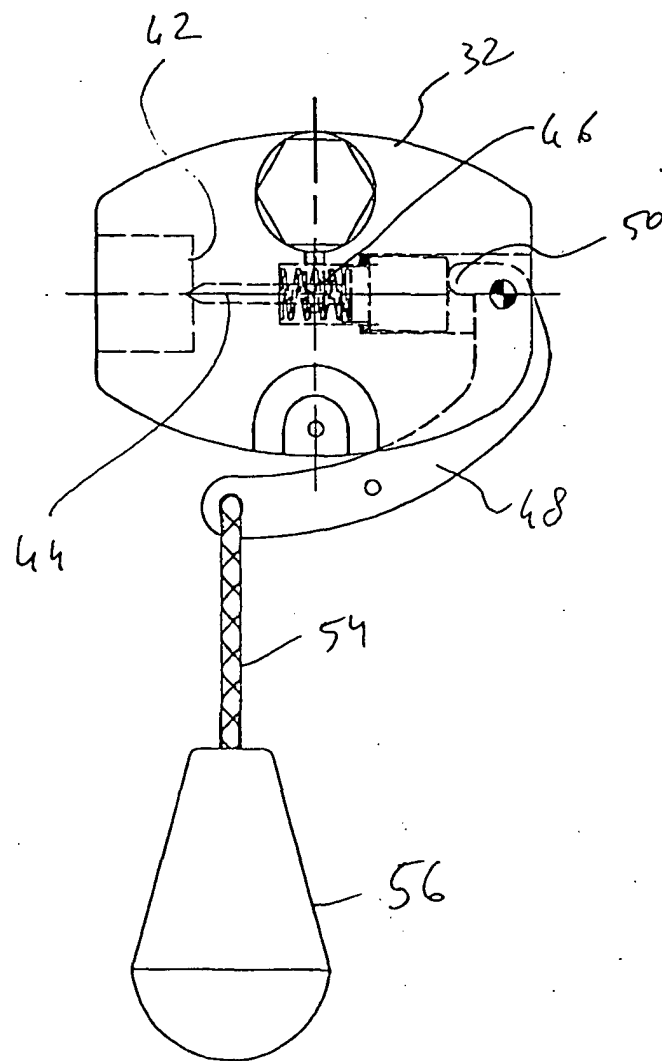


FIG 7





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EUROPEAN SEARCH REPORT

Application Number
EP 03 01 8912

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B63C
Place of search		Date of completion of the search	Examiner
MUNICH		6 October 2003	Nicol, Y
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 01 8912

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06-10-2003

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