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(54) Emergency inflatable device to be manually or automatically operated

(57) An emergency inflatable device (10-10') which is manually or automatically operated comprising at least one compressed gas bottle (16) with an operation rod (24) combined with at least one inflatable element (14-14') being originally folded up on itself and embedded into a ribbon-shaped case (12) to tie the user's waist. Said at least one inflatable element (14) being connected to the ribbon-shaped case (12) by at least one tape (26) and/or a flexible tubular duct (30) whose extension allows placing the element (14) at the height of the user's armpit once inflated.

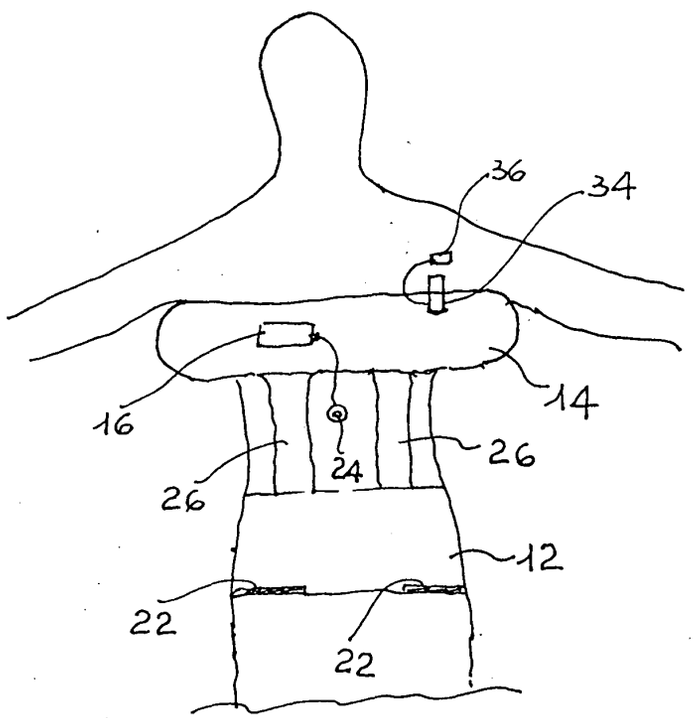

FIG. 4

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Description

[0001] The present invention refers to an emergency inflatable device which is manually or automatically operated.

[0002] More particularly the present invention refers to an emergency inflatable device which is manually or automatically operated to be used by bathers in emergency situations.

[0003] It is known that even experienced swimmers can find themselves in difficult situations when they are in the water due to unforeseeable and unexpected situations. These kinds of situations generally occur due to illnesses striking the bather when he/she is in the water, but also the excessive tiredness can cause critical situations due to muscular cramps. In these cases, the bather runs a serious danger if he/she is not promptly rescued and this is not always possible. The use of jackets assuring the body floating is scarcely appreciated especially by experienced swimmers as it unavoidably alters the correct position of the body in the water and makes movements more difficult.

[0004] People on boats are exposed to the same potential danger, as they can fall into the water due to bad weather conditions or for other unfavourable situations.

[0005] In order to solve these drawbacks, emergency apparatus have been created in time; they are made of an inflatable tubular element of the lifebuoy type and the like and they are worn by the user and fastened around his/her waist or other parts of his/her body. These apparatus are originally folded up on themselves to be less cumbersome. If required, i.e. in emergency situations, the user inflates the tubular element by a simple manual movement that, by means of a rod, opens the valve of the compressed gas bottle or container of the known type. This container, connected to the tubular element, immediately inflates it thus forming a safety lifebuoy. In some embodiments of these emergency apparatus, the inflated lifebuoy rises from the water along the user's bust due to the gas effect to place itself under the user's armpit as a lifebuoy.

[0006] In other cases, the emergency apparatus is arranged to stay around the user's waist once inflated.

[0007] Examples of emergency inflatable devices are described in patents DE 2 202 902, EP 0 325 994, US 2 970 326, US 3 144 667, US 3 925 838, US 5 022 879 and US 6 231 411. These prior patents describe devices comprising one inflatable tubular element which is not suitable for assuring an effective and proper floating of the body in the water. In fact, the apparatus wherein the inflatable element stays around the waist do not sustain the arms and the upper part of the user's body and, consequently, his/her head can be hit by waves in case of rough waters. From this point of view, the known apparatus wherein the inflatable element rises up along the user's bust to place itself under his/her armpits are more appropriate but they show an important drawback. The inflated lifebuoy, in fact, tends to slip out of bather's body who can be unconscious and therefore he/she cannot keep his/her arms in such a position to properly retain the same lifebuoy.

[0008] Object of the present invention is to remedy the above-mentioned drawbacks.

[0009] More particularly, object of the present invention is the provision of an emergency inflatable device that can be used in the water that automatically and properly positions itself along the user's body in order to assure the body floating in the water.

[0010] A further object of the invention is the provision of an emergency inflatable device that efficiently sustains the upper part of the user's body and avoids the accidental slipping out of the inflatable element from the same body.

[0011] Another object of the invention is the provision of a device as defined above that automatically inflates when it gets in touch with water if used on boats.

[0012] A further object of the invention is to provide the users with an emergency inflatable device that assures a high level of resistance and reliability in time which is easily manufactured and at low costs.

[0013] According to the present invention, these and other purposes are reached by an emergency inflatable device comprising at least one compressed gas bottle with an operation rod matched with at least one inflatable element folded up on itself in a ribbon-shaped case to tie the user's waist wherein said at least one inflatable element is connected to the ribbon-shaped case by at least one tape and/or an extensible flexible tubular duct whose extension allows placing the element at the height of the user's armpit once inflated.

[0014] The manufacturing and functional features of the emergency inflatable device of the present invention can be better understood from the following description wherein reference is made to the attached tables of drawings representing a preferred and non-limitative embodiment wherein:

Figure 1 is a schematic front view of the emergency inflatable device of the present invention when it is not in operation;

Figure 2 is a schematic front view of the same device of

Figure 1 in the intermediate condition of partial opening deriving from its operation;

Figure 3 is a schematic front view of the same device of

Figures 1 and 2 worn by the user when it is not in operation;

Figure 4 is a schematic front view of the same device of

Figures 1 and 2 worn by the user when it is in operation;

Figure 5 is a schematic front view of the device of the present invention according to another embodiment.

[0015] With reference to the above-mentioned Figures, the emergency inflatable device of the present invention, marked in its whole with 10 in Figure 1, comprises a flexible ribbon-shaped case 12 made of fabric or natural or synthetic material and at least one inflatable element 14 associated to said case connected to one or more bottles 16 containing compressed gas, generally CO_2, of the known type.

[0016] The ribbon-shaped case 12 ties the user's waist and, for this purpose, is provided with connection means of the opposite ends. Said means are preferably made of at least one plastic buckle or other suitable material, formed by two conventional components 18, 20 that elastically connect between them by means of a groove-and-tongue joint. Said components 18, 20 are advantageously fastened, by interposition of one or more ribbons, to the ends of the case 12 in order to allow the accurate adjustment at the user's waist. Instead of the mentioned buckle, other fastening and adjustment means can be matched to the ribbon-shaped case 12, such as two opposite strips of suitable material one of which being provided with buckle and tongue and the other one provided with multiple spaced holes in order to form a belt.

[0017] A similar buckle or equivalent adjustable means are advantageously fastened to the opposite ends of the inflatable element 14, so that it takes the lifebuoy shape.

[0018] The ribbon-shaped element 12 is advantageously arranged in order to enclose the inflatable element/s 14 and the relevant bottle/s 16 of compressed gas and, to the purpose, it is provided with removable screwing closing means in the vertical direction or in height; said closing means are preferably made of one or more strips 22 of Velcro fastened with adhesives or sewn along parts of its edge or in another suitable position. The Velcro strips 22 allow folding and closing the ribbon-shaped element 12 that, in such a way, embeds the inflatable element 14 and forms an abdominal belt the user can easily wear and properly adjust around his/her waist.

[0019] The same Velcro strips 22 form an easily removable closing when the device 10 is operated. The inflating of the element/s 14 through the bottle/s 16 automatically detaches the edges of the ribbon-shaped element 12 jointed by the strips 22, thus allowing the exposition of the same element/s 14 as described here below.

[0020] The operation of the compressed gas bottle/s 16 is obtained by known devices, being for example constituted by a rod 24, that when pulled by the user, opens the valve of the same bottle and consequently sets the gas free that expands into the inflatable element/s 14. The rod 24 is obviously outside the folded ribbon-shaped case 12 as shown in Figure 3, in such a way that in emergency situations the user can grasp it and pull it.

[0021] The bottle/s 16 is/are directly fastened to the inflatable element 14 with the interposition of a valve support 16' and they are in communication with a mouthpiece of the same inflatable element/s. The valve support 16', of the known type, is fastened to said inflatable elements 14 with any suitable means such as adhesives or heat sealing.

[0022] According to the preferred embodiment shown in Figures from 1 to 4, the ribbon-shaped case 12 embeds one lifebuoy inflatable element 14 connected to the same case 12 by one or more tapes 26 of suitable length made of fabric or natural or synthetic material or of other suitable material. The opposite ends of the tapes 26 are respectively fastened to the inflatable element 14 and to the ribbon-shaped case 12 by adhesives, heat sealing or other suitable means. The length of the same tapes 26, that are curled up on themselves when the device is not in operation, allows the inflatable element 14, once inflated, to rise up along the user's bust and places itself at the armpit height. Once this position is reached, the inflated element 14 is stabilized due to the effect of the tapes 26 that are fastened to the ribbon-shaped case 12 and the latter is in its turn properly stabilized around the user's waist through the cited buckle or other suitable means. Therefore, said element 14, cannot slip out of the user's waist, even if he/she involuntarily rises up his/her arms as he/she is unconscious. The floating is therefore assured and the element 14 when inflated is placed in the most appropriate position to keep the user's head out of the water and protected from waves.

[0023] Figure 5 schematically shows the device of the present invention according to a another embodiment concerning the number of inflatable elements and therefore the floating volume. In said embodiment, the device of the present invention is marked in its whole with 10' and in addition to the lifebuoy inflatable element 14, it also comprises a second similar inflatable element 14' whose size is advantageously more reduced and once inflated it stays around the user's waist and it is fastened to the ribbon-shaped case 12 in one or more points, for example by heat welding, adhesives or other suitable means. The second inflatable element 14' can be provided with an independent compressed gas bottle 16", or it can be inflated by the same bottle 16 fastened to the element 14. In this hypothesis, in order to allow the communication between the inflatable elements 14 and 14', it is advantageously contemplated that the tape or tapes 26 are replaced or matched with at least one flexible tubular duct 30 connecting the same inflatable elements 14, 14' and it is in its turn filled up with compressed gas. The flexible tubular duct or ducts 30 substantially have the same function as the tape/s 26, i.e. they prevent the accidental slipping out from the user's body of the first inflated element 14 positioned at the height of the user's armpits. It is therefore contemplated that, as schematised in Figure 5, the flexible tubular duct or ducts 30 are matched with at least one tape 26 whose opposite ends are respectively fastened to the first inflatable element 14 and to the second inflatable element

14' by adhesives, heat welding or equivalent means. It is also contemplated that the device 10' is provided with one compressed gas bottle 16 fastened to the second inflatable element 14'.

[0024] The compressed gas bottles 16, 16"can be of the automatic type, i.e. provided with a valve that, getting in touch with the water, immediately sets the gas free and inflates the inflatable element or elements 14, 14'. This solution that prevents the user from pulling the rod 24, is particularly suitable for the use of the device on boats in order to allow the automatic operation of the device in case the user accidentally falls into the water.

[0025] As mentioned above, bottles 16 and 16", are matched with a valve support 16', which is also known, for example of the kind manufactured by Halkey Roberts and called "manual inflator" series V870. The bottle 16 is manually screwed to said support in a proper threaded seat.

[0026] The inflatable element 14 and if required or as an alternative the second inflatable element 14', are provided with a protruding mouthpiece 34 with a closing cap 36 to deflate the same element at the end of the safety function and fold it into the ribbon-shaped case 12 to be subsequently used after having replaced the used bottle 16, 16" with a new one. Moreover, if required, said mouthpiece 34 allows inflating the element 14 and/or14' by mouth without operating the bottle 16 in case the user wants to stay in the water and float without effort.

[0027] As can be seen from the previous description, the advantages obtained by the inflatable device of the present invention are clear.

[0028] The emergency inflatable device of the present invention can be worn by the user without hampering his/her movements and, once operated, it safely and properly performs its function that allows the user's body floating in the water. The presence of the tape/s 26 and/or of the flexible tubular duct/s 30 prevents the accidental slipping out of the inflatable element 14 positioned in correspondence with the user's armpits from the user's body, thus assuring a proper floating of the upper part of the body.

[0029] Even though the device of the present invention has been described above with reference to some embodiments, people skilled in the art can make many changes and variants according to the above description. 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 emergency inflatable device (10-10') which is manually or automatically operated comprising at least one compressed gas bottle (16) with an operation rod (24) combined with at least one inflatable element (14-14') being originally folded up on itself and embedded into a ribbon-shaped case (12) to tie the user's waist, **characterized in that** said at least one inflatable element (14) is connected to the ribbon-shaped case (12) by at least one tape (26) and/or by a flexible tubular duct (30) whose extension allows placing the element (14) at the height of the user's armpit once inflated.

2. The device according to claim 1, **characterized in that** the tape (26) is made of fabric or natural and/or synthetic material and it is fastened to the opposite ends, respectively to the ribbon-shaped case (12) and to the inflatable element (14).

3. The device according to any of the previous claims, **characterized in that** the ribbon-shaped case (12) is made of fabric or natural and/or synthetic material and it is provided with at least one buckle or the like formed by two complementary components (18-20) that are integral to the relevant ends of the same case to be elastically engaged between them.

4. The device according to any of the previous claims, **characterized in that** the inflatable element (14) is provided with at least one buckle formed by complementary components (18'-20') fastened to the relevant opposite ends of the inflatable element (14) that elastically engage between them.

5. The device according to any of the previous claims, **characterized in that** the ribbon-shaped case (12) is provided with vertically screwing fastening removable means (22).

6. The device according to claim 5, **characterized in that** said fastening removable means (22) are made of one or more Velcro strips placed along one or more parts of the edge and/or of the surface of the ribbon-shaped case (12).

7. The device according to any of the previous claims, **characterized in that** it comprises two inflatable elements (14-14') one of which (14) places itself at the armpit height when inflated and the second inflatable element (14') stays around the user's waist, said inflatable elements (14-14') being connected and in communication between them through a flexible tubular duct (30).

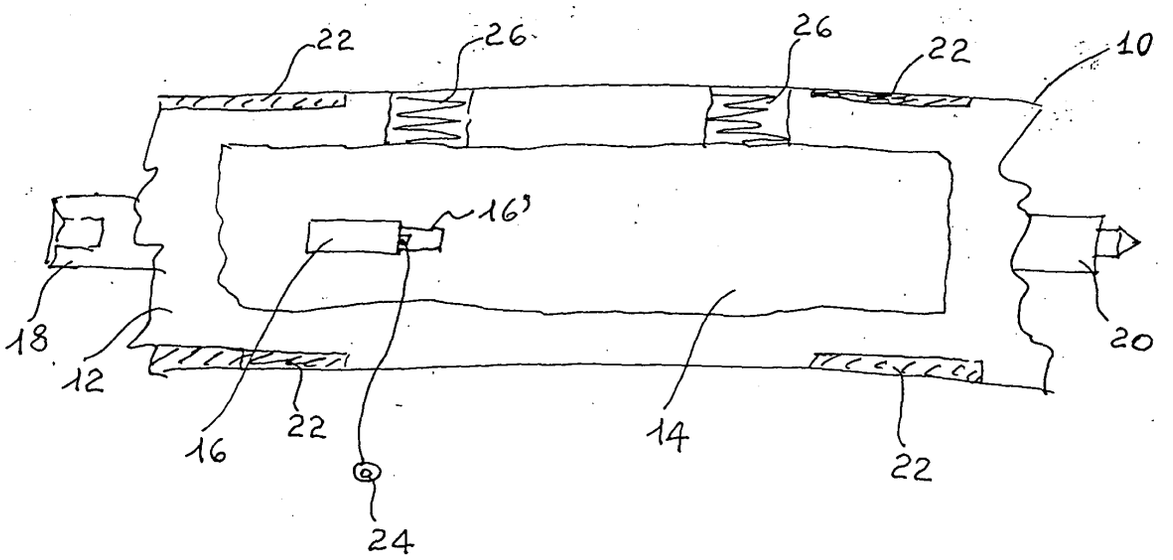
8. The device according to claim 7, **characterized in that** each of the inflatable elements (14-14') is connected to one compressed gas bottle (16-16") and the compressed gas bottles (16-16") are fastened to the relevant inflatable elements (14-14') through a valve support (16').

9. The device according to any of the previous claims, **characterized in that** the second inflatable ele-

ment (14') is fastened in one or more points to the ribbon-shaped case (12).

10. The device according to one or more of the previous claims, **characterized in that** the compressed gas bottle (16-16") is of the automatic operation type that immediately sets the gas free when it gets it touch with the water.

FIG. 1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26
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16'
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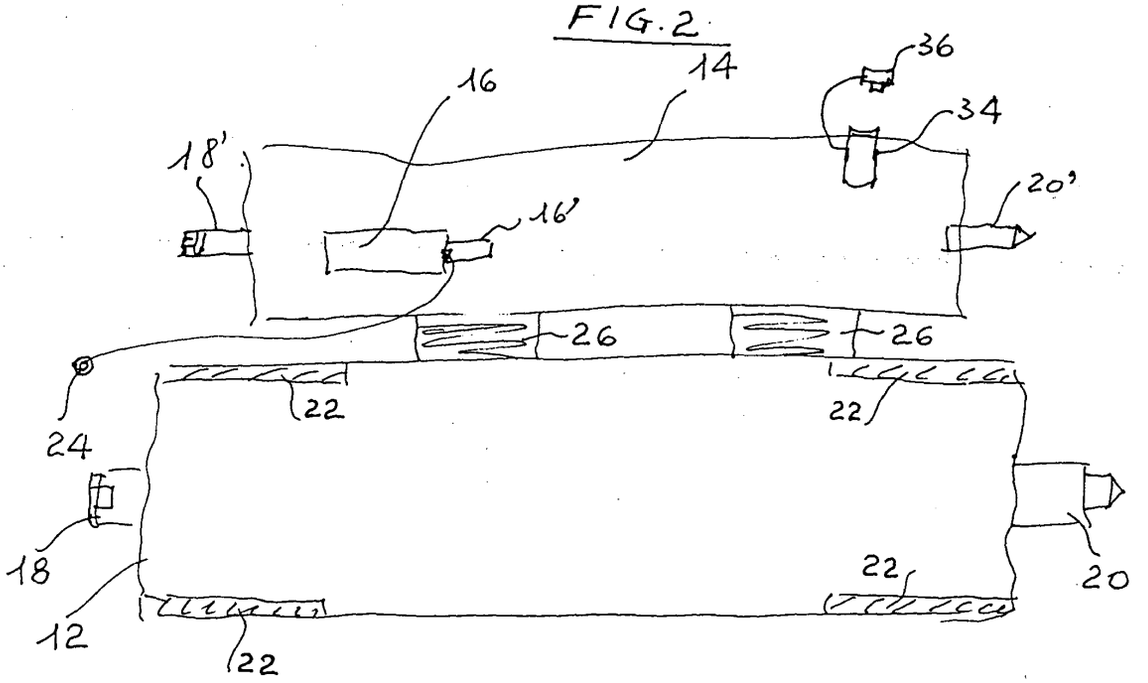
24

FIG. 2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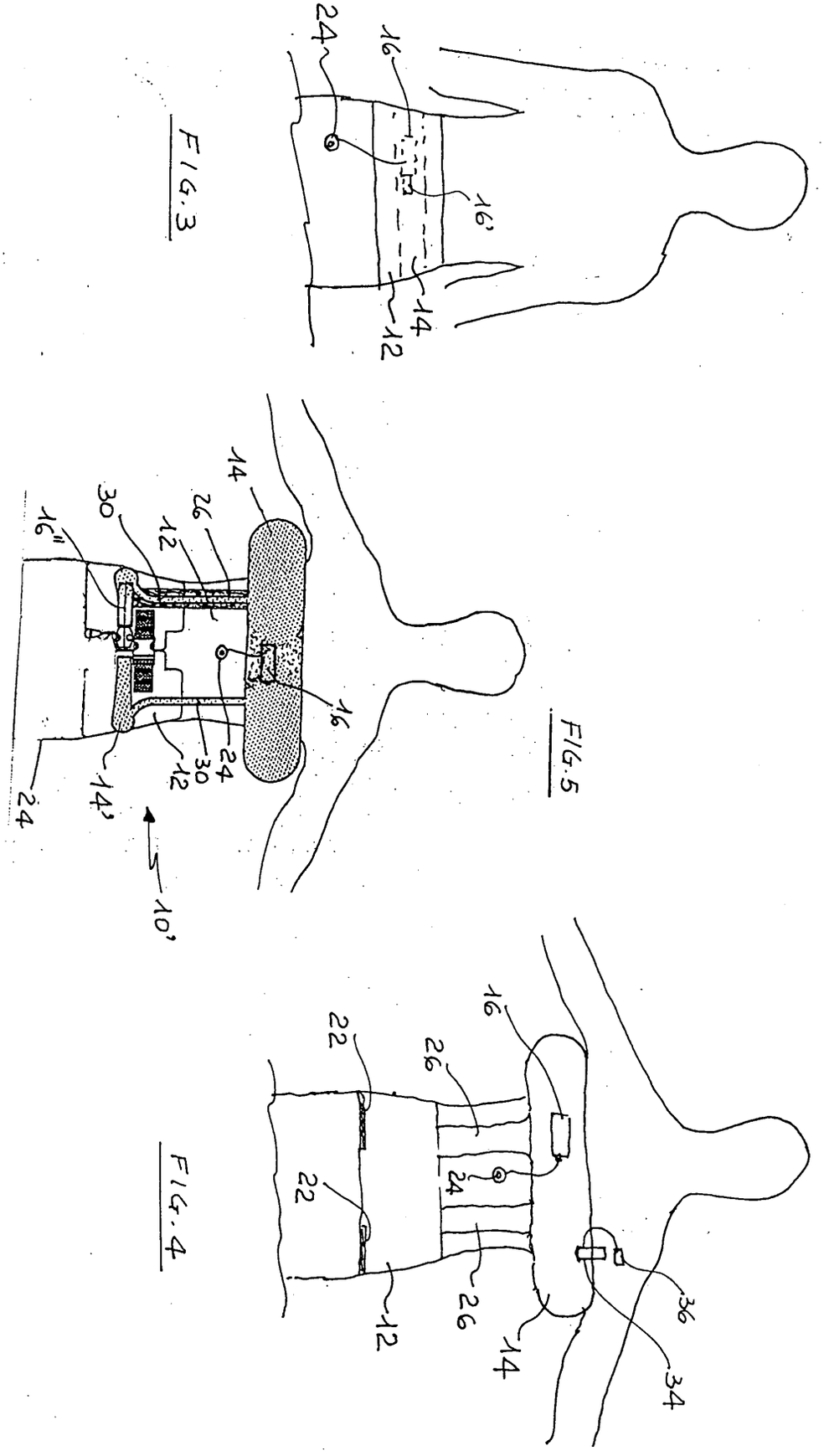

FIG.3

FIG.5

FIG.4