

Feb. 26, 1957

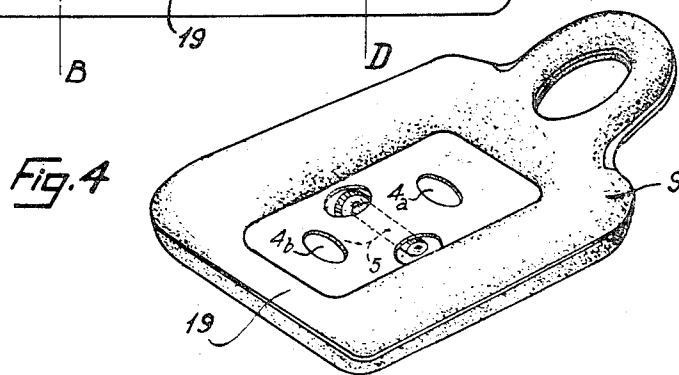
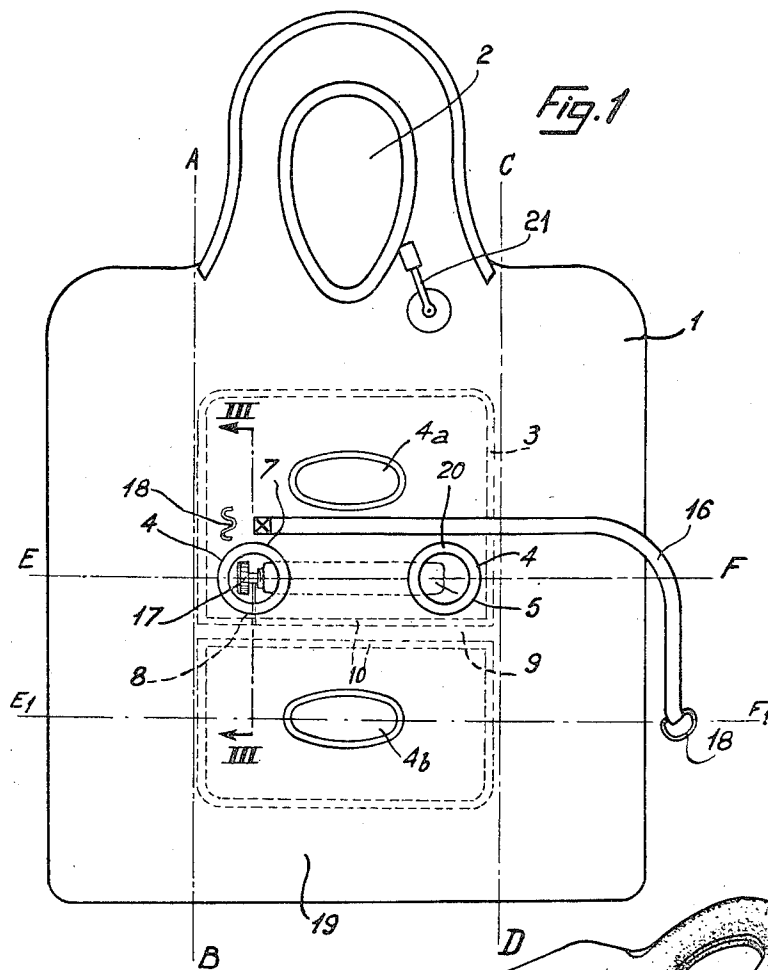
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LIFE-SAVING APPARATUS

Filed Oct. 5, 1954

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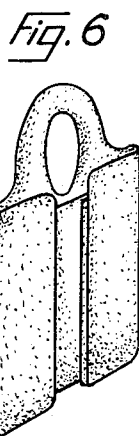
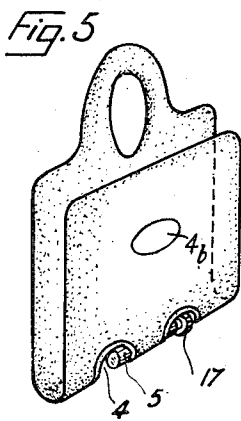
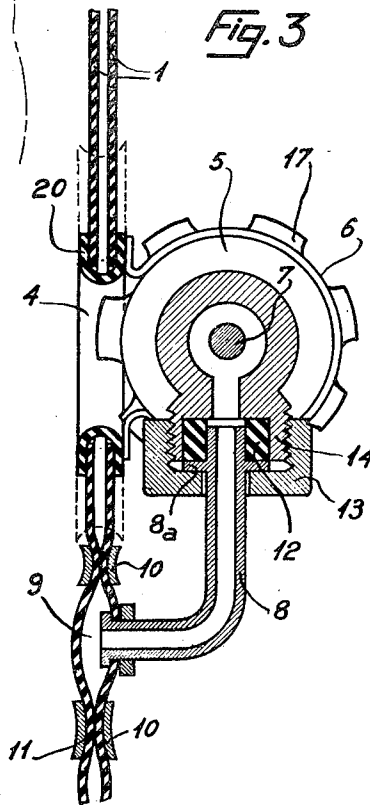
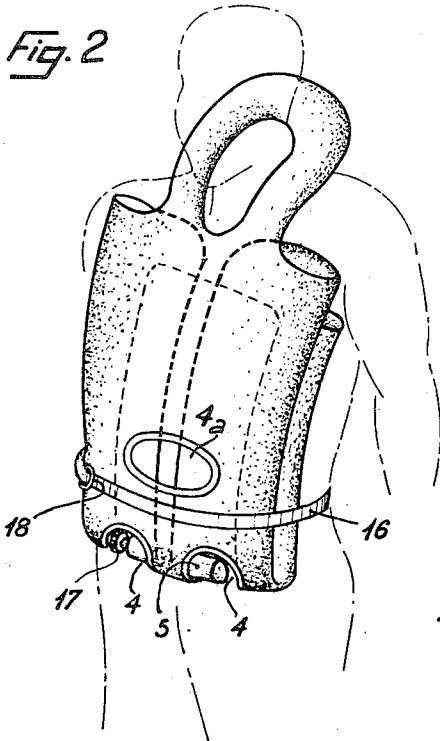
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Filed Oct. 5, 1954

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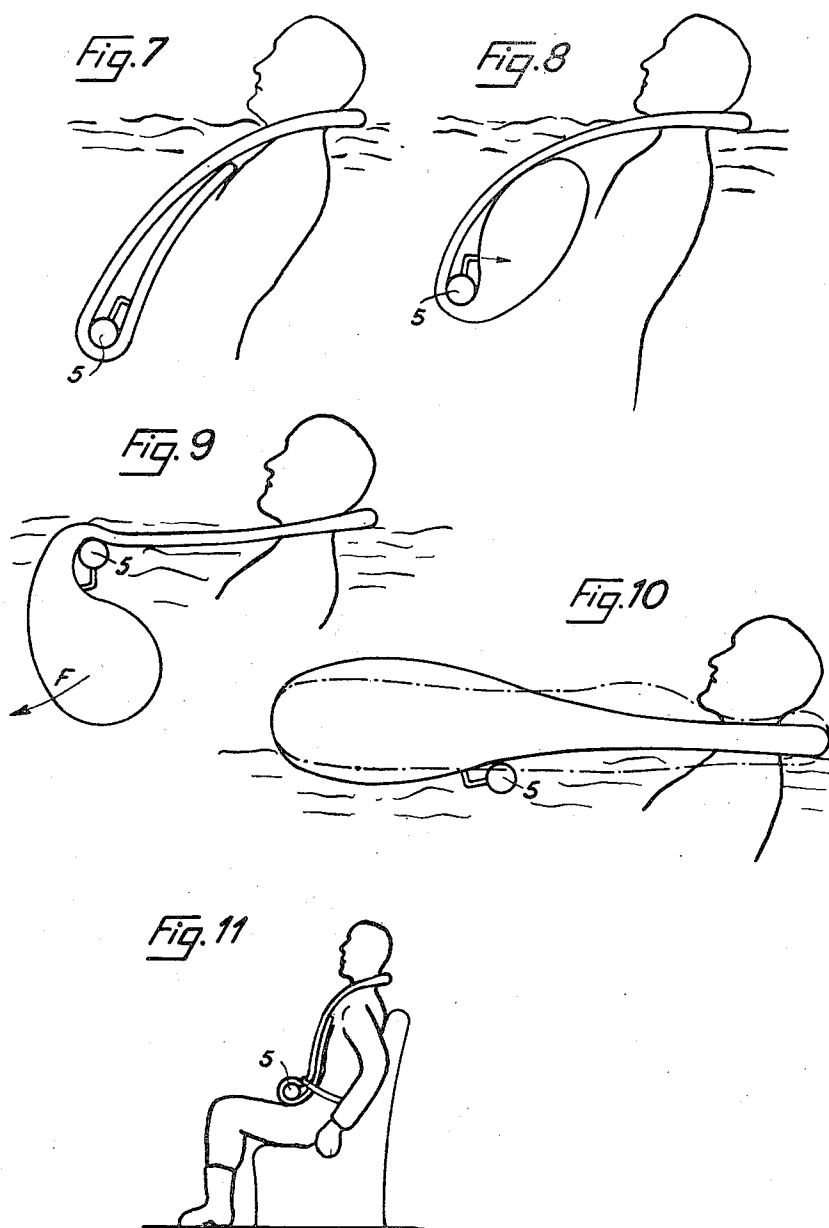
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2,782,429

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Filed Oct. 5, 1954

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2,782,429

LIFE-SAVING APPARATUS

Filed Oct. 5, 1954

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Fig. 12

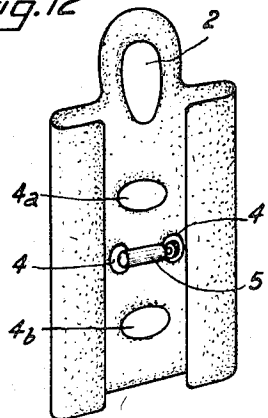


Fig. 13

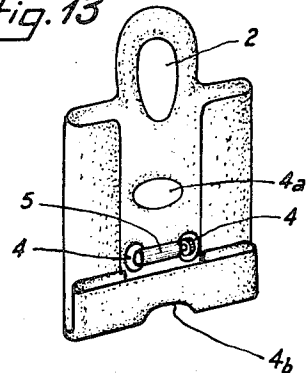


Fig. 14

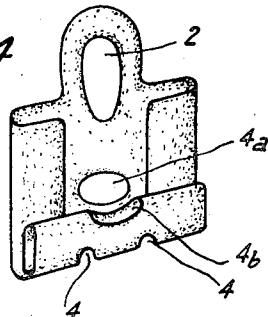
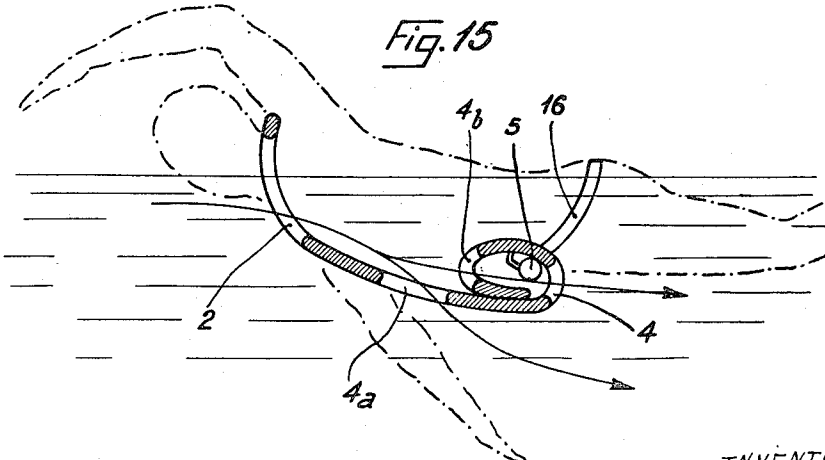


Fig. 15



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LIFE-SAVING APPARATUS

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Application October 5, 1954, Serial No. 460,392

Claims priority, application France October 9, 1953

5 Claims. (Cl. 9—19)

Apparatus for life-saving at sea is already known in which the equipment is constituted by a deflated envelope which is inflated at the moment of need by means of a cylinder of compressed gas so as to give the apparatus the necessary volume to keep afloat a person in danger.

In particular, the applicant has already proposed a life-saving apparatus which, in the deflated state, has the appearance of an apron provided with a collar through which the head is passed and which, when inflated, forms a raft which is capable of supporting not only the wearer of the apparatus but also one and even a number of persons in danger.

In the deflated state, this kind of apron is carried folded against the body of its wearer and it is fixed by means of the collar and by a belt which prevents it from becoming unfolded.

Equipments of this kind have, however, certain disadvantages due to the cylinder of compressed gas which it is necessary to carry for the inflation of the apparatus. Up to the present time, this cylinder was placed on the outside of the apron and on the level of the chest of the wearer. In consequence, when the apparatus was being carried in the deflated condition by a swimmer going to the assistance of another person, the extra load due to this cylinder weighed down the upper part of the body of the swimmer, causing undue fatigue by requiring an additional effort in keeping the head above water. In addition this cylinder formed a troublesome projection on the body when the apparatus was carried in the deflated state ready for emergencies. When placed in this position, the cylinder was also a cause of fatigue to a person sitting down, for example an aircraft passenger who is equipped, as a measure of safety, with an apparatus of this kind. Finally, when the apparatus was inflated, the cylinder remained as a projection on the upper surface of this apparatus so that it hindered the lifting of wrecked persons on to the pneumatic raft constituted by this apparatus when inflated.

In order to remedy these various disadvantages in the improved apparatus in accordance with the invention, the cylinder is placed at the level of the hips and preferably within the interior of the fold formed by the folding back of the lower portion of the apparatus.

In an advantageous form of embodiment of the invention, the central part of the apparatus is provided with at least one opening which corresponds to the position of the transverse fold of the apparatus in the deflated condition, in such manner that its user can have access to this cylinder when it is housed inside this fold so as to be able to open the cylinder. An opening of this kind has the further advantage, when the apparatus is being carried deflated by a swimmer of permitting the flow of water between the body of the swimmer and the deflated apparatus, that is to say of reducing the hydro-dynamic drag of the apparatus which slows down the swimmer. To this same end, special openings may also be provided.

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Finally, all the said openings enable a person to get a grip on the raft in order to get into it or to hold on to it.

The inlet orifice for the air provided by the cylinder is preferably turned towards the lower part of the apparatus so that this lower part is inflated first when the cylinder is opened. Thus, when a swimmer who is going to the rescue of a person in danger has made contact with this person, when he proceeds to open the cylinder of compressed gas, the lower part of the life-saving apparatus tends automatically to place itself under the person to be saved and the latter is thereby placed in the raft. In addition, the injection of air into the lower part of the apparatus is preferably effected through the medium of a transverse channel which directs the air in the first place towards the lateral edges of the apparatus which are initially folded back. By virtue of the thrust of this air, there is thus obtained an easier unfolding action of the said folded edges.

The description which follows below with reference to the attached drawings (which are given by way of example only and not in any sense by way of limitation) will make it quite clear how the invention may be carried into effect, the special features which may be brought out, either in the drawings or in the text, being understood to form a part of the said invention.

Fig. 1 is a plan view of an improved life-saving apparatus in accordance with the present invention.

Fig. 2 shows this apparatus in the folded position and carried by a person diagrammatically shown in dotted lines.

Fig. 3 is an enlarged cross-section through the line III—III of Fig. 1.

Fig. 4 shows the apparatus in the inflated position.

Figs. 5 and 6 show an alternative method of folding the apparatus.

Figs. 7 to 10 are diagrammatic views showing the unfolding of the apparatus in the water while it is being inflated.

Fig. 11 shows a seated person equipped with the apparatus in case of emergency.

Figs. 12, 13 and 14 give a perspective view of another method of folding the apparatus which is especially applicable to rescue work by a swimmer.

Fig. 15 shows a longitudinal cross-section of the apparatus folded up in this way and carried by a swimmer in action.

The apparatus shown in Fig. 1 is made up of two superposed walls 1 which are joined together with a water-tight joint along their edges, the walls being of flexible water-tight material, for example a suitably impregnated textile material. Their general shape is roughly that of a square extended, at its upper part, into a wide rounded portion. In this rounded portion, there is cut out an oval opening 2 which forms a collar, the edges of this opening being also joined together with a water-tight seal.

It will be noted that the base portion of the collar connecting the latter to the square portion is widened out with respect to this collar so that, when the apparatus is inflated, this connecting portion shall be quite rigid. By this means, in case of an accidental overturning of the square portion under the action of the waves or of an unbalance of the load carried by the square portion, a twisting of the apparatus at the level of this connection is prevented, this twisting action being possibly capable of strangling the person who has his head engaged in the collar.

The central part of the square portion is limited by a machined portion covered with strips 3 of adhesive which separates out a central rectangle which is not inflatable. In this central rectangle are provided openings 4 which may be circular. The edges of this opening may be covered by a water-tight strip 20 in order to

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prevent the entry of water to the non-inflatable central portion. The cylinder of compressed gas 5, used for inflation, is arranged transversely in the central rectangle behind the said openings. This cylinder is fixed at its mid-point by means of a wide and short web 6 which holds it in position; this may be opened so as to liberate the gas which it contains by means of a valve 7 which connects it through a rigid tube 8 to a transverse channel 9 which discharges, at each side of the apparatus, into the peripheral portion of the latter, separated by the machined portion 3 from the non-inflatable central part. This channel, as can be seen from Fig. 3, may be simply formed by transverse machinings 10 in the central portion, these machined parts being covered with adhesive strips 11. The machined seam 3 must obviously be interrupted between the two sewn portions 10 which form the channel 9 so as to permit of communication between the channel 9 and the inflatable part of the apparatus. This transverse channel may also be constituted by a flattened tube arranged between the walls 1.

Fig. 3 shows, in addition, that the tube member 8 is connected, in the same way as valves of inner tubes of tyres to the interior of the channel 9 and that, at its other extremity, it carries a shouldered end portion 8a around which is arranged a ring 12 of elastic material such as rubber. The nut 13, which is preferably knurled, thus enables a water-tight connection to be made around the threaded portion 14 of the needle-valve 7 of the cylinder 5.

Finally, the apparatus is completed by a section of tube 21 provided with an end portion having a stopper, the tube enabling the apparatus to be re-inflated from the mouth and also the deflation of the apparatus after use.

Whilst waiting for use, the apparatus is folded up. The folds are made along the lines AB—CD—EF on Fig. 1, which reduce the size of the apparatus to that of a shirt-front. The apparatus may be folded up towards the rear in Fig. 1, first of all following the line AB and CD and then along the line EF. The apparatus then appears as shown in Fig. 2. This folding facilitates swimming, since all the folds communicate with the openings 4 and the water is thus not able to accumulate inside the folds. One or a number of larger openings (indicated at 4a and 4b) may also be specially provided to permit the outflow of the water which enters through the collar during swimming when the apparatus is folded.

The apparatus may also be folded as shown in Figs. 5 and 6 which show a rear view of the apparatus, first of all along the line EF, then along AB and CD. It is less easy to swim in this case but, as will be shown in more detail in the text following, as the fold or folds which are last made obviously are the first to be unfolded at the moment of inflation, the bottom of the apparatus becomes inflated and unfolds itself first over the whole of its width and this facilitates the taking in hand of a drowning person by the rescuer, particularly in deep water.

In the folded state, the apparatus is applied to the chest of the wearer in the manner shown in Fig. 2, that is to say the wearer's head is passed through the opening 2 whilst the belt 16, located at the level of the hips, holds the apparatus folded against the body. In this position, the operating screw 17 of the needle-valve is accessible through one of the openings 4. In addition, the cylinder is supported inside the lower fold of the apparatus.

As can readily be seen in this Figure, the extra weight of the cylinder is applied at the level of the hips. Thus it does not unbalance the swimmer who is carrying the apparatus. Also, the visible front face of the apparatus has no troublesome projection. The position of the belt 16 on the hips does not interfere with the breathing of the wearer. When the latter is seated (see Fig. 11), the cylinder 5 rests on the upper part of the thighs and its weight does not, in consequence, tend to pull down the back of the neck; in addition, by virtue of the openings 4, which also enable the passage of the extremities of the

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cylinder 5, this latter is not pressed against the wearer's stomach.

As the belt is kept in position by a simple hook-buckle 18, the apparatus is put in operation by the wearer unhooking the buckle and opening the valve. No matter in what way the apparatus is folded, the situation is then that shown diagrammatically in Fig. 7. By reason of the position of the air inlet, the lower portion is inflated first (see Fig. 8), the air being prevented from passing towards the upper part by the fold EF. If the folding is carried out as shown in Figs. 5 and 6, this lower portion then unfolds. Its unfolding is less if the folding has been made as shown in Fig. 2. In any event, all the gas contained in the cylinder being then passed into the lower portion, the pressure of the gas causes the lower portion to move in the direction of the arrow F. If the rescuer has in front of him the person in danger, this lower portion is already engaged underneath this person. If the folding has been carried out in accordance with Figs. 5 and 6, the taking on board of this person is automatically effected. At the end of the unfolding action, the apparatus is in the position shown in full lines in Fig. 10; then as the gas is distributed throughout the entire apparatus, the latter takes the shape of the dotted outline given on this same figure.

Fig. 4 shows the inflated apparatus in the floating position; it forms a kind of rectangular bowl, the edges of which are inflated, as also is the collar. It will be noted that the swollen-out portion which forms the lower inflated edge 19, has a volume less than that of the lateral edges. It is thus easier to lift oneself up by this small side in the central bowl or to lift a wrecked person into it, the cylinder 5 being arranged on the lower face, causing no hindrance to this lifting.

The openings 4 provide a grip for the hands which facilitate this operation and, in case of very bad weather, a person lying on this raft may seize it in his arms and hold on to the openings 4.

For the use in rescue work of persons by experienced swimmers, it is preferable to use, as shown, a valve with an operating nut which enables the inflation to be controlled. In the case of individual life-saving, a device for releasing the valve may be used, for example a pulling cord, preferably associated with the unbuckling of the belt.

In the particular case in which the apparatus is used by a swimmer for rescuing persons in danger, it is an advantage to fold it according to the manner shown in Figs. 12 to 14. The apparatus seen from the rear in these figures is first of all folded (see Fig. 12) towards the rear following the lines AB and CD of Fig. 1 and then (see Fig. 13) is again folded towards the rear following the line EF of Fig. 1 which passes through the centre of the opening 4b, and lastly (see Fig. 14) again towards the rear following the line EF.

In these circumstances, as is shown in Fig. 15, the water which enters through the opening 2 of the collar between the body of the swimmer and the apparatus can escape, on the one hand through the opening 4a, and on the other hand through the opening 4b and the openings 4 which give access to the cylinder of compressed gas 5 which form conduits for the passage of the water through the space between the apparatus and the body of the swimmer. In the same way, if the apparatus is not closely applied against the body of the swimmer, it does not offer a great resistance to forward progress whilst swimming. In consequence, this apparatus may be very easily carried by the swimmer while it is simply held in position by the belt 16 round the hips. The person swimming may thus breathe quite freely.

As in the previous cases, the opening of the cylinder 5 after the buckling of the belt ensures the unfolding of the apparatus in the reverse order to the method of folding already referred to above.

In the subjoined claims, the terms "horizontal," "lower

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part" and "inwardly" will be taken as applied with reference to an apparatus carried by a person standing upright; in other words, "horizontal" will be meant to describe a direction parallel to the line EF (Fig. 1), "lower part" a part of the apparatus below this line and "inwardly" a direction towards the body of said person.

What I claim is:

1. A portable life-saving apparatus of the inflatable type designed to be worn in a deflated condition, comprising a folded gastight envelope having at least one generally horizontal fold, the lower part of said apparatus beyond said fold being folded back inwardly, a gas cylinder housed horizontally inside said fold, and duct means between said cylinder and said inwardly folded part.

2. Apparatus as claimed in claim 1, wherein the envelope comprises an inflatable peripheral portion and a non-inflatable central portion, and wherein the duct means leads to the inflatable peripheral portion of the inwardly folded part.

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3. Apparatus as claimed in claim 2, wherein the duct means comprises a conduit extending between opposite parts of the inflatable peripheral portion.

4. Apparatus as claimed in claim 2, wherein the non-inflatable central portion of the envelope has apertures registering with both ends of the gas cylinder.

5. Apparatus as claimed in claim 4, wherein the non-inflatable central portion of the envelope has further apertures above and below the gas cylinder.

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