United States Patent [19]

Martin

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[54] **SURVIVAL OR LIKE PACKS PARTICULARLY SUITABLE FOR AIRMEN**

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[52] **U.S. Cl.** **9/316,** 222/5, 244/147

[51] **Int. Cl.** **B63c 9/16,** B63c 9/24

[58] **Field of Search** ..... 9/2 A, 11 A, 11 R, 9/319, 311, 314, 315, 316; 244/147, 148, 122 A–122 AH, 149; 222/5, 3

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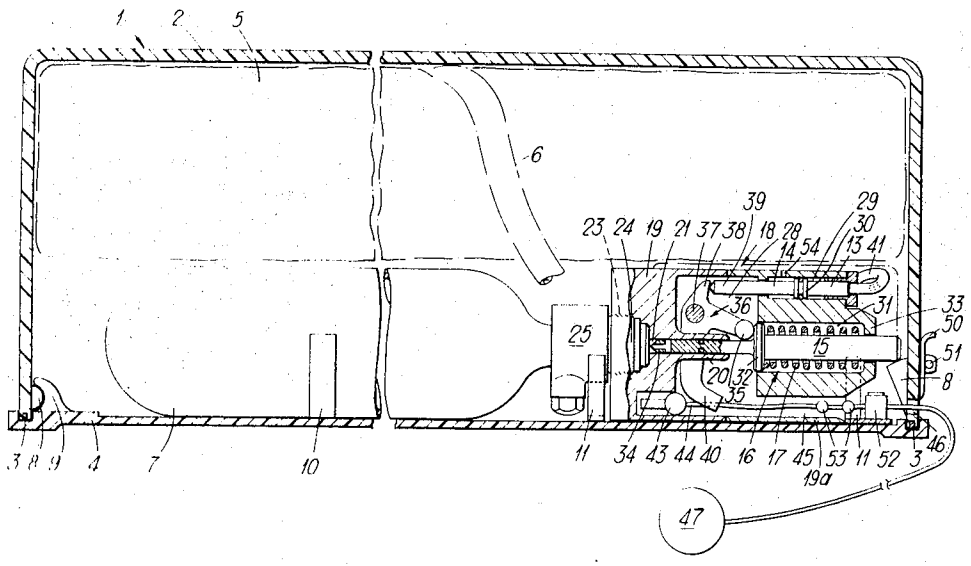
Assistant Examiner—Paul E. Sauberer
Attorney—Kurt Kelman

[57] **ABSTRACT**

An openable survival pack particularly suitable for an ejection seat and suitable for housing an inflatable article, the pack comprising a hollow body; a closure therefor; and means for automatically releasing fastening means on said pack on entry of the pack into water, optional means also being provided when desired for causing automatic inflation of the article housed by the body on release of said fastening means.

3 Claims, 6 Drawing Figures



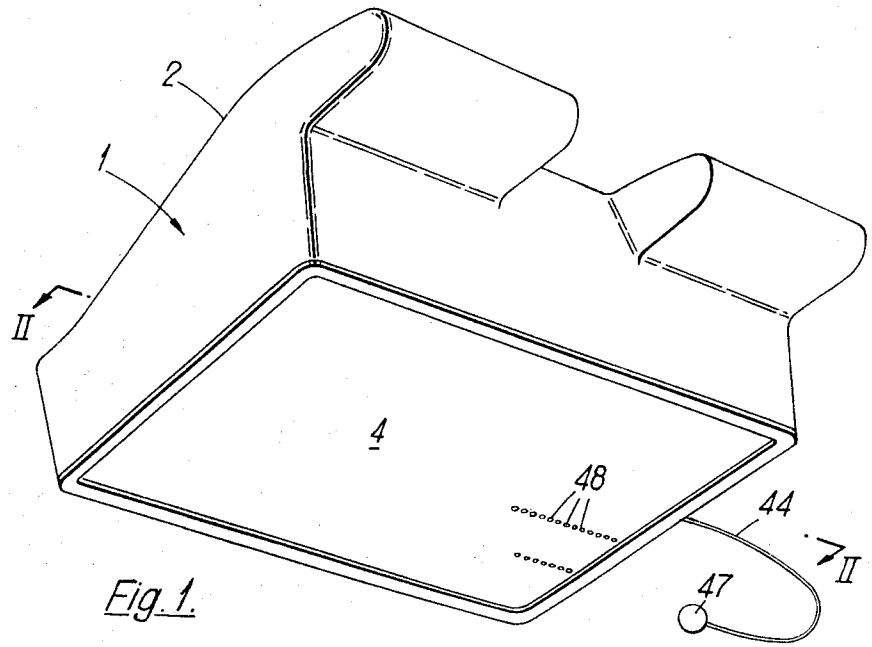

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Fig. 1.

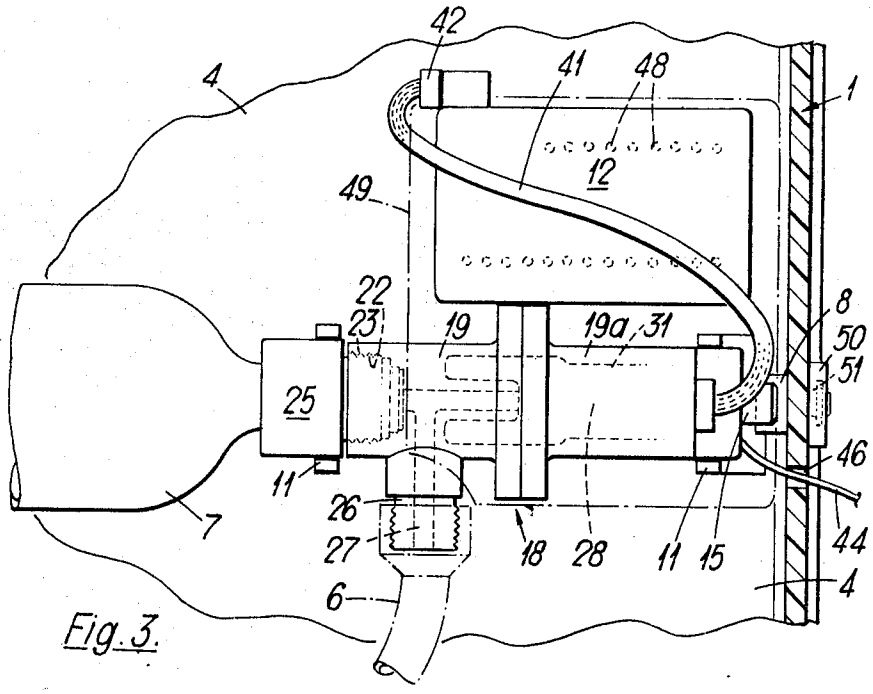
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Fig. 3.

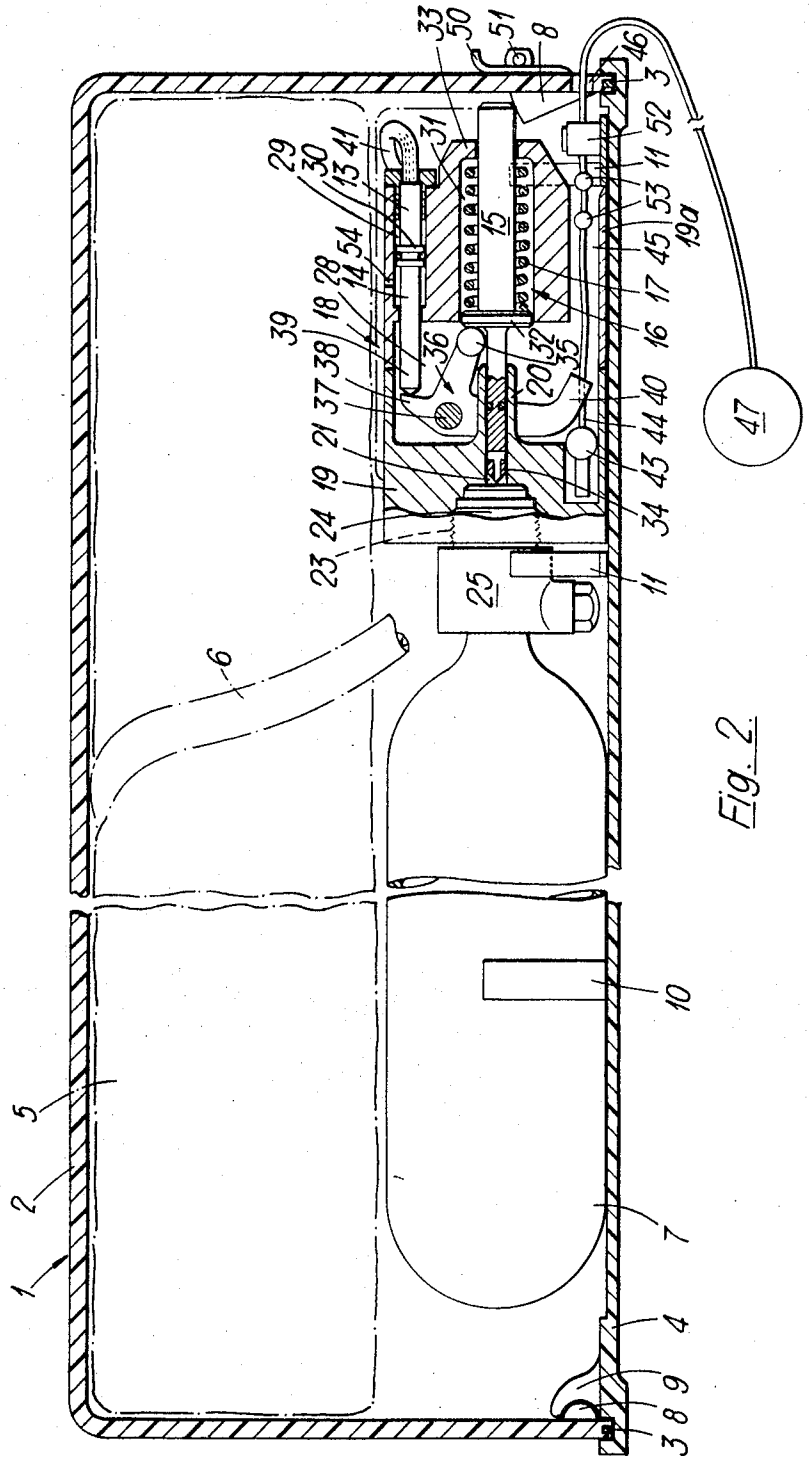
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Fig. 2

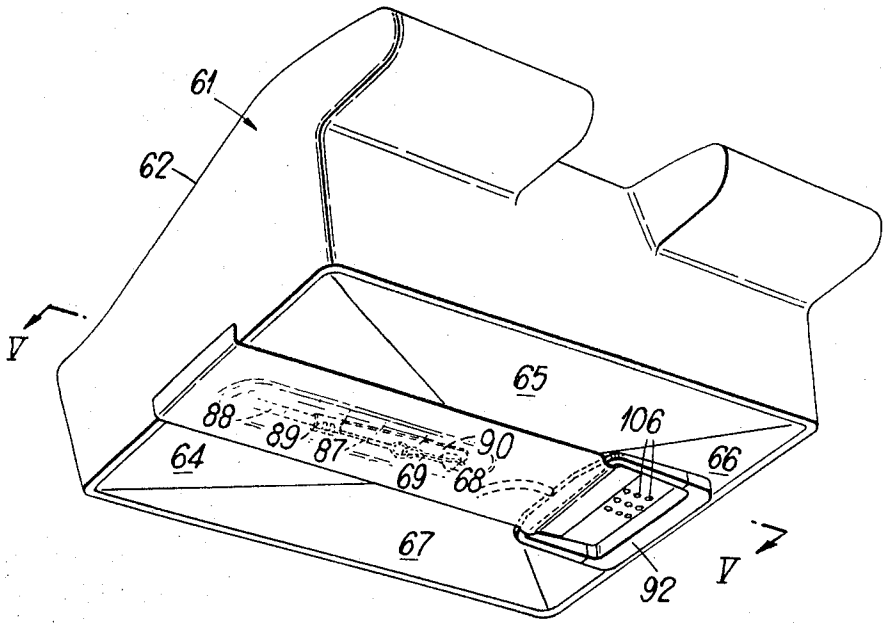

Fig. 4.

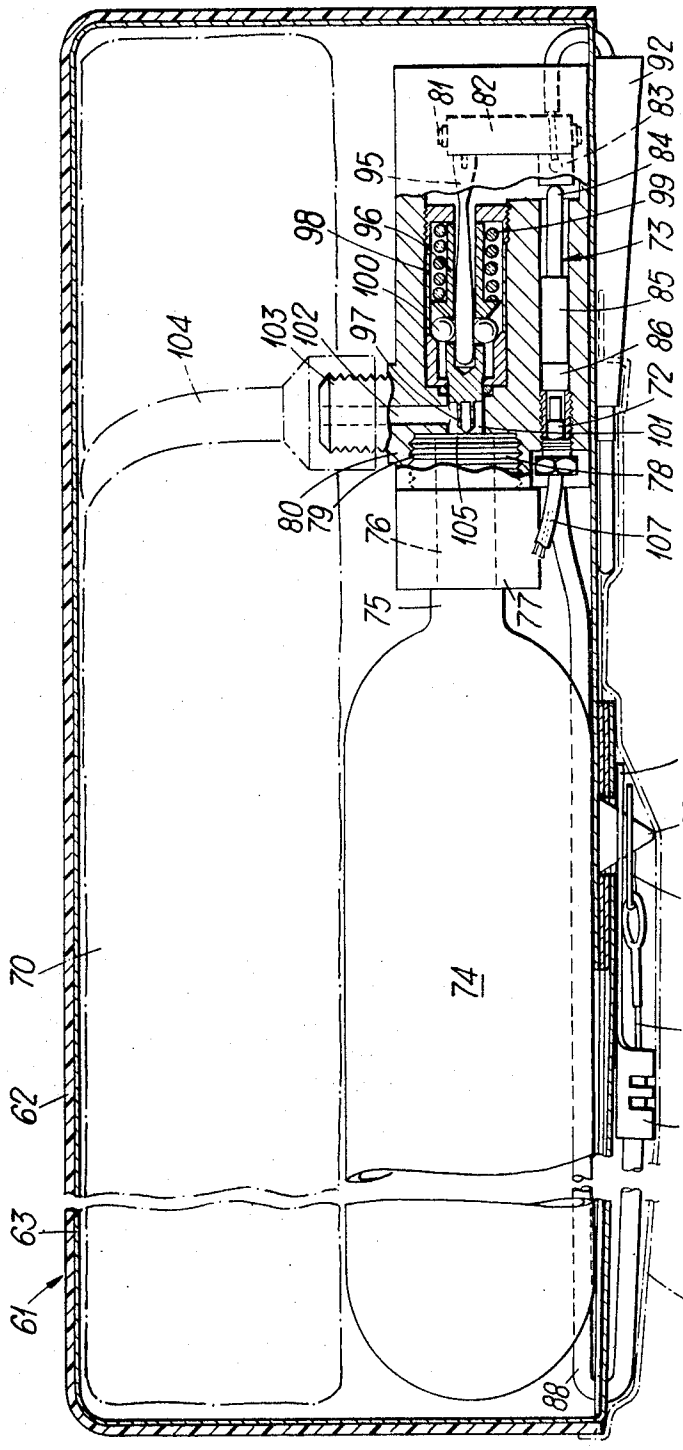
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Fig. 5

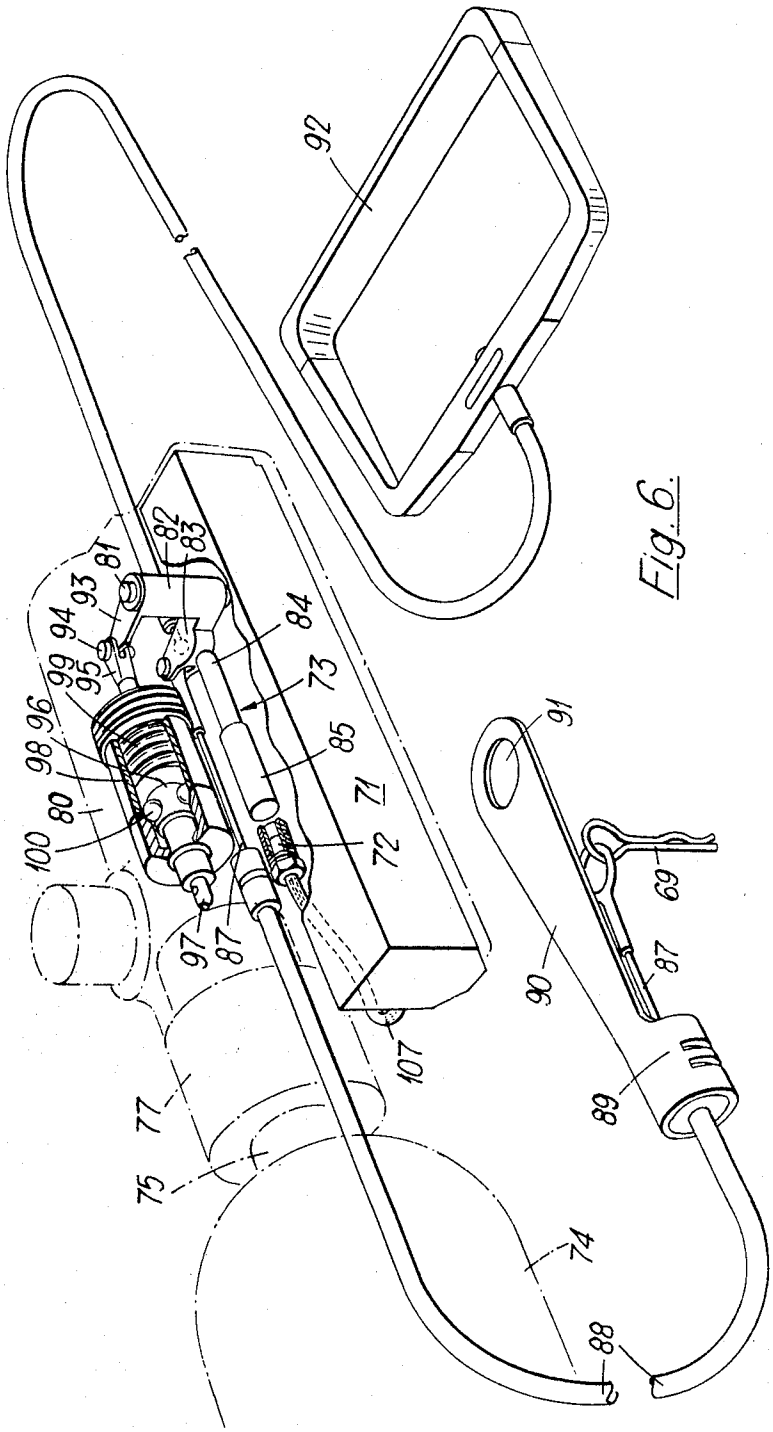
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Fig. 6.

SURVIVAL OR LIKE PACKS PARTICULARLY SUITABLE FOR AIRMEN

This invention concerns packs and in particular survival packs containing an inflatable article such as life belt or raft or an inflatable dinghy and the term "dinghy" should be construed broadly to embrace such items. The invention has particular application in relation to survival packs carried by aircraft or other vehicle ejection seats.

One object of this invention is to provide a survival pack having a closure which is automatically unlocked when 1t is dropped into water so that where the pack contains a dinghy or life raft, such dinghy may be readily released and (where required) automatically inflated.

Conveniently said pack may house an inflatable article (such as a dinghy or life jacket) and additional means for causing inflation of the dinghy may also be provided, such additional means, when provided, being actuated directly, or indirectly, in response to activation of said water activated mechanism. Said electricity generating means may expediently comprise a water activated electric battery.

In certain particularly convenient embodiments in accordance with the invention said pack may be constituted by a rigid container having an open face normally closed by a closure in the form either of a rigid door or doors, or alternatively by means of one or more flaps, such door(s) or flap(s) normally being retained in a pack closing position by said closure retaining means which may take any suitable form of latch mechanism such as, for example, one or more catches or retaining pins. Catch(es) would normally be used where said closure is in the form of a rigid door or doors whereas one or more retaining pins may conveniently be utilised where the closure is constituted by one or more flexible flaps.

In such embodiments the closure release means may compriseqa temporarily restrained energised spring assembly, i.e. an assembly powered by a pre-energised spring which when freed causes movement of the components constituting said latch mechanism.

Still further the said ballistic means for generating pressure fluid may expediently comprise a cartridge whereas said pressure fluid sensitive means may comprise a piston and cylinder assembly.

Where the survival pack contains a dinghy or other item to be inflated, then inflation of the dinghy or the like would generally be effected by means of a supply of pressure fluid (for example compressed carbon dioxide) retained in a pressure cylinder housed within the pack and according to one optional feature of the invention the closure release means of the pack may conveniently be operatively connected to valve means or sealing means on said cylinder so that on actuation of said closure release means said cylinder valve means or sealing means would be opened automatically to cause release of pressure fluid from the cylinder and inflation of the dinghy to which it would be connected.

Advantageously manual overide means may be provided to effect opening of the pack and/or to effect inflation of the dinghy should the pack and/or the life raft be required to be opened and/or inflated in an emergency out of water or, of course, in the unlikely event of the mechanism the subject of this invention failing to operate automatically on contact with water.

In accordance with one embodiment of the invention there is provided an openable survival pack comprising a rigid hollow body, a rigid closure for releasably closing said body, a water activated electrical battery housed within the container when closed, an aperture to permit water to enter said container when closed, and electrically detonatable cartridge, and a piston and cylinder assembly, said cartridge being located in the cylinder of said assembly and being electrically connected to said battery and the piston being moved in response to pressure fluid generated by the cartridge when the latter is detonated, pack closure latch mechanism, pack closure latch mechanism release means, inflation means comprising a canister containing gas under pressure, frangible sealing means for sealing said canister, a conduit for connection to an article to be inflated, and said latch mechanism comprising a pair of abutments adapted to interengage one another, one said abutment being provided on the body and the other on the closure, and one of such abutments being movable with respect to the other, spring biasing means provided to bias said movable abutment means towards a position where the pair of abutments are disengaged from one another, rockable lever means constituting said pack closure release means for releasably retaining said movable abutment means in an interengaging position against the action of the spring biasing means, means for rendering ineffective said frangible canister sealing means, such means being coupled directly to said movable abutment means, such rockable lever means being rockable in response to movement of said piston, the arrangement being such that substantially simultaneously with disengagement of said abutments, said sealing means is rendered ineffective, and means operable manually from outside said body and closure to move said rockable lever to release the movable abutment means.

In accordance with another embodiment of the invention there is provided an openable survival pack comprising a rigid hollow body, a flexible closure for releasably closing said body, such closure comprising at least two flaps, a water activated electrical battery housed within the container when the latter is closed, an electrically detonatable cartridge, a piston and cylinder assembly, said cartridge being located in the cylinder of said assembly and being electrically connected to said battery and the piston being moved in response to pressure fluid generated by the cartridge when the latter is detonated, pack closure latch mechanism, pack closure latch mechanism release means, inflation means comprising, a canister containing gas under pressure, frangible sealing means for sealing said canister, a conduit for connection to an article to be inflated, and said latch mechanism comprising a projection on a first of said flaps which passes through the other flaps constituting the flexible closure, and a retaining pin which engages said projection, a cable coupled to said pin, a first movable lever constituting said pack closure release means coupled to such lever means and such lever means being movable in response to movement of said piston, a second movable lever which moves with said first lever, a spring biased pin for rendering said canister sealing means ineffective, mechanism responsive to movement of said second lever to release said spring biased pin, the arrangement being such that substantially simultaneously with disengagement of said abutments, said sealing means is rendered ineffective

and means operable manually from outside said body and closure to move said movable levers to release the pin from said projection.

In order that the invention may be more readily understood two embodiments of this invention will now be described by way of example, and with reference to, the accompanying drawings in which:

FIG. 1 is a diagrammatic underenath perspective view of a first embodiment of survival pack in accordance with this invention;

FIG. 2 is a part sectional view of the pack of FIG. 1 taken on the line II—II of FIG. 1:

FIG. 3 is a fragmentary, part-sectional plan view of mechanism housed within the pack;

FIG. 4 is a view similar to FIG. 1 but showing a second embodiment of pack in accordance with this invention;

FIG. 5 is a view similar to FIG. 2 taken on the line V—V of FIG. 4; and

FIG. 6 is a part diagrammatic, fragmentary perspective view — partly sectioned — of mechanism carried by the pack.

In this embodiment the survival pack is of generally rigid construction and is of the type which is housed in the seat pan of an aircraft ejection seat.

The pack comprises an opened bottom container 1 formed of a rigid or substantially rigid material (for example moulded synthetic resin-bonded glass fibre) and the upper surface 2 of the pack is contoured to the approximate configuration of the human posterior or buttocks, this portion of the pack lying uppermost in the seat pan of an ejection seat to provide a seating surface for an airman. Obviously this surface would be appropriately padded. Such container is described in the specification of my U.K. Pat. No. 1,052,775.

The underside of the container in this embodiment is provided with a peripheral sealing strip 3 about the edges thereof which define said open bottom against which a closure in the form of a substantially flat plate or door 4 is located releasably to close the container. Housed within the container is, in this embodiment, in addition to various ancillary survival equipment usually provided, an inflatable dinghy shown diagrammatically only and being designated 5. This dinghy 5 is connected by a conduit 6 (usually a flexible tube) to a supply of compressed carbon dioxide contained in a cylinder 7 secured to the inner surface of the closure plate 4.

The closure plate which is flat and rigid is releasably connected to the underside of the container and a pair of abutments 8 are provided on the container to cooperate with a tongue 9 which engages behind a corresponding one of the abutments and a latch mechanism which will be described hereinafter.

The flat closure plate has, on its surface which lies within the container when the plate is in its container closing position, first and second mounting brackets 10, 11. A first of these brackets designated 10 is a curvilinear saddle for locating an end portion of the carbon dioxide cylinder 7 referred to hereinbefore whereas the other bracket 11 serves to support a water activated mechanism for causing automatic release of the closure plate 4 from the container 1 if the container enters water.

More specifically the water activated mechanism comprises a water energised electric battery 12, ballistic means in the form of a cartridge 13 adapted to be detonated in response to activation of the battery 12 when the latter is contacted by water and such cartridge 13 is provided to generate pressure fluid in the form of gas. The mechanism further comprises a pressure fluid sensitive means in the form of a piston and cylinder assembly 14.

The latch mechanism referred to hereinbefore is in the form of a withdrawable latch rod 15 normally engaged in its corresponding abutment 8 of the container 1. Said latch rod 15 forms part of an energised spring assembly 16, the spring 17 of this assembly being retained in an energised (partly compressed) condition when the latch rod 15 is effective to retain the closure plate 4 in a container closing position.

In this particular embodiment the closure latch rod 15 is also associated with means for opening the sealing means of said carbon dioxide cylinder 7.

These various components constituting the water activated mechanism are all secured firmly to the inner surface of the closure plate 4 and such mechanism is primarily incorporated in a basic housing 18.

This basic housing 18 is of two part form.

The first of the two parts designated 19 is provided with a centrally located axially disposed spigot 20 which is centrally and axially bored at 21. One end of this first part 19 is counterbored so that said bore 21 and counterbore which is designated 22 communicate, and are in line, with one another.

This counterbore 22 is internally screw threaded at 23 to receive an externally screw threaded nozzle 24 of a bored coupling 25 connected to the neck of the carbon dioxide bottle 7.

One side of said first part 19 is provided with an externally screw threaded outlet neck 26 having a central bore 27 therethrough, this bore 27 communicating with the bore of the coupling 25 which is co-aligned with the bore 21.

The outlet neck 26 is provided to permit attachment thereto of the inflation conduit 6 of said dinghy 5.

The second of the two parts of the housing 18 which is generally designated 19*a* is provided with a cavity 28 which is located adjacent said spigot 20 and also with two cylindrical bores, a first bore 29 constituting a cylinder for a piston 30 and the second bore 31 constituting a housing for the energised spring assembly 16.

This latter assembly 16 comprises said latch rod 15 which is provided with a peripheral flange 32 against which one end of the spring 17 (a helical compression spring) seats. The opposite end of the spring 17 engages an inwardly directed peripheral flange 33 which defines an aperture through which an end portion of the rod extends to engage its respective abutment 8 on the container 1.

Formed co-axially with the rod and extending away from the flange 32 is a pointed carbon dioxide cylinder seal perforating pin 34 and this pin 34 is located, for sliding movement (with the latch rod 15) in the spigot bore 21.

However the latch rod 15 is retained in an abutment 8 engaging position with the spring 17 energized and with the pin drawn away from the cylinder 7 seal by a first protrusion 35 extending from a rockable lever 36 pivotally supported at 37 within said housing. cavity 28.

A second protrusion 38 is provided on said lever 36 which is engaged by a nose of said piston rod 39 on the piston 30. A third protrusion 40 to be engaged by a manual override device to be described hereinafter is also provided.

The cylinder of the assembly 14 provides at a position immediately behind the piston, i.e., to the opposite side of the piston 30 from the nose 39, sealed accommodation for said cartridge 13.

This cartridge 13 is electrically connected (for firing in a well known manner) by electrical conductors 41 and plug 42 to the said battery 12, which has an apertured wall.

Positioned adjacent the third projection 40 of the lever 36 is an abutment in the form of a ball 43 carried by a cable 44 which passes from the two part body 18 through a rebate 45 therein and through an aperture 46 in the side wall of the container 1 (or the closure plate 4 therefor), this cable terminating in a control knob or handle 47. This assemblage constitutes the manual override device referred to hereinbefore.

The closure plate 4 of the container 1 is provided with a plurality of apertures 48 at a position adjacent the location of the body 18 and secured immediately adjacent, or over, said apertrues is the said water activated electrical battery 12. These apertures 48 are provided so that water outside the container may pass through said apertures and contact the battery 12 and thereby activate the same. As stated hereinbefore the battery is electrically connected to the said cartridge 13 by said conductors 41 and the cartridge 13 is of a kind which can be fired in response to a flow of electricity to the cartridge from the battery. A cover plate 49 is provided to cover at least the battery.

It will be understood that provision should be made to permit opening of the survival pack (once it is closed) without making use of the cartridge (which would in any event, in this embodiment, also result in automatic inflation of a dinghy within the container) merely to enable the contents of the pack to be inspected and serviced.

Accordingly the abutment 8 with which the latch rod 15 engages is pivotally connected to the body of the container and can be withdrawn from its effective interengaging position with the latch by movement of a lever part 50 of the abutment 8 which extends through the wall of the container to the exterior so that the abutment 8 may be manually disengaged from the latch rod 15 from the abutment and permit manual separation of the closure plate 4 from the container 2. The abutment 8 however is normally locked in its operative, interengaging, position by means of a safety pin 51 and to move the abutment 8 in to an inoperative condition removal of said safety pin 51 would be necessitated.

The cable 44 referred to hereinbefore in relation to the manual override mechanism passes, in this embodiment, through a friction jaw so that any chance of accidental actuation of the mechanism occurring in response to unintentional movement of the manual control knob 47 is minimised. In this particular embodiment this friction jaw arrangement is constituted by passing the cable 44 through a spring loaded jaw 52 and providing spheres 53 at intervals along the cable 44 which can only be drawn through such jaw 52 when a positive withdrawal of the cable is effected. The term "cable" should be read to include any suitable form of linkage.

The sequence of operations which occurs on entry of the container into water is as follows:

Once entry of the container into the water takes place, water enters the apertures 48 immediately below or adjacent the battery 12, contacts the battery and the latter becomes activated.

As a result of this activation electrical current flows through the electrical conductors 41 extending between said battey 12 and the cartridge 13 and the cartridge 13 is fired.

Pressure fluid generated by firing of this cartridge 13 moves the piston 30 lying adjacent thereto in said cylinder 29 in a direction away from the cartridge 13 with the result that the nose 39 carried by the piston moves the protrusion 38 on the rockable lever 36 and such piston movement thus causes angular movement of the rockable lever 36 about its pivot point 37. A small bore 54 is provided in the wall of the cylinder so that once the piston 30 has been moved under the influence of the fired cartridge 13 to cause the rockable lever 36 to move, excess unrequired gas is allowed to escape through such bore 54 to the exterior of the housing.

Said angular movement of the rockable lever under the influence of the movement of the piston nose 39 results in the first protrusion 35 normally engaging the flange 32 on the spring biased latch rod 15 to become disengaged and the released latch rod 15 is moved axially under the influence of the pre-energised helical compression spring 17 in a direction away from the abutment 8 with which it is engaged.

The closure plate 4 of the container is thus released.

Movement of the latch rod 15 under the influence of the said spring 17 simultaneously causes the piercing pin 34 which lies within said spigot bore 21 communicating with a counterbore 22 also to move axially into the counterbore 22 and into the bore of the coupling 25 and to pierce the seal closing the exit of the carbon dioxide cylinder 7. Once pierced the broken seal at the outlet of the cylinder 7 permits egress of the pressurized carbon dioxide which then flows into the bore of said coupling 25 from the canister and through said transverse side bore 26 and then into the conduit 27 connected to the outlet 26 to dinghy 5.

To prevent egress of pressure fluid escaping from the carbon dioxide cylinder 7 into the housing 18 a sealing ring 55 is provided about the said pin 34 and this ring provides an adequate pressure seal between such pin and the wall of the said spigot bore 21.

The unlatched closure plate 4 is then moved under the influence of the inflating dinghy 5, from its closing position in to an angular position in which the tongue 9 (at the opposite side of the closure plate to said abutment 8 and latch rod 15) becomes freed from its abutment 8.

In the unlikely event of automatic inflation of the dinghy 5 failing to occur an airman ejecting from an aircraft, for example into the sea would merely have to grasp the manual control knob 47 and pull the same, with the result that the cable 44 attached to the knob 47 is drawn through the friction jaws 52 with the result that the protuberance 43 on the cable engages the protrusion 40 on the rockable lever 36 with the result that the first protrusion 35 is disengaged from the flange 32 of the spring loaded latch rod 15 and the release of the closure plate 4 and inflation of the dinghy 5 occurs.

It will be understood that a lanyard (not shown) would normally be provided for coupling (at least temporarily) the survival pack to the airman so that on ejection from an aircraft into water,the airman will not become separated from his survival pack.

In the above described embodiment release of the spring biased latch rod 15 causes direct movement of the pin 34 for piercing the seal of a carbon dioxide cylinder. It should be appreciated that it is not essential to effect penetration of the seal of the cylinder in this way and the rockable lever or other moving part of the assembly could be arranged to actuate ancillary equipment provided on the cylinder for causing fracture of the seal to enable pressure gas to exude from such cylinder.

It must be understood that the invention could equally well be applied to the automatic opening of a survival pack where neither a dinghy nor a carbon dioxide cylinder is provided with a view to providing ready access to the pack contents where, for example, the airman may be injured.

Referring now the second embodiment of survival pack it will again be seen that the pack is of generally rigid construction formed by an opened bottom container 62 with the upper surface 62 contoured to the approximate configuration of the human posterior or buttocks, the inner surface of the container being at least partially lined by sheet canvas generally designated 63, the canvas extending down the side walls of the container and protruding from the open undersurface of the container in the form of four overlapping flaps respectively designated 64, 65, 66 and 67. These flaps are located in a container closing position in an overlapping configuration by means of a cone 68 carried by the innermost flap, the remaining flaps each being provided with a reinforced aperture through which the cone 68 is passed. The flaps are retained on the cone 68 by a locking pin 69.

Housed within the container is a dinghy 70 and dinghy inflation equipment as will be described hereinafter, this equipment also serving to cause opening of the container.

More specifically the equipment comprises a water activated mechanism in the form of a water energised electric battery 71, ballistic means in the form of a cartridge 72 adapted to be detonated in response to activation of the battery as is the case in the aforementioned first embodiment already described, detonation of the cartridge resulting in the generation of pressure fluid in the form of a gas. The water activated mechanism further comprises fluid pressure sensitive means in the form of a piston and cylinder assembly generally designated 73.

The water activated mechanism serves to cause operation of linkage which serves to remove the safety pin 69 from the cone 68 to unlock the container closing flaps 65 to 67 and also to operate a pressure fluid release mechanism which co-operates with a compressed gas cylinder containing carbon dioxide. The gas cylinder is designated 74 and has a neck 75 having a bore sealed by a frangible seal in a well known manner and this neck 75 is threadedly connected to an axial bore 76 extending through a coupling 77 which is coupled, in turn, by an externally screw threaded spigot 78 to an internally screw threaded counter bore 79 in a body 80 housing said piston and cylinder assembly 73 and said linkage and pressure fluid release mechanism.

The said linkage comprises an upstanding shaft 81 supporting, for pivotal movement, a tubular bearing portion 82 of a U-shaped lever, one arm designated 83 having a bearing surface which is adapted to be engaged by a nose 84 of a piston 85 located within a cylinder 86 of said assembly 73. Coupled to the free end portion of this said arm 83 by means of a rivet passing through a bifurcated end portion of the arm 83 is the inner end of a Bowden cable which extends from the arm 83 to a position where its opposite end is connected to the safety pin 69 via an eyelet. The inner end of the Bowden cable is designated 87 and its outer sheath which is designated 88 terminates adjacent the eyelet end and around said outer sheath 88 is a collar portion 89 of an apertured plate 90, the aperture 91 of this plate being passed over the cone 68 before the pin 69 is passed through the cone so that the plate 90 not only serves as a final cover plate for covering the apertures of each flap but it also serves to locate the pin end of the outer sheath 88 of the Bowden cable. The opposite end of the outer sheath 88 of the Bowden cable is secured in well known fashion to the body 80. The arrangement is such that movement of the inner end 87 of the cable with respect to its outer sheath causes the pin 69 to be withdrawn from the cone 68 as will be described hereinafter. Also secured to the arm 83 is an end portion of an inner end of a second Bowden cable. This Bowden cable extends from the surface of the arm 83 opposite to that engaged by the nose 84 and terminates in a manually operable handle 92 for purposes which will be described hereinafter.

The second arm of the U-shaped lever which is designated 93 has an apertured free end portion which is pivotally coupled, by means of a rivet 94, between the bifurcations of an end portion of an operating rod 95 which extends into the bore of a tubular sliding shaft 96. This tubular shaft 96 is provided with a hollow piercing member 97 and the shaft 96 and piercing member 97 are arranged to move axially within a cylindrical housing 98, the interior walls of this housing 98 guiding the shaft 96 for movement by engagement with a peripheral flange which extends about said shaft 96. This peripheral flange has a chamfered forward face and a rear face which extends from the shaft at right angles. The rear face serves as an abutment against which an end portion of a compressed compression spring 99 engages, the opposite end of this spring 99 engaging an end of the housing 98. Immediately to the front of the chamfered face of the flange is provided a series of radially disposed apertures which are dimensioned to permit passage therethrough of spheres in the form of balls 100. These balls 100 are normally prevented from passing through the apertures as a result of the presence of the rod 95 within the tubular shaft 96 and because the balls 100 cannot pass through the apertures they constitute an abutment which engages a stepped-in portion of the housing 98 and prevents movement of the shaft 96 under the influence of the compression spring 99. With the balls 100 in an effective position the piercing member 97 is retained out of engagement of the frangible seal but is at all times strongly biased towards such frangible seal.

The hollow piercing member 97 is located in a bore 101 which is co-axial therewith and which is of substantially greater dimensions than itself and this bore is in open communication with a bore 102 constituting an outlet which lies at right angles to the bore 101 and terminates in an externally screw threaded neck 103 to which is coupled a conduit in the form of a flexible tube 104 in turn connected to the dinghy 70. In this embodiment the frangible seal of the carbon dioxide cylinder 74 is designated 105.

The sequence of operations which occur when the container **61** is dropped into water will now be described step-by-step, assuming that the container is closed by the flaps in a manner as hereinbefore described.

When the container is dropped into water, water either permiates through the closure flaps (or via apertures designated **106** when such apertures are indeed provided) and the battery **71** is activated. The battery is connected by means of an electrical wire **107** to the cartridge **72** which is fired. The firing of this cartridge results in movement of the piston **85** along the cylinder **86** causing the nose **84** to engage the said surface of the arm **83** with the result that the U-shaped lever is rotated about its tubular bearing portion **82** with the result that the inner end **87** of the Bowden cable is moved with respect to its outer sheath **88** with the result that the eyelet moves and draws the safety pin **69** from a bore traversing the cone **68.** The lockgin means is thereby withdrawn and the flaps are free to separate from one another, three of the flaps falling from the cone leaving the remaining flap which carries the cone **68** to open freely. Movement of the arm **83** under the influence of the piston nose **84** also causes movement of the arm **93** which withdraws the rod **95** partially from the tubular shaft **96** and permits the balls **100** to move inwardly away from the stepped-in portion of the housing **98** and allows such tubular shaft **96** to move in a direction towards the frangible seal **105** under the influence of the energised compressed compression spring **99** with the result that the tubular piercing member **97** fractures the seal **105** and pressure fluid (carbon dioxide gas) escapes from the canister **74** into the bore **101** and up the bore **102** into the tube **104** and thence into the dinghy **70.** Expansion of the dinghy **70** under the influence of the carbon dioxide gas entering the same causes the unlocked closure flaps to spread open and the dinghy is free to expand and fall from the container **61.**

In the unlikely event of a failure in the automatic opening of the container and inflation of the dinghy on contact by the battery with water, an airman may cause such opening and inflation by grasping the handle **92** which causes the inner end **90** of the Bowden cable to move with respect to its outer sheath and to draw the arm **83** along a path equivalent to the path which it would move under the influence of the nose **84** of the piston **85** with the result that the inner end of the Bowden cable **87** would be moved to unlock the flaps and the arm **93** would also move to cause release of the piercing pin **97** and thus release of pressure gas from the cylinder **74.**

To protect the cone **68** and the pin **69** and its associated mechanism such as the Bowden cable inner end **87** and outer sheath **88** a cover strip **108** may conveniently be provided which extends across the under surface of the container, this flap in addition to protecting said aforementioned items also serving to retain the handle **92** in a neat position adjacent the undersurface of the pack. This cover strip may be retained in position in numerous ways and whilst a contact adhesive-carrying strip might be used it could equally well be a strip which is lightly retained in position by fracturable stitching or by means of interlocking hook and pile materials such as those sold under the Registered Trade Mark "VELCRO." It will be understood that any method of attachment which would automatically become ineffective under the pressure of an inflating dinghy will suffice.

I claim:

1. An openable survival pack comprising

1. a rigid hollow casing defining an opening;
2. a rigid closure member releasably mounted over and closing the opening of the rigid hollow casing;
3. an article to be inflated housed in the casing;
4. a latch mechanism releasably mounting the closure member over the opening of the rigid hollow casing whereby the opening is closed, the latch mechanism comprising
   a. a pair of interengaging abutments, one of the abutments being mounted on the casing and the other one of the abutments being mounted on the closure member, the other abutment being movable with respect to the one abutment,
   b. spring means biased to move the movable abutment into a position wherein the abutments are disengaged whereby the closure member is released from the casing, and
   b. a rockable lever means releasably retaining the movable abutment against the bias of the spring means in a position wherein the abutments are interengaged whereby the closure member closes the opening of the casing;
5. means for inflating the article to be inflated, the inflating means including
   a. a canister housed in the casing and containing gas under pressure,
   b. a frangible sealing means for sealing the canister, and
   c. a conduit connecting the canister to the article to be inflated;
6. means for simultaneously rendering ineffective the canister sealing means and releasing the closure member, said means including
   a. a water activated electric battery housed in the casing, aperture means being provided for permitting water to enter into the closed casing for access to the battery,
   b. an electrically detonable explosive cartridge connected to the battery for detonation upon activation of the battery,
   c. a piston and cylinder assembly housed in the casing, the cartridge being located in the cylinder and the piston being movable therein in response to the detonation of the cartridge, and
   d. an element coupled to the movable abutment for movement therewith, the element being mounted for piercing the canister sealing means and thereby rendering it ineffective, and the rockable lever means being rocked for release of the movable abutment in response to the piston movement; and
7. means operable manually from outside the casing and closure member for rocking the lever means.

2. An openable survival pack comprising

1. a rigid hollow casing defining an opening:
2. a flexible closure means including at least two flaps releasably mounted over and closing the opening of the rigid hollow casing;
3. an article to be inflated housed in the casing;
4. a latch mechanism releasably mounting the closure means flaps over the opening of the rigid hollow casing whereby the opening is closed, the latch mechanism comprising

a. a projection on a first underlying one of the closure means flaps and passing through all other flaps of the closure means superposed over the one flap, and
b. a retaining pin overlying an uppermost one of the closure means flaps and engaging the projection;
5. means for inflating the article to be inflated, the inflating means including
a. a canister housed in the casing and containing gas under pressure,
b. a frangible sealing means for sealing the canister, and
c. a conduit connecting the canister to the article to be inflated;
6. means for simulatneously rendering ineffective the canister sealing means and releasing the closure means flaps, said means including
a. water activated electric battery housed in the casing,
b. an electrically detonable explosive cartridge connected to the battery for detonation upon activation of the battery,
c. a piston and cylinder assembly housed in the casing, the cartridge being located in the cylinder and the piston being movable therein the response to the detonation of the cartridge,
d. a cable coupled to the retaining pin for withdrawing the pin from engagement with the projection whereby the closure means flaps are released,
e. a first lever coupled to the cable and being movable in response to the movement of the piston to move the cable and withdraw the pin,
f. a second lever coupled to the first lever for movement therewith,
g. an element mounted for piercing the canister sealing means and thereby rendering it ineffective,
h. spring means biased to move the element into a canister sealing means piercing position, and
i. means normally counteracting the spring means bias to space the element from the canister sealing means and the bias counteracting means being arranged to be removed in response to the movement of the second lever whereby the element is biased into the piercing position; and
7. means operably manually from outside the casing and closure means flaps for moving the levers.

3. An openable survival pack comprising
1. a rigid hollow casing defining an opening;
2. closure means releasably mounted over and closing the opening of the rigid hollow casing;
3. an article to be inflated housed in the casing;
4. a latch mechanism releasably mounting the closure means over the opening of the rigid hollow casing whereby the opening is closed;
5. means for inflating the article to be inflated, the inflating means including
a. a canister housed in the casing and containing gas under pressure,
b. an electrically detonable explosive cartridge connected to the battery for detonation upon activation of the battery,
c. a piston and cylinder assembly housed in the casing, the cartridge being located in the cylinder and the piston being movable therein in response to the detonation of the cartridge,
d. an element movably mounted for piercing the canister sealing means and thereby rendering it ineffective, and
e. a lever mean pivotal in response to the movement of the piston to release the latch mechanism and move the element.

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