July 14, 1959 A. R. SPIDY 2,894,658

INFLATOR WITH WATER SOLUBLE RELEASE

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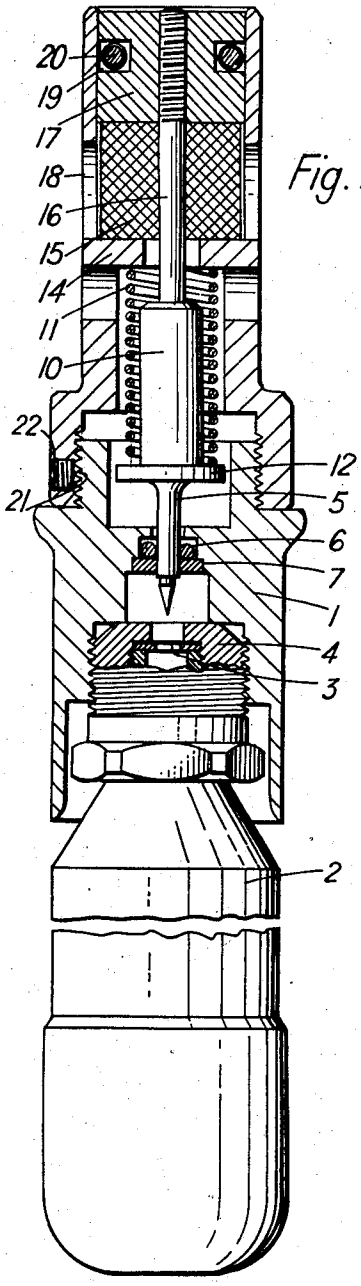

Fig. 1.

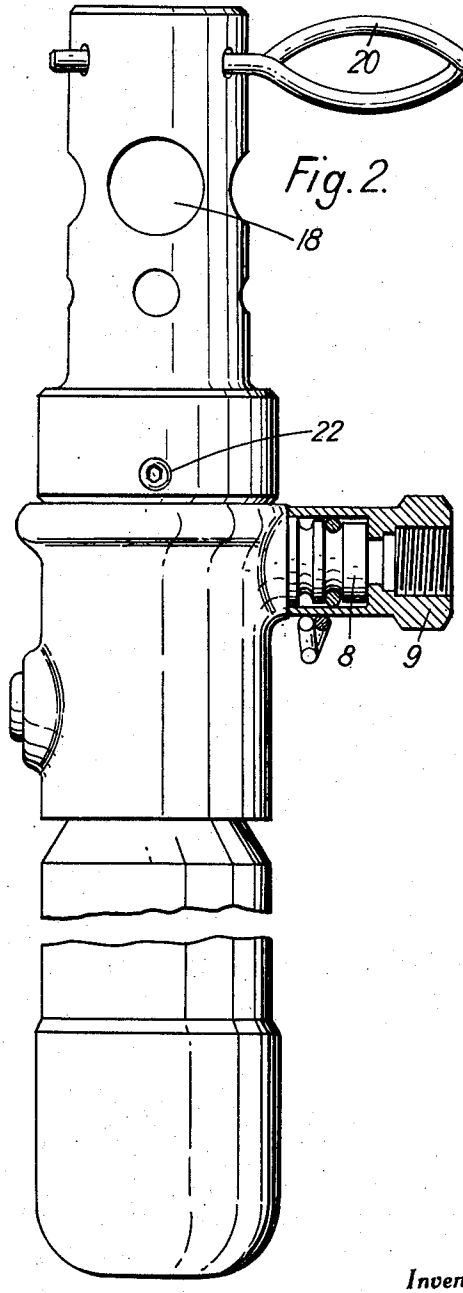

Fig. 2.

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INFLATOR WITH WATER SOLUBLE RELEASE

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1 Claim. (Cl. 222—5)

The present invention relates to apparatus for inflating life-jackets and in particular relates to an inflator for an inflatable life-jacket, which is operated automatically upon being immersed in water. It is a principal object of the invention to provide an inflator which is automatically operated with certainty and rapidity upon immersion in water and such an inflator finds great practical application for use in life-jackets worn by persons engaged in hazardous operations in the proximity of water. In such cases the wearer of the life-jacket is likely to be either injured or unconscious when falling into the water, so that an inflator which operates very rapidly and automatically may well avert the risk of drowning.

According to the present invention an inflator comprises a body having an outlet gas passage adapted to be put into communication with the interior of a life-jacket, a gas capsule secured to or integral with the body and having a sealed mouth located within the body, a striker pin or the like adapted to open the capsule under spring pressure, and a soluble plug located in the body between an abutment formed in the body and an abutment on the striker pin or the like, the soluble plug being trapped between said abutments to prevent movement of the striker pin in the capsule opening direction. The soluble plug is preferably put in a position in the body such that it is immediately contacted by water on immersion, but is shielded from accidental contact by raindrops. The material selected from the soluble plug is one which dissolves very rapidly on immersion in water, whilst not being deliquescent. The soluble material of the plug is preferably also capable of withstanding considerable pressure so that it does not crumble under the influence of the spring which loads the plunger pin, and it is found that a salt such as magnesium sulphate is suitable for this purpose.

One form of construction made in accordance with the invention is shown in the accompanying drawings, wherein:

Figure 1 is a longitudinal section.

Figure 2 is a plan view.

In the form of construction shown the body **1** of the inflator is internally screw threaded at one end to provide an attachment for a sealed gas capsule **2**. The top end of the gas capsule **2** is sealed by a diaphragm member **3** held in an internally screw threaded member **4**, which is itself screwed into the body **1**. The member **4** is apertured centrally to permit the passage of the point of a striker pin **5**, which is guided in an O-ring **6** held in a recess in the body by a retaining washer **7**, so that on rupture of the diaphragm member **3**, substantial quantities of gas cannot pass round the shank of the striker pin **5**.

There is thus formed an enclosed chamber between the O-ring **6** and the top of the gas capsule **2**. In the present example this chamber can be brought into communication with the interior of a life-jacket through a connector **8** which carries a coupling nut **9** and which is

screw threaded for engagement with a screw threaded coupling on the life-jacket. Outside the enclosed gas chamber, the stem of the striker pin **5** has a portion **10** of increased thickness and a compression spring **11** is located about the portion **10**, the spring **11** bearing at its forward end against a shoulder **12** formed on the striker and at its rear end against a shoulder **14** formed on the body. The striker is thus urged towards the sealed top end of the gas capsule by the spring. The opposite face of the shoulder **14** acts as an abutment for a soluble plug **15**, which is of annular shape. The tail end **16** of the striker pin, which is of reduced diameter, passes through the central aperture in the plug. The tail end of the striker is screw threaded and onto this portion a nut **17**, which is adapted to be screwed down into contact with the soluble plug, is fitted so that in effect the soluble plug **15** acts as a spacer between the nut **17** and the shoulder **14**. The side wall of the body is formed with large diameter apertures **18** at the point where the soluble plug is located, so as to permit water to enter the body very rapidly. The nut **17** on the striker tail **16** is preferably formed with one or more grooves **19** which register with corresponding apertures in the wall of the body **1** to permit a safety-pin **20** to be inserted therethrough to prevent longitudinal movement of the striker. The safety-pin is used only when the life-jacket is not in use. The purpose of the safety-pin **20** is to take the strain of the soluble plug **15** and the safety-pin is removed when the life-jacket is put on.

In the event of the inflator being submerged in water, the soluble plug **15** is rapidly dissolved away and then the striker pin **5** is free to move forward until the nut **17** contacts the shoulder **14**. The length of the soluble plug **15** is therefore made greater than the distance that the striker pin **5** needs to travel to rupture the diaphragm **3** at the top end of the gas capsule **2**.

To permit easy assembly of the device, the body is preferably made in two halves which are screw threaded together, at **21** and locked by a body locking screw **22**.

In the form of inflator described above, the gas capsule is carried outside the life-jacket. In a modified construction the gas capsule is located inside the life-jacket, whilst the soluble plug is located outside the life-jacket. In this construction the bottom end of the body is screw threaded on its outer surface to provide a means of securing it in the wall of an inflatable life-jacket. The gas passage leading from the enclosed chamber above the top of the gas capsule is now drilled out, so as to provide an outlet in close proximity to the neck of the gas capsule, which lies inside the inflatable life-jacket.

I claim:

An inflator comprising in combination a body member providing a chamber having an inlet opening, an outlet gas passage adapted to be connected to an inflatable device, and an opening for a pin opposite said inlet opening; means adjacent said inlet opening for securing the neck of a gas capsule provided with a rupturable diaphragm; a second body member providing a chamber therein secured to said first body member adjacent said pin opening; a striker pin in said second chamber extending through said pin opening into said first chamber; means providing a seal between said pin and said pin opening; an annular shoulder in said chamber between the ends of said pin; a spring bearing against said shoulder to urge said striker pin in a direction to rupture the diaphragm; a cylindrical abutment on said striker pin on the opposite side of said shoulder; and a water soluble plug positioned between said abutment and said shoulder for restraining said striker pin from movement in the diaphragm rupturing direction, said cylindrical abutment having a transverse groove on the outer sur-

face thereof and said second body member having a pair of apertures aligned with said groove for receiving a locking pin and having an aperture adjacent said soluble plug for permitting access of water to said soluble plug upon immersion of said member in water.

References Cited in the file of this patent

UNITED STATES PATENTS

1,117,639 Cooey ---------- Nov. 17, 1914
1,329,990 Muller ---------- Feb. 3, 1920
1,367,225 Barker ---------- Feb. 1, 1921
2,675,143 Seemann ---------- Apr. 13, 1954

FOREIGN PATENTS

151,754 Great Britain ---------- Oct. 7, 1920