

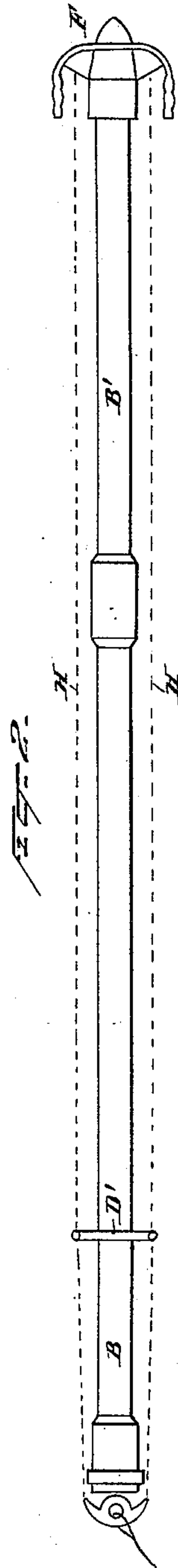
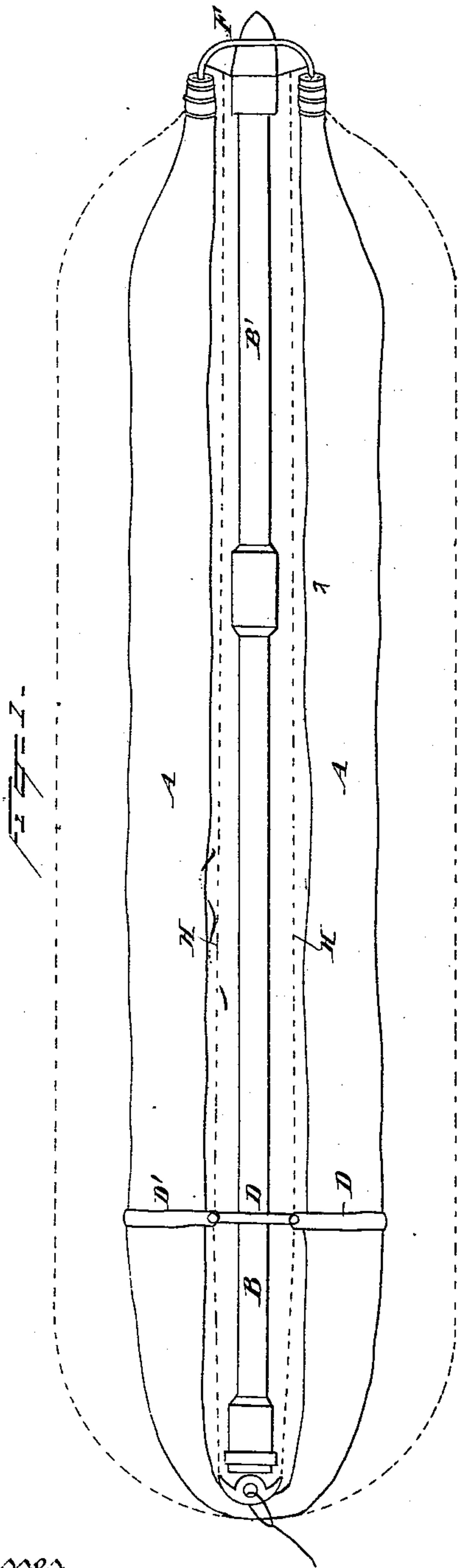
(No Model.)

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J. D'ARCY-IRVINE.  
APPARATUS FOR SAVING LIFE AT SEA.

No. 483,667.

Patented Oct. 4, 1892.



Witnesses  
Norris & Clark.  
Charles R. Searle.

Inventor  
John D. Arcy-Irvine  
By his Attorney  
Thomas Drew Peterson

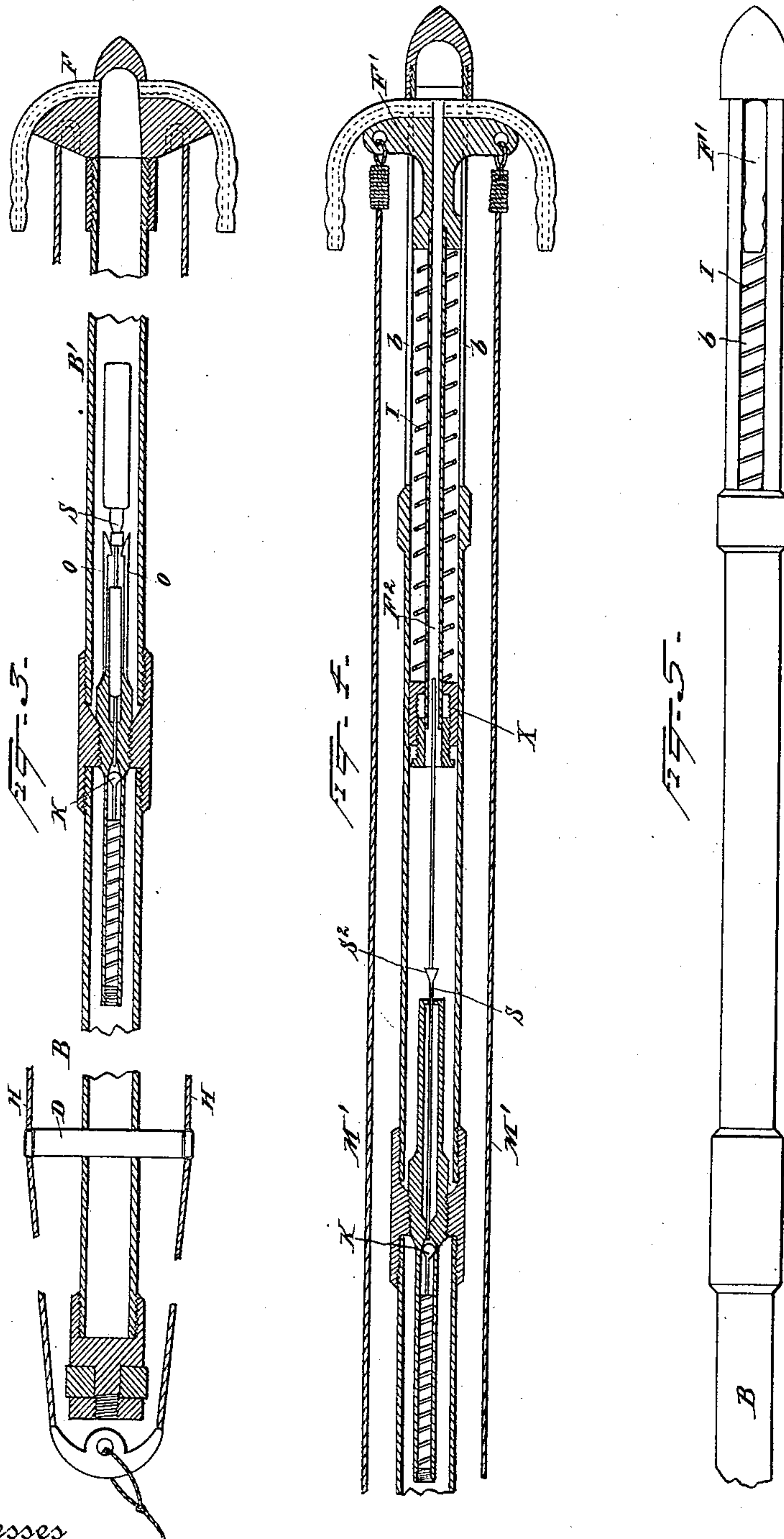
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By his Attorney  
Charles Spess Station



# UNITED STATES PATENT OFFICE.

JOHN D'ARCY-IRVINE, OF HOWTH, IRELAND.

## APPARATUS FOR SAVING LIFE AT SEA.

SPECIFICATION forming part of Letters Patent No. 483,667, dated October 4, 1892.

Application filed November 12, 1891. Serial No. 411,663. (No model.) Patented in England December 31, 1890, No. 21,251.

*To all whom it may concern:*

Be it known that I, JOHN D'ARCY-IRVINE, a subject of the Queen of Great Britain, residing at Howth, in the county of Dublin, Ireland, have invented a certain new and useful Improvement in Apparatus for Saving Life at Sea, (for which I have obtained Letters Patent in England, dated December 31, 1890, No. 21,251,) of which the following is a specification.

This invention relates to apparatus used for saving life at sea, being improvements on a certain invention secured to me by Letters Patent of the United States of America, filed the 8th day of January, 1888, and issued the 5th day of August, 1890, No. 433,674, entitled "Pneumatic apparatus for throwing life-lines."

The present invention bears more particularly on the feature known as the "projectile" described in the above-recited Letters Patent, and is designed for the purpose of constituting the said projectile a floating body after its flight from the gun.

The improvements consist in charging part of the projectile with air or gas of any suitable kind at high pressure liquefied or otherwise, and providing a suitable valve and connections so combined and arranged that on being fired from a gun the gas is allowed automatically to expand into a suitable bag or bags of flexible material. This object is accomplished in the following manner: The projectile is composed of two hollow tubes screwing into each other about the middle. The lower half is charged with gas at high pressure and is provided at its front end with a valve, its base or lower end being solid. In the upper part of the projectile is arranged a striker which opens the valve and allows the gas to escape into the upper portion, and thence through the cross-head into the flexible bag, inflating the same and rendering the whole apparatus buoyant. The striker (the moment the projectile is discharged from a gun) acts on a valve in two ways: first, by its own inertia; secondly, by the pull of the life-line attached to the cross-head.

In order that my said invention may be more readily understood and carried into

practice, I will describe the accompanying drawings.

Figure 1 is a view showing the projectile, cross-head, life-line, and flexible bags complete ready for firing. The dotted lines show the form of the bag fully inflated. Fig. 2 is a view of the said parts without the bags. Fig. 3 is a broken longitudinal section, on a larger scale, of the complete apparatus minus the bags, illustrating the simplest means of actuating the valve to effect the inflating; and Figs. 4 and 5 show a more elaborate construction, which I term the "second form" of the invention. Fig. 4 is a sectional view of the upper part of a projectile, and Fig. 5 is a side view (outside) of the same. The bags attached to this form are similar to those in the form shown in the other figures.

Similar letters of reference indicate like parts in all the figures where they appear.

The action of the apparatus is as follows:

Referring to Figs. 1 to 3, inclusive, assuming the lower part B of the projectile is charged with compressed gas, the striker S is set in position in the upper portion by inserting same between the spring-hooks O O in such a manner that the shoulders when moved rearward a little will enter the hooks of springs and be there retained, while at the same time valve K opens. The compressed air then escapes into the upper part B' of the projectile, and thence through the arms of the cross-head F into the flexible bags A A, which are shown in Fig. 1 in strong lines when collapsed and in dotted lines when inflated. These bags are attached to the life-line H H by means of suitable bands D' D', and the life-line in turn is kept parallel to projectile by means of a collar D, which latter is slipped over the muzzle of the gun when inserting the projectile in the gun and surrounds the outside of the barrel, thus holding the bags in position, while at the same time fulfilling the function ascribed to same (the collar) in my hereinbefore-recited Letters Patent. It should be understood that the striker tends to act by its inertia the moment the projectile is fired. The striker is maintained in the upper portion of the projectile by being gripped between the springs O O sufficiently tight to not be disturbed by ordinary handling of the apparatus. The delay which



will be involved in the movement through a contracted passage of the compressed gas or of the liquid ammonia or other liquid, which on being liberated from pressure assumes the  
 5 form of a gas, is of advantage in allowing the projectile to perform the whole or the main part of its flight before the bags are so much expanded as to materially increase the resistance to the flight.

10 In the second form (illustrated by Figs. 4 and 5) the pull of the life-line contributes to the certainty and extent of the working of the mechanism. The cross-head  $F'$  slides in longitudinal slots  $b$ , formed in the projectile,  
 15 and carries a tube  $F^2$ , Fig. 4, the rear end of which moves piston-rod fashion through soft felt packing  $X$  and acts on the shoulder  $S^2$  of the striker  $S$ , and thus by aiding the inertia of the latter opens the valve  $K$ . The tension  
 20 on the line  $M'$  keeps the valve open. Spring-hooks like those shown in Fig. 3 may be used with this form of the mechanism if found expedient in any case. The cross-head is maintained in its normal position by the spiral  
 25 spring  $I$ . A side view of the cross-head and slot  $b$  in which it slides is shown in Fig. 5.

I claim as my invention—

1. In a projectile, a striker  $S$  and holding-springs  $O O$ , in combination with each other  
 30 and with a case or shell and with means for supplying gas which is set free by the movement of the striker, as herein set forth.

2. A projectile having one or more bags of flexible material arranged close to the main  
 35 body of the case or inclosing shell, in combi-

nation with the said main body and with bags  $A A$ , and with means  $D D'$  and  $F$  for attaching such bags, and with means for inflating the latter after the discharge, so as to make the projectile capable of floating in water, 40 as herein specified.

3. In a projectile having a bag or bags attached and provisions for inflating such controlled by a valve, a striker  $S$ , adapted to move rearward by inertia when the projectile is  
 45 discharged and arranged to open the valve by such movement, as herein specified.

4. In a projectile having a bag or bags attached and provisions for inflating such controlled by a valve, a striker  $S$ , adapted to  
 50 move rearward by inertia when the projectile is discharged, in combination with the spring-hooks  $O$  for holding the valve, all substantially as herein specified.

5. In a projectile having a bag or bags at- 55 tached and provisions for inflating such controlled by a valve, a striker  $S$ , adapted to move rearward by inertia when the projectile is discharged, in combination with a connection to the life-line arranged, substantially as  
 60 shown, so that the tension of the life-line contributes to open and to hold open the valve, as herein specified.

Dated this 14th day of August, 1891.

JOHN D'ARCY-IRVINE.

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