No. 696,971. Patented Apr. 8, 1902.

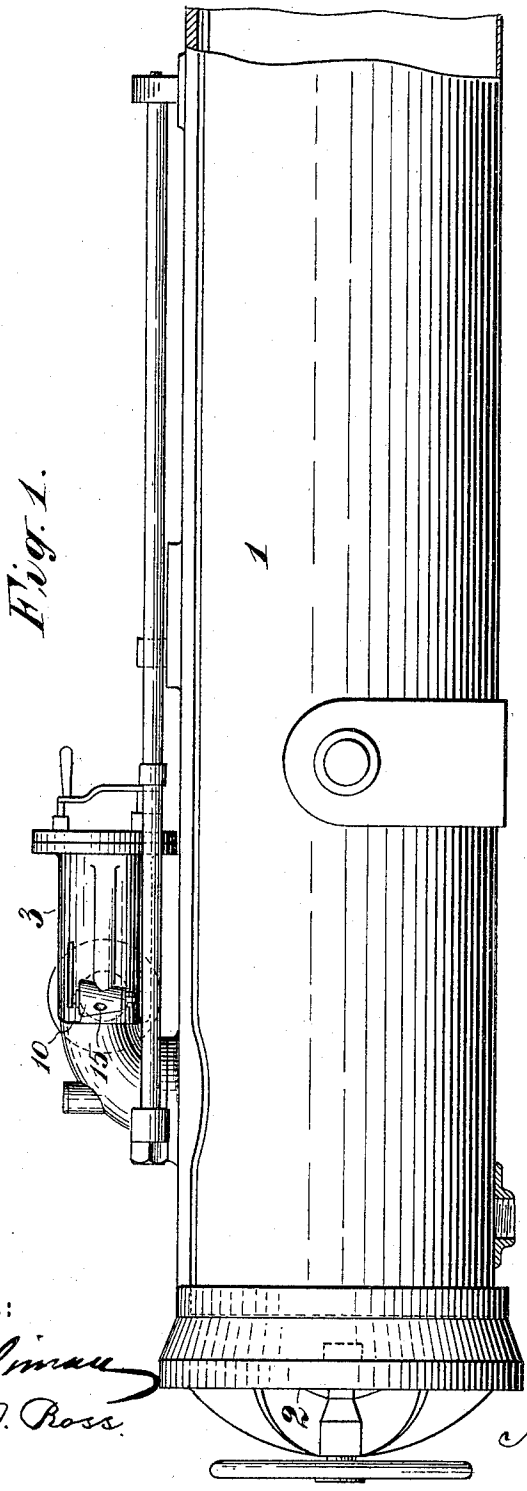
J. P. HOLLAND.

FIRING VALVE FOR SUBSURFACE EXPULSION TUBES.

(Application filed July 27, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



WITNESSES:

F. R. Ellman

Peter A. Ross.

INVENTOR

John P. Holland

BY Henry Connett

ATTORNEY

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Fig. 2.

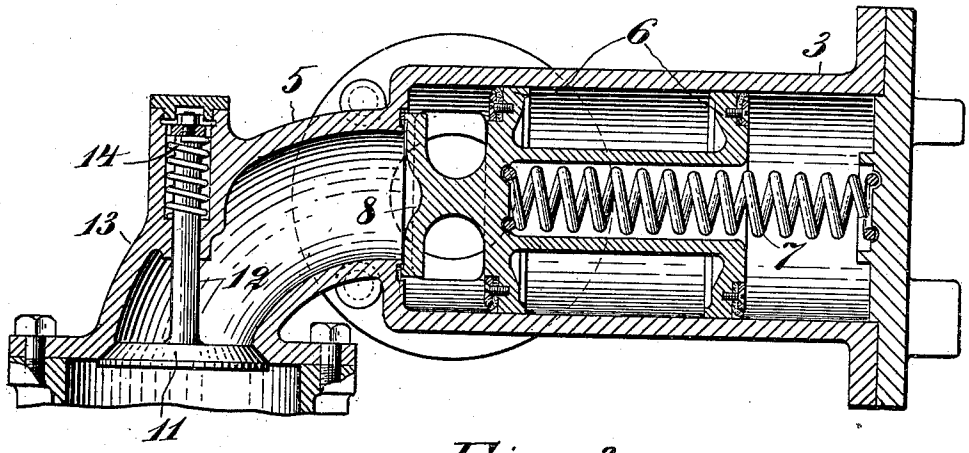
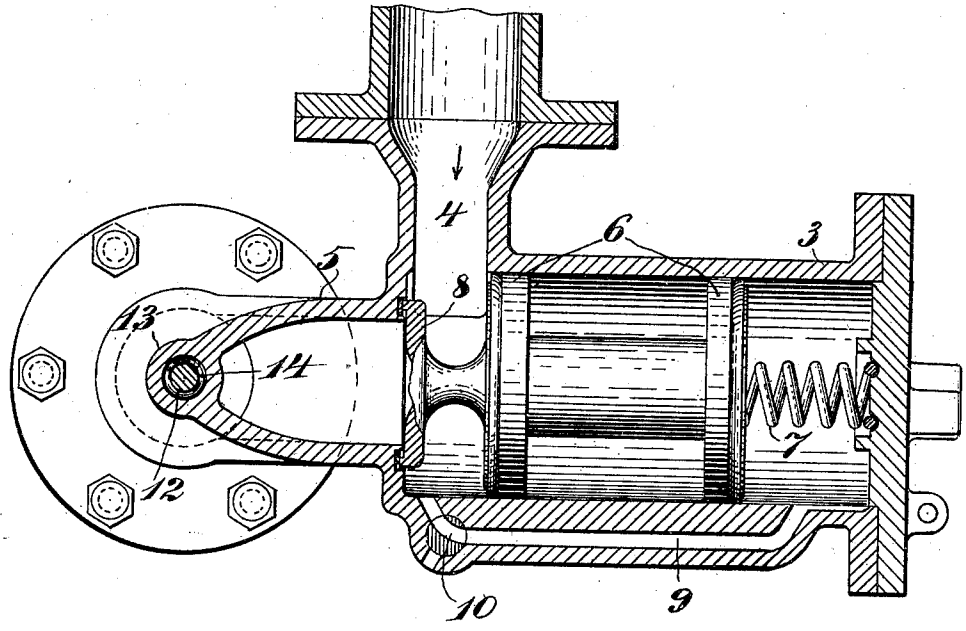


Fig. 3.



WITNESSES:

F. H. Hinman

Peter A. Rose.

INVENTOR

John P. Holland

BY Henry Connett

ATTORNEY

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J. P. HOLLAND.

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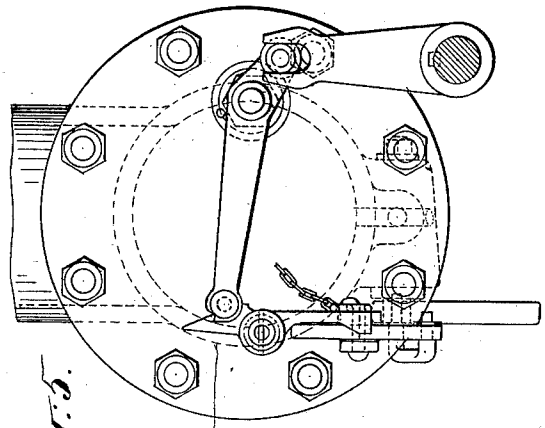

Fig. 5.

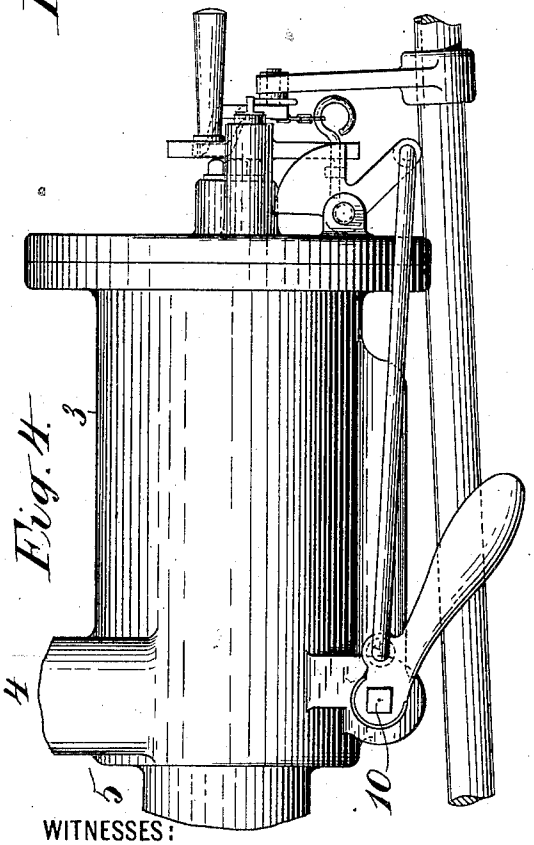

Fig. 4.

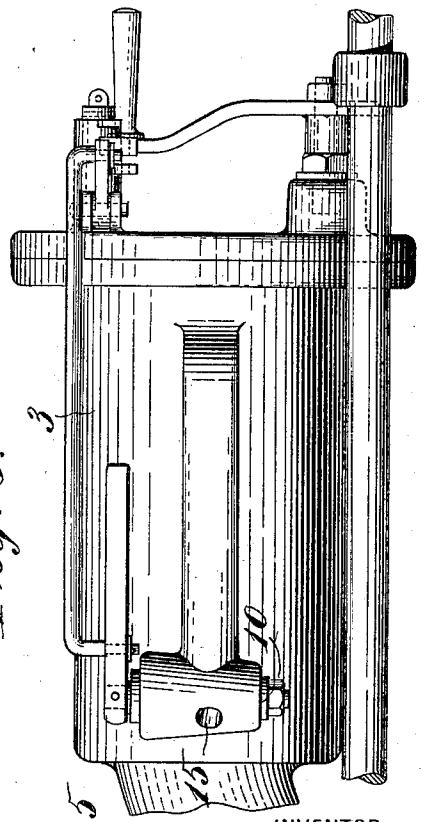

Fig. 6.

WITNESSES:

F. H. Ulman

Peter A. Ross.

INVENTOR

John P. Holland

BY

Henry Connett

ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN P. HOLLAND, OF NEWARK, NEW JERSEY.

FIRING-VALVE FOR SUBSURFACE EXPULSION-TUBES.

SPECIFICATION forming part of Letters Patent No. 696,971, dated April 8, 1902.

Application filed July 27, 1901. Serial No. 69,889. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. HOLLAND, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain Improvements in Firing-Valves for Subsurface Expulsion-Tubes, of which the following is a specification.

This invention relates to devices employed for discharging automobile torpedoes from subsurface expulsion-tubes; and the object of the invention is to prevent the water which enters the expulsion-tube immediately after the torpedo is discharged from flowing back through the air-inlet into the casing of the firing-valve and disabling it.

In the accompanying drawings, which serve to illustrate the invention, Figure 1 is a side elevation, on a relatively small scale, of the rear portion of the expulsion-tube with the firing-valve connected therewith. Fig. 2 is a vertical axial section of the firing-valve and the casing of the automatic stop-valve, and Fig. 3 is a horizontal axial section of the valve-casing. Figs. 4, 5, and 6 are exterior views of the firing-valve and its appurtenances, Fig. 4 being a plan, Fig. 5 an end view, and Fig. 6 a side view.

1 designates the expulsion-tube, and 2 the gate or cap which closes its inner or receiving end. The firing-valve as a whole (seen best in Figs. 2 and 3) comprises a cylindrical casing 3, having an inlet 4 for compressed air and a coupling-piece 5 connecting it with the expulsion-tube. In the casing 3 is a piston 6, backed by a spring 7 and carrying a valve 8, which is seated over the outlet leading to the expulsion-chamber and opens inward. When it is desired to discharge or expel a torpedo, compressed air is slowly admitted between the piston 6 and valve 8 and flows thence by a way or by-pass 9 to the back of the piston, thus balancing the air-pressure on both sides of the latter. The by-pass 9 is controlled by a two-way cock 10, and when by means of this cock the chamber back of the piston is opened to the atmosphere the air-pressure is unbalanced, the piston is pressed back, and the valve opens. As soon as the balance of air-pressure in the piston is restored the spring 7 closes the valve. Figs. 4, 5, and 6 show the means for admitting the air to the valve-casing and for operating the cock 10; but as the present invention does not relate to these devices they need not be described.

After the expulsion of the torpedo and the pressure on opposite sides of the piston has been balanced only the pressure of the spring 7 serves to prevent the flow of water past the valve 8 when it rushes into the expulsion-tube. To prevent this and keep the water out of the casing 3 and the air connections, I provide an automatic stop-valve 11. (Seen best in Fig. 2.) This valve is seated at the outlet end of the coupling-piece 5 and opens toward the expulsion-tube, its stem 12 being guided at 13 and provided with a spring 14, which tends to draw the valve up to its seat. When the charge of air passes to the expulsion-tube, it readily displaces and passes the valve 11; but as soon as the pressure on the piston 6 is balanced the spring 14 will close the stop-valve and prevent any water from passing back to the valve 8.

The two-way cock 10 serves not only to control the passage or way 9, but also to relieve the pressure behind the piston 6 by opening the chamber behind the piston to the atmosphere at the outlet 15.

This invention is applicable to the subsurface or under expulsion-tubes of any vessel, whether a cruiser, battle-ship, or submarine boat.

Having thus described my invention, I claim—

1. The combination with an expulsion-tube and its firing-valve, of an automatic stop-valve located between the firing-valve and the said tube to prevent the access of water to the firing-valve and air connections, substantially as set forth.

2. The combination with the expulsion-tube, the casing of the firing-valve, and the coupling-piece connecting said casing with the expulsion-tube, of the firing-valve and its piston, and the automatic stop-valve mounted in the said coupling-piece and opening toward the expulsion-tube, substantially as set forth.

In witness whereof I have hereunto signed my name, this 24th day of July, 1901, in the presence of two subscribing witnesses.

JOHN P. HOLLAND.

Witnesses:

PETER A. ROSS,

K. M. CAPLINGER.