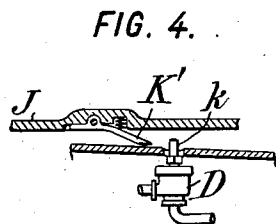
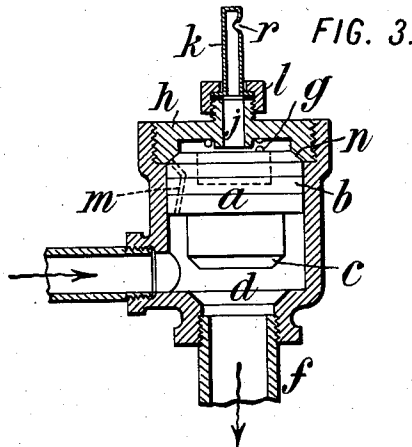
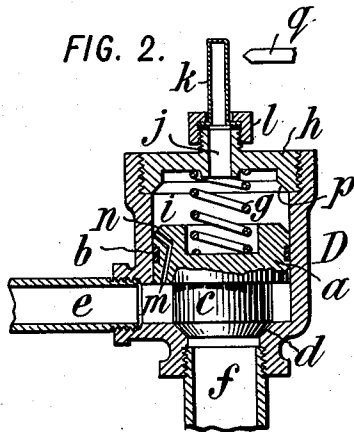
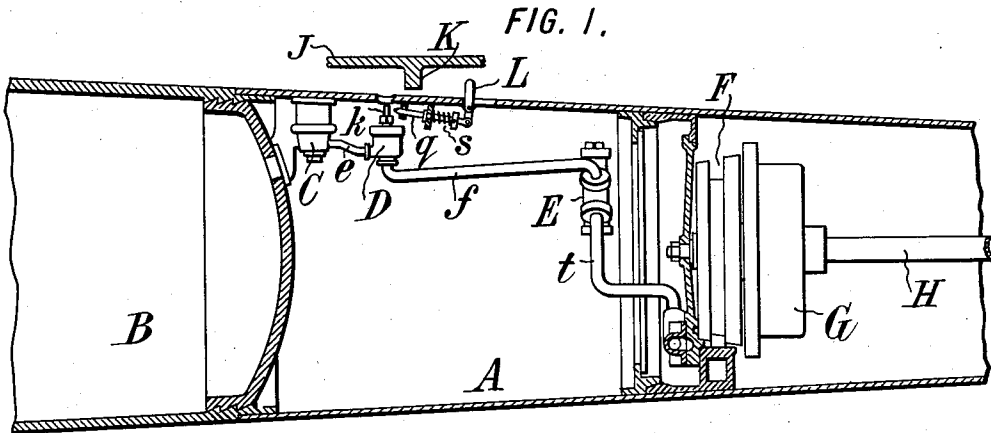


No. 880,030.

PATENTED FEB. 25, 1908.

F. M. LEAVITT.
STARTING VALVE FOR AUTOMOBILE TORPEDOES.

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STARTING-VALVE FOR AUTOMOBILE TORPEDOES.

No. 880,030.

Specification of Letters Patent.

Patented Feb. 25, 1908.

Application filed February 16, 1907. Serial No. 357,630.

To all whom it may concern:

Be it known that I, FRANK M. LEAVITT, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Starting-Valves for Automobile Torpedoes, of which the following is a specification.

This invention relates to improved means for opening a valve for admitting fluid under pressure from the source of supply thereof to the engine or motor upon the launching of a torpedo.

According to this invention the valve prior to launching is held closed by pressure confined in a chamber or space which is in communication with a frangible part which is adapted to be broken in the act of launching the torpedo, so that the pressure escapes from said space and the valve is thereby released and permitted to open. Preferably it is opened by the pressure of the compressed air or other fluid from the reservoir. Preferably the frangible part is a cap or capsule of easily broken metal which is either fractured by contact with a projection in the launching tube, or is broken or cut independently by some intermediate moving part which is displaced by contact with some part of the launching tube.

Figure 1 of the accompanying drawings is a vertical mid-section of a portion of an automobile torpedo illustrating a suitable application of my invention; Figs. 2 and 3 are vertical sections of the starting valve in its preferred form showing it respectively in closed and opened positions; Fig. 4 is a fragmentary view corresponding to Fig. 1, but showing a modification.

Referring to the drawings, let A designate the shell or hull of an automobile torpedo, of which B is the compressed air reservoir or air flask, C is any usual filling or charging valve, D is the starting valve, E may be a pressure reducing valve or an emergency stop valve, F is the engine, which in the present instance is shown as a turbine, G is a fixed casing which in the case of a turbine engine is employed as a housing for the speed reducing gearing, and H is a fragment of the propeller shaft.

At J is shown a fragment of the launching tube having any suitable inward projection K.

L is an outward projection on the torpedo which as the latter moves within the launch-

ing tube preparatory to launching encounters the projection K as a means of operating the starting valve. The movable projection L consequently takes the place of the starting valve hook in the ordinary Whitehead torpedo.

The starting valve D consists of a suitable shell in which is arranged a movable part *a*, such as a piston or its equivalent. Preferably the shell is formed with a cylindrical chamber, and the part *a* is constructed as a piston with if desired any suitable piston packing *b*. The piston *a* carries or is otherwise suitably connected to a valve proper *c*, which may be a tappet or cone valve adapted to seat upon a seat *d*, and thereby as shown in Fig. 2 cut off communication between the inlet *e* and the outlet *f*. A spring *g* is provided to initially press the valve to closed position. Preferably the shell is made with a removable top or cap *h* so that access may be had to the inclosed parts. In communication with the chamber *i* above the piston *a* there is an outlet or escape passage *j* for communication with a frangible part *k*. This part is best constructed as a flanged cap or capsule of drawn sheet metal such as copper or brass. This capsule is united to the valve shell in air-tight manner by any convenient means, such for example as a screw coupling or union *l*. Provision is made for admitting fluid under pressure to the chamber *i*, which is conveniently accomplished by drilling a minute hole or duct *m* through the piston *a* as shown, or in any other manner by which fluid under pressure may flow restrictedly from the inlet *e* to the chamber *i*. Preferably this duct opens into the chamber *i* at such point that when the valve is wide open so that the piston *a* seats against a stop shoulder, the duct *m* shall thereby be closed; this I preferably accomplish by causing the duct to open through a conical portion *n* of the piston which closes against a corresponding conical seat *p* in the valve shell.

Any suitable means is arranged for breaking or puncturing the frangible part or capsule *k*. As an example of such means the drawings show a knife *q* arranged adjacent thereto and to which in any suitable way is imparted a movement upon or just before the launching of the torpedo, so that the knife is caused to cut or puncture the frangible part, thus making an opening therein as

shown at *r* in Fig. 3, and permitting the escape of compressed fluid therefrom. As shown in Fig. 1 the knife *q* is connected to the projection *L* so as to be advanced when the projection is moved by encountering the fixed projection *K* in the launching tube. A spring *s* is shown to hold the parts normally in the inactive position. The projection *L* is shown as a lever one arm of which projects externally, while its opposite arm is connected to the knife *q*.

In operation, the reservoir *B* is first charged with compressed air or other fluid through the valve *C*, which is closed until just before the launching; in preparation for the launching operation the valve *C* is opened, thereby admitting compressed air through the tube *e* to the starting valve *D*. This starting valve is already held closed by its spring *g*. Upon the admission of compressed air the latter enters under the piston and flows through the duct *m* into the chamber *i* above the piston, which it quickly fills and establishes therein an equal pressure to that beneath, whereby the valve is held closed and pressed upon its seat with a pressure proportional to the relative areas of the upper side of the piston and the annular lower part thereof exterior to the valve *c*. To launch the torpedo it is placed in the launching tube and expelled therefrom by gaseous pressure in the well known manner. As soon as the torpedo has moved far enough to bring its projection or lever *L* into contact with the projection *K*, this lever commences to turn and it quickly thrusts the knife *q* against the capsule *k*, thereby puncturing or rupturing the latter and permitting an escape of compressed air from the chamber *i*; thus the pressure holding the valve closed is relieved, and as this escape can occur more rapidly through the orifice *r* than air can enter through the restricted duct *m*, the pressure above the piston instantly falls so low that the pressure against its annular portion beneath exceeds the pressure above it, so that the piston is forced up, thereby unseating its valve *c* and establishing a flow of the compressed air through the starting valve to the engine, this flow occurring through the tube *f*, the valve *E* and tube *t*. The valve thus opens instantly and is stopped by the piston seating against the seat *p*, which closes the duct *m* and prevents leakage of compressed air from the valve through the broken capsule. The starting valve consequently receives beneath it the entire pressure of the compressed air which is flowing to the engine, by which it is held open during the entire period of the run of the torpedo. Before another run of the torpedo can be made, it is necessary to remove the broken capsule and substitute a new one. The valve closes by its spring *g* upon the relief of the pressure beneath it.

The frangible part *k* may be variously constructed. It need not be in the form of a cap or capsule, but may be any septum or partition which is capable of withstanding the heavy pressure employed, and is puncturable or fracturable with sufficient ease to enable it to be cut or broken by the action of any suitable device against it in the operation of launching. Although a metal part is preferable for this purpose, yet the frangible part may be of other materials. The use of a frangible part according to my invention has the important advantage that when once cut or broken it insures that the valve shall remain open during the remainder of the operation. Its use also affords a practical assurance against accidental or premature opening of the starting valve.

A modified means for breaking or cutting the part *k* is shown in Fig. 4. Here the launching tube instead of a fixed projection *K*, has a movable knife or cutter *K'*, and the starting valve *D* is arranged with its frangible capsule *k* projecting sufficiently beyond the hull of the torpedo to be cut by the knife *K'* during the launching movement. Otherwise the construction and operation do not differ from that already described.

The details of construction of the starting valve may be greatly varied without departing from the invention. The construction shown is the simplest and most perfect embodiment of my invention which I have been able to devise, but I do not limit myself to the use of the details or constructive features shown, nor exclude the application of my invention with other or equivalent or more complicated devices.

I claim as my invention:—

1. A starting valve for automobile torpedoes comprising a pressure-actuated part receiving a gaseous pressure tending to hold the valve closed, a frangible part confining such pressure, and means for breaking or puncturing such frangible part to permit an escape of such pressure, in substantially the manner set forth.

2. A starting valve for automobile torpedoes comprising a valve shell, a movable part therein, means for admitting pressure to a chamber on one side of said part to hold the valve closed, a frangible part in communication with said chamber and serving to confine such pressure, and means for breaking or puncturing the frangible part to permit an escape of pressure from said chamber.

3. A starting valve for automobile torpedoes comprising a valve shell, a piston and valve proper movable therein, an air inlet to one side of said piston, a restricted duct for communicating pressure from said inlet to a chamber on the opposite side of the piston, and a frangible part communicating with said chamber and confining the pressure therein.

4. A starting valve for automobile torpedo comprising a valve shell, a movable part and valve proper therein, an inlet opening, a restricted duct permitting pressure from said inlet to a chamber on the opposite side of said moving part, opening into said chamber at a seat adapted to close by the opening movement of the valve, and a frangible part in communication with said chamber and confining the pressure therein.

5. A starting valve for automobile torpedo comprising a valve shell having an inlet, a valve seat and an outlet, a piston and attached valve movable therein, means for admitting a restricted flow from the inlet to a chamber on the opposite side of said piston in which the pressure acts against the entire area of the latter, and a frangible part in communication with said chamber and confining the pressure therein.

6. A starting valve for automobile torpedo comprising a pressure-actuated part receiving a gaseous pressure tending to hold the valve closed, a frangible part confining such pressure consisting of a projecting cap or capsule, means for detachably uniting it, and means for breaking or puncturing it to permit an escape of pressure.

7. An automobile torpedo comprising a

starting valve having a frangible part for confining pressure therein, combined with a launching tube having means for breaking or puncturing said frangible part during the launching movement of the torpedo.

8. An automobile torpedo comprising a starting valve having a frangible part for confining pressure therein, combined with a launching tube having an internal projection, and means in connection therewith for breaking or puncturing said frangible part during the launching movement of the torpedo.

9. An automobile torpedo comprising a starting valve having a frangible part for confining pressure therein, and having a movable knife, and an externally projecting part adapted on displacement to move said knife for puncturing said frangible part, combined with a launching tube having means for displacing said projecting part during the launching movement of the torpedo.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

FRANK M. LEAVITT.

Witnesses:

M. ARONSON,

ARTHUR C. FRASER.