

W. DIETER.
 AUTOMOBILE TORPEDO.
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1,125,979.

Patented Jan. 26, 1915.

Fig. 1.

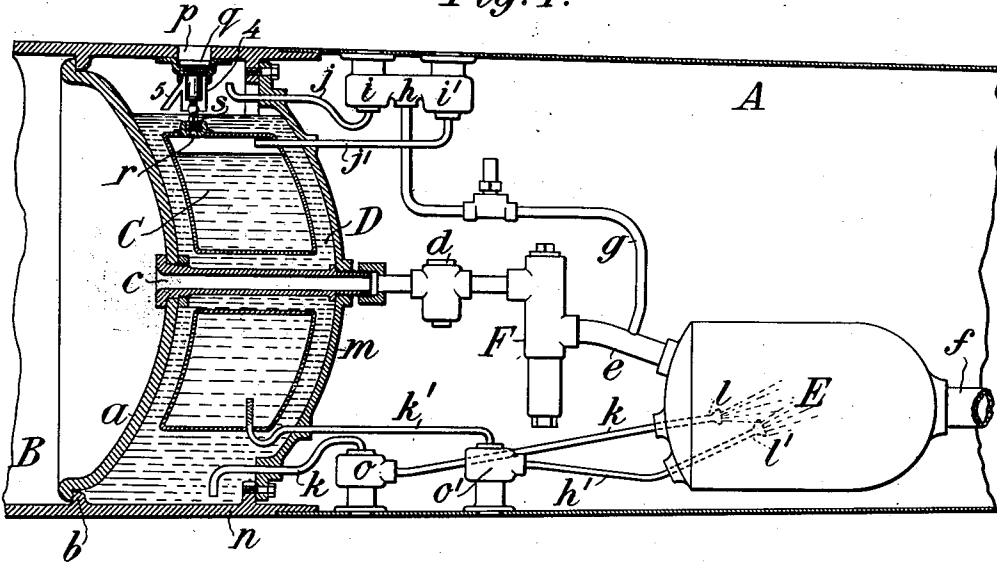


Fig. 2.

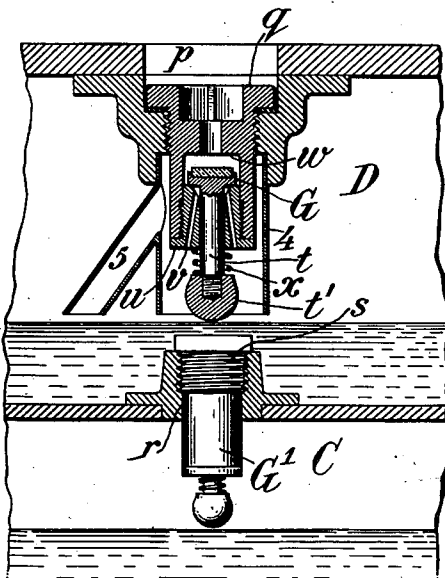
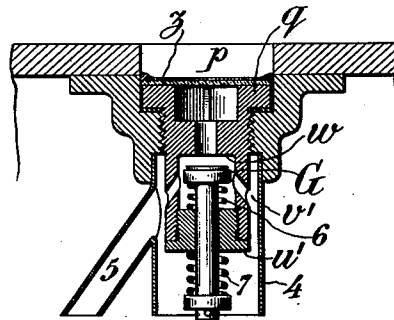


Fig. 3.



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UNITED STATES PATENT OFFICE.

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AUTOMOBILE TORPEDO.

1,125,979.

Specification of Letters Patent.

Patented Jan. 26, 1915.

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To all whom it may concern:

Be it known that I, WILLIAM DIETER, 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 Automobile Torpedoes, of which the following is a specification.

This invention relates to automobile torpedoes wherein a supply of compressed air is carried which is reduced to working pressure and then passed through an air heater to the turbine or other engine which drives the propellers. In the air heater the combustion of alcohol or other suitable fluid is maintained, together with a spray of water which is converted into steam; so that the power is increased by an added volume of gaseous combustion products and steam which are generated in the heater. In such torpedoes the act of launching turns on the air, and the air pressure is utilized to force the liquid fuel and the water to the spray nozzles of the heater; and at the instant of launching an igniter is operated to ignite the liquid fuel in the heater. With such torpedoes difficulty has sometimes been experienced in effecting the ignition or maintaining the flame; this has occurred particularly when considerable delay has intervened between the preparation and launching of the torpedo; and has been most troublesome with submerged or underwater launching tubes.

The object of the present invention is to overcome this difficulty and insure certainty of ignition and proper maintenance of the flame until the operation of the heater is well established, after which time no further trouble has been encountered.

The present invention is based upon the theory that the difficulty stated is caused by minute leakages of air into the fuel tank and water tank (particularly the latter), whereby sufficient air pressure is generated overlying these liquids to displace some of the liquids prematurely into the heater. Such premature introduction of either liquid into the heater results in the formation of a pool thereof in the bottom of the heater, and upon the launching of the torpedo its rapid and violent motion causes a splashing of the liquid which is liable to either prevent successful ignition, or to extinguish the flame immediately after ignition has

been accomplished. Hence if these leakages can be relieved and prevented from generating a pressure in either of these tanks, the premature displacement of liquid into the heater will be avoided, and the consequences of such undesirable presence of liquid will be averted. The present invention therefore aims to provide means for relieving any small pressure that may be established in the liquid tanks or either of them, whereby any leakage may freely escape, such means, however, being adapted to prevent the escape of a larger pressure when upon the launching of the torpedo the compressed air is turned on, and the air at reduced or working pressure is admitted to the heater and engine. The means provided for this purpose is a specially designed relief valve applicable to either or both the liquid tanks.

The invention in its preferred application is shown in the accompanying drawings, wherein,—

Figure 1 is a vertical mid-section of the mid portion of a torpedo including the after end of the air flask and the devices intervening between this and the engine. The several devices are shown partly in diagrammatic manner developed in approximately the vertically medial plane of the torpedo, for clearness of illustration; Fig. 2 is a vertical mid-section on a larger scale showing the relief valve and adjacent parts; Fig. 3 is a similar section showing a modified construction.

Referring to Fig. 1, A is the shell or hull of the torpedo, B is the compressed air flask or reservoir, C is the alcohol tank, D is the water tank, and E is the air heater (technically called the superheater). The reservoir B is commonly constructed with a head *a*, its edge resting against an internal flange *b*, the two being fitted with a ground joint. The compressed air passes out through a tube *c* under control of a starting valve *d*, and after traversing a reducing valve F passes by a tube *e* into the heater E, and the increased volume therefrom passes out through pipe *f* to the turbine or other engine. The reservoir B carries initially a pressure exceeding 3,000 pounds per square inch, which is reduced by the reducer F to a working pressure of about 400 pounds. From the tube *e* air under this latter pressure is conducted through a duct *g* to a

valve casing *h* containing valves at *i* and *i'* which normally are closed, but which open under pressure and admit compressed air through pipes *j* and *j'* respectively into the air spaces above the liquid in the tanks D and C respectively. By means of this pressure the liquids are expelled through bottom pipes *k* *k'* which extend into the heater E and terminate in spray nozzles *l* and *l'* for spraying respectively water and alcohol or other liquid fuel. In the pipes *k* *k'* are interposed check valves *o* *o'* for preventing back flow. The water tank D is formed between the head *a* and an after head *m* which is bolted to an extension *n* of the shell of the reservoir B. The fuel tank C is an annular vessel placed within the tank D.

The parts thus far referred to are or may be of the well known construction and arrangement, of which no minute description is necessary. For further information concerning these, reference is made to patent of F. M. Leavitt No. 1,022,486 dated April 9, 1912. So far as concerns the present invention these various known parts and their grouping may be modified in any of the ways known in the art, or in any way within the skill or judgment of constructors, the parts shown being illustrated as one suitable known construction to which the present invention may be applied.

It is usual to provide the water tank with a filling opening *p* which after filling is closed by screwing in a plug *q* (which heretofore has been a tight plug); and to provide in line with these another opening *r* into the fuel tank C, this being closed by a screw plug *s*. According to the preferred embodiment of the present invention the plug *q* is perforated and made hollow and provided with a relief valve G. This valve may be variously constructed, its essential feature being that it will open to relieve a minute pressure within the tank, but will close upon the admission of compressed air to the latter so as to retain the same under compression. In the preferred construction shown in Fig. 2 the valve has a stem *t* which may slide freely in an opening in a plug *u* which is screwed into the bottom of the plug *q*. The valve G seats lightly by gravity or by light spring pressure upon an under seat which is afforded by the upper end of the plug *u*. The valve thus serves as a check-valve for preventing inflow of sea water from the exterior of the torpedo. Any minute air pressure due to leakage may escape through the space around the stem, or through ducts *v*, and lifting the light valve G may pass out through the perforation of the plug and escape. If however a pressure of air is suddenly admitted, as results from the opening of the starting valve *d*, then a strong upward current is estab-

lished which carries with it the valve G and seats it against an upper seat *w* which is afforded within the plug *q*, so that the outlet through this plug is closed and remains closed during the run of the torpedo. To make a tight closure, the upper face of the valve G is preferably provided with a sufficiently soft or yielding packing or gasket. The valve is shown as weighted by a knob *t'* applied on the lower end of the stem, and as having also a light spring *x* which is initially under little or no compression, but which is compressed by the upward movement of the valve. The plug is shown as having the usual filling tube 4 with its air relief branch 5 for convenience in filling. Precisely the same construction of relief valve may be applied to the plug *s* as is shown in Fig. 2 at G¹, where the structure is shown in elevation, the internal construction being the same as shown with respect to the plug *q*.

Fig. 3 shows a modified construction wherein the valve G has no lower seat, there being so far as concerns the valve itself a free vent for the escape of air due to leakage through ducts *v'* and past the valve and out through the perforation of the plug *q*. The function of excluding ingress of sea water is performed by a temporary cap *z*, which may consist of a piece of stiff waterproof paper held in place by grease, or may consist of rubber or any other suitable water-excluding material. When the air pressure due to leakage comes beneath this cap, it lifts and vents off the air. The valve G is held in its position shown by the opposite stress of springs 6 and 7 applied to the valve stem on opposite sides of the lower plug *u'*. When the compressed air is turned on the rush of air lifts the valve and seats it against the upper seat *w* as before.

The construction in detail of the relief valve may be greatly varied without departing from the invention. The only essential requisites are that normally there shall be a check against ingress of sea water and a substantially free vent for air pressure due to leakage, while upon the introduction of compressed air in large volume the valve shall instantly close and hold the pressure.

The application of the relief valve is of the more importance for venting the water tank D; but it is also advantageous for venting the fuel tank C. One reason why with the specific construction shown the former of these tanks has greater need of venting than the latter, is that any leakage through the ground joint between *a* and *b* would enter the tank D.

I claim as my invention:—

1. An automobile torpedo having a compressed air reservoir, a pressure reducer, an air heater, and a liquid tank receiving compressed air and communicating with the

air heater, combined with means for excluding sea water from such tank and for venting any leakage of air therefrom, such means adapted to close upon the admission of compressed air thereto.

2. An automobile torpedo having a compressed air reservoir, a pressure reducer, an air heater, and a liquid tank receiving compressed air and communicating with the air heater, combined with a relief valve for such tank adapted to freely vent leakage of air therefrom, and to close upon the admission of compressed air thereto.

3. A relief valve for a tank of an automobile torpedo having an outlet seat with which it is normally out of contact, and adapted to be displaced against said seat by a strong outflow of air upon an admission of compressed air to the tank.

4. A relief check-valve for the tank of an automobile torpedo having opposite seats

on one of which it bears lightly to freely vent pressure due to leakage, and adapted to be displaced by a strong current due to the admission of compressed air and thereby close against the opposite seat.

5. A relief check-valve for the tank of an automobile torpedo, comprising a plug closing the filling opening of the tank having an outlet opening through it, and a valve carried by said plug normally unseated therefrom and adapted to be seated thereagainst to close the outlet opening upon the admission of compressed air.

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

WILLIAM DIETER.

Witnesses:

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