

W. DIETER.
 CHECK VALVE FOR AUTOMOBILE TORPEDOES.
 APPLICATION FILED APR. 15, 1913.

1,146,557.

Patented July 13, 1915.

Fig. 1.

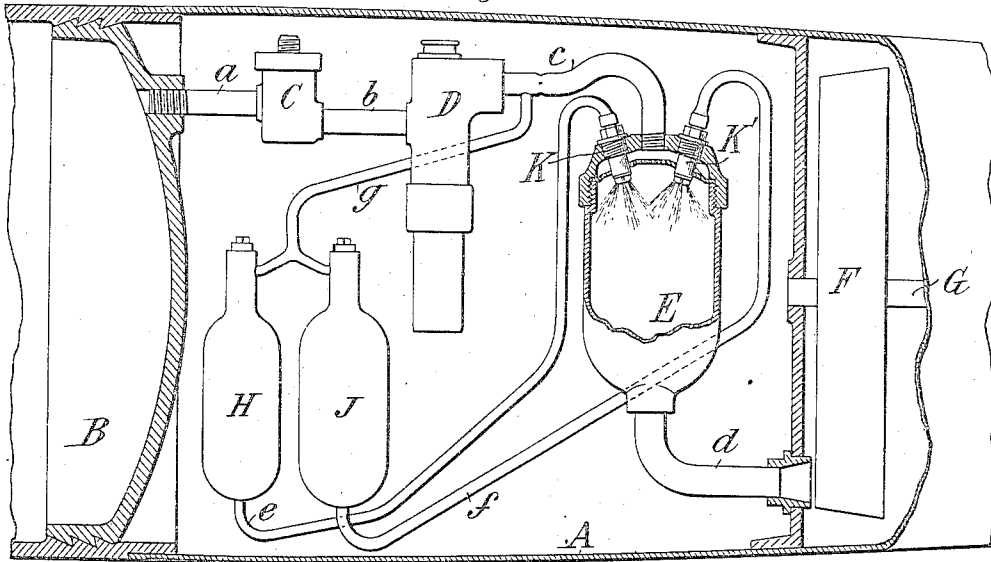
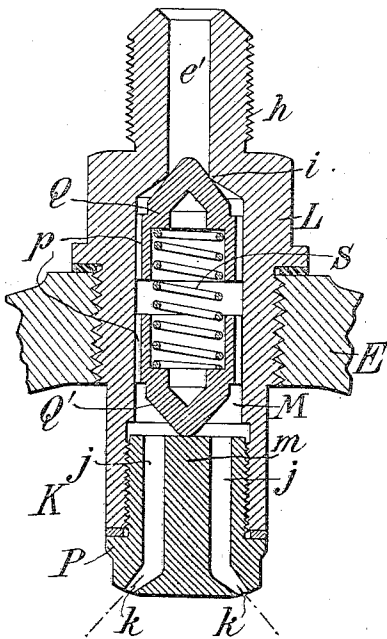


Fig. 2.



WITNESSES:
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Fig. 4.

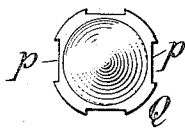


Fig. 3.

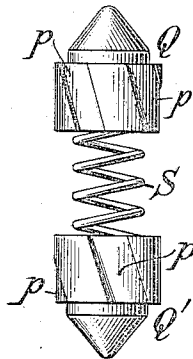


Fig. 5.

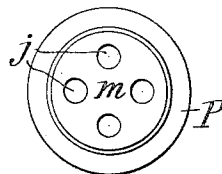
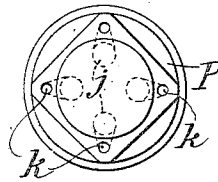


Fig. 6.



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UNITED STATES PATENT OFFICE.

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CHECK-VALVE FOR AUTOMOBILE TORPEDOES.

1,146,557.

Specification of Letters Patent.

Patented July 13, 1915.

Application filed April 15, 1913. Serial No. 761,292.

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 Check-Valves for Automobile Torpedoes, of which the following is a specification.

In automobile torpedoes wherein a so-called superheater is used to heat the compressed air during its flow from the reservoir or air flask to the engine, it is customary to introduce the liquid fuel to this superheater through a spray nozzle or atomizer. In some torpedoes water is sprayed into the superheater through another atomizing nozzle. The liquid fuel (usually alcohol) and the water are carried in receptacles from which these liquids are forced by air pressure through pipes to their respective spray nozzles. It is customary to introduce check valves into the pipes or conduits between these liquid receptacles and their respective spray nozzles. The present invention provides improved valves for this purpose.

The accompanying drawings show the preferred embodiment of the invention.

Figure 1 is a diagrammatic view showing the connection of the elements of the torpedo which are related to the spray nozzles, being a fragmentary vertical section of the middle portion of the torpedo; Fig. 2 is a vertical longitudinal section through one of the spray nozzles on a larger scale; Fig. 3 shows in elevation the internal parts removed; Fig. 4 is an end view of Fig. 3; Figs. 5 and 6 are respectively top and bottom views of the jet plug of the spray nozzle.

Referring to Fig. 1, A is the torpedo body or hull, B is the compressed air reservoir or flask, C is the starting valve, D the reducing valve, E the combustion chamber or heater commonly called the superheater, F is the engine, here shown as a turbine, and G the propeller shaft. *a b c d* are the respective pipes or passages for conducting the compressed air from the reservoir through the respective valves and superheater and to the engine. H is the fuel vessel and J is the water vessel. From the bottoms of these lead pipes *e* and *f* respectively which extend to the spray nozzles K and K' which are screwed through the end of the superheater and have perforated ends which open inside the superheater in order to dis-

charge the spray thereinto. Compressed air is conducted from the pipe *c* through a pipe *g* communicating with the tops of both the vessels H and J whereby to expel the liquid therefrom to the nozzles. All of these parts and their operation are well known. As the spray nozzles K and K' are preferably alike, the description of one will serve for both. Each nozzle K comprises a shell L having a threaded body and preferably a hexagonal head whereby it may be readily screwed into a threaded hole in the superheater head. It has a neck *h* through which is a bore *e'* forming the inlet passage for the liquid. Beyond this the shell L is counterbored, forming a chamber the end of which around the inlet *e'* forms a seat *i*. The other end of the chamber is closed by a plug P through which are formed ducts or passages *j j* terminating in outwardly-directed jet openings *k k*. The ducts *j j* are grouped around the center of the plug, leaving a solid central abutment *m*. Within the chamber M is loosely mounted a tappet check valve Q which is adapted to seat against the seat *i*, and is pressed to the seat by a spring S which reacts against a cup Q'. These parts are shown detached in Fig. 3. The cup Q' is an exact duplicate of the valve Q, so that in assembling the parts it makes no difference which is first introduced, this one becoming the valve Q and the other one becoming the spring cup Q'. Thus the occurrence of any mistake in assembling is rendered impossible. The parts Q Q' are formed each with a conical portion which is adapted to serve as the tappet valve, and with a cylindrical portion which makes a very loose and free sliding fit with the chamber M, and which is bored out to form a cup for receiving the end of the spring S. They are introduced before screwing in the nozzle plug P. When this plug is screwed in its central abutment *m* engages the point of the cone on the cup Q' and forces it inward, compressing the spring. Thus the spring presses the valve Q against its seat, causing it to serve as a check valve, whereby to prevent any flow from the interior of the superheater toward the vessels H and J respectively. But when the compressed air is turned on so that its pressure acts through the tube *g* against the liquid in the vessels H and J, this liquid enters through the passage *e'*, unseats the valve Q, the spring of

which is too weak to resist this, and flows around the cylindrical portions of the valve Q and cup Q', whereby it reaches the opposite end of the chamber, whence it escapes through the ducts *j* and jet orifices *k*.

To facilitate the flow of liquid past the parts Q Q' their cylindrical portions have grooves *p p* cut in them as shown in Fig. 4. According to a further feature of the invention these grooves are cut obliquely so as to constitute spiral passages after the manner of rifling, as shown in Fig. 3. These rifling grooves have the effect of causing the parts Q Q' to rotate during the continuance of the flow of the liquid through the nozzle. During such rotation the parts spin upon the apex of the cone of the cup Q' where it rests upon the abutment *m*. This rotation has the effect of turning the valve so that it is scoured or polished and is presented in a new position against its seat.

An important feature of this invention is the location of the check valve within the body or shell of the nozzle instead of locating it as heretofore at some point in the pipes *e* or *f*. Also heretofore it has been customary to provide this check valve with a vent to the exterior through the outer shell A; but this has been found objectionable because when a torpedo is placed ready for launching in an under-water tube, the hydrostatic pressure is liable to cause a leakage of sea water into the superheater. This liability is avoided by the present invention. Also by locating the valves in the nozzles the necessity of pipe joints or couplings for connecting them to the pipes *e f* is avoided, the only connections for these pipes being those at their opposite ends where they join respectively with the vessels H or J and the nozzles K or K'.

The invention is susceptible of modification in form or structure, or by the substitution of equivalents which will be readily understood.

I claim as my invention:—

1. A check valve comprising a shell forming a chamber having an inlet at one end and an outlet at the other, a valve in said chamber for closing said inlet, and a spring for said valve having a pivotal mounting, said shell having an abutment receiving the reaction of the spring at said pivotal mounting, and the valve having spiral surfaces on its exterior whereby it is rotated by the flow of fluid through said chamber around it.

2. A check valve comprising a shell forming a chamber having an inlet at one end and an outlet at the other, a valve in said chamber for closing said inlet, a spring for said valve, and a cup receiving the reaction of said spring, having a pointed end and constituting a pivotal mounting for the spring, said shell having an abutment at the outlet end of the chamber for receiving the

reaction of said cup, and the valve and cup being interchangeable, whereby either may serve as the valve.

3. A check valve comprising a shell forming a chamber having an inlet at one end and an outlet at the other, a valve in said chamber for closing said inlet, a spring for said valve, and a cup receiving the reaction of said spring, having a pointed end and constituting a pivotal mounting for the spring, said shell having an abutment at the outlet end of the chamber for receiving the reaction of said cup, and the valve and cup having spiral surfaces on their exteriors, whereby they are rotated by the flow of fluid through said chamber around them.

4. A check-valve comprising a shell having a cylindrical chamber with an inlet at one end, a valve for closing said inlet, a spring cup, and an interposed spring, said valve and cup having guiding portions loosely fitting the walls of the chamber and having grooves for the flow of liquid.

5. A check valve comprising a shell forming a chamber having an inlet thereto at one end and an outlet at the opposite end with a central abutment, a valve therein for closing said inlet, having a pointed end entering the inlet, a spring cup having a pointed end resting rotatively against said abutment, and a spring interposed between said valve and cup, said cup and valve being interchangeable whereby either may serve as the other.

6. A check-valve comprising a shell forming a chamber having an inlet thereto at one end, and non-central outlets therefrom at the other end, and having at the outlet end a central abutment, and a valve, spring and spring cup inclosed in said chamber, the spring cup being pointed with its apex resting on said abutment, and the valve, spring and cup being free to turn in said chamber.

7. A check-valve comprising a shell having a cylindrical chamber with an inlet thereto at one end and non-central outlets at the opposite end having a central abutment at the outlet end, a valve, cup and interposed spring in said chamber, said valve and cup having cylindrical portions freely guided within said chamber, and said cup having a central apex resting on said abutment, whereby said inclosed parts are free to turn in said chamber.

8. A check-valve comprising a shell having a cylindrical chamber with the inlet at one end and closed at the opposite end by a plug through which are formed non-central outlet passages, and a valve, cup, and interposed spring inclosed in said chamber and rotatable therein, the cup having a central apex resting on said plug.

9. A spray valve comprising a shell having a chamber with an inlet at one end and

outlets at the other, and a valve, cup, and interposed spring in said chamber, said valve and cup having cylindrical portions freely fitting said chamber and having spiral grooves in such portions.

10 5 10 A check valve comprising a shell forming a chamber, having an inlet thereto at one end, and having a plug closing the opposite end thereof, with non-central outlets from the chamber through said plug, leaving a central abutment, and a valve, cup and interposed spring inclosed in said cham-

ber and removable through the opening closed by said plug, the spring cup being pointed with its apex resting on the abutment of said plug.

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

WILLIAM DIETER.

Witnesses:

GEO. LEICH,
FREDK. C. FLADD.