F. M. LEAVITT.

AUTOMOBILE TORPEDO.

APPLICATION FILED JUNE 13, 1916.

1,308,180. Patented July 1, 1919.

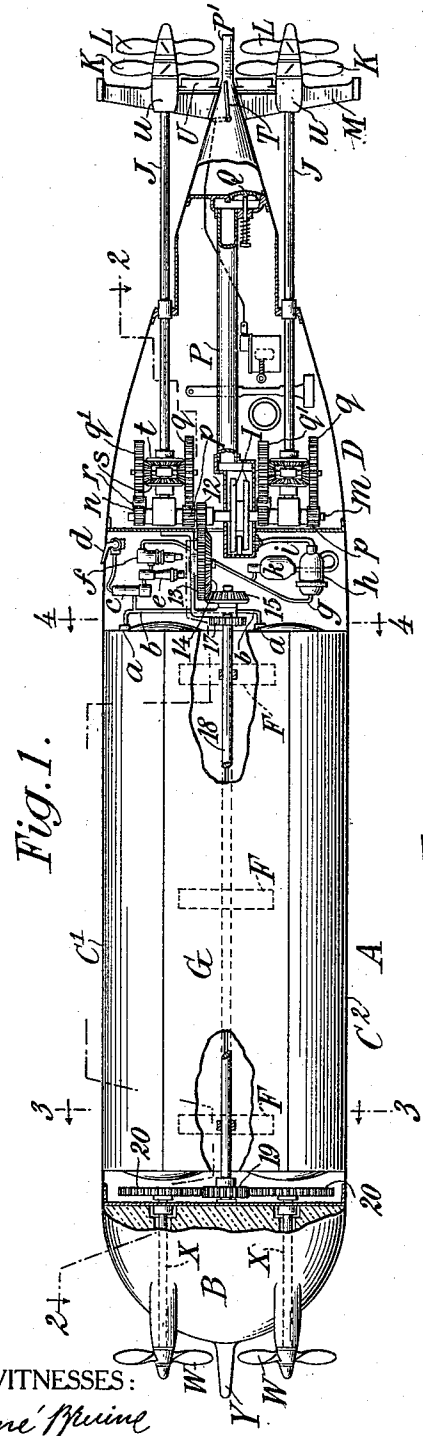


Fig. 1.

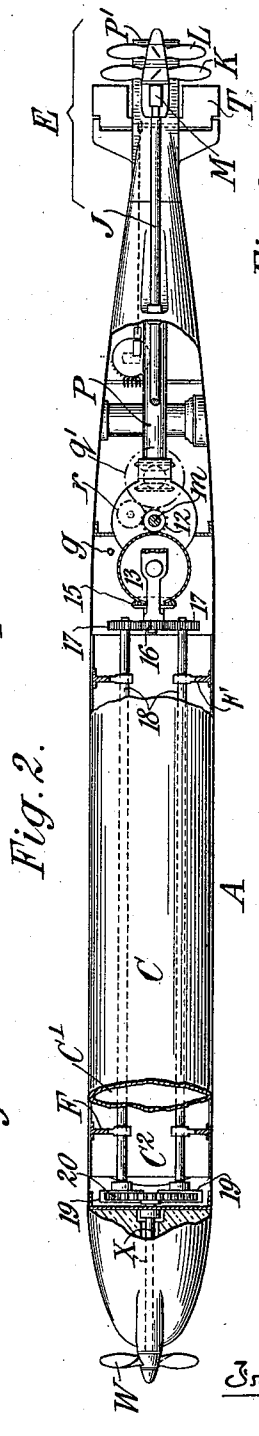


Fig. 2.

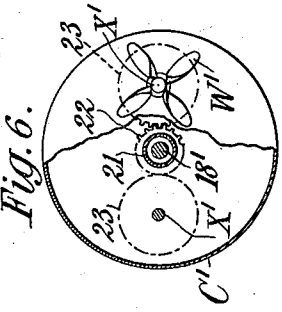


Fig. 6.

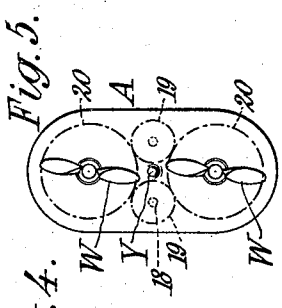


Fig. 5.

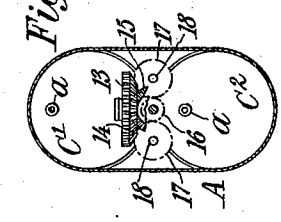


Fig. 4.

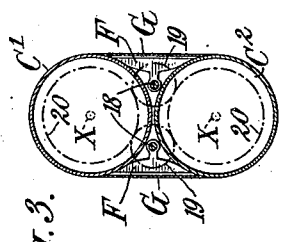


Fig. 3.

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AUTOMOBILE TORPEDO.

1,308,180. Specification of Letters Patent. Patented July 1, 1919.

Application filed June 13, 1916. Serial No. 103,391

To all whom it may concern:

Be it known that I, FRANK M. LEAVITT, a citizen of the United States of America, residing in Smithtown, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Automobile Torpedoes, of which the following is a specification.

This invention aims to provide an automobile torpedo with means for cutting, tearing, or otherwise penetrating a defensive net so that the torpedo on encountering such net may force its way therethrough. The invention also aims to increase the efficiency of the propelling mechanism whereby to reduce the slip of the screws and give a more effective propulsion at high speeds.

These aims are accomplished by providing the torpedo, in addition to the usual propeller screws at the stern, with one or more rapidly revolving devices at or beyond the bow of the torpedo adapted to serve preferably both as net cutters and as propellers. In their preferred form these devices are constructed as propeller screws having any suitable number of blades and of sufficient strength, and having edges sufficiently sharp to serve the purposes of a net cutter. These propeller screws are supplemental to the stern propellers and afford an increased area of propelling surface. Being mounted in advance of the body or hull of the torpedo, they operate in substantially undisturbed water, so that their operation is free from the effect known as cavitation. They are preferably driven by connection with the normal driving mechanism aft of the air flask or flasks, and through one or more communicating shafts and appropriate gearing.

The present invention is most advantageously and preferably applied in connection with the torpedo of the double flask type, such as is fully set forth in my application Serial No. 92,869, filed April 22, 1916, to which reference may be made for a more complete description than that herein given of the construction and details thereof.

In the drawings,—

Figure 1 is a partial side elevation and partial vertical longitudinal mid-section of a double flask torpedo embodying the present invention;

Fig. 2 is a partial plan and partial horizontal section of such torpedo, the sectional portions of which are cut in the planes of the line 2—2 in Fig. 1;

Fig. 3 is a vertical transverse section cut on the line 3—3 in Fig. 1;

Fig. 4 is a vertical transverse section cut on the plane of the line 4—4 in Fig. 1 and looking forward;

Fig. 5 is a front elevation;

Fig. 6 is partly a front elevation and partly a vertical cross-section of a modification illustrating the invention as applied to a torpedo of the present standard type having a single air flask.

Referring to the drawings, the torpedo shown in Figs. 1 to 5 inclusive will be first described. A is the torpedo hull as a whole, which is built up in the usual manner of sections, including the head B, air flask section C, after-body D and tail section E. The flask section C is made up of two air flasks C^1 and C^2 (Fig. 3), shown as placed one above the other and suitably connected together, as by a succession of bridge bars F, F placed at suitable intervals. Plates G, G extend between the flasks tangenting their exterior circular outlines, as shown in Fig. 3.

Each flask may be of the same construction heretofore standard. From the air outlet opening *a* of each extends a tube *b*, which tubes unite and lead to a starting valve *c* of any usual construction operated in any usual way from a starting hook *d*. From the valve *c* the compressed air passes through one or more reducing valves *e*, *f*, and thence by a tube *g* to the usual heater *h*, and thence by a pipe *i* to the nozzle of the usual turbine I (or any other suitable motor engine) for driving the torpedo. For maintaining combustion in the heater *h* liquid fuel is fed from any suitable fuel reservoir *k* in the usual manner.

The turbine shaft *m* is extended above and below the turbine wheels and carries pinions *n*, *n* and *p*, *p*. The pinions *p* mesh with gear wheel *q*, *q*; the pinions *n* mesh with idler pinions *r*, *r*, which in turn mesh with gear wheels *q'*, *q'*; the ratio being such that the gears *q*, *q'* of each set turn in opposite directions at like speeds. These gears carry bevel pinions which drive bevel gears *s*, *t* fixed respectively on the inner and outer propeller shafts in the well known manner. The

outer propeller shafts J, J carry the forward propeller screws K, K; the inner shafts, which are extended within the shafts J and which are not shown, carry as usual the aft propeller screws L, L. Thus, the pairs of propellers, the driving shafts and the gearing group for each pair of shafts are duplicated, the propellers being wholly outside the hull with their shafts supported in out-board bearings *u*, *u* carried on brackets M, M.

The exhaust air from the turbine passes through a conduit P and escapes through the usual sea valve Q into the tail section, whence it is discharged through a conduit P′ emerging between the upper and lower pairs of propellers.

The steering is performed by the usual depth mechanism or diving gear and the usual gyroscopic steering gear, which operate respectively depth rudders T and vertical rudders U.

As thus far described the construction is the same as that set forth in my aforesaid application Serial No. 92,869, to which reference may be made for a more complete description.

According to the present invention, revolving net cutters or propeller screws W, W are mounted adjacent to, or in advance of, the bow portion or head of the torpedo. These are constructed preferably as propeller screws having two, three or four blades, as desired, and having preferably sharp cutting edges on their advancing sides. Two such net cutting propellers are shown, and these may revolve in the same direction or in opposite directions, as desired. They are mounted respectively on shafts X, X extending longitudinally through the torpedo head, and are connected through suitable intercommunicating mechanism with a driving means, which for simplicity is preferably the same means used for driving the usual aft propellers K, L.

A suitable way of driving the net cutting propellers from the main propelling engine or turbine is that shown. The turbine shaft *m* carries a pinion 12 which drives a gear 13 carrying a bevel gear 14 which drives a bevel gear 15 fixed on a central shaft, which carries a pinion 16 which drives two gears 17, 17 fixed on shafts 18, 18, which shafts extend forward and carry at their front ends pinions 19, 19, which mesh with gears 20, 20 fixed on the rear ends of the shafts X, X. The shafts 18, 18 are shown as extended forward through the triangular chambers between the air flasks and the respective side plates G, G (see Fig. 3).

By means of the gearing and shaft connections thus described the screws W, W are driven at high speed in advance of the torpedo and in such direction as to coöperate with and supplement the propelling effect of the rear propellers K, L. Should the torpedo strike a net or other such obstruction, the rapidly whirling blades of the screws W, W should have the effect of severing such net. If the wires of the net are not immediately severed and are drawn into the hubs of the screws, the sharpened edges of the blades will then act with great advantage of leverage to cut the wires. Even if the resistance of the net should be such as to break or distort some of the blades of the screws W, this will probably occur after such a breach has been effected in the net as will permit the torpedo, under the impulse of its inertia and the propulsive action of its propeller screws, to force its way through such breach and travel the short remaining distance necessary to effectively strike the target which the intercepting net was intended to protect.

In the preferred arrangement shown the shafts X, X and the shafts J, J are in alinement with each other and with the intervening longitudinal axes of the cylindrical air flasks, C′, C².

The head B carries the usual explosive charge and requires some suitable detonating means for exploding this charge upon encountering the target. This means should be so devised as to be unaffected by the mere encounter with the protecting net. The present invention is not concerned with the means for exploding the charge. The head is shown in Fig. 1 as formed with a projecting horn or prong Y which may contain the fuse or exploding means.

Fig. 6 shows how the present invention may be applied to a torpedo of the ordinary or standard single flask type. The left-hand portion of the figure is a section through the flask C′. In place of the two shafts 18 a single shaft 18′ is provided which is best arranged centrally, the air flask being provided with a central tube 21 through which this shaft is extended, the compressed air being exterior to the tube 21. The rear end of the shaft 18′ may be driven directly by the gear 15 (Fig. 1). Its front end carries a gear 22 which drives gears 23, 23 fixed on the rear ends of the shafts X′ which carry the net cutting screws, one of which is shown at W′.

Various other arrangements of connecting shafts and gearing may be provided for communicating rotation from the driving means to the forward net cutting screw or screws W or W′.

While the invention is peculiarly adapted to the double flask type of torpedo set forth in my said prior application, yet it is applicable to other shapes or types of torpedoes, as for example to the standard type, an example of such application having been shown and described with reference to Fig. 6.

It will be understood that the elements W or W′ which preferably combine the functions of net cutting and of auxiliary propulsion, may be so modified as to omit or neglect either of these functions. For example, if they were constructed as propeller screws which have such low pitch as to have no propulsive effect, they would serve the net cutting function only.

I claim as my invention:—

1. An automobile torpedo comprising propelling mechanism, stern propeller screws, two parallel longitudinal shafts extending through the bow of the torpedo and driven from said propelling mechanism, and a pair of revolving net-cutting screws mounted on said shafts forward of the torpedo.

2. An automobile torpedo having two parallel longitudinal cylindrical air flasks, forming part of the hull of the torpedo, said hull flattened to in part conform to said flasks in transverse contour and extended forward and aft of the flasks to form head and tail portions, propeller screws turning on axes coinciding with those of the respective flasks, propelling mechanism for driving said screws, longitudinal shafts extending through the head of the torpedo, and net-cutting screws mounted on said shafts forward of the torpedo, said screws being driven from said propelling mechanism.

3. An automobile torpedo having two parallel air flasks forming part of the hull, the latter including longitudinal spaces between the flasks, having propeller screws and propelling mechanism driving them, and having revolving devices at the bow of the torpedo and means for driving them from such propelling mechanism, such means comprising longitudinal shafts extended through the spaces between the air flasks.

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

FRANK M. LEAVITT.

Witnesses:

PETER KRUSE,

LOUIS KIRSCHBAUM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."