

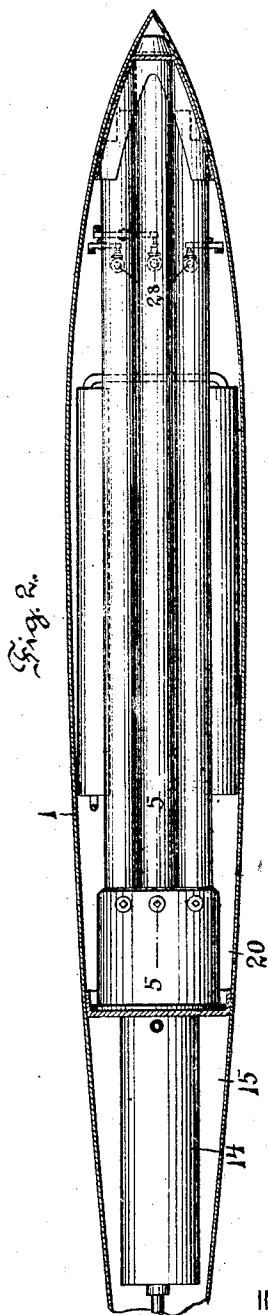
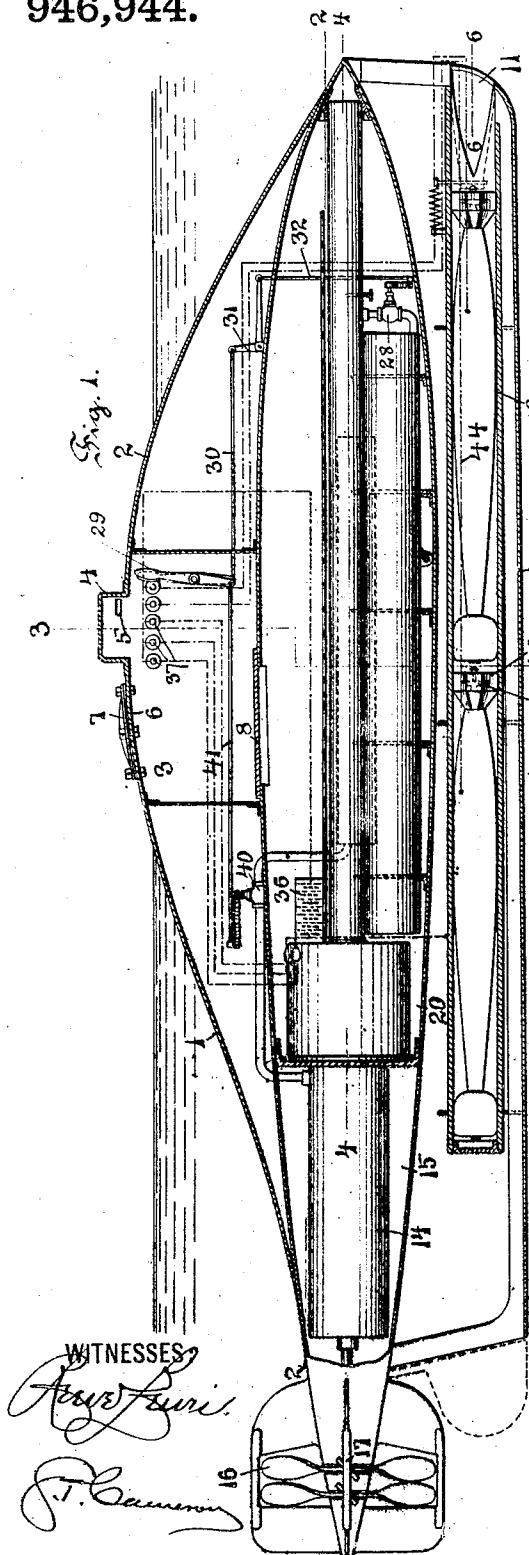
H. MAXIM.
TORPEDO BOAT.

APPLICATION FILED MAR. 23, 1899.

946,944.

Patented Jan. 18, 1910.

3 SHEETS—SHEET 1.



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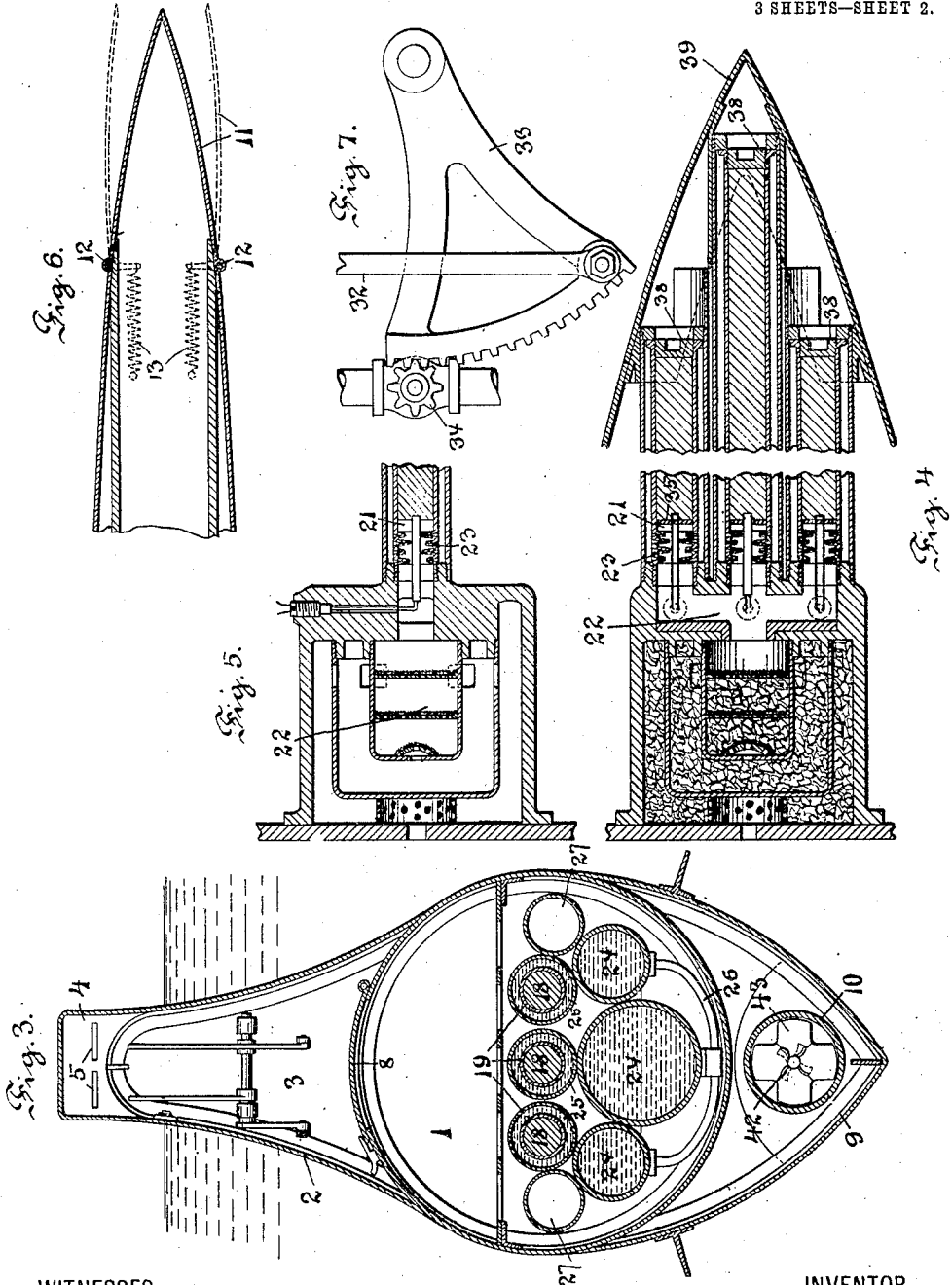
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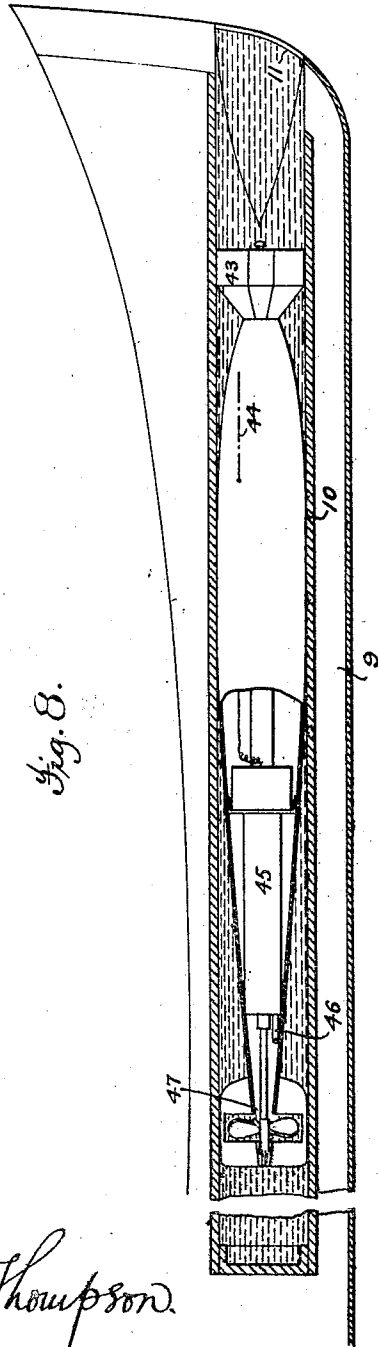
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UNITED STATES PATENT OFFICE.

HUDSON MAXIM, OF NEW YORK, N. Y.

TORPEDO-BOAT.

946,944.

Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed March 23, 1899. Serial No. 710,193.

To all whom it may concern:

Be it known that I, HUDSON MAXIM, resident of the city and State of New York, have invented new and useful Improvements in Torpedo-Boats, which are fully set forth in the following specification.

My invention relates to an improvement in processes and apparatus for launching torpedoes.

The object of the invention is to launch a torpedo in as close proximity to the target as possible, with the highest obtainable initial velocity and with the minimum of danger, from the fire of the hostile war-ship, to the torpedo boat and its occupants.

In carrying out my invention any suitable boat may be employed from which to launch the torpedo, but I prefer to employ a small torpedo boat which may be almost entirely submerged so as to afford a small and inconspicuous target to the enemy, and equipped with propelling devices whereby it may be driven at an exceedingly high speed, to the end that it may rapidly pass through the zone of fire of the warship attacked, launch its torpedo and withdraw with equal rapidity.

With the objects aforesaid in view, my invention resides in a process of launching automobile torpedoes which consists in ejecting a torpedo from its launching tube by the combined power of its propellers and the expansive force of the motive fluid after said fluid has acted upon the propellers. The expansive force of the motor fluid after it has passed through the propellers of the torpedo is utilized by causing it to react between the launching tube and the rear of the torpedo, the motive fluid acting on the torpedo in said tube, in a manner similar to that by which a projectile is fired from a gun by the gases of explosion of the powder charge. The automobile torpedoes employed may be of any desired type and are placed in a launching tube or submarine gun which is allowed to remain full of water and is provided with a port at its forward end opened by the outrush of the torpedo when launched, and adapted to close automatically, openings being provided so that the space in the interior of the launching tube is constantly in communication with the sea. Any suit-

able motor fluid may be employed for the launching and propulsion of the torpedoes. I may, if desired, for the purpose of producing motor fluid, place in the main body of the torpedo, long rods or bars of a compound colloid of gun cotton and nitroglycerin or other suitable compound capable of supporting its own combustion. These bars or candles, as they may be called, of self-combusting compound, are provided with means for ignition independently or in series, or simultaneously, as may be desired, while all the surfaces except those ignited should be protected from ignition so that the material may be caused to be consumed gradually and in the desired direction. The products of combustion of the colloidal candles may be utilized for evaporating a liquid or heating a gas or both, for the production of motor fluid for driving the motor or for propelling purposes by any suitable means or device. For example, the torpedoes employed may be those driven by a motor actuated by some expansive fluid, such as compressed air, carbonic acid, or a compound fluid consisting of products of combustion of a nitro compound and another fluid or fluids.

In the practice of my invention the propelling mechanism of the automobile torpedo is set in motion while within the launching tube, which tube as above mentioned is filled with water, and the torpedo will therefore be launched with great rapidity, this end being secured by the combined action of the propeller screws of the torpedo and the direct propulsive action of the motor fluid escaping from the rear of the torpedo into the launching tube. The torpedoes will be ejected with such velocity, together with the water thrown forward at the same time, that there will be sufficient recoil to aid materially in stopping the torpedo boat, so that the boat may be rushed directly forward, head on, toward a war-ship until very close to it, when the torpedo being launched and the propellers of the boat simultaneously reversed, the combined action will be not only to bring the boat to a very sudden standstill, but to cause it to retreat with great speed in the opposite direction from which it came. It is obvious that a torpedo boat

of high speed will thus be enabled to pass very quickly through the zone of fire of the guns of the enemy, deliver its torpedoes and then get out of range with the minimum consumption of time.

With this general statement of the leading features of the invention, I have, in order to make the same more clearly understood, shown in the accompanying drawings means for carrying it into practical effect without thereby limiting the improvement in its useful application to the particular apparatus herein illustrated.

Figure 1 is a longitudinal, vertical elevation, partly in section of a torpedo boat which I prefer to employ as the launching apparatus in carrying out my process. Fig. 2 is a horizontal section of the boat on the line 2—2 of Fig. 1; Fig. 3 is a transverse section on the line 3—3 of Fig. 1; Fig. 4 is a horizontal section on the line 4—4 of Fig. 1, showing a part of the fluid pressure generating apparatus, which I prefer to employ in said boat. Fig. 5 is a vertical, longitudinal section of part of the generator on the line 5—5 of Fig. 2; Fig. 6 is a horizontal section of the forward portion of the torpedo tube and its opening ports or doors with contiguous parts of the boat taken on the line 6—6 of Fig. 1; Fig. 7 is an elevation of the lever operating device for opening and closing the various valves and stop-cocks of the boat's mechanism. Fig. 8 is a broken sectional detail showing how the gases after actuating the propeller of the torpedo, escape and react on the water.

Referring to the drawings, the boat consists chiefly of a cigar-shaped main body portion 1. This main body contains the principal motive machinery, and is provided with a superstructure 2. The superstructure is provided with a compartment 3 constituting a pilot house, from which the various devices and parts of the boat's mechanism may be operated and controlled. The pilot house is provided with a closed hood or lookout 4 projecting above the water-line of the boat, and having windows 5 in the form of small apertures, closed with a solid plate of glass. The pilot house is also provided with a manhole 6 having a cover 7, with which the same may be closed watertight. Communication may be had between the main body of the boat and the pilot house through a manhole made watertight by means of the door 8. The boat is also provided with a sub-structure 9 which contains the torpedo launching tube or submarine gun 10 which carries two or more automobile or dirigible torpedoes. The launching tube is adapted to be normally closed by a double door 11, or two doors, divided at the stem line, and conforming to the general contour of the boat. The doors are constructed so as to swing out in a lateral direction on vertical

hinges 12, attached to the side of the launching tube, so that the doors are opened by the outrush of the torpedo and the water in the tube within which the torpedo is immersed. After the passing of the torpedo from the launching tube, the doors are closed by means of springs 13 attached to the arms of the hinges.

A suitable motor, preferably a double turbine, is contained at 14, in the compartment 15. One part of the turbine is adapted to rotate in one direction, while the other part is caused to rotate in an opposite direction. One part of the turbine is directly connected to one of the screws or propellers 16, while the other is directly connected to the other screw, by means of independent shafts at 17, the one being a tube, and the other adapted to rotate within the same. The motor or turbine, is preferably actuated by an expansive fluid, which is generated by any suitable method. Preferably there are provided a plurality of candles of the self-combustible nitro-compounds, 18 as for example, three in number, each preferably inclosed in separate tubes, 19, and adapted to be burned from one end only, while the sides of the candle are protected from ignition by being in contact with the tube walls or by being sealed or cemented to the tube walls. The several tubes are preferably arranged side by side in the horizontal plane with the main body 1, and made to extend from near the bow of the boat back to the chamber 20, containing the mixing and evaporating device hereinafter described. The colloidal candles of nitro-compound are adapted to be ignited, either successively, or simultaneously, as may be required; the ignition being effected at the end communicating with the chamber 20. It is obvious that the combustion chamber will be enlarged as the candle of nitro-compound becomes consumed.

An evaporation chamber 22, in communication with the combustion chamber 21, is provided, having the same interior structure and function as the evaporation chamber illustrated and described in my application, Serial No. 710,192, filed March 23, 1899.

A separate spraying device 23 is preferably provided for jetting water into the path of the products of combustion of each of the colloidal candles in the passage of the same to the evaporation chamber. The several colloidal candles are adapted to be ignited either separately or simultaneously, but the center candle is preferably first ignited. A water supply to the spraying device is provided in the cylinders 24, from which it is forced under pressure to and through the outer cylinders constituting water jackets 25 for the cylinders 19 carrying the colloidal candles 18. The water reservoirs are preferably arranged beneath the cylinders carrying the colloidal candles,

in order to place the weight of the same as low in the vessel as possible. The water reservoirs are connected by a pipe 26, so that they may be emptied and filled simultaneously. A compensating device or automatically operated valve, not shown, is provided for admitting the water of the sea into the chamber 9 about the launching tube 10 or into the spaces beneath and about the various cylinders 24, 25 and 27 within the main body of the boat. The automatic valve is adapted to be opened and closed by the varying pressure of the sea-water, so that, as the boat becomes less deeply immersed, a sufficient amount of water will be admitted to again immerse the boat to its original depth. The pipes connecting the liquid holding chambers or reservoirs 24, with the cooling jacket 25 are each opened and closed by a valve 28 operated by a hand lever 29 in the pilot house, the lever being connected by a rod 30, a bell crank 31, and a connecting rod 32, attached to a quadrant 33, which is provided with a rack meshing with a pinion 34 on the spindle of the valve, see Fig. 7. The ignition end of each of the colloidal candles is separated from the combustion chamber by a non-heat conducting and non-combustible body or coating 35, which is destroyed or broken through upon ignition of the candle. The ignition of the colloidal candles is effected by means of an electric current, which current is generated by the battery 36, the circuit being completed by means of push buttons 37 in the pilot house. A small thread of wire embedded in the ignition end of the powder, and constituting part of the electric circuit, is raised to incandescence by the electric current, thereby igniting the colloidal compound. Openings are provided at the bow of the boat for the insertion of the colloidal candles into their respective tubes after which the tubes are closed by the plugs 38, and the ports by the watertight closure 39.

The torpedo is provided with the usual propeller, the shaft being driven by a suitable engine 45 (Fig. 8), of the turbine or any suitable type, the motor fluid therefor being supplied for example by the products of combustion of a self combustible colloidal candle in manner as before described with reference to the boat propulsion. The exhaust motor fluid or products of combustion and steam, after doing duty, leave the engine casing by a pipe 46, and find an exit to the exterior of the torpedo by a rear opening 47, around the propeller shaft, so that the torpedo will be expelled or launched from the tube with great rapidity, due to the combined action of the propeller screws and the direct propulsion of the escaping motor fluid by its impact against the water in the tube.

the apparatus herein described the torpedo or torpedoes are placed in the launching tube 10 which tube is filled with water and is in open communication with the sea as already described, the doors 11 of the launching tube however, being closed. The control of the application of the motor fluid of the torpedoes to the propellers thereof is controlled from the pilot house 4 by the operator, preferably through electrically operated devices whose application is secured by the operation of the buttons 37. The electric wire 44 thus communicates with the pilot house and controls the firing or launching of each of the torpedoes in the launching tube so that said torpedoes may be launched either separately or simultaneously, one after the other.

When a torpedo is employed like that described in my aforesaid application Sr. No. 710,192, the colloidal candle within the same is adapted to be ignited by means of the wire 44 communicating with the pilot house, whereby, as already stated, the torpedo is thrown from the launching tube by the combined action of its propellers or screws on the water surrounding the torpedo in the launching tube and by the pressure upon the rear of the torpedo of the escaping motor fluid exhausted from the torpedo in driving the screws.

When employing torpedoes of a type having a fuse unlocked or cocked by means of a rotating fan 42, the premature revolution of the fan is prevented by means of circumferential blocks 43, encircling the head of the torpedo about the fans.

What is claimed is:—

1. The herein described process of launching automobile torpedoes from a tube within which they are immersed in water; which consists in utilizing the combined action of the propellers of the same and the expansive force of the escaping motor fluid acting upon the torpedoes at their rear to impart the launching movement thereto.

2. The herein described process of launching automobile torpedoes, which consists in igniting within the torpedo a self-combustible compound, passing the products of combustion through a propelling device out of the rear of the torpedo and further utilizing the escaping motor fluid for expelling the torpedo from a tube by direct pressure upon the rear of the same.

3. The herein described method of launching automobile torpedoes from a launching tube which consists in passing a motive fluid through the propeller operating mechanism of the torpedo and afterward utilizing the expansion of the said fluid within the tube to assist in ejecting the torpedo therefrom.

4. The herein described method of launching automobile torpedoes from a torpedo

In practicing my invention by the use of

boat which consists in passing a motive fluid through the propeller operating mechanism of the torpedo to drive it forward, then causing the exhaust motive fluid to react between the torpedo and the boat, and simultaneously operating the propellers of the boat to propel it rearward.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses:

HUDSON MAXIM.

Witnesses:

C. A. L. MASSIE,
ELISHA K. CAMP.