G. C. DAVISON.

TURBINE DRIVEN TORPEDO.

APPLICATION FILED JULY 24, 1911.

1,126,183.

Patented Jan. 26, 1915.

3 SHEETS—SHEET 1.

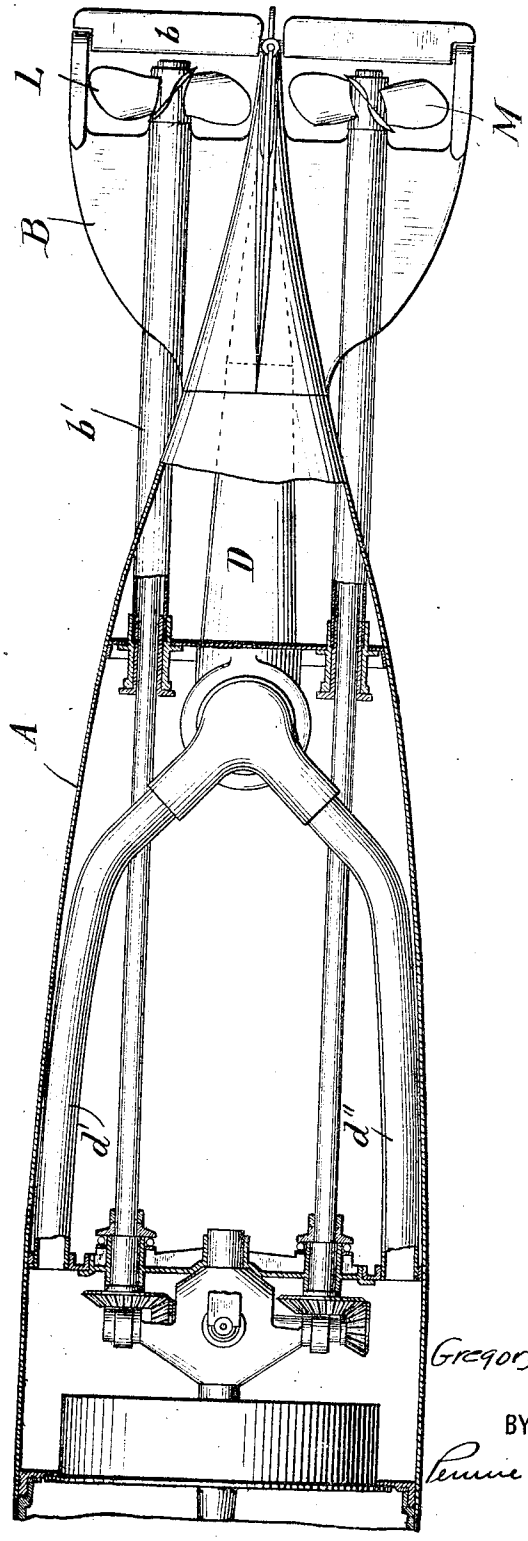


Fig. 1.

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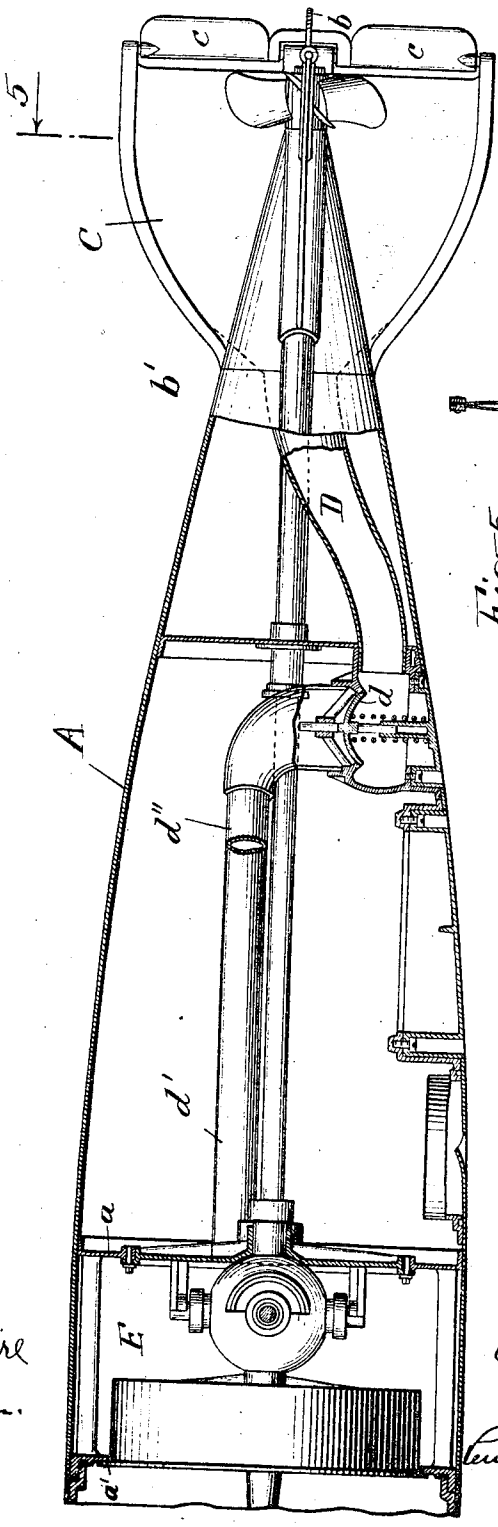


Fig. 2.

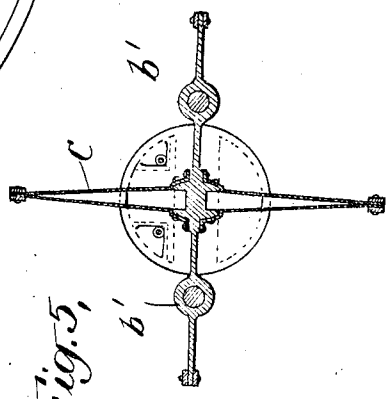


Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 4.

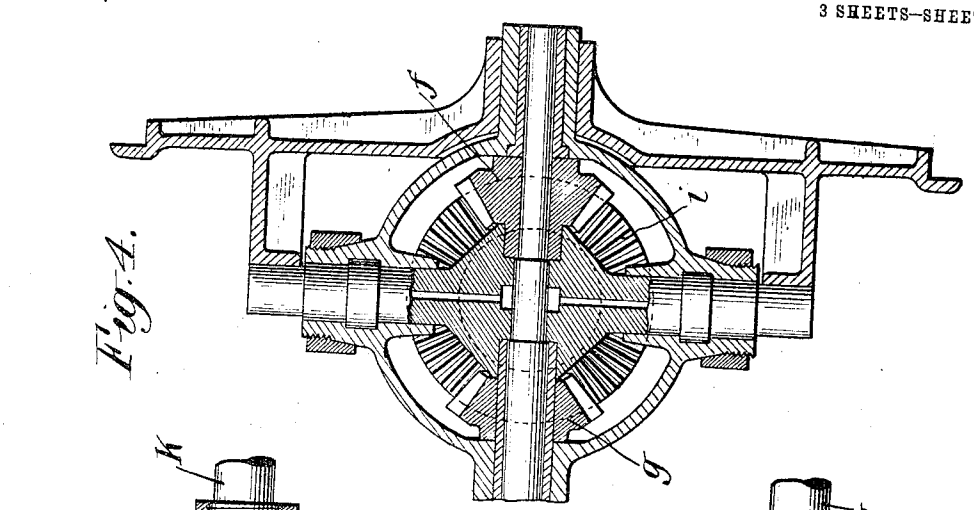
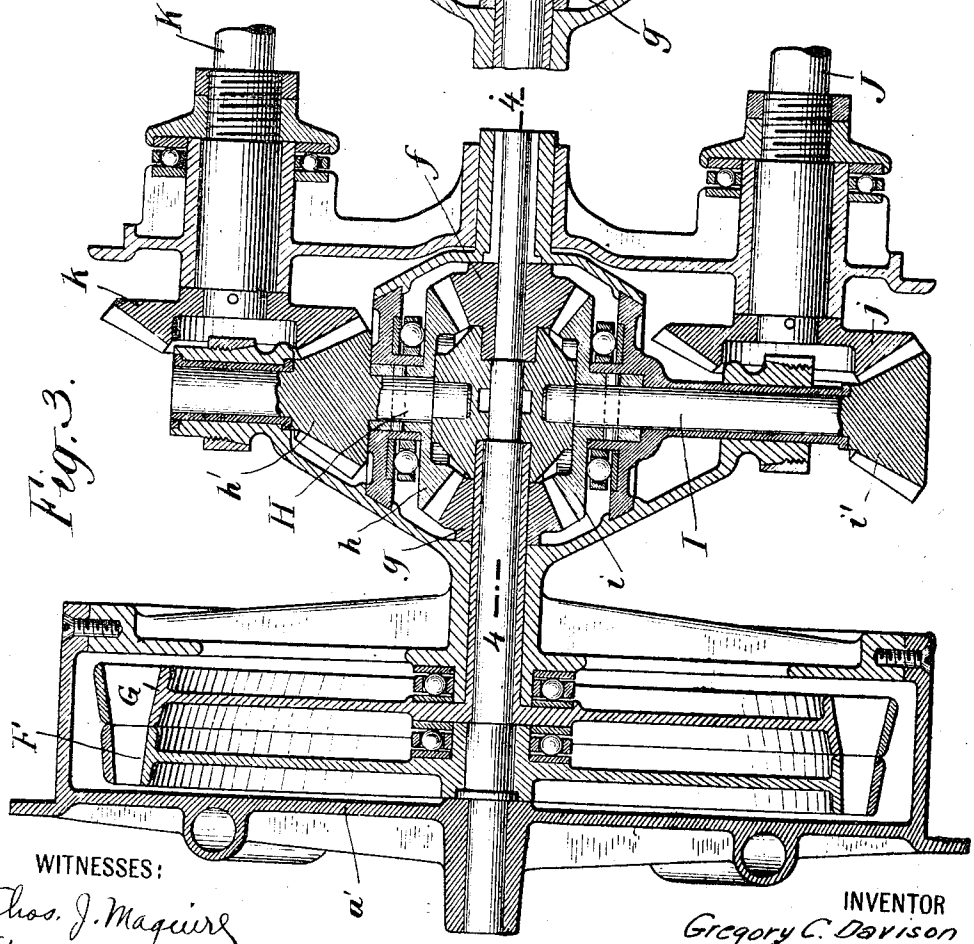


Fig. 3.



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UNITED STATES PATENT OFFICE.

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TURBINE-DRIVEN TORPEDO.

1,126,183. Specification of Letters Patent. Patented Jan. 26, 1915

Application filed July 24, 1911. Serial No. 640,338.

To all whom it may concern:

Be it known that I, GREGORY C. DAVISON, a citizen of the United States, residing at New London, county of New London, State of Connecticut, have invented certain new and useful Improvements in Turbine-Driven Torpedoes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the general construction and arangement of the driving mechanism of automobile torpedoes, especially those driven by turbines or other forms of rotary engines.

The automobile torpedo requires perfect kinetic symmetry to avoid deviation from a calculated path and the gyroscopic effect of the rotating parts within the shell should be neutralized. So also, should the propellers and exhaust gases which act upon the surrounding fluid medium through which the torpedo takes its course be so opposed and arranged as to avoid erratic action.

The usual practice heretofore in the arrangement of the propellers has been to place two oppositely revolving wheels in tandem in which case they are required to be nicely proportioned for a given speed and of different diameter and pitch.

The better arrangement of the two like opposed wheels arranged upon opposite sides of the axis of the topedo has been used in a few cases notably in the Howell torpedo described in the Howell Patent No. 311,325 granted January 27, 1885, in which no fluid engine was employed and in a modified form shown in Figure 2 of Patent No. 858,266 granted to me June 25, 1907, where two turbines side by side and directly connected to the propeller shafts were shown.

My present invention comprehends the employment of a two stage turbine, that is, practically two turbines, in tandem, the rotors of which run in opposite directions and are, by balanced reducing gearing in which gyroscopic action has been neutralized, geared to one another (so that they run synchronously) and to two synchronously rotating propeller shafts driving opposed propellers mounted upon opposite sides of the axis of the torpedo. And it also comprehends the piping of the exhaust gases through the after part of the torpedo shell to an outlet at the tail this outlet being given the form of a long narrow slit located in the plane of the axis of the torpedo midway between the propellers. The narrow slit form of the outlet breaks up the exhaust gases into small bubbles which do not have the erratic discharge effect upon the water noticed in the case of circular exhaust openings of large area under water.

I have illustrated the after part of a torpedo embodying this invention in the accompanying drawings in which:

Fig. 1, is a plan view showing the shell cut away exposing the interior driving mechanism; Fig. 2, is an elevation of the same; Fig. 3, is a horizontal central section in detail of the turbine and gearing; Fig. 4, is a vertical central section of the gearing; Fig. 5, is a cross section on line 5—5 of Fig. 2 taken in the direction of the arrows.

Referring to the drawings A designates the shell of the topedo which terminates in a tail consisting of the horizontal web B supporting the horizontal or diving rudder *b* and the shaft tunnels *b'*, and the hollow vertical web C supporting the vertical rudder *c* and which is the exhaust terminal. This web C (see Fig. 5) is open to the sea at its rearward edge as a long narrow vertical fissure from which the exhaust issues in a finely divided condition and does not react upon the torpedo to cause deviations in its course. A pipe D conducts the exhaust from a check valve *d* to the interior of hollow web C and two like pipes *d'* and *d''* lead the exhaust from the turbine chamber E, inclosed by partitions *a* and *a'* and the shell A, to the check-valve *d*. The check valve *d* is provided for the usual purpose of preventing water from entering the turbine chamber E through the exhaust passage when the torpedo, at the end of the run, is lying still in the water. This arrangement of the exhaust piping excludes the exhaust gases from the after part of the torpedo where the steering devices, etc. (indicated in Fig. 2 by their supporting bases) are located.

The turbine consists of the two rotors F and G, which are driven in opposite direction by the suitable impingement thereon of the motive fluid, and these rotors F and G drive the bevel pinions *f* and *g* respectively. The pinions *f* and *g*, running in opposite directions, both mesh with bevel gears *h* and *i* which drive the shafts H and I and

compel synchronism of the rotors. Bevel pinions h' and i' respectively mounted on shafts H and I mesh with bevel gears j and k on the propeller shafts J and K driving these shafts in opposite directions. The propeller shafts J and K pass out of the shell A through the shaft tunnels b' and carry the opposed propeller wheels L and M on their outer ends.

It will be noted that each wheel of the gear group is duplicated by another wheel rotating at the same speed in the opposite direction neutralizing their moments of inertia and eliminating gyroscopic action, and where, as in the case of the pinions h' and i', the gears lie unequal distances from the axial line of the shell, the weights of the gears and their shafts should be proportioned to effect kinetic symmetry.

It is obvious that more stages may be used in the turbine if desired.

This arrangement of tandem rotors geared down to parallel non-centric shafts is especially well adapted to the accepted form of torpedo body and affords the opportunity for establishing perfect kinetic symmetry.

What I claim is:

1. In an automobile torpedo, the combination of oppositely revolving turbine rotors arranged in tandem, oppositely revolving propeller shafts arranged symmetrically on opposite sides of the axis of the torpedo, and intermeshing reduction gearing having kinetic symmetry and arranged to establish driving connection between said rotors and said shafts and maintain synchronous rotation of said shafts.

2. In an automobile torpedo, the combination of oppositely revolving turbine rotors, oppositely revolving propeller wheels arranged upon opposite sides of the axial plane of said torpedo, intermeshing reduction gearing between and serving to synchronously connect and drive said wheels, and an exhaust outlet having the form of a thin fissure located in the axial plane of said torpedo and midway between said propeller wheels.

3. In an automobile torpedo, the combination of two non-centric propellers and an exhaust outlet having the form of a thin fissure, located midway there-between.

4. In an automobile torpedo, the combination with the after body of said torpedo of an engine chamber forward of said after body, two propeller shafts, driving mechanism for said shafts within said engine chamber, and an exhaust conduit leading from said engine chamber through said after body to a point at the stern midway between said propeller shafts, said conduit adapted to isolate the exhaust gases from said after body.

5. In an automobile torpedo, the combination of two propeller wheels mounted on opposite sides of an axial plane of said torpedo and a fissure-like exhaust nozzle midway between and perpendicular to the plane of mounting of said propeller wheels.

6. In an automobile torpedo, an outer shell terminating in a hollow vertical fin having a narrow open rear end, serving as an exhaust outlet.

7. In an automobile torpedo, the combination of a shell terminating in a hollow vertical fin having a narrow open rear end serving as an exhaust outlet, and oppositely revolving propellers mounted upon either side of said fin.

In testimony whereof I affix my signature, in presence of two witnesses.

GREGORY CALDWELL DAVISON.

Witnesses:
W. D. FESLER,
F. B. BRAKE.

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