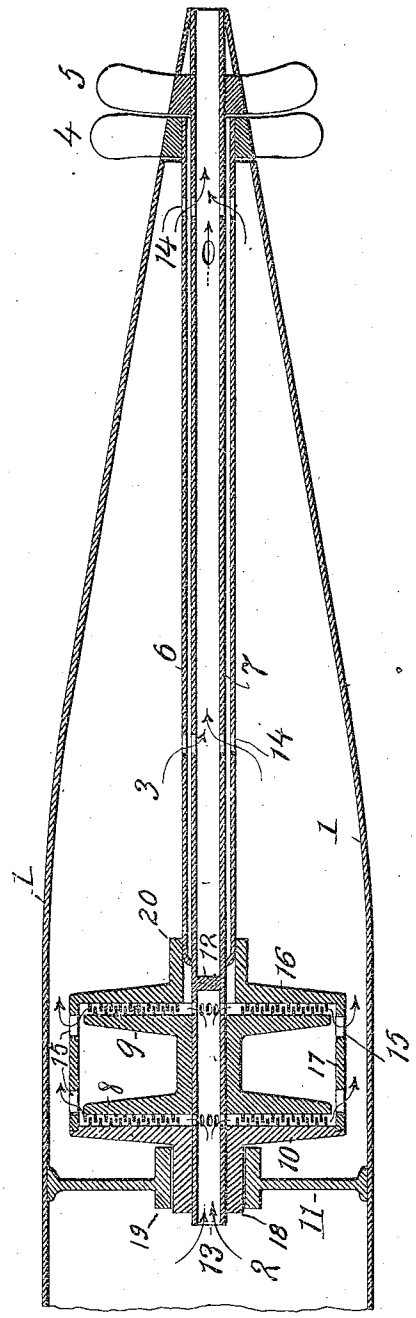
No. 888,390. PATENTED MAY 19, 1908.

G. DALÉN.

MACHINERY FOR PROPELLING VESSELS.

APPLICATION FILED APR. 23, 1907.



WITNESSES:

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GUSTAF DALÉN, OF STOCKHOLM, SWEDEN.

MACHINERY FOR PROPELLING VESSELS.

No. 888,890. Specification of Letters Patent. Patented May 19, 1908.

Application filed April 23, 1907. Serial No. 369,799.

To all whom it may concern:

Be it known that I, GUSTAF DALÉN, engineer, citizen of Sweden, residing at Stockholm, Sweden, have invented a certain new and useful Improvement in Machinery for Propelling Vessels, of which the following is a specification.

The present invention refers to an improvement in machinery for propelling vessels provided with two co-axially arranged propellers, rotating in opposite directions. The object of the invention is to neutralize reaction forces, which would tend to rotate the vessel itself around its longitudinal axis.

The accompanying drawing shows the aft part of a torpedo in longitudinal section, provided with the present improvement.

1 indicates the shell of the torpedo, 2 the compartment, in which the motive fluid—for instance compressed air—is stored and 3 is the compartment in which the propelling machinery is placed.

4 and 5 are screw propellers mounted on shafts 6 and 7. The shafts 6 and 7 are hollow, the shaft 7 being disposed within the shaft 6.

Keyed upon the shaft 7 are two turbine wheels 8, 9, of the radial flow type having buckets projecting from their outer faces and preferably disposed in concentric rings. Entering the spaces between said bucket rings are similar buckets or guide blades which project from the inner faces of two turbine wheels 10, 16. On the outer circumferential peripheries of wheels 10, 16, is a wall 17, extending between said wheels: so that the wheels 10, 16, and wall 17, together form a casing for the inner wheels 8, 9. On the wheel 10 is a hollow trunnion 18, which has a bearing in a sleeve 19 in partition 11. On wheel 16 is a hollow trunnion 20, to which is keyed fast the outer shaft 6. Said shaft terminates within said trunnion and may be flanged inwardly at its end. In shaft 7 is a partition 12.

The operation is as follows: Motive fluid is admitted from compartment 2 to the open end 13 of shaft 7. It then passes through openings in the wall of said shaft to the bucket spaces between the wheels and so to openings 15 in the casing wall 17 and to compartment 3. From compartment 3 it passes by openings 14 into the interior of shafts 6 and 7, and finally escapes astern through the open rear ends of said shafts. The result is that wheels 10, 16 and wheels 8, 9, are rotated in relatively opposite directions, and the propellers being similarly rotated act conjointly to drive the boat.

The advantage of employing turbine wheels rotating in opposite directions and mounted on the propeller shafts instead of piston machines as hitherto proposed is that the turbine wheels accommodate their speed of rotation and thus their delivery of work independently of one another to the temporary and varying water resistance of the corresponding propeller, whereby no reaction forces tending to rotate the vessel around its longitudinal axis arise due to unequal load on the propellers. Owing furthermore to the fact that no stationary nozzles or guide blades are used no reaction forces will arise due to the admission of the motive fluid, which would tend to rotate the vessel.

I claim:—

1. Two hollow coaxial shafts, two turbine wheels each mounted on one of said shafts and rotating said shafts in opposite directions, a partition in the inner shaft and means for causing the working fluid to pass through a part of the inner shaft on one side of said partition to said wheels and after leaving said wheels through said shaft on the other side of said partition to exhaust.

2. In combination with a hull of a vessel a transverse bulkhead dividing the same into two compartments, a turbine wheel in one of said compartments, a hollow shaft therefor extending through and journaled in said bulkhead and a partition in said shaft; the said hollow shaft having openings whereby motive fluid is conducted through said bulkhead and through said hollow shaft on one side of said partition to said wheel and then from said wheel-containing compartment to said hollow shaft on the other side of said partition and so to exhaust.

3. The combination with the hull of a vessel of two hollow shafts, one inclosing the other, a screw propeller on each shaft, a cylindrical casing on the exterior shaft having buckets on its inner faces, radial flow turbine wheels on the inner shaft disposed within said casing and having buckets coöperating with said casing buckets and a partition in said inner shaft; the said shafts and casing having openings whereby working fluid admitted to said interior shaft on one side of said partition is caused to pass through the bucket spaces and through said casing wall,

and thence to said shaft on the opposite side of said partition and through said shaft to exhaust.

4. The combination with the hull of a vessel divided by a transverse partition into two compartments, two hollow shafts one inclosing the other, a partition in the inner shaft and a screw propeller on each shaft, of a rotary cylindrical casing in one of said compartments journaled in said transverse partition, mounted upon the exterior shaft and having buckets on its inner faces, radial flow turbine wheels mounted on the inner shaft and disposed within said casing and having buckets coöperating with said casing buckets and means for conveying working fluid from the other of said hull compartments to the interior shaft on one side of said partition, thence to the bucket spaces, and thence through the wall of said casing to the inclosing compartment thereof, and thence again to said interior shaft on the opposite side of said partition and so to exhaust.

In testimony whereof I have affixed my signature in presence of two witnesses.

GUSTAF DALÉN.

Witnesses:
WALDEMAR BOMAN,
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