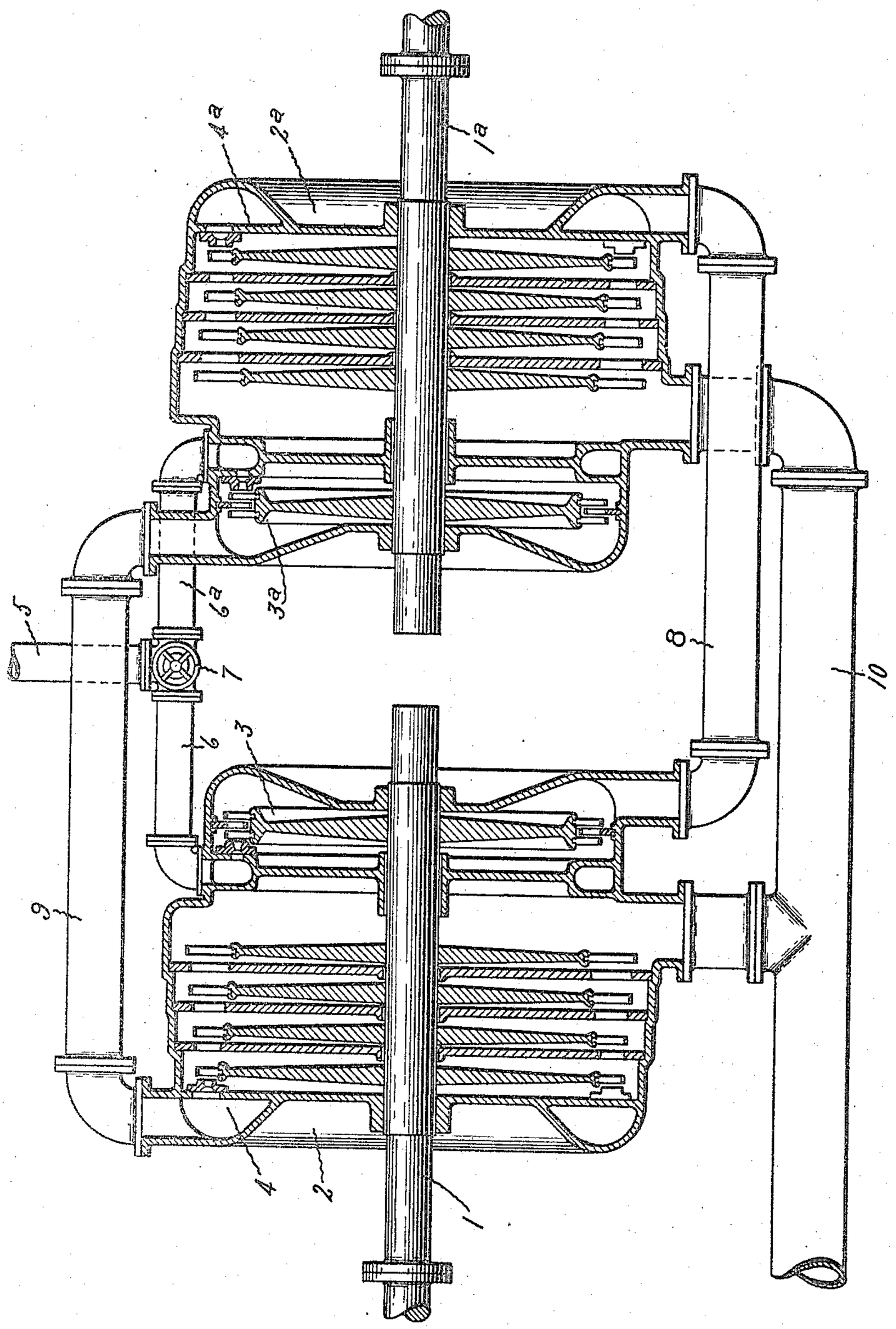
K. ALQUIST.

MARINE TURBINE.

APPLICATION FILED AUG. 31, 1914.

1,155,030.

Patented Sept. 28, 1915.



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UNITED STATES PATENT OFFICE.

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MARINE TURBINE.

1,155,030. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed August 31, 1914. Serial No. 859,361.

To all whom it may concern:

Be it known that I, KARL ALQUIST, a subject of the King of Sweden, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Marine Turbines, of which the following is a specification.

The present invention relates to marine turbines and particularly to such turbines simultaneously operating bow and stern propellers.

In steamships, more especially ferry-boats, which have to be run with either end forward, both ends being provided with propellers, these propellers have generally been driven from the same shafting extending entirely through the boat and actuated by a reciprocating engine at an intermediate point. It has been found, however, that this method is inefficient as the two propellers run at the same velocity, the forward propeller throwing the water hard against the bow of the boat. The best efficiency is obtained when the forward propeller does comparatively little work, the main propulsive force being obtained by the stern propeller, but to effect such a distribution of power, it would be necessary to run the propellers at different speeds, and this in the case of reciprocating engine drive would necessitate a separate engine for each propeller. If, on the other hand, an ordinary turbine drive was used, it would then be necessary to provide two units, each consisting of "forward" and "reversing" portions in a well understood manner. A larger portion of the steam would then be used in the "forward" portion of one of the units for operating the stern propeller (for the time being) and a smaller portion used for driving the "forward" propeller by means of the reverser of the other unit. The boat would be thus propelled by two small turbines and as the reverser is inefficient, unless built nearly as large as the forward portion, it will easily be seen that practically four full-sized turbine rotors would be required in order to get efficient propulsion, and the cost and weight of the machinery would be large.

In order to overcome the objections described, I have made the following arrangement for driving by means of turbines, which arrangement constitutes the present invention. I dispense with separate reversing portions in the two units altogether and build each unit to consist of a high pressure and a low pressure portion or element, which are so bladed that the steam tends to revolve them in opposite directions. I further connect the high pressure portion of each unit with the low pressure portion of the other so that the steam, after doing part of its work in the high pressure portion of one unit, completes the work in the low pressure portion of the other unit, from which it passes to the condenser. The machinery is thus so arranged that the one-half of the one turbine drives one of the propellers, while the one-half of the other turbine drives the other propeller. The forward propeller (for the time being) is preferably suitably driven by the high pressure portion of one turbine, giving say, 30% of the total power and the then stern propeller by the low pressure portion of the other turbine, utilizing the remainder of the power. It will be understood however that my invention is not necessarily limited to this arrangement. By this arrangement it will be noticed that, in addition to saving in weight and cost of the machinery, the efficiency is also improved as the steam acting on the two propellers from efficiency point of view does its work in one large turbine, and thus can give more power than if the same amount of steam were divided between two smaller units, as otherwise would be the case.

In the accompanying drawing wherein I have shown somewhat diagrammatically an arrangement embodying my invention, 1 and 1^a indicate two shafts each of which drives a propeller, one propeller being at one end of the boat and the other at the other end.

2 and 2^a indicate two elastic fluid turbines for driving the shafts 1 and 1^a respectively, the turbine 2 having a high pressure portion 3 and a low pressure portion 4, and the turbine 2^a having a high pressure portion 3^a and a low pressure portion 4^a. The high pressure and low pressure portions of each turbine are oppositely bladed, the low pressure portion being preferably for forward drive of its propeller when at the stern and the high pressure portion for forward drive of its propeller when at the bow.

5 is a conduit connected with a suitable source of high pressure motive fluid and it is provided with a branch 6 leading to

the high pressure portions 3 of turbine 2 and a branch 6ª leading to high pressure portions 3ª of turbine 2ª. Motive fluid may be directed to either branch by means of valve 7.

8 is a conduit for conveying the exhaust from the high pressure portion of turbine 2 to the low pressure portion of turbine 2ª, and 9 is a similar conduit for conveying the exhaust from the high pressure portion of turbine 2ª to the low pressure portion of turbine 2. The low pressure portion of each turbine exhausts into the conduit 10 which leads to a suitable condenser (not shown).

From the above description the operation of the arrangement will be obvious, the high pressure portion of one turbine driving its propeller in a forward direction at a time when it is at the bow, while at the same time the low pressure portion of the other drives its propeller (which is then at the stern) forward.

It will, of course, be understood that the parts illustrated are of a more or less diagrammatic nature and only by way of example, and that in actual practice suitable arrangements of turbine controlling valve mechanisms, etc., will be used as may be found desirable.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. The combination of two shafts, a high pressure turbine element and a low pressure turbine element connected to each shaft and adapted to drive it in opposite directions, and conduits connecting the high pressure element of each shaft to the low pressure element of the other.

2. In combination, two turbines each having a high pressure portion and a low pressure portion bladed to run in opposite directions, means for admitting motive fluid to the high pressure portion of either turbine, and conduits connecting the exhaust of the high pressure portion of each turbine to the low pressure portion of the other.

3. The combination with two shafts adapted to drive propellers at opposite ends of a boat, of a turbine for driving each shaft comprising a high pressure portion and a low pressure portion bladed to run in opposite directions, and conduit means connecting the exhaust of the high pressure portion of each turbine to the low pressure portion of the other.

4. The combination with two shafts adapted to drive propellers at opposite ends of a boat, of a high pressure turbine element and a low pressure turbine element connected to each shaft, each high pressure element being arranged for forward drive when its propeller is at the bow of the boat and each low pressure element being arranged for forward drive when its propeller is at the stern of the boat, means for admitting high pressure motive fluid to each high pressure portion, and conduits connecting the exhaust of the high pressure element of each shaft to the low pressure element of the other.

In witness whereof, I have hereunto set my hand this 29th day of August, 1914.

KARL ALQUIST.

Witnesses:
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