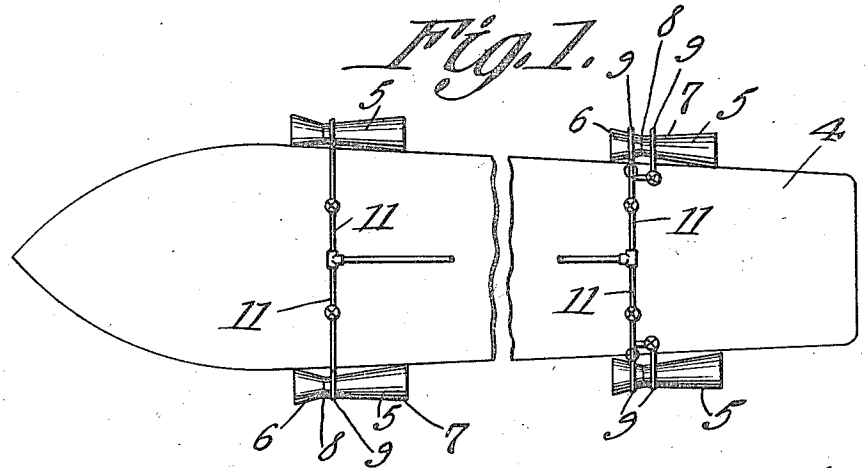
R. DEAN.

BOAT PROPULSION.

APPLICATION FILED APR. 30, 1914.

1,123,498. Patented Jan. 5, 1915.

Fig. 1.



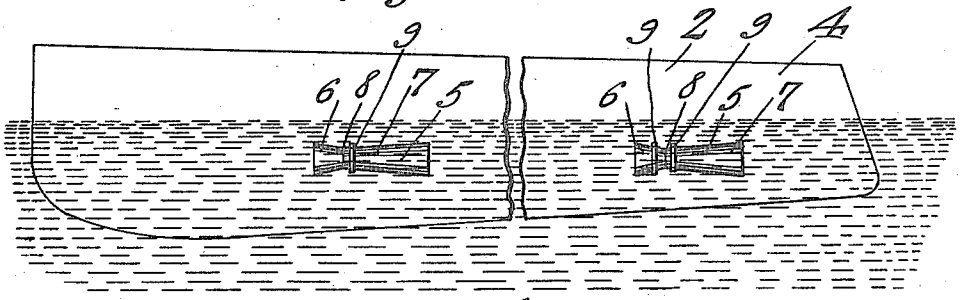


Fig. 2.

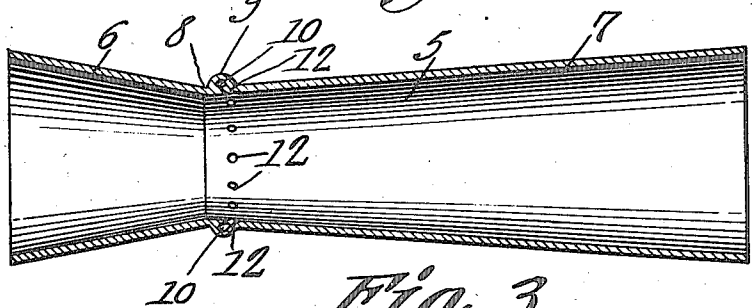


Fig. 3.

Witnesses

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BOAT PROPULSION.

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To all whom it may concern:

Be it known that I, REX DEAN, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented a new and useful Boat Propulsion, of which the following is a specification.

This invention relates to improved apparatus for boat propulsion.

The object of the present invention is to utilize the principle of a Venturi tube for the propulsion of boats.

A further object is to accomplish the aforementioned end by employing one or a number of Venturi tubes submerged in the water or supporting medium of the boat and to establish and maintain a low pressure or vacuum at the constricted portion of the tube and to establish and maintain a pressure at the outer portion of the tube to thus set up and maintain a flow of water through the tube, the reaction of which mass of moving water results in the forward propulsion of the boat.

A further object is to convert the statical or potential energy of a gas under pressure into kinetic or dynamical energy in a liquid and to accomplish the aforementioned end with a relatively small loss of energy.

A further object is to utilize a gas under pressure to set a relatively large volume of water into motion and flowing with considerable velocity to thus utilize the reaction accompanying the flow of water for the forward propulsion of a boat or allied object, the jet action or reaction being obtained by the flow or rearward projection of the water rather than by the projection or action of the gaseous medium.

Another object is to provide a Venturi tube with a pipe connected adjacent the throat or restricted portion thereof, through which pipe flows a gaseous medium, such as compressed air so that the difference in velocity between the gaseous medium and the liquid medium will be reduced to a minimum to thus provide for a high degree of efficiency in the transformation of the energy into useful work.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings accompanying this specification and forming a part thereof, the preferred embodiment of my invention is illustrated, in which:—

Figure 1 is a top plan view of a vessel with my improved boat propelling means or apparatus applied thereto, the view being in the nature of a diagram, which remark applies with equal force to the view in side elevation marked Fig. 2. Fig. 3 is an enlarged view of one of the Venturi tubes arranged for the particular use above described.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 4 designates the hull of a vessel which is provided with the Venturi tubes 5 secured thereto below the water line as illustrated in Fig. 2 and which tubes are arranged along the side walls of the vessel a considerable distance apart so as to prevent the interference of their action. It is to be noted however, that the number and disposition of the tubes may be changed according to the nature of the work involved.

The Venturi tube disclosed in Fig. 3 includes the two usual frusto-conical portions 6 and 7, the meeting portions 8 of which define a constricted throat at which point the maximum velocity of the water flowing through the tube occurs. The outlet conical portion 7 is considerably longer and more tapering than the inlet portion 6. Extending around the constricted throat 8 of the tube is the pipe 9 which may be considered as an enlarged annular portion of the tube through which the passageway 10 extends and communicating with which are the pipes 11. The pipe 9 is provided with a plurality of orifices 12 which curve in the direction of flow of water through the tube, as illustrated in Fig. 3. The annular ring-like pipe 9 is placed immediately adjacent the constricted throat 8 but slightly toward the outlet side thereof. The orifices point in the direction of the outflow of liquid through the tube for reasons as will be hereinafter dwelled upon at more length.

The theoretical aspect of the present apparatus is of interest and importance and to more readily appreciate the same, the fol-

lowing features of a Venturi tube are recalled. When a liquid flows through a Venturi tube, the initial pressure, or pressure at the entrance to the tube is gradually decreased as the throat or constricted portion of the tube is approached and with a corresponding increase in the liquid velocity. The maximum velocity and minimum pressure occurs at or near the constricted throat, after which zone the pressure again rises and the potential energy predominates. The transformation of the potential into kinetic energy and again into potential energy takes place at a minimum loss, the apparatus being therefore highly efficient. These features are utilized in the present apparatus which includes the advantages of a jet propulsion in which a liquid is used, without the accompanying disadvantages thereof. The pipe 9 with its curved orifices is supplied with a gas such as air under compression, with the result that a low pressure or vacuum zone is produced and maintained at the constricted or throat portion of the tube and a relatively higher pressure is maintained within the outlet portion 7. This results in the flow of water in the inlet portion 6, being drawn therein by the low pressure which is at all times present, and which water having reached the low pressure zone is projected rearwardly by the outflowing gases from the orifices 12 and the reaction of which moving mass of water acting upon the side of the outlet portion 7 results in the forward propulsion of the boat. The constricted throat 8 provides that although the same amount of energy will be present in the moving mass of liquid, its velocity will be increased and approach the velocity of the gas issuing from the orifices 12. This prevents the formation of eddies and counter currents within the tube which are always present when two streams of either liquid or gas meet, when flowing in the same direction and with relatively great differences of velocity. A large quantity or volume of water will therefore be projected rearwardly and at a considerable velocity, the reaction of which water will, acting upon the side walls of the tube, move the boat in a forward direction. The reaction will take place between the moving mass of water and the sides of the tube, rather than between the gaseous medium and the orifices 12. The veracity of this statement will be more readily appreciated when it is noted that the maintenance of a vacuum at the constricted zone and high pressure at the outlet zone of the tube will result in the flow of a liquid therethrough.

In the form shown in Fig. 1, some of the tubes are provided with a branch pipe which leads to the opposite portion of the throat 8, allowing the boat to be moved in a rearward direction, when it is so desired.

Although it has been spoken of as providing air under pressure to the Venturi tubes, it will be readily appreciated that steam may be used and obtained direct from the boilers.

Having thus fully described my invention, what I claim is:—

1. An apparatus of the class described, comprising a vessel, a Venturi tube carried thereby, a pipe ring surrounding the restricted portion of said tube and provided with orifices leading to and communicating with the interior of said tube, said orifices curved and pointing in a rearward direction, and a pipe communicating with said pipe ring adapted to supply a gaseous medium thereto under pressure for the forcible projection of a liquid medium through said Venturi tube in a rearward direction, resulting in the forward propulsion of the boat.

2. A device for boat propulsion comprising a Venturi tube, a pipe ring surrounding the restricted portion of said tube and provided with orifices leading to and communicating with the interior of said tube, said orifices curved and pointing in a rearward direction adapted to supply a fluid under pressure to the said Venturi tube for the forcible projection of a liquid medium through said Venturi tube in a rearward direction.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

REX DEAN.

Witnesses:
O. S. HARTMAN,
F. H. HUFFMAN.