Feb. 25, 1941. J. G. VINCENT 2,233,231

BOAT PROPELLER

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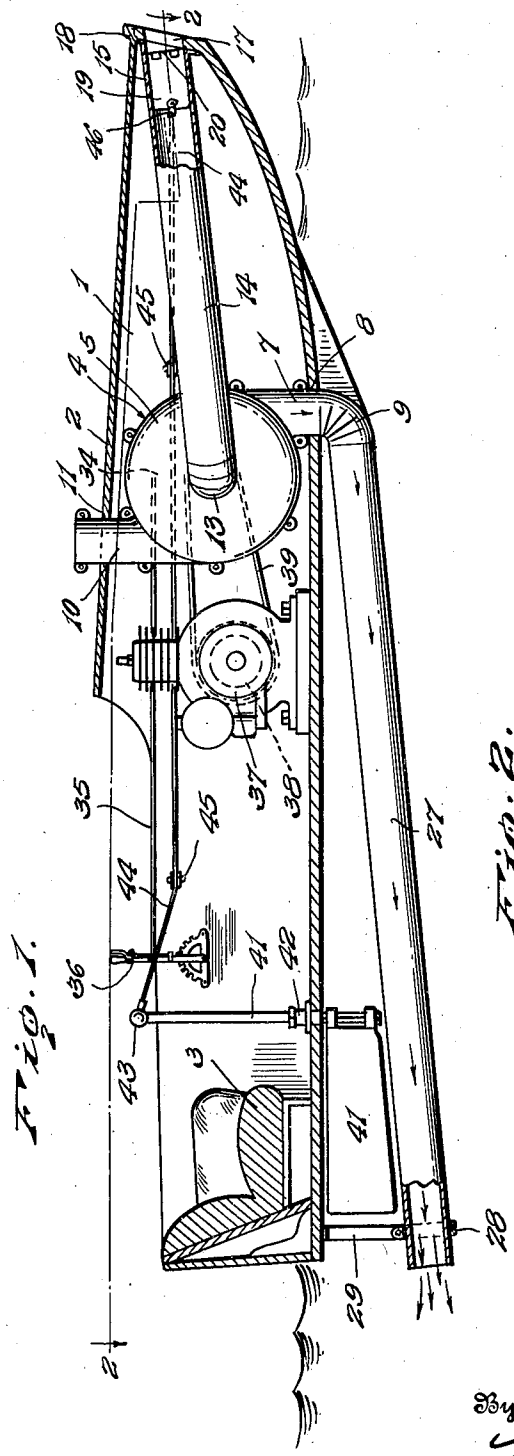


Fig. 1.

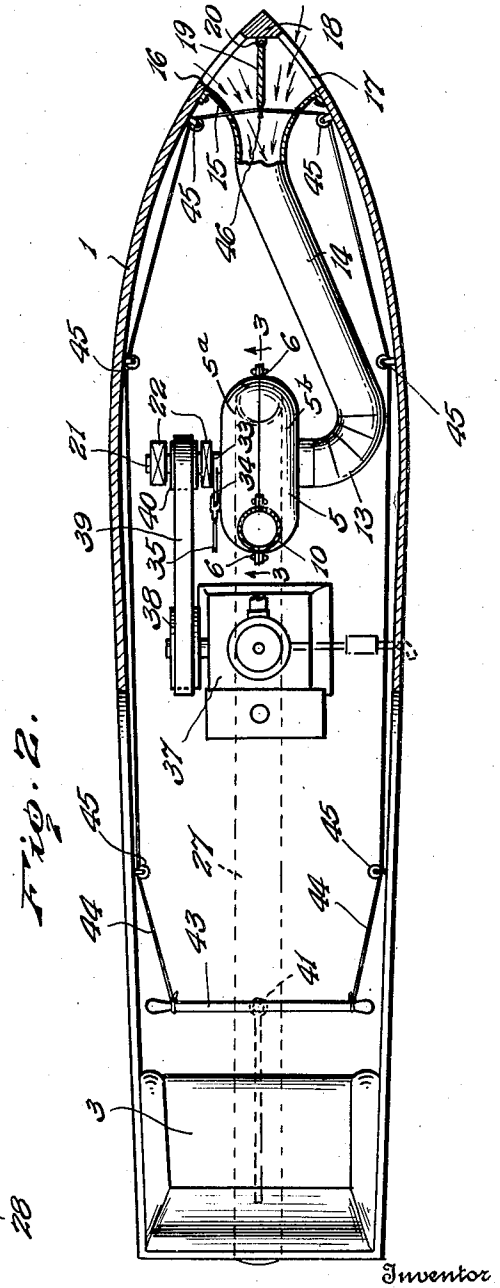


Fig. 2.

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Fig. 3.

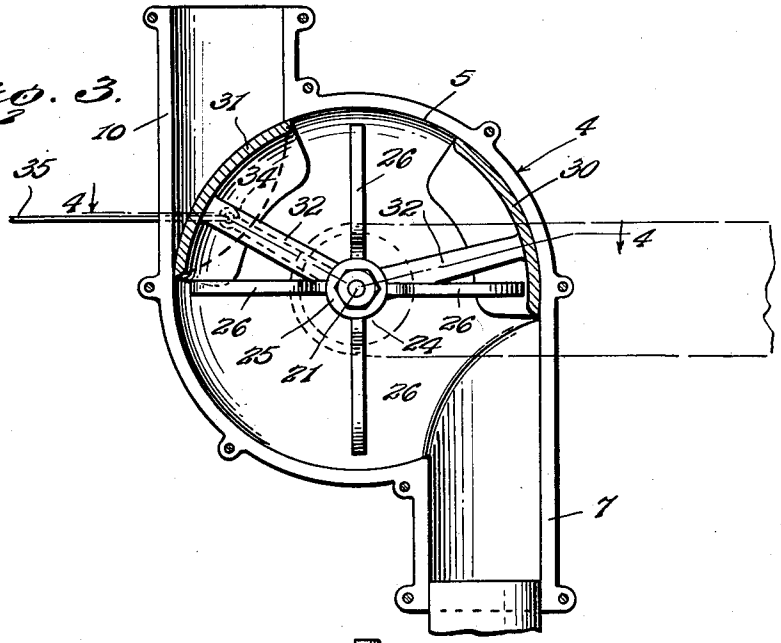
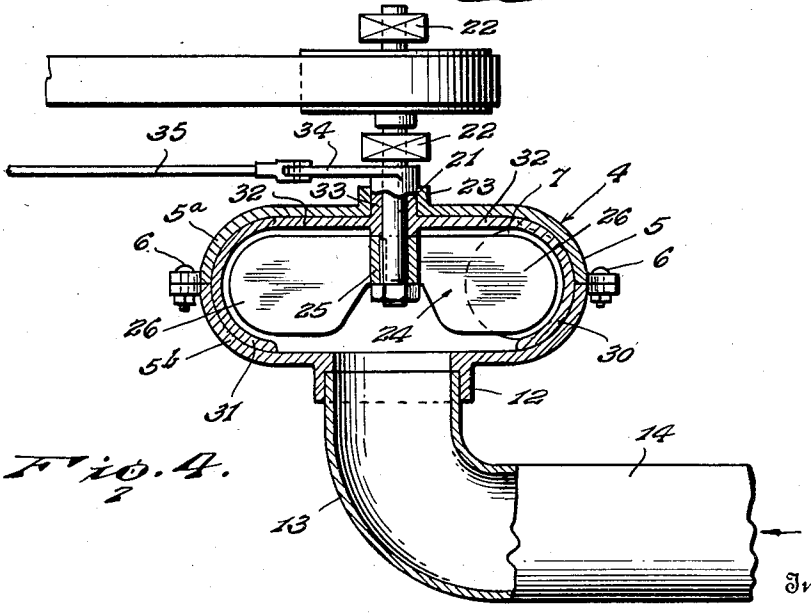


Fig. 4.



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UNITED STATES PATENT OFFICE

2,233,231

BOAT PROPELLER

John G. Vincent, Reyno, Ark.

Application December 2, 1938, Serial No. 243,666

1 Claim. (Cl. 115—11)

This invention relates to boats and more particularly to propelling means for a boat, it being one object of the invention to provide a boat with propelling means consisting of an apparatus by means of which air is forced through a conduit extending longitudinally of the boat under the same and open at its rear end so that air will be discharged rearwardly below the surface of the water and propel the boat forwardly.

Another object of the invention is to provide a propelling apparatus of this character consisting of a fan housing mounted in the hull of the boat and having an inlet pipe opening through the stem of the boat and a main discharge pipe extending through the bottom of the boat and rearwardly under the same, an auxiliary outlet for air being provided and valve means being provided for controlling flow of air from the fan housing through the main air outlet and the auxiliary outlet. It will thus be seen that by proper adjustment the quantity of air discharged through the main outlet may be regulated and the speed at which the boat is propelled forwardly controlled.

Another object of the invention is to so construct the valve means that, as it is adjusted in a direction to close the main air outlet, it will also uncover or open the auxiliary air outlet. Therefore, the opening and closing of the main and auxiliary air outlets will be in proper proportion and escape of air from the fan housing will not be retarded but the direction of its escape controlled for regulating the forward speed of the boat.

Another object of the invention is to provide a propelling apparatus for a boat wherein the discharge pipe extends rearwardly under the rudder as well as under the hull of the boat. It will thus be seen that the discharge pipe or conduit will serve as a shield for the rudder and prevent damage to the rudder in case the boat should run aground or over a submerged obstruction.

Another object of the invention is to provide the inlet pipe with a throat at its forward end opening through the bow of the boat at opposite sides of the stem, a vane being mounted in the throat back of the stem and having actuating means connected with the handle bar of the rudder so that this vane will be shifted transversely in the throat when the rudder is moved to control flow of air through the throat and create a vacuum condition at one side of the vane to assist in turning the boat.

Another object of the invention is to provide propelling means for a boat including a fan housing and an operating motor both of which are mounted under the forward hood or deck where they will be out of the way and not detract from the appearance of the boat.

The invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a sectional view taken longitudinally through a boat equipped with the improved propelling apparatus,

Figure 2 is a view taken along the line 2—2 of Figure 1 and looking down upon the boat,

Figure 3 is a sectional view upon an enlarged scale taken vertically through the fan upon the line 3—3 of Figure 2, and

Figure 4 is a sectional view taken along the line 4—4 of Figure 3.

The boat 1, which has been shown equipped with the improved propelling apparatus, is of the speed boat type and is provided with a forward deck 2 and an open cockpit rearwardly thereof in the stern portion of which is built a seat 3. It is to be understood that this merely represents one type of boat which may be equipped with the improved propelling apparatus.

The compressor 4 which constitutes one of the main elements of the propelling apparatus is mounted in the boat under the deck 2 and has a casing 5 formed of companion side sections 5^a and 5^b which are secured against each other by fasteners 6 and when so secured form a hollow casing, as shown in Figure 4. A main discharge neck 7 extends downwardly from the casing 5 with its lower portion extending through an opening 8 formed in the bottom of the boat where it is engaged with an elbow 9 extending rearwardly toward the stern of the boat. There has also been provided an auxiliary outlet neck 10 which extends upwardly from the casing and through an opening 11 formed in the deck 2. At its center the side section 5^b of the casing is formed with an inlet neck 12 with which is connected the elbow of an inlet pipe or conduit 14 extending forwardly towards the bow of the boat where it terminates in a flared mouth or throat 15. This mouth or throat is flared transversely of the boat and secured to the sides of the hull in position to receive air which passes inwardly through openings 16 and 17 at opposite sides of the stem 18. A vane or plate 19 extends longitudinally in the throat or mouth 15 in a vertical plane and at its forward end is pivotally connected with the stem 18, as shown at 20, for transverse swinging movement. It will thus be

seen that this deflector plate may be swung transversely of the throat from its normal position directly back of the stem to an adjusted position in which it will extend in a direction to block the opening 16 or the opening 17 and assist in steering the boat in a manner to be hereinafter set forth.

The shaft 21 of the fan or compressor is rotatably mounted through the bearing 22 rising from the bottom of the boat at the opposite side of the casing from the air inlet pipe, and this shaft extends inwardly through the bearing neck 23 into the fan casing 5 and at its inner end carries an impeller 24 having a hub 25 fixed to the shaft and a suitable number of blades 26 radiating from its hub. These blades are of the usual type provided for suction fans, and when the shaft 21 is rotated, air will be drawn inwardly through the air inlet pipe 14 and driven out through the main outlet neck 7 or the auxiliary outlet neck 10 or through both of these outlet necks according to the speed at which the boat is to be propelled forwardly. The air is discharged through the main outlet neck 7 and the elbow 9 and from this elbow flows through the pipe 27 which extends under the boat towards the stern at a downward incline with its rear end supported by a collar 28 carried by a hanger 29 which is suspended from the bottom of the boat close to the stern thereof. The rear end of the pipe 27 projects slightly beyond the stern of the boat, as shown in Figure 2, and when air is discharged from this pipe, it will act upon the water to urge the boat forwardly. The volume of air passing through the pipe 27 and the speed at which this air is discharged will control the speed at which the boat is forced forwardly.

In order to control flow of air through the two necks 7 and 10, there has been provided a valve having plates or shoes 30 and 31 which are arcuate longitudinally and also transversely so that they will conform to the longitudinal and transverse curvature of the peripheral portion of the fan casing 5, as shown in Figures 3 and 4. These plates are carried by arms 32 extending radially from a sleeve 33 which fits snugly about the shaft 21 and snugly within the bearing neck 23 through which it extends. At its outer end the sleeve 33 carries an arm 34 to which the forward end of a rod 35 is pivotally connected. This rod 35 extends towards the stern of the boat and at its rear end is connected to a latch lever 36 so located that it may be easily reached and grasped by a person occupying the seat 3. It will thus be seen that the operator of the boat by adjusting the lever 36 may turn the sleeve 33 and move the plates 30 and 31 circumferentially of the fan casing. When the valve plates are adjusted circumferentially of the fan casing in the direction of the arrows shown in Figure 3, the valve plate 30 will be moved in a direction to extend across and block the main outlet neck 7 and at the same time the valve plate 31 will move in a direction to shift it out of blocking relation to the auxiliary outlet neck 10. When the valve is in the position shown in Figure 3, all of the air drawn inwardly through the inlet pipe 14 will be forced out of the fan casing through the main outlet neck 7 and the boat will be propelled forwardly at full speed, but when the valve is adjusted as set forth, the neck 7 will be gradually closed and the neck 10 gradually opened so that flow of air through the neck 7 will be gradually reduced and a proportionate quantity of air allowed to escape through the auxiliary outlet neck 10. It will thus be seen that the forward speed of the boat will be gradually reduced until all of the air is escaping through the auxiliary neck 10 and no forward motion will be imparted to the boat.

The fan or impeller is driven through the medium of an engine 37 which is mounted in the boat under the rear portion of the deck 2. The shaft of this engine carries a large pulley 38, and about this pulley is engaged a bolt 39 which extends forwardly and is trained about a small pulley 40 carried by the shaft 21 between the bearings 22. The shaft 21 will thus be driven at high speed from the engine shaft, and by adjusting the engine the maximum speed of the boat when the valve is in the position shown in Figure 3 may be controlled. It will thus be seen that the speed at which the boat will be propelled forwardly may be controlled both by the adjustment of the valve 24 and by regulating the speed of the engine.

The rudder 41, by means of which the boat is steered extends longitudinally of the boat under the rear portion thereof. This rudder is located between the discharge pipe 27 and the bottom of the boat and at its forward end is firmly secured to the lower portion of a rudder post 41 extending vertically through a packing box 42. The rudder post is located a short distance in front of the seat 3, and at its upper end carries a handle bar or tiller 43 which projects from opposite sides of the rudder post. By grasping this cross bar or tiller the person occupying the seat 3 can turn the rudder post to swing the rudder transversely of the boat and steer the boat in the usual manner. The rear ends of ropes or wire cables 44 are secured to the handle bar or tiller close to its end, and these cables extend forwardly in engagement with guide pulleys 45 and have their forward ends brought toward each other and secured to the rear end of the plate 19. It will thus be seen that, when the handle bar is moved to turn the rudder post and swing the rudder towards the port or starboard, the plate 19 will also be swung to an adjusted position, but when the rudder is swung to starboard, the plate 19 will be swung to port. When the plate 19 is swung partially or entirely into blocking relation to the opening 16, air may still enter freely through the opening 17 but inward movement of air through the opening 16 will be retarded or entirely cut off according to the position of the plate 19 and a vacuum condition will be created at this side of the bow of the boat which will tent to swing the valve in the opposite direction for which turning movement of the rudder 41 has been set. Therefore, adjustment of the plate 19 will assist the rudder in turning the boat and steering of the boat will be facilitated.

Having thus described the invention, what is claimed as new is:

In combination with a boat, propelling means including a fan housing mounted in the boat and having an outlet neck extending through the bottom of the boat and rearwardly thereof for discharging air into water under the boat and urging the boat forwardly, an inlet pipe extending from said fan housing toward the bow of the boat and having a throat at its front end communicating with openings formed through sides of the bow of the boat at opposite sides of the stem of the boat, a deflector plate extending longitudinally in said throat in a vertical plane and pivotally mounted at its front end for transverse swinging adjustment, a rudder having a

post journaled vertically through the bottom of the boat, a handle bar carried by and extending transversely of said rudder post, and cables extending longitudinally of said boat with their rear ends connected with opposite end portions of the handle bar and their forward ends connected with the rear end portion of said plate from opposite sides thereof and adapted to move the deflector plate transversely in the throat into blocking relation with predetermined side openings of the bow of the boat when the handle bar is moved to adjust the rudder for steering the boat.

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