Oct. 2, 1928. 1,686,264

H. L. BROWNBACK

AERIALLY PROPELLED SPEED BOAT

Filed July 21, 1925

Fig. 1.

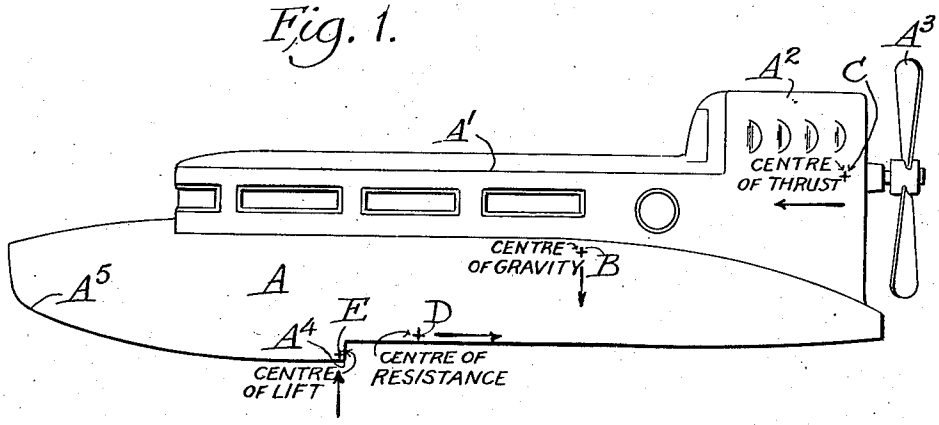


Fig. 2.

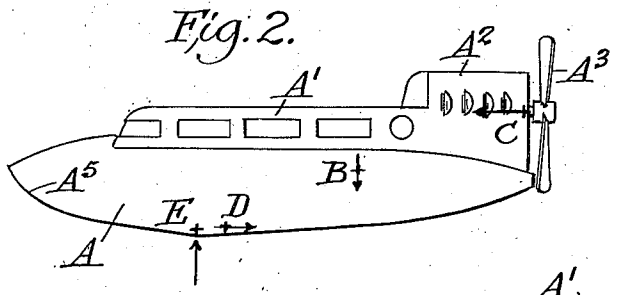
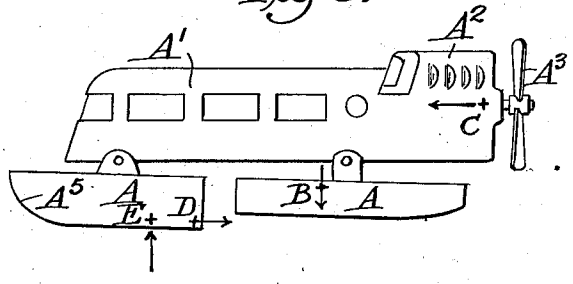


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY LOWE BROWNBACK, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR TO BROWNBACK MOTOR LABORATORIES, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

AERIALLY-PROPELLED SPEED BOAT.

Application filed July 21, 1925. Serial No. 45,023.

This invention relates to aerially propelled speed boats, and the principal object of the invention is to provide a speed motor boat driven by an aerial propeller which boat, upon attaining sufficient speed, will be supported on the surface of the water through dynamic reaction upon its bottom surface, the hull of the boat and the aerial propeller being so arranged that the center of lift of the bottom surface of the hull, and the center of resistance of the hull is forward and below the center of gravity of the boat, and that the center of thrust of the aerial propeller is above and to the rear of the center of gravity, so that any derangement of the balance of forces sustaining, retarding and propelling the boat will tend to raise the boat at the center of gravity, and any substantial increase in the application of propelling power or any combination of external forces which may tend to raise the stern or depress the bow suddenly will tend to move the center of lift and the center of resistance forward, the center of gravity being of course stationary, and thereby restore the stability of the hull, or these remaining stationary, to revolve the boat about the resultant force, thus attempting to lift the boat at its center of gravity and depressing the bow, moving the center of resistance forward and restoring the equilibrium of forces acting on the hull.

I will explain the invention with reference to the accompanying drawing which illustrates one practical embodiment thereof to enable those familiar with the art to adopt and use the same, and will summarize in the claims the essentials of the invention, the novel features of construction, and the novel combinations of parts, for all of which protection is desired.

In the drawings:

Fig. 1 illustrates diagrammatically, any preferred form of the invention.

Figs. 2 and 3 illustrate modifications of the hull of the boat.

The drawing diagrammatically illustrates aerially propelled speed boats embodying my invention. The hull A of the boat may be of any desired form, such as the ordinary pointed nose type, or the sea-sled type, the length thereof being preferably short relative to the width thereof. The boat may be provided if desired with a low cabin A′ extending substantially the full length of the hull. Mounted upon the rear end of the cabin A′ above the deck of the hull, is a motor A^2, of any desired type, and of sufficient power to propel the hull at proper speeds, the shaft of the motor A^2 extending to the rear of the cabin and having an aerial propeller A^3 of suitable design and size fixedly mounted thereon.

The bottom surface of the hull A in Fig. 1 is stepped as at A^4, the deeper portion of the hull A being forward of the stepped portion A^4. The bottom surface of the hull, both fore and aft of the stepped portion A^4, is substantially flat, but may be slightly V-shaped, or rounded, and V-shaped at the bow to prevent "pounding" with the forward end of the bottom surface sloping upwardly as at A^5 in the usual manner in order that the boat will more readily ride upon the surface of the water as the speed increases. A suitable rudder (not shown) operating in either air or water, may be provided for steering the boat.

As shown in Fig. 2, the bottom surface of the hull is provided with planing or reaction surfaces designed to present suitable angles to the plane of the water to provide the desired reactions, instead of being stepped as in Fig. 1.

Fig. 3 illustrates my invention applied to a tandem hull in which the resultant centers of lift, gravity, resistance and thrust would be located approximately as in Figs. 1 and 2, the after section of the hull being of less depth than the forward section.

Other types of hulls may be used, and preferably the bow end of the bottom surface of each type of hull is slightly V-shaped, or rounded, to prevent "pounding."

The center of gravity of the boat is indicated at B in the drawing, and is of course stationary, and the hull and cabin should be so designed that the center of gravity B will be located slightly to the rear of the midsection of the hull, and somewhat below the surface of the deck. The center of thrust, indicated at C in the drawing, is slightly forward of the propeller A^3 and coaxial with the shaft of motor A^2 said center of thrust C being disposed considerably above and to the rear of the center of gravity B. The

center of resistance of the hull A would be located approximately as indicated at D in the drawings, and the center of lift would be located as indicated at E, said center of lift E being normally disposed in the bottom surface of the hull at the stepped portion A^4. The center of resistance D of the hull would likewise be located at the bottom surface of the boat slightly to the rear of the center of lift.

By the above design the boat propelled by the aerial propeller A^3 upon obtaining sufficient speed will be supported on the surface of the water through dynamic reaction upon its bottom surface and any substantial increase in the application of propelling power or any application of external forces tending to suddenly elevate the stern or depress the bow of the boat will tend to move the center of lift and the center of resistance forward and to raise the boat at the center of gravity, the portion of the bottom surface of the boat forward of the stepped portion A^4 or the portion designed for the major dynamic reaction touching the surface of the water. The portion of the bottom surface of the boat to the rear of the stepped portion A^4 or the portion designed for the major dynamic reaction will run on the surface of the water and the boat will act substantially like a hydroplane skimming the surface of the water, since the center of thrust C is above and to the rear of the center of gravity.

By the above arrangement wherein the center of lift E of the bottom surface, and the center of resistance D of the hull is forward of and below the center of gravity B of the boat, and the center of thrust C is above and to the rear of the center of gravity B any derangement of the balance of forces sustaining, retaining, and propelling the boat will tend to raise the boat at its center of gravity and move the center of lift E forward, thereby restoring the balance of forces, and hence tending to restore the stability of the hull.

As shown by the arrows in the drawing, the forces C and D tend to revolve the boat in an anti-clockwise direction around B as a center. This tendency is opposed by the forces E and B which tend to revolve the boat in a clockwise direction around D as a center. Any force tending to destroy the equilibrium of the resultant of the moments of these unbalanced forces will be opposed by an opposite force which will close the diagram of forces, and maintain equilibrium.

Thus also, a sudden shutting off of power will tend to shift the center of resistance back, raising the bow, and automatically increasing the resistance of the hull, giving a powerful braking effect.

I do not limit my invention to the exact form shown in the drawing, for obviously changes may be made within the scope of the claims.

I claim:

1. A boat of the character specified comprising a hull so designed that its center of gravity is disposed in rear of the mid-section of the hull, the center of resistance being disposed forward of the center of gravity, and the center of lift being disposed forward of the center of resistance; and means above the center of gravity for propelling the boat, the center of thrust thereof being disposed above and in rear of the center of gravity; whereby any change in the propelling thrust will shift the centers of lift and resistance to maintain a balance of forces during acceleration; and whereby the rear portion of the bottom of the hull will skim the surface of the water when at speed.

2. A boat of the character specified comprising a hull so designed that its center of gravity is disposed in rear of the mid-section of the hull, the center of resistance being disposed below and forward of the center of gravity, and the center of lift being disposed forward of the center of gravity, and the center of lift being disposed forward of the center of resistance; and an air propeller at the rear of the hull for propelling the boat, the center of thrust thereof being disposed above and in rear of the center of gravity; whereby any increase in the propelling thrust will shift the centers of lift and resistance forward to maintain a balance of forces during acceleration; and whereby the rear portion of the bottom of the hull will skim the surface of the water when at speed.

3. A boat of the character specified comprising a hull having a stepped reaction surface, said hull being so designed that its center of gravity is disposed in rear of the mid-section of the hull, the center of resistance being disposed below and in front of the center of gravity and in rear of the step in the reaction surface, and the center of lift being disposed forward of the center of resistance and substantially at the step in the reaction surface; and means above the center of gravity for propelling the boat, the center of thrust thereof being disposed above and in rear of the center of gravity; whereby any increase in the propelling thrust will tend to shift the centers of lift and resistance forward to maintain a balance of forces during acceleration, and whereby the bottom of the hull in rear of step will skim the surface of the water when at speed.

4. A boat of the character specified comprising a hull having a stepped reaction surface, said hull being so designed that its center of gravity is disposed in rear of the midsection of the hull, the center of resistance being disposed below and in front

of the center of gravity and in rear of the step in the reaction surface, and the center of lift disposed forward of the center of resistance and of the step in the reaction surface; and an air propeller at the rear of the hull for propelling the boat, the center of thrust thereof being disposed above and in rear of the center of gravity; whereby any increase in the propelling thrust will tend to shift the centers of lift and resistance forward to maintain a balance of forces during acceleration, and whereby the bottom of the hull in rear of the step will skim the surface of the water when at speed.

5. A boat of the character specified comprising a hull so designed that its center of gravity is disposed in rear of the mid-section of the hull, the center of resistance being disposed below the center of gravity and forward of the mid-section of the hull, and the center of lift disposed forward of the center of resistance; and means above the center of gravity for propelling the boat, the center of thrust thereof being disposed above and in rear of the center of gravity; whereby the thrust and resistance forces will tend to revolve the hull around the center of gravity, and the gravity and lift forces will tend to revolve the hull in the opposite direction around the center of resistance in order to maintain a balance of forces during acceleration, and whereby the rear portion of the hull will skim the surface of the water when at speed.

6. A boat of the character specified comprising a hull having a stepped reaction surface, said hull being so designed that its center of gravity is disposed in rear of the mid-section of the hull, and the center of resistance being disposed below the center of gravity and forward of the mid-section of the hull, and the center of lift disposed forward of the center of resistance; and an aerial propeller at the rear of the hull for propelling the boat, the center of thrust thereof being disposed above and in rear of the center of gravity; whereby the thrust and resistance forces will tend to revolve the hull in one direction around the center of gravity, and the gravity and lift forces will tend to revolve the hull in the opposite direction around the center of resistance in order to maintain a balance of forces during acceleration, and whereby the bottom of the hull in rear of the step will skim the surface of the water when at speed.

In testimony that I claim the foregoing as my own I affix my signature.

HENRY LOWE BROWNBACK.