The present invention generally relates to a boat construction and more particularly to novel improvements over the device in copending application for Water Jet Powered Boat, Serial No. 792,838, filed February 12, 1959, now Patent No. 3,099,456, issued November 21, 1961.

The primary object of the present invention is to provide a boat hull construction which materially reduces the drag of the boat as it passes through the water inasmuch as the water in front of the boat is pumped back through the boat, thus eliminating the necessity of the boat having to push this column of water from in front of the boat. This "pumping through" materially reduces the drag of the water on the boat and enables movement of the boat through the water with less power than normally would be required if the water in front of the boat had to be pushed out of the way.

As is well known, most boat hulls are tapered at the forward end thereof but the forces of drag act normal to or perpendicular to the surfaces regardless of the taper. Thus, applicant, by providing a straight transverse or flat bow and by pumping the water from in front of the boat has eliminated the problem of drag. The combination of the water being pumped through between the bottom member and a false bottom member and adjustable planing devices provides a highly efficient boat hull requiring relatively small power as compared to a conventional boat hull employing a conventional pusher type propeller and no planing devices.

Another object of the present invention is to provide a boat construction including adjustable longitudinal planing devices in the form of pivotally attached elongated longitudinally disposed planing members mounted on the boat for pivotal movement about a transverse axis disposed at the bow or at longitudinally spaced points of the boat thereby enabling the characteristics of the bottom of the boat to be altered to assist in the planing of the boat and also to assist in steering control of the boat.

Another object of the present invention is to provide a boat construction having a novel arrangement of structural components enabling the boat to be easily propelled and maneuvered in a completely new and unobvious manner, the boat including means for varying the bottom characteristics thereof for varying the propulsion forces required to propel the boat.

Still another object of the present invention is to provide a boat construction incorporating longitudinal planing devices together with means for relieving the vacuum behind the planing devices.

Still another object of the present invention is to provide a boat construction in which the water at the front of the boat is pumped through passageways forming a false bottom in the boat together with a structural arrangement which provides a constant water volume throughout the length of the boat.

Still another feature of the present invention is to provide a boat construction which is relatively simple in construction, easy to assemble and generally inexpensive to manufacture.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a top plan view of the boat construction of the present invention with portions thereof broken away illustrating the details of construction thereof;

FIGURE 2 is a side elevational view of the boat with portions thereof broken away;

FIGURE 3 is a front elevational view of the boat;

FIGURE 4 is a detailed sectional view taken substantially upon a plane passing along section line 4—4 of FIGURE 1 illustrating the details of construction of the adjustment for the planing device and also for the mechanism for releasing the vacuum behind the planing device;

FIGURE 5 is a transverse, vertical sectional view taken substantially upon a plane passing along section line 5—5 of FIGURE 1 illustrating further structural details of the boat;

FIGURE 6 is a detailed sectional view of a modified form of construction including a tapered flow passage for providing a constant rate of flow of water through the false bottom of the boat;

FIGURE 7 is a detailed sectional view taken substantially upon a plane passing along section line 7—7 of FIGURE 4 illustrating the details of the propulsion mechanism; and

FIGURE 8 is a detailed sectional view taken substantially upon a plane passing along section line 8—8 of FIGURE 5 illustrating further structural features of the invention.

Referring now specifically to the drawings, the numeral 10 generally designates the boat construction of the present invention which includes a hull 12 which may be of any suitable configuration but which is conveniently illustrated as being rectangular and including a stern 14, a bow 16 and side panels 20 all of which are rigidly interconnected by any suitable means for providing a water tight hull. Suitable seats may be provided such as seats 22 and the water tightness of the hull is completed by a bottom member 24.

The bottom member 24 is provided with a central upward extending tubular member 26 rigid with the center thereof which rotatably receives a housing 28 having an outboard motor 30 mounted on the top thereof by virtue of a carrier plate 32 rigid with the housing 28 and having a depending flange 34 on the periphery thereof for rotatably engaging an outwardly extending flange 36 at the upper end of the tubular member 26. The outboard motor 30 is provided with a depending housing 38 having a propeller 40 mounted on the lower end thereof. The propeller 40 is disposed slantly below a transverse horizontal partition 42 and also a partition 44 which is provided with an enlarged opening 46 for passage of water. Extending downwardly from the forward end of the opening 46 is a ramp 48 for guiding water upwardly and into the opening 46. Depending from the rear edge of the ramp 48 is a deflector 50 curved rearwardly for deflecting the water rearwardly and out through a discharge opening 52 disposed rearwardly of the deflector 50. Thus, water will be drawn inwardly from an enlarged inlet opening 54 forwardly of the ramp 48 then downwardly through the opening 46 and out through the discharge opening 52.

For guiding and confining the water during the flow thereof, a false bottom 56 is provided in spaced relation to the bottom 24 and the false bottom 56 is divided into a plurality of separate areas by a plurality of radially extending partitions 58. Thus, water will be drawn in from the forward end of the boat and then
discharged out of the rear end thereof thus propelling the boat through the water.

As auxiliary propelling means, the side panels 20 are provided with cylindrical housings 68 disposed longitudinally across the bow with the ends of the housings being closed by a perforated plate 62. Disposed in the housing 60 is a propeller 64 carried by a shaft 66 supported by brackets 68 and driven from a suitable power source such as shaft 70 driven from a power take-off 72 from an auxiliary motor 74 mounted under the rear seat 23. Thus, the propeller 64 is employed for moving water rearwardly from the front of the boat to the rear of the boat. Extending into the tubular housing 60 is a pipe fitting 76 having a valve 78 therein in which the valve may be employed for discharging water into the hull of the boat for evaporation from the hull of the boat depending upon the orientation and curvature of the pipe fitting 76 and its relationship to the propeller 64.

Extending downwardly from the false bottom 56 is a pair of generally V-shaped longitudinal side members 86 having closed end plates 82 and a central rectangular member 94 having a V-shaped forward end 85 all of which cooperate to define longitudinal stabilizers for the boat.

Pivoting between the stabilizers 86 and 88 adjacent the forward end thereof is a pair of planing devices 86 and 88 having their forward ends thereof biannually supported by an elongated hinge pin or shaft 90. The hinge pin 90 allows the planing devices 86 and 88 to be swung vertically by virtue of operating rods 92 extending upwardly through apertures 94 in the false bottom 46 and in the bottom member 24. A stuffing box 84 is provided for maintaining the water tight relation of the bottom member 24. The upper end of the rod 92 is engaged with and operated by an eccentric mechanism 98 carried by a shaft 100 supported in a pair of bearings or bushings 102 and provided with a manual handle 104 for rotation of the shaft 100. Upon rotation of the shaft 100, the eccentric 98 attached thereto will cause reciprocation of the actuating rod 92 thus raising and lowering the rear end of the planing devices 86 and 88. It will be appreciated that when the planing devices 86 and 88 are lowered to the position illustrated in FIGURE 4, the relationship between the hull or bottom of the boat and the planing members has been altered thus altering the planing characteristics of the boat. Also, by raising one planing device and lowering the other, the boat may be more easily maneuvered.

Adjacent the rear of the false bottom 56, there is provided a pair of apertures 104 communicating the area between the false bottom 56 and the bottom member 24 and the area above the planing devices 86 and 88 respectively. A closure plate 106 is provided for the opening 104 and the closure plate 106 is connected with an operating rod 108. The operating rod 108 extends through a stuffing box 110 and is connected to an operating handle 112 mounted on a quadrant plate 114 for pivoting of the handle 112 to a desired position after which it may be locked in position thus placing the plate 106 in closed or open or partially opened position thus relieving the vacuum behind the planing devices 86 and 88 and allowing more effective operation of the boat. The relief of the vacuum by the planing devices by permitting water to flow thereinto will clearly eliminate the vacuum drag normally expected from an arrangement of this nature.

The forward end of the false bottom 56 may also be provided with an opening 116 closable by a hinged cover 118 which is operated by an operating pin 120 attached to the planing devices so that when the planing devices are elevated to an inoperative position, the pin 120 will close the plate 118.

As illustrated in FIGURE 6, the false bottom 56 is flat and the bottom member 24 is upwardly inclined toward the center thus increasing the volume between the bottom member 24 and false bottom 56. This enables a substantial constant volume of water to be displaced. Inasmuch as the partitions disposed forwardly of the impeller or propeller are disposed in converging relation, the volume of water capable of passing therethrough would normally be reduced. Thus, in order to overcome this, the central parts of the bottom members are spaced further apart thus increasing the vertical height of the water passageway for increasing the volume capable of flowing therethrough.

While a blade type of propeller has been illustrated, it is pointed out that it is also within the purview of the present invention to employ a centrifugal type of impeller having a central opening and a plurality of radially disposed vanes or blades thereon for discharging water.

Additionally, FIGURE 6 illustrates a conventional type of outboard propeller 122 disposed within the area between the bottom member 24 and the false bottom member 56. The increases in space between the members 24 and 56 also enables reception of the propeller 122 and the propeller housing 124 normally provided thereon.

Directional control for the boat is obtained by rotation of the cylindrical housing 28 about the vertical axis thereof which rotates the entire assembly including the motor 39 and the orientation of the bottom partition 44. Thus, the direction of movement of water is thus varied in relation to the boat hull may be varied in relation to the direction of movement of the boat hull. Speed requirements are met by varying the speed of the propeller and otherwise employing the longitudinal propelling devices at each side of the boat hull. The planing devices enable the boat hull to be partially elevated out of the water in an expedient manner while the vacuum braking devices including the openings 184 enable operation of the boat in an efficient manner without any substantial vacuum drag.

The valve assembly 78 may be used for supplying circulating water for various purposes such as for fire extinguishing or the like and also may be employed for use with a heat exchange device or radiator for the purpose of cooling an internal combustion engine such as is employed for powering the vessel in the event some type of engine other than the outboard motor is shown.

The orientation of the planing devices may be varied in that there may be a multiplicity of planing devices oriented at either the front or the back, at both the front and back or at several longitudinally spaced points along the length of the bottom of the boat. Also, these planing devices stabilize the boat to such an extent that they tend to keep the boat from capsizing such as sometimes occurs with increased speeds.

The use of a propeller or water impeller is optional. In other words, the propeller may be oriented with the axis of rotation disposed vertically as illustrated in FIGURE 1 or the same construction could be employed with the impeller oriented in the manner of FIGURE 6. It is pointed out that the construction of FIGURE 1 or FIGURE 4 would also include the outwardly converging bottom member 24 and false bottom 56 substantially in the same manner as illustrated in FIGURE 6 to provide a constant volume of flow. Also, the auxiliary tubes along each side of the hull are communicated with the front of the vessel for taking water from the bottom of the vessel and also a pivotal plate 84 may be employed for use as an auxiliary tube for also conveying water rearwardly from the front to the rear of the boat.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to be limited to the exact construction and operation shown and described, and accordingly, all suitable modifications and
equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A boat construction comprising a hull, said hull including a longitudinal bottom member, a plurality of longitudinally extending planing devices extending substantially throughout the length of the bottom member, means pivotally mounting the forward ends of the planing devices to the boat hull, and means individually interconnecting the rear ends of the planing devices and the boat hull for separately orientating the planing devices adjustably in angular relation to the bottom member of the boat whereby varying the planing characteristics thereof and also enabling steering control of the boat, said boat hull including a false bottom spaced from the bottom member, the space between the bottom member and false bottom being open, partitions interconnecting the bottom member and the false bottom, and a water impelling means disposed centrally of the length of the planing devices and intermediate the bottom member and false bottom for pumping water from the front end of the boat and discharging it rearwardly thereof for propelling the boat forwardly.

2. The structure as defined in claim 1 wherein said boat hull is provided with open-ended longitudinal tubular housings on each side thereof, water impeller means disposed in each housing, power means for the water impeller means for moving water longitudinally through the housing.

3. The structure as defined in claim 2 wherein said false bottom is provided with an opening therein disposed above the planing devices for releasing the vacuum behind the planing devices, and movable closure means on the false bottom for opening and closing the openings, said closure means being operatively connected to the planing devices.

4. The structure as defined in claim 3 wherein said bottom member and false bottom are spaced apart a greater distance at the center thereof than at the outer edges for providing a constant volume of flow of water therebetween.

5. The structure as defined in claim 4 wherein said means for controlling the position of the rear ends of the planing devices includes a pair of operating rods connected to the planing means, eccentric individually operating means connected with the upper ends of the operating rods and rotatably mounted on the boat hull for raising and lowering the rear ends of the planing devices, and means connected with the eccentric devices for operation and adjustment of the planing devices.

6. The structure as defined in claim 5 wherein said operating means includes a manually operated handle, said handle being connected with the eccentric means.

7. A boat construction comprising a hull having a generally flat bottom member, a false bottom disposed in spaced relation to the bottom member, a plurality of radially extending vertical partitions rigidly interconnecting the false bottom and the bottom member, the spaces defined by the bottom member, false bottom and partitions being open at the outer end thereof and being open at the center of the hull, water impelling means mounted centrally between the bottom member and the false bottom for moving water from one peripheral portion of the space between the false bottom and bottom member and discharging it to an opposite portion of the periphery thereby propelling the boat, said false bottom including outer depending stabilizing members extending longitudinally thereof and a centrally disposed stabilizing member, a planing device disposed between each side of the central stabilizing member and the outer stabilizing members, operating means connected to the rear ends of the planing devices and being controllable from the interior of the hull for raising and lowering the planing devices, means pivotally attaching the forward ends of the planing devices to the false bottom adjacent the forward end thereof, an elongated tubular member mounted alongside of each side of the hull and having open front and rear ends, water propelling means disposed in each tubular member for propelling water therethrough for assisting in the propulsion of the boat, said false bottom having openings disposed rearwardly of the water impelling means and in overlying relation to the rear portion of the planing devices, a closure plate for each opening, and means operable from the interior of the hull for opening and closing the closure plates for breaking the vacuum above the planing devices.

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