No. 763,684. PATENTED JUNE 28, 1904.

C. A. MANKER.

BOAT.

APPLICATION FILED OCT. 14, 1903.

NO MODEL.

FIG. I.

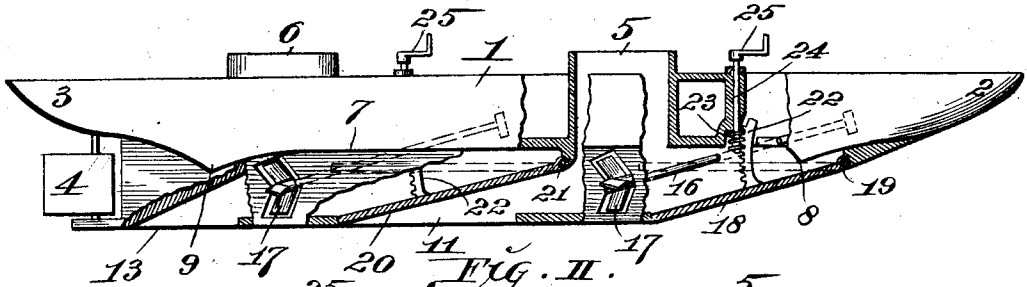


FIG. II.

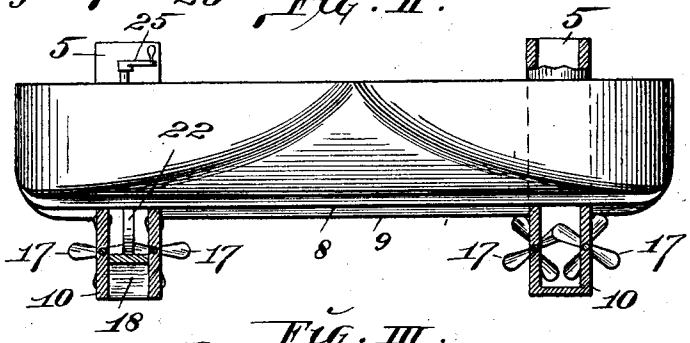


FIG. III.

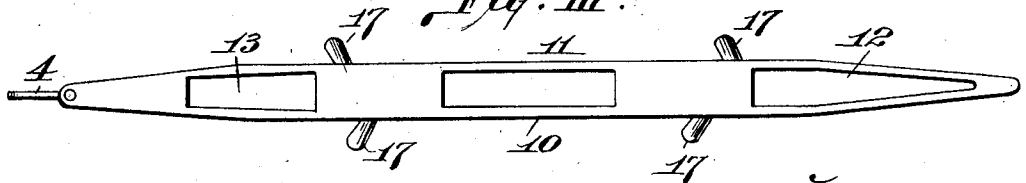
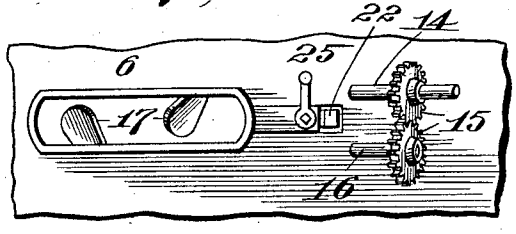


FIG. IV.

FIG. V.



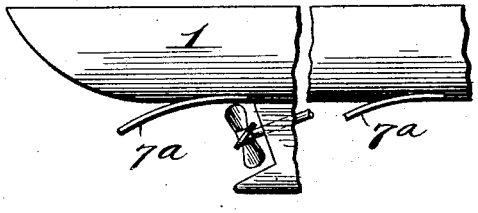
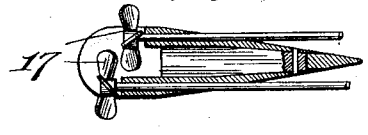
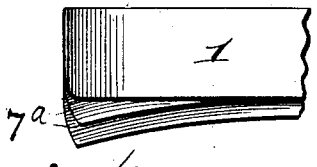


FIG. VII.

FIG. VI.





Attest:—
M. P. Smith,
Blanche Hogan.

Inventor:—
Carey A. Manker
By Knight Bros.
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 763,684. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

CAREY A. MANKER, OF PEARL, ILLINOIS, ASSIGNOR TO MANKER-HEAVNER NAVIGATION COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF ARIZONA TERRITORY.

BOAT.

SPECIFICATION forming part of Letters Patent No. 763,684, dated June 28, 1904.

Application filed October 14, 1903. Serial No. 177,076. (No model.)

To all whom it may concern:

Be it known that I, CAREY A. MANKER, a citizen of the United States, residing in Pearl, in the county of Pike and State of Illinois, have invented certain new and useful Improvements in Boats, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an improvement in boats or navigable vessels, in which I make use of means to secure the advantage of the inertia of the water in which the vessel travels to obtain floating of the vessel with a degree of minimized displacement and resistance of the water. In this means the principal feature of construction employed is that of screw-propellers whose disk of revolution is shielded in the portion taking the upward travel or strokes of the propeller-blades. In this connection a keel serves as the shield to protect the blades during their upward strokes from impingement in the water, and during the descending strokes the blades act in the water for propelling action and also for lifting action to raise the vessel and diminish the displacement of water. The propeller-shafts are set at an angle to a line extending longitudinally and horizontally through the boat for the purpose of maximizing the lifting thrust of the propellers as distinguished from tangential outward and inward thrust. In addition to the foregoing I make use of a gate that may be raised and lowered and through the medium of which water is excluded from the shielding-keel when the gate is closed and admitted into said keel to flow longitudinally therethrough at the time of starting the boat or floating it in a backward direction, so that at one period the water will have complete access to the propeller and at the other period it will only have access to the propeller-blades exterior of the keel and while said blades are descending. I further provide the hull of the vessel with a concave or slanting bottom or slanting plate substituted in lieu of such slanting bottom, either of which serves to assist in sustaining the boat by the inertia of the water.

The foregoing are the prime features of my boat which are used in combination to attain the object of the invention, which is to secure minimized resistance of the water in navigation.

The invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a view of my boat, partly in side elevation and partly in vertical longitudinal section. Fig. II is an elevation of the bow or forward end of my boat, exposing vertical cross-sections of keel. Fig. III is a bottom view of one of the keels. Fig. IV is a top view of a portion of the boat-floor and one of the air-shafts extending upwardly therefrom, and also shows in part two of the boat-propellers. Fig. V is a side view of the stern or rear end of my boat, illustrating a modification of the inclined inertia-sustaining portion of the boat. Fig. VI is a front end view of a portion of the end of the boat, illustrating inertia-sustaining inclines, as well as means for preventing tossing or toppling of the boat. Fig. VII is a section illustrating a modification of the keel of the boat.

1 designates the hull of my boat, 2 its bow, and 3 the stern.

4 is a rudder mounted at the stern of the boat, as seen in Fig. I.

5 and 6 are air-shafts that extend vertically in the hull above the keels, to be hereinafter described. The bottom of the vessel-hull is provided with a concave or curving face 7, that extends from a forward point 8 to a rear point 9 and curves downwardly at each of said points, as illustrated in Fig. I. By so forming the bottom of the hull I furnish a water-bearing contact that causes the hull of the boat to tend to rise steadily to the surface of the water at all times during the travel thereof.

10 designates the keels of the vessel, which are preferably two in number and are tubular, as most clearly illustrated in Fig. II. In the bottom of each keel is a central orifice 11, a forward orifice 12, and a rear orifice 13. The propellers of the boat are arranged in pairs, one propeller being carried by a power-

driven shaft 14, that is connected by gearing 15 to the shaft 16 of the second propeller.

17 designates the propellers, each of which has its blades so positioned as to operate partially within the tubular or hollow keels 10 and partially exterior of said keels. The propeller-blades are helically shaped and have their leading edges slanting outwardly and backwardly from their hub, as shown. The shaft of each propeller is so positioned as to set at an angle to the longitudinal horizontal lineof the boat and extends in a downwardly-inclined line, as illustrated in Fig. I and as shown by the positions of the propeller-shafts in Fig. IV. Power may be applied to the propeller-shafts in any suitable manner. One pair of propellers in each keel is situated near the forward end of the boat, so that the propeller-blades will operate into and out of the keel intermediate of the locations of the forward orifice 12 and central orifice 11 in the bottom of the keel, and a second pair of propellers is situated rearwardly from the first pair to operate into and out of the keel between the central and rear orifices 12 and 13.

18 is a gate hinged to the vessel's hull at 19 and adapted for service in controlling the forward orifice 12 in the keel, and 20 is a gate hinged to the hull 21 for service in controlling the passage of water through the central orifice 11 into the keel at the location of the rear propeller's 17. These gates are designed to be raised and lowered through the medium of cogged segments 22, that receive the engagement of screws 23, carried by operating-shafts 24, having handles 25. On the turning of said shaft the gates 18 and 20 may be raised or lowered at will.

7ª designates fins or downwardly-projecting inertia-sustaining members extending transversely of the boat-hull at its bottom. These fins are curved outwardly, backwardly, and downwardly, (see Fig. VI,) and they are designed for service in overcoming displacement and preventing sidewise motion or tossing of the vessel at all times.

In Figs. V and VI, I have shown a modification of the inertia-sustaining surface at the bottom of the vessel-hull. In this modification I utilize vanes 7ª, that take the place of the concave face 7 in the preferred form of construction, these vanes being curved downwardly, outwardly, and backwardly to furnish purchase against the water and overcome rolling of boat, as above stated.

In Fig. VII, I have shown a modification of the keel of the boat, illustrating a construction in which the keel is discontinued immediately in the rear of the propellers instead of being carried rearwardly to the stern of the boat, as illustrated in Figs. I and III. This discontinuation of the keel is also illustrated in Fig. V.

In the practical use of my boat the operation is as follows: It is necessary in securing the initial momentum for the travel of the boat to raise the gates 18 and 20, that control the entrances into the chambers of the keel in which the propellers 17 operate in order to accomplish the boat's forward motion, for it has been found difficult to rotate the propellers at first unless water is permitted to flow through the keel-chambers; but by raising the gates through the operating members connected thereto the propellers operate in the water exterior of the keel and also interior thereof and the initial velocity of the boat is obtained, after which the gates are lowered and exclude the passage of water into the keel-chamber through the orifices 12 and 11 into the keel-chambers in which the propeller-blades operate during the upward strokes. Thereafter the propeller-blades in their upward strokes are shielded by the keel while operating in the keel-chambers and during their downward strokes the blades by traveling through the water exterior of the keel operate with lifting action to constantly elevate the boat during the propulsion thereof and by combination of this lifting action and the feature of the propellers set at an angle to the perpendicular and with the sustaining action of the curved bottom of the boat's hull or modifications of such curved bottom the boat tends steadily to rise to the surface of the water, thereby providing for the securing of and maintenance of greatly developed speed over what would be possible in the usual displacement of water incident to boats propelled without lifting action. The only difficulty present in connection with a boat having its propeller-blades shielded during their upward strokes, so that they will operate with lifting action, is in the initial speed in starting the boat, but by means which I have set forth, each of which acts in combination with the others, greatly reduces or minimizes resistance of water, thus permitting the attainment of speed that cannot be had under condition of displacement except at greater expense of fuel and power than is practicable. I am aware that many modifications of the construction of my boat may be made without departing from the spirit of my improvement, and therefore desire it distinctly understood that I do not limit myself to the precise construction of parts set forth, which may be altered as found desirable. The air-shafts extending vertically in the vessel's hull from the keel-chambers in which the propeller-blades operate during their upward strokes provide for ingress and egress and circulation of air from and within said chambers, thereby avoiding the presence of confined air in said chambers to retard the movement of the propeller-blades.

I claim as my invention—

1. In a boat, the combination with a hollow keel, of propellers having their blades ar-

ranged to operate within said keel during their upward strokes, and means for admitting water to said keel and excluding it therefrom at different periods, substantially as set forth.

2. In a boat, the combination with a hollow keel, of propellers having their blades arranged to operate within said keel during their upward strokes, and a gate for admitting water to said keel and excluding it therefrom at different periods, substantially as set forth.

3. In a boat, the combination of a hull, a shielding-keel carried by said hull, a screw-propeller positioned in a plane inclined to the perpendicular of said keel and having its blades shielded by said keel during their upward strokes; said hull having a curving bottom surface projecting downwardly at its ends, substantially as and for the purpose set forth.

4. In a boat, the combination of a hull, a shielding-keel carried by said hull, a screw-propeller having its blades shielded by said keel during their upward strokes, and an air-shaft in said hull above and communicating with the portion of said keel in which the propeller-blades operate, substantially as set forth.

5. In a boat, the combination of a hull, a shielding hollow keel carried by said hull and having inlet and discharge orifices, a propeller having its blades arranged to operate in said keel during their upward strokes, and a gate for controlling the ingress of water to said keel within which the propeller-blades operate, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CAREY A. MANKER.

Witnesses:
GEORGE O. ROGEES,
HENRY C. GERKE.