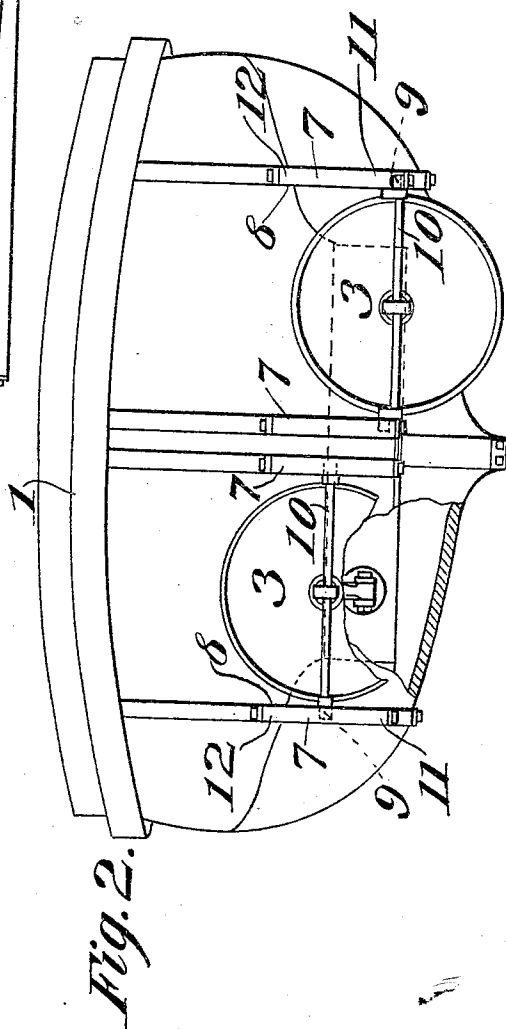
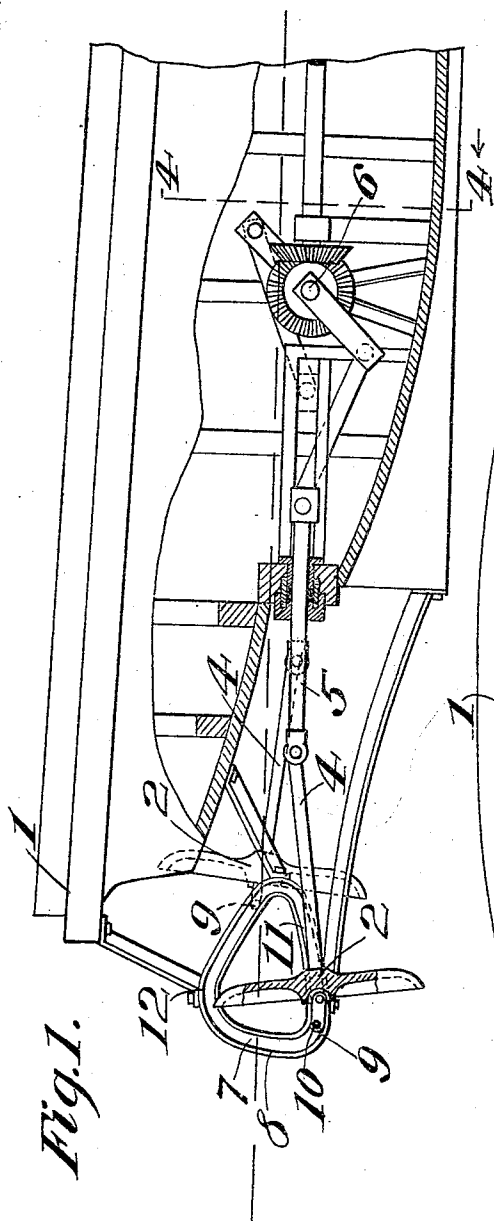


B. D. MARKS.
 RECIPROCATING PROPELLER.
 APPLICATION FILED SEPT. 3, 1908.

931,783.

Patented Aug. 24, 1909.
 2 SHEETS—SHEET 1.



Witnesses

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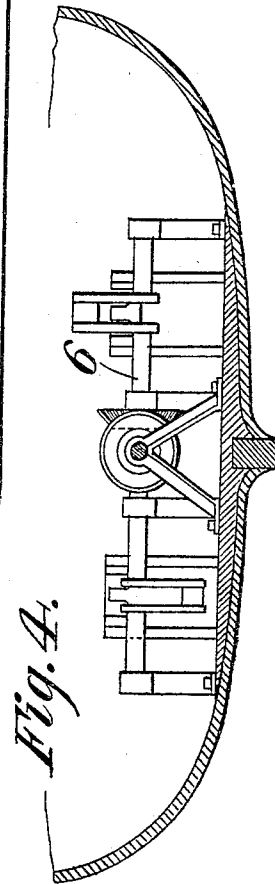
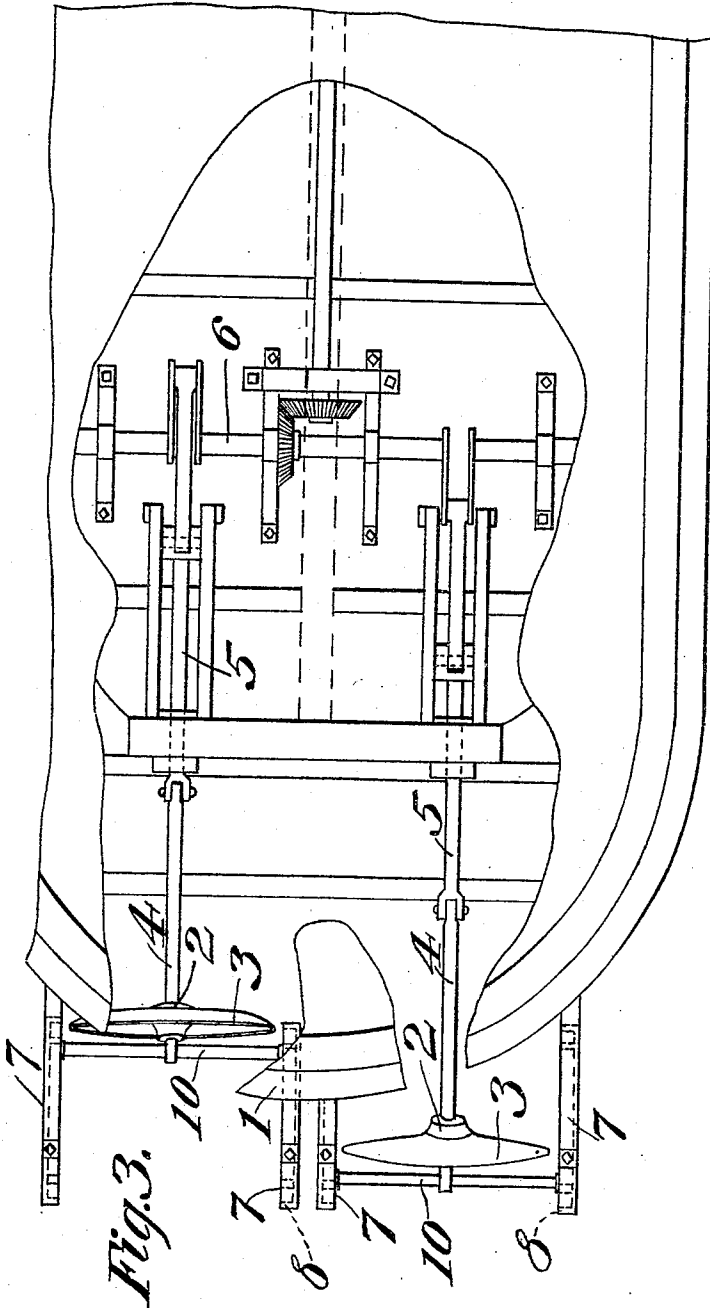
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UNITED STATES PATENT OFFICE.

BENNETT D. MARKS, OF CHICAGO, ILLINOIS.

RECIPROCATING PROPELLER.

931,783.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed September 3, 1908. Serial No. 451,525.

To all whom it may concern:

Be it known that I, BENNETT D. MARKS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reciprocating Propellers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in reciprocating propellers for boats.

In constructing propellers of this type it has been the common practice to make the blades in a plurality of hinged sections so that during the return stroke of the plunger the sections are permitted to fold inwardly in order to reduce the resistance offered to their passage through the water to the greatest possible extent. This form of blade however is decidedly objectionable because of the fact that the blade being made in a number of hinged sections the joints of the sections could not possibly withstand the strain to which they would be subjected, as the plunger makes its thrust and consequently the parts would become deranged or rendered unfit for service after the propeller has been in use but a short period of time.

In order to overcome the above objections, I have devised a propeller which is cast integral or riveted to the plunger and have provided guide frames of the desired form whereby the blade is gradually lowered into the water as the plunger makes its thrust and is raised—entirely or nearly clear of the water as the plunger makes its return stroke. With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of the stern of a boat with my improved form of propeller applied in position thereto; Fig. 2 is a rear view of Fig. 1 with parts broken away; Fig. 3 is a plan view; Fig. 4 a vertical section taken on the plane indicated by the dotted lines 4—4 of Fig. 1, looking in the direction indicated by the arrow.

In the embodiment illustrated the numeral 1 indicates the stern of a boat of any ordi-

nary construction and 2 the improved propelling means which is arranged in the desired position with relation to the stern of the boat. As shown, this propelling means comprises two rigid preferably concavo-convex propeller blades 3 which are arranged at opposite sides of the stern, as shown, and are integral with or rigidly connected to the rear extremities of the pivoted sections 4 of the plungers 5, the latter being connected with a crank shaft 6 extending transversely through the stern of the boat.

Each of the propeller blades 3 is arranged to work between a pair of corresponding laterally spaced guide frames 7 suitably supported in rear of the stern and at the desired height with reference to the water line. Each of these frames is of approximately elliptical form and is constructed from a flat piece or bar of metal arranged in edgewise relation with a vertical plane and provided at opposite side edges with inwardly extending guide flanges 8 to receive suitable rollers 9 journaled to opposite ends of a cross bar 10 one of which is arranged at the rear extremity of the pivoted section of each of the plungers and between each pair of guide frames. By employing a construction of this kind it will be observed that while these frames serve to guide the propeller blades in the desired manner the plungers are so connected therewith as to reduce friction to a minimum and consequently increase the desirability of the device. These frames comprise lower portions 11 which are gradually curved inwardly in the water and which extend to the rear ends of the frames. The frames are then bent upwardly and forwardly to form upper curved portions 12 of approximately semi-circular form, the central portions of which extend above the surface of the water to the desired distance. By this construction it will be observed that as the plunger makes its thrust its respective blade is gradually lowered into the water until at the rear end of its pair of guide frames and is then raised in approximately edgewise manner until out of the water and returned to initial position.

It is to be further observed that by constructing the lower portions 11 of the guide frames as indicated and described, each of the propeller blades is gradually lowered into the water as its respective plunger makes its thrust and that for this reason the impact is gradual and will not cause severe

shocks or strains to which the boat and propelling means would be otherwise subjected and which would cause the discomfiture of the passengers. It is to be further noted
 5 that by lifting the blades out of the water upon the return strokes of the plungers that practically no resistance if any is offered to the return of the propeller blades into initial or normal position to make the next
 10 thrust.

It is to be understood that while the construction of frame which I have shown and described is more particularly suited for the purpose than any other which I have been
 15 able to devise at the present time, I do not limit myself to this particular form of frame but claim the right to use any form or construction whereby the objects or aims in view heretofore pointed out may be accomplished. It is also evident that the crank
 20 arms of the crank shaft are arranged at 180 degrees apart in order that one of the propeller blades will be brought into normal or initial position while the other is making its
 25 thrust. Any suitable form of engine may be used to drive the crank shaft.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the
 30 invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of
 35 the invention, as defined in the appended claims.

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

40 1. In combination with a plunger, a propeller blade rigidly attached thereto, and guide frames whereby the blade is caused to be gradually lowered into the water during the thrust of its plunger and raised out of
 45 the surface of the water upon the return stroke of the plunger.

2. In combination with a boat, a plunger mounted to reciprocate through the stern thereof, a propeller blade made in one piece
 50 rigidly connected with the rear extremity of the plunger, and guide frames suitably supported in rear of the stern of the boat whereby the propeller blade is caused to be gradually lowered into the water as the plunger
 55 makes its thrust and is raised out of the water during the return stroke of the plunger.

3. In combination with a boat, a plunger mounted to reciprocate through the stern thereof, a concavo-convex propeller blade
 60 rigidly connected with the rear extremity of the plunger and a pair of corresponding laterally spaced guide frames for the rear end of the plunger whereby the propeller blade is caused to be gradually lowered into the
 65 water as the plunger makes its thrust and is

lifted above the surface of the water upon the return stroke of the plunger, and means for driving the plunger.

4. In combination with a boat, a plunger made in two jointed sections mounted to reciprocate through the stern of the boat, a
 70 propeller blade made in one piece rigidly connected with the rear extremity of the rear section of the plunger, and means for guiding the rear extremity of the rear plunger
 75 section whereby the propeller blade is caused to be gradually lowered into the water as the plunger makes its thrust and is raised out of the water during the return stroke of the
 80 plunger.

5. In combination with a boat, a plunger mounted to reciprocate through the stern of the boat a propeller blade cast in one
 85 piece rigidly connected with the rear extremity of the plunger, and a pair of corresponding laterally spaced guide frames supported in rear of the stern of the boat and for guiding the rear extremity of the
 90 plunger, said frames comprising lower gradually and inwardly curved portions and upper portions of greater curvature, the central portions of the upper portions extending above the water level, and means for driving
 95 the plunger.

6. The combination with a boat, of a
 100 plunger made in a number of jointed sections mounted to reciprocate through the stern of the boat, a propeller blade made in one piece rigidly connected with the rear extremity of the rear section of the plunger,
 105 and a pair of corresponding laterally spaced guide frames supported in rear of the stern of the boat and for guiding the rear extremity of the rear plunger section whereby the propeller blade is caused to be gradually
 110 lowered into the water as the plunger makes its thrust and is raised out of the water during the return stroke of the plunger, said frames comprising inwardly extending guide flanges, a cross bar arranged at the rear extremity of the rear plunger section, and
 115 rollers journaled to opposite ends of the cross bar and adapted to bear between the guide flanges of the frames, and means for operating the plunger.

7. The combination with a boat, of a plunger mounted to reciprocate through the stern thereof, a propeller blade made in one
 120 piece rigidly connected with the rear extremity of the plunger, a pair of corresponding laterally spaced guide frames supported in rear of the stern of the boat for guiding the rear extremity of the plunger and whereby the propeller blade is caused to be gradually
 125 lowered into the water as the plunger makes its thrust and raised out of the water during the return stroke of the plunger, each of the frames being constructed from a flat piece of metal which is arranged in edge-wise relation with a vertical plane and is
 130

bent at opposite side edges to form inwardly
extending guide flanges, a cross piece ar-
ranged at the rear extremity of the plunger
and extending between the guide frames,
5 and rollers journaled to opposite ends of the
cross piece to bear between the guide flanges
of the frame, with means for operating the
plunger.

In testimony whereof I have hereunto set
my hand in presence of two subscribing 10
witnesses.

BENNETT D. MARKS.

Witnesses:

ERNEST H. L. MUMMENHOFF,
OTTO W. HELLMRICH.