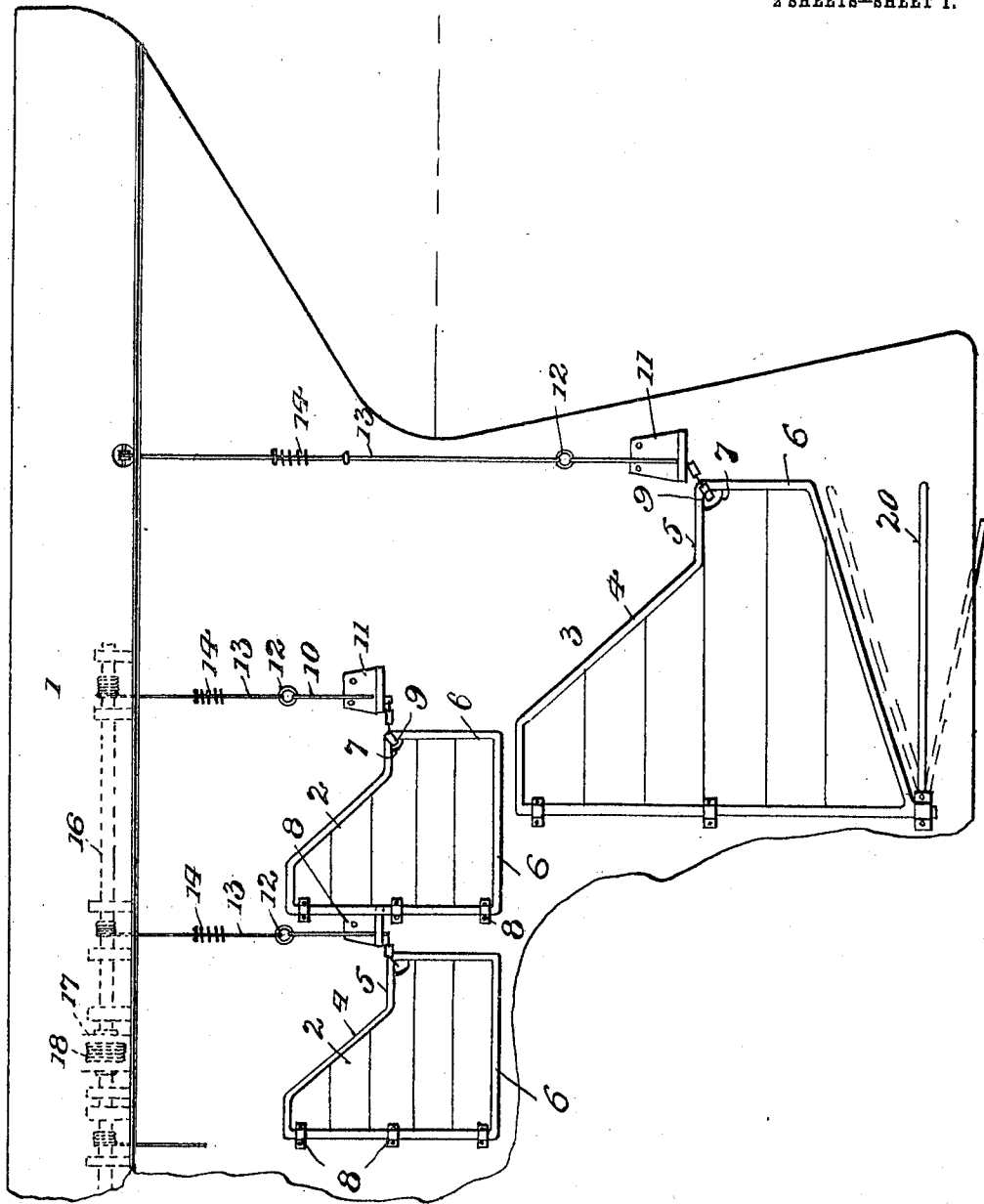


C. J. LOW.
 MEANS FOR PROPELLING WATER CRAFT.
 APPLICATION FILED FEB. 24, 1909.

945,104.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.



Witnesses
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Fig. 1.

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Fig. 2.

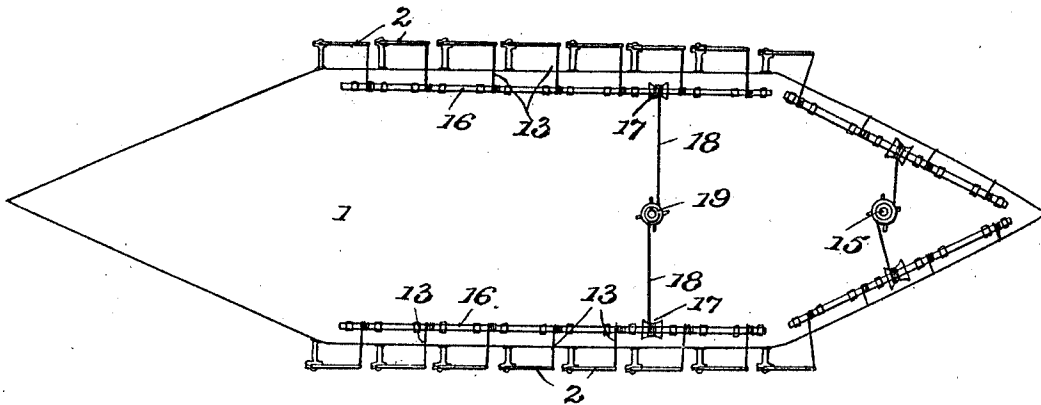
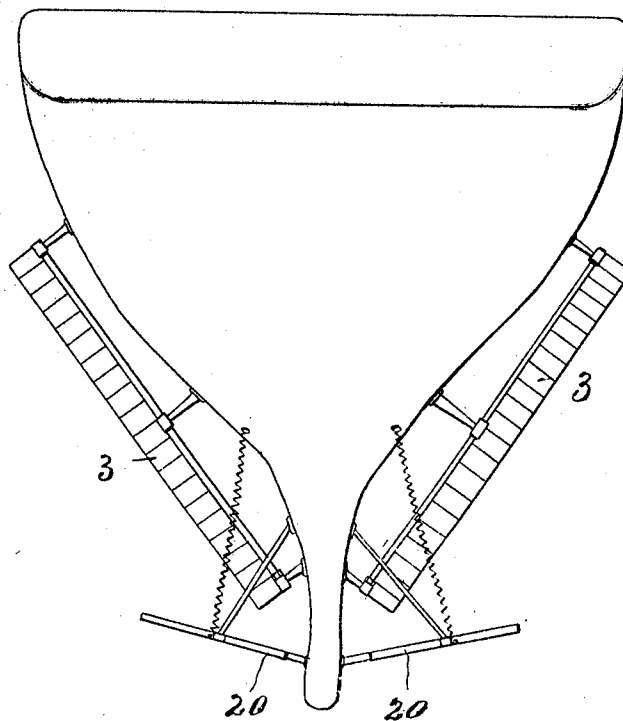


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES JONATHAN LOW, OF CHELAN, WASHINGTON.

MEANS FOR PROPELLING WATER-CRAFT.

945,104.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed February 24, 1909. Serial No. 479,702.

To all whom it may concern:

Be it known that I, CHARLES JONATHAN Low, a citizen of the United States, residing at Chelan, in the county of Chelan and State of Washington, have invented certain new and useful Improvements in Means for Propelling Water-Craft, of which the following is a specification.

The purpose of this invention is to utilize the force of the waves for propelling ships, boats and water craft generally, either in conjunction with the usual propelling means or independently thereof. It is well known that the waves are possessed of inherent force, but difficulty has been experienced to harness such force and utilize the same for driving craft launched upon the waters and in motion.

The present invention equips water craft with wings which are so mounted and disposed as to be automatically operated by the waves, such motion being effectively applied for propelling the vessel, either in conjunction with the ordinary propelling means or independent thereof according to the developed force.

A further purpose of the invention is to provide an upper and a lower set of wings, the former to be operated by the surface waves and the latter to be actuated by the up and down motion of the vessel, incident to the rise and fall thereof, due to the force of the waves.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side view of a vessel equipped with propelling means embodying the invention; Fig. 2 is a top plan view of the vessel; Fig. 3 is a rear view.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The invention is adapted to vessels propelled solely by sails or driven by steam or

other power so as to supplement such power in turbulent waters. The vessel indicated is typical of water craft to which the invention may be applied. The hull 1 of the vessel may be of any size or shape and is provided upon opposite sides with upper wings 2 and lower wings 3. These wings are of like formation, differing only in size, the lower wings 3 being larger than the upper wings 2. The lower wings 3 are arranged to be submerged at all times except possibly in very heavy water, whereas the upper wings 2 are only partly submerged, but may be wholly or entirely submerged when the vessel is loaded. The several wings are pivotally connected at their front vertical edges with the hull of the vessel and are free at their rear vertical edges to swing inward or outward with reference to the hull. The upper rear corners of the wings are cut away, as clearly indicated in the drawings, forming a slanting edge 4 and a horizontal edge 5. The wings may be constructed in any manner and be of any relative size. It is preferred to have each of the wings formed of sheet metal and reinforced at its edges by a frame 6 of stout wire, the body of the wing being attached to the frame in any substantial way. An opening 7 is formed in the upper rear corner of each wing. Brackets 8 are attached at their inner ends to the sides of the hull 1 and are formed at their outer ends with bearings in which the wings are mounted, the vertical members of the frames 6 being mounted in said brackets in a manner to admit of the wings swinging freely at their rear edges. The brackets 8 may be of any construction and secured to the hull in any substantial way.

A ring 9 is fitted to the openings 7 of each of the wings and a short length of cable 10 is connected to each ring and passes through a bracket 11, the upper end of the cable having a ring 12 fitted thereto and which acts as a stop to limit the outward swinging movement of the wing by coming into contact with the bracket 11. A cable 13 connects each ring 12 with adjusting means provided upon the deck of the vessel and which

cable is provided in its length with a spring connection 14 to prevent injury to the wings when acted upon suddenly or subjected to abnormal force. A capstan 15 receives the 5 cables 13 connected with the lower wings 3 and by turning said capstan the cables may be lengthened or shortened to control the movement of the wings 3 or to hold them parallel with the sides of the hull, so as not 10 to offer any appreciable resistance to the forward movement of the vessel when driven through the water by the usual propelling means.

The upper wings 2 are usually provided in 15 series and the cables 13 connected therewith are attached at their upper ends to shafts 16 mounted in bearings upon the deck of the vessel. By turning the shafts 16 the series of wings 2 are operated simultaneously. A 20 drum 17 is fast to each of the shafts 16 and one end of a cable 18 is attached to each drum 17 and is connected at its opposite end to a capstan 19 suitably located upon the deck of the vessel. By turning the capstan 25 19 the cables 18 are wound thereon, thereby turning the shafts 16, so as to wind the cables 13 thereon and move the wings 2 into a position either parallel with the sides of the hull or so as to limit their movement as will 30 be readily understood.

The capstans 15 and 19 are adapted to be operated either by hand or by power, according to the nature of the vessel.

The relative position and number of the 35 wings is immaterial, so long as said wings are arranged to utilize the power of the waves to the best possible advantage for propelling the ship or other craft independently of, or in conjunction with the usual propelling 40 means. In calm waters the propelling means consisting of the wings 2 and 3 are of no advantage, but in turbulent waters said wings have a movement imparted thereto and this movement is utilized to assist materially in driving the vessel through the 45 waters.

The springs 14 interposed in the length of the several cables or chains also serve in addition to the purpose herein stated to enable 50 the use of a smaller cable or chain as far as the ring 12. These springs assist materially in preventing the small cables or chains from breaking by the packing blows and jerky action of the waves upon the wings.

55 The wings 3 are located upon opposite sides of the keel at the stern, and are normally inclined to the horizontal at an angle of about 45°, so that the up and down motion of the stern of the vessel would cause 60 the water to act on both sides of the wings generating a propelling force.

In addition to the wings 3 at the front of the vessel, I have arranged substantially

horizontally disposed wings 20, the same being disposed at an angle of about 10 degrees 65 with the horizontal.

In the practical operation of the side wings 2, it will be understood that a wave coming up between the wings and the sides 70 of the hull will force the wings outwardly, the wings swinging freely in an outward direction until the limit of their free movement has been reached, according to the adjustment of the cables. As soon as this 75 swinging movement of the wings reaches the limit, it is clear that the outward and forward impulse of the wings will impart a forward impelling force to the vessel. The cuts at the upper edges of the wings permit the wave to easily break over the upper 80 edges. On the return movement of the wings 2 they will not be permitted to strike the sides of the hull, because the brackets 11 and the cables 10 have their movement through said brackets stopped at the point 85 where the free edges of the wings will be stopped short of contact with the hull. Relative to the wings 3, it is clear, that the up and down movement of the vessel's hull at the stern caused by the action of the waves 90 will act on such wings as the vessel rises and settles at the stern. This is due to the fact that these wings are inclined as best shown in Fig. 3, that they will swing in both directions by the action of the hull, the wings 95 being brought to a standstill in their swinging movement by the cables which are attached thereto and thus giving a propelling force to the vessel just as a sail would act, after it had reached the limit of its free 100 movement swinging about the mast as soon as the rope which was secured to its boom was stretched out taut. As to the wings 20, it may be assumed that when the vessel's stern rises by the undulatory action of the 105 water, the resisting action of the water acts on the upper side of the wing thereby tending to drive the vessel ahead; after the wing has reversed its angular position it is obvious that the setting of the stern will act in 110 a corresponding manner.

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

1. In combination with water craft, a wing having pivotal connection therewith 115 and adapted to be actuated by the force of the waves for propelling the craft and a cable for limiting the movement of the wing and having a spring connection in its length, and a cable having connection with the wing, 120 and means for varying the length of the cable to control the movement of the wing.

2. In combination with water craft, a wing having pivotal connection therewith and adapted to be actuated by the waves, a 125 cable having connection with the wing and

provided with a stop, a bracket attached to the craft and receiving said cable and adapted to act in conjunction with the said stop to limit the extreme movement of the wing, and a second cable connected with the first mentioned cable and adapted to be controlled to regulate the position of the wing.

3. In combination with a vessel a series of wings having pivotal connection therewith, a shaft, cables connecting the several wings

with the shaft, and means for turning the shaft to regulate the effective length of the cables to control the position of the wings.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES JONATHAN LOW. [L. s.]

Witnesses:

DUNCAN MCARTHUR,
ROY L. GREEN.