No. 840,548. PATENTED JAN. 8, 1907.

G. F. ATWOOD.

BOAT PROPELLER.

APPLICATION FILED MAY 12, 1906.

Fig. 1.

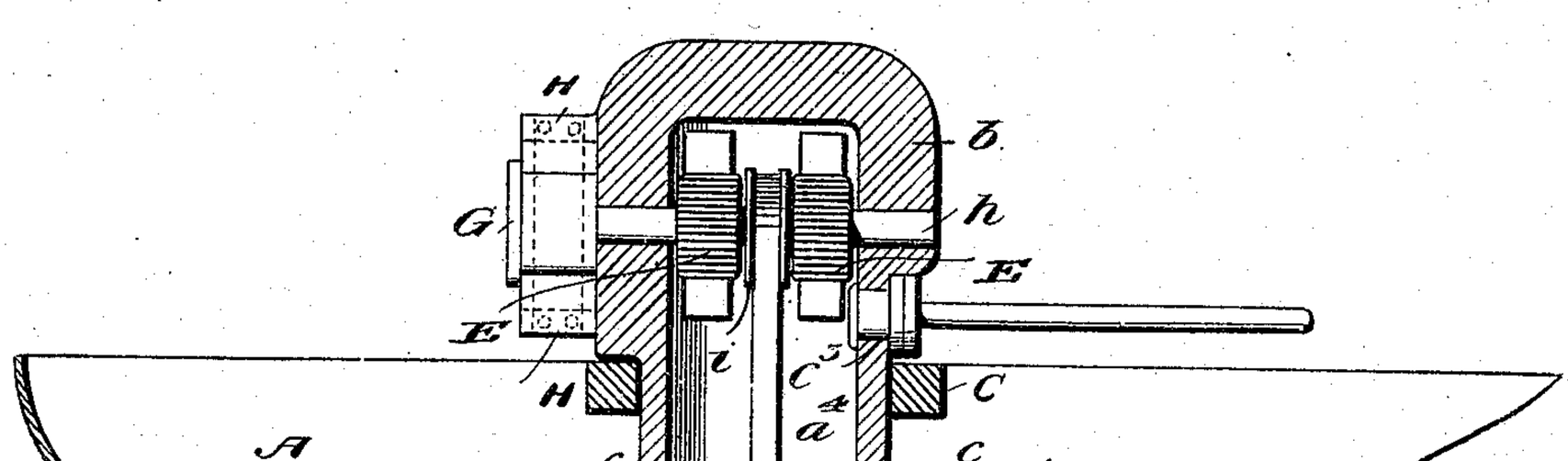


Fig. 2.

Fig. 3.

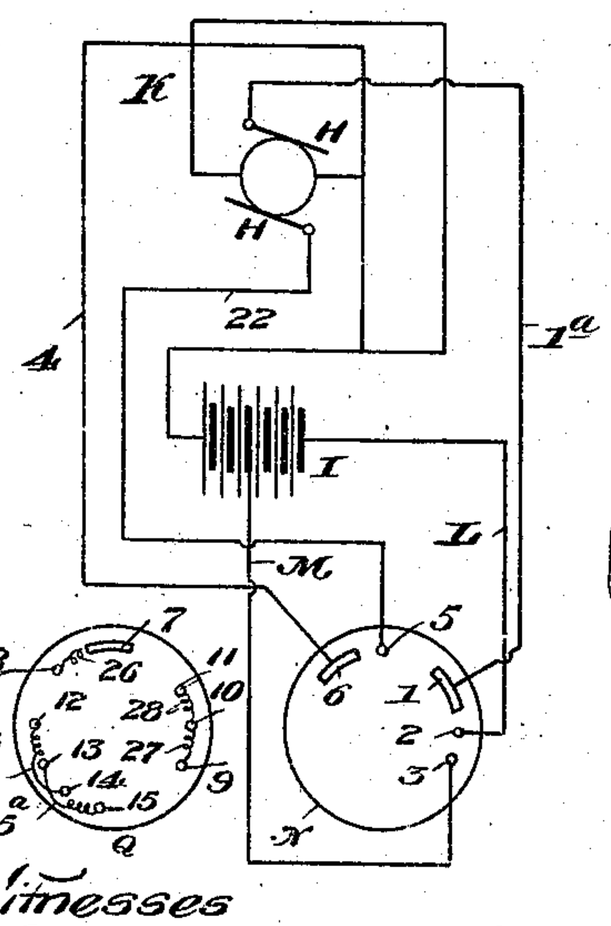
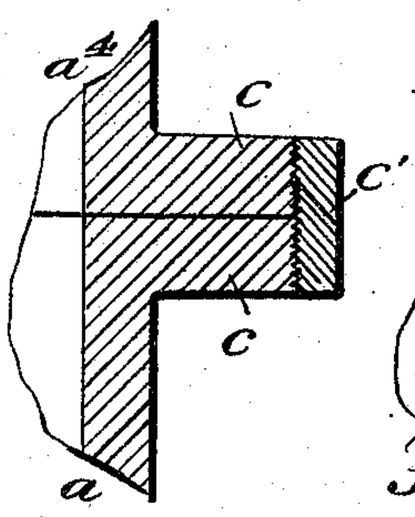
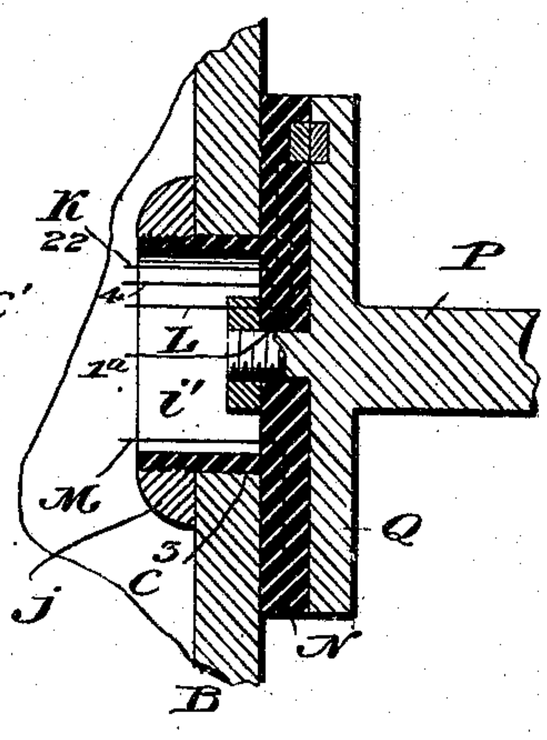


Fig. 4.





Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE FRENCH ATWOOD, OF WAKEFIELD, MASSACHUSETTS.

BOAT-PROPELLER.

No. 840,548. Specification of Letters Patent. Patented Jan. 8, 1907.

Application filed May 12, 1906. Serial No. 316,519.

To all whom it may concern:

Be it known that I, GEORGE FRENCH ATWOOD, a citizen of the United States, residing at Wakefield, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Boat-Propellers, of which the following is a specification.

My invention pertains to electromechanical means for propelling boats; and it contemplates the provision of a simple, compact, and inexpensive means which will be easy on the batteries employed and which will permit of the direction of movement of a boat being expeditiously reversed without injury to any of the working parts.

Other advantageous features of my invention will be fully understood from the following description and claims when the same are considered in connection with the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of the rear portion of a boat provided with my improved propelling means. Fig. 2 is a diagrammatic view of the motor-controlling means. Fig. 3 s an enlarged detail section illustrative of the opposed disks of said controlling means, and Fig. 4 is an enlarged detail section of a portion of the axially-movable casing of the propelling means.

Similar letters and numerals designate corresponding parts in all of the views of the drawings, referring to which—

A is the rear part of a boat-hull, and B is a vertically-disposed axially-movable casing journaled and supported in a suitable bearing C in the hull. The said casing B may be of any construction compatible with the purpose of my invention without involving a departure from the scope thereof, though I prefer to have it comprise a lower section a, bearing a preferably integral rudder a^3, and an upper section a^4, the upper part b of which is adapted to serve as a field-magnet for a purpose presently set forth. The motor (hereinafter described in detail) is insulated from anything below it.

The sections a and a^4 are provided with oppositely-threaded portions c c and are connected through the medium of a surrounding nut c', having interior right and left hand threads engaging the oppositely-threaded portions of the casing-sections. It will thus be seen that by turning the nut c' through a part of a revolution the sections a a^4 may be moved endwise apart to increase the length of casing B and in that way take up slack of the band k, presently described.

D is a propeller arranged in an opening e in the rudder and carried by a shaft f, journaled in and extending across the lower portion of the casing B.

g is a band-pulley fixed on the propeller-shaft f and contained in the casing B, and h is a shaft journaled in the upper portion of casing B and bearing spaced armatures E and a band-pulley i, the said band-pulley being disposed between the armatures E and connected through the medium of a band k with the pulley g on the propeller-shaft f.

In addition to the field-magnet b and the armatures E the electromotor of my improvements comprises a commutator G and commutator-brushes H, which *per se* may be and preferably are of the ordinary well-known construction and for such reason need not be particularly described herein.

In virtue of the construction and relative arrangement of the working parts thus far described it will be apparent that when the armatures E are rotated the shaft h will also be rotated and motion will be transmitted from said shaft through the band or belt k to the propeller-shaft f. From this it follows that the direction of rotation of the propeller-shaft may be expeditiously reversed without impairing any of the working parts and without the waste of electrical energy. It will also be noticed in this connection that the means for transmitting motion from the armature-shaft to the propeller-shaft is entirely inclosed, and hence is not liable to be affected by the water in which the propeller is immersed. Moreover, the casing B serves when turned on its axis to steer the boat.

I, Fig. 2, is a source of electric energy, of any suitable type, which may be situated at any suitable point in the boat.

K is a conductor which extends through the opening c^3 in the field-magnet portion of the case B and electrically connects the field-magnet and the end minus pole of the source of electric energy.

L is a conductor which extends through the opening c^3 of the casing and is connected to the end plus pole of the source of electric energy.

M is a conductor also extending through the opening c^3 and connected to an intermediate plus pole of the source of electric energy.

N is a disk, of insulating or other suitable material, having an annular projection i' ex-

tending through the wall of the casing B and secured by a nut *j'* or other suitable means, and P is a tiller, having a disk Q opposed to and pivotally connected to the disk N in the manner shown in Fig. 3. The disk N is provided with a contact 2, to which the conductor L extends; a contact 3, to which the conductor M extends; a contact 6, connected by a conductor 4 with the opposite end of the field-magnet with reference to the conductor K; a contact 1, connected by a conductor 1^a with one of the commutator-brushes H, and a contact 5, connected through a conductor 22 with the other commutator-brush H. The several conductors L, M, 4, 22, and 1^a extend from the disk N into the casing B, as shown in Fig. 3. The disk Q is provided with contacts 9, 10, and 11, electrically connected by conductors 27 and 28; contacts 7 and 8, electrically connected by a conductor 26; contacts 13 and 15, electrically connected by a conductor 15^a, and contacts 12 and 14, electrically connected by a conductor 15^b.

In practice when the handle or tiller P is in a position to hold the contact 11 on the disk Q in engagement with the contact 1 on disk N and the contact 5 in engagement with the contact 7 and the contact 8 in engagement with the contact 6 the circuit will be from the end plus pole of the source of electric energy through the conductor L, contact 2, contact 10, conductor 28, contact 11, contact 1, conductor 1^a, one of the commutator-brushes H, the commutator G, the other commutator-brush H, the conductor 22, contact 5, contact 7, conductor 26, contact 8, contact 6, conductor 4, the field-magnet, and the conductor K to the end minus pole of the source of electric energy. From this it follows that the armatures of the motor will be rotated with the full power of the source of electric energy in a direction to propel the boat forwardly. When the tiller P is turned on its axis a suitable distance to carry the contact 9 into engagement with the contact 3 and the contact 10 out of engagement with the contact 2, the circuit will be from an intermediate plus pole of the source of electric energy through conductor M, contact 3, contact 9, conductor 27, contact 10, conductor 28, contact 11, contact 1, conductor 1^a, one of the commutator-brushes H, the commutator G, the other commutator-brush H, the conductor 22, the contact 5, the contact 7, the conductor 26, the contact 8, the contact 6, the conductor 4 of the field-magnet, and the conductor K to the end minus pole of the source of electric energy. Because of this the armatures of the motor are obviously rotated with but a portion of the energy of the battery, and hence at a slow speed in a direction to propel the boat forward. When the tiller P is rotated in the same direction as before sufficiently far to disengage the contact 9 from contact 3 and the contact 10 from contact 2, the electrical connection between the source of electric energy and the motor will be interrupted and the motor stopped. When, however, the handle is turned in the same direction sufficiently far to place the contacts 12, 13, 14, and 15 in engagement with the contacts 5, 6, 2, and 1, respectively, the circuit will be from the plus pole of the source of energy through conductor L, contact 2 and contact 14, conductor 15^b, contact 12, contact 5, conductor 22, one of the commutator-brushes H, the commutator G, the other commutator-brush H, the conductor 1^a, the contact 1, the contact 15, conductor 15^a, contact 13, contact 6, the conductor 4, the field-magnet, the conductor K to the minus pole of the source of electric energy. Because of this the propeller will be rotated in an opposite direction to that first described, and the boat will be moved backwardly.

By grasping the tiller P and moving the same in a horizontal plane a person is enabled to steer the boat, while by turning the said tiller on its axis such person is enabled to quickly and easily start the boat, as well as stop and regulate the speed of the same.

While I have shown and described the casing B as equipped with a rudder, I desire it distinctly understood that the rudder is not essential to the successful operation of my improvements in propelling and steering a boat, and therefore the said rudder may be omitted when desired without affecting my invention.

It is obvious that in lieu of the plain band *k* and pulleys *g* and *i* illustrated a sprocket-band and pulleys may be employed without involving departure from the scope of my invention.

In virtue of the pulley *i* being arranged on the armature-shaft between the two armatures it will be observed that the motor is highly efficient in proportion to the power expended, and it will also be observed that because of the motor having two separate armatures and two commutators with pulley in center I am enabled to run the motor at slow speed with one armature and commutator and at high speed with both.

I claim—

1. The combination of a boat, a vertically-disposed, axially-movable casing journaled in a bearing on the boat, an insulating-disk having an annular projection extending through the casing-wall and secured thereto, a shaft journaled in the lower portion of the casing and provided at a point within the casing with a band-pulley and at a point outside the casing with a propeller, a shaft journaled in the upper portion of the casing and provided within the same with a band-pulley, a band or belt connecting the pulleys and contained in the casing, an electric motor

comprising rotary armatures fixed directly on the second-mentioned shaft, a tiller having a disk opposed to the insulating-disk of the casing and pivotally connected thereto, a source of electric energy, and coöperating means on the disks for controlling the supply of electric energy to the motor.

2. The combination of a boat, a vertically-disposed, axially-movable casing journaled in a bearing on the boat and comprising lower and upper sections, means connecting said sections to assure same turning together on their axes, an insulating-disk having an annular projection extending through the casing-wall and secured thereto, a shaft journaled in the lower portion of the casing and provided within the casing with a band-pulley and without the casing with a propeller, a shaft journaled in the upper portion of the casing and provided within the same with a band-pulley, a band or belt connecting the pulleys and contained in the casing, an electric motor comprising rotary armatures fixed directly on the second-mentioned shaft, a tiller having a disk opposed to the insulating-disk of the casing and pivotally connected thereto, a source of electric energy, and cooperating means on the disks for controlling the supply of electric energy to the motor.

3. The combination of a boat, a vertically-disposed casing journaled in a bearing on the boat and comprising lower and upper sections having oppositely-threaded portions, and a nut having interior opposite threads, surrounding and engaging the oppositely-threaded portions of the sections, a shaft journaled in the lower section of the casing and provided within the casing with a band-pulley and without the casing with a propeller, a shaft journaled in the upper section of the casing and bearing a band-pulley, a band connecting said pulleys, and a tiller for turning the casing on its axis.

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

GEORGE FRENCH ATWOOD.

Witnesses:

EDEN K. BOWSER,

JOHN M. CAMERON.