C. E. REDFIELD.

CURRENT MOTOR.

APPLICATION FILED NOV. 29, 1911.

1,020,574.

Patented Mar. 19, 1912.

2 SHEETS—SHEET 1.

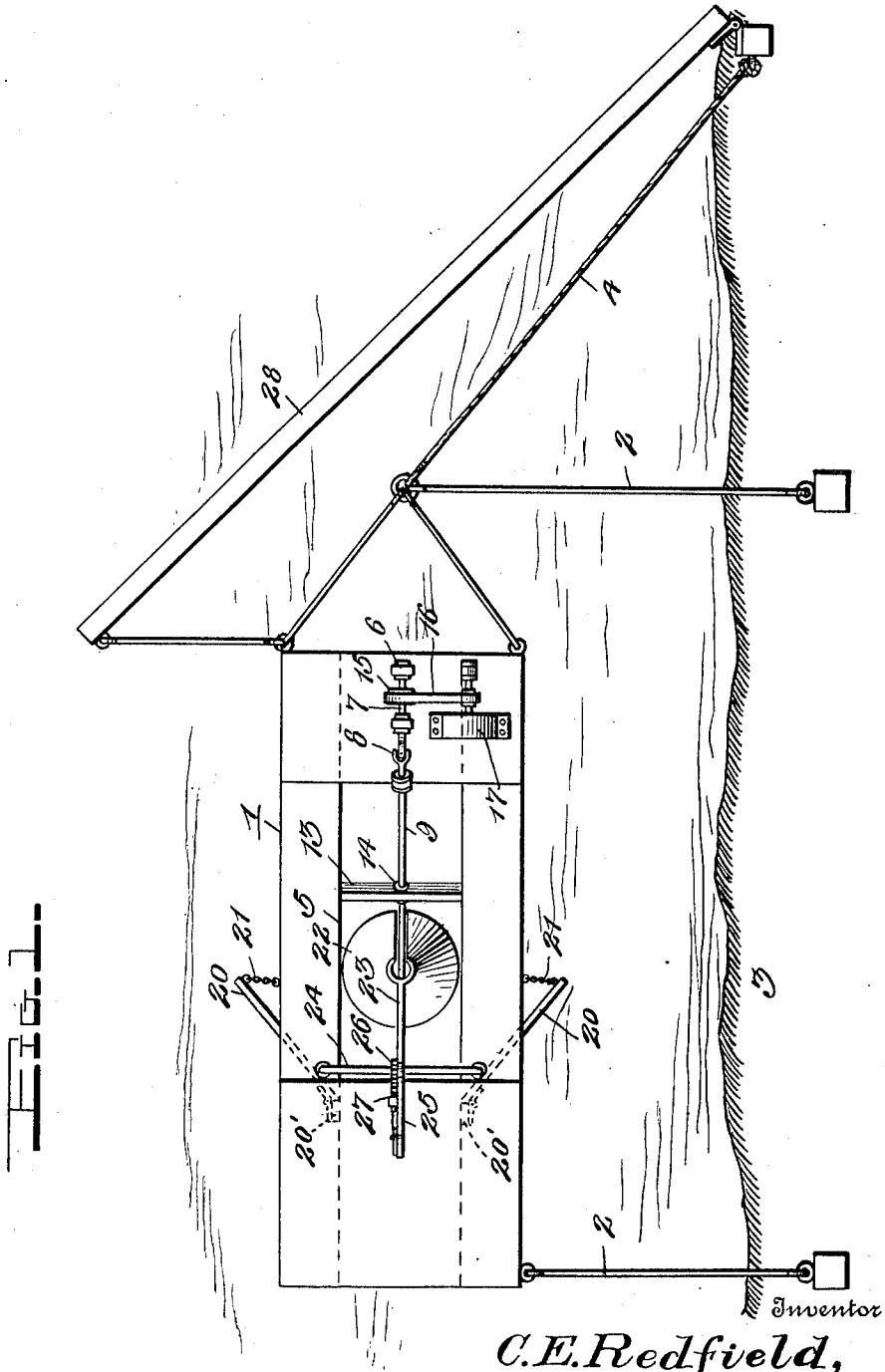

Fig. 1.

Witnesses

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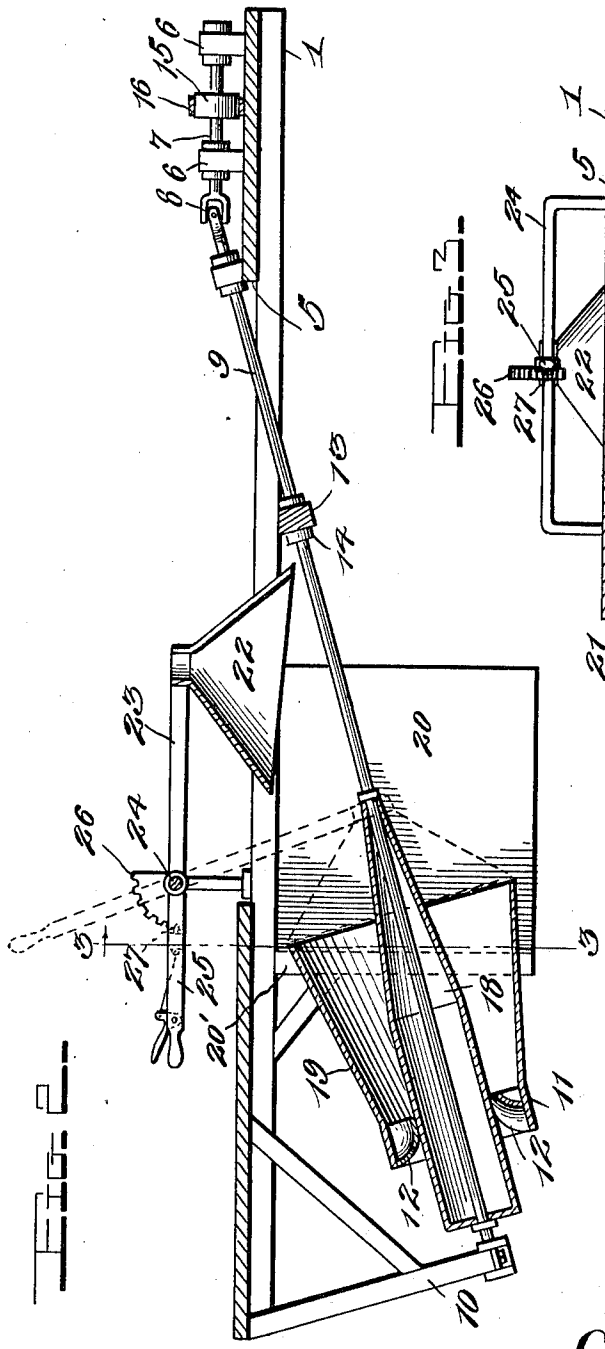

Fig. 2.

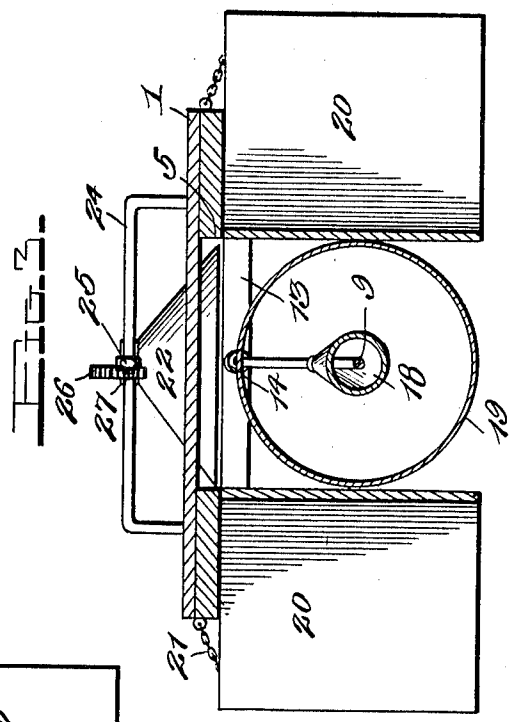

Fig. 1.

Witnesses

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UNITED STATES PATENT OFFICE.

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CURRENT-MOTOR.

1,020,574. Specification of Letters Patent. Patented Mar. 19, 1912.

Application filed November 29, 1911. Serial No. 663,128.

To all whom it may concern:

Be it known that I, CHARLES E. REDFIELD, a citizen of the United States, residing at Okanogan, in the county of Okanogan and State of Washington, have invented certain new and useful Improvements in Current-Motors, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to new and useful improvements in current motors and more particularly to a motor employing a turbine runner or wheel, and my object is to provide a device of this character which is cheaper and lighter in construction than any similar device heretofore known without impairing the efficiency, durability and simplicity of the same.

A further object of the invention resides in providing means for the floating of the device, and a still further object resides in providing means for the buoyancy of the weighted parts of the device.

Still another object of the invention resides in providing means to direct the current to the wheel or runner, and a further object is to provide means to increase and decrease the velocity of the water as the same flows to said wheel.

A still further object resides in providing means to cut off the direct flow of the current to said wheel.

With these and other objects in view, my invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter referred to and more particularly pointed out in the specification and claims.

In the accompanying drawings forming a part of this application, Fig. 1 is a top plan view of the device complete. Fig. 2 is an enlarged longitudinal section therethrough, and, Fig. 3 is a transverse section through the device as seen on line 3—3, Fig. 2.

In carrying out my invention, I shall refer to the drawings in which similar reference characters designate corresponding parts throughout the several views and in which—

1 indicates a float of any desired type disposed in a stream or other body of water wherein there is a current, said float being retained in any adjusted position in said stream by means of the brace arms 2 which are pivoted at one of their ends in any desired manner to supports or the like on the bank 3, while the opposite ends are similarly hinged or pivoted to said float 1. The float may also be anchored from the bank by any other desired means, such as a cable 4, and thus, said float may be retained any distance from the bank and at the same time is capable of being raised and lowered with the tide without affecting its position with respect to the bank and without damaging any of the retaining means. This float is preferably of an elongated type having an elongated longitudinal opening 5 therein, and rotatably mounted in the bearings 6 at the forward end of said float 1, is a shaft 7, said shaft being connected by means of a universal joint 8 to an additional shaft 9, said latter shaft being inclined downwardly and rearwardly through the longitudinal opening 5 in said float. The rear or lower end of said shaft 9 is rotatably mounted in a bearing formed in the lower end of a hanger 10 which is mounted on the under face of the float 1 at the rear end thereof, and carried on the shaft 9 adjacent its lower end beneath the float 1 and designed to rotate with said shaft, is a turbine runner or wheel 11. This turbine runner is of the usual or any preferred type having a plurality of vanes or the like 12 extending from the central or hub portion thereof to the outer periphery or felly portion of the same, so that as the current from the stream in which said float is disposed, contacts with said vanes, the wheel will rotate to correspondingly rotate the shaft 9, and in order to prevent an end thrust of said shaft, a stop block 13 is provided on the under face of the float 1 which is adapted to contact with a collar or the like 14 carried on said shaft. This stop block and collar 13 and 14 are designed preferably concavo convex having ball bearings mounted therebetween, so as to provide as little friction as possible, and it will be appreciated that when said shaft is rotated through the rotation of said wheel 11, the shaft 7 will also be rotated. This shaft 7 has mounted thereon, a pulley 15 which may be connected by means of a belt 16 to any desired device for any desired purpose, I having shown, however, a pump 17 on the float 1 to which said belt is connected, said pump being designed to pump

water from the stream to any desired point on the bank 3. Although I have shown my device connected to a pump, it will be understood that I do not wish to limit myself to this construction and, if desired, may use the power generated from the current for any desired purpose, whatsoever.

As above stated, the turbine wheel is carried on the shaft 9 adjacent its lower or rear end, but said shaft has mounted thereon at the point at which said wheel is carried, an air-tight casing or jacket 18, said jacket being substantially conical in design, the point of divergency or apex being at the forward end thereof, and it will be seen from this construction that the turbine wheel is, in reality, directly mounted on the casing or jacket 18 adjacent its rear end. This casing or jacket, being air-tight, provides buoyant protection for the turbine wheel and thus, the weighted parts of the device will not be adapted to draw any portion of the float 1 below the surface of the water, while the operating parts, themselves, will be constantly below said surface, but said air-tight jacket has a second purpose, which, from its particular design, is to direct the current to the outer extremities of the vanes of the turbine wheel, which are the points of most effectiveness.

As the power of the current is increased proportionate to the velocity thereof, it is, of course, essential to obtain the greatest possible velocity of the current as the same is directed to the turbine wheel 11, and to accomplish this result, I provide a substantially funnel-shaped casing 19 which as shown is formed integral with the outer periphery of the turbine wheel but it may be attached to the float in any manner, if so desired, and has the larger end thereof disposed toward the forward end of the float 1, and with this device applied, it will be seen that the current will be concentrated on the wheel and the velocity of said current correspondingly increased. In order to further provide means for the increasing or decreasing of the velocity with which the water runs at the point adjacent the water wheel, I provide a pair of blades or wings 20 which are hinged at their inner ends to the dependent supports or arms 20′ carried on the float 1, said arms being disposed on opposite sides of and immediately adjacent the casing 19, and when said wings are disposed in their extended positions, as shown in Fig. 1, the same form somewhat of an extension for the casing 19. These wings are held in their extended positions by means of the chains 21 which are carried on the free ends of said blades or wings and engaged with the float 1, but when not desired for use, said wings or blades may be thrown back upon the outer periphery of the casing 19 and held in their inoperative positions by any suitable means (not shown), and it will be appreciated that the velocity of the current at the point of the casing will be increased or decreased by being forced into a smaller or larger area as will be provided by moving the wings 20 into their operative or inoperative positions.

It will, of course, be necessary at times to entirely eliminate the rotation of the turbine wheel, and in order to provide means for this purpose, a deflector 22 is provided, which deflector is conical in design and carried on the lower end of an arm 23 which is, in turn, pivotally mounted on a frame 24 on the float 1. This conical deflector 22 is designed to be raised and lowered through the longitudinal opening 5 in the float 1 so as to be disposed immediately forward of the casing 19 when lowered in the water, and in order to provide means for the raising and lowering of said deflector, a lever 25 is provided in connection with said arm 23. When the lever is moved in one direction, said deflector will be lowered, and when moved in the other direction, said deflector will be raised, and in order to provide means for retaining the lever in any desired position, the rack 26 is provided on the frame 24, which rack is adapted to be engaged by a detent 27 carried on the lever 25. This deflector 22, as stated above, is conical in design, having the larger end thereof disposed toward the rear end of the float 1, whereby when the same is lowered, the current will be directed to the sides of the casing 19 to prevent said current from contacting with the vanes of the turbine wheel.

As the operating parts of the device are entirely submerged in the water and disposed at a point where the current is quite strong, it is important to provide some means for the protection of these operating parts from the drift wood and the like traveling in the current, and to this extent, I provide, as shown in Fig. 1, a fender 28 which, although shown as mounted on the bank of the stream, may be carried by the float 1.

From the foregoing, it will be seen that I have provided an improved current motor wherein the usual or any desired form of turbine wheel may be employed and entirely submerged below the surface of the water for generating the power. It will further be seen that I have provided a float carrying a rotatable shaft upon which said turbine wheel is carried, and have still further provided means in connection with said shaft for the buoyancy thereof and for the adjunctive parts of the turbine. It will still further be seen that I have provided means for concentrating the current on the turbine wheel, whereby the velocity of said current will be materially increased, thereby giving increased power. Furthermore,

it will be seen that I have provided means for the adjustment of the velocity of the current by the increasing and the decreasing of the area immediately around the turbine wheel. It will still further be seen that I have provided a deflector as a means whereby the rotation of the turbine wheel may be entirely eliminated, when desired. It will still further be seen that a device constructed in the manner hereabove described, is simple and inexpensive to manufacture, light and durable in construction, and extremely effective and useful in operation.

While I have shown and described the elements which are most well adapted to perform the functions set forth, it is obvious that various changes in the form, proportion and in the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the principles of the invention.

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

1. A current motor of the class described, comprising a float, means to anchor the same in a body of water, a rotatable shaft extending longitudinally of the float and having a portion thereof therebelow, a turbine wheel carried on the shaft below the float, and means to direct the current to said wheel.

2. A current motor of the class described, comprising a float, means to anchor the same in a body of water, a shaft extending longitudinally of the float and having one end thereof disposed below the float, a turbine wheel carried on the last referred to end of said shaft, and means to provide a buoyancy for the shaft at the end having the wheel thereon.

3. A current motor of the class described, comprising a float, means to anchor the same in a body of water, a shaft extending longitudinally of the float and having one end thereof disposed below the float, a turbine wheel carried on the last referred to end of said shaft, means to provide a buoyancy for the shaft at the end having the wheel thereon, and means to concentrate the current on the wheel.

4. A device of the class described comprising a float, means to anchor the same in a body of water, a rotatable shaft extending longitudinally of the float and having one end thereof disposed therebelow, a turbine wheel carried on the last referred to end of said shaft, an air-tight jacket also formed on the shaft at the end thereof carrying said wheel, and means to direct a current to the wheel.

5. The combination with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of the float and having one end thereof disposed therebelow, a turbine wheel carried on the last referred to end of said shaft, means to direct a current to said wheel, and means carried on the float to stop the flow of the current to said wheel.

6. The combination with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of the float and having one end thereof disposed therebelow, a turbine wheel carried on the last referred to end of said shaft, means to direct a current to said wheel, a conical deflector to direct the current from said turbine wheel, and means on the float for the operation of said deflector.

7. In a device of the class described, the combination with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of the float and having one end thereof disposed below the same, a turbine wheel carried on the last referred to end of said shaft, a funnel-designed casing carried by said wheel to direct the current thereto, a conical member to deflect the current from said wheel, and means to operate said conical member from the float.

8. In a device of the class described, the combination with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of the float and having one end thereof disposed below the same, a turbine wheel carried on the last referred to end of said shaft, a funnel-designed casing carried by said wheel to direct the current thereto, a conical member to deflect the current from said wheel, means to raise and lower said conical member from the float, and additional means to retain the same in any adjusted position.

9. In a current motor, the combination with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of said float and having one end thereof submerged below the float, a turbine wheel carried on the submerged end of said shaft, an air-tight casing also formed on said submerged end of the shaft, a funnel-designed casing carried by said turbine wheel to direct the current thereto, a conically-designed current deflector, and means for the operation of the same from the float.

10. The combination with a float, and means to anchor the same in a body of water; of an inclined shaft extending longitudinally of the float, means to rotatably mount the ends of said shaft, respectively, above and below the surface of the water, a turbine wheel carried on said shaft immediately adjacent the submerged end thereof, means to direct a current to said wheel, means to provide a buoyancy for the submerged end of said shaft, and additional means to prevent the end thrust of said shaft with respect to the float.

11. In a current motor, the combination

with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of the float and having one end thereof disposed therebelow, a turbine wheel mounted on the last referred to end of said shaft, means to direct a current to said wheel, and means to increase and decrease the velocity of the current directed.

12. In a current motor, the combination with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of the float and having one end thereof disposed therebelow, a turbine wheel mounted on the last referred to end of said shaft, a funnel-designed casing carried on said wheel, and a plurality of movable members carried on the float contiguous with the casing.

13. In a current motor, the combination with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of the float and having one end thereof disposed therebelow, a turbine wheel mounted on the last referred to end of said shaft, a funnel-designed casing carried on said wheel, a plurality of wings suspended from the float contiguous with said casing, and means to retain the same in their operative and inoperative positions.

14. In a current motor, the combination with a float, and means to anchor the same in a body of water; of a rotatable shaft extending longitudinally of the float and having one end thereof disposed therebelow, a turbine wheel mounted on the last referred to end of said shaft, an air-tight jacket also formed on said shaft at the end thereof carrying the turbine wheel, a funnel-designed casing formed on said wheel to direct a current thereto, and a plurality of movable wings carried on said float immediately adjacent the casing.

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

CHARLES E. REDFIELD.

Witnesses:

OLEN L. BROWN,

ARCHIBALD D. BALDERSTON.