(No Model.)

W. P. FRANCIS.

CURRENT MOTOR.

No. 584,342. Patented June 15, 1897.

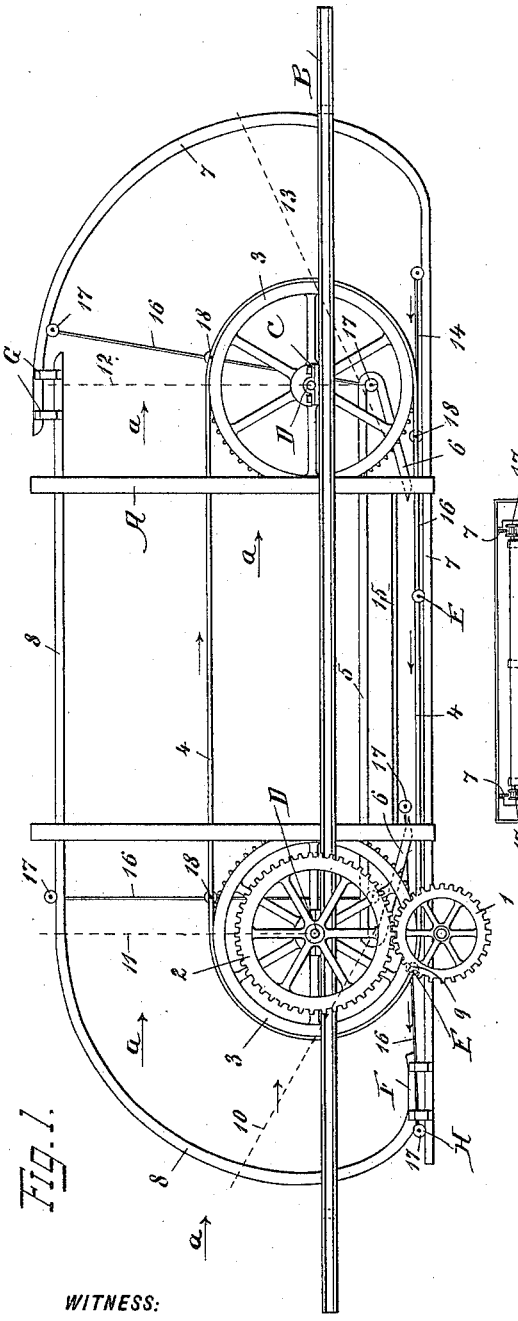

FIG. 1.

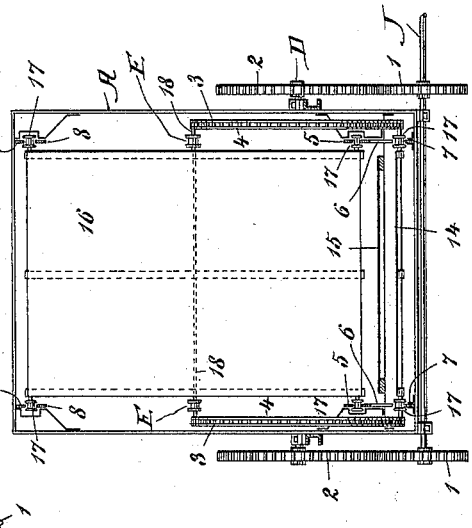

FIG. 2.

WITNESS:

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CURRENT-MOTOR.

SPECIFICATION forming part of Letters Patent No. 584,342, dated June 15, 1897.

Application filed June 27, 1896. Serial No. 597,110. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. FRANCIS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Current-Motors, of which the following is a specification.

My invention relates to a new and useful improvement in current-motors, and has for its object to provide a device of this description which will utilize the full force of a given portion of a current of either water or air; and this result is accomplished by the arrangement of a series of surfaces or blades so as to be maintained at right angles to the current during their travel therefrom and be returned to the starting-point while presented edgewise to said current.

With these ends in view my invention consists in the details of construction and combination of elements hereinafter set forth, and then specifically designated by the claim.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, I will describe its construction and operation in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of my device, showing the blades upon their rearward travel in full lines and the positions assumed when being returned in dotted lines; and Fig. 2, an end view thereof.

Referring to the drawings in detail, A represents two uprights which are arranged to support the frame, which latter serves to support the several operating parts of the machine, and B are side rails which are secured to these uprights and have supported thereon the boxes C. In these boxes are journaled the shafts D, to which are secured the sprocket-wheels 3, and over these sprocket-wheels run the belts 4, adapted to the teeth of said sprockets, in order that any force applied to these belts may be transmitted to the sprocket-wheels, or vice versa.

The blades 16 are mounted upon cross-rods 18, which latter are pivoted to the belts, so that the blades may have a free swinging movement upon the axes of said rods, for the purpose hereinafter set forth.

The length of each blade upon either side of the rods 18 is somewhat less than the diameter of the sprocket-wheels 3, so that when the blades are in a vertical position, as shown in full lines in Fig. 1, their lower edges will be above the horizontal plane of the returning blades, and upon either side of the blades, at the ends thereof, are journaled grooved rolls 17, by means of which the blades are guided when traveling upon the several tracks hereinafter described; also, rolls E are journaled upon the rods 18 upon either side of the blades.

8 are tracks secured to the uprights A and extending horizontally along the upper portion of the machine and curved downward upon the front end thereof and terminating in a horizontal extension F. 7 are also tracks which extend horizontally upon the under side of the machine and are secured to the uprights A and curved upward upon the rear end of the machine, where they are secured by the brackets G to the ends of the tracks 8, the termination of the tracks 7 being in a higher horizontal plane than the termination of the tracks 8 upon the upper side of the machine and in a horizontal plane upon the lower side of the machine. 5 are guideways which also serve as tracks and which are arranged horizontally above the tracks 7 and terminate in angular extensions 6, the ends of which are located in close proximity to the tracks 7, a sufficient space being provided for the free passage of the rolls E. By this arrangement it will be seen that when a pressure incident to the kinetic force of a water or air current is brought to bear upon the surfaces of the blades when in their vertical position they will be forced rearward in the direction of the arrows *a*, the tracks 5 and 8 serving as guides to prevent the blades from swinging until the blades successively reach the position shown in dotted lines at 12, when the lower rolls 17 of these blades will be arrested by the termination of the track 5, and a further movement of the blades will cause their upper rolls 17 to travel upon the track 7, which on account of their curves will gradually bring the blades into the position shown by dotted lines 13, and a further movement of the blade after reaching this position will cause the lower rolls 17 thereof to pass onto

the tracks 7, as well as the rolls E, when, as shown in Fig. 1, this blade will lie horizontally, its edge being the only surface to offer resistance to the current.

As will be understood, when one of the blades has been carried to this horizontal position the other will still be in its upright position and by the action of the current thereon will continue to move the belts 4 in the same direction, the under side of which will carry the blade which has been turned to the horizontal forward until the front rolls 17 thereon are again brought into contact with the tracks 8, as shown at H. Now a further movement of the belts will cause the rod 18 of this blade to start upward upon the peripheries of their sprocket-wheels, which will elevate the rolls 17 upon the rear of the blades into contact with the guide-rails 15, and as this rod 18 continues to rise in its travel upon the line of travel of the peripheries of the sprocket-wheels the forward end of the blade will also rise, but at a faster rate, it being guided by the rolls 17 until reaching the position indicated by the dotted lines 10, when the current will again act upon the under side of this blade and assist its upward movement until it finally comes in the position indicated by the dotted lines 11, after which this blade will move rearward by the force of the current, as before described, and bring about the return movement of the blade which had previously brought about its return. As the rolls 17 upon the lower end of the blade pass out of engagement with the rails 15 they will pass into engagement with the forward-inclined extensions 6 and during the movement just described ride up these extensions until coming in contact with the under side of the tracks 5 and will again serve to guide the blade in its rearward movement.

In order that power may be transmitted from the belts upon which they are carried, I secure upon the forward shaft D gear-wheels 2, adapted to mesh with the pinions 1, mounted upon the shaft J, which latter may be geared in any convenient manner to the mechanism to be driven by the motor.

A motor thus constructed will utilize the entire force of a given area of a current, and a motor may be either utilized as a submerged motor by being properly placed beneath the surface of the water in an inverted position, or where advantageous a sufficient portion thereof may be permitted to project above the surface of the water to allow the return of the belts when in their horizontal position above the water. When the motor is to be driven by wind current, it is preferably placed in the position shown in the drawings, in an exposed locality, where the air may freely act upon the surfaces of the blades.

It is also obvious that by applying power to the wheels 3 my improvement may be used as a propeller, in which case the feathering of the blades in returning will obviate the reaction upon the water which is usual in propellers as now constructed.

Having thus fully described my invention, what I claim as new and useful is—

The current-motor comprising the series of track-sections, guideways, sprocket-wheels and endless belts compassing said wheels and blades carried by said belts, the inner series of said track-sections being arranged interiorly of the other track-sections and near the base, and having lower inclined end portions standing at a short distance above the bottom portions of one of the outer track-sections, the upper end of the outer track-section being arranged at a short distance apart for the passage of the outer end of the guide-rolls of said blades from the upper side of one of the outer track-sections to the under side of the opposite track-sections, said guideways being arranged interiorly of said inner track-sections, with their ends standing a short distance above the lower ends of the inclined end portions of said inner track-sections, said blades being pivoted or axially hung upon rods connected to said belts, and carrying rolls, said blades also having rolls at their ends, and means for transmitting power, substantially as set forth and described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

WILLIAM P. FRANCIS.

Witnesses:
S. S. WILLIAMSON,
MARK BUFORD.