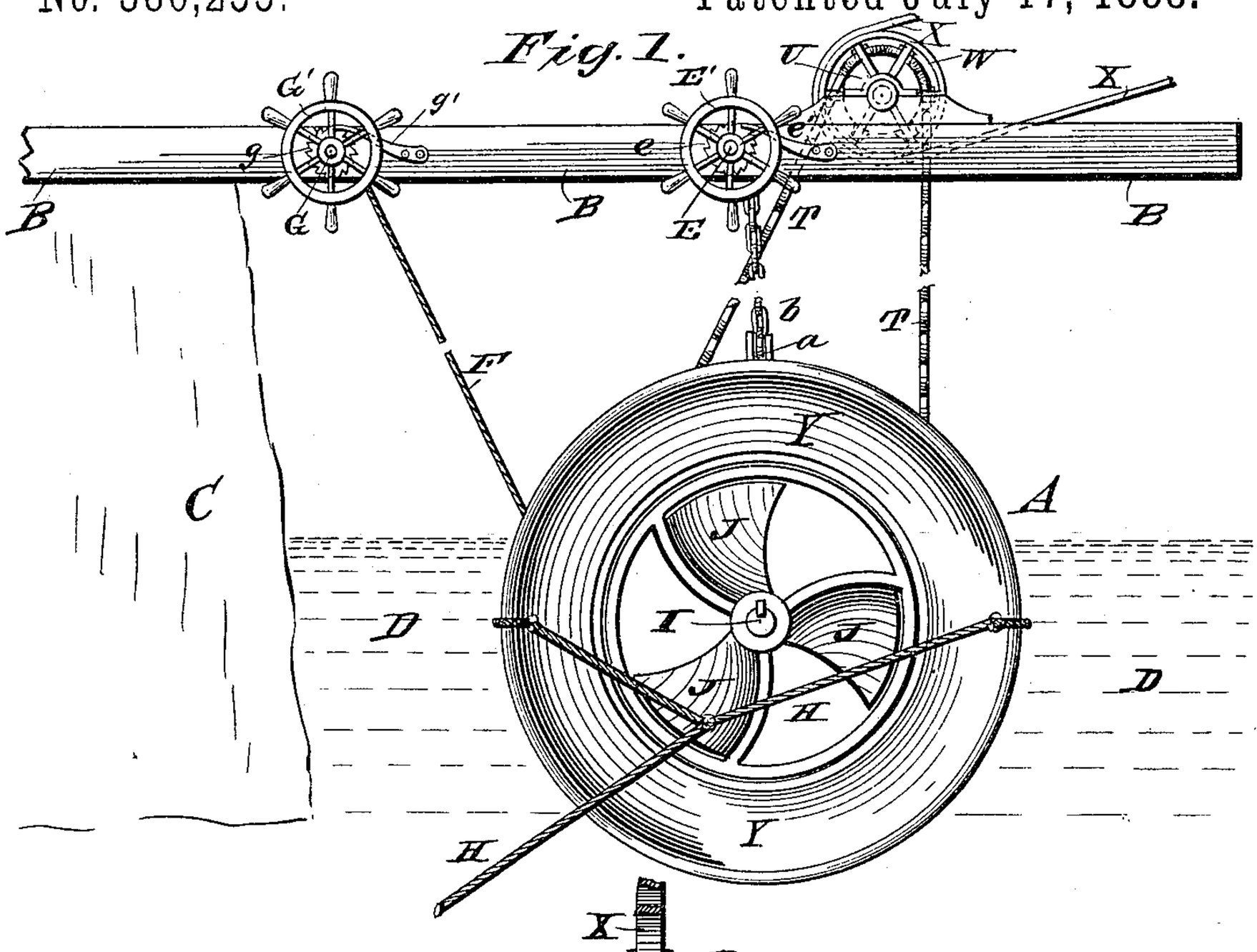
(No Model.) 2 Sheets—Sheet 1.

M. McCARTY.

CURRENT MOTOR.

No. 386,255. Patented July 17, 1888.

Fig. 1.



WITNESSES:

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ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

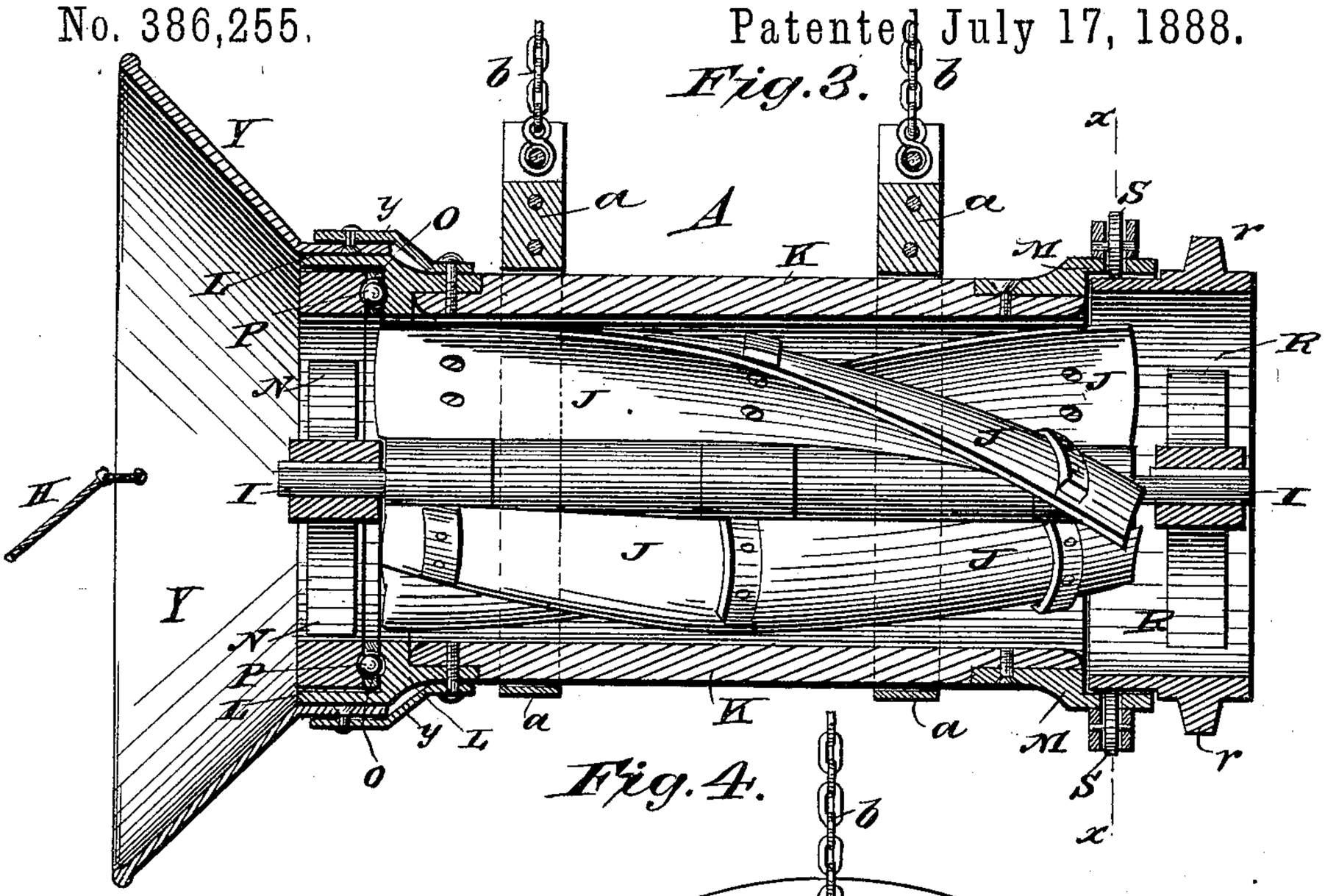


Fig. 4.

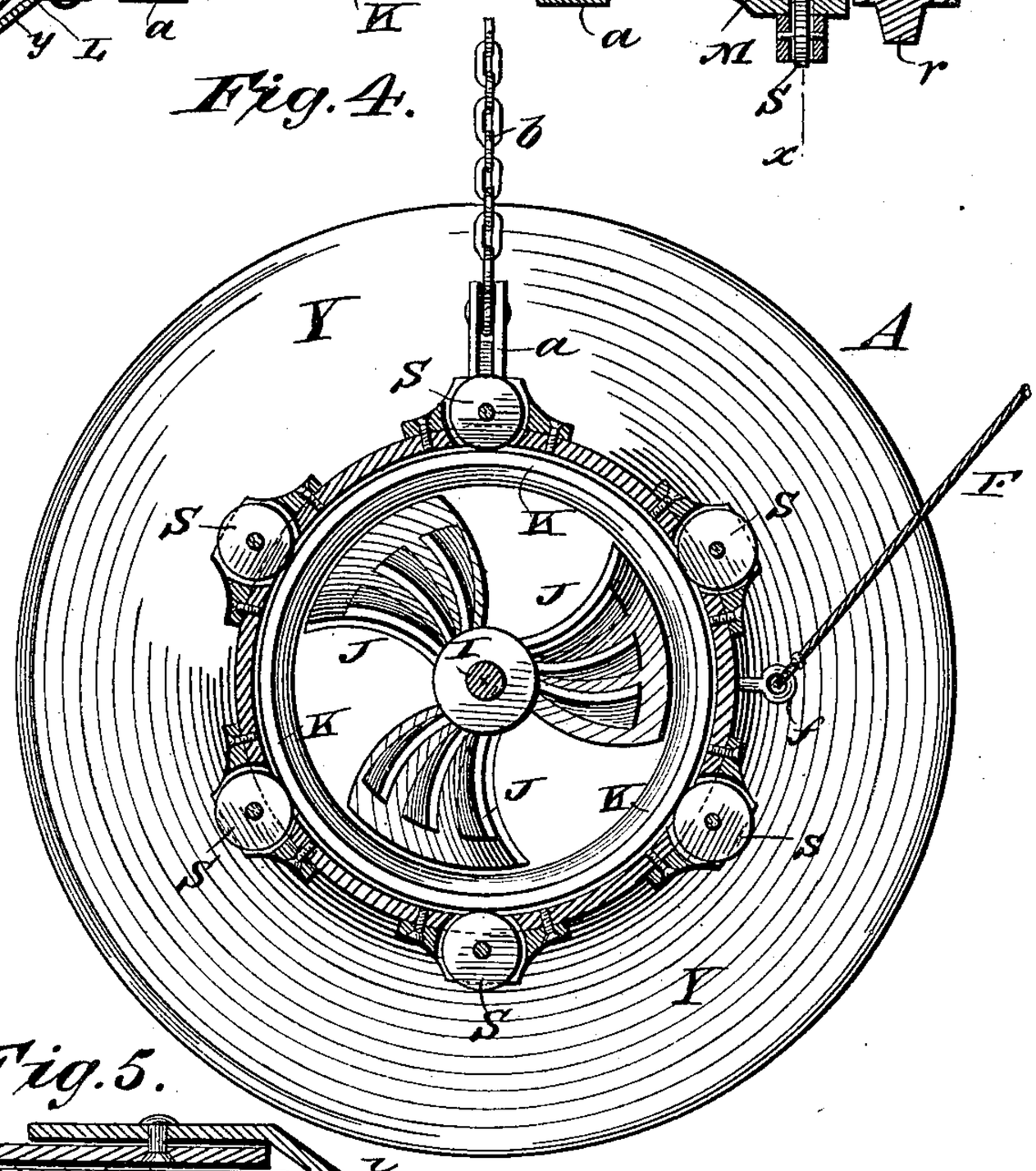


Fig. 6.

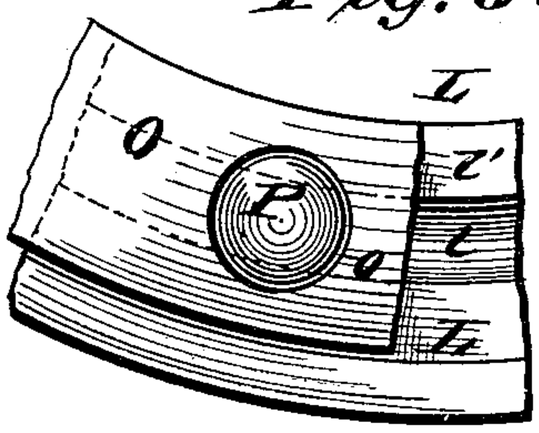
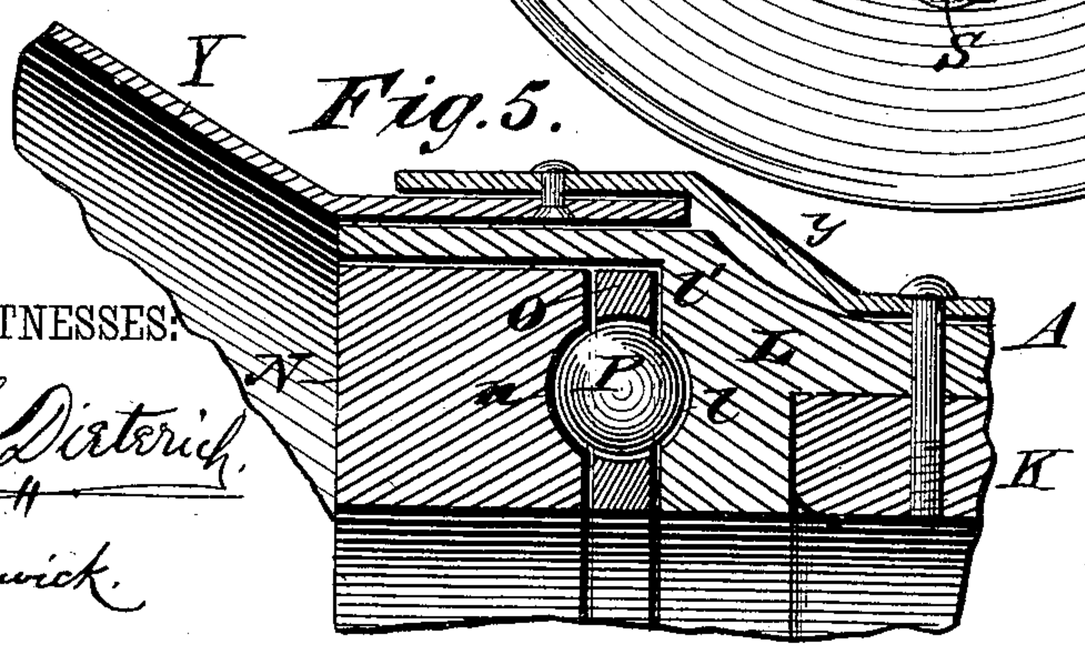


Fig. 5.



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UNITED STATES PATENT OFFICE.

MICHAEL McCARTY, OF MONTROSE, COLORADO.

CURRENT-MOTOR.

SPECIFICATION forming part of Letters Patent No. 386,255, dated July 17, 1888.

Application filed January 16, 1888. Serial No. 260,862. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL MCCARTY, of Montrose, in the county of Montrose and State of Colorado, have invented a new and Improved Current-Motor, of which the following is a full, clear, and exact description.

My invention has for its object to provide a simple, inexpensive, and efficient motor adapted for operation by a running stream for driving machinery on shore and connected to the motor by a belt. The motor is adapted to take advantage of high or low water, and is also adapted to the varying forces of inshore and offshore currents to regulate the speed of the machinery driven by it, and is also arranged to work with very little friction and consequent economy of power.

The invention consists in certain novel features of construction and combinations of parts of the current-motor, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is an elevation of my improved current-motor as seen from the upstream side. Fig. 2 is a view of the motor, taken at right angles to Fig. 1. Fig. 3 is an enlarged longitudinal sectional elevation of the current-wheel of the motor. Fig. 4 is a transverse section of the wheel, taken on the line *x x*, Fig. 3. Fig. 5 is an enlarged fragmentary longitudinal section of the wheel at one of its ball-bearings, and Fig. 6 is a detail face view at one of the ball-bearings.

The current-wheel A, which I will hereinafter particularly describe, is suspended by straps *a a* and chains *b b* from a frame-work, B, of timber, which is supported in any suitable manner on the bank C of a running stream, D, and so as to project transversely over and across or partly across the stream. The wheel-suspending chains *b b* are connected to a shaft, E, which is journaled on the frame B and ranges about parallel with the direction of flow of the water, and a hand-wheel, E′, on the shaft E allows the chains to be conveniently wound upon or paid out from the shaft to suspend the current-wheel at any required height to assure the best effect of the flowing water on the wheel when the water is either high or low. A ratchet, *e*, on the shaft E may be engaged by a pawl, *e′*, on the frame B to hold the current-wheel at any desired vertical adjustment.

To that side of the case of the current-wheel next the bank C are fixed a couple of eyes or bolts, *f*, to which are connected one of the ends of ropes (or it may be chains) F F, the other ends of which are attached to a shaft, G, which is journaled on the frame B and about parallel with the outer shaft, E. The shaft G carries a ratchet, *g*, which is engaged by a pawl, *g′*, on the frame B. It is obvious that by winding the ropes or chains F onto the shaft G by turning its hand-wheel G′ the current-wheel A, while suspended by the chains *b*, may be drawn toward the river-bank in the arc of a circle of larger or smaller radius, depending on the greater or less distance the wheel hangs from the frame B. These features of construction allow the current-wheel to be hung at a greater or less depth vertically in the water, and at the same time permit it to be set farther from or closer to the bank of the stream and at varying depths the nearer it approaches the bank C to utilize to the best advantage the more swiftly-running currents a little offshore, and also the more slowly-running currents closer to the bank, for regulating the speed of the wheel, as circumstances attending the use of the motor may suggest or require. The wheel-supporting frame B consists, preferably, of two parallel long timbers connected by shorter cross-timbers, and may be of any desired length.

A rope or chain, H, connected at one end to the upstream end of the current-wheel, is fastened in any suitable manner at a point farther upstream and serves to hold the wheel steady and level in the water against the force of the current which operates the wheel.

I particularly describe the current-wheel proper as follows: It consists of a central shaft, I, to which are fixed a number of longitudinally-ranging concavo-convex helical blades, J, which rotate with the shaft in a cylindrical casing, K, which is shown made of wooden staves encircled by metal bands L M, fixed, respectively, to the upstream and downstream ends of the casing. The casing may be made of metal, if preferred. To one end of the shaft I is fixed a skeleton wheel or head, N, which rotates within the casing-band L and is grooved all around at *n* at the inner edge of its rim,

between which and the thrust-shoulder *l'* of the band L, which is annularly grooved at *l* opposite the groove *n* of the head N, is placed loosely a ring, O, which is apertured at *o* at a number of places—say four—to receive loosely a like number of anti-friction balls or rollers, P, which rotate in the opposing grooves *l n* of the band and head L N. The wheel-head N may thus freely rotate on the ball-bearings P, and these bearings may rotate freely on the shoulder *l'* of the strap L, and the entire ring O and the ball-bearings P are free to rotate between the head N and the shoulder *l'* of the band L, to distribute the wear of the ball-bearings all around the grooved surface of the band, which gives durability to the upstream bearing of the wheel I, which thus easily takes the thrust or pressure of the swiftest current and operates with minimum friction and loss of power. At its downstream end the wheel-shaft I has fixed to it a skeleton driving-wheel, R, which rotates within the shouldered or rabbeted outer end of the band M, which is provided with a series of anti-friction rollers, S, against which the rim of the driving-wheel R bears and rotates clear of the band and with very little friction. The wheel R is provided with peripheral teeth *r*, which are engaged by the links of a driving-chain, T, which passes to and over a chain-wheel, U, fixed to a shaft, V, journaled on the wheel supporting frame B and carrying a wheel or pulley, W, from which a driving-belt, X, will lead to a pulley on a shaft, (not shown,) and arranged to operate machinery of any kind on the shore or bank of the stream, or at a distance therefrom.

The upstream end of the current-wheel is preferably provided with a flaring mouth-piece, Y, which may be held to the wheel-casing K or its band L in any suitable manner, so as to conduct or guide the flowing water into the casing to drive the wheel I J. I show the mouth-piece held to the wheel casing and band K L by bolted metal straps *y*. When the wheel is to be used in a swiftly-running current, this flaring mouth-piece, which gathers the water to the wheel-casing, may be dispensed with, as the water then flowing directly into the wheel casing through the skeleton head N will have ample pressure to operate the wheel effectively.

The anchoring-rope H is shown attached to the outer edge of the mouth-piece Y; but it may be extended through the mouth-piece and be attached to the wheel-casing K or its rim L, and when the mouth-piece is not used the rope will be attached directly to the wheel-casing.

When the current-wheel is raised or lowered, as high or low water may require, some of the links of the driving-belt T may readily be removed or replaced to adjust the belt to give proper driving-connection between the wheels R U of the motor.

It is obvious that a current-wheel formed with a spirally-bladed shaft fitted in a casing through which the water passes to rotate the wheel is a simple and powerful form of motor, not so liable to injury as endless belts of floats moved by the current to impart motion to machinery. Furthermore, all motors of this general character which are supported on floating structures are more or less subject to damage by the rolling and pitching of the floats, and the shafting or gearing operated by such motors is particularly liable to injury; hence the advantages of my spirally-bladed and incased wheel suspended in the water from a frame fixed to the bank or shore and arranged for vertical and lateral adjustment, as above described, are apparent. Furthermore, the motor has great durability, and the conveniences afforded for adjusting the current-wheel both vertically and laterally are not attained in any construction of current-motor of which I am aware, and, finally, the motor is comparatively inexpensive, as costly floats or docks or bulk-heads are not required.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a current-motor, of a frame fixed to the bank of a stream and projecting over the water, a current-wheel comprising a casing suspended from said frame and a bladed shaft fitted for rotation in said casing, and flexible connections between the frame and casing, substantially as shown and described, whereby the wheel may be adjusted bodily in a lateral curvilinear direction, as set forth.

2. The combination, in a current-motor, of a frame fixed to the bank of a stream and projected over the water, a current-wheel comprising a casing suspended by a windlass from said frame and a bladed shaft fitted for rotation in said casing, cord or chain connections from the current-wheel to a windlass arranged on the frame behind the wheel-suspending windlass, a driving-shaft on the frame, and pulley-and-belt connections from the current-wheel to said driving-shaft, substantially as described, for the purposes set forth.

3. In a current-motor, the current-wheel constructed with a casing K, a bladed shaft, I J, fitted for rotation therein, and a skeleton head, N, and driving-wheel R, fitted to the bladed shaft for rotation at opposite ends of the casing, substantially as described, for the purposes set forth.

4. In a current-motor, the combination, with the casing K and a bladed wheel, I J, fitted for rotation therein, of a skeleton head, N, on the upstream end of the wheel and working against the casing, a drive-wheel, R, fixed to the downstream end of the casing and adapted to receive a driving-belt, and anti-friction rollers S, fitted to the casing and forming bearings for the driving-wheel, substantially as described, for the purposes set forth.

MICHAEL McCARTY.

Witnesses:
CHARLES F. REPATH,
NATHANIEL YOUNG.