No. 756,335. PATENTED APR. 5, 1904.

F. H. CRAGO.

CURRENT MOTOR.

APPLICATION FILED OCT. 28, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

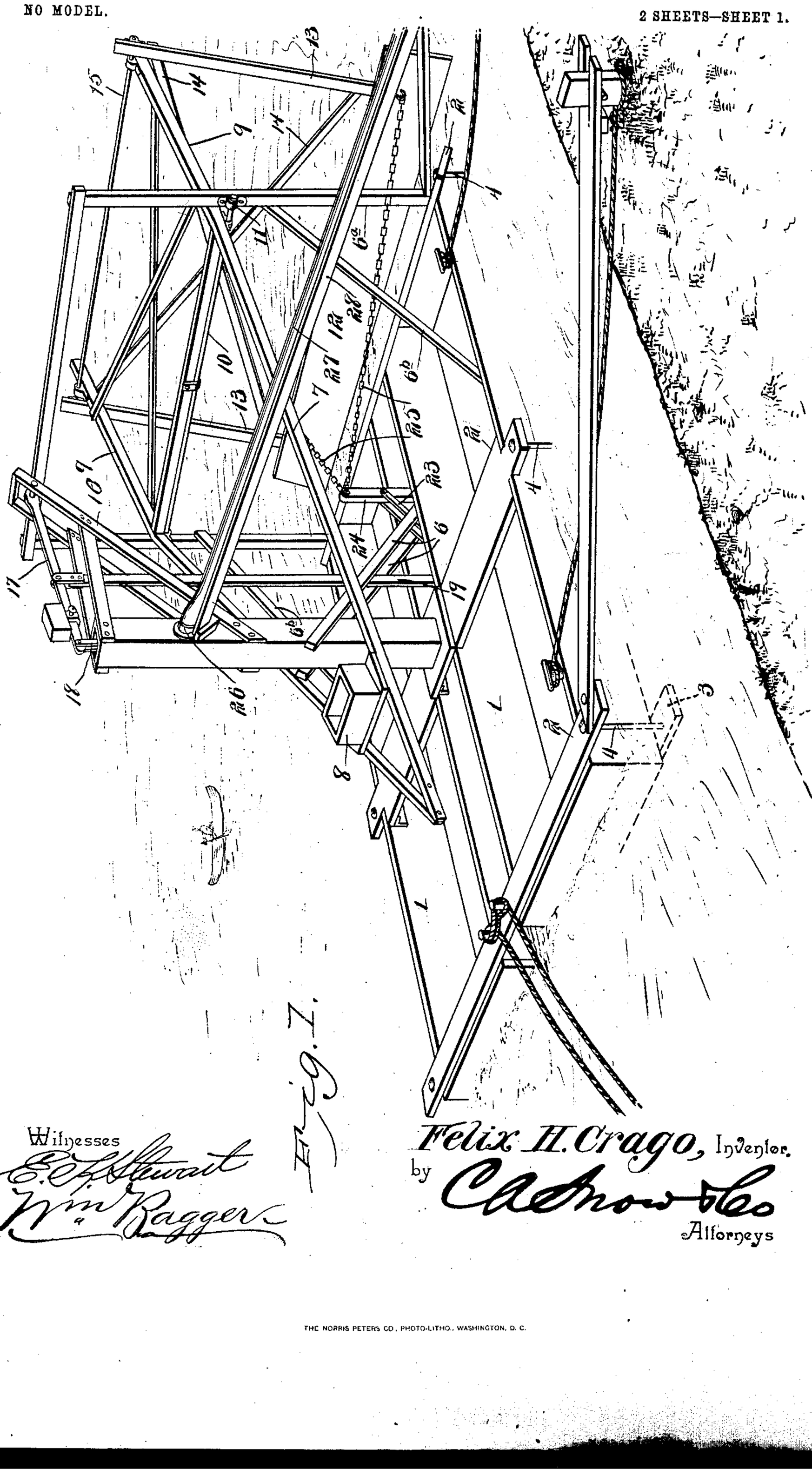

Fig. 1.

Witnesses
E. C. Stewart
Wm. Ragger

Felix H. Crago, Inventor.
by Cachow & Co
Attorneys

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NO MODEL. 2 SHEETS—SHEET 2.

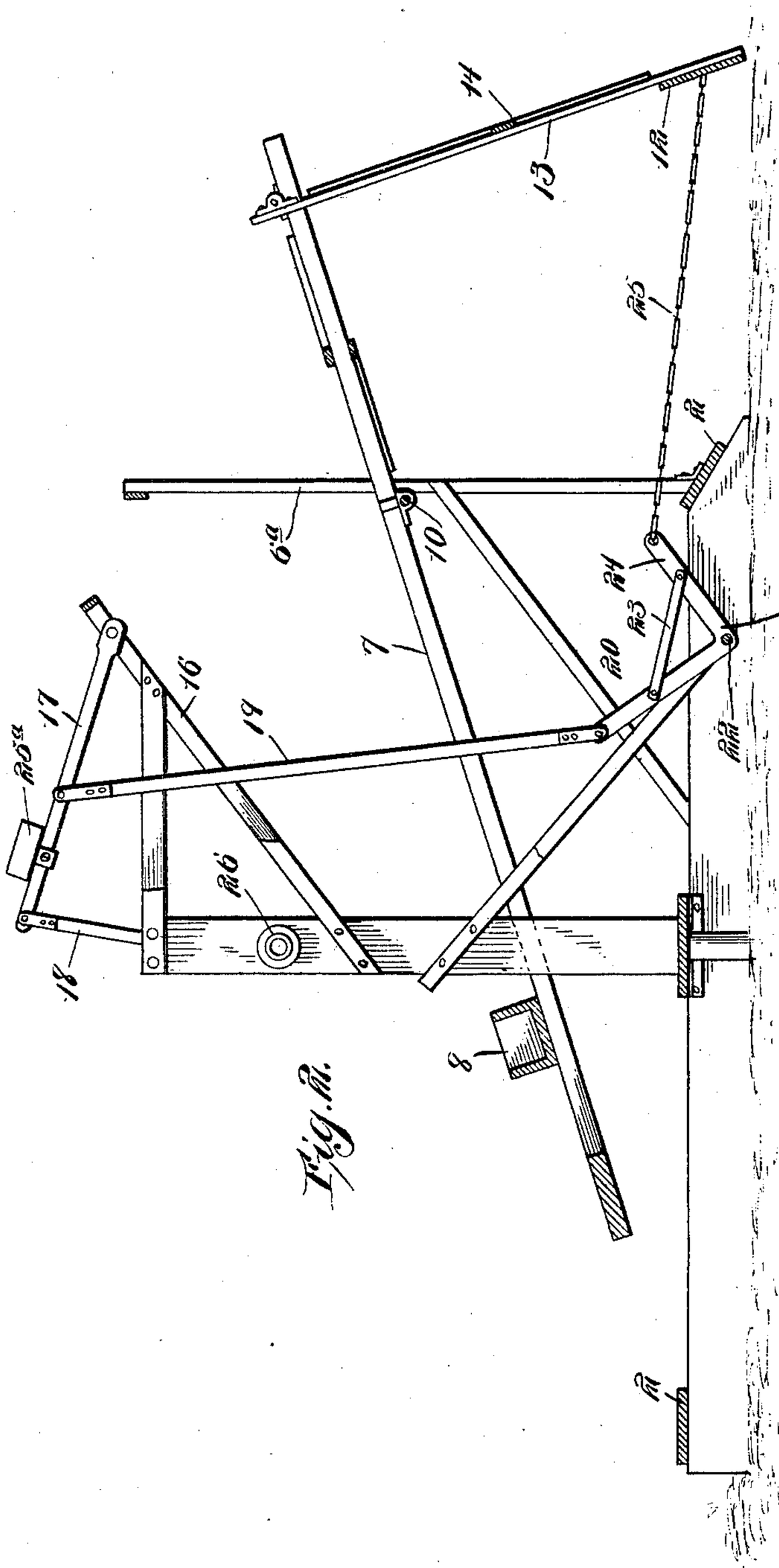

Fig. 2.

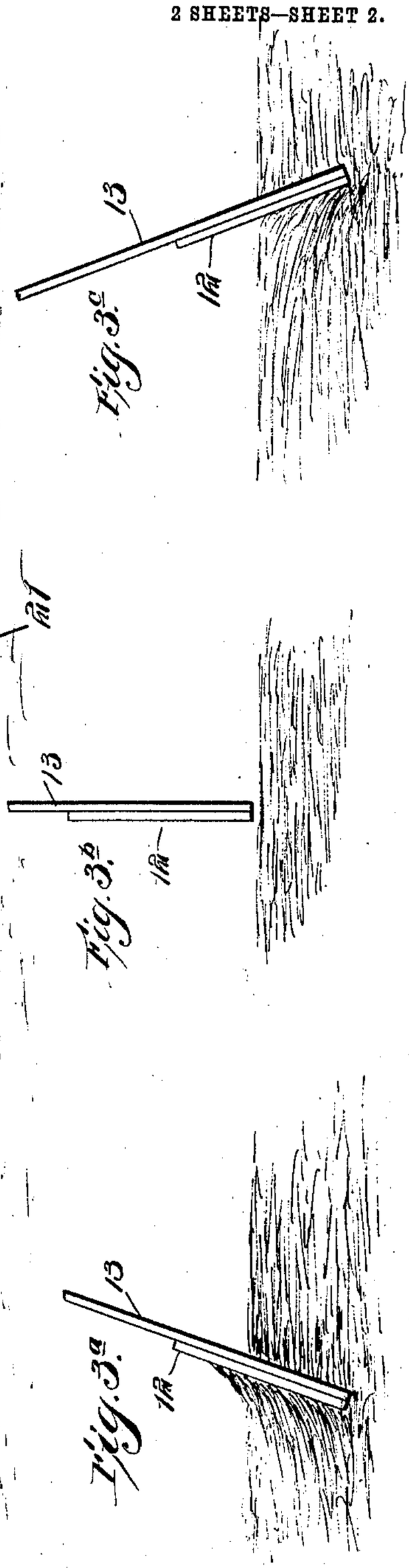

Fig. 3.

Fig. 3b.

Fig. 3a.

Witnesses
E. F. Stewart
Wm. Bagger

Felix H. Crago, Inventor.
by Cushman & Co
Attorneys

No. 756,335. Patented April 5, 1904.

UNITED STATES PATENT OFFICE.

FELIX H. CRAGO, OF BILLINGS, MONTANA.

CURRENT-MOTOR.

SPECIFICATION forming part of Letters Patent No. 756,335, dated April 5, 1904.

Application filed October 28, 1903. Serial No. 178,909. (No model.)

To all whom it may concern:

Be it known that I, FELIX H. CRAGO, a citizen of the United States, residing at Billings, in the county of Yellowstone and State of Montana, have invented a new and useful Current-Motor, of which the following is a specification.

This invention relates to hydraulic motors of that class which are generally known as "current-motors" and which are operated by the current of a stream in which they are placed, said current serving to operate the motor, the power generated thereby being utilized, for instance, to pump water for irrigating or other purposes.

My present invention has for its object to provide a device of this class which shall be simple in construction and of such a nature that it may be manufactured without the necessity of skilled labor and which will operate without attention, thereby providing a means by which water may be raised from the stream in which the motor is placed.

My invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of my improved current-motor, showing the blade of the same about to enter the water. Fig. 2 is a longitudinal sectional view showing the device at the opposite end of the stroke with the blade about to ascend from the water. Figs. 3^a, 3^b, and 3^c are detail views showing various positions of the blade or paddle.

Corresponding parts in the several figures are indicated by similar numerals of reference.

1 1 designate a pair of flat-bottomed boats or floats which sustain my improved current-motor and its related parts. These floats are spaced apart and connected by means of braces 2 2 and 3 3, which are located, respectively, against the upper and the lower or bottom sides of the side floats, connections between the said braces 2 and 3 being made by means of bolts 4. The interspace between the floats 1 1 is of sufficient width to receive the lower end of a pump-casing, which in addition to being clamped securely between the floats is retained securely by means of braces 6, of which any desired number may be used, the same being arranged in any desired position which will serve to rigidly connect the pump-casing with the floating supporting means.

At the rear end of the floating structure is erected a rectangular frame structure 6^a, sustained and supported by means of suitable braces 6^b, and pivotally connected with the side members of the frame structure 6^a is a V-shaped frame 7, the side members of which converge in a forward direction, the front ends of said side members being securely connected, as will be clearly seen in Fig. 1. The frame in front of its pivotal point or fulcrum supports a box 8, in which weights may be placed for the purpose of providing the desired equilibrium to enable the device to operate to the best advantage, the front part of said frame being slightly overbalanced by the portion in rear of its fulcrum. The side members 9 of the V-shaped frame 7 diverge rearwardly, as shown, from the pivotal point or fulcrum, which consists of a shaft 10, connected with the side members 9 and having its ends journaled in boxings 11 upon the upright members of the vertical frame structure 6^a.

12 designates the water-engaging blade or paddle, which is secured at the lower ends of the side pieces 13 of a frame which in addition to said side pieces includes diagonal braces 14 and a shaft 15, which latter pivotally connects the paddle-carrying frame with the rear ends of the side members of the V-shaped frame 7. Such weights as are placed in the box 8 are intended to approximately counterbalance the weight of the paddle-carrying frame, so that the frame 7 shall be approximately equally weighted on opposite sides of the fulcrum thereof.

The pump-casing is provided with an upwardly and rearwardly extending bracket-frame 16, in the outer end of which is fulcrumed a lever 17, the free end of which is pivotally connected with the pump-rod 18. Intermediately connected with the lever or walking-beam 17 is a link 19, the lower end of which has pivotal connection with one arm 20 of a bell-crank lever 21, which latter is ful-

crumed upon a pin or shaft 22, which connects the proximate walls of the floats 1. A brace 23 connects the horizontal arm 20 of the bell-crank lever with its vertical arm 24, and said vertical arm is connected, by means of chains 25, with the paddle 12 or with the paddle-carrying frame.

Upon the lever or walking-beam 17 is placed an adjustable weight 25[a], which assists in enabling the desired equilibrium to be ascertained and maintained between the working parts of the device.

When this device is out of operation, the front end of the V-shaped frame is depressed, thus elevating the paddle-carrying frame until the paddle is clear of the water. In this position the frame 7 may be maintained by any suitable means. When the device is to be started in operation, the V-shaped frame is released, thus permitting the paddle to descend. It may be assumed that the blade or paddle enters the water in an approximately vertical position, as shown in Fig. 3[b] of the drawings. As soon as it comes under the current it is moved forcibly in a rearward direction, the chains 25, connecting the blade with the bell-crank lever 21, serving to rock the latter upon its fulcrum, the connecting-link 19 being thus elevated, thereby raising the free end of the lever 17 and moving the pump-rod in an upward direction. When the limit of the paddle in a rearward direction has been reached, it will have attained the downwardly and rearwardly inclined position shown in Fig. 3[c]. The force of the current when the blade is in this position will be expended downwardly against the front face of the blade, which being inclined downwardly and rearwardly receives a tendency to be lifted from the water. While in this position—that is, clear of the water—the weight of the pump-rod, the lever 17, and the link 19 will cause these members to descend, impelled additionally by the adjustable weight 25[a], thus shifting the position of the bell-crank lever and drawing the lower end of the paddle-carrying frame in a forward direction, so that the blade when it descends will present its front face in a downwardly and forwardly inclined position with relation to the current, as will be seen in Fig. 3[a] of the drawings. When the blade descends in this position, the tendency of the current exercised upon the face of the paddle will be to climb upwardly upon and hence to submerge the paddle-blade, which, now exposed to the full force of the current, moves rapidly in a rearward direction when its position is reversed to that illustrated in Fig. 3[c], where the tendency of the current is to eject the blade in an upward direction, when the operation heretofore described will be repeated. It is when the blade is forcibly propelled in a rearward direction by the force of the current that the lifting action of the pump takes place and the water lifted by means of the latter is discharged through the spout 26, from which a hose 27, supported in a trough 28, may be used to convey the water to any desired point.

Having thus described my invention, I claim—

1. In a current-motor, a supporting-frame, a rocking frame pivotally connected with said supporting-frame, a paddle-carrying frame pivotally connected with one end of the rocking frame, a counterbalance supported upon the latter at the opposite side of its fulcrum, a bell-crank lever, connecting means between one arm of the latter and the machinery to be driven, and flexible means connecting the other arm of the bell-crank lever with the paddle-carrying frame.

2. In a device of the class described, a float, a supporting-frame mounted thereon, a rocking frame pivotally connected with said supporting-frame, a paddle-carrying frame pivotally connected with said rocking frame, a bell-crank lever, flexible connecting means between one arm of said bell-crank lever and the paddle-carrying frame, an operating-lever, a weight adjustable upon the latter, and a link connecting said operating-lever with the other arm of the bell-crank lever.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FELIX H. CRAGO.

Witnesses:

FRANK SHOWERS,

J. S. HAMMOND.