No. 880,393. PATENTED FEB. 25, 1908.

C. A. NEYLAND.

CURRENT MOTOR.

APPLICATION FILED MAY 15, 1907.

3 SHEETS—SHEET 1.

Fig 1

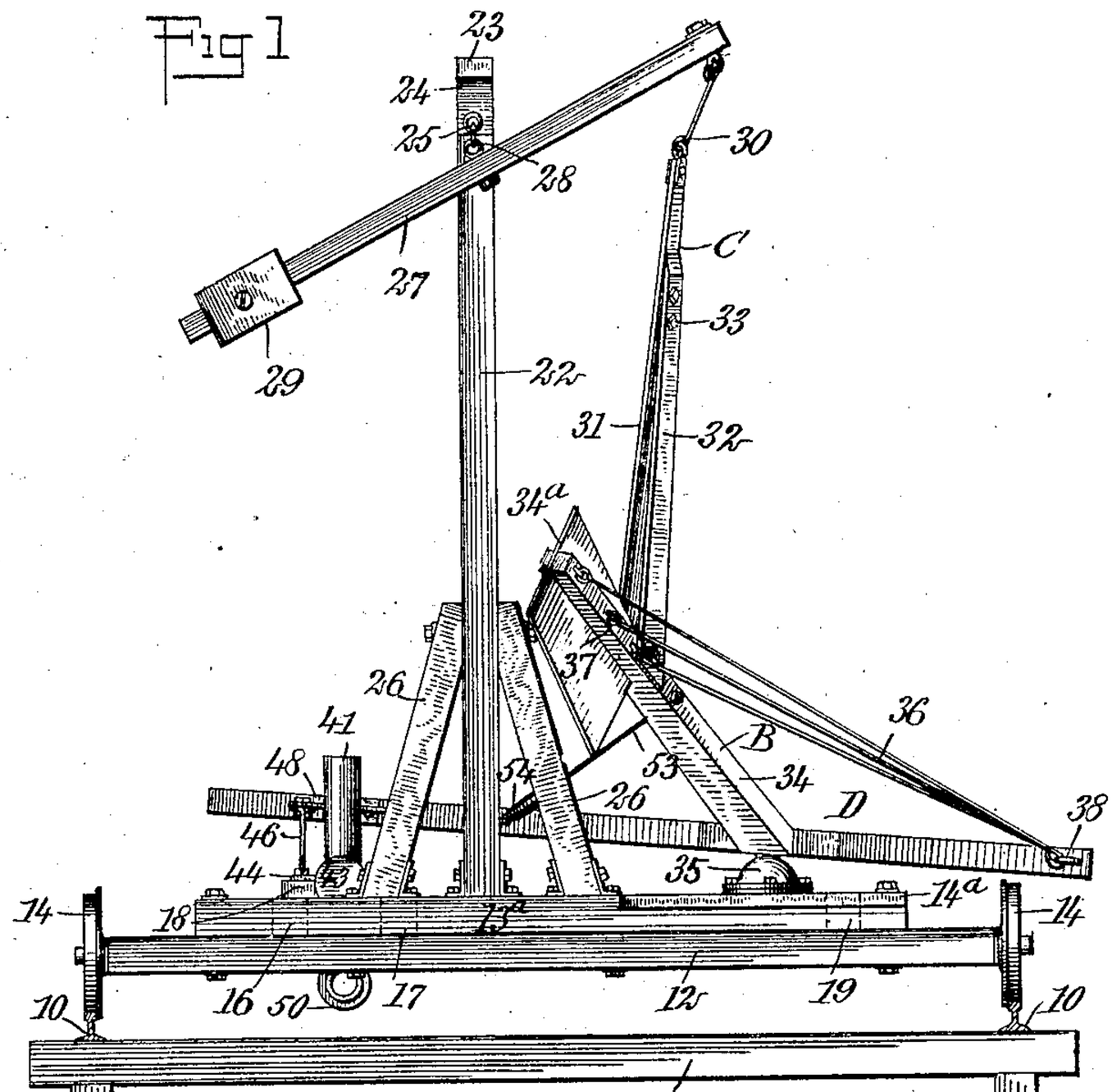
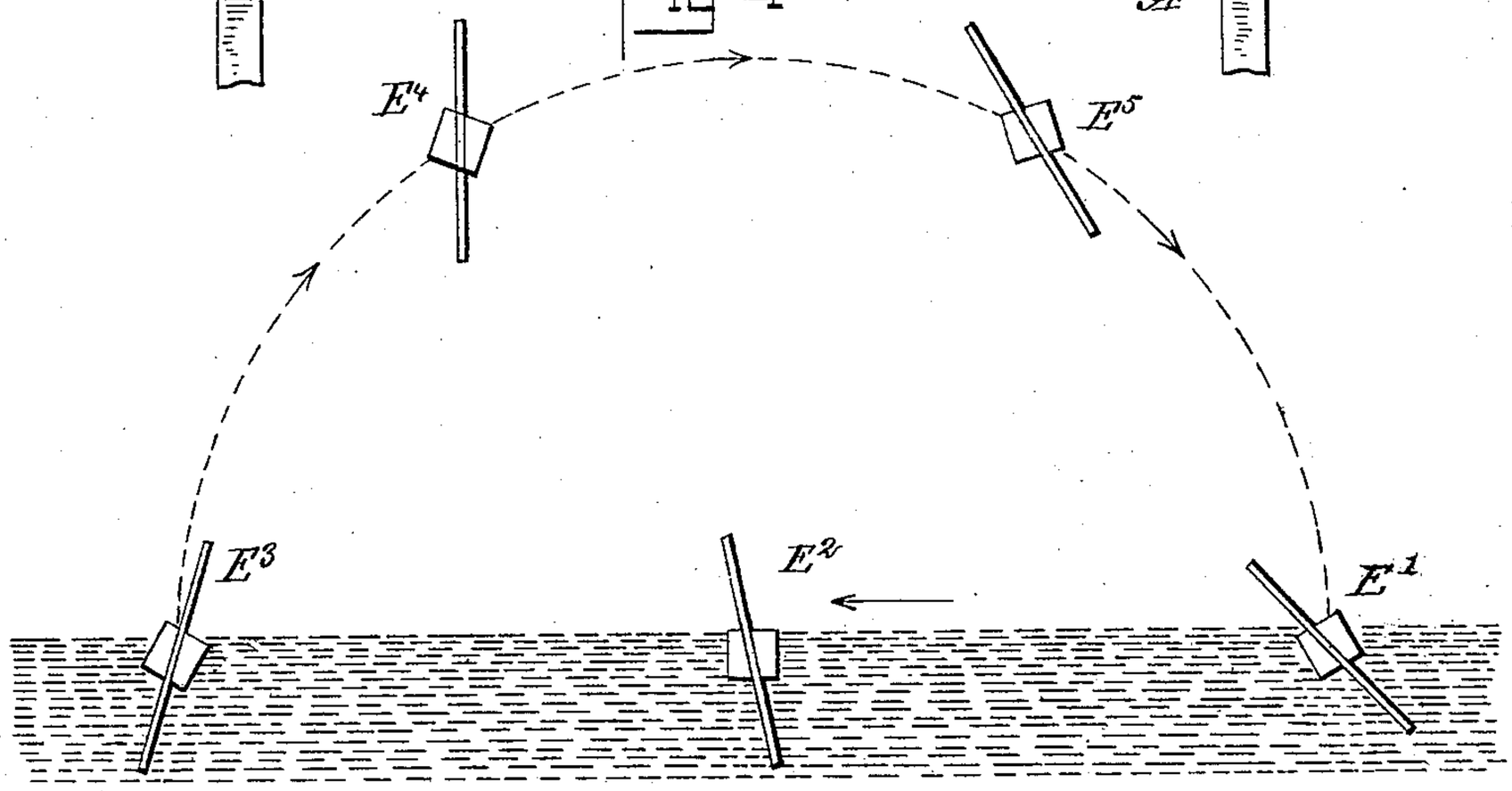


Fig 4



WITNESSES

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3 SHEETS—SHEET 2.

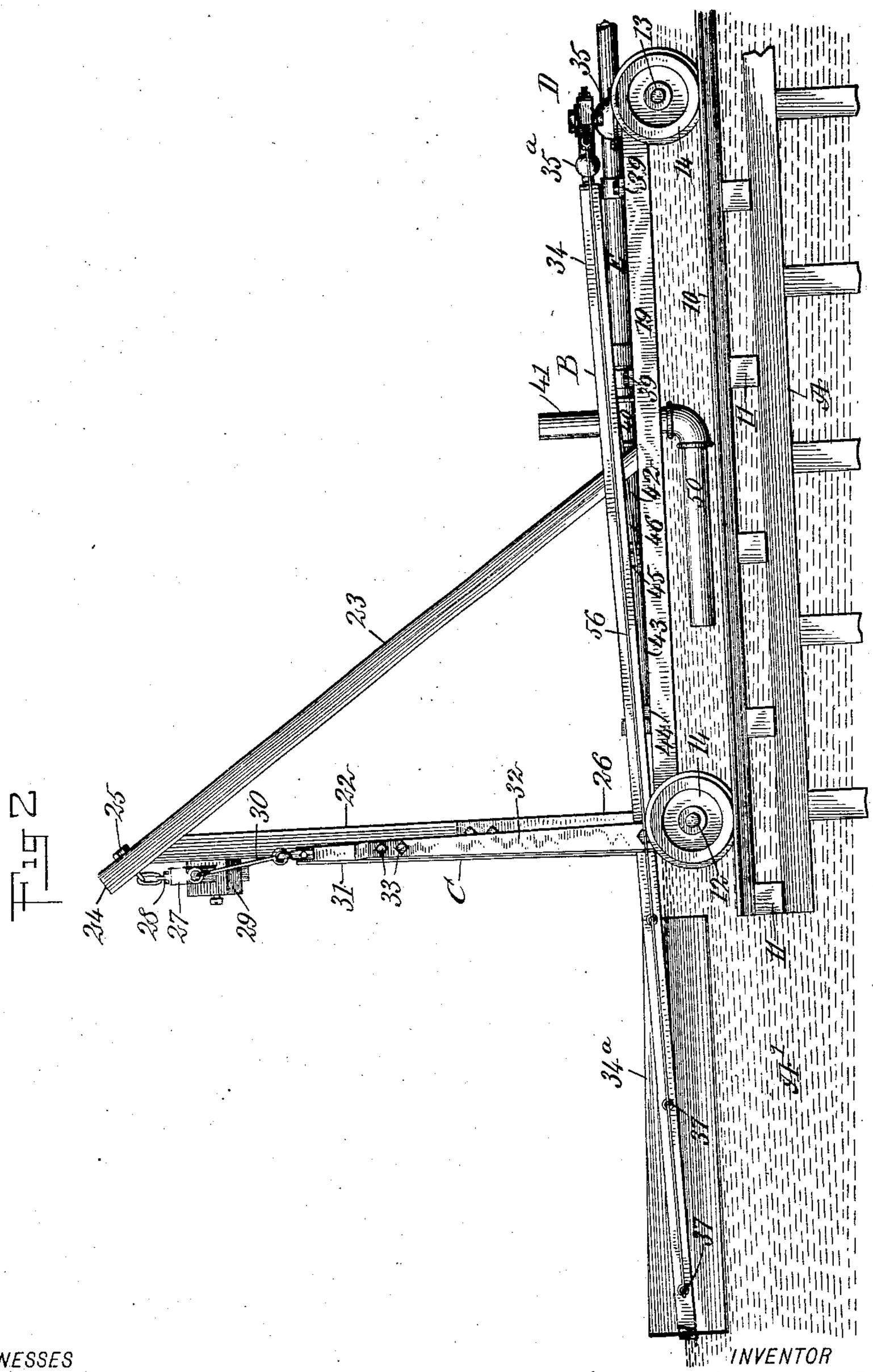

FIG 2

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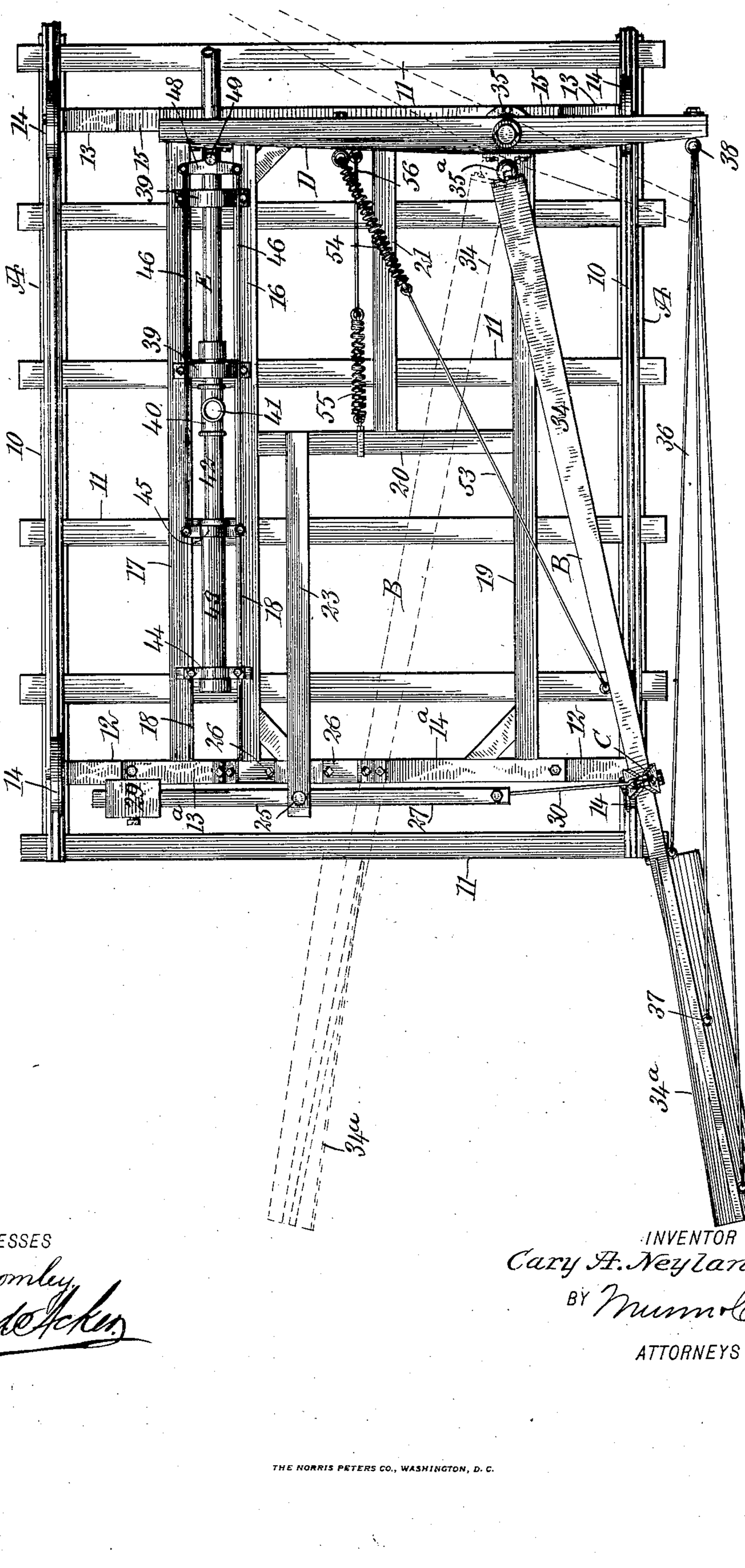
3 SHEETS—SHEET 3.

FIG 3



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CURRENT-MOTOR.

No. 880,393. Specification of Letters Patent. Patented Feb. 25, 1908.

Application filed May 15, 1907. Serial No. 373,719.

To all whom it may concern:

Be it known that I, CARY ALBERT NEYLAND, a citizen of the United States, and a resident of Spokane, in the county of Spokane and State of Washington, have invented a new and useful Improvement in Current-Motors, of which the following is a full, clear, and exact description.

The purpose of the invention is to provide a current motor of exceedingly simple and effective construction wherein the speed of the current regulates the speed and power of the pump, and wherein also the paddle leaves the water at an acute angle but at opposite inclinations, occupying a position at right angles to the current at mid-stroke, thereby deriving the utmost power from the current at such time.

Another purpose of the invention is to provide a current motor that is easily stopped and started, and one that has few wearing points and which is not liable to be easily disarranged.

The invention consists in the novel construction and combination of the several parts as will be hereinafter fully set forth and pointed out in the claims.

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

Figure 1 is a front elevation of the improved motor and its support; Fig. 2 is a side elevation thereof; Fig. 3 is a plan view; and Fig. 4 is a diagrammatical view illustrating the position of the blade of the paddle when acted upon by the current, and when returned to be again introduced into the current.

A represents a trestle or equivalent support, which is constructed to extend into the water A′ with a downward inclination. Tracks 10 are located upon the said support separated therefrom by suitable sleepers 11. The motor proper consists of a front axle 12 and a rear parallel axle 13, the said axles being provided with flanged wheels 14 at their end portions to travel on the rails or tracks 10. The frame of the motor consists of a front bar 13^a that is bolted or otherwise secured to the front axle 12, and a rear bar 15 that is correspondingly secured to the rear axle 13; horizontal tracks 16 and 17 are located in parallelism a suitable distance apart at the left of the center of the frame viewed from the front, as is shown in Fig. 3, and these tracks are secured to the front and the rear members of the frame, and each of the said tracks 16 and 17 at its inner edge is provided with a flange 18 that extends from a point near its center to the forward end of a track, as is also shown in Fig. 3, the flanges being for a purpose to be hereinafter described. A horizontal brace bar 19 is also provided for the right-hand side of the frame viewed from the front, and this latter bar extends from the front to the rear member of the frame and the said brace bar which runs longitudinally of the frame, is connected at its center with the opposing track 16 by means of a transverse bar 20 horizontally located, and furthermore a horizontally located connecting bar 21 extends from the transverse bar 20 at its central portion to the central portion of the rear member 15 of the frame, as is best shown in Fig. 1. Any desired number of braces may be employed.

A mast 22 is secured to the front member 13^a of the frame extending up therefrom a suitable distance, and the said mast is located at the left-hand side of the center of the front member 13^a when viewed from the front. A brace bar 23 is secured to the upper and portion of the mast at an inclination, and at its lower end is usually attached to the central transverse bar or beam 20, and the upper end 24 of the said brace bar 23 extends over and beyond the upper end of the mast 22, as is shown in Figs. 1 and 2, and at this over-hanging portion of the brace bar 23 an I-bolt 25 is secured and the mast 22 at its lower end is supported by converging braces 26 secured to the front member 13^2 of the frame.

A walking-beam 27 is provided for the over-hanging portion 24 of the brace bar 23, being located in front of the mast 22, and the central portion of this walking-beam 27 is connected with the I-bolt 25 by one or more links 28, and at the left-hand end of the said walking-beam 27 when viewing the motor from the front, a weight or counterbalance 29 is adjustably secured, and at the opposite end of the walking-beam 27 a downwardly extending link 30 is pivotally attached, and this link 30 is pivotally connected with a pendulum supporting arm C. This pendulum supporting arm comprises two opposing members 31 and 32 separated at their lower

ends but connected at their upper ends, the member 32 being shorter than the member 31, and the connection is effected by bolts 33 passed out through the upper end of the shorter member 32 and through a slot in the opposing member 31, so that the shorter member 32 is adjustable upon the longer member. The pendulum arm C is adapted for use in connection with a paddle B. This paddle comprises a body bar 34 and a blade 34ª, which may be made of cheap metal, said blade being passed through and secured in a slot produced at the forward end of the body bar 34, and the said blade 34ª occupies a diagonal position in the body bar so that when a blade enters the water it will be at an acute angle thereto, the upper end of the blade inclining toward the center of the motor, as is shown at the right in Fig. 4, and the said blade enters the water when its body bar 34 has reached a position at its forward end at the forward right-hand side of the frame when viewed from the front, and it may be here remarked that the front member 13ª of the frame is provided at its upper and forward side portion with a wear plate 14ª over which plate the body bar of the paddle has movement.

A lever arm D is located transversely at the rear of the frame over its rear member 15, and this lever arm has a universal pivotal connection 35 with the right-hand end portion of the said rear frame member 15, the said pivot 35 being located between the center and the right-hand end of the said lever arm, as is shown in Fig. 3. The inner end of the body bar or bar member 34 of the body B has a universal connection 35ª with the lever arm D at a point immediately in front of the pivot or fulcrum 35 of the latter, and the paddle is prevented from moving to a right angle with respect to the lever arm D and is made to extend at an acute angle outwardly from said lever arm by means of cables 36 which are connected with the body bar 34 of the paddle where it receives the most strain, namely, where the blade 34 is attached, as is shown at 37 in Figs. 1 and 3, and the rear ends of the said cables 36 are drawn together and are attached to an I-bolt 38 passed through the right-hand end of the aforesaid lever arm.

A supply pipe E is located between the tracks 16 and 17, as is best shown in Fig. 3, extending from a point about centrally between the ends of the tracks out at the rear portion of the frame. Strips 39 serve to hold this pipe in position, the strips being secured to the tracks 16 and 17. The forward or inner end of the pipe E is provided with a T-fitting 40 in which a check valve of any description is located, and the said fitting is likewise provided with an upwardly extending air chamber 41. A length of pipe 42 is connected with the forward end of the fitting 40 and this length of pipe 42 constitutes the plunger of a pump, and on this plunger 42 a cylinder 43 is telescoped, being mounted to slide on the plunger to and from the fitting 40. The cylinder 43 is provided with straps 44 and 45 adjacent to its end portions, and the ends of these straps are made to engage with and travel upon the upper faces of the tracks 16 and 17 adjacent to the flanges 18 of said tracks, as is shown in Fig. 3.

Rods 46 are pivotally attached to the end portion of the innermost strap 45 and these rods 46 extend rearwardly and are pivotally attached to the ends of a lever 48, which lever is centrally pivoted to the forward face of the lever arm D adjacent to its left-hand and the connection between the lever 48 and the lever arm D being indicated at 49 in Fig. 3. Thus it will be observed that as the left-hand end of the lever arm D is carried out to substantially the dotted position shown in Fig. 3, the cylinder 43 is drawn rearward upon the plunger 42 effecting a stroke of the pump, and this action takes place immediately upon the blade rising from the water after having completed its work in the current, and when it is raised to be carried to the normal point to commence the work again, at which latter time the lever arm D is restored to its normal position shown in Fig. 3, and the cylinder 43 is carried forward and placed in position for another rearward stroke.

A suction pipe 50 extends down in the water from the fitting 40, and this suction pipe is provided also with a suitable check valve. The link connection between the pendulum supporting arm C and the walking beam 27 eases the sudden jolt of the paddle when it is dropped in the current, and by adjusting the two members of the said pendulum supporting arm the angularity of the blade 34ª may be increased or decreased as desired.

A link 53 is attached to the left-hand side portion of the body bar of the paddle B, as is shown in Fig. 3, and said link is connected with a spring 54 attached to the lever arm D at the left of its center, which spring 54 is placed under compression when the paddle is carried down stream, and another spring 55 is sometimes attached to the horizontal bar 20, being connected by a link 56 with the lever arm D adjacent to where the spring 54 is connected with said arm. The cable or link 53 and spring 54 and spring 55 insure the return motion of the wheel and the pump cylinder, but the spring 55 is hardly necessary since the gravity of the body bar of the paddle is sufficient to swing back far enough to produce the proper strokes of the pump cylinder.

The paddle having swinging pendulum motion is caused to enter the water at an obtuse angle, and the current will hold the paddle well under the water during the en-

tire time it is laboring on the pump and is moving down stream. When the blade of the paddle enters the current its upper edge inclines toward the left-hand side of the motor and the body bar of the paddle B will have rocked to the position shown at E′ in Fig. 4, at the middle of the stroke of the paddle the body bar 34 occupies the position shown at E^2 in Fig. 4, the blade having a slighter inclination than at E′, and just prior to the blade of the paddle leaving the water its inclination is the reverse of that at starting, the upper edge inclining in direction of the right-hand side of the motor, as is shown at E^3 in Fig. 4, since the body bar 34 will have rocked toward the left and at such time the current will force the paddle blade out from the water, whereupon the weight 29 will draw the blade upward, as is shown in Fig. 1, and the springs 54 and 55, if the latter are used, will draw the paddle to the right or to its normal position, and when in such position the weight of the paddle overcoming the weight 29, the blade of the paddle again drops into the stream. The angle at which the blade of the paddle enters and leaves the current is an important factor, since it always assures a complete and powerful stroke regardless of the resistance of the pump, as well as always staying under the water until it has made this stroke and has assumed the new position at which the current throws it out.

The body or bar section 34 of the paddle B being made quite long assures great leverage and produces a stroke of the pump at each downward sweep of the paddle. The paddle reaches well out in the stream, thereby coming in contact with deep and swift water. The motor may be pushed out or drawn in upon its support according to the rise and fall of the stream. The device is easily stopped and started by simply maintaining the weight 29 until the blade of the paddle is out of the water and releasing the same to start again. In Fig. 4 I have also illustrated the position of the body bar 34 of the paddle when returning, E^4 showing its first intermediate position and E^5 its second intermediate position. I desire it to be understood that the cylinder 43 of the pump may be denominated its plunger, and that when the blade is in its upper position just withdrawn from the water as shown in Fig. 1, the operating lever E has a downward inclination in direction of the right-hand side of the motor.

The blade 34^a does not change its position relatively to the body bar 34 during its travel, but the entire paddle has a rocking motion, since it is swung and suspended by the pendulum arm C, which causes the blade to enter and pass out of the current at different angles.

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

1. In a current motor, a base, a controlling lever having a universal pivotal connection with the base, a paddle having a universal connection with the lever, a walking beam, a pendulum connection between the paddle and walking beam, a pump, and means for operating the pump by the movement of the lever.

2. In a current motor, a base, a controlling lever having pivotal and rocking movement thereon, a paddle universally connected with the lever, the blade whereof is diagonally set in a body bar, a counterbalanced walking beam, a pendulum connection between the paddle and walking beam, a pump, and means for operating the pump by the movement of the lever.

3. In a current motor, a base, a controlling lever having pivotal and rocking connections between its center and one end with the base, a paddle having universal connection with the lever at its inner end, the blade of the paddle being diagonally set in its body bar, limiting cables connected with the blade section of the paddle and the short end of the lever, operating means connected with the pump piston and the longer end of the lever, a counterbalanced walking beam, and a pendulum connection between the walking beam and the paddle.

4. In a current motor, a base, a controlling lever having pivotal and rocking connections between its center and one end with the base, a paddle having universal connection with the lever at its inner end, the blade of the paddle being diagonally set in its body bar, limiting cables connected with the blade section of the paddle and the short end of the lever, operating means connected with the pump piston and the longer end of the lever, a counterbalanced walking beam, a pendulum arm constructed in adjustable sections attached to the paddle, a swinging connection between the pendulum arm and the walking beam, and a tension connection between the paddle and the said lever.

5. In a current motor, a base, a paddle universally supported by the base, a weighted swinging element supported above the paddle, a pendulum connection between said swinging element and the paddle, a pump, and devices for operating the pump by the movement of the paddle, while in or out of the stream.

6. In a current motor, a base, an operating lever universally mounted upon the base at a point between its center and one of its ends, a paddle universally connected with the said lever at its inner portion, a tension device placed under pressure when the paddle is moved in a down stream direction, the blade

of the said paddle being diagonally located in its body bar, a swinging element supported above the paddle, an adjustable pendulum connection between the swinging element and the paddle, a pump, and means for operating the piston of the said pump, which means are connected with the longer end of the lever.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARY ALBERT NEYLAND.

Witnesses:

JAMES J. GRAHAM,

W. C. DRURY.