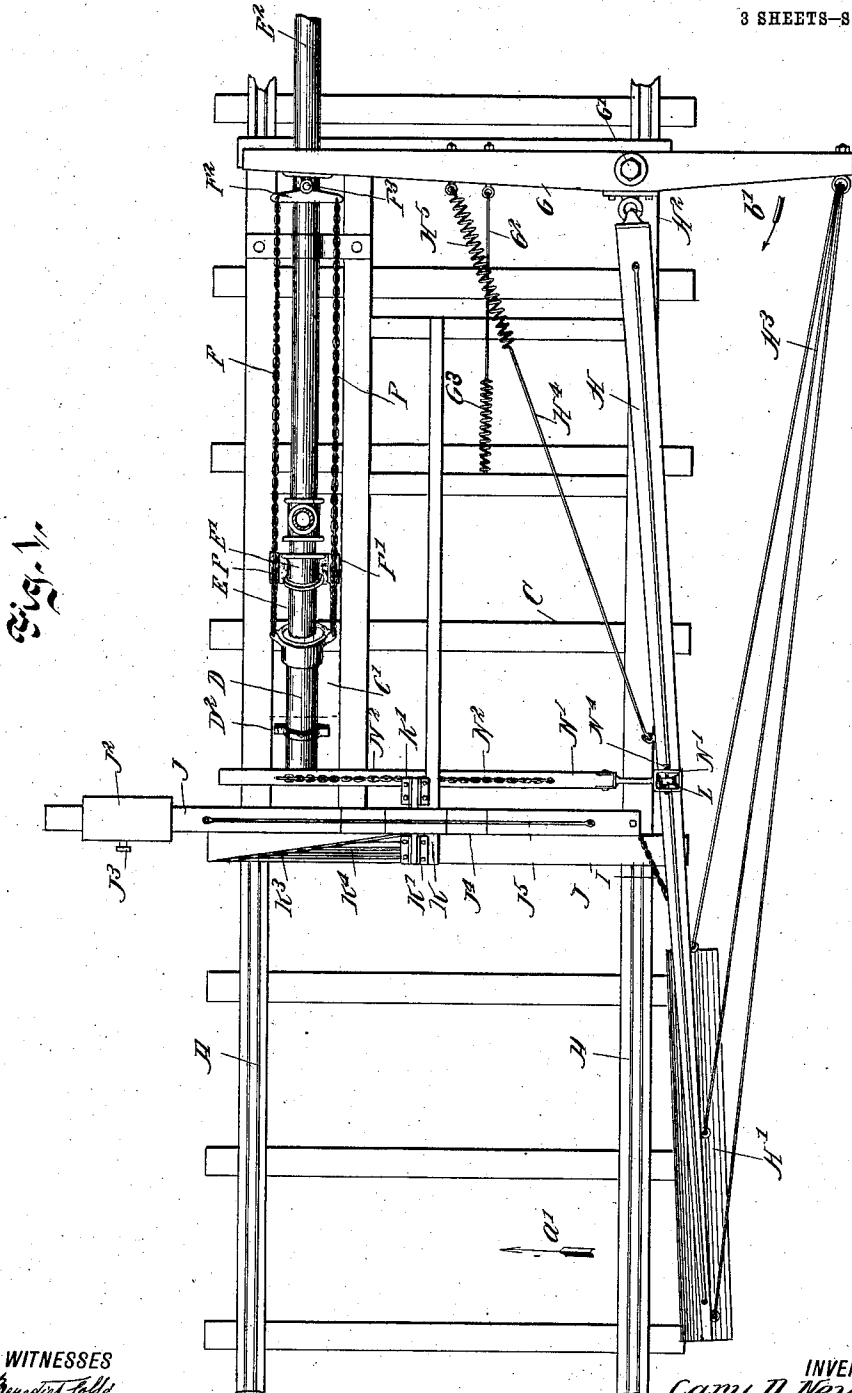


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CURRENT MOTOR.
APPLICATION FILED JUNE 6, 1911.

1,027,213.

Patented May 21, 1912.

3 SHEETS—SHEET 1.



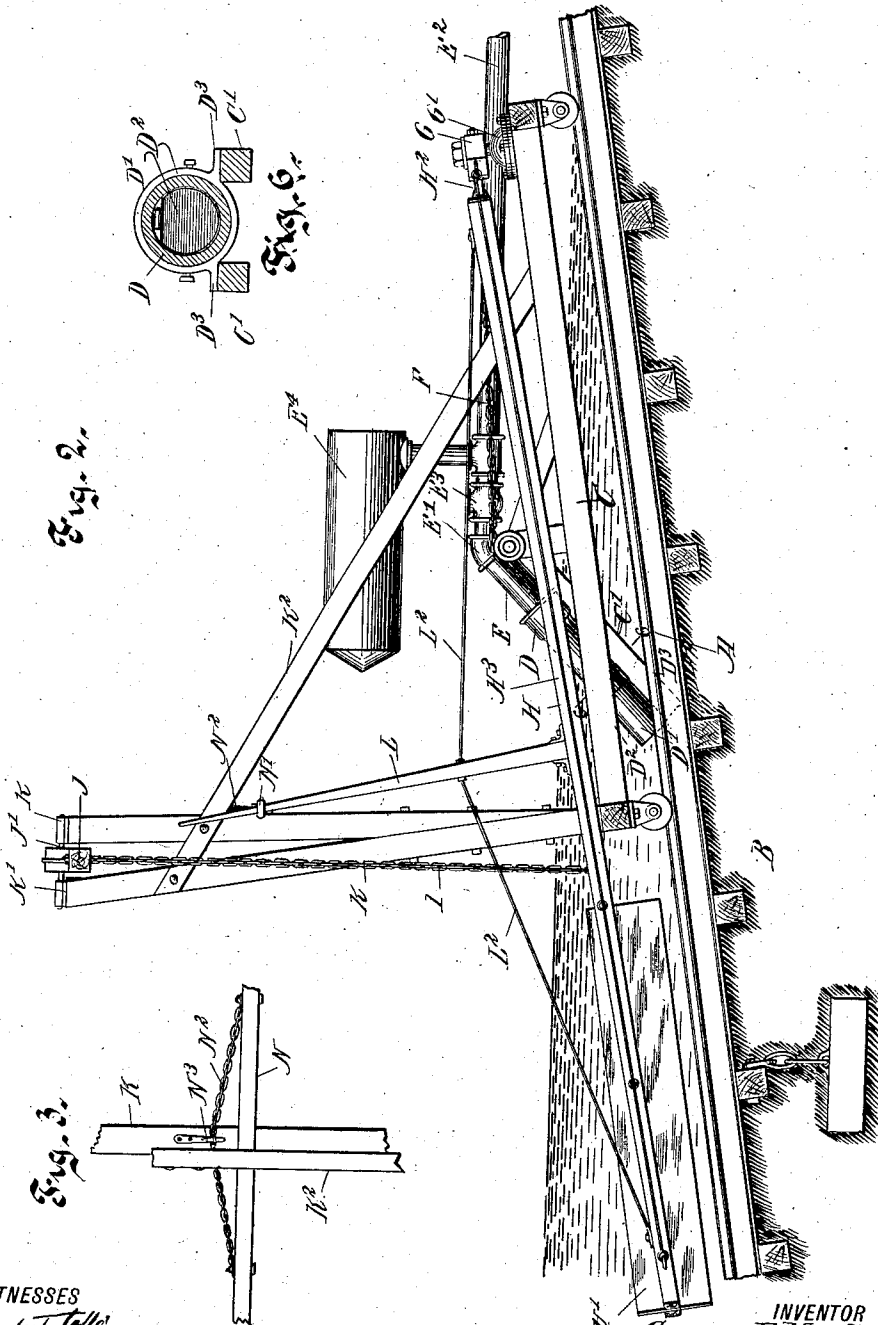
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INVENTOR
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ATTORNEYS

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WITNESSES
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Wm. J. Hoston

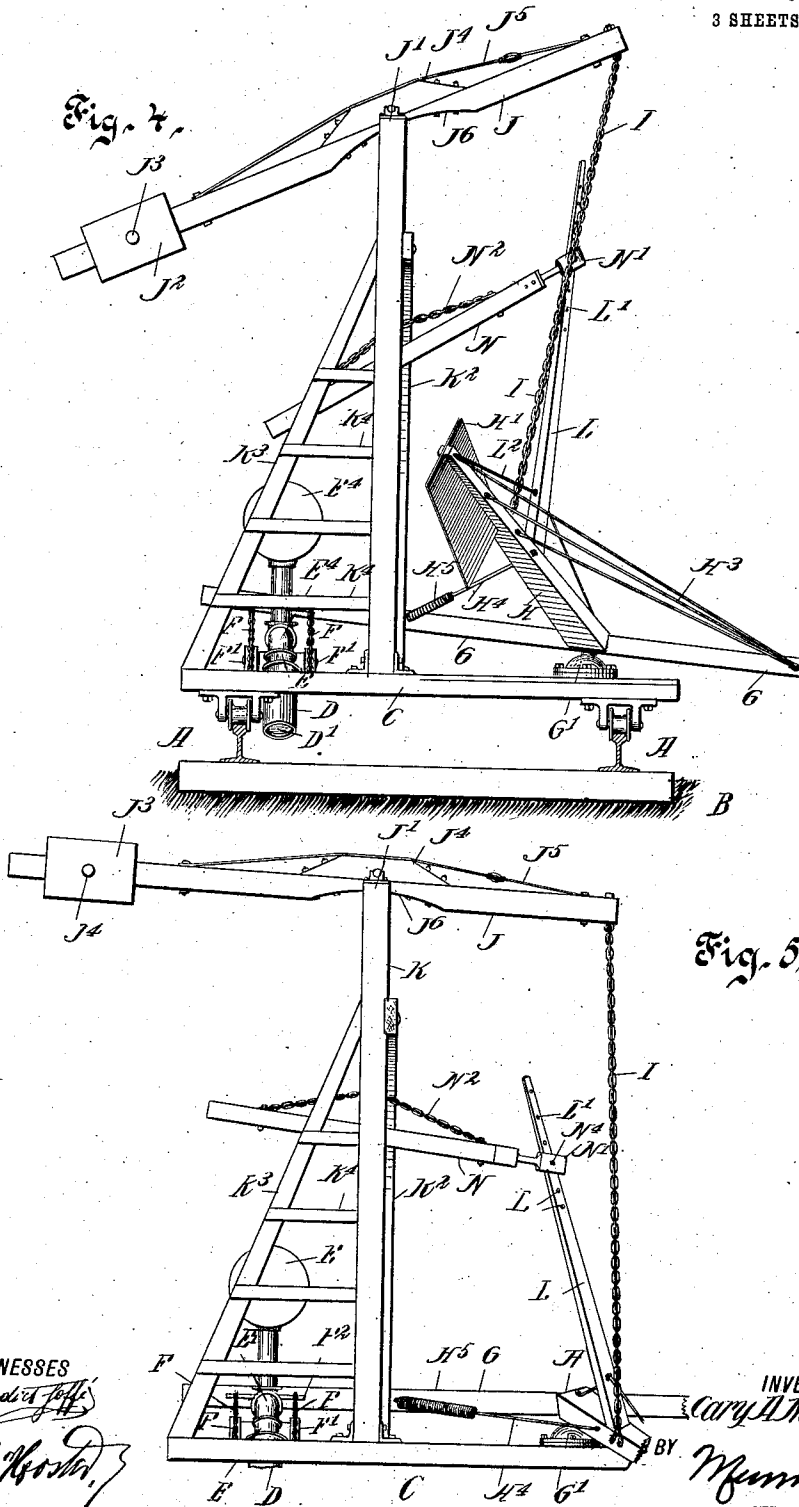
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WITNESSES
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UNITED STATES PATENT OFFICE.

CARY A. NEYLAND, OF SPOKANE, WASHINGTON.

CURRENT-MOTOR.

1,027,213.

Specification of Letters Patent.

Patented May 21, 1912.

Application filed June 6, 1911. Serial No. 631,565.

To all whom it may concern:

Be it known that I, CARY A. 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 Improved Current-Motor, of which the following is a full, clear, and exact description.

The invention relates to current motors, such as shown and described in Letters Patent of the United States, No. 880,393 and No. 930,878, granted to me on February 25, 1908, and August 10, 1909, respectively.

The object of the invention is to provide a new and improved current motor, more especially designed for use on a flowing stream, tide water or other moving body of water, and arranged to actuate a pump or other mechanical contrivance in a very effective manner, and to utilize the force of the moving body of water to the fullest advantage. For the purpose mentioned use is made of a sweep beam connected with a mechanical contrivance such as a pump and with a paddle arm carrying a paddle adapted to be acted on by the force of the moving body of water to impart a swinging motion to the said paddle arm, which latter is connected with a counterbalancing device and with an adjustable controlling device for controlling the dip of the paddle in the water. Use is also made of a specially constructed pump having a conduit pipe terminating in an inclined hollow plunger on which is mounted to slide a cylinder connected with the sweep beam so that the cylinder is drawn up on the plunger by the force of the water acting on the paddle, and during the return stroke of the paddle the cylinder by its own weight returns to lowermost position thus returning the sweep beam, paddle arm and paddle to starting position.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a plan view of the current motor and showing the parts in position at the beginning of the working stroke of the paddle; Fig. 2 is a side elevation of the same; Fig. 3 is a rear view of an adjustable controlling device for controlling the dip of the paddle in the water; Fig. 4 is a front elevation of the current motor showing the

parts in position on the return stroke of the paddle; Fig. 5 is a like view of the same showing the parts in position at the beginning of the working stroke of the paddle; and Fig. 6 is an enlarged cross section of the cylinder pump.

An inclined railway track A is anchored on the shore B of a waterway, to extend into the water a sufficient distance for the proper operation of the current motor, and on the said track A is mounted to travel a carriage C supporting the motor proper. On the carriage C is mounted a pump consisting essentially of a cylinder D mounted to slide on an inclined hollow plunger E connected by an elbow E' with a horizontally-disposed conduit pipe E² extending from the rear end of the carriage C to the adjacent land, to deliver the water to a reservoir or other receiver. The conduit pipe E² is provided adjacent to the elbow E' with a check valve E³ to retain the water in the conduit pipe E² during the down stroke of the cylinder D on the plunger E, and the conduit pipe E² in the rear of the check valve E³ is provided with a suitable air chamber E⁴ to maintain a pressure on the water in the conduit pipe E².

The cylinder D is provided in its lower end with a suction valve D', and the cylinder is encircled by a band D² provided with side-wise extending shoes D³ mounted to slide on bearings C' forming part of the carriage C and inclined thereon to correspond to the inclination given to the plunger E, as will be readily understood by reference to Fig. 2. The upper end of the cylinder D is connected with chains F extending upwardly over guide pulleys F' journaled on the carriage C, and the said chains F extend on opposite sides of the conduit pipe E² and connect at their rear ends with a yoke F² pivotally connected at F³ on the down-stream end of a transversely-extending sweep beam G fulcrumed by means of a universal joint G' on the rear end of the carriage C. A rod G² extending longitudinally is connected with the sweep beam G and is attached to one end of a spring G³ secured at its other end to the carriage C so as to hold the sweep beam G under tension.

A paddle arm H extends longitudinally and is provided at its forward end with a paddle H' while its rear end is pivotally connected by ball and socket joint H² with

the sweep beam G adjacent to the fulcrum G', and the said paddle arm H is connected at its forward portion by a number of stays H³ with the upstream end of the sweep beam G. A stay H⁴ is connected at one end with the paddle arm H at the down-stream side, and is connected with a spring H⁵ attached to the lower end of the sweep beam G so as to hold the paddle arm H under tension, so that a swinging motion given to the paddle H' by the force of the body of water, causes a rocking motion of the sweep beam G for the latter to exert a pull on the chains F with a view to draw the cylinder D upward on the plunger E. Instead of the spring H⁵ a weight may be attached to the stay H⁴. The stays H³ and H⁴ may be in the form of rods or cables.

An upwardly-extending chain I connects the paddle arm H with a yard arm J provided with a pivot pin J' journaled in bearings K' attached to the upper bifurcated end of a stanchion K erected on the forward end of the carriage C and held in place by suitable braces K², K³, as plainly indicated in Figs. 1, 4 and 5, the stanchion K and the brace K³ also supporting rungs K⁴ for forming a ladder to permit of reaching the top of the stanchion K for repairs or other purposes. The yard arm J extends transversely and is provided at its free end with a weight J² held adjustable on the yard arm by a set screw J³ or a similar fastening means. The pivot pin J' of the yard arm J is preferably mounted in a block J⁴ attached to the top of the yard arm J and braced by a truss rod J⁵, and the under side of the yard arm J is preferably concave as at J⁶ so that the yard arm J is free to swing on the stanchion K. While locating the pin J' in the block J⁴ above the top of the yard arm J the latter readily balances.

In order to control the dip of the paddle H' in the water use is made of an adjustable controlling device arranged as follows: On the paddle arm H is erected a post L extending through a loop N' held on a transversely-extending swing arm N provided with a chain N² secured at its ends to the top of the swing arm N and engaging with one of its links a hook N³ attached to the stanchion K (see Fig. 3). A pin N⁴ passes through the loop N' and engages one of a series of apertures L' formed on the upper portion of the post L, so that the swing arm N can be adjusted at its loop N' up or down on the post L. The chain N² engaging the hook N³ forms an adjustable fulcrum for the arm N by engaging any one of the links of the chain N² with the said hook N³, and in doing so the post L is more or less inclined to turn the paddle arm H on its pivotal connection H² with a view to give more or less inclination to the paddle H', thereby controlling the dip of the pad-

dle in the water. The post L is connected by suitable braces L² with the paddle arm H, as shown in the drawings.

The operation is as follows: Assuming that the flow of the water in the waterway is in the direction of the arrow *a'* (Fig. 1) and that the carriage C is positioned on the track A so as to permit a proper submergence of the paddle H' in the current of the stream: now when the paddle H' is in position for immersion, the sweep beam G is disposed at right angles to the conduit pipe E², plunger E and cylinder D, with the cylinder D in lowermost position. Upon the immersion of the paddle H' the force of the current of water causes a swinging of the paddle arm H so as to rock the sweep beam G in the direction of the arrow *b'*, whereby a pull is exerted on the chains F and the cylinder D is drawn upward thus forcing the water in the plunger E up and into the conduit pipe E past the check valve E³. The paddle H' extends farther from the lower side of the arm H than the upper side thereof, and the depending portion of the paddle H' is acted on by the current of water to feather the said paddle H' to such an extent that when the paddle H' reaches the full extent of its rocking movement in the water then the paddle H' is disposed vertically, and as the paddle arm H is rocked by the paddle H' the post L by its engagement with the swing arm N gradually turns the paddle H' to such an angle that the force of the water throws the paddle H' upward and out of the current. The weight J² of the balancing yard arm J is now free to act, thus imparting a swinging motion to the yard arm J whereby an upward swinging movement is given to the paddle arm H thus holding the paddle H' out of contact with the water during the return swinging movement of the paddle arm H caused by the weight of the arm H and its paddle H' aided by the springs G³ and H⁵. From the foregoing it will be seen that during the working stroke of the paddle H', while being submerged in the current of water, an upward sliding movement is given to the cylinder D to force the water from the plunger E into the conduit pipe E², and during the return stroke of the paddle H', while out of the current of water, the cylinder D is free to slide downward of its own weight and refill with water by way of its suction valve D'.

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

1. A current motor of the class described, comprising a sweep beam, a paddle arm pivotally connected with the said sweep beam and carrying a paddle, a counterbalancing device for the said paddle arm, and an adjustable controlling device connected with

the said paddle arm for controlling the dip of the paddle.

2. A current motor of the class described, comprising a sweep beam, a paddle arm pivotally connected with the said sweep beam and carrying a paddle, a counterbalancing device for the said paddle arm, a post on the said paddle arm intermediate the ends thereof, and a swing arm engaging the said post to govern the dip of the paddle.

3. A current motor of the class described, comprising a sweep beam, a paddle arm pivotally connected with the said sweep beam and carrying a paddle, a counterbalancing device for the said paddle arm, a post erected on the said paddle arm, and a swing arm pivotally connected with the said post and having an adjustable fulcrum to govern the dip of the paddle.

4. A current motor of the class described, comprising a sweep beam, a paddle arm pivotally connected with the said sweep beam and carrying a paddle, a counterbalancing device for the said paddle arm, a post erected on the said paddle intermediate the ends thereof and provided with a row of apertures, a swing arm having a loop through which extends the said post, a pin on the said loop and engaging one of the said post apertures, a chain attached at its ends to the said swing arm, and a fixed support engaged by one of the links of the said chain.

5. A current motor of the class described, comprising a sweep beam, a paddle arm pivotally connected with the said sweep beam and carrying a paddle, a counterbalancing device for the said paddle arm, an adjustable controlling device connected with the said paddle arm for controlling the dip of the paddle, and a pump having a conduit pipe terminating in an inclined hollow plunger, a pump cylinder mounted to slide on the said plunger and having a suction valve, and a connection between the said pump cylinder and the said sweep beam.

6. A current motor of the class described, comprising a sweep beam, a paddle arm pivotally connected with the said sweep beam and carrying a paddle, a counterbalancing device for the said paddle arm, an adjustable swinging arm connected with the

said paddle arm for controlling the dip of the paddle, and a pump having a conduit pipe terminating in an inclined hollow plunger, a pump cylinder mounted to slide on the said plunger and having a suction valve, chains connected with the said cylinder at opposite sides thereof, guide pulleys for the said chains, and a yoke connected with the ends of the chain and pivotally connected with the said sweep beam.

7. A current motor of the class described, comprising a pump having an inclined movable member, a sweep beam connected with the said movable pump member, a paddle arm pivotally connected with the said sweep beam and provided with a paddle, a stanchion having a bifurcated top carrying bearings, a yard arm having a pivot pin engaging the said bearings, the said pivot pin being arranged above the top of the yard arm, and a chain connecting the said yard arm with the said paddle arm.

8. A current motor of the class described, comprising a pump having an inclined movable member, a sweep beam connected with the said movable pump member, a paddle arm pivotally connected with the said sweep beam and provided with a paddle, a stanchion having a bifurcated top carrying bearings, a yard arm having a pivot pin engaging the said bearings, the said pivot pin being arranged above the top of the yard arm, a chain connecting the said yard arm with the said paddle arm, a post erected on the said paddle arm intermediate its ends and provided with a row of apertures, a swing arm having a loop through which extends the said post, a pin on the loop engaging one of the said apertures, a chain secured at its ends to the said swing arm, and a hook on the said stanchion and engaged by one of the links of the said chain.

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

CARY A. NEYLAND.

Witnesses:

A. S. DUNN,
H. C. DRURY.