

(No Model.)

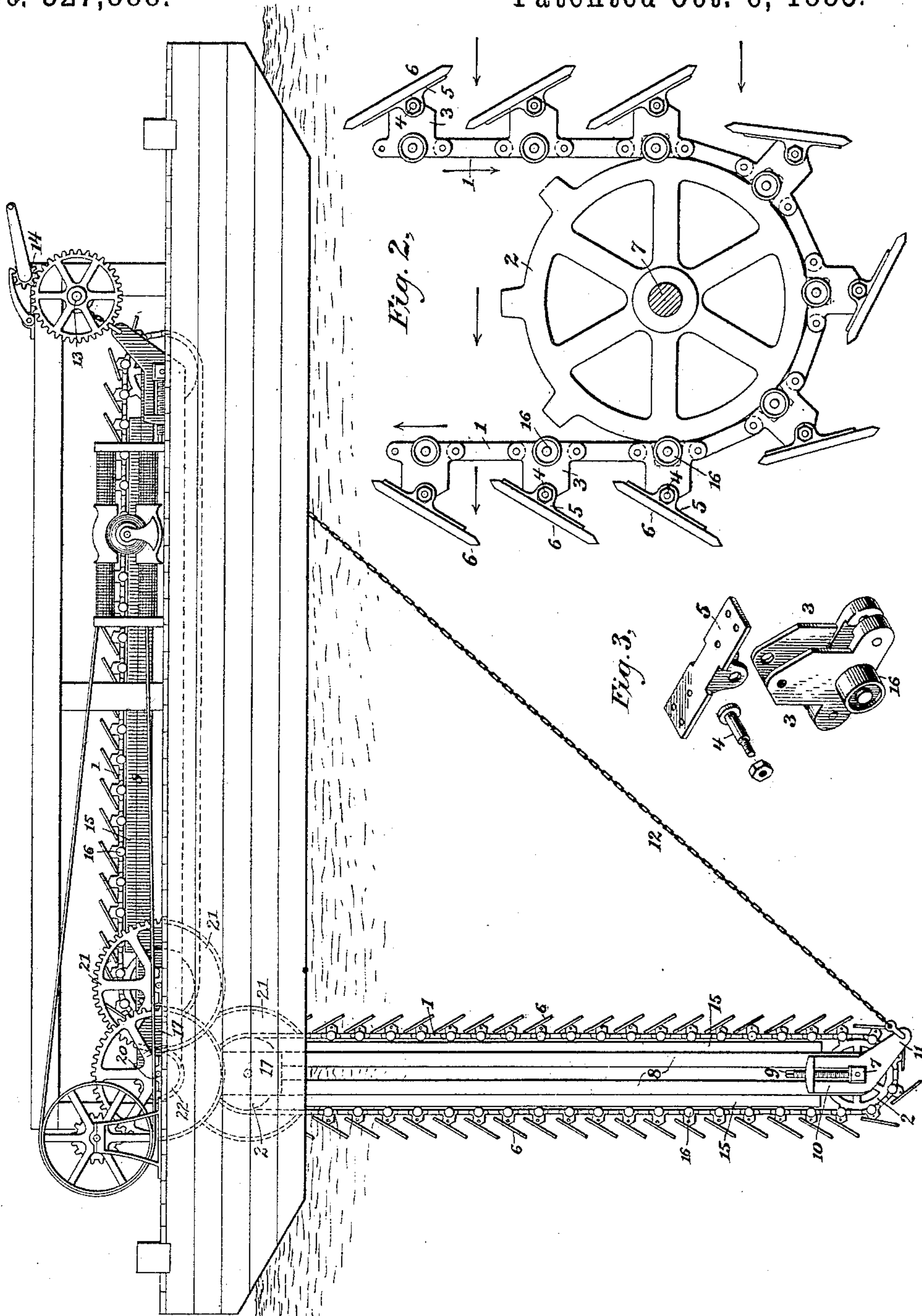
3 Sheets—Sheet 1.

W. MAIN.
FLOATING CURRENT MOTOR.

No. 327,888.

Patented Oct. 6, 1885.

Fig. 1.



Witnesses
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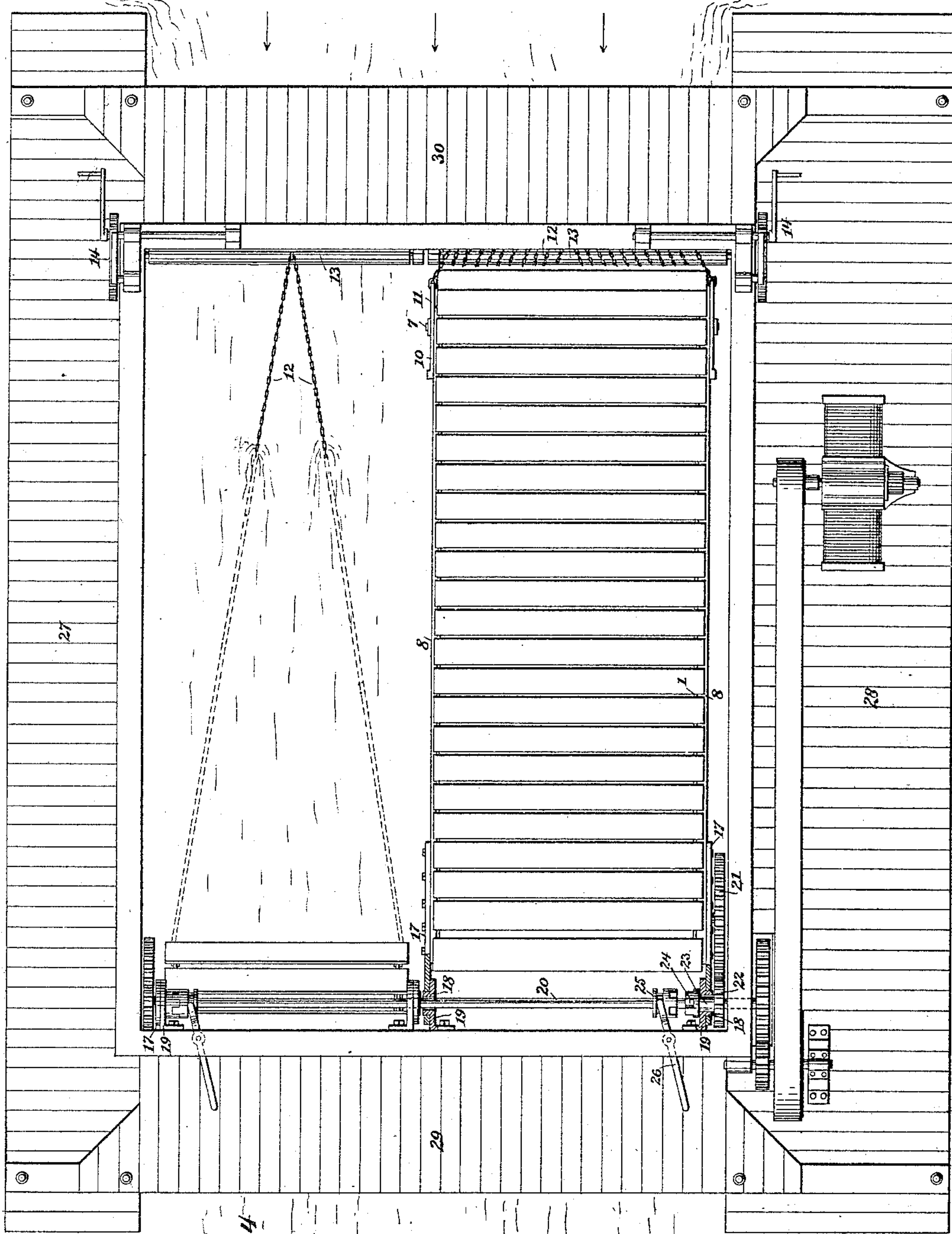
(No Model.)

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FLOATING CURRENT MOTOR.

No. 327,888.

Patented Oct. 6, 1885.



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(No Model.)

3 Sheets—Sheet 3.

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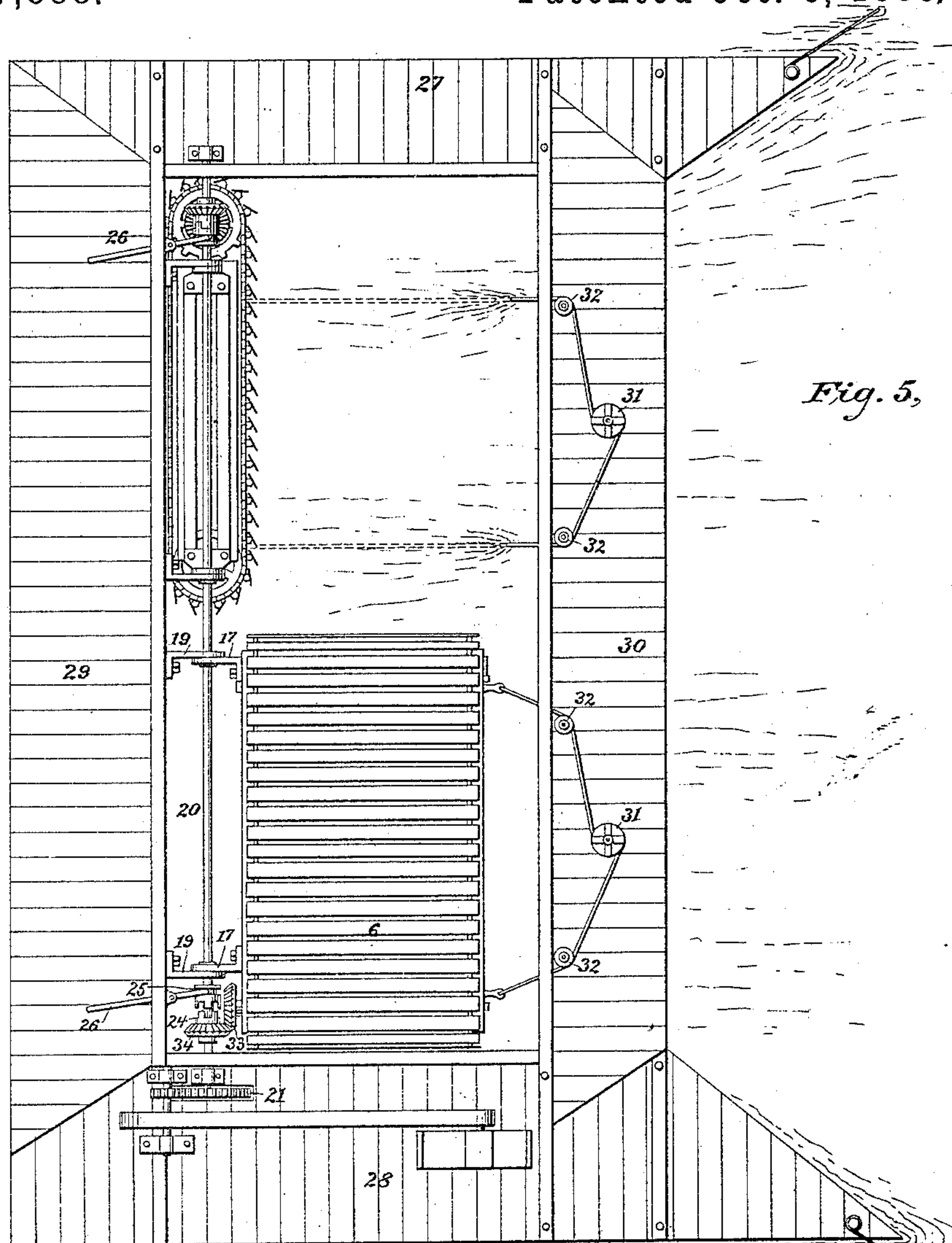


Fig. 5,

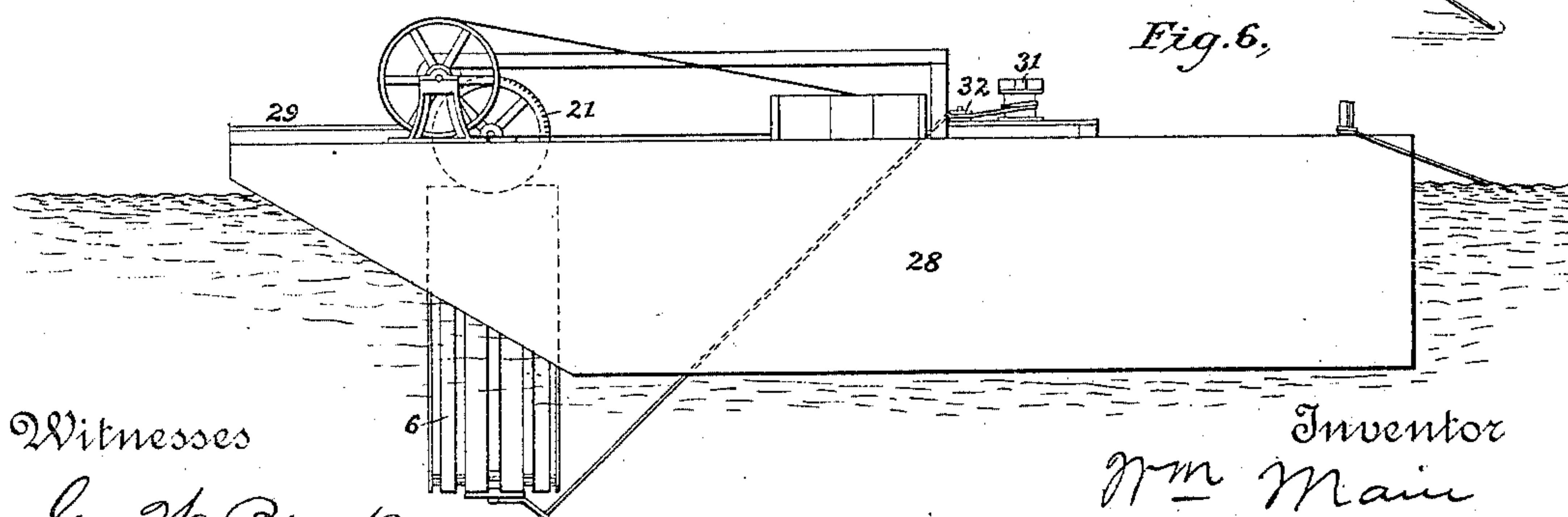


Fig. 6,

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UNITED STATES PATENT OFFICE.

WILLIAM MAIN, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE RIVER AND RAIL ELECTRIC LIGHT COMPANY, OF OHIO COUNTY, WEST VIRGINIA.

FLOATING CURRENT-MOTOR.

SPECIFICATION forming part of Letters Patent No. 327,888, dated October 6, 1885.

Application filed August 11, 1885. Serial No. 174,100. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MAIN, a citizen of the United States, residing in Brooklyn, county of Kings, State of New York, have
5 invented a new and useful Improvement in Floating Current-Motors, of which the following is a specification, and which I designate as "Case E."

My invention relates to that class of current-
10 motors in which the floats are carried by endless chains. In motors of this kind heretofore constructed, the floats, after having received the force of the current, have had their return path through the air, or, as is shown by
15 me in a previous application, partly through the water, but in both forms of construction without contributing during their return to the propulsion of the mechanism.

It is a leading object of my present invention to construct a chain-motor in which the
20 floats will be operative throughout their entire course; and to this end my invention consists in part of so mounting the floats that their path is substantially at right angles to the direction of the current instead of parallel
25 to it, as heretofore, the floats being driven forward by the impact of the water upon their inclined faces; and, further, in pivoting the floats near their centers and providing them
30 with double bearings, so that as each float passes from the advance to the return path it will reverse its inclination and continue to be driven forward by the current.

It is a further advantage of the construction
35 which I have outlined that not merely a surface stratum of water may be utilized, as heretofore, but the entire bulk of the current, the shape of the frame over which the floats travel being capable of adaptation to the dimensions
40 of the stream, and the amount of immersion of such frames being readily adjustable.

Another object of my invention is to relieve
the chains carrying the floats and the wheels
over which the chains travel of transverse
45 strain, a result very desirable in all forms of chain water-power mechanism, but especially so when the path of the floats is transverse to the direction of the current. To this end I have provided supporting guide-pieces for the

chains; and in order to reduce the friction between the chains and the frames, I place rollers at intervals along the chains, which serve to support the latter upon the guide-pieces.

My invention further consists in providing
suitable means of pivotal suspension and hoisting
55 apparatus, so that the frames carrying the chains and floats may be raised out of the water, when desired, to enable the structure to be more readily moved and to be floated
60 over shallows.

My invention further consists in certain features and details of construction, hereinafter fully described, and set forth in the claims.

In the accompanying drawings, which illustrate my invention and form a part of this
65 specification, Figure 1 is a side elevation of a scow or boat upon which my improved water-power mechanism is mounted, the latter being shown in its operating position. Fig. 2 is a
70 view on a large scale of a part of one of the float-carrying chains, together with one of the sprocket-wheels over which it runs. Fig. 3 is a detail of one of the links of the chain, showing the manner of attachment of the
75 floats and also one of the friction-wheels. Fig. 4 is a plan view of the entire apparatus, showing above one set of chain-wheels in operative position, and below another set drawn up and uncoupled from the main shaft. Fig. 5 is a
80 plan, and Fig. 6 an end view, of a modified form in which the movement of the floats is horizontal instead of vertical.

The chains 1 are formed of pivoted links, as shown, and run over sprocket-wheels 2, two
85 of which are provided for each chain. From each alternate link of the chain project double brackets 3 3, through eyes in the ends of which passes the bolt 4, which is firmly secured in its place by a lock-nut, and serves as an axis
90 for brackets 5, to which the floats 6 are attached. It will be observed that this manner of fixing the bolt 4 throws the wear upon the eyes in bracket 5 instead of upon those in brackets 3, which is a feature of importance, since the former brackets may be much more
95 readily removed for repair than the latter. The brackets 5 are so attached to the floats as to bring their eyes a little to one side of the

center of the floats, so that the force of the current, pressing more strongly upon one side of the float-pivots than on the other, will operate to give the float the proper inclination, and to reverse it as it passes from its forward to its return path. The brackets 3 are beveled, as shown, at their outer ends to provide suitable inclined bearings for the float. The axes 7, carrying the sprocket-wheels 2, are mounted in rigid frames formed of timbers 8, the relative position of the lower axis being adjustable by means of the screw 9, working in block 10, fixed to the lower end of the frame. The arm 11, projecting from this block 10, is connected by means of chain 12 to the hoisting-shaft 13, revolved by a crank and gearing 14. Guide-pieces 15 15 are attached to the frame-timbers 8 for affording a support for the chain as it passes through the water, and wheels 16 are mounted upon the float-carrying links of the chain for reducing the friction between the chain and the guide-pieces.

The pivoting of the frames is effected as follows: To the upper end of each frame is bolted an eye-piece, 17, arbored upon a sleeve, 18, which is part of the bracket 19, bolted to the supporting structure. The main shaft 20 passes freely through sleeves 18, and has suitable journals also fixed to the supporting structure. It is evident that this construction, while it provides a common center for the swinging frame and main shaft, relieves the latter of the weight and friction of the frame and permits the frame to be freely moved without interfering with the rotation of the shaft.

The power is communicated from the chain mechanism to the main shaft through the gear-wheel 21, mounted upon the shaft which carries the upper sprocket-wheels, over which the chain passes, and to provide for ungearing the chain mechanism from the main shaft to permit repairs to be made, or for other purposes, a clutch apparatus between gear-wheel 21 and the shaft is a desirable, though not a necessary feature. A clutch for this purpose may be of any of the well-known constructions. The device which I have shown consists of gear-wheel 22, engaging with gear-wheel 21, and mounted upon a second hollow sleeve, 23, which incloses the main shaft and passes through one of the sleeves 18, carrying at its other end one part, 24, of a clutch, the other part of which, 25, is feathered to the shaft and is moved to and from its engaging position in the usual manner by means of lever 26. The importance of a device of this sort will appear when it is considered that when the chain mechanism is drawn up for repair, as in the lower part of Fig. 4, unless it is capable of detachment from the shaft, it will continue to be driven by it, making it necessary to raise the other chain mechanism also, and suspend entirely the operation of the motor while the repairs are in progress.

Gearing from the main shaft, as shown, con-

nects with the dynamo or other machinery to be driven by the motor.

While I have shown two chain mechanisms geared to one main shaft, I do not limit myself to this number, as any other may be used; but I consider it the preferable construction. The use of more than two would necessitate a central bearing for the shaft and probably introduce considerable difficulty in securing proper alignment of bearings.

The form of boat which I have shown as a supporting structure is peculiar, and is a feature of some importance. It consists of two floats, 27 28, fastened together at their ends, one of which, 28, carrying the dynamo or other machinery operated by the motor, is made of greater width than the other. The uniting structures at the ends of the two floats 29 30 are decked over, thus affording a pathway entirely around the power mechanism. This construction is believed to combine the greatest convenience of form with economy of material. It is obviously, however, not a necessary feature of my invention, since many other forms of supporting structure for the power mechanism which I have described might be readily devised.

In the modification shown in Figs. 5 and 6 reversible floats of a character similar to those above described are used, but are so mounted as to have a horizontal instead of a vertical motion, the construction otherwise being substantially the same as that already described. A slightly different form of hoisting apparatus is shown, consisting of a capstan, 31, upon which are wound two ropes passing to the free end of the float-frames over the friction-pulleys 32. Another change from the construction before shown appears in the beveled gear 33, mounted upon the sprocket-wheel shaft and engaging with beveled gear 34, loosely mounted upon the main shaft and carrying upon its hub one part of the clutch 24 25. The construction shown in this modification will be found to be particularly useful in broad and shallow streams, since the length of the frames may be indefinitely extended, and the floats may be made as short as the character of the stream requires.

I claim—

1. In a water-power mechanism, an endless chain carrying floats traveling in a path perpendicular to the direction of the propelling-current, said floats resting when in operative positions in planes oblique to the direction of the current.

2. In a water-power mechanism, the combination of endless chains traveling in a path perpendicular to the direction of the propelling-current with floats pivoted to said chains, substantially as described and shown.

3. In a water-power mechanism, the combination of endless chains traveling in a path perpendicular to the direction of the current with floats pivoted to said chains, and two sets of oppositely-inclined bearings for each float

arranged on opposite sides of the float-pivots, substantially as described and shown.

4. In a water-power mechanism, endless chains carrying pivoted floats and provided with oppositely-inclined bearings for the floats, one bearing on each side of the float-pivot, substantially as shown and described.

5. In a water-power mechanism, the combination of endless chains with reversible floats pivoted near their centers to said chains and bearings for the floats fixed to the chain and inclined to the path of travel, substantially as described and shown.

6. In a water-power mechanism, the combination, with an endless chain, of a float pivoted to the chain between its edges and slightly nearer one edge than the other and bearings for the floats inclined to the chain, substantially as described and for the purpose set forth.

7. In a water-power mechanism, the combination of endless chains, brackets having inclined ends projecting therefrom, and floats pivoted to the extremities of the brackets and resting upon the inclined ends of the brackets as bearings, substantially as described and shown.

8. The combination of the float 6, bracket 5, attached thereto, shoulder-bolt 4, provided with a lock-nut on which bracket 5 is loosely pivoted, and brackets 3, projecting from the chain and supporting the bolt, whereby the pivotal wear is thrown upon the nut and the bracket attached to the float, substantially as described, and for the purpose set forth.

9. The combination, with a chain water-power mechanism in which the path of the floats is transverse to the direction of the current, of rigid guide-pieces for the float-carrying chains.

10. The combination, in a water-power mechanism, of endless chains traveling in a path perpendicular to the current, floats carried thereby, rigid guide-pieces for the floats, and friction-rollers between the chains and the guide-pieces, substantially as described and shown.

11. The combination, in a water power mechanism, of endless chains moving in vertical paths about sprocket-wheels, mounted on horizontal shafts, with reversible floats pivoted to said chains, substantially as described and shown.

12. The combination, in a water-power mechanism with endless chains moving in vertical paths about sprocket-wheels mounted on horizontal shafts, of floats pivoted a little off their

centers to said chains and provided with doubly-inclined bearings thereon, substantially as described and shown.

13. The combination of two pivoted water-power mechanisms geared to a single shaft with two clutches, one between each of the power mechanisms and the shaft, whereby either of the mechanisms may be detached from the shaft, as desired.

14. In a water-power mechanism, the combination of a floating support, a horizontal main shaft journaled thereon, two or more frames journaled concentrically with said shaft, sprocket-wheels carried by horizontal shafts journaled in said frames, endless chains running upon the sprocket-wheels, reversible floats resting when operative in planes oblique to the path of the chains carried by the chains, and means for raising and lowering the free ends of the frames, substantially as described, and for the purpose set forth.

15. The combination, with the main shaft of a water-power mechanism journaled to the supporting structure, of a fixed sleeve loosely surrounding the shaft and serving as an arbor for the frame carrying the power mechanism, a second sleeve loosely mounted upon the shaft and geared to the power mechanism, and a clutch between the second sleeve and the shaft, substantially as shown, and for the purposes set forth.

16. The combination of a chain-power mechanism in which the path of the floats is perpendicular to the direction of the current with a supporting-frame therefor, to one end of which the power mechanism is attached and which is pivoted at the other end to a floating support, and means for raising and lowering the free end of the frame, substantially as described and shown.

17. The combination, with a boat or other floating support, of frames pivoted thereto, shafts and sprockets-wheels mounted on the free ends of said frames, endless chains carried by the sprocket-wheels, reversible floats operative to propel the chain in both directions attached to the chains, and means for raising and lowering the free ends of the frame and the mechanism carried thereby, substantially as described and shown.

In testimony whereof I subscribe my name in the presence of two witnesses.

WILLIAM MAIN.

Witnesses:

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WILLIAM H. DE LANCEY.