J. I. HAWLEY.

CURRENT MOTOR.

APPLICATION FILED MAY 29, 1909.

954,626.

Patented Apr. 12, 1910.

2 SHEETS—SHEET 1.

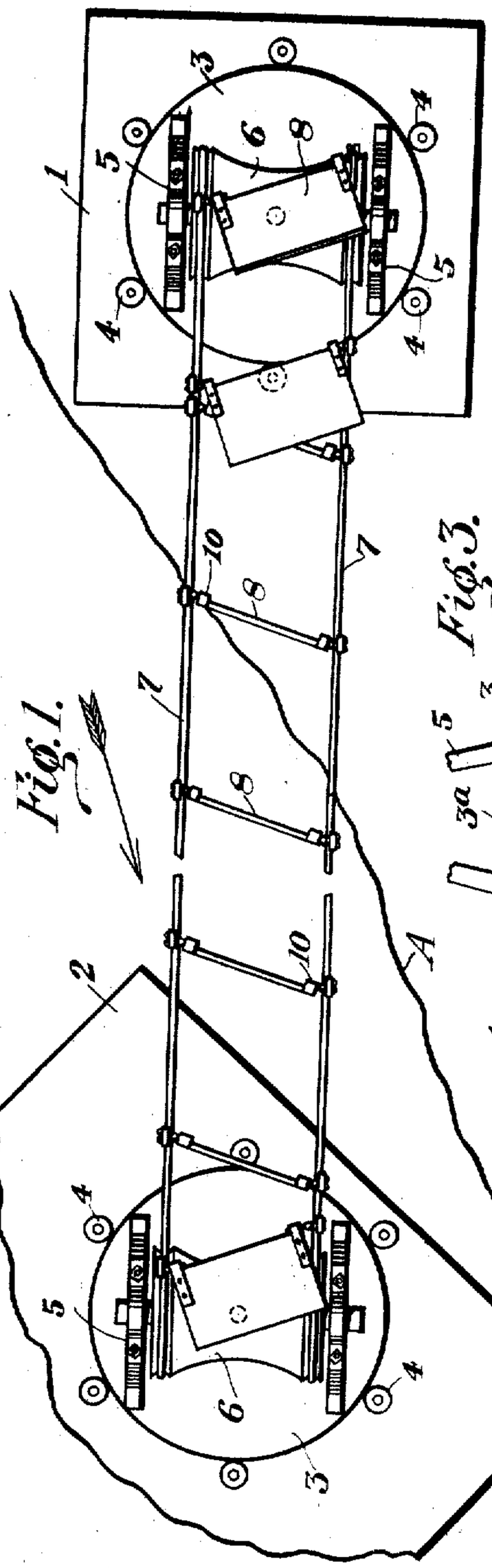

Fig. 1.

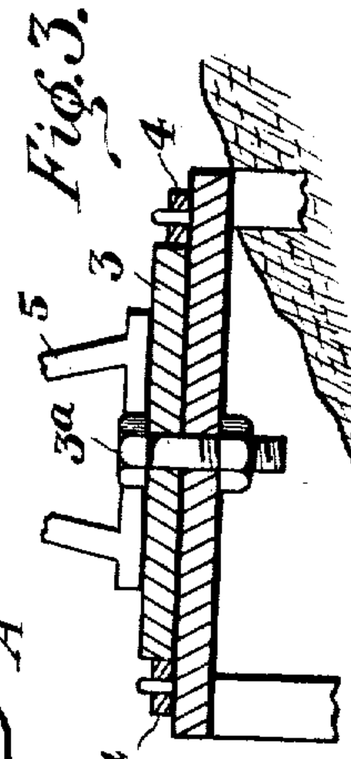

Fig. 3.

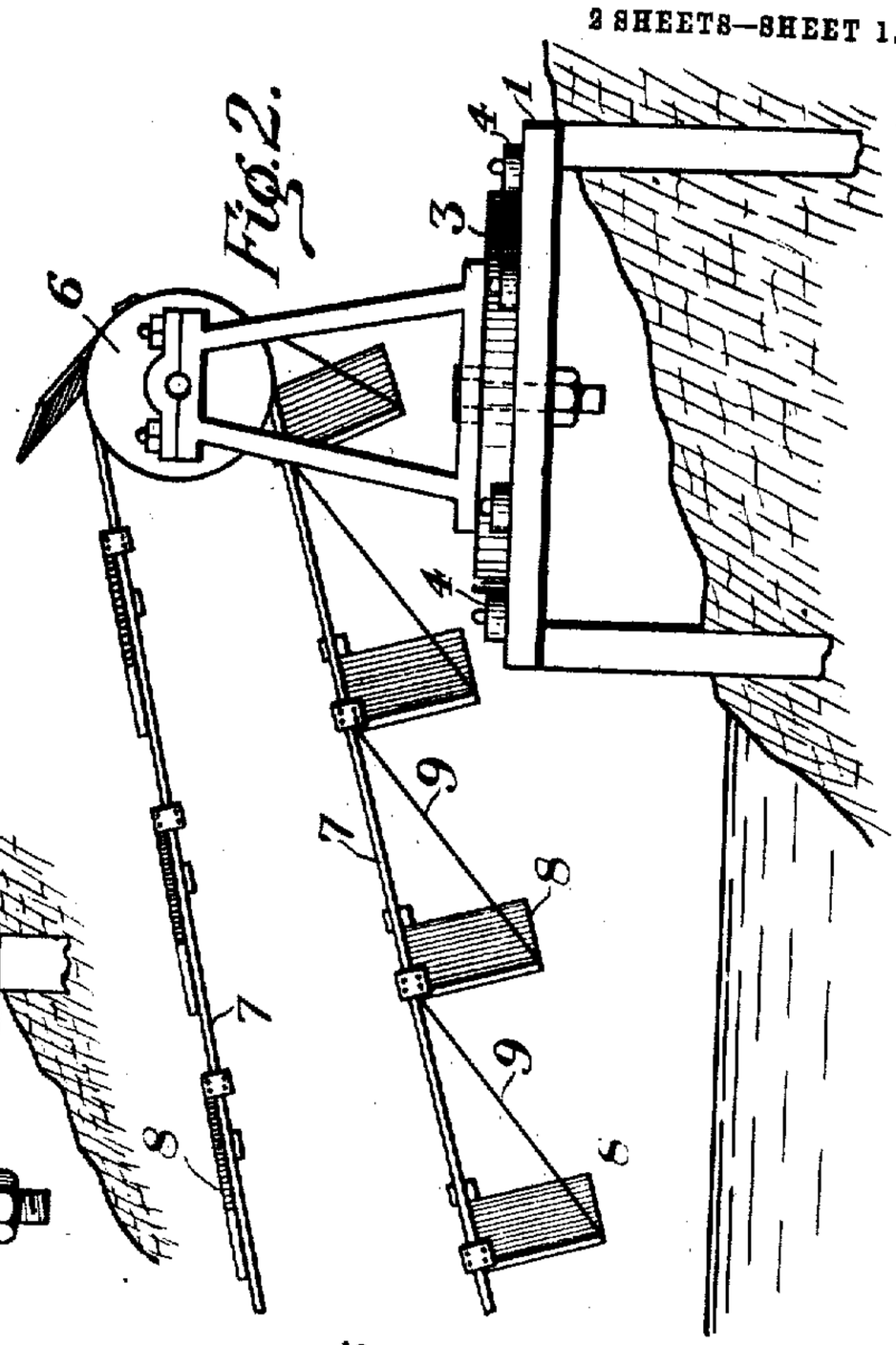

Fig. 2.

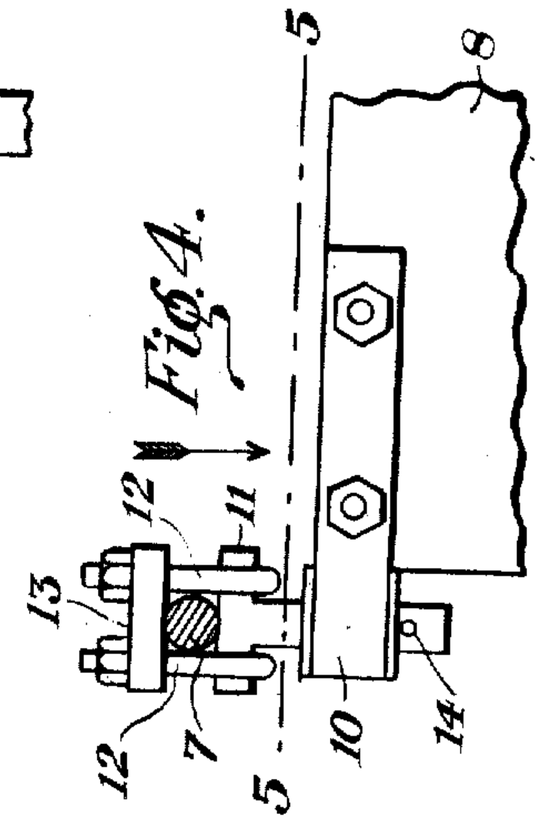

Fig. 4.

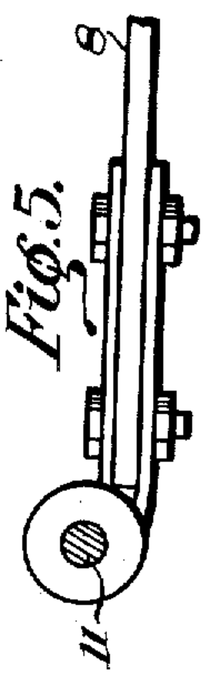

Fig. 5.

Witnesses

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2 SHEETS—SHEET 2.

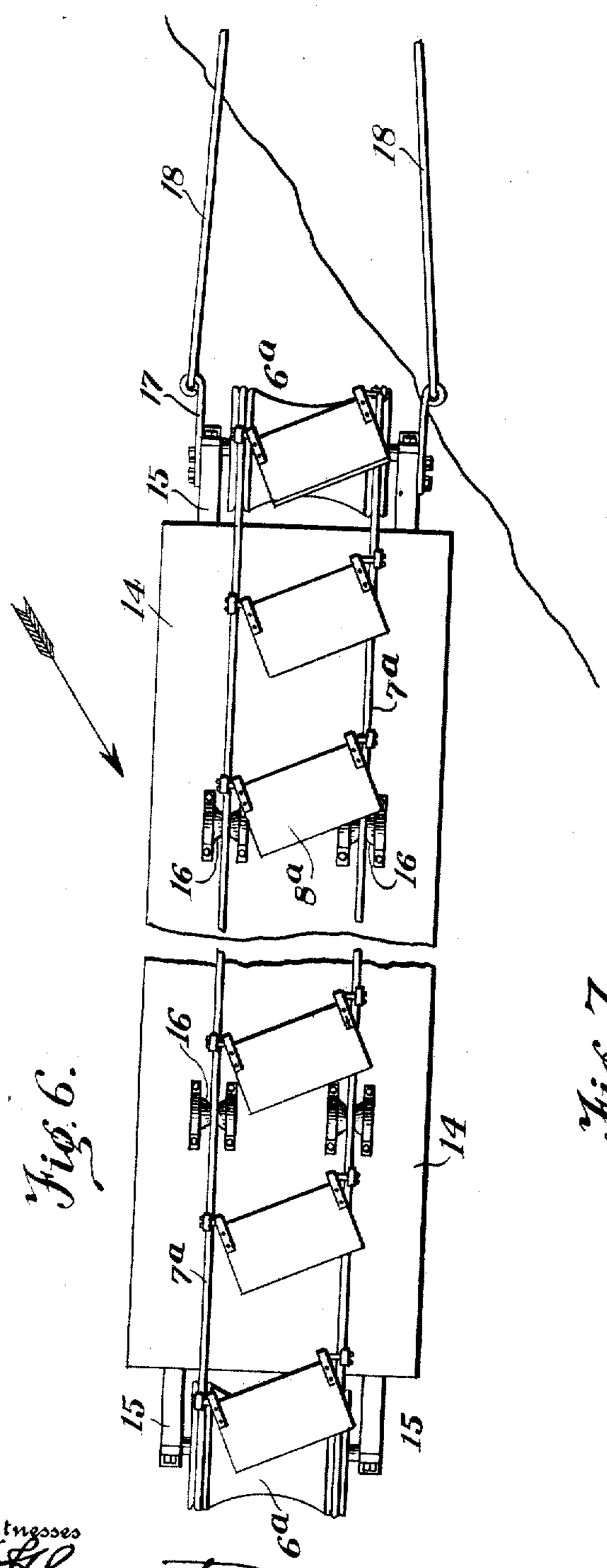

Fig. 6.

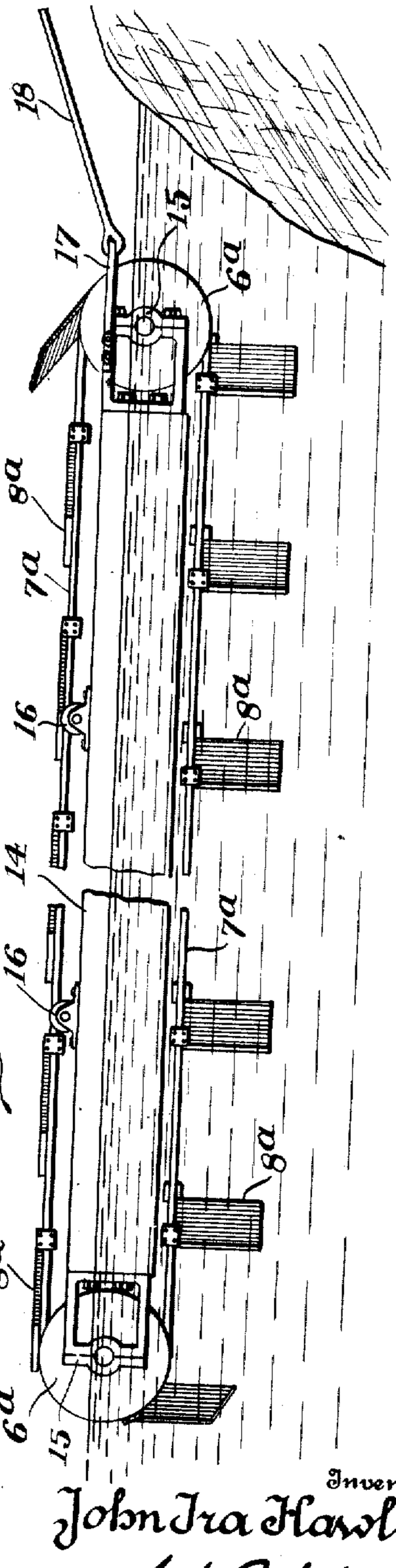

Fig. 7.

Witnesses

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CURRENT-MOTOR.

954,626. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed May 29, 1909. Serial No. 499,218.

To all whom it may concern:

Be it known that I, JOHN IRA HAWLEY, a citizen of the United States, residing at Plymouth, in the county of Benton and State of Washington, have invented certain new and useful Improvements in Current-Motors, of which the following is a specification.

The present invention relates to certain new and useful improvements in the construction of hydraulic motors of that type which are designed to utilize the energy of a stream or moving body of water, and the object of the invention is the provision of a current motor which is durable and inexpensive in its construction, which can be readily installed upon a stream, and which is peculiarly designed so as to render available for useful purposes a maximum amount of the energy of the water.

The invention further contemplates a device of this character which will readily accommodate itself to the rise and fall of the stream, and which can be quickly adjusted so as to obtain the best results with either a swift or slow current.

With these and other objects in view, as will more fully appear as the description proceeds, the invention consists in certain constructions and arrangements of the parts, the novel features of which are pointed out in the appended claims.

For a full understanding of the invention, reference is to be had to the accompanying drawings, in which,

Figure 1 is a top plan view of my improved current motor, portions being broken away: Fig. 2 is a side elevation of that end of the current motor which is mounted upon the shore: Fig. 3 is a vertical sectional view through the same, portions being removed: Fig. 4 is a detail view of a portion of one of the blades, showing the manner of connecting the blades to the endless cables: Fig. 5 is a sectional view on the line 5—5 of Fig. 4, looking in the direction of the arrow. Fig. 6 is a plan view of a modified form of the invention: and, Fig. 7 is a side elevation of the same.

Corresponding and like parts are referred to in the following description, and indicated in all the views of the drawing by like reference characters.

Specifically describing the preferred embodiment of the invention, the numeral 1 designates a stationary base or platform which is designed to be mounted upon the bank of a stream or moving body of water, and 2 a movable or floating base which may be in the nature of a scow as illustrated. Pivotally mounted upon each of the bases 1 and 2 so as to turn about a vertical axis is a circular plate 3, the peripheries of the said circular plates being engaged by the small rollers 4 which serve to prevent any binding action and admit of the plates turning freely. As indicated upon the drawing these plates are mounted upon the pivot bolts 3^a which pass through the respective bases. Projecting upwardly from opposite sides of each of the plates 3 are the standards 5 upon which a drum 6 is journaled so as to turn about a horizontal axis. Passing around the two drums 6 carried respectively by the stationary base 1 and the movable base 2, is a pair of cables or endless belts 7, and applied to these cables are the blades or floats 8. These blades 8 are arranged at an angle with respect to the cables, and are preferably mounted so as to swing about a horizontal axis, the outward swinging movement of the blades being limited by the cords 9. With this construction it will be obvious that, as shown in Fig. 2, those blades upon the upper reach of the endless cables 7 will swing inwardly against the same so as to assume an inoperative position, while those blades upon the lower reach of the cables will drop by the action of gravity into a substantially vertical position so as to be acted upon by the current when submerged. At this point it may be stated that those portions of the cables passing around the drums 6, together with the blades carried thereby, are elevated entirely above the surface of the stream so as not to be acted upon by the water, while those portions of the cables between the drums sag and cause the blades upon the lower reach to be submerged, in which position they are acted upon by the current.

Specifically describing the present method of mounting the blades 8, it will be observed that opposite ends of each blade are provided with the upwardly projecting sleeves 10, said sleeves, as shown in Fig. 5, being offset laterally upon one side of the blades to admit of the blades folding flat against the cables, and being formed in any manner desired such as by looping the intermediate portion of a piece of strap iron. Each of these sleeves loosely receives the shank of a T member 11 the head of which is clamped to one of the cables 7 by means of

the two U bolts 12 and the block 13. The blades turn freely upon the changs of the T members as a horizontal axis, and cotter pins 14 are provided for preventing the sleeves 10 from slipping over the ends of the T members and thereby causing the blades to become disengaged from the cables.

The various blades are arranged parallel to each other and are disposed at an angle to the cables, and owing to the peculiar manner of mounting the blades it will be obvious that this angle may either be made larger or smaller, as required by the velocity of the current or other conditions, by slipping one of the cables around the drums independently of the opposite cable. The current of the stream would run substantially parallel to the shore line A indicated in Fig. 1, and would have approximately the direction of the arrow. The energy of the water acting upon the submerged blades would tend to push the blades forward so as to draw the cables around the drums, and would also have a lateral component tending to move the blades outwardly away from the shore.

In explanation of the operation of the device, it may be stated that the force of the current acting upon the faces of the submerged blades would have a tendency to swing the float away from the shore and up stream until the blades assumed a direction parallel to the direction of the current, which is the position of least resistance, but that this tendency would be resisted by the force of the current acting upon the float and the edges of the floats and the cables, and that the device would finally asume a position of equilibrium similar to that indicated in Fig. 1, in which position a portion of the energy of the stream acting upon the submerged blades would be utilized for holding the float away from shore, while the remainder of the energy would be utilized in moving the cables around the drums and turning the latter. With a swift current the angle between the direction of the current and the blades would be comparatively small, while with a slow or sluggish current the angle would necessarily be much greater. It will thus be obvious that the forces acting upon the submerged blades serve both to revolve the drums about their axes, and also to hold the floating base 2 away from the shore, and the power may be taken from the drums and employed for performing useful work in any well known manner.

In the modified form of the invention shown in Figs. 6 and 7, the numeral 14 designates an elongated float which is loosely connected to the shore or other fixed base by flexible members such as the anchor ropes 18. Projecting outwardly from each end of the float are the bearings 15 and journaled upon these bearings are the drums 6ª. The endless cables 7ª pass around the drums as in the previous instance, the upper reaches of the cables being above the float and running over the idlers 16, while the lower reaches of the cables are under the float and submerged. The blades 8ª are applied to the cables just as in the preferred embodiment of the invention previously described, those blades under the float hanging in a vertical position so as to be acted upon by the current, while those blades above the float swing downwardly against the cables in an out of the way position. The anchor ropes 18 are secured to the arms 17 projecting from the bearings 15 at one end of the float, and the blades 8ª are arranged at an angle to the longitudinal axis of the float. The current of the stream has approximately the direction of the arrow in Fig. 6, and as in the former construction, strikes the blades at an angle to the normal so as to both move the blades in the direction of the longitudinal axis of the float and also move the float laterally and hold it away from the shore. It will be readily obvious that such a construction is very advantageous for many purposes, since it entirely eliminates the necessity of anchoring the float to the bed of the stream, and enables the same to be secured either to the shore or a fixed base at one side thereof by means of ordinary cables such as those on the drawings.

Having thus described the invention, what I claim as new is:

1. In a current motor, the combination of a floating base arranged to swing either toward or away from the shore but held against moving with the current, a drum carried by the floating base, a cable passing around the drum, and blades carried by the cable so as to be acted upon by the current, the current striking the blades at an angle to the normal so as to both turn the drum and hold the floating base away from the shore.

2. In a current motor, the combination of a floating base arranged to swing either toward or away from the shore but held against moving with the current, a drum carried by the floating base, a cable passing around the drum, blades carried by the cable so as to be acted upon by the current, the currents striking the blades at an angle to the normal so as to both turn the drum and hold the floating base away from the shore, and means for varying the angle between the blades and the cable.

3. In a current motor, the combination of a floating base arranged to swing either toward or away from the shore but held against moving with the current, a drum carried by the floating base, a cable passing around the drum, T members applied to the

cable, and blades pivotally mounted upon the T members, the said blades being designed to be acted upon by the current and the current striking the blades at an angle to the normal so as to both turn the drum and hold the floating base away from the shore.

4. In a current motor, the combination of a floating base, a stationary base, drums mounted upon the floating base and stationary base respectively, a cable passing around the drums, and blades carried by the cable so as to be acted upon by the current, the current striking the blades at an angle to the normal so as to both turn the drums and swing the floating base outwardly away from the shore.

5. In a current motor, the combination of a floating base, a stationary base, drums mounted upon the floating base and stationary base respectively so as to turn about both a vertical axis and a horizontal axis, a cable passing around the drums, and blades carried by the cable so as to be acted upon by the current, the current striking the blades at an angle to the normal so as to both turn the drums and swing the floating base outwardly away from the shore.

6. In a current motor, the combination of a floating base, a stationary base, plates pivotally mounted upon the bases, drums carried by the plates, a cable passing around the drums, and blades carried by the cable.

7. In a current motor, the combination of a floating base, a stationary base, plates pivoted upon the bases, antifriction rollers engaging the plates, drums carried by the plates, a cable passing around the drums, and blades carried by the cable.

8. In a current motor, the combination of a floating base, a stationary base, plates pivotally mounted upon the said bases, standards projecting upwardly from the plates, drums journaled upon the standards, a cable passing around the drums, and blades carried by the cable.

9. In a current motor, the combination of a floating base, a stationary base, drums mounted upon the respective bases so as to turn about either a vertical axis or a horizontal axis, a pair of cables passing around the drums, blades carried by the cables and adapted to be acted upon by the current, and means for connecting the blades to the cables so that the blades can be set at any angle to the cables by slipping one of the cables around the drums independently of the opposite cable.

10. In a current motor, the combination of a floating base, a stationary base, drums mounted upon the respective bases, a pair of cables passing around the drums, blades carried by the cables and adapted to be acted upon by the current, and means for securing the blades to the cables so that they can be set at any desired angle to the cables by slipping one of the cables around the drums independently of the opposite cable.

11. In a current motor, the combination of a floating base arranged to swing either toward or away from the shore but held against moving with the current, a drum carried by the floating base, a cable passing around the drum, and blades pivotally connected to the cable so as to swing against the upper reach of the same, the current acting against the blades at an angle to the normal so as to both turn the drum and hold the floating base away from the shore.

12. In a current motor, the combination of a floating base arranged to swing either away from or toward the shore but held against moving with the current, a drum carried by the floating base, a pair of cables passing around the drum, blades carried by the cables and adapted to be acted upon by the current so as to turn the drum and swing the float away from shore, and means for securing the blades to the cables so that they can be set at any desired angle to the same by slipping one of the cables around the drum independently of the opposite cable.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN IRA HAWLEY.

Witnesses:
JAMES MCINTYRE,
J. D. MCCARTHY.