

A. A. PORTER.
WATER CURRENT MOTOR.
APPLICATION FILED OCT. 2, 1907.

899,320.

Patented Sept. 22, 1908.
2 SHEETS—SHEET 1.

Fig. 1

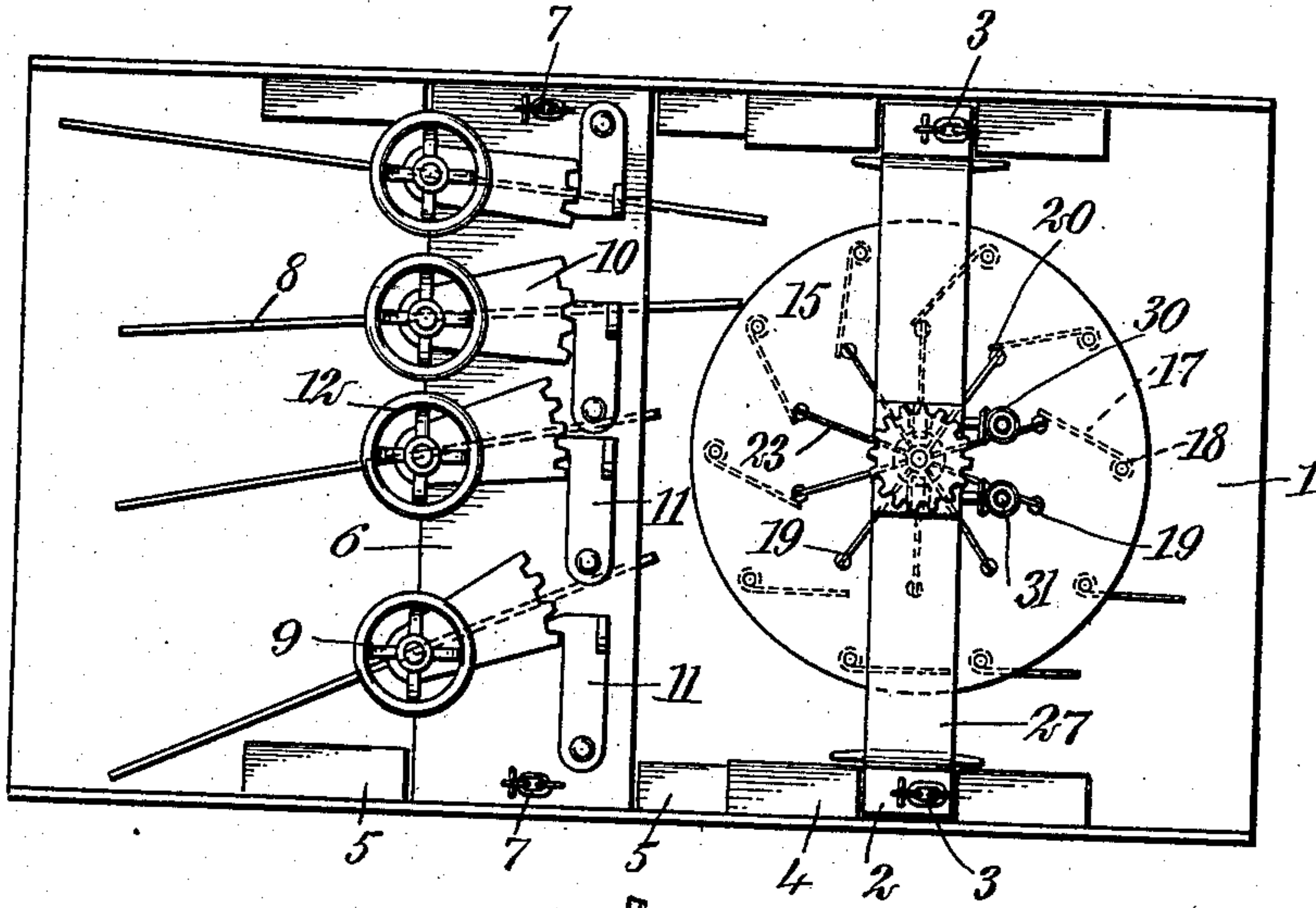


Fig. 2

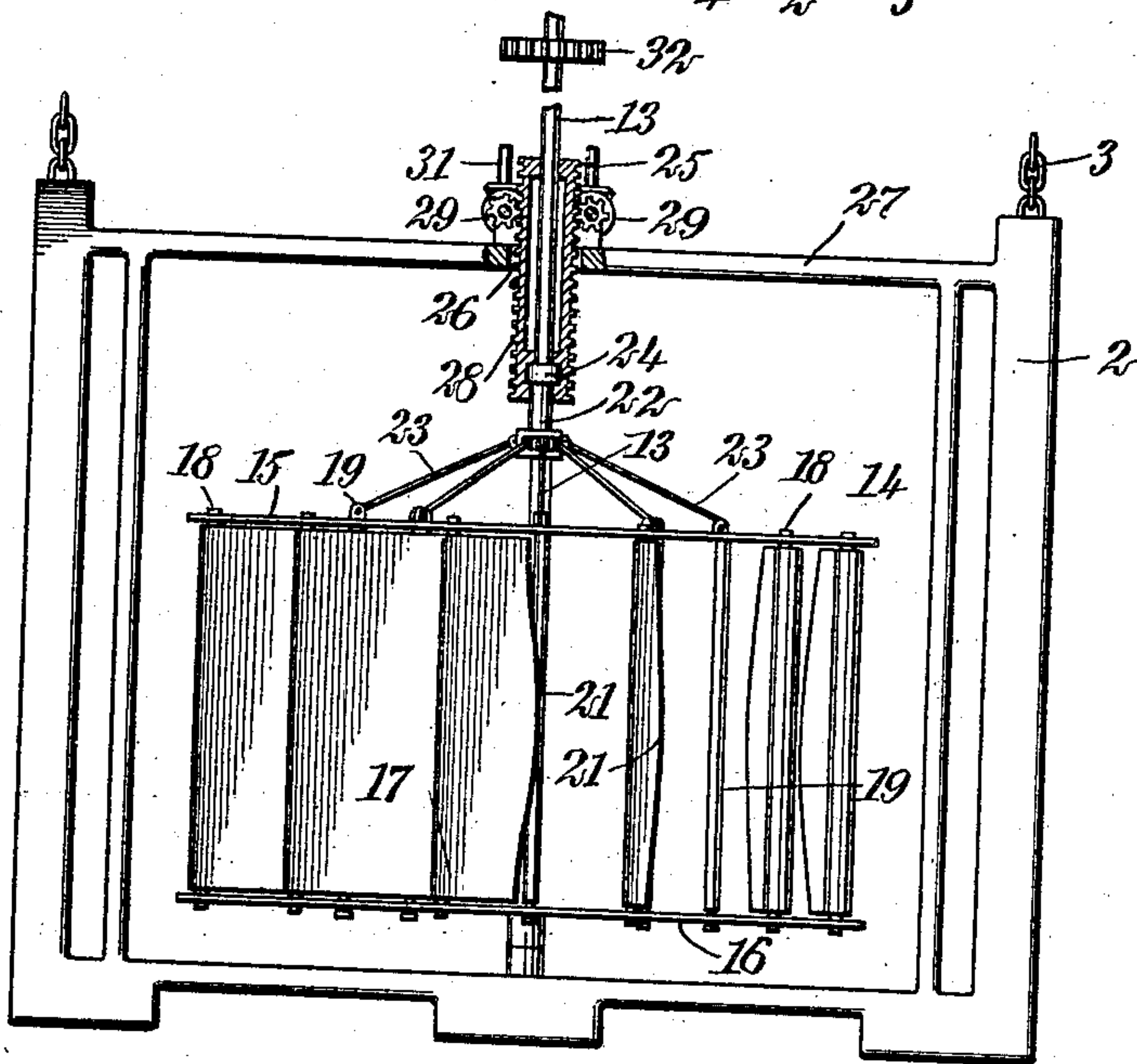
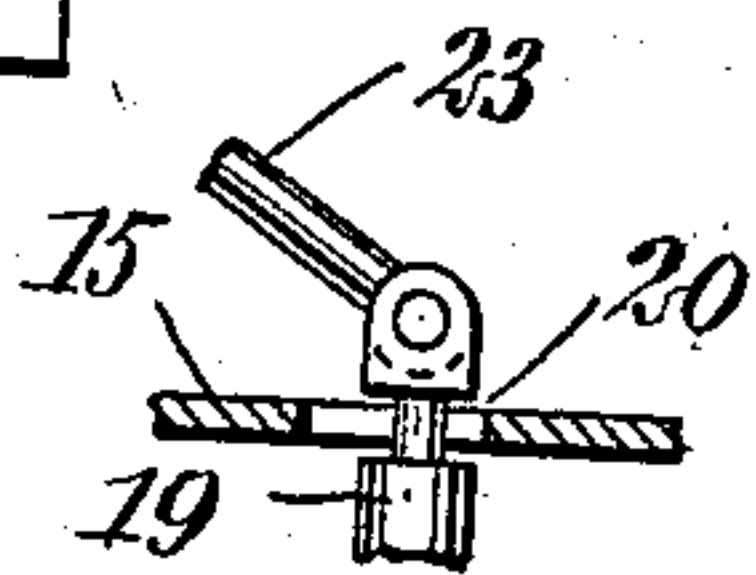


Fig. 2A



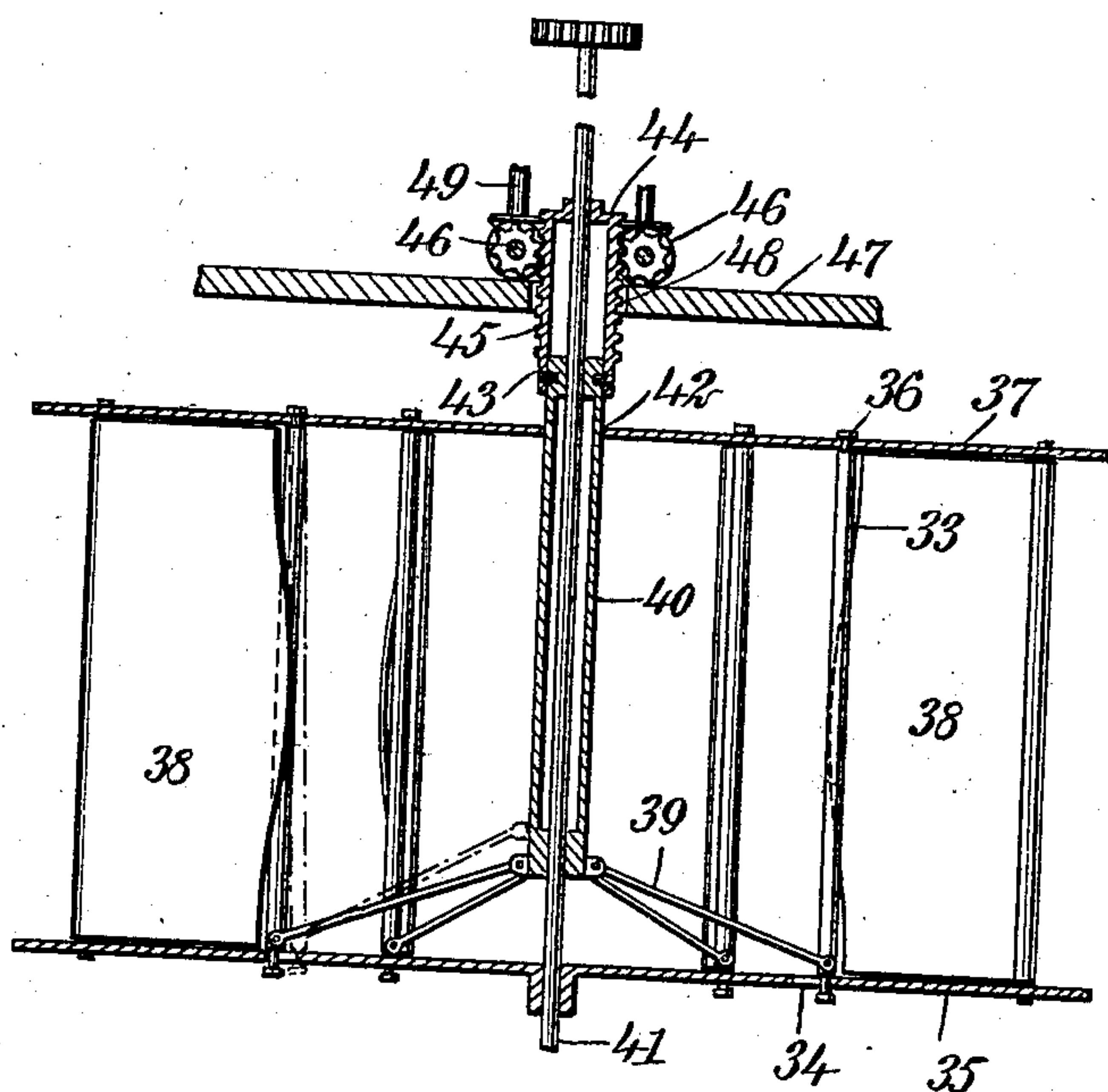
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Fig. 3



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UNITED STATES PATENT OFFICE.

ASAHEL A. PORTER, OF WATERBURY, CONNECTICUT.

WATER-CURRENT MOTOR.

No. 899,320.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed October 2, 1907. Serial No. 395,477.

To all whom it may concern:

Be it known that I, ASAHEL A. PORTER, a citizen of the United States, and a resident of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and Improved Water - Current Motor, of which the following is a full, clear, and exact description.

This invention relates to water current motors such as are used in streams and rivers for developing power. The invention is especially applicable in wheels of this class which are provided with movable wings, and the object of the invention is to provide improved means for controlling the position of the stops for the wings, so as to enable the stopping or reversal of the wheel to be readily effected.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth 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 plan of a wheel constructed according to my invention, and representing the same mounted in a flume; Fig. 2 is a front elevation of the wheel and frame carrying the same, certain parts being shown in cross section to illustrate the manner in which the position of the stops is controlled; Fig. 2^a is a vertical section taken through a portion of the upper head of the water wheel, and illustrating the manner of mounting the stop; and Fig. 3 is a vertical section through a wheel of modified construction.

Referring more particularly to the parts, 1 represents a flume in which there is mounted a wheel frame 2, said frame being lowered into position and supported upon chains 3, and it is guided vertically between suitable guide blocks 4. In the forward portion of the flume, similar guide blocks 5 are provided, which enable a gate-frame 6 to be held in position by chains 7 similar to the chains 3. This gate-frame 6 is provided with a plurality of gates 8 mounted upon vertical spindles 9, the said spindles having pivoted segments 10 which enable the gates to be locked in any angular position by means of suitable pivoted locking members 11. In order to facilitate the swinging of the gates into the desired position, the spindles 9 thereof are

provided with rigid hand wheels 12 as indicated. In the wheel frame 2 a vertical shaft 13 is rotatably mounted; to this shaft a wheel 14 is rigidly attached, the said wheel comprising an upper head 15 and a lower head 16. Between these heads a plurality of blades or wings 17 are attached pivotally upon pivot pins 18. These wings or blades are arranged an equal distance apart as shown, and between them in a smaller circle I arrange a plurality of stops or stop pins 19. The lower ends of these stop pins are seated in the lower head 16 so as to permit a freedom of movement of the upper ends. The upper ends pass through short radial slots 20 which are formed in the upper head as indicated in Fig. 2^a. The inner edges of the blades or wings 17 are convex and curved as indicated at 21 near their middle point, and the position of the stops 19 is such that when they are disposed in the outer ends of the slots 20 they engage the inner edge of the wings 17 if swung around their pivots. When the upper ends of the stops are drawn to the inner ends of the slots, however, they will release the wings.

Just above the upper head 15 a sliding sleeve 22 is provided on the shaft 13, and this sleeve is connected by a plurality of links or spreaders 23 with the upper ends of the stops. The upper portion of this sleeve 22 is formed into an enlarged collar 24, and at this collar a swinging connection is made with a runner 25. This runner passes upwardly through an opening 26 in the cross bar 27 of the frame 2, and it is provided on opposite sides with rack teeth 28. On the upper side of the cross bar 27, oppositely disposed pinions 29 are mounted, which mesh with the teeth 28, and these pinions are adapted to be rotated in opposite directions through the medium of bevel gear wheels 30 attached to vertically disposed stems 31. These stems 31 pass upwardly above the surface of the water, and are adapted to be rotated in order to control the position of the stops, as will be readily understood. At a suitable point above the surface of the water, the shaft 13 is provided with a rigid gear wheel 32 from which the power may be taken.

In Fig. 3, I illustrate a modified construction, in which the lower ends of the stops or stop pins 33 are mounted in slots 34 which are formed in the lower head 35 instead of in the upper head. The upper ends of the stop pins 33 are then simply held in the upper

head 37 of the wheel, by enlarged heads 36 the attachment at this point being such as to permit a free movement of the lower portions of the pins. The wings 38 are similar in construction to the wings or blades of the preferred form. The lower ends of the stop pins 33 are connected by links or spreaders 39 with a sleeve 40 mounted to slide upon the shaft 41 of the wheel. The upper portion of this sleeve 40 slides through an opening 42 formed in the upper head, and is connected by a swivel connection 43 with a runner 44. This runner is similar in construction to the runner 25 of the preferred form, presenting oppositely disposed rack teeth 45 which mesh with pinions 46 mounted at opposite sides of the runner on the cross bar 47 of the wheel frame. The runner slides through an opening 48 in the cross bar as indicated. From this arrangement it will be readily understood that when the pinions 46 are operated by means of their vertical operating stems 49, the runner 44 may be raised or lowered. This will adjust the lower ends of the stop pins 33 in or out so that they will lie either within the path of the wings 38 or outside of the path thereof.

In the operation of the water wheel, the gates 8 are arranged so that they tend to concentrate the water at one side of the wheel, as indicated in Fig. 1. The stop pins are held in their operative position; that is, lying in the path of the wings or blades. The rotation of the wheel in a right-hand direction is then started by hand or by power. As the wings or blades move toward the rear end of the flume, or right end, as viewed in Fig. 1, their edges come in contact with the stop pins, so that they assume the relation indicated. In this way the blades on this side of the wheel offer a resistance to the current, and impart a rotary movement to the wheel. The wings on the opposite side simply arrange themselves to the rearward of their pivot pins, and lie in the current without offering substantial resistance to the passage thereof.

When it is desired to stop the wheel, this can be accomplished by simply raising the runner until the movable ends of the stops are brought to the inner ends of the slots. The wings are thus released from the stops, and they will all hang in the current to the rear of their pivot pins, without tending to rotate the wheel in either direction.

When it is desired to reverse the wheel, the wheel is stopped as described above by throwing the stop pins to their inoperative position, and after the wheel has come to rest the stop pins are thrown back to their operative position and the rotation of the wheel in the reverse direction is begun by hand. After sufficient rotative movement has been given to the wheel in this direction, that is, about a quarter turn, the wings will catch the current, and the wheel will then come under the influence of the current and be rotated thereby.

Special attention is called to the fact that by reason of the convex inner edge on each of the wings, the support for each wing against the force of the current is located substantially midway between the two heads of the wheel. If the inner edges of the wings were simply straight lines, the stop pins would engage the inner edges of the wings near one of the heads, leaving the other end without a support. This would tend to give the blades an undesired twist.

While the wheel is more efficient when set in a flume, as illustrated, it may be used without a flume, if desired; and evidently the wheel can be operated with its shaft in a horizontal position as well as in a vertical position.

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

A water current motor having a shaft, a wheel with a pair of heads on said shaft, a plurality of wings pivotally mounted between said heads and having convexed inner edges, a plurality of stops having their ends mounted in one of said heads so as to permit a swinging movement of said stops radially with respect to the axis of said shaft, means for guiding said stops on the other head, links attached to said stops, and a sliding sleeve on said shaft attached to said links and affording means for drawing said stops inwardly to move them out of the path of said convexed edges.

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

ASAHEL A. PORTER.

Witnesses:

GEORGE ROBBINS,
MARTHA A. FRANKLIN.