

966,511.

Patented Aug. 9, 1910.

3 SHEETS—SHEET 1.

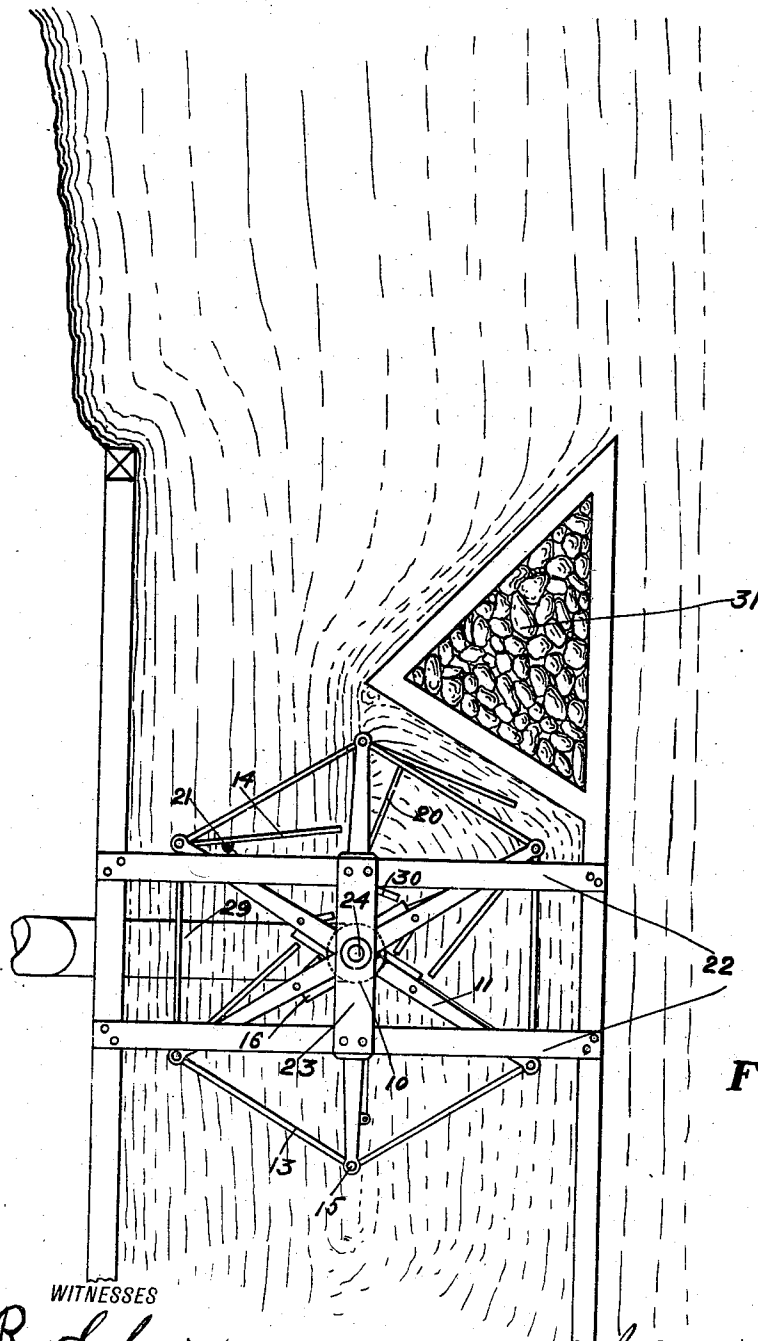


Fig. 1.

WITNESSES

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J. W. ZIEGLER.
CURRENT WHEEL.
APPLICATION FILED JAN. 24, 1910.

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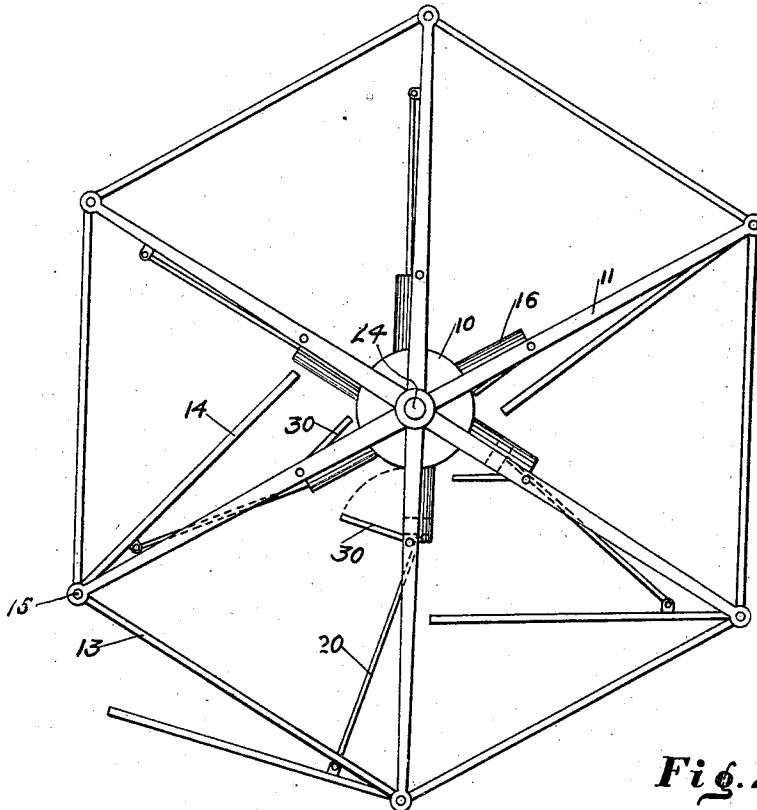


Fig. 2.

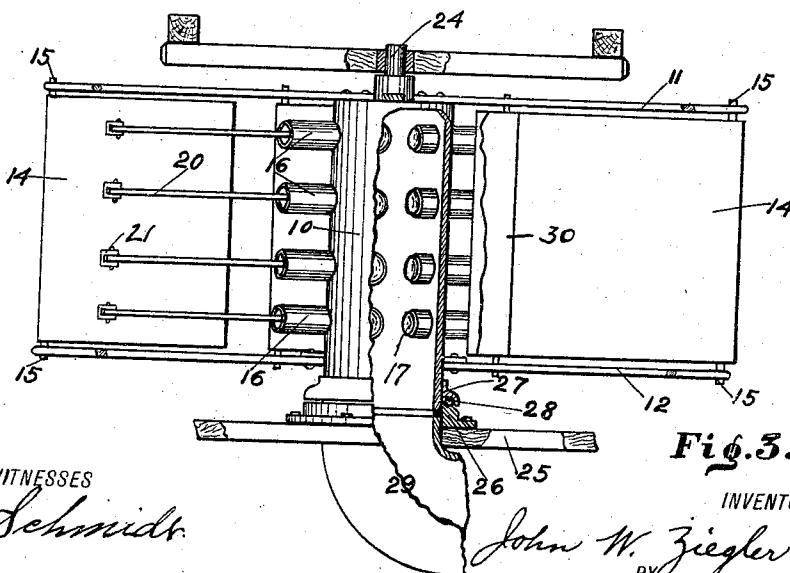


Fig. 3.

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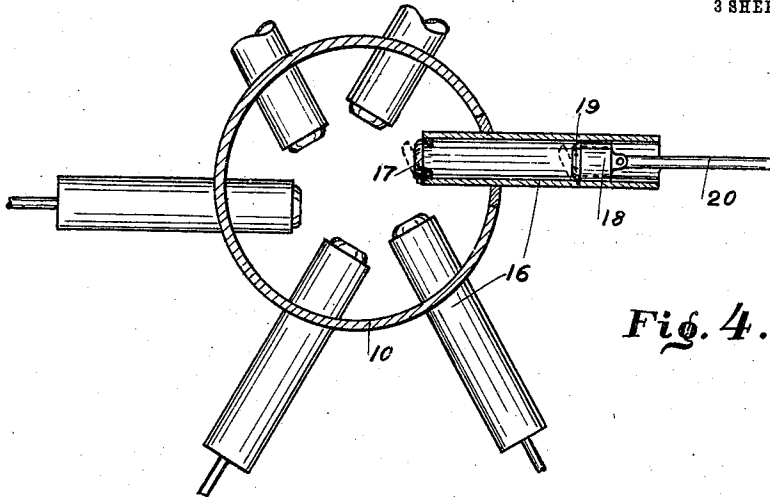


Fig. 4.

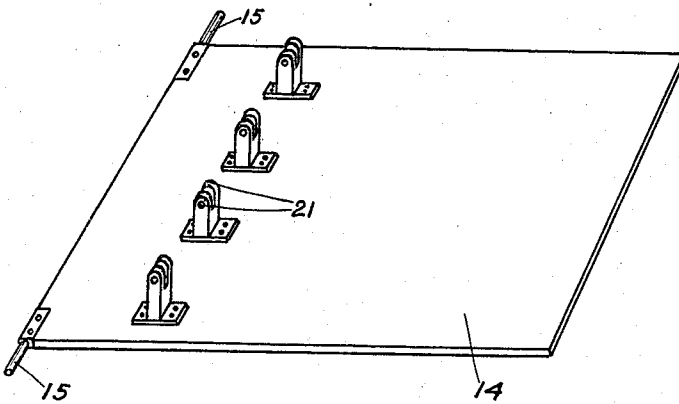


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN W. ZIEGLER, OF SPOKANE, WASHINGTON, ASSIGNOR OF ONE-HALF TO L. W. WILLETT, OF SPOKANE, WASHINGTON.

CURRENT-WHEEL.

966,511.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed January 24, 1910. Serial No. 539,668.

To all whom it may concern:

Be it known that I, JOHN W. ZIEGLER, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Current-Wheels, of which the following is a specification.

This invention relates to that class of hydraulic motors known as current wheels, the wheel being submerged in a stream so as to be impelled by the current thereof.

The wheel which is the subject of the present invention is designed more particularly to pump water for irrigation and other work, for supplying water to tanks, etc.

It is the object of the invention to provide a wheel of the kind stated which is simple in structure, and which utilizes the full power of the current; and with these and other objects in view as will appear when the nature of the invention is better understood, the same consists in a novel construction and arrangement of parts to be hereinafter described and claimed.

In the drawings forming a part of this specification, Figure 1 is a plan view of the motor in working position. Fig. 2 is a plan view of the wheel removed from the stream. Fig. 3 is an elevation of the wheel, partly in section. Fig. 4 is a horizontal section of the pump chamber. Fig. 5 is a perspective view of one of the movable blades of the wheel.

Referring more particularly to the drawings, 10 denotes the hub of the wheel which is a hollow cylinder closed at its upper end and open at its lower end, for a purpose to be presently made clear. When in operating position, the hub is vertically disposed, the wheel therefore being horizontally positioned in the stream. To the hub are secured upper and lower spokes 11 and 12 respectively, connected at their outer ends by braces 13. The upper and lower spokes are arranged in pairs, and between the members of each pair is mounted for swinging movement a blade 14. These blades are pivotally mounted between the upper and lower spokes to swing on an axis which is parallel to the axis of the wheel, or, in other words, the pivots of the blades are vertical. On the upper and lower edges of the blades are trunnions 15 which are mounted in bearing openings in the upper and lower spokes

at the outer ends thereof, the trunnions being located adjacent to that end of the blade which is farthest from the axis of the wheel. The blades therefore swing toward and from the axis of the wheel. There are as many blades as are pairs of spokes.

On the hub 10 are mounted a plurality of substantially radially extending pump cylinders 16, arranged in groups, the cylinders of each group being arranged in a vertical row. The cylinders pierce the hub and are open at their outer ends. The ends of the cylinders within the hub are fitted with check valves 17 opening into the hub. In each pump cylinder 16 works a piston 18 provided with a valve 19 arranged to open on the outward stroke and to close on the inward stroke. To each piston is pivotally connected a rod 20 projecting from the outer open end of the cylinder. The piston rods are connected to the blades 14 so that the swinging movement thereof will impart a reciprocatory movement to the pistons. The piston rods of one row of cylinders are connected to one of the blades, the piston rods of the next row to the next blade, and so on throughout the entire series. The connection between the piston rods 20 and the blades 14 is a pivotal one, there being ears 21 on the back of the blades to which the piston rods are pivotally connected.

The wheel is mounted in working position in a suitable frame-work set on piles or anchored in any suitable manner in the stream. The frame includes spaced top pieces 22 connected by a cross piece 23 having a bearing which receives a pivot 24 secured to the upper end of the hub 10. The frame also has a bottom member 25 on which is mounted a ring 26 fitting snugly around the lower end of the hub. To this end of the hub is secured a thrust collar 27 which is located above the ring 26. Antifriction balls 28 interposed between the collar and the ring complete the support for the lower end of the hub. The ring 26 is also entered by a pipe 29 which is the outlet of the pump, said pipe communicating with the open lower end of the hub and extending to the place of use of the water.

In order to close the space between the upper and lower spokes not occupied by the blades 14, supplemental blades 30, pivoted to said spokes, are provided, these blades being mounted in the same manner as the

blades 14, and located so that their free ends reach to the hub 10 when they swing in the direction thereof. These supplemental blades provide an additional surface for the current to work against, and therefore assist to keep the wheel in operation.

In practice, the wheel is set in the stream as shown in Fig. 1. A dam 31 is built into the stream behind which dam the wheel is located, and the dam extending outwardly far enough to permit an eddy to come up on one half of the wheel, and allow the current to flow straight through the other half. The current working against the blades 14 and 30 causes the wheel to rotate. The blades 14 also swing on their pivots to reciprocate the pump pistons 18. On the outward stroke the piston valves 19 open and let the water from the stream into the pump cylinders 16, and on the inward stroke the piston valves close and the water in the pump cylinders is forced into the hub 10, the check valves 17 opening. The pipe 29 delivers the water to the place of use.

The motor herein described is simple in construction and highly efficient in operation, the full force of the current being utilized.

I claim:

1. A current wheel comprising a hollow hub, spokes carried by the hub, blades pivot-

ally mounted on the spokes, pump cylinders carried by the hub, and discharging thereinto, pistons working in the cylinders, and operatively connected to the blades, and a delivery pipe connected to the hub.

2. A current wheel comprising a hollow hub, spokes carried by the hub, blades pivotally mounted on the spokes to swing toward and from the hub, supplemental blades carried by the spokes adjacent to the hub, pump cylinders carried by the hub, and discharging thereinto, pistons working in the cylinders, and operatively connected to the first-mentioned blades, and a delivery pipe connected to the hub.

3. A current wheel comprising a hollow hub, upper and lower spokes on the hub, blades pivotally mounted between said upper and lower spokes, said blades having their pivots adjacent to their ends farthest from the hub, pump cylinders carried by the hub, and discharging thereinto, pistons working in the cylinders, and operatively connected to the blades, and a delivery pipe connected to the hub.

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

JOHN W. ZIEGLER.

Witnesses:

H. E. SMITH,
NETTIE KING.