

F. H. HAYNER & D. O. BAER.

WATER WHEEL.

APPLICATION FILED JUNE 4, 1909.

962,345.

Patented June 21, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

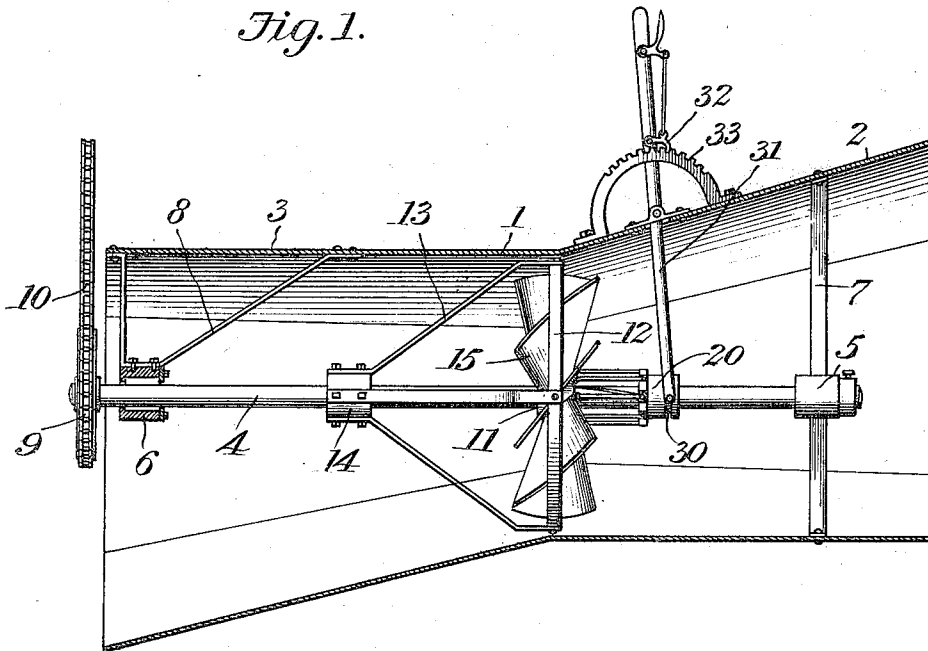


Fig. 2.

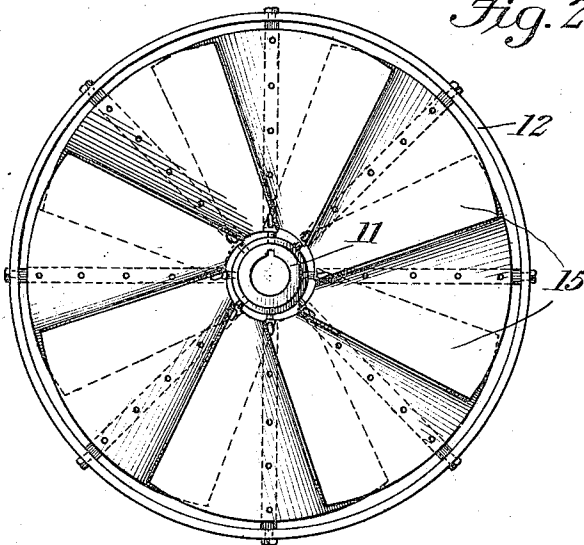


Fig. 7.

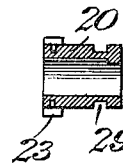
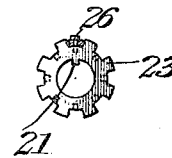


Fig. 8.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

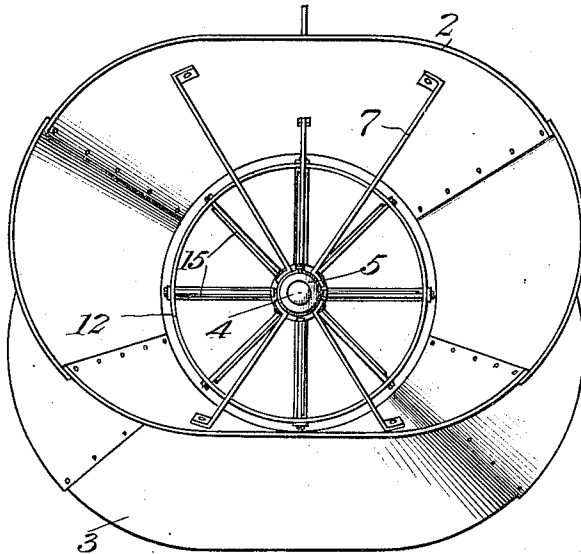


Fig. 4.

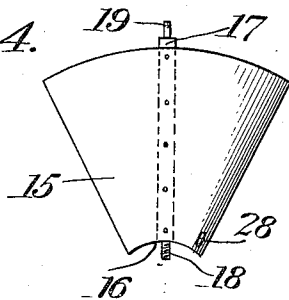


Fig. 6.

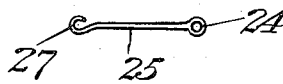


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK H. HAYNER AND DAVID O. BAER, OF BOISE, IDAHO.

WATER-WHEEL.

962,345.

Specification of Letters Patent. Patented June 21, 1910.

Application filed June 4, 1909. Serial No. 500,095.

To all whom it may concern:

Be it known that we, FRANK H. HAYNER and DAVID O. BAER, citizens of the United States, residing at Boise, in the county of Ada and State of Idaho, have invented new and useful Improvements in Water-Wheels, of which the following is a specification.

This invention relates to water wheels or motors designed for generating power to pump water, drive an electrical dynamo and for other analogous purposes.

The object of the invention is to provide a motor which may be supported in a stream and driven by the current without the expense of dams or other costly works, and further to provide a motor which may be controlled to run at different speeds as circumstances may require or thrown out of operation at will.

The invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a longitudinal section through the casing of a motor embodying our invention, showing the operating parts in side elevation. Fig. 2 is a view looking toward the discharge end of the motor casing. Fig. 3 is a view looking toward the inlet end thereof. Fig. 4 is a detail view of one of the propeller blades. Fig. 5 is a view of a portion of the main shaft, showing the spiral groove therein. Fig. 6 is a view of one of the links connecting the blades with the adjusting collar or sleeve. Figs. 7 and 8 are detail views of the adjusting collar or sleeve.

Referring to the drawings, 1 designates the casing of the water wheel or motor, which is preferably made of plates of boiler iron or other suitable material riveted or otherwise connected together, and which comprises inlet and discharge portions 2 and 3. These portions 2 and 3 are of flaring form, the portion 2 being of greatest diameter at its inlet end and the portion 3 of greatest diameter at its outlet end, said portions being arranged in apposition with their reduced ends connected, as shown.

Arranged longitudinally within the casing is a shaft 4 journaled in bearings 5 and 6. The bearing 5 is supported by a series of radial arms 7 forming a spider connected with the walls of the inlet section 2, while the bearing 7 is supported by an angular bracket 8 secured to one side of the dis-

charge or outlet section 3. These bearings may be of any suitable construction to firmly and securely support the shaft so that it will always run in a true line. The outer end of the shaft extends beyond the section 3 and carries a sprocket wheel 9 for transmitting power through a chain 10 to the gearing of the pump, dynamo or other machine to be driven. Any other suitable type of transmitting gearing for this purpose may be employed.

Arranged between the reduced meeting ends of the sections 2 and 3 is a propeller wheel comprising a hub 11 rigidly mounted on the shaft and an annular rim 12 surrounding the hub, said rim being fixed to the free ends of a series of angular supporting arms 13 carried by a collar or sleeve 14 fixed to the shaft within the section 3, so as to positively connect the rim to rotate with the shaft. Between the hub and rim is arranged an annular series of blades 15, each of segmental form and having the proper spiral twist or curvature. The inner reduced ends of these blades are segmentally notched or recessed, as at 16, to permit them to have a certain degree of oscillatory movement without interference from the hub. To the back of each blade is screwed a bar or strip 17 having at its lower end a journal 18 to turn within a bearing opening in the hub and at its upper end a journal 19 to turn within an opening in the rim 12, by which each blade is mounted upon a shaft or axis to have a determined amount of rotary movement.

An adjusting collar or sleeve 20 is mounted upon the portion of the shaft within the casing section 2 and is provided with a tongue or feather 21 to engage a spiral or cam groove 22 on the shaft, by which said sleeve is adapted to have a partial rotary movement in one direction or the other as it is adjusted outwardly and inwardly on said shaft. The outer end of this sleeve is notched to provide an annular series of lugs or projections 23, which receive between them the eyed ends 24 of a series of links 25, which ends of the links are secured to the sleeve by screws 26 passing through said eyes. The outer ends of the links are provided with hooks 27 which engage openings 28 formed in one of the lower corner portions of each of the blades 15, by which the collar or sleeve 20 is coupled to all of the blades. In said collar

or sleeve is also formed an annular groove 29 receiving pins or projections 30 upon the forked end of an adjusting lever 31, which lever extends exteriorly through an opening 5 in the top of the section 2 to provide a manipulating portion carrying a pawl 32 to engage a rack 33 on the casing, by which the lever and the parts of the propeller above described may be secured in adjusted position.

In the use of the device, the motor, if a small one, may be fastened by its casing to the bottom of a single barge or float, or if a large one, may be fastened by its casing 15 between two barges or floats, and the pump or other machine to be driven may be mounted upon the deck or top of the barge or one of the barges, in the event that two are employed, so that the driving element thereof 20 may be connected with the shaft 4 through the sprocket gearing. It will be understood that by mounting the blades in the manner described and through the action of the lever 31 and the described connection of the collar 20 with the shaft 4, the blades may be 25 set at different angles and fixed in adjusted position to drive the shaft at different rates of speed or to prevent action of the current thereon, so as to throw the apparatus out of operation. As the lever is 30 moved in one direction or the other, it will be apparent that the sleeve 20 in sliding on the shaft will also be caused to turn or rotate through the movement of the feather 35 21 within the spiral groove 22, thus swinging the blades on their axes to different positions according to the range of adjustment of the sleeve. By this construction the apparatus may be readily and conveniently controlled, 40 as will be clearly understood.

The blades are pitched at such an angle as to rotate the shaft through the impact of the water thereon in one direction, and by varying their working angle the speed 45 of rotation of the shaft may be regulated. Through the flaring form of the inlet section 2, the body of water entering the same will have an easy inflowing movement and will be contracted so that its energy on the 50 blades will be increased, while the flaring form of the section 3 provides for the free discharge of the water after acting upon the blades and reduces back pressure through which the motion of the propeller 55 would be retarded.

A water motor or wheel constructed in

the manner set forth may be inexpensively manufactured and installed for use to utilize the current of any stream, and will be found of great usefulness in sections possessing water power and where it is desirable to utilize the same in an inexpensive manner to drive machinery of any preferred type.

We claim:—

1. A water wheel or motor comprising a casing having flaring inlet and discharge portions of elliptical form in cross section and arranged in apposition, a shaft disposed longitudinally within said casing, a 70 propeller wheel mounted on the shaft at the point of intersection of said casing portions and embodying a series of blades adjustable to set at different angles, a sleeve slidable on the shaft and having a cam engagement 75 therewith for longitudinal and rotary adjustment, a set of links extending parallel with and around the shaft and connecting said sleeve with the propeller blades, means for adjusting the sleeve, and means for 80 transmitting power from the shaft.

2. A water wheel or motor comprising a casing embodying reversely flaring inlet and discharge portions arranged in apposition, bearing brackets upon the casing section, a shaft disposed longitudinally within 85 said casing and journaled in said brackets and having a spiral groove, a sleeve slidable on the shaft and having a projection movable in said groove, a hub fixed to the 90 shaft, a collar also fixed to the shaft, a rim surrounding the shaft, a series of diagonal arms surrounding the shaft and connecting the collar and rim, angularly adjustable propeller blades journaled in the hub and 95 rim at the point of intersection of said casing portions, links arranged parallel with and about the shaft and connecting the sleeve with the propeller blades, an adjusting lever extending through the inlet section 100 of the casing and having a loose pivotal connection with the sleeve, means upon the exterior of the casing for locking said lever in adjusted position, and means for transmitting motion from the shaft. 105

In testimony whereof we affix our signatures in presence of two witnesses.

FRANK H. HAYNER.
DAVID O. BAER.

Witnesses:

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D. L. SELBY.