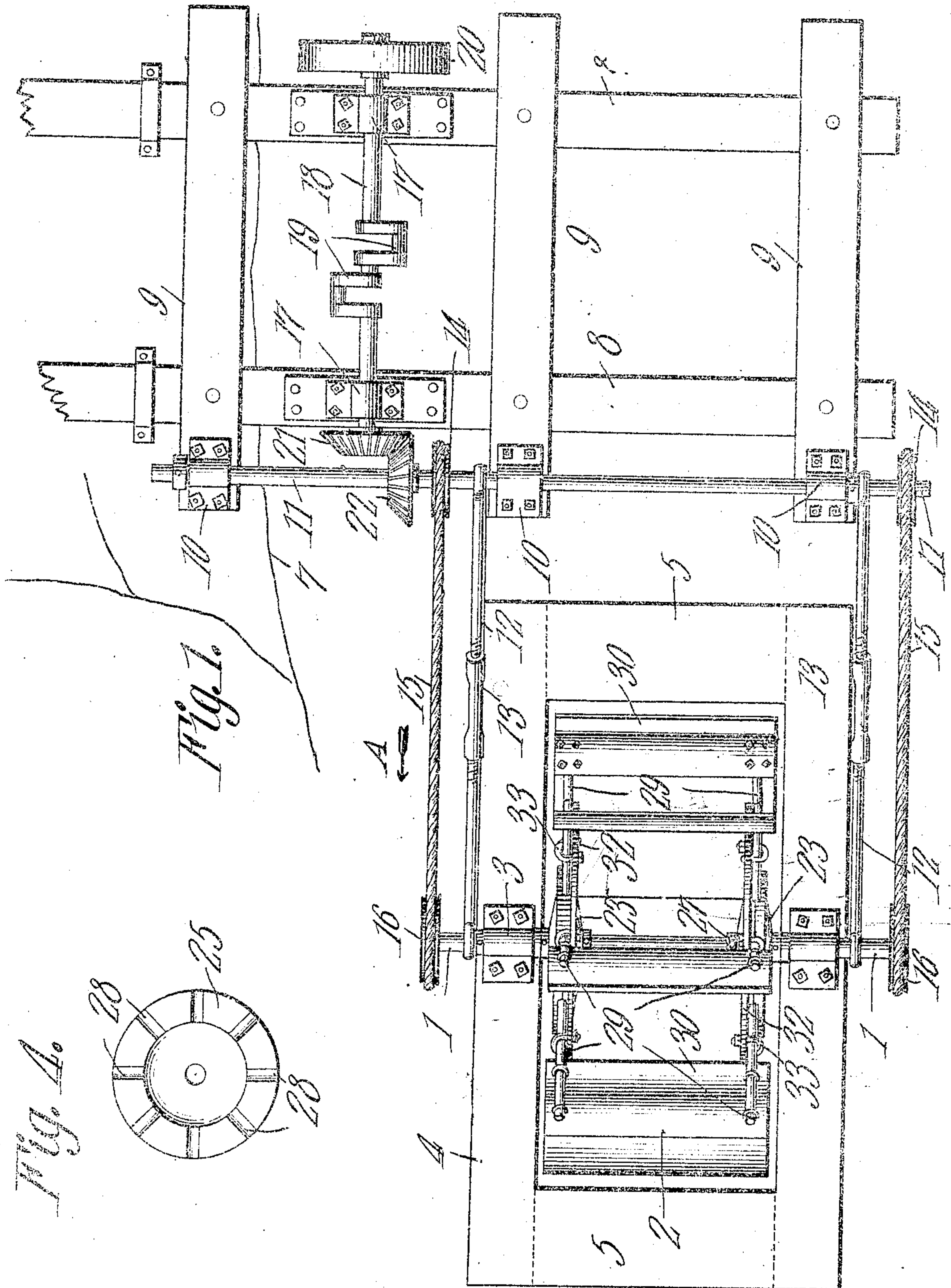


No. 897,962.

W. R. CLARKSON.  
HYDRAULIC MOTOR.  
APPLICATION FILED MAY 20, 1907.

PATENTED SEPT. 8, 1908.

2 SHEETS—SHEET 1.



WITNESSES:

*[Handwritten signatures of witnesses]*

William R. Clarkson, INVENTOR.

BY *[Handwritten signature]*

ATTORNEYS



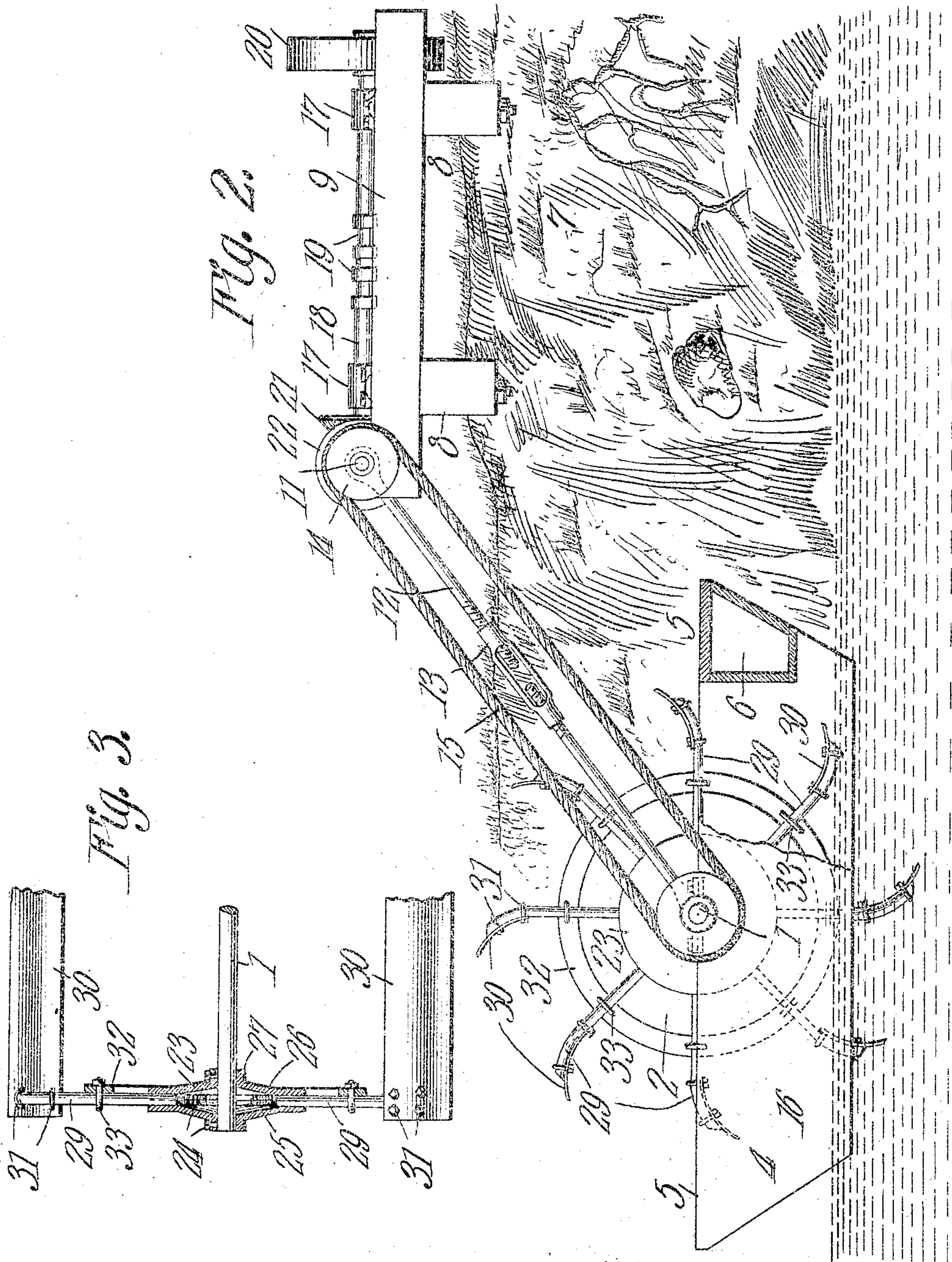
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WITNESSES:

*E. H. [Signature]*  
*A. P. [Signature]*

William R. Clarkson, INVENTOR.

By *Chas. [Signature]*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

WILLIAM R. CLARKSON, OF TENINO, WASHINGTON.

## HYDRAULIC MOTOR.

No. 897,962.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed May 20, 1907. Serial No. 374,645.

*To all whom it may concern:*

Be it known that I, WILLIAM R. CLARKSON, a citizen of the United States, residing at Tenino, in the county of Thurston and State of Washington, have invented a new and useful Hydraulic Motor, of which the following is a specification.

This invention relates to a hydraulic motor of the type known as current wheels in which a water wheel is rotated by the current of a stream, and the energy derived therefrom carried by various means to some place of transformation.

The object of the invention is to provide a hydraulic motor comprising an undershot water wheel journaled on a float connected by tension bars to an anchorage in such manner that the float with its water wheel will always be held in line with the flow of the current, and that however high or low the water in the stream may be, the depth of submergence of the water wheel will remain constant. Power is transmitted by belts, chains or other means from the water wheel to the shore and from thence by crank or belt wherever desired.

In the accompanying drawings:—Figure 1 is a plan view of the motor complete. Fig. 2 is a side elevation of the same with a portion of the float broken away. Fig. 3 is a central section through the water wheel. Fig. 4 is a view of a detail part.

Similar numerals of reference indicate the same parts in all the figures.

Attached to a shaft 1, by means hereinafter described, is an undershot water wheel 2, the shaft 1 being journaled in bearings 3 bolted on each side of a float 4 of any approved construction, but here shown in the form of a double scow open from end to end and connected together at each end 5, above the surface of the stream, by suitable timbers which may be arranged to form a receptacle 6 for ballast.

Projecting outwardly from the bank 7 of the stream above the level of high water, and firmly anchored to said bank, are two spaced beams 8, parallel to each other, on which are rigidly bolted a plurality of cross beams 9 the ends of which are shown projecting beyond the anchored beams 8 for a short distance. On the down stream ends of the cross beams 9 are bearings 10 in which is mounted a rotatable shaft 11. Pivotaly attached to the shaft 11 are two anchor bars 12, which extend from said shaft 11 to the water wheel

shaft 1, the bars being disposed on opposite sides of the float 4 and journaled on said shaft 1 near the outer face of each bearing 3. The anchor bars 12 are parallel to each other and are each provided with a turn buckle 13 for increasing or decreasing the distance between the shafts 1 and 11.

Keyed to the shaft 11, a short distance beyond the anchor bars 12 are sheaves 14 around each of which a rope, cable or chain 15 passes to similar sheaves 16 on the shaft 1 of the water wheel. By means of this transmission mechanism the energy derived from the floating water wheel is conveyed from the rising and falling shaft 1 to the shaft 11 journaled on fixed bearings. The direction of the current of the stream—indicated by the arrow A—keeps the float 4 always on the down stream side of the projecting anchor beams 8, and as the stream rises and falls, the float moves with it, swinging in an arc around the shaft 11 as an axis, the rope, cable or other power transmission being thereby always kept at the same tension by the anchor bars 12. Should the rope belts 15 become slack, a few rotations of the turnbuckles will tighten them again.

Upon each anchored beam 8 in any suitable position thereon is bolted a bearing 17 for a cross shaft 18 provided with cranks 19, between the bearings 17, a belt wheel 20 on one end and a bevel pinion 21 on the other end. The bevel pinion 21 is on the end nearest the shaft 11 and meshes with a similar pinion 22 on said shaft. The power thus conveyed to the shaft 11 is distributed by the cranks 19 or the belt wheel 20.

The water wheel 2 which occupies the entire width of the space between the twin scows 4, except a clearance for the ends of the paddles, comprises two or more hubs 23 keyed or bolted to the shaft 1 by bolts 24. Each hub is made of two circumferentially divided sections 25 and 26, duplicates of each other, and connected together in any suitable way. The hub sections are made somewhat disk shaped, each having a boss or hub 27 into which a fastening bolt 24 is threaded. The abutting face of each hub section is provided with a series of equally spaced radial slots 28, which, when the sections are brought together, form suitably shaped sockets for the inner ends of tubular or rod like spokes 29 the outer ends of which are curved away from the direction of rotation of the water wheel 2, as clearly represented in Fig. 1. When the



hubs 23 are assembled on the shaft 1 the spokes 29 of each hub are alined with those of the other hub or hubs. Fixed to the curved ends of each series of alined spokes 29 is a paddle 30 bent to the same arc as the ends of the spokes and fastened thereto preferably by U-shaped bolts 31. By shaping the paddles as above described, they move more quietly and easily through the water, and withdraw therefrom with less friction than would be the case with radially disposed paddles, as they do not lift the water in their upward flight. The spokes radiating from each hub are braced by means of a concentric ring 32 fastened to each spoke by a U-shaped bolt 33.

The operation of the hydraulic motor may be readily understood from the above description and it is only necessary to add that the water wheel will rotate as well when the water in the stream is so low that the anchor bars are approximately perpendicular as when they are nearly horizontal; the speed and power obtainable from the motor depending however upon the force of the current. This can be regulated in a measure by means of ballast placed on the float which will cause more or less of the width of the paddles to be submerged.

Having thus described the invention what is claimed is:—

The combination with a fixed structure disposed to be secured upon the bank of a

stream and to overhang the stream; of a float, longitudinally adjustable anchor bars 35 connecting the float with the side portions of the fixed structure, said float and bars being extended in the direction of movement of the stream, a drive shaft journaled upon the float, oppositely disposed concavo-convex 40 disks upon the shaft and arranged in pairs, said disks having registering grooves in their adjoining faces, spokes within the grooves, means extending through the disks and engaging the shaft for holding the disks in frictional engagement with the spokes, each of said spokes having a curved terminal portion, transversely curved blades parallel with 45 the shaft and secured upon the curved portions of the spokes, said portions extending transversely of the blades and constituting 50 reinforcements therefor, a brace ring connected to each set of spokes, a driven shaft journaled upon the overhanging frame, and means for transmitting motion from the 55 drive shaft to the driven shaft, said means being disposed to be tightened by the adjustment of the anchor bars.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature 60 in the presence of two witnesses.

WILLIAM R. CLARKSON.

Witnesses:

P. C. KIBBE,  
FRED SPENCER.