This invention relates to improvements in water wheels or motors.

The main object of my invention is to provide a simple, efficient and powerful water wheel or motor for generating power by the flow of water through the wheel.

Another object is to provide a water motor including a plurality of wheels or rotor members having alternately oppositely set blades and the said wheels being alternately secured to and journaled freely on a supporting shaft whereby they may rotate in opposite directions, the whole being set on a supporting base and the freely rotating wheels being connected together and suitably geared to the supporting shaft to aid in driving the same.

With these and other objects in view the invention resides in the novel construction and arrangement of parts as hereinafter set forth and claimed, reference being had to the accompanying drawings wherein:

Figure 1 is a side elevation of the water motor. Figure 2 is an enlarged view similar to Figure 1 but a part of the gears, hubs, drums and base being shown in cross section and a part of the frame being broken away.

Figure 3 is a horizontal section along the line 3-3 in Figure 1.

Referring now with more particularity to the drawings the motor comprises a suitable heavy base 1 in which is journaled at 1a the lower end of a vertically extending supporting or drive shaft 2 which is journaled at its upper end at 3 and extended through the top 4 of a supporting frame 5, the said top 4 being mounted and supported above the base 1 by vertical posts or legs 6. A plurality of hubs 7, 8, 9, 10 and 11 are mounted on the shaft 2 one above the other and are slightly tapered from their lower to their upper ends as shown. At their undersides and around their shaft receiving bosses 12 the hubs have annular bearing races or tracks 13 which terminate short of the outer and lower margins of the hubs whereby depending annular and marginal lips or aprons 14 are provided which are adapted to depend freely on the upper margins of the next hubs below as shown in Figure 2, this being the purpose of the tapered form of the hubs aforesaid as will be understood.

The upper ends of the hubs also have recessed annular bearing races or tracks 15 adapted to register with the races 13 of the hubs above and tapered roller bearings 16 or their equivalent are mounted in their mating recesses.

The lowermost hub 11 on the shaft 2 rests on similar roller bearings 17 running in an annular race 18 formed on a boss 19 on the base 1, the apron 14 depending down over the margin of this boss as shown. The aprons 14 of the hubs serve to protect the bearings 16 and 17 from the water employed in running the motor.

The hubs 7, 9 and 11 are freely journaled on the shaft 2 whereas the hubs 8 and 10 are keyed by keys 20 to the shaft to turn therewith, the hubs being alternately free and tight on the shaft as shown and it will be understood that any number of hubs smaller or greater than the five herein shown and described may be employed as desired.

Water driven blades 21 are extended radially outward from the hubs 7, 8, 9, 10 and 11 and 70 are angularly set or twisted as shown, the blades extended from the free hubs 7, 9 and 11 being twisted or set in one direction while those extended from the keyed hubs 8 and 10 are twisted or set in the opposite direction. Surrounding these blades 21 and secured to the outer ends thereof are annular drums or housings 22, the upper margins 23 of which are flared outwardly as shown to receive the lower margins of the drums next above. The hubs, blades and drums are thus assembled to form five individual water wheels or rotor members supported one above the other on the shaft 2. The free wheels including the hubs 7, 9 and 11 are joined rigidly together by tie bars 24 secured at their upper and lower ends 25 and 26 to the upper and lower wheels and secured at 27 intermediate their ends to the center wheel as shown, the said tie bars being spaced outwardly to clear the wheels secured to the shaft 2 by means of inwardly turned 90 legs 28 at their ends and blocks 29 at their centers.

The upper wheel has an annular gear supporting ring 30 secured within the upper edge of its drum 22 and an internal gear 31 is supported above this upper wheel and concentrically therewith by radially spaced legs 32 secured at 33 at their ends to the ring and gear. A pinion 34 is secured on the lower end of a shaft 35 journaled at 36 through the top 4 and meshes with the internal gear while a pinion 37 secured to the upper end of the shaft 35 above the top 4 meshes with a gear 38 secured on the shaft 2.

In operation water is run or injected into the top of the motor and striking the blades 21 will cause the upper wheel to turn and will simultaneously be deflected in its course so that it will strike the oppositely set blades of the next wheel below and rotate this wheel in the opposite direction. This action continues from top to bottom.
of the wheel until the water escapes. The shaft 2 is thus driven directly by the wheels on the hubs 8 and 10 and through the gears 31, 34, 37 and 38 is driven at the same speed and in the same direction by the wheels on the hubs 7, 9 and 11. The ratio of these gears is of course correct to drive the shaft 2 as desired. Power may be obtained or taken off from the motor through a pulley 39 on the upper end of the shaft 2 or a smaller power at higher speed may be obtained by using a pulley on the shaft 35 as will be understood.

Further details of the use and option of my invention will be understood without further description at this point and while I have herein set forth a certain preferred embodiment of my invention it is understood that I may vary therefrom in minor structural details so as best to construct a practical device for the purposes intended, not departing from the spirit of the invention and within the scope of the appended claim.

I claim:

In a water wheel structure, a base, a shaft journaled on the base, water wheels mounted on the shaft, the end and alternate wheels being free on the shaft and the remainder secured on the shaft, a supporting frame including legs spaced from the sides of the water wheels and an end spaced from one end wheel, a gear supporting ring secured within one end water wheel, radially spaced legs secured to the gear supporting ring and extended endwise from the water wheel, an internal gear secured on the outer ends of the legs concentric with the shaft and water wheels and spaced outward from the latter, and co-acting gears on the said shaft and meshing with the said internal gear for driving the shaft.

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