June 23, 1931. E. F. SMITH ET AL 1,811,031

WATER WHEEL

Filed Sept. 25, 1926 4 Sheets-Sheet 1

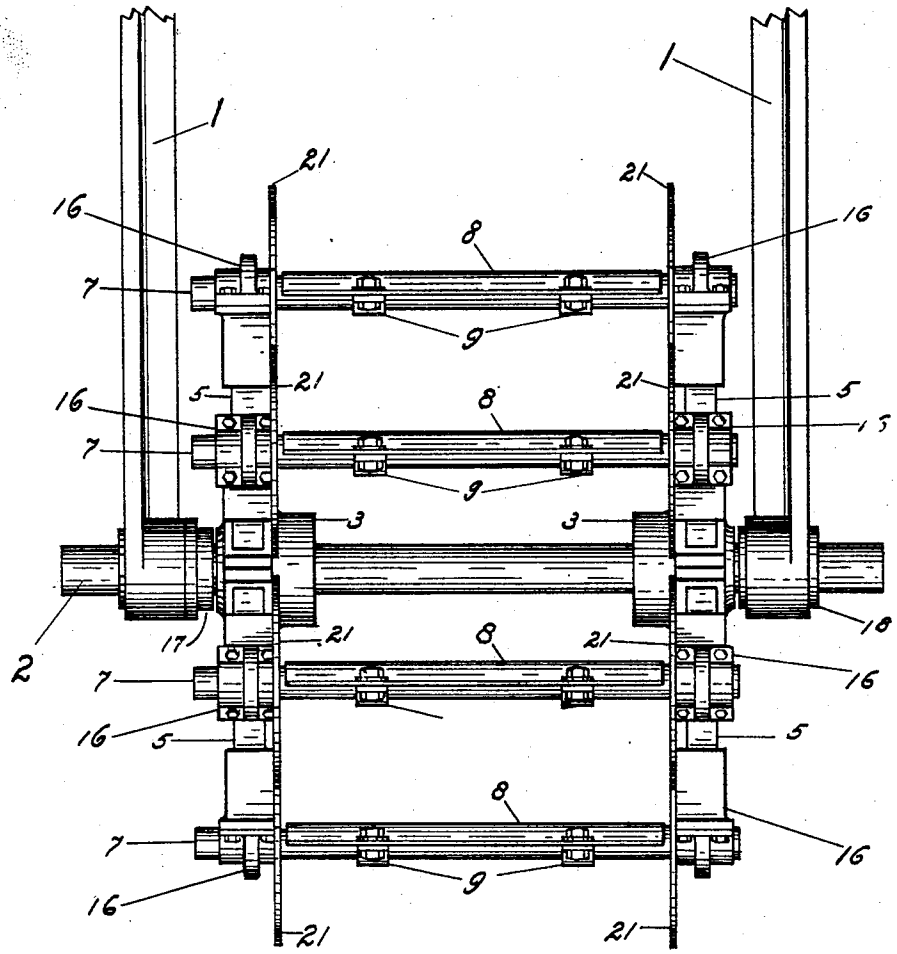

FIG 1.

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WATER WHEEL

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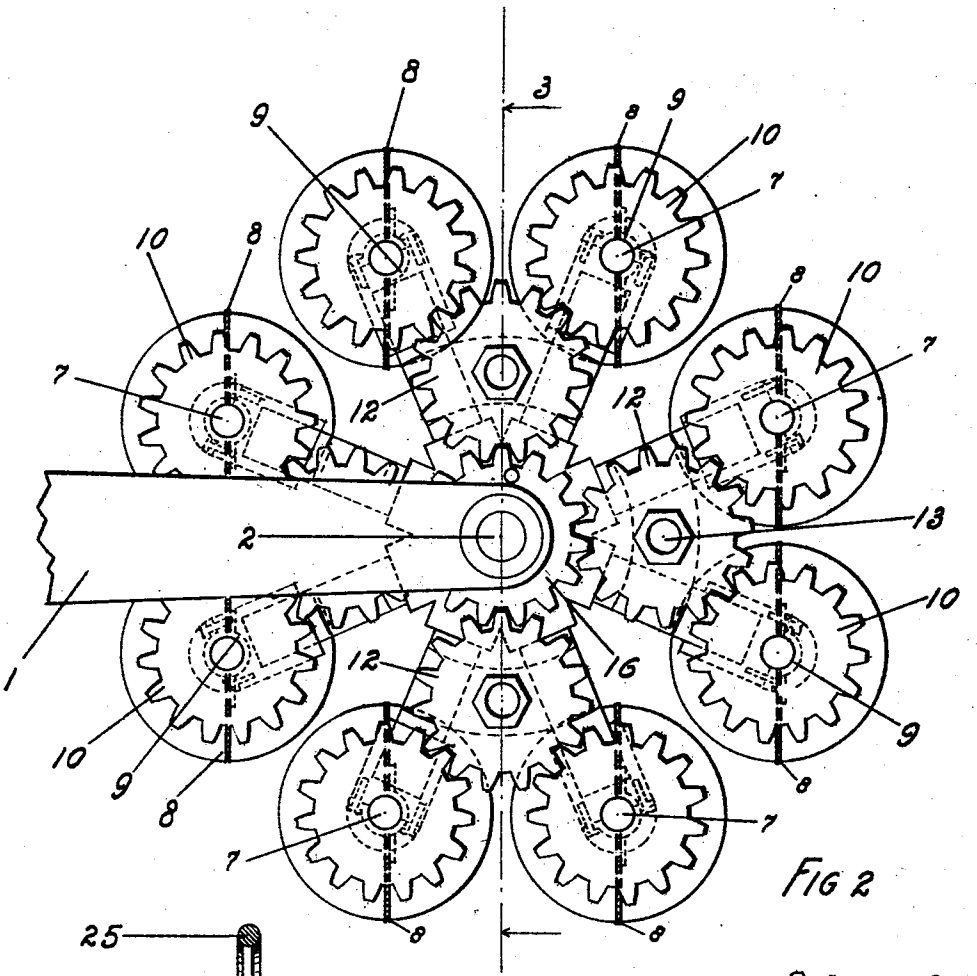

FIG 2

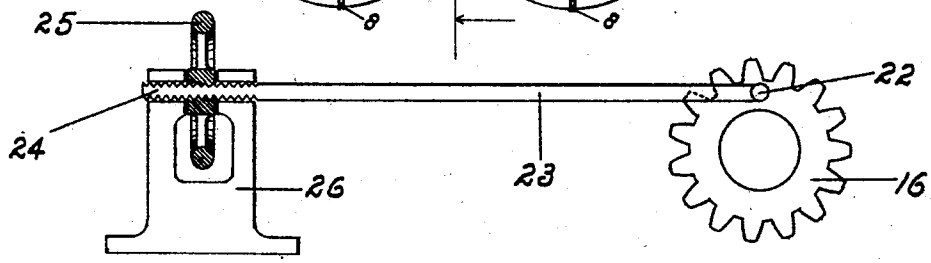

FIG 4

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WATER WHEEL

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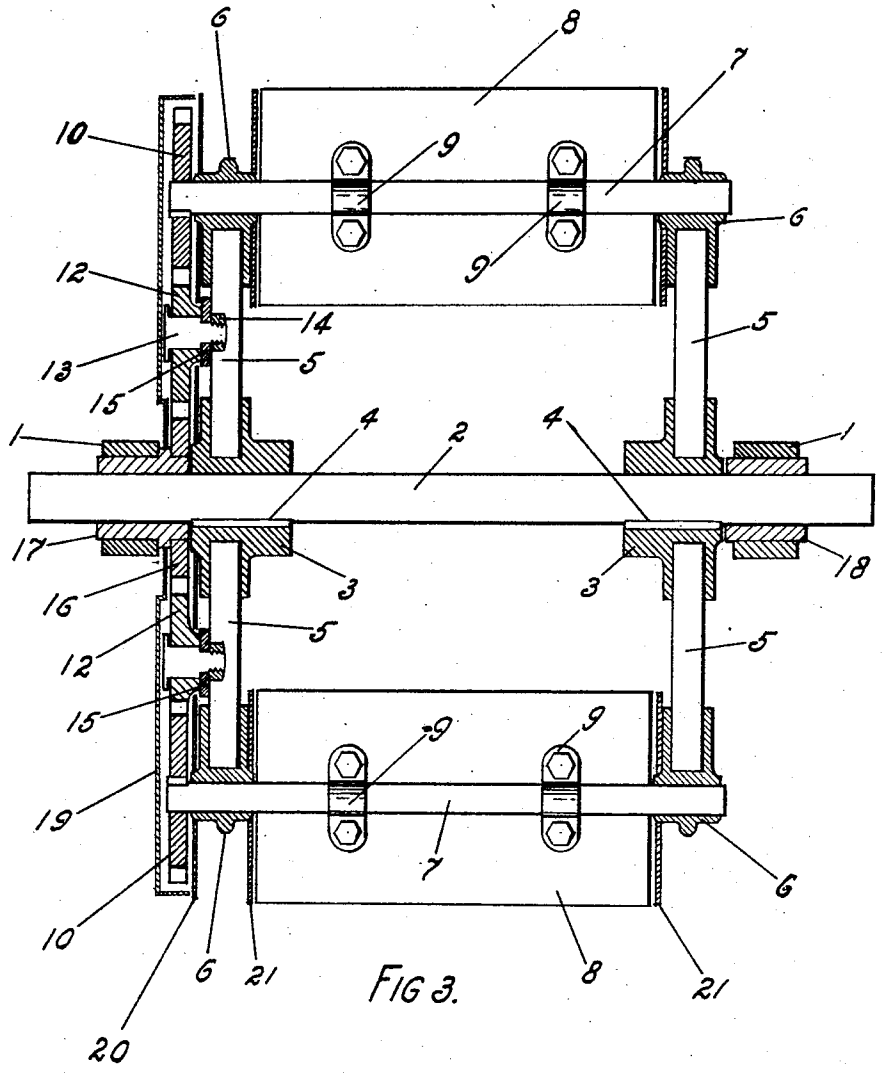

FIG 3.

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WATER WHEEL

Filed Sept. 25, 1926 4 Sheets-Sheet 4

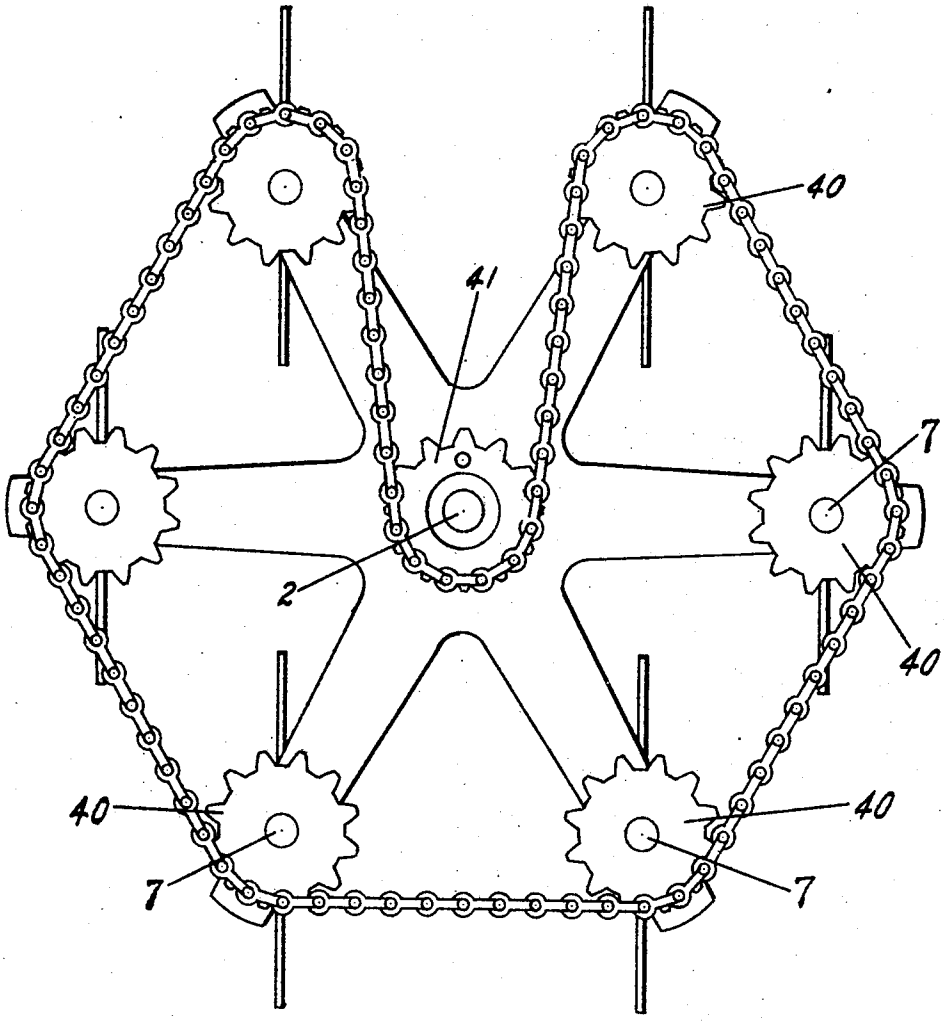

FIG 5

Edward F. Smith INVENTOR.
BY Charles D. Smith
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Patented June 23, 1931

1,811,031

UNITED STATES PATENT OFFICE

EDWARD F. SMITH AND CHARLES D. SMITH, OF CINCINNATI, OHIO

WATER WHEEL

Application filed September 25, 1926. Serial No. 137,784.

The object of our invention is to provide a water wheel for boats which shall be simple in construction and highly efficient in use and possess marked utility.

Another object of our invention is to provide a water wheel for boats to be used at the rear or at the sides thereof, for propulsion purposes, and in which the wheel will be of reduced diameter, but possess increased area of paddle surface and further to apply the power nearer the rim of the wheel, in order to obtain more torque. In our wheel the water lift and paddle slap of the wheels now commonly used, is eliminated.

In our wheel, the paddles remain at a 90% angle at any part of a revolution in relation to the water surface and the pressure exerted by the paddles is at all times parallel to the water surface, giving a continuous shove to the boat without vibration of any kind.

When our wheel is used as a side wheel drive, the center, where the power is applied, being much lower there; obviates wheel swing when making a turn, the wheel never chokes itself and therefore can be run at any particular speed desired, governed by the power plant which can be two-thirds smaller than those in present day use for the reason that the losses of the paddle wheels are entirely eliminated in the new design of water wheel which converts all the power applied into useful energy.

In the side wheel drive one of the most frequent troubles is caused by drift in the form of floating logs which enter the wheel when the radial paddle wheel is used. In our wheel with the paddles always in a vertical position there is no chance for drift to enter, as it is pushed down under the wheel.

These advantages and features of our invention will readily become apparent from perusal of the following specification and claims.

In the accompanying drawings forming a part of this specification;

Fig. 1 is a plan view of the wheel with the gears and gear guards removed,

Fig. 2 is a side elevation,

Fig. 3 is a section taken on line 3—3 of Fig. 2, with guards in position,

Fig. 4 is a detail of the adjusting means for the paddles,

Fig. 5 is a modification, showing a chain drive.

In the drawings, 1 designates supports which are carried by a boat (not shown), and these supports carry a rotatable shaft 2, which may be operated by any suitable means, (not shown). Two side members are mounted in spaced relation on the shaft, and each of these members comprises a hub 3, keyed to the shaft at 4, and carrying radially extending spokes 5, which support bearings 6.

Rotatable shafts 7 are journaled in the bearing 6, and carry paddles 8, the medial portions of which are fixed to the shafts by means of clamp plates 9.

One end of each shaft 7 is fixed to a gear 10, and these gears mesh with idler gears 12 that are mounted on stud shafts 13 which are secured by lock nuts 14 to a ring 15 that is fast on the spokes 5 on one of the side members.

An adjustable gear 16 is fast on a bearing 17 that is rockably mounted in one of the supports 1, and this gear meshes with the idlers 12.

All of these gears are of uniform size, and when the mechanism is in operation, the gear 16 is held stationary so that all of the blades 8 extend vertically as the wheel rotates.

The shaft 2 rotates in the bearing 17, and in a similar bearing 18, carried by the other one of the supports 1.

To protect the gears which are all arranged in the same plane at one side of the wheel, an outer cover plate or casing 19 is secured to the bearing 17, and this cooperates with another guard plate 20, which is mounted on one of the hubs 3, and rotates with the wheel.

The paddles are also provided with guard plates, and these consist of disks 21 which are fixed to the bearings 6, and arranged at the ends of the paddles.

While there is no advantage in adjusting the blades 8 out of the vertical position when maximum energy is required, the blades may be adjusted while retaining their parallel relationship, by means of a rod 23, (see Fig. 4), which is pivotally connected at one

end, as shown at 22, to the gear 16. The opposite end of this rod is screw threaded, at 24, and engaged by a hand nut 25 which cooperates with a support 26 that is preferably arranged in the engine room of the boat.

It will be readily understood that changes and modifications may be made in our water wheel without departing from the spirit of the invention, and we claim any changes which may fall within the scope of our claims.

What we claim as new and our invention and desire to secure by Letters Patent is:

1. A propelling water wheel including a body rotatable about a horizontal axis a number of parallel horizontal shafts carried by the body, and each having its ends journaled in said body, paddles arranged on said shafts, gears fixed to said shafts, a stationary gear having its axis coaxial with the axis about which the body rotates, and idler gears mounted on said body and meshing with the first mentioned gears and with said stationary gear, all of said gears being of the same size, whereby all of the paddles are maintained in vertical positions while the wheel rotates.

2. A propeller wheel structure, including supports, a rotatable horizontal power shaft carried by the supports, spaced side members fast on the power shaft and provided with bearings, horizontal propeller shafts journaled in said bearings, paddles fast on the propeller shafts and arranged between the side members, each propeller shaft extending along the medial portion of its associated paddle, gears fixed to the propeller shafts, a stationary gear surrounding the power shaft, and idler gears mounted on one of said side members and meshing with the stationary gear and the gears on the propeller shafts, all of said gears being of uniform diameter and arranged in the same plane.

3. A rotatable propeller wheel including spaced side members, propeller shafts carried by said members, paddles mounted on the propeller shafts, each propeller shaft extending along the medial portion of its associated paddle, guard disks fixed to said side members and arranged at the ends of each paddle, and means for maintaining said paddles in a vertical position as the wheel rotates.

4. In a propeller wheel, a rotatable body, paddles carried by the body, a series of meshing gears arranged in the same plane and functioning to maintain the paddles in vertical position while the wheel is rotating, a stationary guard disk arranged at one side of the gear, a rotatable guard disk arranged at the opposite side of the gears, said disks forming a casing for the protection of the gears.

5. A propelling water wheel, comprising a horizontal rotatable driving shaft, a body mounted on and movable with said shaft, a series of horizontal paddle shafts, each having its ends journaled in said body, paddles mounted on the paddle shafts, a gear fixed to each of said paddle shafts, a stationary gear coaxial with the driving shaft, idler gears mounted on the rotatable body and meshing with the first mentioned gears and with said stationary gear, all of said gears being of the same size, whereby said paddles will be maintained in vertical positions while the body rotates, and, guard disks fixed to the body and arranged at the ends of each paddle shaft for preventing obstacles from interfering with the paddles while they are in operation.

6. A propelling water wheel comprising a rotatable driving shaft, a body mounted on and movable with said shaft, a series of paddle shafts journaled in said body, paddles mounted on the paddle shafts, a gear fixed to each of said paddle shafts, a stationary gear coaxial with the driving shaft, idler gears mounted on the rotatable body and meshing with the first mentioned gears and with said stationary gear, all of said gears being of the same size, whereby said paddles will be maintained in vertical positions while the body rotates, and a sectional guard casing covering the gears to protect the latter, one of the casing sections being stationary, and the other movable with the body.

In testimony whereof, we affix our signatures at the city of Cincinnati, county of Hamilton and State of Ohio, this 22d day of September, 1926.

EDWARD F. SMITH.
CHARLES D. SMITH.