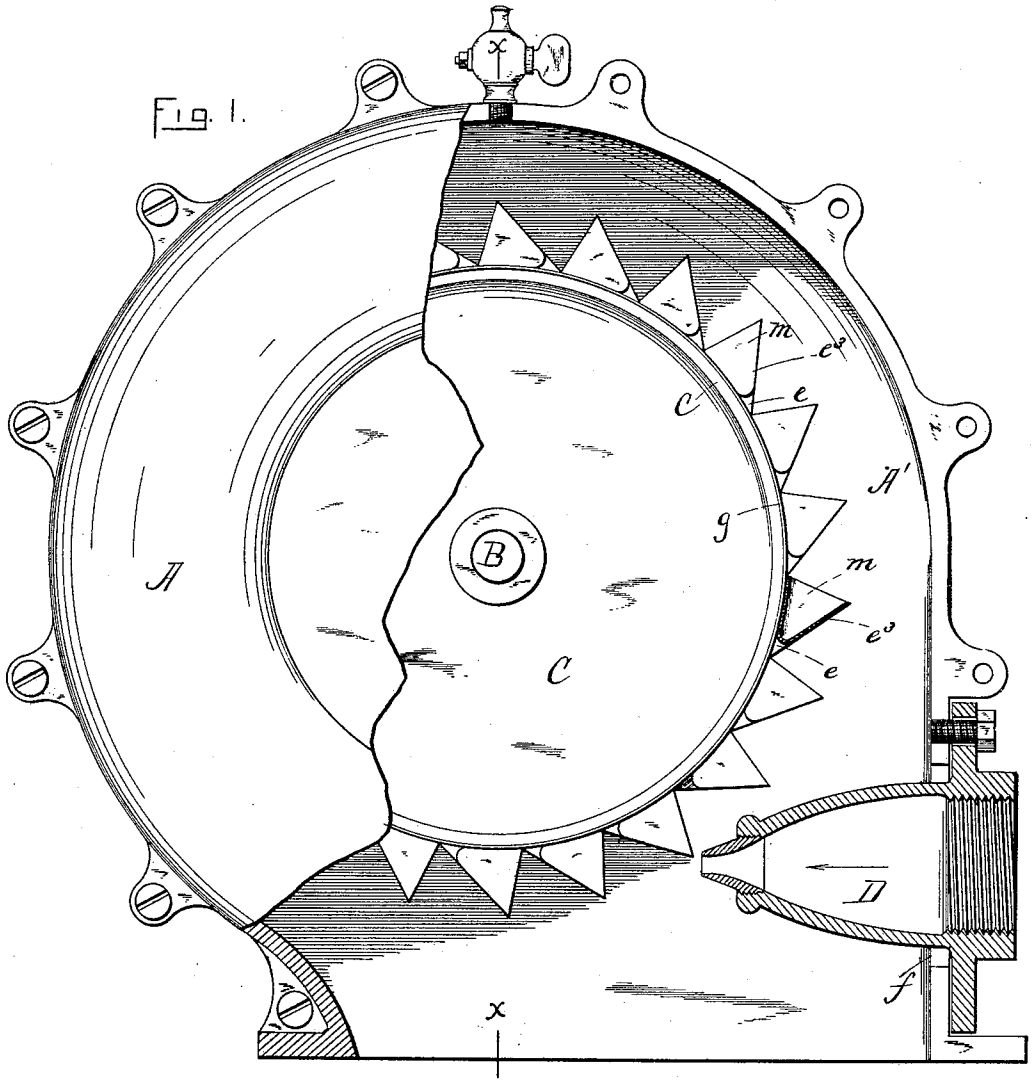
(No Model.) 2 Sheets—Sheet 1.

L. PORTER.

WATER MOTOR.

No. 482,927. Patented Sept. 20, 1892.

Fig. 1.



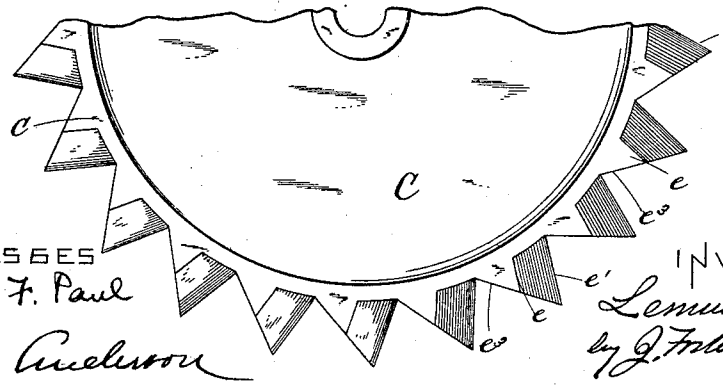


Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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WATER MOTOR.

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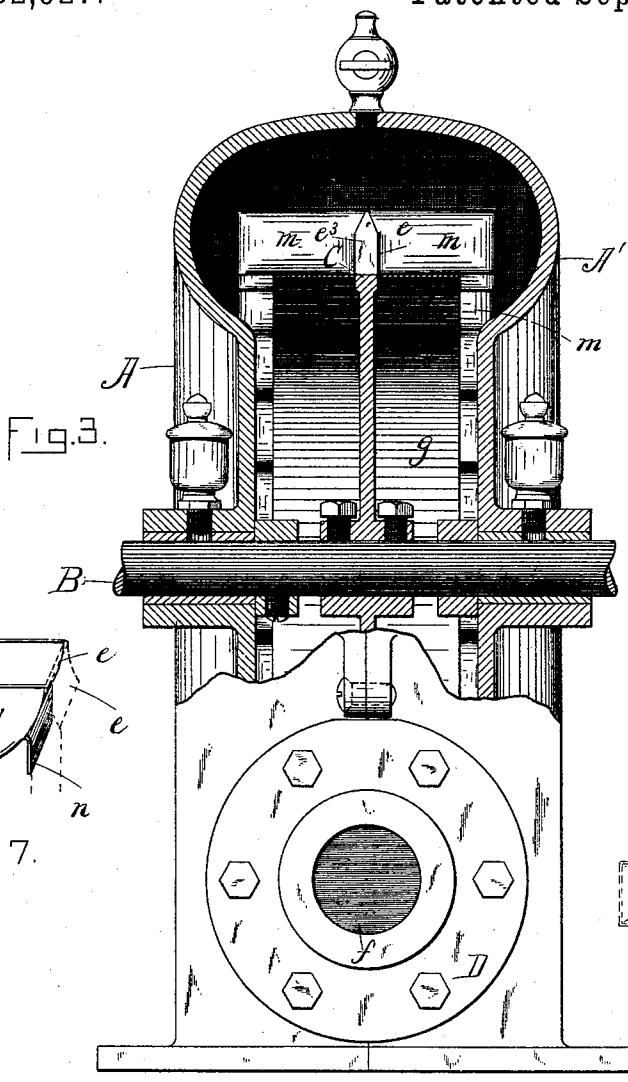

Fig. 3.

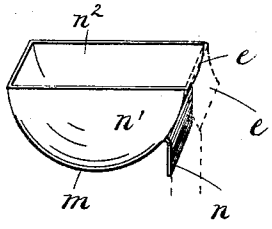

Fig. 7.

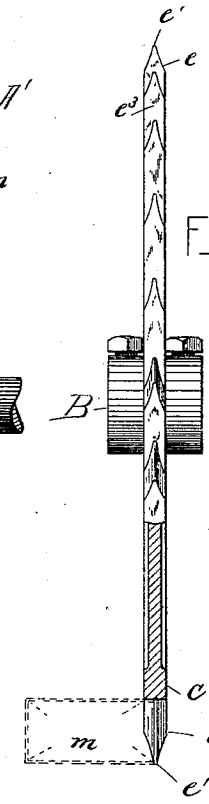

Fig. 4.

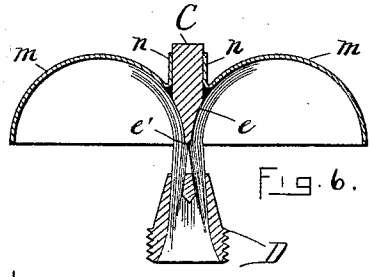

Fig. 6.

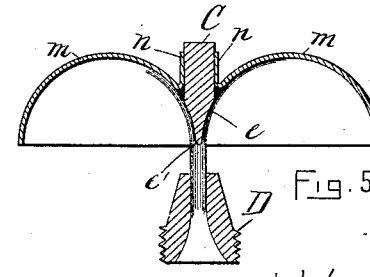

Fig. 5.

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UNITED STATES PATENT OFFICE.

LEMUEL PORTER, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE MALDEN MACHINE COMPANY, OF BOSTON, MASSACHUSETTS.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 482,927, dated September 20, 1892.

Application filed October 29, 1891. Serial No. 410,226. (No model.)

To all whom it may concern:

Be it known that I, LEMUEL PORTER, a citizen of the United States, residing at Providence, in the county of Providence, State of Rhode Island, have invented certain new and useful Improvements in Water-Motors; and I do hereby declare the following to be a full, clear, and exact description of the same.

My present invention relates to certain improvements in the form and construction of the motor-wheel, the water-discharging mechanism, their relative position, and the impact of the propelling-stream.

The object of this invention is to secure greater strength and greater effective power in that class of motors using jet-streams under pressure relative to the size of the motor and the amount of applied power.

My invention is embodied in the form and mechanism which I shall now proceed to describe and which I have illustrated by the accompanying drawings.

In the drawings, Figure 1 is a front elevation of the motor, with a portion of the casing broken away to show the wheel and jet-nozzle in sectional elevation. Fig. 2 is a perspective view of a part of the motor-wheel. Fig. 3 is a cross-section on the line x x, Fig. 1, showing, also in perspective, the under side of the wings and details in the construction of the casing. Fig. 4 is an edge view of the wheel, with a part in cross-section. Figs. 5, 6, and 7 are detail views, and will be more particularly referred to hereinafter.

The casing is formed in two sections, (represented in the drawings by A A′,) in which is journaled the shaft B, carrying the serrated motor-wheel C. In the side of the casing is the opening f, (see Figs. 1 and 2,) into which is fitted the jet-nozzle D, through which a stream of water under high pressure is thrown upon the wheel.

Having enumerated the principal parts of the motor, I will now proceed to describe them in detail.

The wheel C, which may be of any suitable size, is a disk cast with a narrow rim c, the rim being only slightly wider than the body of the wheel. (See Figs. 3 and 4.) The outer edge, which forms the periphery of the wheel, is serrated, as shown in Figs. 1, 2, 3, and 4. The teeth which form this serrated periphery e e are constructed with narrow edges e' e', not made sharp, but constructed with an appreciable thickness, thus presenting an opposing surface for the impact of the propelling-stream, and I prefer to make them slightly convex, (see Figs. 4, 5, and 6,) so as to avoid a direct recoil of the water, which would obstruct and diminish the force of the stream. The number of the teeth relative to the size of the wheel and the depth and angle of their edges is such that the wheel presents to the stream at the point of impact a strong substantially continuous narrow periphery vertical to the longitudinal axis of the stream. This construction permits the end of the jet-nozzle D to be brought close to the periphery, the distance of the nozzle from the periphery varying only slightly as the stream passes from tooth to tooth, thereby giving to the wheel a very uniform motion. On the sides of the disk adjacent to its toothed periphery are deflecting-wings m m. (See Figs. 1 and 2.) Each wing has a flange n, by which it is soldered or bolted to the side of the disk, or it may be secured thereto in any other suitable manner, or may be made integral with the disk. As placed upon the wheel its inner surface forms a continuation of the side of the adjacent tooth, so that the jet deflected by the curved tooth is still further deflected by the wing and discharged from its outer edge, all the reactionary force of the water having been utilized.

The most advantageous form for the wing and the one which I have shown as appearing to most thoroughly utilize the reactionary force of the water is a curve concentric with the curve of the teeth, as shown in Figs. 5 and 6. Each deflecting-wing is joined by its sides n' n^2 to the disk, n' being contiguous to and on the same plane with the rear face e^3 of the adjacent tooth. These sides may, if desired, extend beyond the edge e', the side n' being then united with the deflecting-wing on the opposite side of the disk. Along the under side of the wings is fastened a narrow strip of metal g, which serves to preserve their relative position and to prevent their being bent out of shape by the force of the water or from any other cause. I do not wish to be limited

by these detailed features of the teeth and adjacent wings; but the construction which I have described is the one which I consider most advantageous.

D represents the jet-nozzle, which I construct in two ways—in the ordinary form having a single jet-orifice, as shown in Fig. 5, and also a nozzle with two converging jet-tubes, as shown in Fig. 6. The jet-nozzle is fitted into the side of the casing with its axis nearly tangential to the wheel, the discharging-orifice being placed as near as possible to the periphery of the latter, (see Fig. 1,) so that the stream impinges upon the adjacent tooth immediately on its discharge from the nozzle and before there has been any loss of its propelling force. The angle at which the jet-tubes are placed in relation to each other in the latter form of nozzle is such, relative to the distance of the nozzle from the edge of the nearest tooth, that they shall both strike upon its convex edge. Such an impact secures the advantage of a substantially direct propelling force without any series splashing or obstruction to the stream. The propelling-power of the jet is further utilized and developed by the spreading and curving of the sides of the teeth, and it continues to exert a forward pressure upon the wheel until discharged at the edges of the wings. It is obvious that two nozzles attached to one pipe or two pipes, each provided with a nozzle, which should direct the stream upon the wheel, would accomplish substantially the same effect as the form of nozzle which I have shown.

Having thus described the construction in which I have practically carried out my invention, I will now particularly point out in the claims that which I deem to be new and desire to secure by Letters Patent.

I claim—

1. In a water-motor, the combination of a serrated wheel whose teeth are formed with narrow forward edges and diverging sides, deflecting-wings, and a jet-nozzle having a double orifice, substantially as described.

2. In a water-motor, the combination of a serrated wheel the teeth of which have their sides inclined laterally, with deflecting-wings, and a jet-nozzle having a double orifice with converging jet-channels leading thereto, whereby converging jets are thrown upon the wheel, substantially as described.

3. In a water-motor, a narrow serrated rimmed wheel formed of teeth having narrow edges and beveled sides, with deflecting-wings adjacent to the toothed periphery, and a jet-nozzle provided with jet-tubes arranged obliquely to each other, whereby jets are thrown obliquely against the teeth of the wheel and deflected laterally, substantially as described.

4. In a water-motor of the character described, a toothed motor-wheel the teeth of which form a narrow periphery, the forward edge of each tooth being narrower transversely than vertically and extending obliquely upward from the rim of the wheel in the plane of its disk, in combination with a jet-nozzle placed adjacent thereto, substantially as described, and for the purpose set forth.

5. The combination of a motor-wheel with teeth having their sides laterally curved and adjacent curved deflecting-wings, substantially as described, and for the purpose set forth.

6. A water-motor wheel having a toothed periphery in which the sides of the teeth are inclined laterally, with deflecting-wings on its disk adjacent to said teeth, substantially as described.

Signed at Boston this 24th day of October, A. D. 1891.

LEMUEL PORTER.

Witnesses:
ISAAC F. PAUL,
GEO. W. ANDERSON.