(No Model.)

E. M. CARHART.

WATER WHEEL.

No. 386,802. Patented July 31, 1888.

Fig. 1.

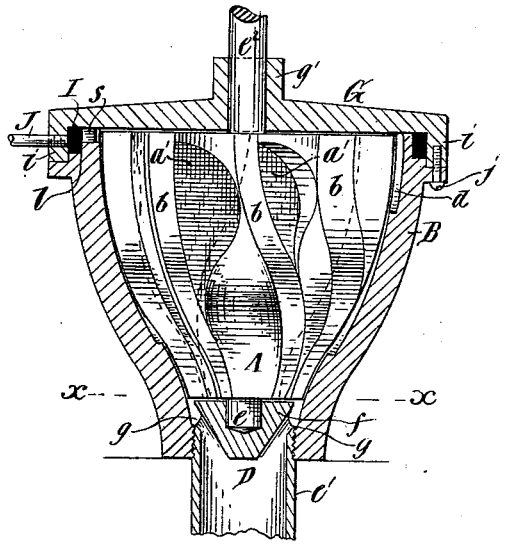


Fig. 2.

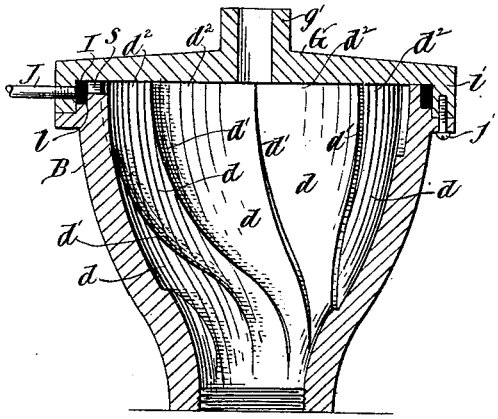


Fig. 3.

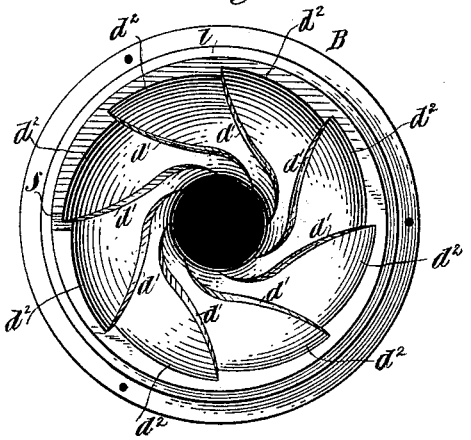
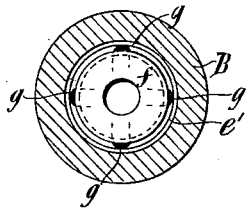


Fig. 4.



Witnesses
James D. Griswold
M. J. Roach.

Inventor
Edwin M. Carhart
by his Attorneys
Gifford & Brown

UNITED STATES PATENT OFFICE.

EDWIN M. CARHART, OF PROVIDENCE, RHODE ISLAND.

WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 386,802, dated July 31, 1888.

Application filed May 16, 1887. Serial No. 238,399. (No model.)

To all whom it may concern:

Be it known that I, EDWIN M. CARHART, of Providence, in the county of Providence and State of Rhode Island, have invented a certain new and useful Improvement in Water-Wheels, of which the following is a description.

My present invention is an improvement on the water-wheel patented to me March 26, 1885, No. 318,869; and it consists in a novel construction of curb and the combination with the wheel; and it also consists in certain other novel combinations therewith, to be hereinafter more fully described.

In the accompanying drawings, Figure 1 is a vertical section of a water-wheel and curb embodying my improvement. Fig. 2 is a vertical section of the curb. Fig. 3 is a plan or top view of the same. Fig. 4 is a transverse section taken on the plane of the dotted line *x x*, Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

A designates the body of the water-wheel. This wheel decreases in size toward its lower end. Blades or buckets *b*, conforming to the contour of the body, extend therefrom and spirally around the same. Arranged in the body A and between the blades or buckets *b* cavities *a'* are formed. For a more complete description of the construction of this wheel I would refer to my said Letters Patent No. 318,869.

B designates the curb for the wheel. As shown, this curb conforms in shape to the contour of the wheel A both internally and externally. It is provided upon its inner surface with spirally-extending recesses or grooves *d*. These recesses or grooves extend, as shown, from the top nearly to the bottom of the curb. Each of these recesses or grooves comprises a spirally-extending end wall, *d'*, and a rear wall, d^2, the latter being of gradually-lessening projection from the end wall, *d'*, of an adjacent recess to the end wall, *d'*, of the recess in which it terminates; or, in other words, the rear wall, d^2, is nearest the wheel at the end wall of the adjacent recess, where it commences, and farthest from the wheel at the end wall, *d'*, where it terminates. A cross-section of this curb would have the appearance of ratchet-teeth upon its inner surface. These recesses or grooves extend in a reverse direction spirally to that of the spiral blades or buckets *b* of the wheel A. Water thrown centrifugally from the blades or buckets *b* during the rotation of the wheel passes into the recesses *d* of the curb, and is deflected by the end walls, *d'*, of the recesses onto the blades or buckets *b* near the lower ends of the latter, thereby materially augmenting the power of the wheel. As the end walls, *d'*, of the recesses are spiral, the water passing down them is thrown back with considerable force onto the blades or buckets.

D designates a combined nozzle or outlet and a step-bearing for the lower journal, *e*, of the wheel A. The lower portion, *e'*, of this nozzle is hollow, and is externally screw-threaded to engage an internal screw-thread on the inner surface of the curb near the lower end of the latter. The upper portion, *f*, thereof, which constitutes the step-bearing, is solid, except that it is perforated or provided with apertures *g*, through which water from the interior of the curb may pass into the outlet-nozzle *e'*. I have shown four of these apertures *g*; but I may use any desired number.

G designates the cap or cover for the wheel. It is provided with a hub, *g'*, through which extends the upper journal, e^2, of the wheel A. It is also provided circumferentially with a downwardly-extending flange, *i*, which extends about the curb B. Bolts *j*, extending through lugs on the curb or case and into the flange *i*, serve to secure the cover on the curb or case. At its upper end the curb or case B is provided with an external circumferential groove or rabbet, *l*. When the cap or cover G is in place, it incloses said groove or rabbet, thereby forming an annular chamber, I.

J designates an inlet-pipe opening into the annular chamber I. From the annular chamber I an opening or openings, *s*, communicate with the interior of the case or shell B.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a water-wheel decreasing in diameter toward its lower end and provided externally with spirally-extending blades or buckets conforming to the contour of the body, a case or curb for the wheel conforming in shape upon its interior with

the shape of the wheel, said case or curb being provided internally with spirally-extending grooves or recesses having spirally-extending end walls, *d'*, extending from the top nearly to the bottom of the case or curb, said grooves or recesses and their rear walls extending spirally in a reverse direction to that of the blades on the wheel and vanishing at their lower ends upon the surface of the curb, substantially as specified.

2. The combination, with a water-wheel, of a curb or case therefor, provided at its upper end with an external circumferential rabbet, a cap or cover provided with a downwardly-extending circumferential flange, whereby, when the cap or cover is in place, an annular chamber, as I, is formed, an inlet-pipe communicating with said chamber, and a passage or passages from said chamber to the interior of the curb or case, substantially as specified.

EDWIN M. CARHART.

Witnesses:
O. B. HAUXHURST,
E. M. DOWNS.