

(No Model.)

E. M. CARHART.

WATER WHEEL.

No. 386,802.

Patented July 31, 1888.

Fig. 1.

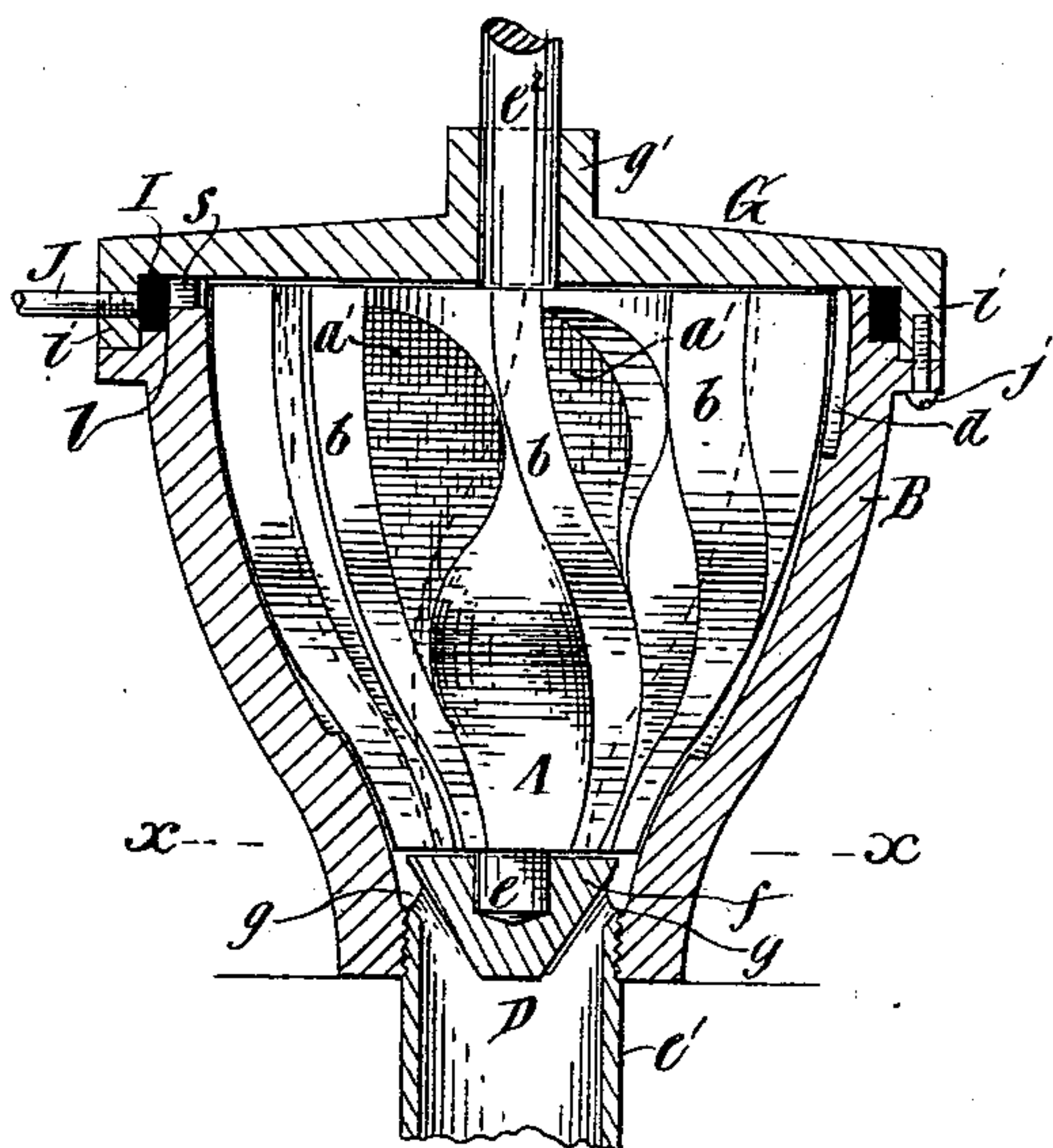


Fig. 2.

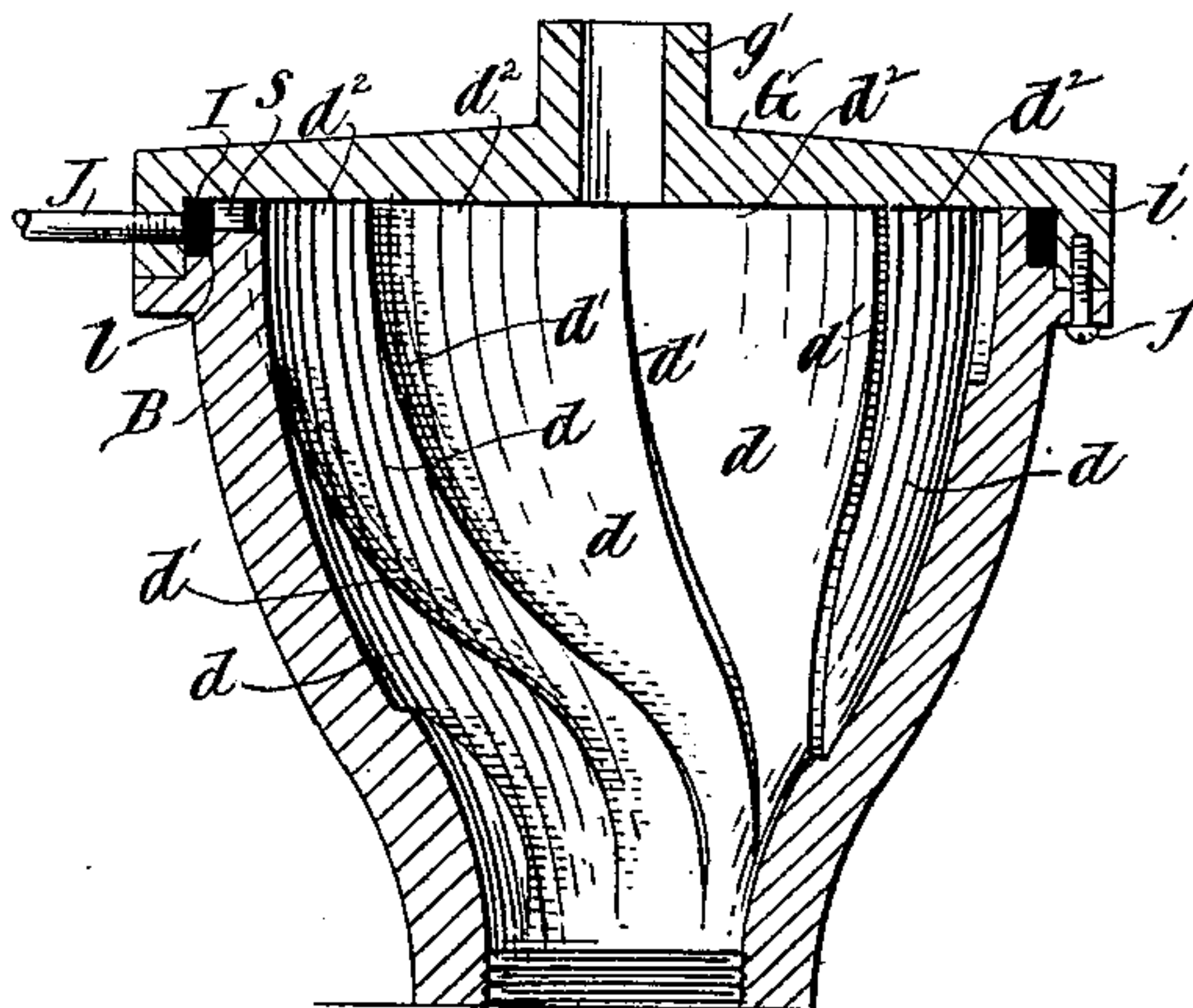


Fig. 4.

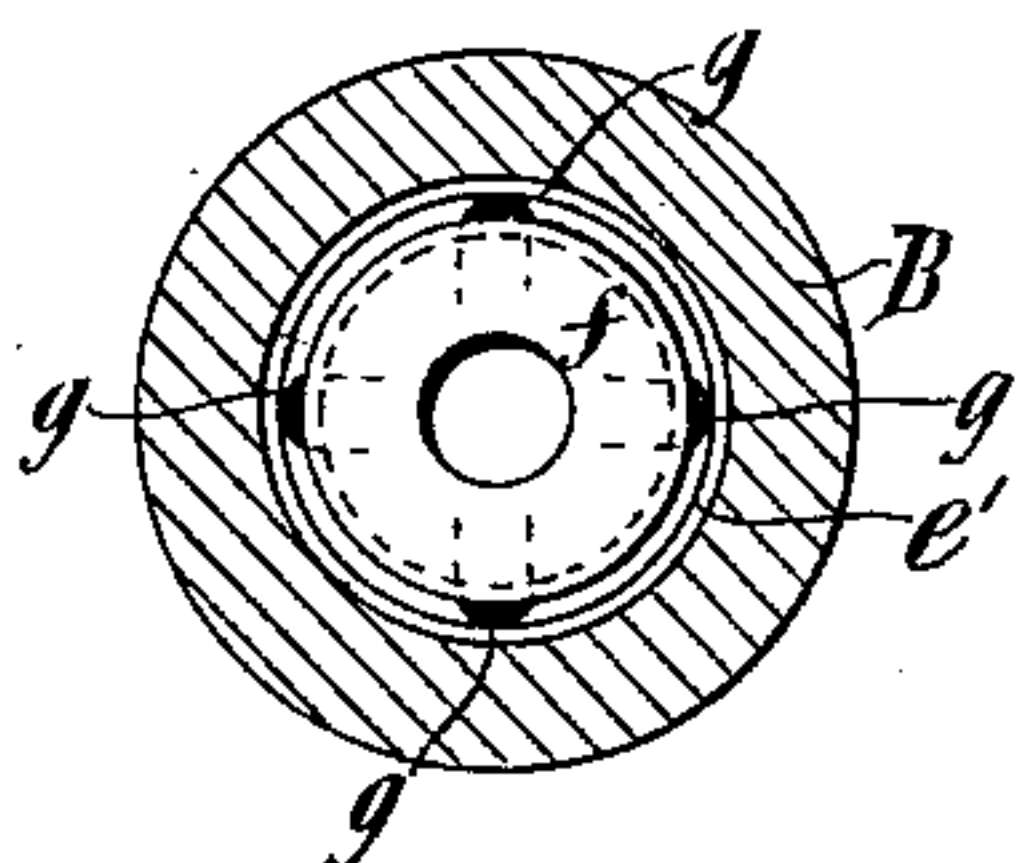
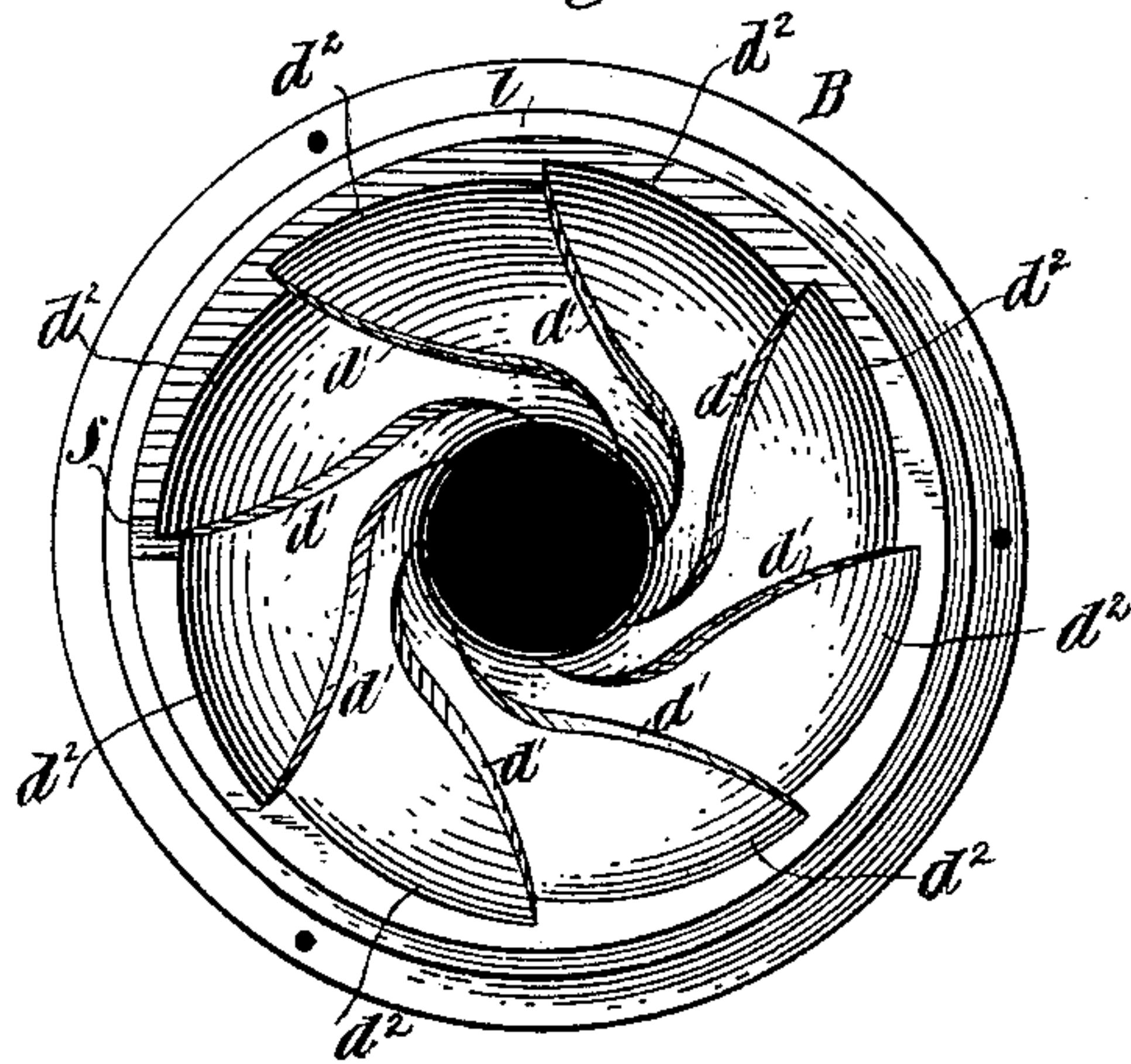


Fig. 3.



Witnesses  
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# 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  
5 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,  
10 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.

15 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  
20 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.  
25 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*  
30 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  
35 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,  
40 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''*, the latter being of gradually-lessening projection from the end wall, *d'*, of an adjacent  
45 recess to the end wall, *d'*, of the recess in which it terminates; or, in other words, the rear wall, *d''*, 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  
50 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  
55 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  
60 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  
65 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  
70 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-  
75 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''*, of the wheel A.  
80 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.  
85 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.  
90

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  
95 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 con-  
100 tour 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  
5 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.  
10

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, 15 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. 20

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Witnesses:

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