

No. 728,230.

PATENTED MAY 19, 1903.

G. J. HENRY, JR.
WATER WHEEL BUCKET.
APPLICATION FILED AUG. 7, 1901.

MODEL.

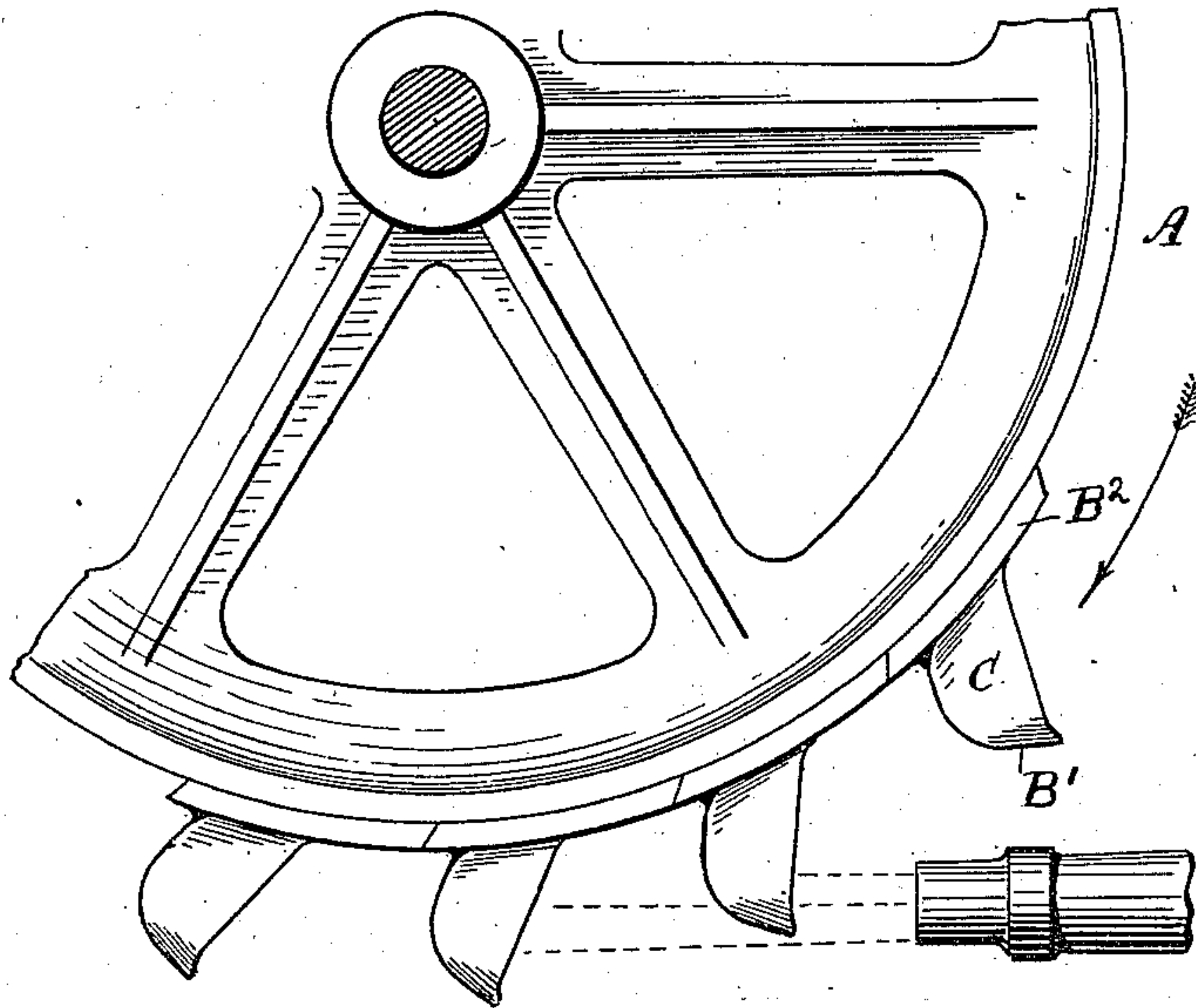


Fig. 1.

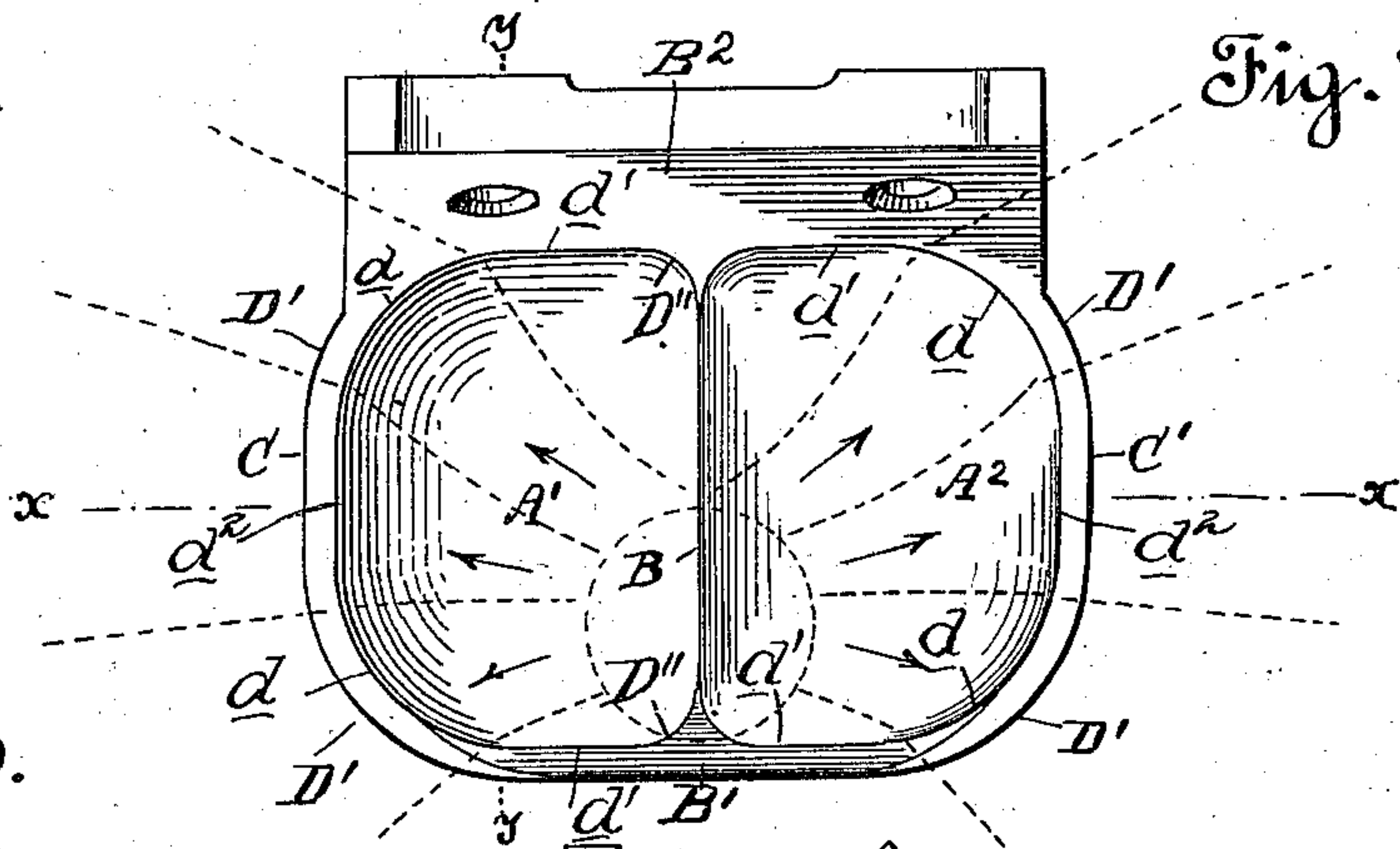


Fig. 2.

Fig. 3.

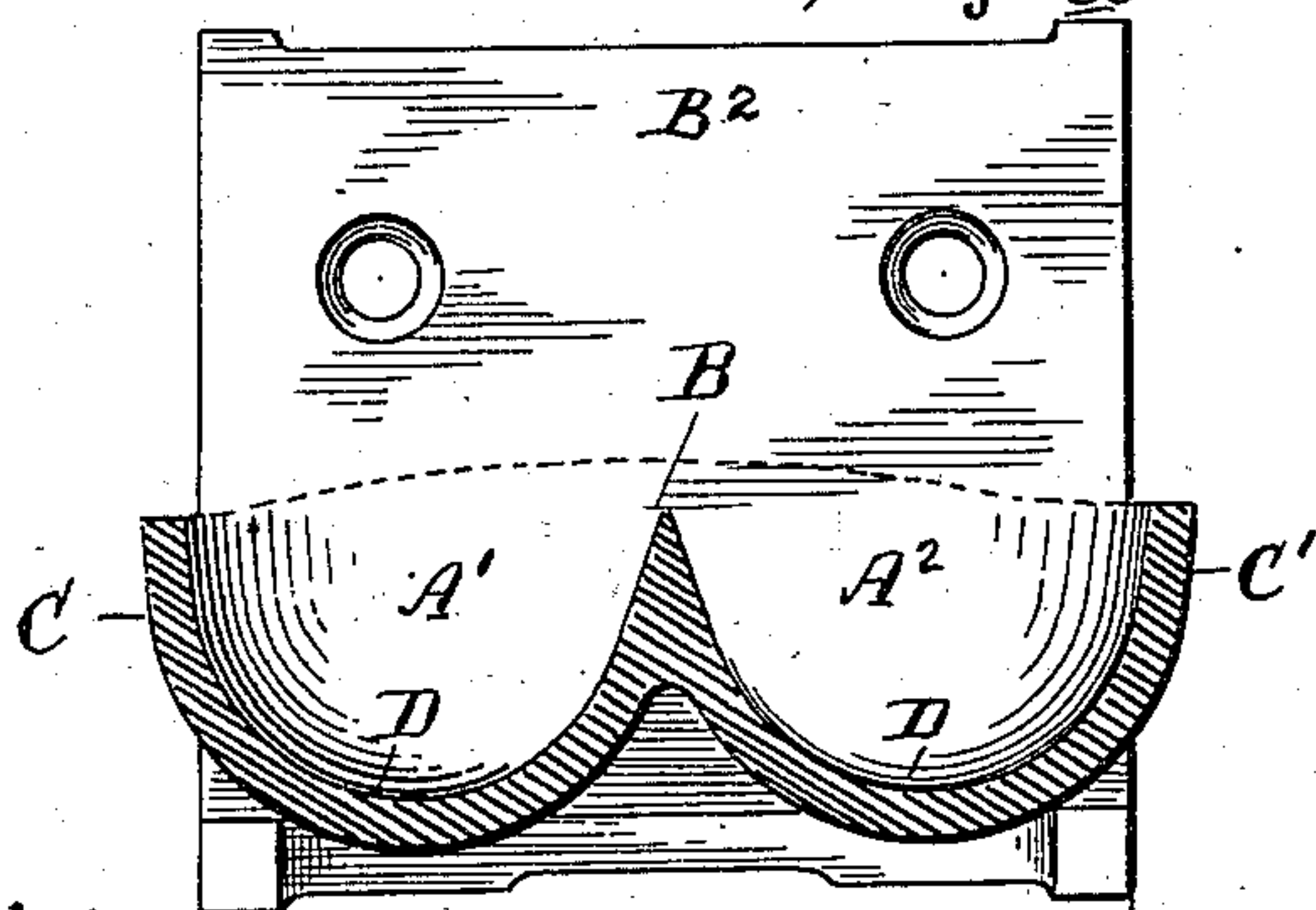
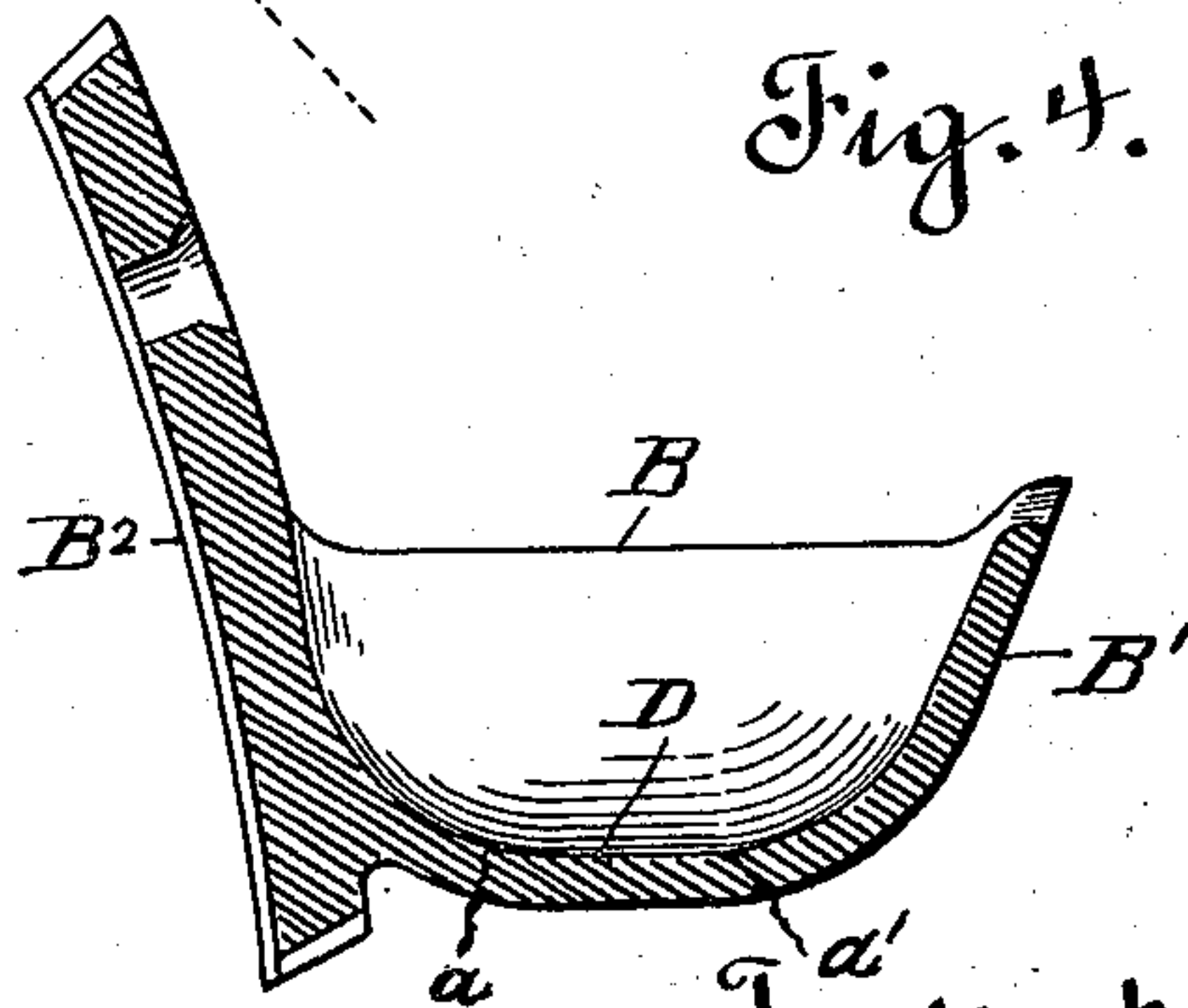


Fig. 4.



Witnesses.

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WATER-WHEEL BUCKET.

SPECIFICATION forming part of Letters Patent No. 728,230, dated May 19, 1903.

Application filed August 7, 1901. Serial No. 71,139. (Model.)

To all whom it may concern:

Be it known that I, GEORGE J. HENRY, Jr., a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Water-Wheel Buckets; and I do hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to a certain new and useful water-wheel bucket for use in connection with what is known as "tangential" water-wheels, the essential feature being the production of a water-wheel bucket which will permit of the most efficient use of the impact-stream and at the same time maintain its surfaces of the most efficient curvature, irrespective of the wearing action of the impelling fluid.

The object of the invention is to provide a water-wheel bucket which will permit of the impelling jet or stream being received at spouting velocity and with the least frictional resistance reduce its velocity to zero, which will receive the fluid or impelling stream on an even surface or gentle curvature so related to the fluid that the flow over the bucket-surfaces will not be confined by ridges or unevenness and such that during the period of fluid action on the bucket-surface approximately the same velocity and amount of fluid will pass over each point in the working surfaces, which during the entire path of its working arc shall permit of the stream being received at spouting velocity and discharge the same, so as not to interfere with the bucket next following.

The buckets at present in use may be said to fall in one of two classes—those having curved walls united to concavity bottoms having a focus or contact point and those having the concavities the bottoms of which are cylindrical surfaces joined to substantially straight walls. In the former class the impact-stream acting upon the focus-point quickly wears away the bottoms of the concavities, and thus destroys the utility and life of the bucket, while in the latter class the water is so confined that the buckets rapidly wear or are cut away at the corners. Neither of said styles of buckets permits of the impact-stream being received at spouting velocity and with least frictional resistance

reduce its velocity to zero, nor during the fluid action on the bucket's surface will the same amount of fluid pass over each point in the working surfaces at approximately the same velocity, nor does the water act within the concavities upon natural lines.

In the present invention the focus or contact point of the concavity-bottoms is eliminated, thus differing from the first class of buckets above mentioned, and the straight or inclined walls of the second class of buckets are dispensed with. A bucket is thus produced in which is combined the advantageous features of each class of buckets, with the defects of each eliminated. The result is the production of a bucket in which the cylindrical surfaces of the bottoms of the concavities are, as hereinafter described, united to the front, rear, and side walls by a series of curved surfaces of varying radius, thus obtaining a bucket in which there is a band of discharge and in which the discharge at the corners is spread into a thin stream or fan.

To comprehend the invention, reference should be had to the accompanying sheet of drawings, wherein—

Figure 1 is a broken view of a water-wheel with a series of buckets attached thereto; Fig. 2, a top plan view of one of the buckets; Fig. 3, a longitudinal sectional view taken on line *x x*, Fig. 2; and Fig. 4, a cross-sectional view on line *y y*, Fig. 2.

In the drawings the letter A is used to indicate an ordinary tangential wheel, to the periphery of which the water-wheel buckets are secured. Each bucket consists of concavities A' A², separated by a central dividing-wedge B, which wedge constitutes the inner side wall of each concavity. This wedge is joined to the front and rear walls B' B², which walls are also connected by the outer side walls C C'. The bottom D of each cavity from *a* to *a'* is an approximately cylindrical surface, which merges into a series of curves at its respective ends to form the front and rear walls of the cavities and into others at the sides thereof to form the side walls and central dividing-wedge. The corners D' of the bucket are curved or rounded, the curves of the corners D'', adjoining the web B, being of a relatively small radius, while the corners D' are of a much larger

radius, the surfaces d of which gradually merge into the rear and front surfaces d' and side surfaces d^2 of the cavities. With the concavities thus constructed the water of the impact stream will be received therein and will turn through an angle of approximately one hundred and eighty degrees less the necessary amount to insure its clearing the bucket next behind. The water flows evenly over the buckets' concavities by being received on surfaces of gentle curvature, not being confined by ridges or hollows, and as discharged from the concavities the water is spread out into a "flat vane," so to say.

The front wall of the bucket is inclined rearwardly in a downward direction and its upper edge slightly raised above the central dividing-wedge by being formed upon a curve. By thus constructing the front wall its dip into the impact stream is reduced to a minimum and enters the stream with the least amount of disturbance.

The construction of bucket above described comprehends or includes in the general combination and features the unbroken front, rear, and side walls, so that the interior of the buckets as constructed is substantially uniform, without abrupt bends or inwardly-projecting portions.

The term "unbroken" is to be understood as defining a construction having a regular impact or spreading surface as distinguished from those wherein the wheel-lug or wheel-rim is set or projected into the cavities.

Spreading the utilized water into a vane of discharge prevents the water being concentrated at any particular portion of the discharge-corners of the concavity, and thus eliminates the rapid wear incident to modern tangential buckets.

By constructing the concavities of the bucket with a bottom cylindrical surface merging into the concavity-walls by a series of curved surfaces, as described, the discharge-corners of the bucket being curved or rounded off, as described, a uniform wear throughout the entire bucket is afforded.

Having thus described the invention, what is claimed as new, and desired to be protected by Letters Patent, is—

A water-wheel bucket of the character described, consisting of two cavities having substantially cylindrical central surfaces each having an unbroken front and rear wall, said front and rear walls being joined to the side walls and the bottoms of the cavities by gradually-curved spreading-surfaces thereby providing large curved outer corners and unbroken interior surfaces to each of the bucket-cavities, so as to form regular discharge-lines for the water along the bucket-surfaces.

In witness whereof I have hereunto set my hand.

GEORGE J. HENRY, JR.

Witnesses:

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