

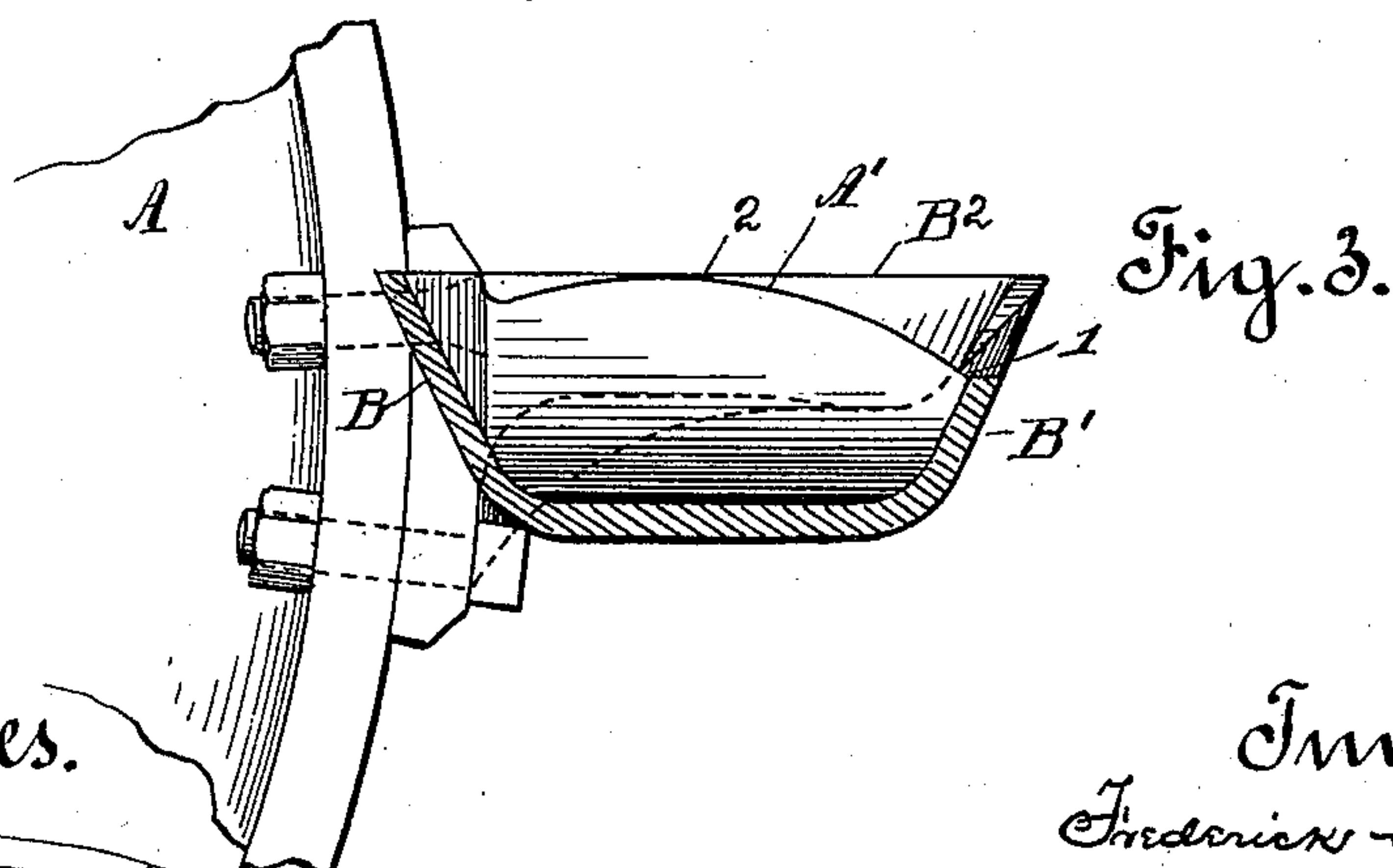
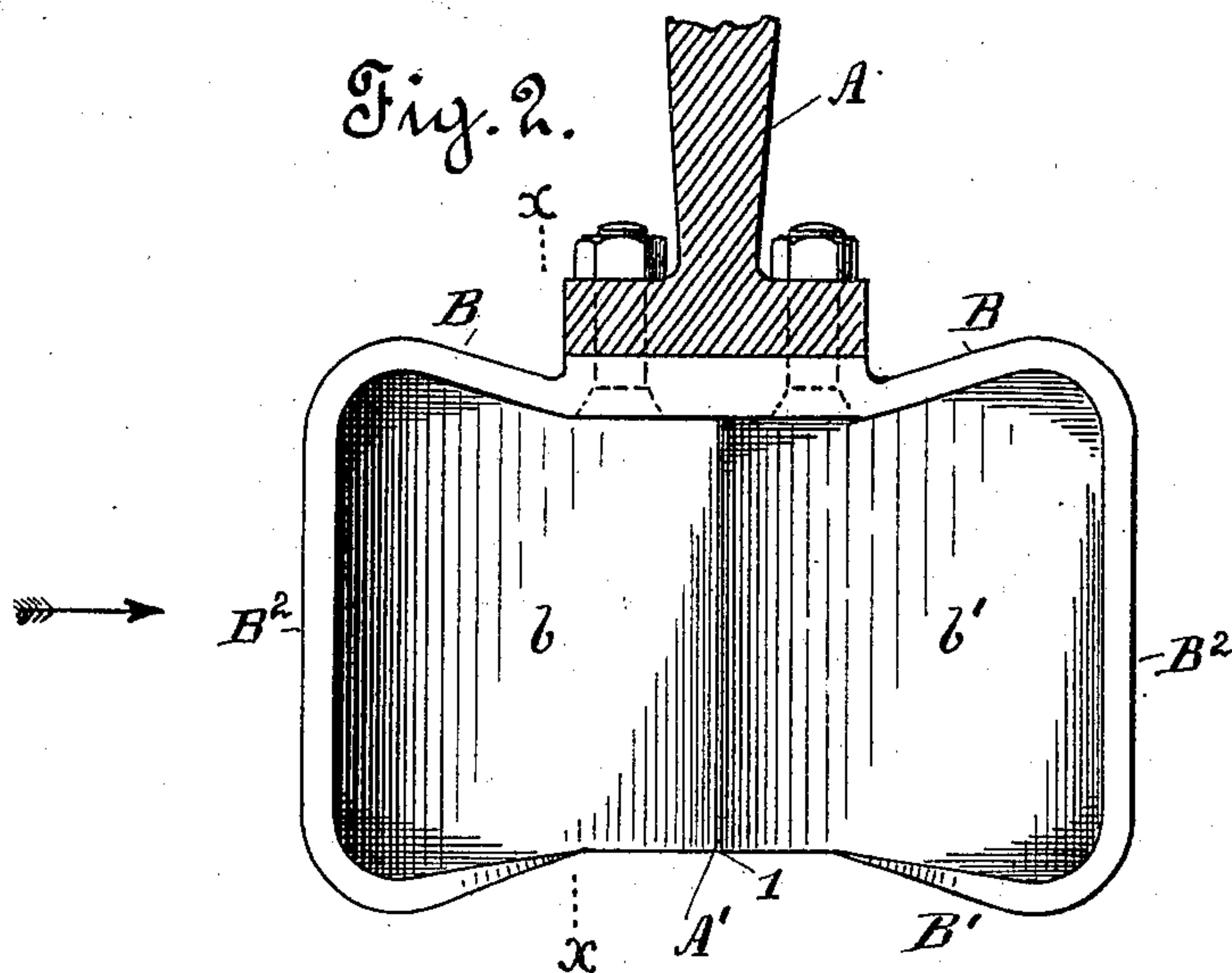
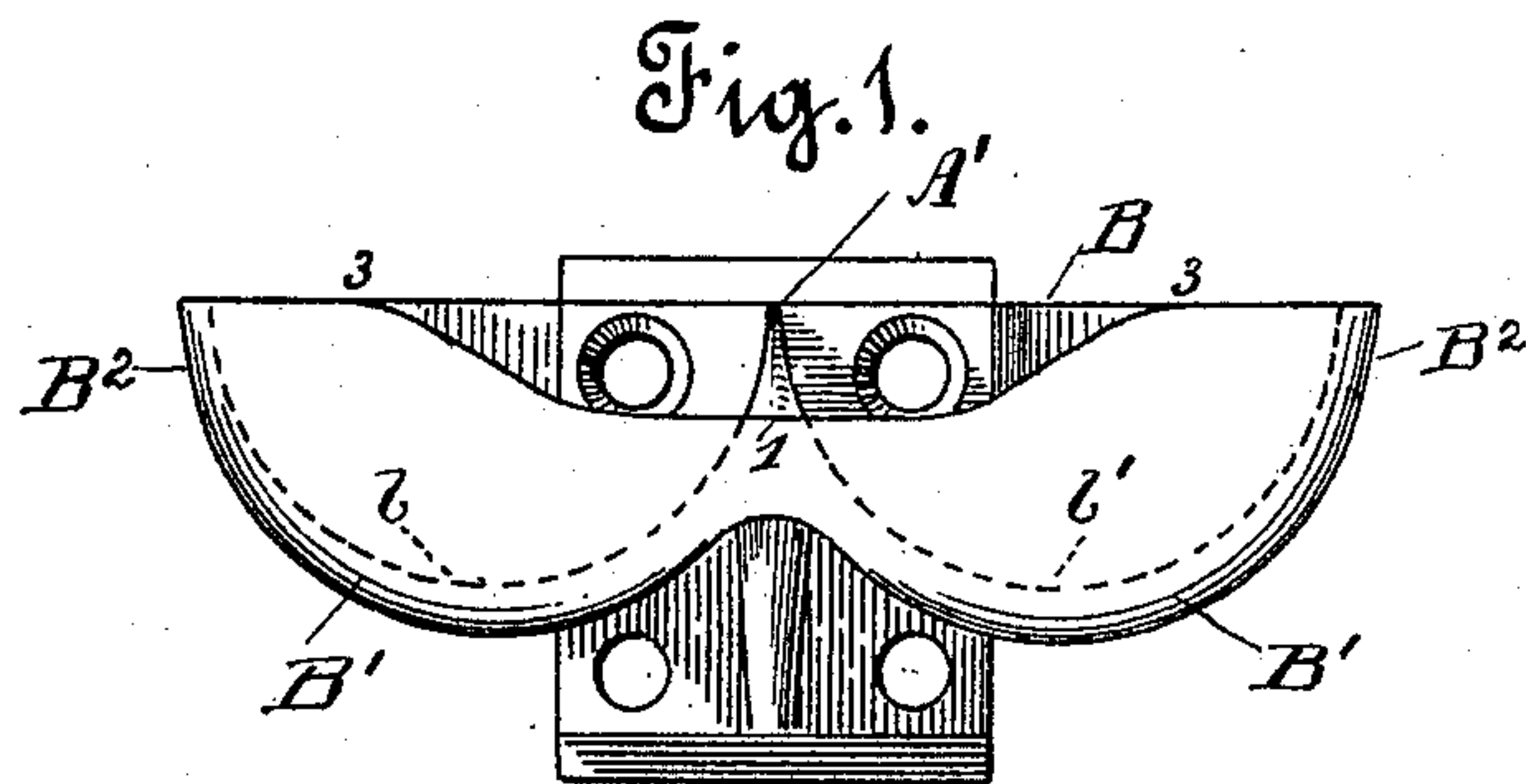
No. 617,555.

Patented Jan. 10, 1899.

F. K. BLUE.
WATER WHEEL BUCKET.

(Application filed Oct. 5, 1898.)

(No Model.)



Witnesses.

H. Monteverde.

Elmer Wickes.

Inventor.
Frederick K. Blue
by *Wacker*
his atty.

UNITED STATES PATENT OFFICE.

FREDERICK K. BLUE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO THE
PELTON WATER WHEEL COMPANY, OF SAME PLACE.

WATER-WHEEL BUCKET.

SPECIFICATION forming part of Letters Patent No. 617,555, dated January 10, 1899.

Application filed October 5, 1898. Serial No. 692,707. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK K. BLUE, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Water-Wheel Buckets; and I do hereby declare that the following is a full, clear, and exact description thereof.

This invention relates to a certain new and useful bucket designed for use more especially in connection with what are known as "tangential" water-wheels, or such whereby power is derived from a column of water or impact-stream directed against the buckets secured to and projecting from the periphery or rim of the wheel.

The invention consists in the arrangement of parts and details of construction, as shown in the drawings and described and pointed out in the specification.

The invention is mainly for use in connection with water-wheels driven under low pressure or a heavy body of water; and the object of the invention is to so construct the bucket as to permit its entrance into the impact-stream with the least possible resistance and to secure a rapid and natural outflow or discharge of the utilized water of the stream. This is essential owing to the size of the impact-stream in order to obviate liability of the rotation of the water-wheel being retarded by the buckets cutting into the impact-stream or by a portion of the propelling force or power of the stream being diverted for purposes other than that of impelling the water-wheel.

In order to fully comprehend my invention, reference must be had to the accompanying sheet of drawings, forming a part of this application, wherein—

Figure 1 is a front view in elevation of the bucket. Fig. 2 is a top plan view of the bucket, a portion of the water-wheel being shown with the bucket attached thereto; and Fig. 3 is a longitudinal sectional view taken on line *xx*, Fig. 2.

In the drawings, the letter A is used to indicate the water-wheel proper, to the periphery of which I secure, by means of lugs, bolts, or otherwise, a series of water-wheel buckets.

Each bucket has its bottom formed into two curves, which meet in a central apex or sharp ridge A, thus forming two distinct pockets *b b'*. The curved bottoms are joined to or formed integral with the rear wall B and front wall B', which walls are connected by means of the side walls B². The upper edges of these walls and of the front and rear walls are preferably in the same horizontal plane. The central portion of the rear wall or that portion which impinges against the periphery of the wheel A is somewhat flattened and gradually inclined from top to bottom in order that the bucket will assume its proper position when secured to the periphery of the wheel. If so desired, that portion of the back or rear wall extending beyond the sides of the water-wheel rim may be curved or rearwardly extended beyond the face of the wheel-rim.

The central apex or ridge A' has its edge upwardly inclined or curved from the point 1 of the front wall toward the upper edge of the rear wall, the inclination or curvature being preferably greater between points 1 and 2 than from point 2 toward the rear wall. This curvature or inclination of the apex or central ridge places the forward end thereof considerably below the horizontal plane of the bucket-walls, which would detract from the efficiency of the wheel if the front wall of the bucket be not arranged to compensate therefor. To accomplish this, the front wall B' is cut away from points 3 downward to a level or line with point 1, leaving the outer edge or that portion beyond point 3 level or in line with the top edge of the side walls. By thus cutting away the upper portion of the front wall its depth intermediate points 3 is reduced to the utmost at that point where the bucket first cuts into or penetrates the impact-stream, hence offering but slight resistance to the entrance of the bucket therein, so as not to retard the rotation of the wheel. This is an important feature of the bucket, for owing to the size or diameter of the low-pressure impact-stream if the front wall be not reduced it is necessary that the entire depth of the bucket front or wall be forced into the stream, which detracts to that extent from the power of the wheel. The cut-away

portion of the front wall of the bucket should in width approximate the diameter of the impact-stream in order that the uncut portion thereof will clear or, so to speak, "straddle" the stream as carried therethrough.

As the entrance of the bucket, due to its front wall being cut away, as described, into the impact-stream is below the upper edge of the side wall and uncut portion of the front wall, and inasmuch as the forward end of the central ridge or apex is likewise extended below the upper horizontal line of the side walls, it is obvious that the moment the upper edge of the cut-away central portion of the front wall dips into the impact-stream the same strikes against the forward edge of the central ridge or apex and is divided and directed into each pocket of the bucket, thus subjecting the wheel to the force of the stream before the bucket has passed its full depth therein. Thus the wheel receives the full benefit of the force of the impact-stream from the moment the bucket dips therein until carried out of the same, and as the entrance of the stream into the bucket is below the edge of the side discharge-walls it is obvious that as the bucket is carried through the stream no resistance is offered to the outflow of the utilized water at the front of the bucket, as it escapes freely therefrom owing to the cut-away central portion of the front wall. The side portion of the front wall of the bucket is preserved as to height in order to confine and offer such resistance to the tendency of the water entering the pockets of the bucket to make its escape as will serve to throw the full power of the impact-stream upon the wheel proper. It is essential that the side portions of the front wall equal in height the edge of the side walls of the bucket, for if the entire face of the front wall be cut away to a line with point

1 the desired resistance would be lost and efficiency of the wheel to such extent destroyed.

By cutting away the central portion of the front wall, as described, I am enabled to construct the bucket-front at less tangential inclination than heretofore, thus securing greater impact-surface for the bucket. With the present bucket the front wall may be formed nearly vertical to its base and the wall not drag as the bucket dips into the stream, consequently creating a gain in the surface of the bucket at the front of the bucket-bottoms, which is lost in the buckets now in use by reason of the heavy inclination at which the front wall has to stand in order to clear the stream.

Having thus described my invention, what I claim as new, and desire to secure protection in by Letters Patent, is—

In a water-wheel bucket, the combination with the rear and side walls thereof, of an inclined or curved ridge or dividing-piece arranged within the bucket, the inclination of the ridge or piece being from front to rear so that the forward end thereof falls a given distance below the horizontal line of the side walls, the front wall of the bucket being united to and having its outer or side portions equal in height to the side walls, the central portion of said front wall being cut away to such a depth as to be substantially in line with the forward end of the central ridge or dividing-piece of the bucket.

In testimony whereof I affix my signature, in presence of two witnesses, this 2d day of September, 1898.

FREDERICK K. BLUE.

Witnesses:

N. A. ACKER,
LEE D. CRAIG.