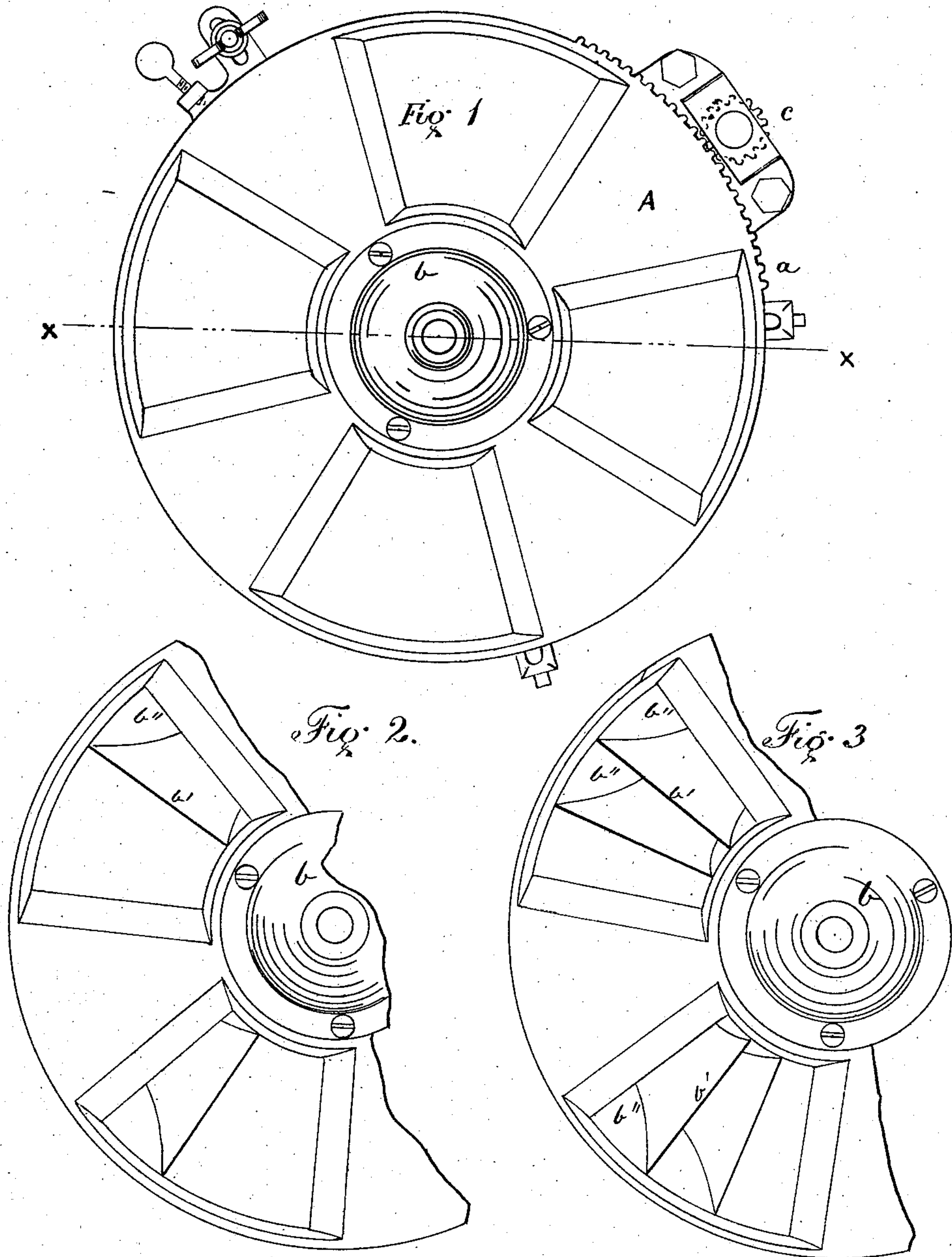


J. B. McCORMICK & J. S. BROWN.
Turbine Water-Wheels.

No. 154,698.

Patented Sept. 1, 1874.



Witnesses.
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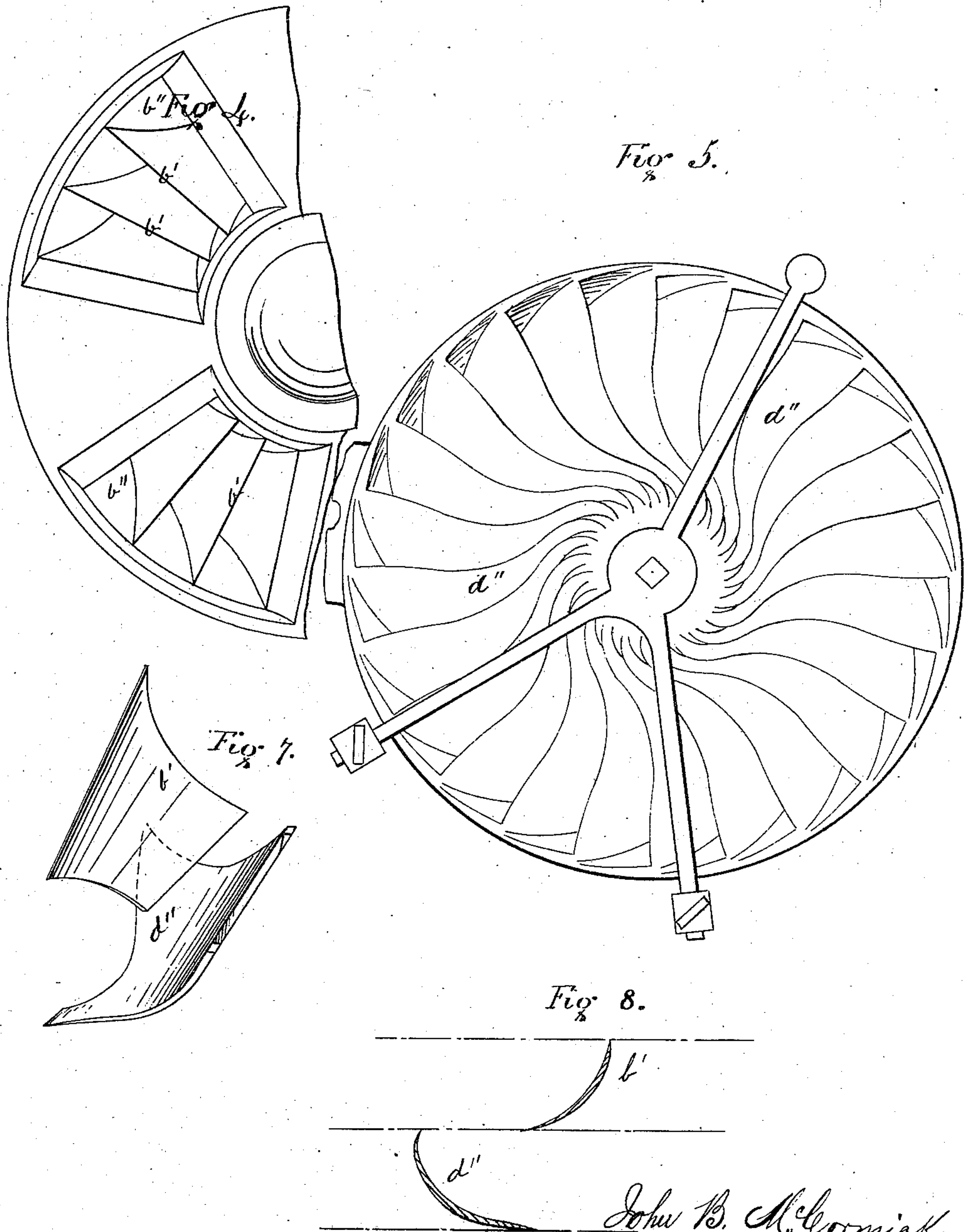
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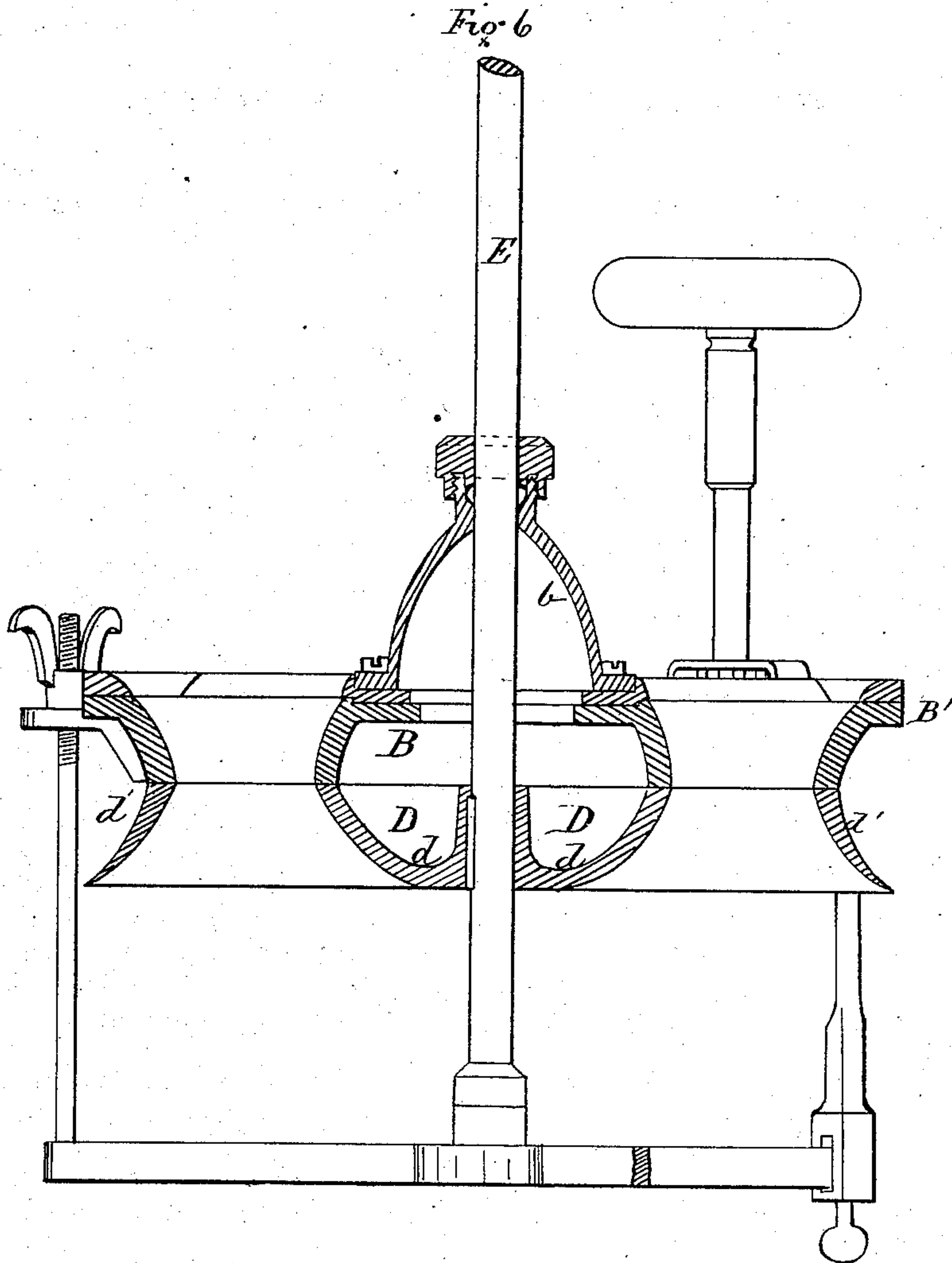
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UNITED STATES PATENT OFFICE.

JOHN B. McCORMICK, OF INDIANA COUNTY, AND JAMES L. BROWN, OF
BROOKVILLE, PENNSYLVANIA.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **154,698**, dated September 1, 1874; application filed
June 30, 1874.

To all whom it may concern:

Be it known that we, JOHN B. McCORMICK, of the county of Indiana, State of Pennsylvania, and JAMES L. BROWN, of Brookville, in the county of Jefferson and State of Pennsylvania, have invented certain new and useful Improvements in Turbine Water-Wheels; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

Figure I is a top view of the gate arrangement in connection with the guide-wheel closed. Fig. II is a partial view of the same with the gate open, showing the subdivision in the guide-wheel. Fig. III is a partial view of the same with the gate open to two-thirds of the full power. Fig. IV is a partial view of the same open to its full gate, showing all the subdivisions. Fig. V is a bottom view of the water-wheel, showing the arrangement of the buckets. Fig. VI is a transverse sectional view embodying our invention, through line *x*, Fig. I. Fig. VII shows the bucket b^1 of the guide-wheel and bucket d^2 of the water-wheel. The concave discharge-surface of bucket d^2 is also shown in this figure. Fig. VIII is an edge view of the ends of the same.

The gate A is divided into four cut segments or openings, enlarged so as to cover or expose one or more of the chutes or subdivisions in the guide-wheel. The gate is operated by the cog-wheel C, which meshes into the cog-sector *a* on the rim of the gate. The rim of the guide-wheel B is bell-shaped, having the larger circumference at the top. The bell-crown *b* of the guide-wheel serves as a guide for the shaft of the water-wheel, as shown in Fig. VI. This guide-wheel has openings for the passage of the water, corresponding to the openings in the gate, which openings are subdivided, by partitions b^1 , into three parts, which may be further divided into six parts, if desired. These subdivisions b^2 have flaring sides, presenting the larger opening at the top, and, by their peculiar shape, compress the

water to its greatest density at the moment of delivery from bucket b^1 and impact with bucket d^2 . The quantity of water can be regulated by sixths, or thirds, or full gate, and the column of water from each subdivision delivered in solids at the moment of striking the bucket d^2 . The water-wheel revolves on the shaft E, which is keyed on the hub *d*. This hub is in the form of an inverted bell-crown. The bell shape of the rim d^1 of the water-wheel, having its greatest circumference at the bottom, and the inverted bell-crown form of the hub *d*, and the peculiar form of the buckets d^2 , as shown in Fig. VII, by their combination and arrangement in the water-wheel, form the best opening for the passage of the water from the point of hit on the buckets of the water-wheel to the point of discharge, and permit the wheel D to deliver itself free from all friction after it has received the full force of the solid columns of water.

Having thus fully described our invention, we claim—

1. The bucket d^2 , having the curved edges and the concave discharge-surface, as shown in Fig. VII, in combination with the bell-shaped rim d^1 and bell-crown-shaped hub *d*, to form a constantly-enlarging opening for discharging the water, so as to permit the wheel to free itself therefrom without loss by friction, as shown and described.

2. The subdivisions b^2 , formed by partitions b^1 in the guide-wheel B, having the bell-shaped sides shown, in combination with the gate A, having enlarged openings, substantially as shown and described.

3. The combination of the wheel D, having buckets d^2 , and guide-wheel B, having subdivisions b^2 , and gate A, all constructed substantially as shown and described.

In testimony that we claim the foregoing we have hereunto set our hands this 30th day of June, 1874.

JOHN B. McCORMICK.
JAMES L. BROWN.

Witnesses:

E. C. WEAVER,
J. P. TOWN.