

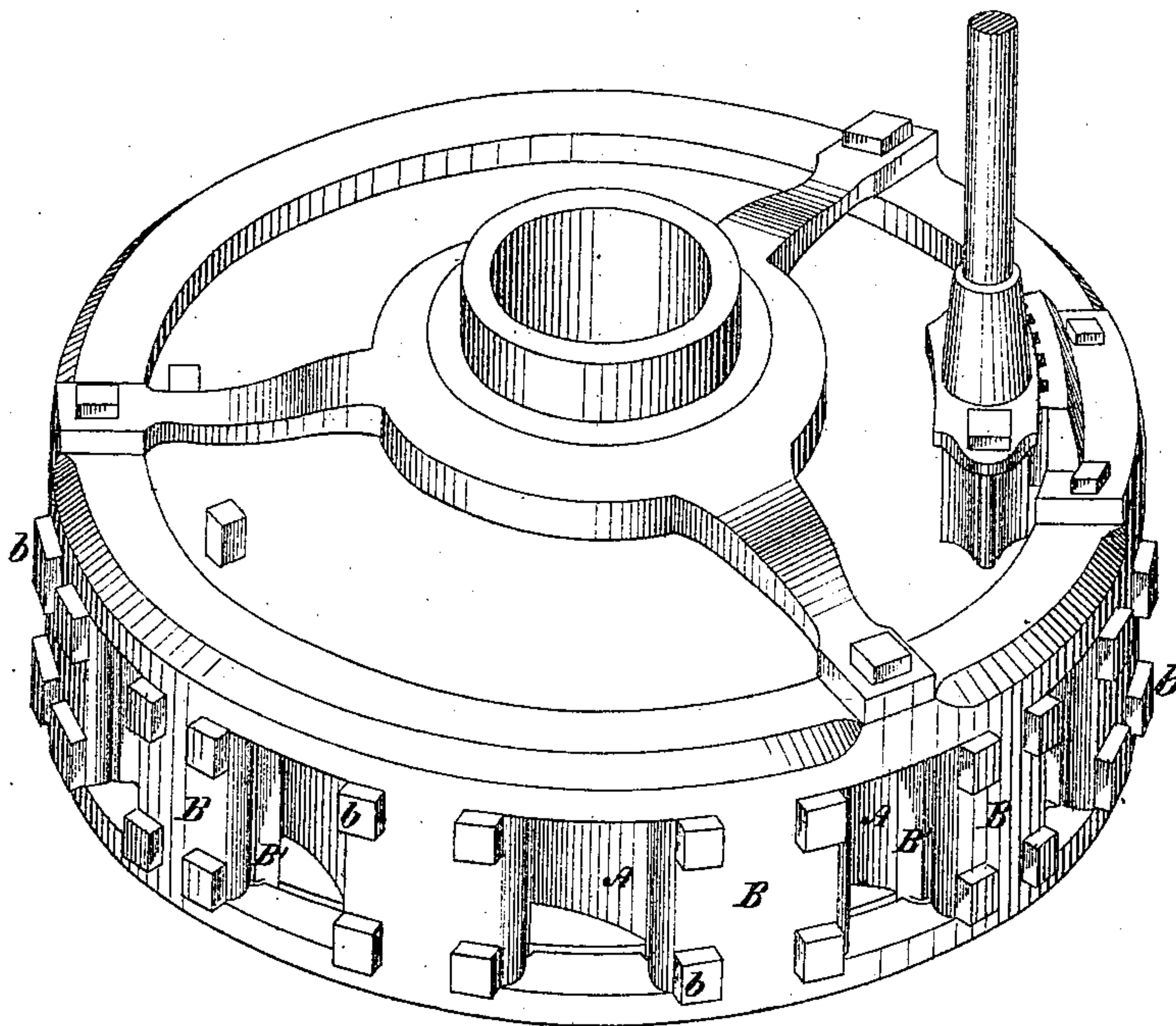
N. F. BURNHAM.

Water-Wheel.

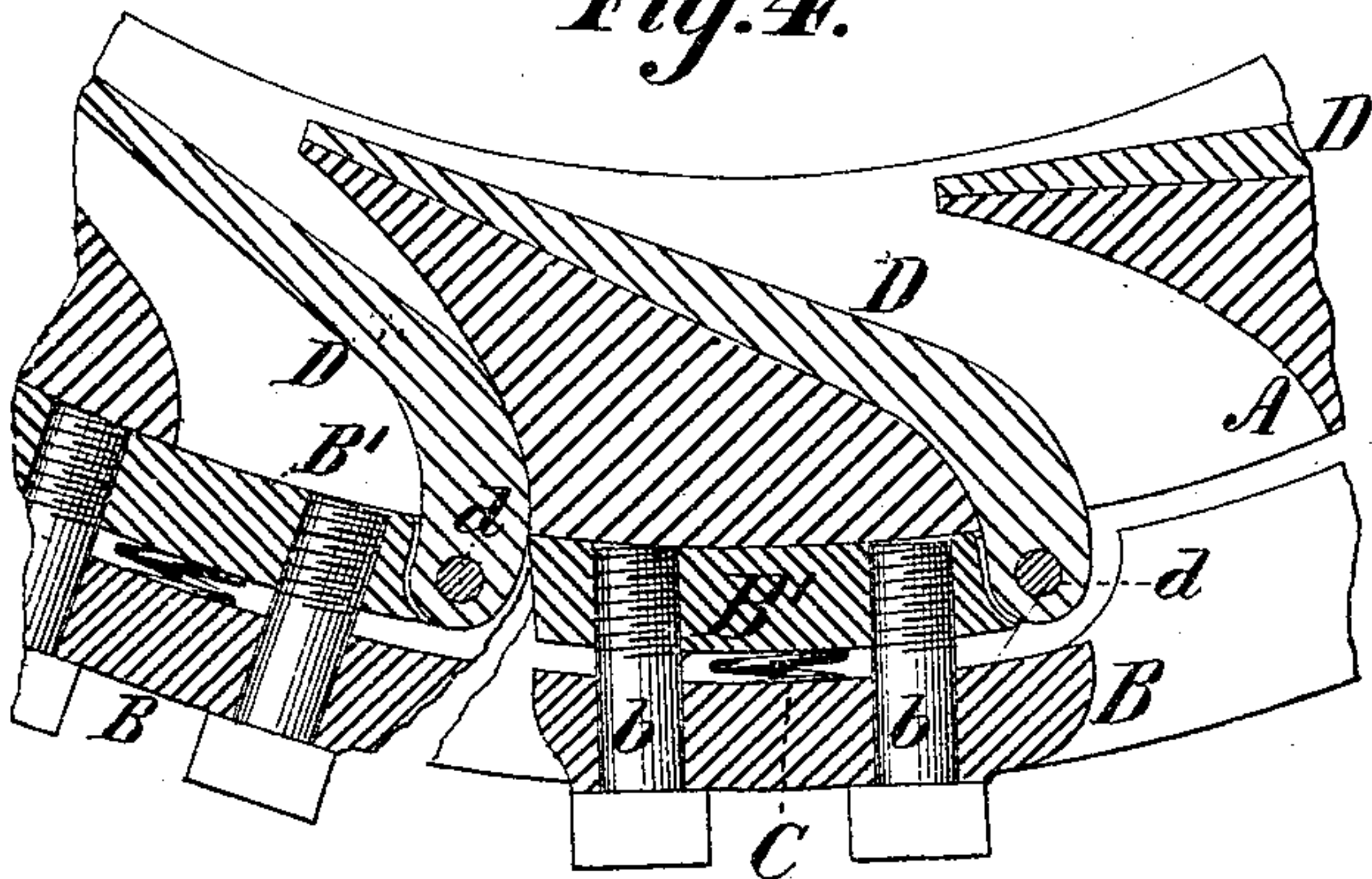
No. 133,079.

Patented Nov. 19, 1872.

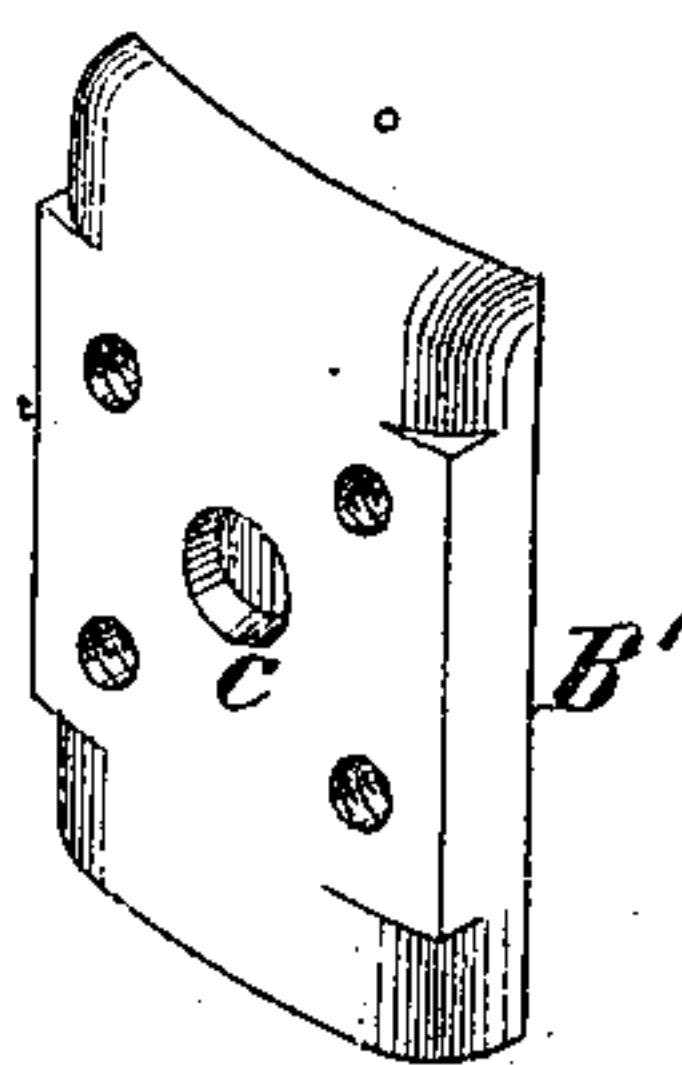
*Fig. 1.*



*Fig. 4.*



*Fig. 5.*



*Witnesses.*

*J. Shorlen Bell.*  
*Thos. J. Town*

*Inventor.*

*N. F. Burnham*  
*by his Atty*  
*Wm. Baldwin*

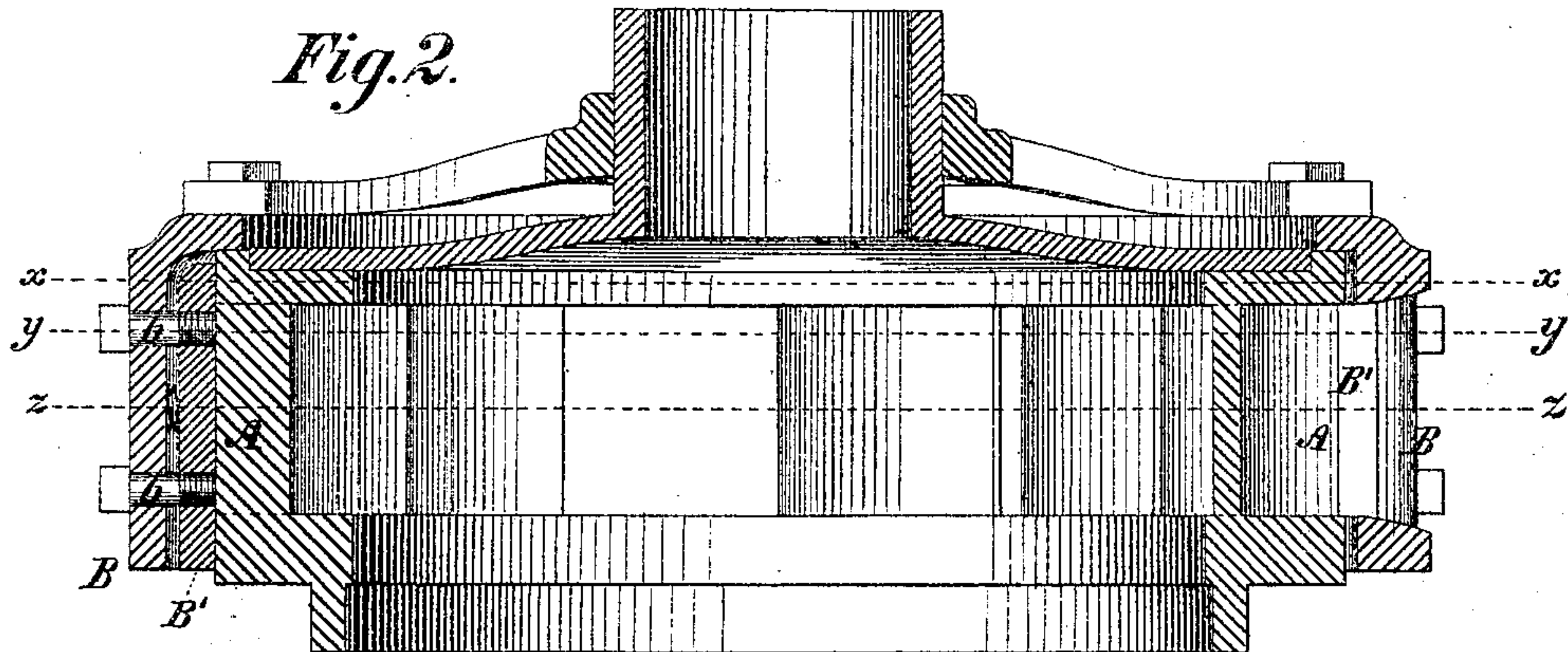


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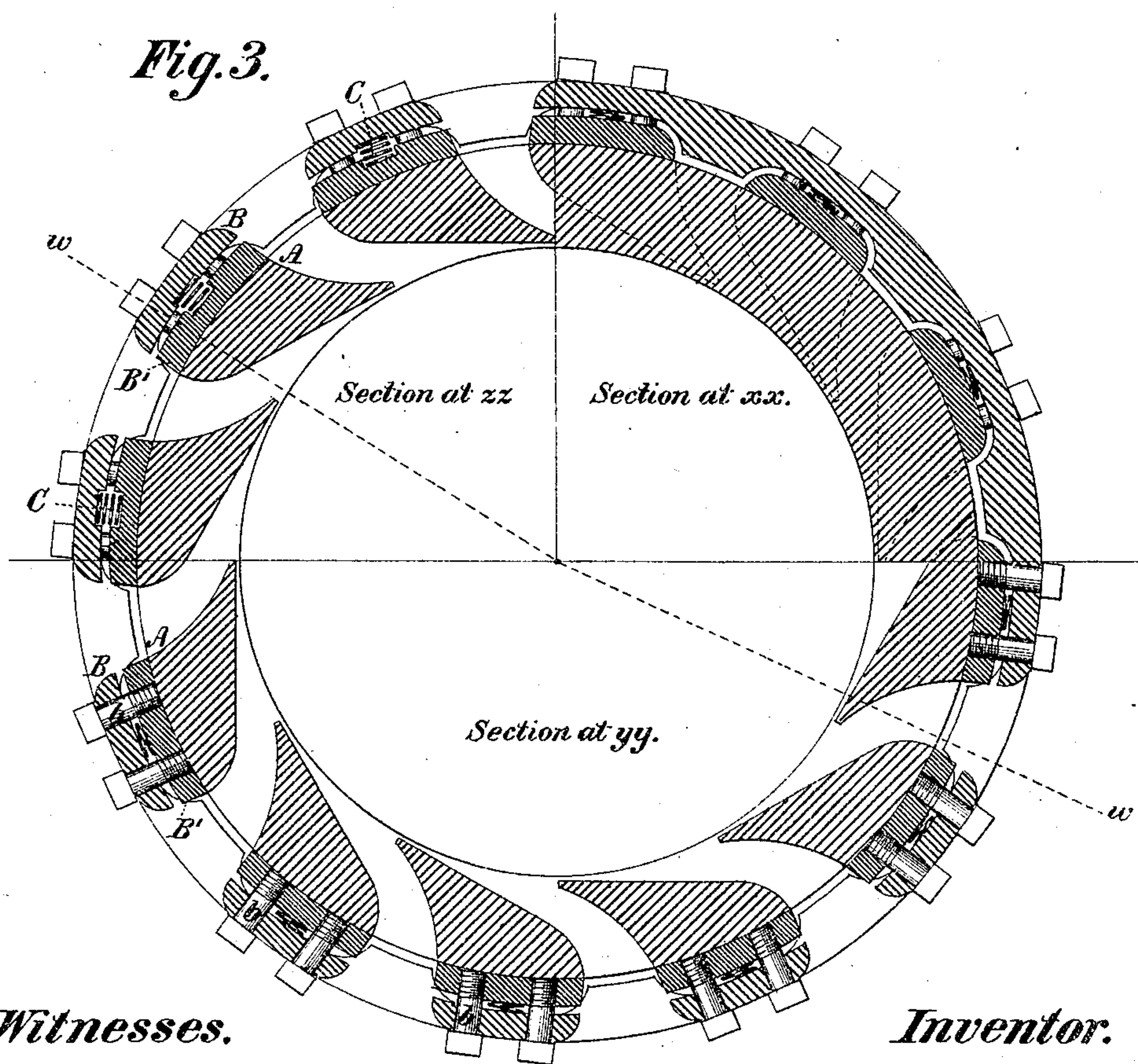
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Patented Nov. 19, 1872.

*Fig. 2.*



*Fig. 3.*



*Witnesses.*

*J. Snowden Bell.*  
*Thos. J. Town*

*Inventor.*

*N. F. Burnham*  
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*W. D. Baldwin*



# UNITED STATES PATENT OFFICE.

NATHAN F. BURNHAM, OF YORK, PENNSYLVANIA.

## IMPROVEMENT IN WATER-WHEELS.

Specification forming part of Letters Patent No. 133,079, dated November 19, 1872.

*To all whom it may concern:*

Be it known that I, NATHAN F. BURNHAM, of the borough and county of York, in the State of Pennsylvania, have invented certain new and useful Improvements in Water-Wheels, of which the following is a specification:

My invention relates to turbine-wheels of the class having an external register-gate to regulate the flow of water to the buckets. My patent of May 9, 1871, shows such a gate fitting snugly, but capable of turning freely around the casing containing the chutes which guide the water to the buckets, recesses being provided between the gate and casing to permit the escape of sand or other clogging matter. The object of the first part of my present invention (which constitutes an improvement on the device above mentioned) is to insure accurate fitting between the gate and casing while allowing the former freely to turn upon the latter, to permit the escape of sand or other clogging matter, and to compensate wear between the adjacent faces of the gate and casing; to which ends the improvement consists in combining the casing and the register-gate, with packing-blocks interposed between the casing and register-gate, fitting accurately to the former, connected to the latter by adjusting-screws, and held closely against the casing by the pressure of the water, which enters freely between the blocks and register-gate, the blocks being free to yield to allow obstructing matter to escape, while ordinarily preserving a tight joint between the gate and casing. My patent of July 16, 1872, shows a gate sliding transversely across the chute, cutting off the water near the inner line of the chute, and provided with a hinged tongue to fill up the space behind the gate, so as to obtain the full effect of the water with a partially-closed gate or a diminished head. The object of the next part of my invention is to combine the advantages of this device with those due to the use of the packing-blocks hereinbefore mentioned; and to this end my improvement consists in combining a casing, a register-gate, a packing-block, and a tongue hinged to the packing-block, and conforming to its movements in opening and closing the chute.

The accompanying drawing shows so much only of a water-wheel case as is necessary to illustrate the invention herein claimed.

Figure 1 is a perspective view; Fig. 2, a vertical section on the line *ww* of Fig. 3; Fig. 3, a horizontal section, different portions of which are taken on the lines *xx*, *yy*, and *zz*, respectively, of Fig. 2; Fig. 4, a horizontal section, on an enlarged scale, of a portion of a wheel case and gate, showing the tongues; and Fig. 5, a perspective view of one of the packing-blocks detached.

The construction of the various parts of the wheel described in my previously-mentioned patents need not be recapitulated here.

The outer surface of the walls *A* of the chutes forms a cylindrical bearing-surface for packing-block *B'*, accurately fitted thereto, and movable across the chutes as usual. These blocks are connected with the register-gate *B* by screw-bolts *b*—in this instance four to each block. These bolts are movable freely back and forth in their sockets in the gate, but screw into the blocks so as to move with them; and it is obvious that, in order to admit of this backward and forward movement, the sockets for the bolts of each block must be formed in the register-gate parallel to the radius passing through the center of the block, instead of being themselves radial. The blocks are pressed constantly against the casing by the inflowing water, which enters freely between the blocks and register-gate, but yield to allow sand or other clogging matter to pass between them and the casing if necessary. The distance between the blocks and casing is regulated by the screw-bolts, the heads of which act as stops to prevent the water from forcing them too closely together. In order to hold the packing-blocks close against the casing when the pressure is relieved, and to prevent the pressure, when let on, from forcing back the packing-blocks by the water getting in front of them, I form recesses *c* in the blocks, and interpose a spiral spring, *C*. The depth of the recesses is such as to permit the gate and blocks to abut, if desired; and to guard against displacement of the springs, similar recesses may also be formed in the gate, respectively opposite the recesses in the blocks. Tongues *D*, hung to the blocks by pivots *d*, move with them, to expand or contract the area of the chutes as the gate is opened or closed.

I claim as my invention—

1. The combination of the casing, the regis-

ter-gate, the yielding connecting-bolts, and the adjustable movable packing-blocks fitting accurately against the casing, and having a water-space between them and the register-gate, substantially as set forth.

2. The combination of the register-gate, the packing-block, the adjusting-bolts, and the spring interposed between the register-gate and packing-block, substantially as set forth.

3. The combination of the casing, the register-gate, the packing-block, and the tongue hinged thereto, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

N. F. BURNHAM.

Witnesses:

A. B. VANDERSLOOT,  
PETER AHL, Jr.