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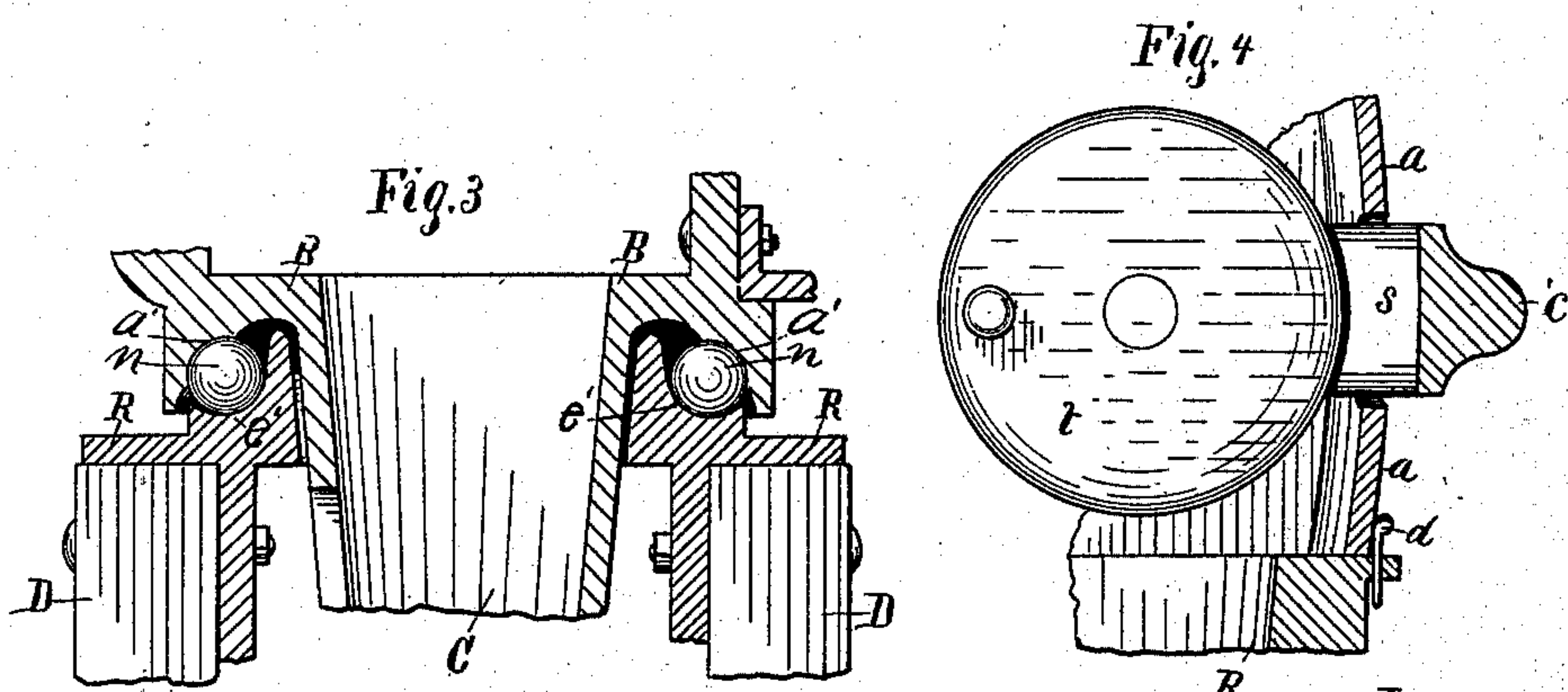
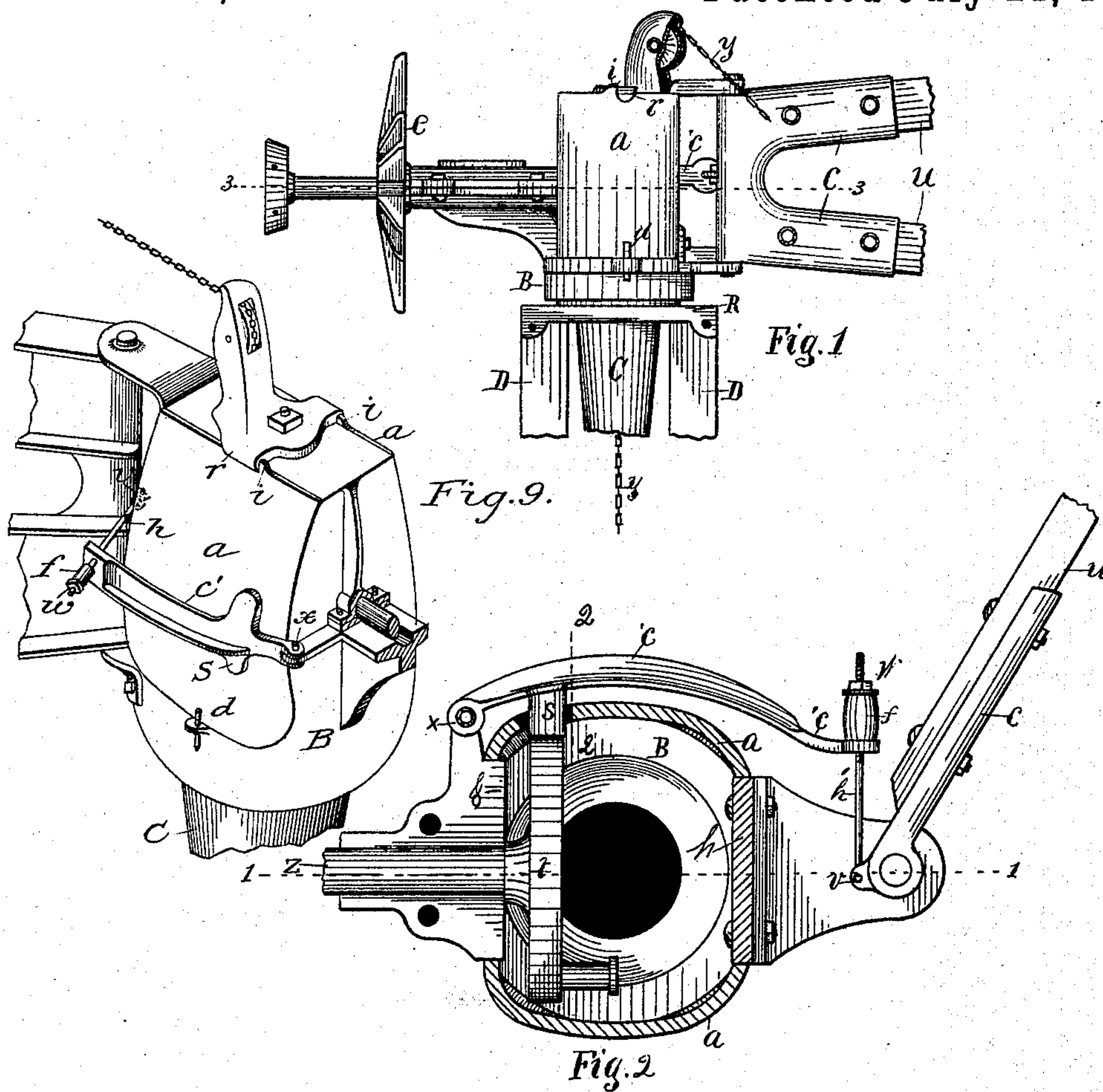
2 Sheets—Sheet 1.

H. MANVEL & M. B. WILLIAMS.

WINDMILL.

No. 322,463.

Patented July 21, 1885.



Attest.

John C. Perkins
John H. Chase

Inventors.

Horner Manvel & Malcolm B. Williams
By Lucius C. West
Atty-

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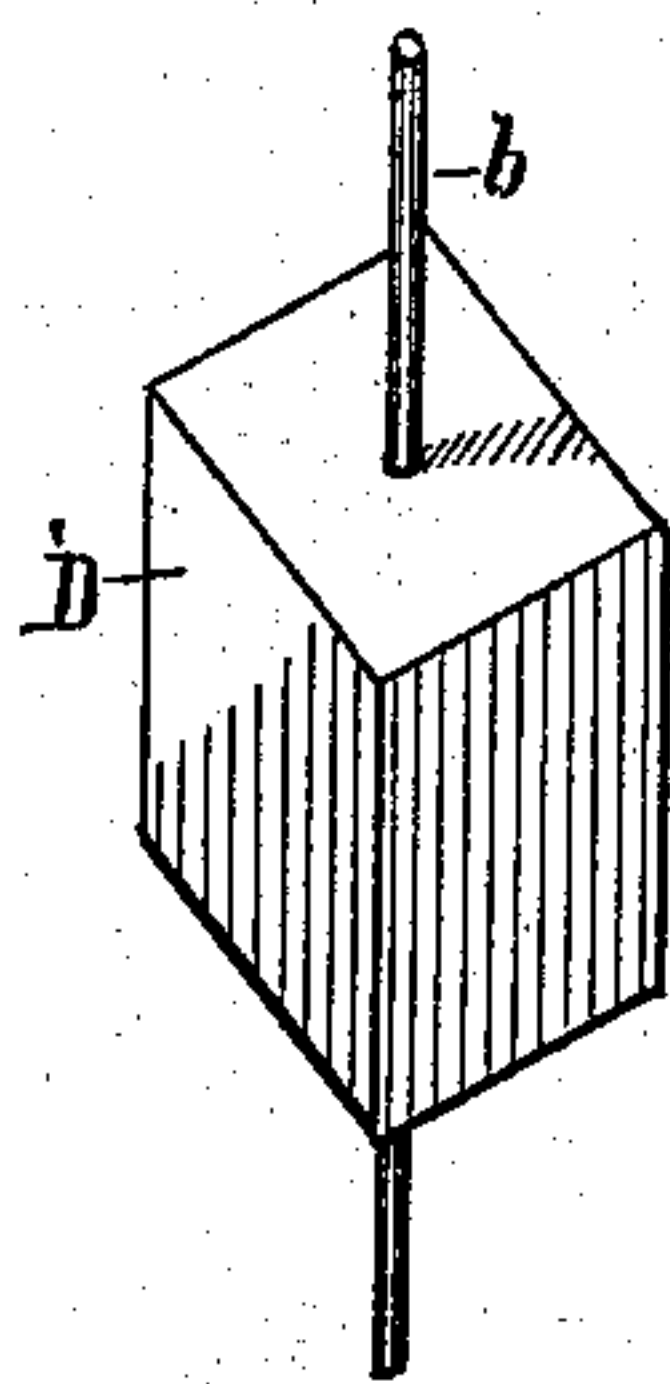
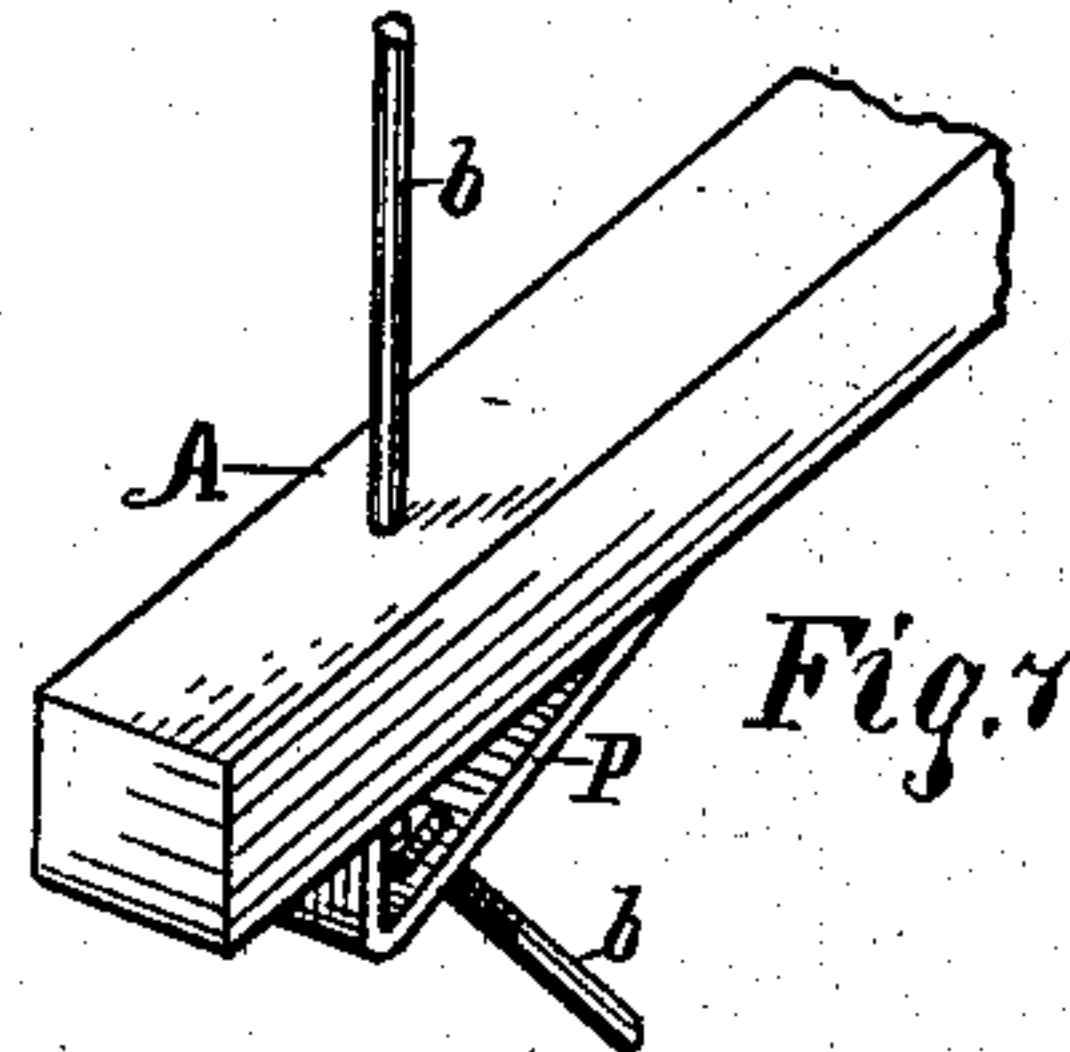
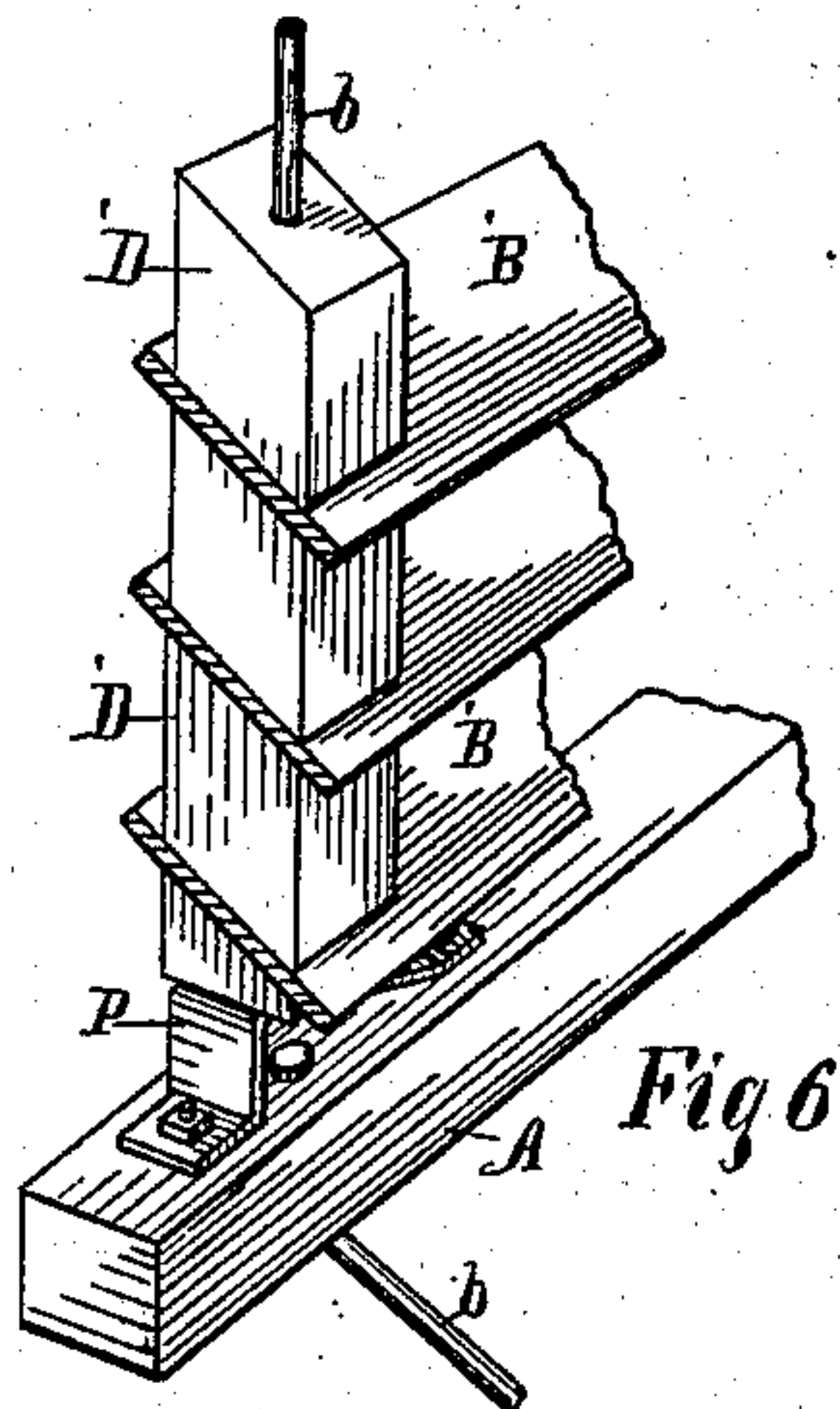
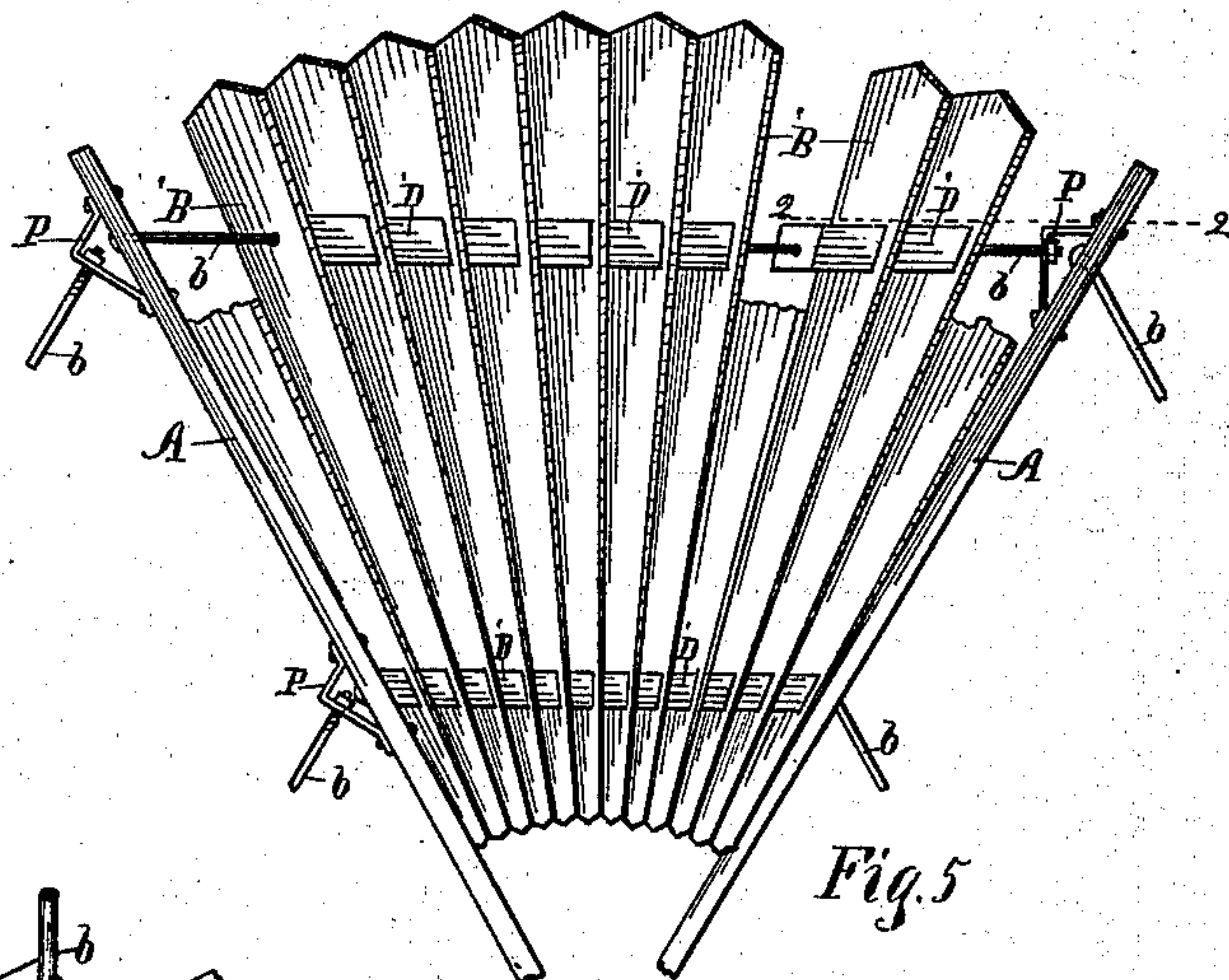
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Fig. 8
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UNITED STATES PATENT OFFICE.

HOMER MANVEL AND MALCOLM B. WILLIAMS, OF KALAMAZOO, MICHIGAN.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 322,463, dated July 21, 1885.

Application filed March 1, 1884. (No model.)

To all whom it may concern:

Be it known that we, HOMER MANVEL and MALCOLM B. WILLIAMS, citizens of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Improvement in Windmills, of which the following is a specification.

Our invention has for its object certain improvements in windmills, hereinafter described and claimed.

In the drawings forming a part of this specification, Figure 1 is a side elevation with the wheel and vane removed; Fig. 2, a horizontal section on line 3 3 in Fig. 1, with parts left full; Fig. 3, a vertical section of Fig. 1, with upper parts broken away, on a line corresponding to 1 1 in Fig. 2; Fig. 4, a broken portion of Fig. 2 in section on line 2 2 in said figure; Fig. 5, a section of a wind-wheel with portions broken away. Figs. 6, 7, and 8 are broken details of Fig. 5 in enlarged perspective, and Fig. 9 is a top view of the urn or casing.

The mill-head B is provided with the usual pendent tubular portion, C, located loosely through the cap R of the derrick D. The cap R is provided with a convex groove or way, *e'*, conforming in contour with the arc of a hemisphere, Fig. 3. A like groove, *a'*, is formed in the under surface of the overarched portion of the head B. In these two circular ways *e'* *a'* spherical friction-balls are located, as at *n*. The arc of the periphery of these balls conforms to the arc of the ways.

By means of these specified details of improvement in the bearings of the mill-head the latter is less liable to get out of balance, accuracy in movement is secured, and the construction and operation otherwise greatly facilitated.

The urn is made small and compact, of a size to incase the crank-disk *t* and immediate connections. The two attachable sides *a a*, are adapted to fit the edges of the front and rear walls, *g h*. The sides *a a* are provided with a lug, *i*, at the upper end adapted to form a back engagement with a hooked lug, *r*, formed on each edge of the upper wall. The base-wall formed with the head B, is provided with a perforated lug on each side adapted to receive the pin *d*, Fig. 1. Thus by means of

the lugs *i r* and the pin *d* the side-wall castings are held in a detachable position in a simple and secure manner. One of the walls, *a*, is perforated to admit the brake-shoe *s* sufficiently far to engage the crank-disk *t*. This obviates the necessity of making the urn unduly large to shield these engaging parts. The brake-shoe lever *c'* is pivoted to a projecting lug of the head at *x*. The other end is perforated, and a rod, *h'*, is loosely located therein. This rod *h'* is pivotally connected with the vane-casting *c* at *v*, forward of the vane-pivot. By this means, when the vane swings to a position to cause the brake-shoe *s* to engage the crank-disk *t*, said vane pulls on the lever *c'*, thus exerting great power with little movement. By this arrangement we are enabled to locate the brake on a more convenient side of the mill.

f is a rubber tube located on the end of the rod *h'*, behind the lever *c'*, and is held in place by a tension-nut, *w*. This tube *f* serves to cause a yielding engagement of the brake-shoe, and prevents a too quick disengagement of the brake in a sudden action of the vane.

In Fig. 5, B' represents the sails of a wind-wheel. A A are the arms of a section of the wheel. The sails radiate in the common manner in a slanting position, Fig. 6. The arms A are provided with loops or connecting-irons P, with which one end of the sail-rods *b* is connected. The other end of the rods *b* are connected with the arms A by passing through a hole in said arm at a point opposite the contiguous end of the next rod *b* in an adjoining section. Said section is not here shown, but the rods thereof are shown broken away in Fig. 5. Between the sails B' are located on rods *b* separating-blocks D', the two ends thereof being beveled to conform to the slant of the sails. In Figs. 6 and 8 these blocks are clearly shown, the sails B' in the former figure being in section on line 2 2 in Fig. 5. Like arrangement of blocks D' and rods *b* are connected with the sails at or near each end, Fig. 5. By turning the nut on the end of the rods *b* in the connecting-irons P the sails and blocks are securely tightened together, and the arms A in their relation with each other and the wheel are properly located, braced, and ten-

sioned. By means of the connecting-irons P the end of one rod *b* is located at a point where the plane of the other ends, bringing the heads opposite, and yet giving room for the use of a
5 wrench in turning the nuts.

In the operation of the mill to throw the wheel out of the wind the hinged vane is swung around toward the wheel, when said vane catches the wind and turns the head on
10 its ball-bearings, as in other mills of this class, and during this action the brake-shoe engages the crank-disk, as before stated.

Separating-blocks have heretofore been employed between the sails of the wheel, in which
15 construction separate actions were required to tension the wheel-sections and to compress the blocks and sails. In other wheels small thimbles have been employed to separate the ends of cast brackets, the sails of the wheel being
20 passed through and secured to said brackets, and the tension-rods being passed through said ends of the brackets and through the thimbles, by which means the sails were adjusted to the desired angle, and "tarved" at
25 their outer ends. In our construction, as contrasted with said state of the art, it will be observed that the same action which tightens the securing-nuts on the ends of the rods *b* to tension the sail-arms and wheel-sections, also
30 compresses the beveled ends of the blocks *D'* directly against the slanting faces of the fixed sails *B'*.

Having thus described our invention, what we claim as new, and desire to secure, is—

35 1. The combination, with the mill-head provided with the front, rear, and top walls to the

urn, and with the side perforated lugs at the base, and the hooked lugs at the top of the side-wall castings provided with the upper lock-lug and the securing-pins, substantially 40 as set forth.

2. The combination of the sail-arms provided with the loop-irons or equivalents, the sails, the blocks having the beveled ends between the sails, and the tension-rods passing 45 through the sails, and blocks adjustably connecting with the loop-irons, whereby the action which tensions the sail-arms and wheel-sections also compresses the beveled ends of the blocks against the faces of the sails, substan- 50 tially as set forth.

3. The combination, with the crank-disk and vane, of the brake having the arm pivoted at one end, the other end perforated and provided with the loosely-playing connecting-rod, 55 said rod provided with the rubber tube back of the brake-arm, and pivotally connected with an extension of the vane forward of the vane-pivot, all substantially as set forth.

4. The combination of a crank-disk, a brake 60 to engage said disk, and an urn covering said disk and brake, and provided with a perforation to admit the brake, substantially as set forth.

In testimony of the foregoing we have here- 65 unto subscribed our names in the presence of two witnesses.

HOMER MANVEL.

MALCOLM B. WILLIAMS.

Witnesses:

JOHN H. CHASE,

CHARLES V. CHASE.