G. B. ROOT & W. W. ROBINSON.

MILL-SPINDLE.

No. 169,847. Patented Nov. 9, 1875.

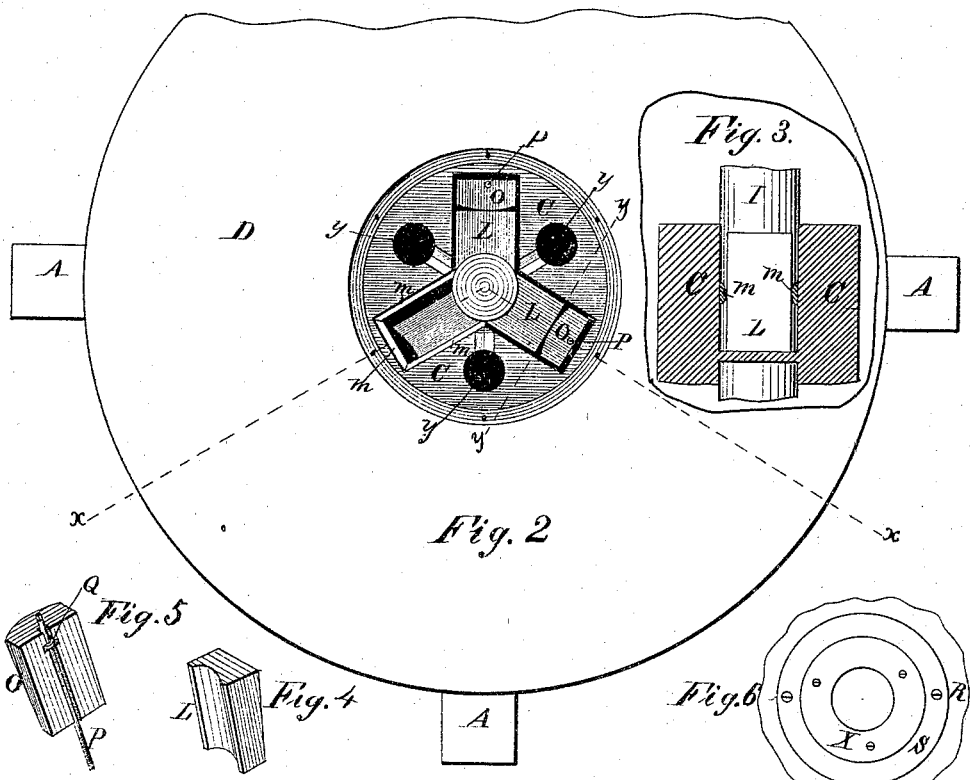
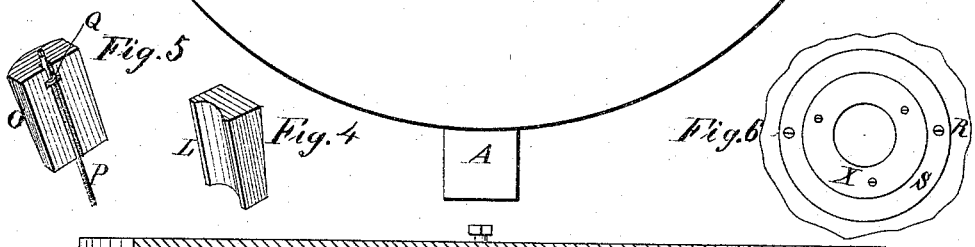


Fig. 2



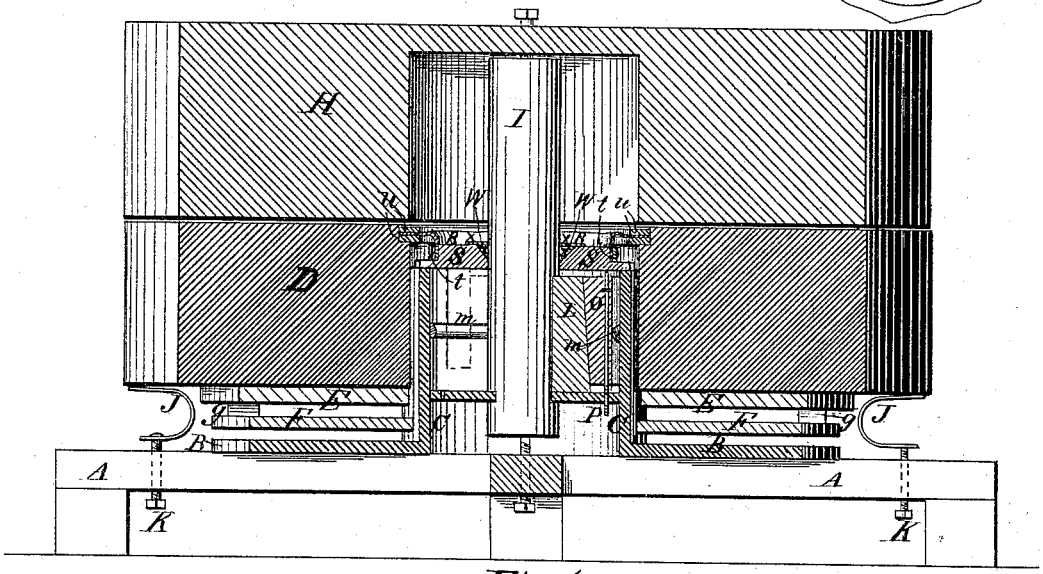


Fig. 1

WITNESSES

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UNITED STATES PATENT OFFICE.

GARDNER B. ROOT AND WILLIAM W. ROBINSON, OF RIPON, WISCONSIN.

IMPROVEMENT IN MILL-SPINDLES.

Specification forming part of Letters Patent No. **169,847**, dated November 9, 1875; application filed September 1, 1875.

To all whom it may concern:

Be it known that we, GARDNER B. ROOT, and WILLIAM W. ROBINSON, both of Ripon, in the county of Fond du Lac and State of Wisconsin, have invented certain new and useful Improvements in Millstone Trams and Bushing; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section taken in the plane of the line *x x*, Fig. 2. Fig. 2 is a plan view of the bed-stone and top of the bush, the cap of the latter being removed. Fig. 3 is a vertical section of the boss, taken in the plane of the line *y y*, Fig. 2. Fig. 4 is a perspective view of one of the bearing-boxes of the spindle. Fig. 5 is a similar view of one of the adjustable wedges; and Fig. 6 is a top-plan view of the annular plate and the cap of the bush, by which the dust-packing is held around the spindle.

Similar letters of reference in the accompanying drawing denote the same parts.

Our invention has for its object to improve the operation of that class of millstones in which the bed-stone is adapted to rock on its supports, for the purpose of adjusting itself to the face of the runner. To this end the invention consists, first, in a series of adjustable springs placed under the edge of the bed-stone, for the purpose of leveling and balancing the same without interfering with its oscillations. It also consists in the construction of the adjustable bearing-boxes in the bush of the bed-stone, and their combination with the runner-spindle, for the purpose of producing a uniform pressure against the spindle, to prevent the unequal wear and heat thereof, as well as of the boxes. It also consists in the combination of a flexible gasket with the bed-stone and runner-spindle, for the purpose of preventing grain, flour, dust, &c., from passing down through the stone, to injure the bearing-surfaces of the spindle and boxes, and at the same time permitting the free oscillations of the bed-stone. It also consists in the combination of the flexible gasket with the bed-stone, the spindle, and the bushing, for the purpose of holding the central support of the gasket in place around the spindle. It also consists in the construction of the gasket and the means for securing it to the bed-stone and bush. It also consists in a packing of wool, cotton, or other suitable material, which we call a "dust-packing," combined with the spindle and the cap or cover of the bushing, for the purpose of preventing the passage of dust, flour, &c., around the spindle, down to the boxes.

In the accompanying drawings, A is the frame-work supporting the millstones, composed of two cross-timbers carrying a central platform, B. C is the tubular bush, rising from the center of the platform. D is the bed-stone, mounted loosely upon the bush, and provided upon its under side with an annular metal plate, E, having notches or recesses at opposite points in its lower face. F is an annular rocking plate of metal, provided with lugs *g g* upon its upper surface to enter the recesses in the plate E, and with recesses in its lower surface at right angles to the line of the lugs *g g* to receive lugs upon the platform B. By this construction the bed-stone is adapted to oscillate freely in any direction, so that its upper surface shall conform to the face of the runner H, which is mounted upon the spindle I in the usual manner. J J are bent springs, bearing at one end against the under side of the bed-stone, and swiveled at their opposite ends to the points of screws K K, passing upward through the cross-timbers of the frame. The springs yield readily under the oscillations of the stone, and serve to level and balance the same when adjusted by the set-screws. The springs prevent the wastage of grain when the stones are first started, because they hold it up to the runner and prevent it from tipping in either direction.

By this method of balancing we avoid the injury done to the stone by cutting into its sides for the introduction of the lead balance commonly employed.

The bearing-boxes and their connections are constructed in the following manner: The interior of the bush C is cast or otherwise formed with three radial chambers to receive the bearing-boxes L, and around the three sides of each chamber, midway of its length, is a horizontal rib, *m*, preferably cast with the bush. The boxes L, by which the spindle is

supported and guided, are made with flat sides to bear against the side ribs of the chambers, and their faces are made concave and lined with Babbitt metal, in the usual manner, to bear against the spindle. The rear sides of the boxes are beveled from the top downward, so that the widest end of each shall lie at the bottom of the chamber. O O are wedge-shaped adjusting-blocks, placed within the chambers behind the boxes, and mounted upon long screw-rods, P, secured to collars Q in each block. The lower ends of the screw-rods enter female screws at the bottom of the chambers, and by their operation the wedge-blocks are fed up and down behind the bearing-boxes. The front faces of the adjusting-blocks are made convex transversely, to bear against the beveled sides of the boxes, and their rear faces and sides are made perfectly flat, to rest against the side and back ribs *m* of the chambers.

By this construction of the chambers, wedges, and boxes, the latter are made to bear against the spindle with a uniform central pressure, and at the same time yield to any jar of the spindle, and oscillate to shape the Babbitt-metal lining thereto.

The ribs *m* cause the boxes to bear evenly against the spindle throughout their entire length, while the convexity of the wedges prevents the boxes from bearing unevenly against the spindle in a lateral direction—that is to say, the ribs form a central line across the back and sides of the boxes, upon which the latter oscillates to and from the shaft—while the convexity of the wedges forms a central line longitudinally of the boxes, about which they oscillate laterally to and from the shaft.

This construction, therefore, forms a universal joint, by which the boxes are adapted to yield in any direction to conform to the jar-rings and oscillations of the spindle.

The vertical adjustment of the wedges to tighten and loosen the boxes does not affect the central bearings thereof, which always remain the same, with the results above stated.

R is the flexible gasket, composed of leather, cloth, rubber, or other proper material, and and fitted into the eye of the stone by the following means: S is a rabbeted disk, firmly attached as a cover to the top of the bush, and through the center of which the spindle passes. The inner edge of the gasket is bent down and attached to the vertical face of the rabbet, where it is firmly secured by a band or strap, *t*. It is then bent or folded outward, and its outer edge clamped to the eye of the bed-stone between two flat rings, U U, which are held together by screws or other suitable fastenings, the lower ring being cemented or otherwise fastened to a ledge formed around the eye of the stone just below its upper surface.

By this construction a folded flexible packing is formed between the spindle and stone, which yields readily to the oscillations of the stone, and at the same time effectually prevents flour, dust, or other matter from passing down through the stone to cut and wear the boxes and spindle.

The cover or disk S is beveled outward around its eye to form a shallow recess for the reception of a roll, W, of cotton, wool, or other material, which is covered by a thin cap, X, fitting closely against the spindle and secured firmly to the disk. This forms the dust-packing, to prevent dust, dirt, and other injurious matter from passing down to the boxes around the spindle. If desired, an annular flexible washer may be placed under the plate, with its inner edge bent upward around the spindle, to more effectually exclude the dirt; but in most cases the soft roll and cover X will be found sufficient. The spindle is lubricated in the usual manner by the capillary attraction of a piece of wicking encircling the spindle, with its end inserted in the oil-receptacles Y formed in the bushing between the box-chamber.

Having thus described our invention, what we claim as new is—

1. The combination of a series of adjustable springs with the oscillating bed-stone, for the purpose of leveling and balancing the same without interfering with its oscillations, substantially as described.

2. The adjustable bent springs J J, arranged under the edge of the bed-stone, substantially as described, for the purpose specified.

3. The chambers of the box, formed with a horizontal rib, *m*, around its sides, substantially as described, for the purpose specified.

4. The combination of the chamber-ribs *m*, convex wedges O, and beveled bearing-boxes L, with the bush and spindle, substantially as described, for the purposes specified.

5. The combination of a flexible gasket with the runner-spindle and oscillating bed-stone, substantially as described, for the purposes specified.

6. The combination of a flexible gasket with the runner spindle, the oscillating bed-stone, and the bushing, for the purpose of holding the center support of the gasket in place around the spindle, substantially as described.

7. The rabbeted disk or bush cover S and the clamping-rings U U, combined with the flexible gasket, for securing it to the bush around the spindle and to the eye of the bed-stone, substantially as described.

8. The dust-packing, consisting of the packing material *w*, held within a recess of the disk S around the spindle, by means of the cap X, substantially as described, for the purpose specified.

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W. W. ROBINSON.

Witnesses for both signatures:
H. H. MEAD,
LEND. HIGBY.