

U. BOWMAN.

3 Sheets—Sheet 1.

Flour Mill.

No. 103,003.

Patented May 10, 1870.

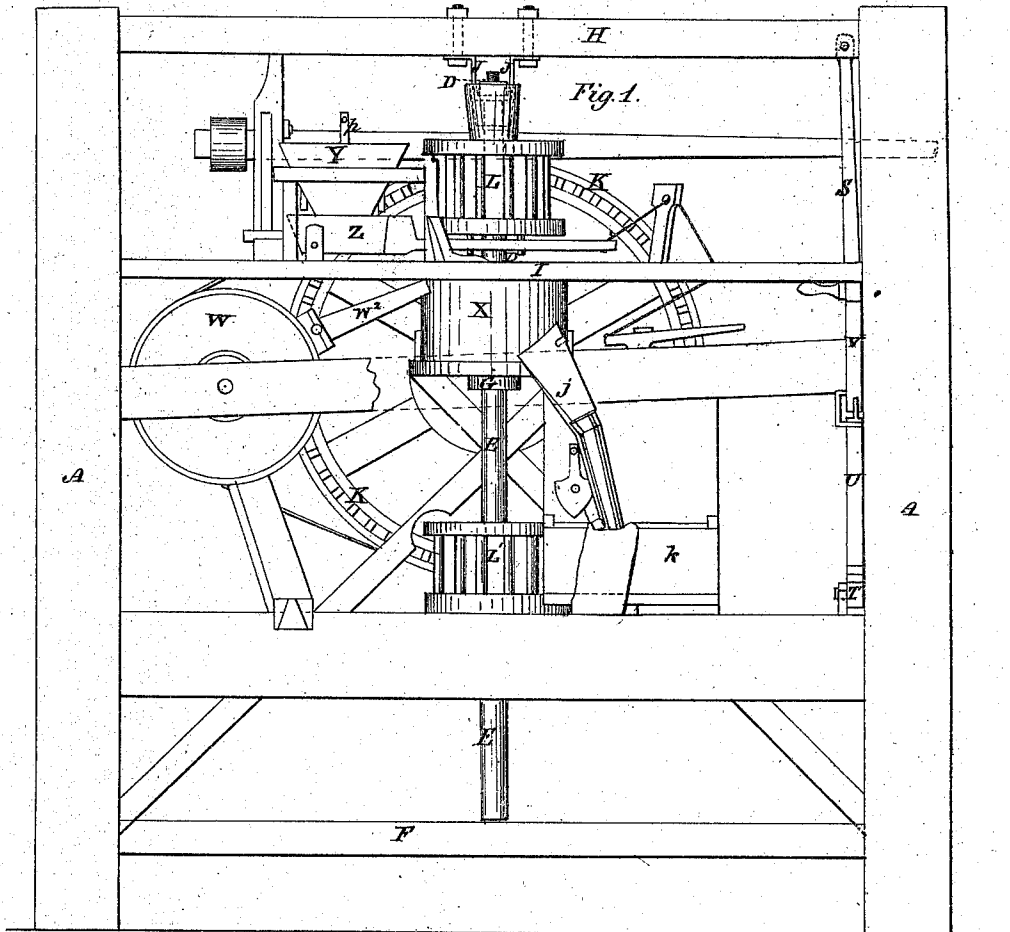


Fig. 6

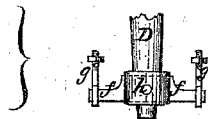


Fig. 4

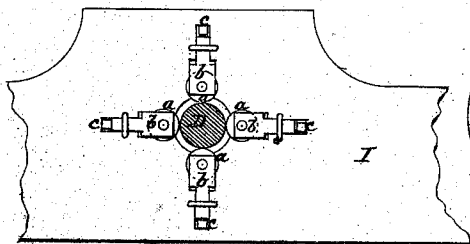


Fig. 7

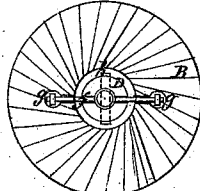


Fig. 9

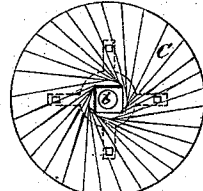


Fig. 5

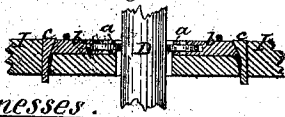


Fig. 8

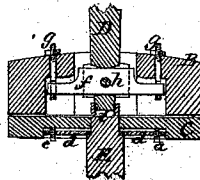
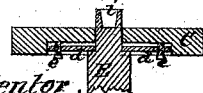


Fig. 10



Witnesses.

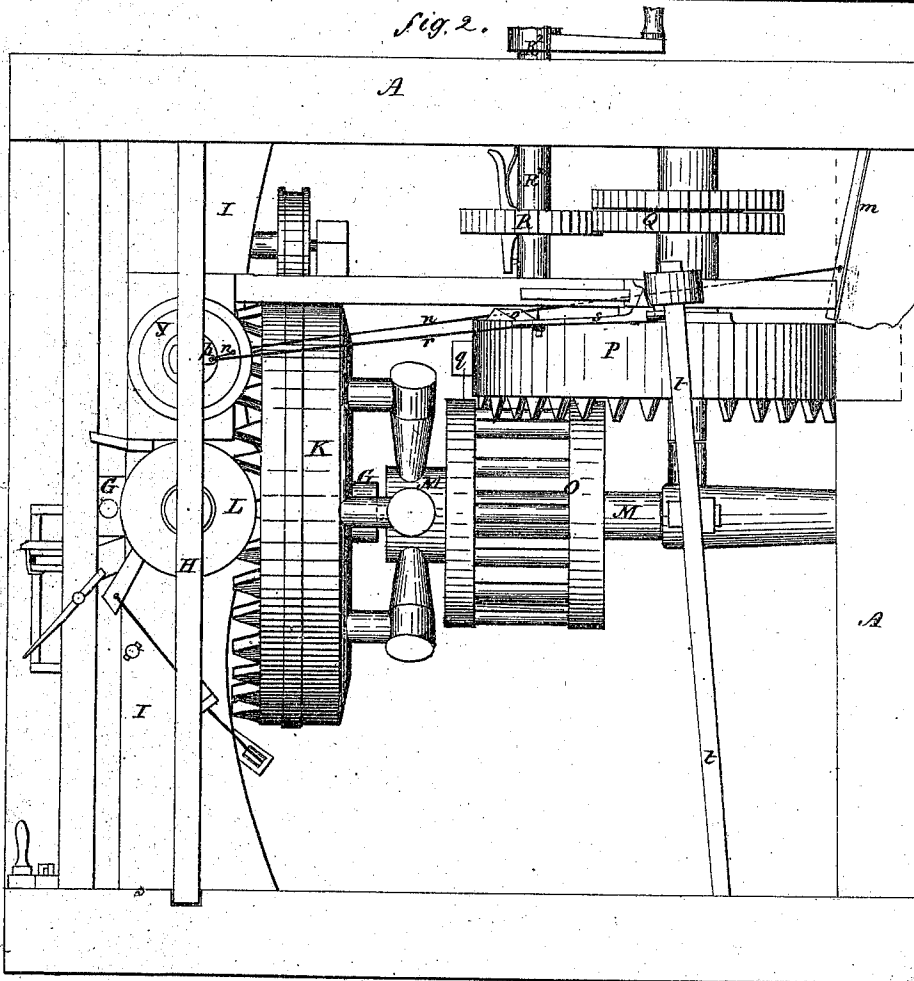
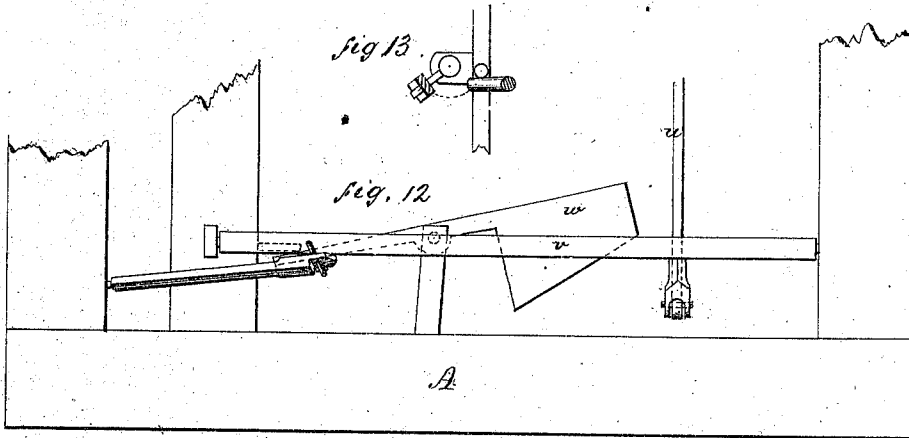
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# United States Patent Office.

URIAH BOWMAN, OF CRAIG'S MILLS, VIRGINIA.

Letters Patent No. 103,003, dated May 10, 1870.

## IMPROVEMENT IN FLOURING-MILLS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, URIAH BOWMAN, of Craig's Mills, in the county of Washington and State of Virginia, have invented certain new and useful Improvements in Flouring-Mills; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings of the same making part of this specification, in which—

Figure 1, sheet 1, represents an elevation of a mill, embracing my improvements.

Figure 2, sheet 2, represents a plan or top view of the same.

Figure 3, sheet 3, represents a vertical section of the same, showing the mechanism for operating the signal-bell.

Figures 4 and 5, sheet 1, represent a top view and section of a portion of one of the bridge-trees, showing the manner of supporting the suspended shaft of the upper grinding-stone in a central position.

Figure 6, sheet 1, represents the lower end of the suspended spindle, showing its attachment to the sword for suspending the upper stone.

Figure 7, sheet 1, represents a bottom view of the upper stone, with its suspending device.

Figure 8, sheet 1, represents a sectional view of the upper and lower revolving stones in their proper relative positions.

Figures 9 and 10, sheet 1, represent a top view and section of the lower stone.

Figures 12 and 13, sheet 2, represent views showing the mechanism for operating the cut-off water-gate, when the mill is driven by water-power.

In the accompanying drawings—

A represents the frame, of rectangular form, and, for a portable mill, of a size from two and a half to three feet square.

At one side of this frame the millstones B and C are arranged, and supported upon and by independent vertical spindles D E, and revolve in opposite directions.

The lower vertical spindle E is supported in a cross-beam, F, at the bottom of the frame, and in a bridge-tree, G, directly beneath the burr which it carries.

The upper spindle D is suspended by an adjustable beam, H, at the top of the frame, and supported by a bridge-tree, I, directly above the burr which it carries. It is suspended by a yoke-shaped metallic frame, J, bolted to the under side of the adjustable beam H, by passing its upper end through an opening in said yoke, and securing it thereto by a collar and nut, as shown in figs. 1 and 3, and, by adjusting the beam vertically, the surfaces of the two stones may be brought in contact, and any desired pressure obtained upon their grinding-surfaces, thereby enabling me to

use burrs of comparatively small diameter, say, about eighteen inches.

The lower end of the upper spindle D and the upper end of the lower spindle E are centered, and supported laterally in their respective bridge-trees by means of four anti-friction rollers, *a*, carried by four arms, *b*, secured to the bridge-trees G I, so as to be adjusted by gravitating wedges *c*, which bear against the outer ends of said arms, and thus keep the said anti-friction rollers centrally in contact with the cylindrical spindles, by which a compensating central bearing is always obtained, as shown in fig. 4.

The lower stone C is secured to and balanced upon the upper end of the lower spindle E, by means of a four-armed plate, *d*, through the ends of the branches of which adjusting screws *e* are secured, by which it may be leveled and adjusted, as shown in figs. 8, 9, and 10.

The upper burr B is suspended by a sword, *f*, pivoted to the lower end of the upper spindle D, the arms of which sword are fitted into suitable recesses in the burr, and secured thereto by two bolts, *g*, the upper ends of which pass through openings in the burr, and are held by screw-nuts bearing on the upper side thereof.

The pivot *h* for connecting the end of this spindle to the sword is at right angles to the latter, and the burr suspended thereby can perfectly accommodate itself to any irregularity in the adjustment of the lower burr, without interfering with its connection with the spindle.

In addition to the centering anti-friction wheels *a* of the upper spindle D, its lower end may be stepped into and centered in the upper end of the lower spindle E, which projects above its burr, and is provided with an opening, *i*, for this purpose, of sufficient depth to admit of the vertical adjustment of the upper burr without interrupting the central junction of the two spindles, as shown in figs. 8 and 10.

The two burrs, having any suitable dress, thus arranged, are revolved in opposite directions, by means of a vertically-revolving master cog-wheel, K, arranged so that its cogs will match into and drive trundle-heads or cog-gearing L L, secured to the upper and lower spindles in such manner as to impart to the burrs opposite revolving motions, whereby the capacity of the grinding-surface of the burrs is greatly increased, thus dispensing with the necessity of using burrs of large diameter, and doing a greater amount of work than it is possible to obtain with the fixed bed-stone, as heretofore.

The shaft M of the master-wheel is supported in suitable bearings in the bridge-tree G of the lower stone, and a pendent arm, N, of the frame, and carries a gear-wheel or trundle-head, O, matching into the

cogs of a driving-wheel, P, the shaft of which is supported in suitable bearings of the frame, and provided with a cog-wheel, Q, into which a similar cog-wheel, R, on the crank-shaft R<sup>2</sup> engages. This latter gear-wheel may be secured by a suitable shifting device, to put it into and out of gear.

The suspension beam H of the upper stone is pivoted at one end and connected at the other to a vertical rod, S, which may be adjusted by means of a screw or the levers T U V, as shown in figs. 1 and 3, to produce any desired pressure of the upper upon the lower burr, and thus compensate for their comparatively light weight.

A blast-fan is inclosed within the case W, and a spout, W<sup>2</sup>, leads therefrom into the case X, which surrounds the burrs, for introducing a continuous blast of cold air directly around the burrs, to keep them cool and prevent the flour from becoming too highly heated. The blast from the fan may be so directed as to strike the opening through which the grain is fed to the burrs and blow out the chaff and dust.

The grain-hopper Y is supported upon the upper bridge-tree I, and is provided with the usual shaking trough Z for feeding the grain through a spout in the bridge-tree into the eye of the upper burr.

The flour is discharged through a spout, j, from the burr-case into a chest, k, or bag, as may be desired.

As the mill is designed especially as a portable one, the hopper, therefore, requires to be supplied from time to time, but, in case it should become empty at any time, from neglect or other cause, I hang a bell, l, within it, so as to be vibrated, and thus give an alarm when the grain in the hopper has fallen below the bell, but so long as the bell is imbedded in the grain it will not ring. This signal-alarm is operated by the driving mechanism, arranged in any convenient manner, but in the drawings it is represented as being operated by devices when the mill is arranged to be driven by hand-power, as shown in fig. 2, and by water-power, as shown in fig. 3. These devices consist of a spring arm, m, connected to the handle p of the bell by a cord, n, and arranged so as to be struck by cams o, on the face of the cogged wheel P, and, although the cams will vibrate the bell each revolution of the wheel, yet no alarm will be given until the grain in the hopper is nearly fed out, so as to set the bell free to make the alarm.

In fig. 3 the devices for operating the alarm are shown as arranged when the mill is driven by water-power, in which case the spring arm m is actuated by cams q on the circumference of the cogged wheel P, and the handle of the bell is connected by another cord, r, to a trip-lever, s, which is tripped when the bell has free motion, and which in turn trips a weighted arm, t, which, through a connecting-rod, u, operates a rock-shaft, v, and lets fall a gate, w, to close the mill-race and cut off the water to the wheel, as shown in figs. 12 and 13. But these devices may be arranged in various ways, and, therefore, any special devices need not be particularly described.

When the mill is arranged to be driven by water-power, the water-wheel is secured upon the lower end of the shaft of the driving-wheel P.

Having thus described my improvement,

I claim—

1. The lower burr C, adjusted upon the spindle E, which carries it, and the upper burr B, suspended by its driving-spindle D, in combination with the master cog-wheel K and the gearing L L', for communicating to said burrs their opposite motions, as herein shown and described.

2. The combination of the adjustable beam H with the short driving-spindle D of the upper burr B, and the metallic frame J, by which said short spindle is suspended, arranged, and operating, as herein shown and described.

3. The combination of the short spindles D and E with the anti-friction wheels a, the graduating wedges c and their carrying arms b, all arranged and constructed substantially as herein shown and described.

4. The combination of the bell l with the cord n, the tripping-lever m, and the cams o, upon the driving gear-wheel P, all arranged and operating substantially as herein described.

5. The arrangement of the tripping devices S T U V, connected to and operated by the vibration of the handle of the bell, to automatically trip and let fall the water-gate w, to shut off the water from the wheel when the mill is operated by water-power, as herein shown and described.

URIAH BOWMAN.

Witnesses:

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