

C. J. SHUTTLEWORTH.

Friction-Gear for Driving and Supporting Mill Stones.

No. 154,156.

Patented Aug. 18, 1874.

Fig. 1.

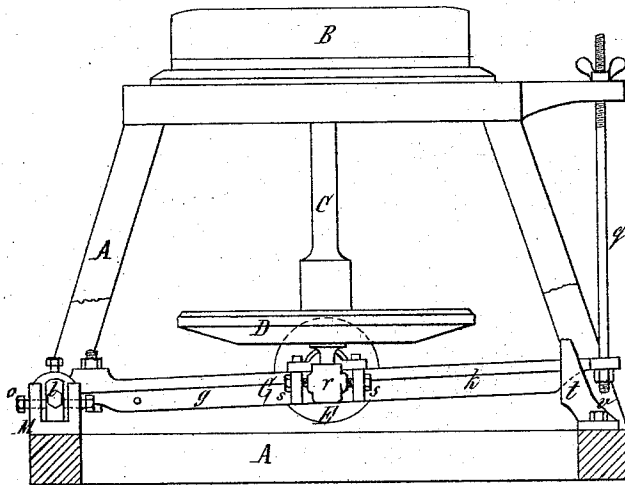


Fig. 2.

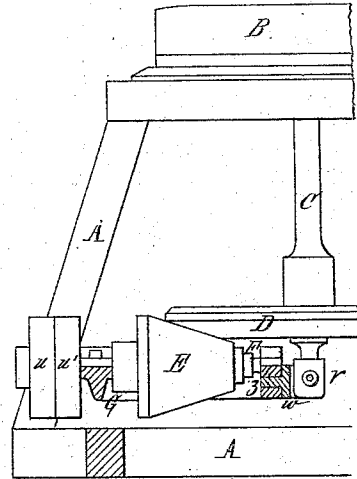


Fig. 3.

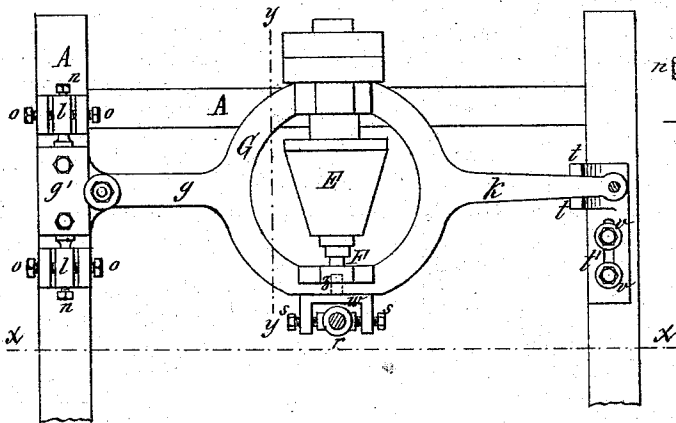


Fig. 4.

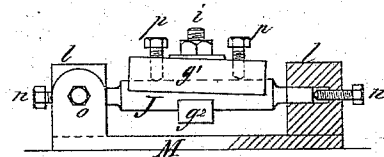
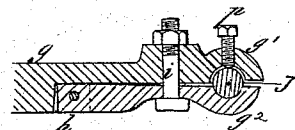


Fig. 5.



J. J. Bonner.
Permit. H. D. Dick. Witnesses

Chas. J. Shuttleworth, the Inventor
by Jay Hyatt
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UNITED STATES PATENT OFFICE.

CHARLES J. SHUTTLEWORTH, OF SPRINGVILLE, NEW YORK.

IMPROVEMENT IN FRICTION-GEAR FOR DRIVING AND SUPPORTING MILLSTONES.

Specification forming part of Letters Patent No. **154,156**, dated August 18, 1874; application filed April 3, 1874.

To all whom it may concern:

Be it known that I, CHARLES J. SHUTTLEWORTH, of Springville, in the county of Erie and State of New York, have invented an Improved Friction-Gear for Driving and Supporting Millstones, of which the following is a specification:

My invention relates to an improved method of driving, supporting, and adjusting vertical shafts by means of friction-gear, thereby dispensing with the use of a step for such shafts, and avoiding the loss of power resulting from the friction incident to this mode of support.

In the accompanying drawings, Figure 1 is an elevation of my improvements with the bed or supporting frame in section in line *x x*, Fig. 3. Fig. 2 is a sectional elevation in line *y y*, Fig. 3. Fig. 3 is a plan of the friction driving-wheel and adjustable supporting-frame thereof. Fig. 4 is a partly-sectional elevation of the bearings for one end of the adjustable frame. Fig. 5 is a vertical section of one end of the adjustable frame.

Like letters of reference designate like parts in each of the figures.

A represents any frame adapted for supporting a portable grinding-mill; B, the lower stone; C, the millstone-spindle; and D, a bevel friction-wheel mounted thereon near the lower end; and E, a similar friction driving-wheel or pinion engaging therewith and mounted on a horizontal shaft, F, which has its bearings in an adjustable frame, G. This frame is preferably constructed with two arms, *g k*, extending from opposite sides of the frame and supported at their ends as follows: The arm *g* terminates in boxes *g¹ g²*, the lower being hinged to the end of the arm, as shown at *h*, Fig. 5, and secured to the rigid box *g¹* by a bolt, *i*. J is a short trunnion passing through the boxes *g¹ g²*, and supported at its ends in bearing-blocks *l l* resting in the ends of a cast-iron bed-plate, M. The trunnion J is adjusted endwise by means of set-screws *n*, while the blocks *l* are adjusted within the frame M by set-screws *o*. *p p* are set-screws, passing through the box *g¹*, with their ends resting on the top of the trunnion, by means of which and the hinged box *g²* the frame G can be tipped or inclined in either direction, as shown in Fig. 4, for a purpose to be presently ex-

plained. The opposite arm *k* of the frame is supported between guide-standards *t* by a suspension-rod, *q*, by which this end of the frame can be adjusted vertically, as may be required. The guide-standards are cast in one piece with a base, *t'*, which is secured to the side of the frame by bolts *v* passing through slots, by which the position of the standards can be readily adjusted. The lower end of the spindle C fits in a box or bearing, *r*, secured by set-screws *s* between two ears of a bearing-block, *w*, attached to the frame G by a pivot, *z*, by which the foot of the spindle can be adjusted in line of said screws, which also form pivots, on which the box *r* can turn. *u u'* are loose and tight pulleys on the end of the driving-shaft F.

The parts being constructed, as above described, it is evident that the weight of the vertical spindle and its attachments are supported by the friction driving-wheel E, and serve to produce the necessary friction between the two wheels to render the gearing operative.

I have found by experience that by making the friction-wheels of wood, especially the driving-pinion, with the end of the grain outward, a most durable and efficient gearing is produced.

The driving-wheel and spindle C are readily adjusted in the various directions required, as follows: The frame G is adjusted lengthwise, or at right angles to the shaft F, by means of the set-screws *o* and movable bearing-blocks *l*. It is adjusted in line of the shaft F by means of the adjustable guide-standards *t t'* at one end, and by means of the set-screws *n* pressing against the ends of the trunnion J at the opposite end of the frame. The frame is adjusted vertically at one end by means of the suspension-rod *q*, while the face of the driving-wheel can be adjusted, if required, to insure the perfect engagement of the friction-surfaces of the two wheels D E. The bearing-block *w* and pivoted box *r* for the lower end of the vertical shaft allow it to adapt itself to this shaft, whether the shaft F and frame G are exactly horizontal or not. The pivots *s* of the box enables the lower end of the spindle C to be adjusted a trifle out of line of the horizontal shaft F, either to the right or

to the left, according as the mill may run, with the sun or against the sun. This will have the effect to prevent the lower end of the spindle C from crowding outwardly against the box *r*, and the shaft F from pressing the collar thereon against the outer box thereof with the force that it otherwise would.

The advantages resulting from my improvements in the saving of power, and in the facility and accuracy with which a millstone or other vertical spindle can be adjusted, are obvious.

My improvements are adapted for driving spindles which run the upper as well as the lower stone, and for stationary and portable mills alike.

What I claim as my invention is—

1. The combination, with a vertical shaft provided with a bevel friction-wheel D, of the bevel friction driving-wheel E, whereby the said shaft and its attachments are driven and supported, substantially as set forth.

2. The combination, with the mill-spindle C and friction-wheel D, of an adjustable frame, carrying a friction driving and supporting

wheel, E, and box for the lower end of the mill-spindle, by which the latter is adjusted, substantially as set forth.

3. The combination, with the vertical spindle C and friction-wheel D, of the frame G, friction driving-wheel E, box *r*, bearing *w*, and suspension-rod *q*, by which the spindle is vertically adjusted, substantially as set forth.

4. The combination, with the vertical shaft and friction driving-gear D E, of the adjustable box *r*, for throwing the foot of the vertical shaft out of line with the driving-shaft, substantially as and for the purpose set forth.

5. The combination, with the frame G, of the adjustable guide-standards *t t'* and adjustable trunnion J, substantially as and for the purpose set forth.

6. The combination, with the frame G and trunnion J, of stationary box *g*¹, hinged box *g*², and set-screw *n*, for adjusting the friction driving-wheel, substantially as set forth.

C. J. SHUTTLEWORTH.

Witnesses:

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