# A. CUNNINGHAM.
## MILLSTONE-DRIVER.

No. 193,598. Patented July 31, 1877.

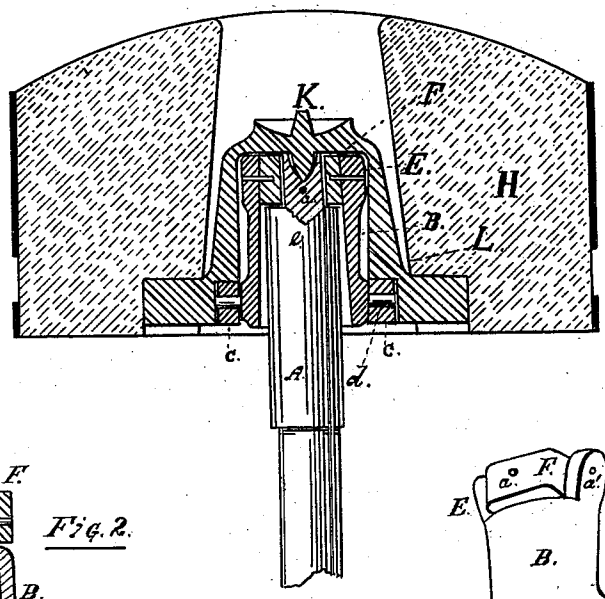



Fig. 1.

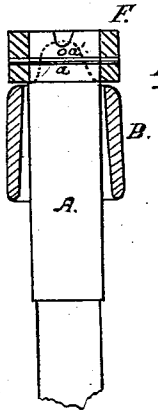



Fig. 2.

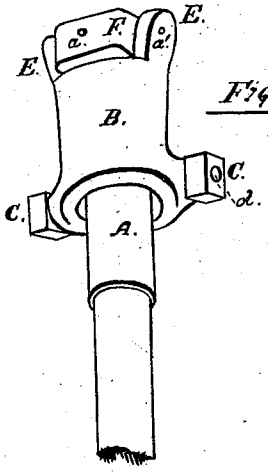



Fig. 3.

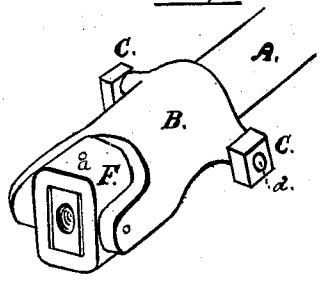



Fig. 4.

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# UNITED STATES PATENT OFFICE.

ALBERT CUNNINGHAM, OF MILWAUKEE, WISCONSIN.

## IMPROVEMENT IN MILLSTONE-DRIVERS.

Specification forming part of Letters Patent No. **193,598**, dated July 31, 1877; application filed March 16, 1877.

*To all whom it may concern:*

Be it known that I, ALBERT CUNNINGHAM, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Millstone-Drivers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention consists of a new device for connecting a mill-spindle to the bail of the millstone, so as to transmit motion from the spindle to the stone in such a manner as not to impair the perfect balance of the stone while in motion, and also permit the spindle to be slightly out of "tram," without its thereby causing an oscillation in the stone.

I accomplish these objects by a peculiar jointed connection between the spindle and the driver, and also in a peculiar form for the driver fitting it to be thus connected.

In the accompanying drawings, Figure 1 is a perpendicular medial sectional view of the upper millstone, the driving staff or spindle, and the driving device and connection. Fig. 2 is a perpendicular medial section of driving-staff and driver at right angles with that in Fig. 1. Fig. 3 is a perspective view of the driving-staff, driver, and connecting-joint. Fig. 4 is a perspective view of the same, showing the joint connecting the driver and spindle.

A is the driving staff or spindle of the usual well-known form and proportions, except that it is formed with the tenon *e* to fit the block F.

B is a hollow sleeve, provided with the ears E E, the projecting trunnions *d d*, and the square washers C C, all constructed and united as shown in the drawing.

F is a square block pivoted to the ears E E by the pivot *a'*, and also pivoted to the end *e* of spindle A, the direction of the pivots being at right angles to each other, thereby forming a universal or gimbal joint. The tenon *e* fits loosely in the block F, so as to oscillate slightly on the pivot *a*. K is the cock-head, which is preferably placed as shown in the drawing.

L is the bale fitted with a recess for the reception of the small square blocks or washers C C, and provided with the adjustable cock-head K, but otherwise of the usual well-known form and proportions.

The point of suspension of the stone or the end of the cock-head K is at or near the horizontal plane that passes through the pivots *a a'*. (*a a'* are to be in the same horizontal plane.) An annular space of about a quarter of an inch in breadth is left between the inside of B and spindle A to allow free oscillation of sleeve or driver B upon pivots *a a'*.

In operation the stone is placed upon the spindle in the position shown in Fig. 1, and balanced upon the cock-head K, the square blocks or washers C C passing into the recesses shown in the bail L.

It is not absolutely necessary to employ the washers C C upon the trunnions *d*, but I prefer their use because a better bearing is thereby secured. If one of the blocks C presses the first upon the bail, the sleeve B will swing backward to a point where both trunnions drive equally.

Any inclination of the driving-staff will not affect the balance of the stone through the driver because the gimbal-joint pivots *a a'* are in the same or nearly the same (preferably the same, though a slight variance will not make much difference) horizontal plane with the point of suspension. The sleeve B is always in tram, because freely hung at the point of suspension, and receives motion from the driving-spindle through the described universal-joint connection.

The connection of the driver with the spindle is at or very near the point of suspension, while the power is applied to the runner-stone at or near the point of extreme resistance.

I am aware that a millstone has been both sustained and driven by a driver-plate pivoted to the spindle and the stone in such manner as to permit a universal motion of the latter; and I am also aware that the ordinary suspending-bail has been driven by a slotted eye-plate or driver mounted on an angular portion of the spindle in the lower part of the stone.

My arrangement is distinguishable, however, from the above and all others by the fact that my driving-sleeve is suspended freely

between the bail and spindle, and the fact that the sleeve transmits the power from the upper end of the spindle directly to the lower part of the stone.

I claim—

1. The combination, substantially as shown and described, of a mill-spindle, a grinding-stone suspended thereon by a bail or balance-rynd, and an intermediate driving-sleeve pivoted to the spindle in such manner as to have a universal motion thereon, and provided with trunnions engaging with the bail.

2. The combination of the driving-sleeve B, spindle A, block F, and pivots *a a'*, when constructed and operating substantially as and for the purposes hereinbefore set forth.

3. The combination of the spindle A, the stone H, suspended thereon by the bail B, the block F pivoted upon the upper end of the spindle, and the driving-sleeve B, pivoted at its upper end to the block, and provided at its lower end with the trunnions *d*, entering recesses in the bail, as and for the purposes described.

4. The combination, substantially as shown and described, of a mill-spindle, a grinding-stone, having at or above its center a bearing on said spindle, and a separate pivoted driving-sleeve extending and transmitting power from the upper end of the spindle directly to the lower part of the stone.

In testimony that I claim the foregoing as my own I affix my signature in the presence of two witnesses.

ALBERT CUNNINGHAM.

Witnesses:

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G. B. SEAMAN.