

(No Model.)

2 Sheets—Sheet 1.

J. COMERFORD.

Device for Balancing Millstones on their Spindles.

No. 233,207.

Patented Oct. 12, 1880.

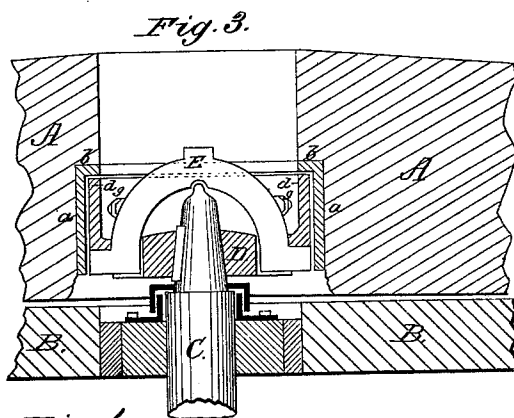
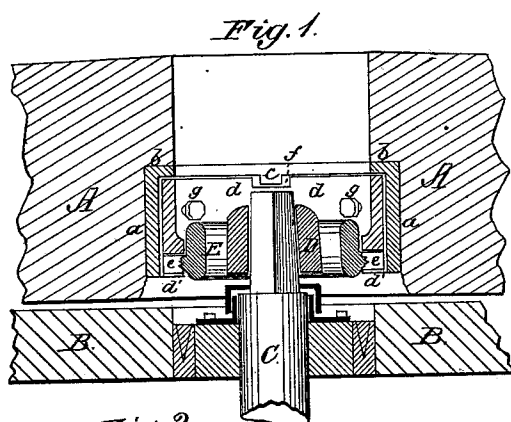


Fig. 2.

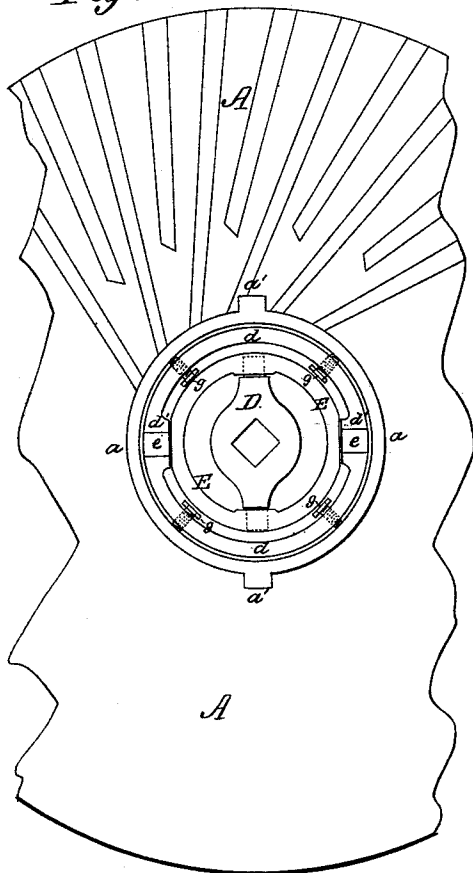
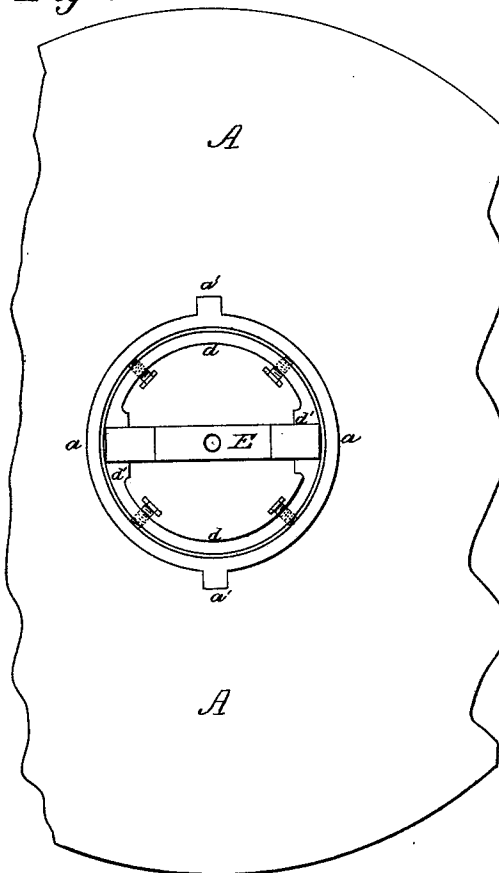


Fig. 4.



WITNESSES:

W. W. Hollingsworth,
John C. Hemon.

INVENTOR:

James Comerford,
BY *Wm. L. G.*
ATTORNEYS.

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2 Sheets—Sheet 2.

J. COMERFORD.

Device for Balancing Millstones on their Spindles.

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Fig. 5.

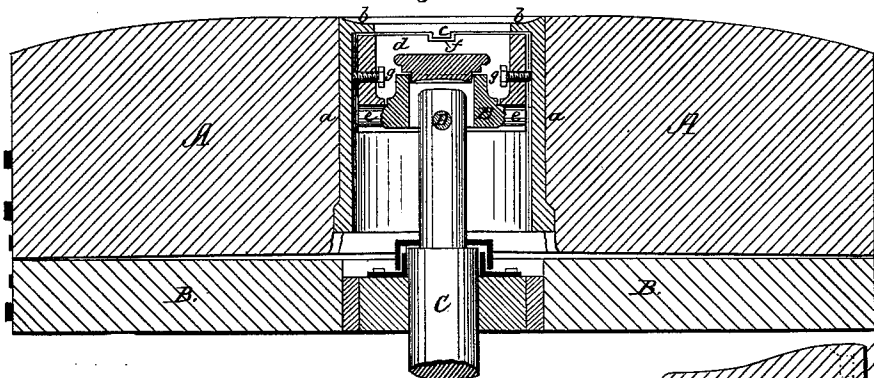


Fig. 6.

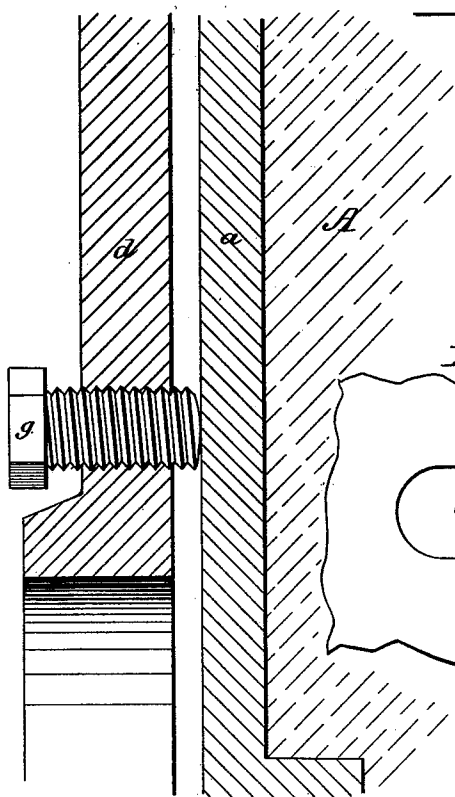


Fig. 7.

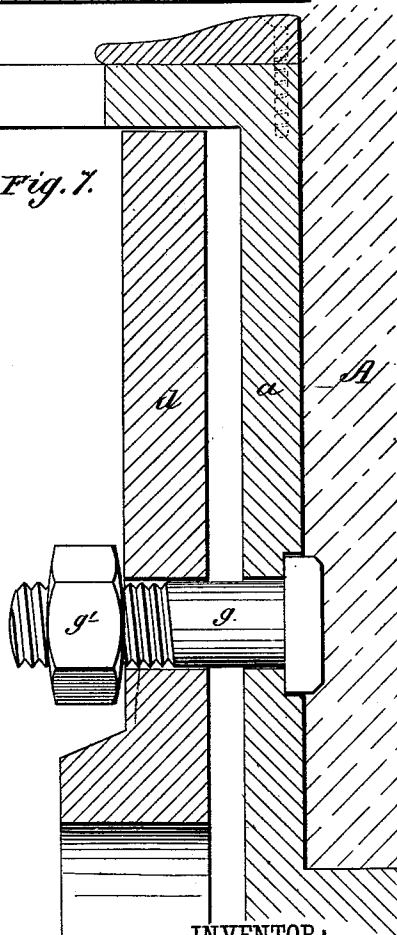
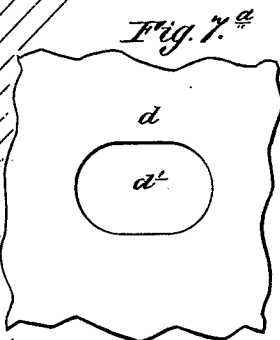


Fig. 7.^a



WITNESSES:

W. W. Hollingsworth,
John C. Lemon.

INVENTOR:

James Comerford
BY *Wm. D. C.*

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JAMES COMERFORD, OF RATHDRUM, IRELAND.

DEVICE FOR BALANCING MILLSTONES ON THEIR SPINDLES.

SPECIFICATION forming part of Letters Patent No. 233,207, dated October 12, 1880.

Application filed August 5, 1880. (No model.) Patented in England January 6, 1880.

To all whom it may concern:

Be it known that I, JAMES COMERFORD, of Rathdrum, in the county of Wicklow, Ireland, have invented a new and Improved Apparatus for Balancing Millstones on their Spindles; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to an improved apparatus for balancing or adjusting the running millstone upon its spindle.

This improved balance consists of a ring fixed in the eye of the stone by three or more radial set-screws, and connected to the universal joint or other bearing on the cock-head of the spindle, the said ring being sufficiently smaller than the eye to admit of the stone being shifted by means of the set-screws in any direction radial to the spindle, with which the ring remains concentric. The stone is supported on the ring by an inwardly-projecting flange or lugs on a lining or a set of legs fixed in the eye and rising through it (more or less) toward the back of the stone, it being generally preferred that the ring should be high up in the eye, so that the bearing on the spindle may be at or above the center of gravity of the stone, although it is not limited to this position. The ring is notched to receive the said lugs, or lugs on the flange, to relieve the set-screws of lateral strain in driving the stone.

By means of the radial set-screw the millstone can be moved or adjusted with regard to the ring and spindle until the point of support on the cock-head of the spindle is brought to coincide with a vertical line passing through the center of gravity of the stone. The stone will then stand in equilibrium. A perfect standing balance is thus obtained, and as no weights have been used a running balance will generally be found to follow, provided the stone be evenly built; but if the stone runs unevenly weights must be used. They can be applied in many ways:

First, equal weights placed in each of the four quarters of the stone, high up at the back near the skirt, those weights being adjustable up and down by screws, as now used, until a perfect running balance is obtained.

Second, the stone having been adjusted on its spindle by means of the set-screws until a per-

fect running balance is obtained, if there be not then a standing balance, weight may be added to the light side of the stone until a standing balance is obtained. This weight should be placed in the same horizontal plane with the point of support, so as not to affect the running balance.

Third, if one side of the stone be heavy standing and the opposite side be heavy running, weight may be added to the heavy side standing, high up at the back of the stone near the skirt, which will make the same side heavy running. By moving the stone on its spindle by means of the set-screws a point can now be found where the standing and running balances coincide, provided the weight be right.

When a perfect standing and running balance has been obtained, the set-screws having been screwed tightly home, the lugs should be keyed in the notches to prevent the possibility of the ring turning in the eye when the stone is set to work; or, if desired, the ring may be permanently fixed by means of cement or by wedge-shaped keys driven tightly in round it. When cement is used the set-screws may be removed or allowed to remain.

In the accompanying drawings, Figure 1 is a central vertical section of a pair of millstones provided with the apparatus of my invention. Fig. 2 is a plan of the runner lying face uppermost, the universal joint being shown in its place in the ring. Figs. 3 and 4 are similar to Figs. 1 and 2, except that the form of driver is different. Fig. 5 is a similar section, the universal joint being high up in the eye above the center of gravity of the stone. Figs. 6 and 7 are details of the radial set-screws.

A is the runner. B is the bed-stone, and C is the spindle on which the runner is poised. D E are the two parts of the universal joint, or the beam and mace, as the case may be. *a* is a cast-iron lining cemented in the eye of the runner, and fixed so as to be incapable of rising or turning therein by two or more lugs, *a'*, recessed and leaded in the burrs. In Figs. 1 and 3 this lining does not extend completely through the eye, which is enlarged at the lower part to receive it, and the lining is cast with an inwardly-projecting flange, *b*. In Fig. 5 the lining extends completely through to the

back of the stone, and the eye is of the same diameter throughout.

c is one of two lugs cast on the under side of flange *b* at opposite points. *d* is an adjustable ring received within the lining *a*, and upon which the flange *b* rests. This ring is cast with bearings *d'*, that rest on the pivots or lugs *e* of the universal joint or other form of bearing used. The parts should fit together with sufficient accuracy to prevent any lateral movement of the ring *d* on the spindle. The ring *d* is also provided with notches *f* in its upper edge to receive the lugs *e*. The ring *d* is rather smaller than the lining *a*, so as to leave a space between the two of about a quarter of an inch, (more or less,) to permit of the desired adjustment, and the notch *f* is considerably wider than the lug *e*, for the same purpose.

g are screw-bolts, preferably four in number, screwing through tapped holes in the ring *d* against the lining *a*. One of these bolts is shown on a larger scale in Fig. 6, which represents a cross-section of part of the ring and lining. By loosening one or more of these set-screws and tightening up the opposite ones, the runner *A* may be adjusted more or less concentrically with the ring *d*. When a perfect standing and running balance have been obtained the notches *f* are packed with keys, one of iron in front of the lug and one of wood behind it, to lock the ring *d* in the lining *a* and insure their turning together and relieve the set-screws of lateral strain in driving the stone. These keys can be easily removed should any readjustment be necessary.

It will be obvious that a set of legs might be substituted for the lining *a*, and that in Figs. 1 and 3 the lining *a* might even be dispensed with altogether. In this case the set-screws

would bear against the stone itself, and the flange *b* would be held by lugs leaded or cemented in the burrs. There should also be an external flange on the ring *d* at or near its lower edge, upon which the burrs or a flange fixed in the burrs would rest.

In Fig. 5 the flange *b*, instead of being cast on the lining *a*, as shown, may be screwed to the ring *d*, so as to be concentric with the spindle *C*, in which case there should be three or more inwardly-projecting lugs cast on the lining *a*, which would fit into notches in the ring *d*.

It is preferred that the set-screws *g* should screw through the ring *d*, as above described; but they might be fixed in the lining *a* with their heads countersunk in the back thereof, as shown in Fig. 7, or embedded in the cement and pass freely through holes *d'* in the ring *d*, and be provided with nuts *g'*, bearing against the inside of the ring. The bolt-holes *d'* should be elongated horizontally, as shown in Fig. 7, to permit of the desired adjustment.

Having thus described my invention, what I claim as new is—

The combination, with runner *A*, of the lining *a*, fixed in the eye thereof, and having flange *b*, with lugs *c*, the ring *d*, provided with bearings *d'*, and the universal joint *D E*, having lugs *e*, whereby the runner may be adjusted by screws *g* with respect to the ring and spindle to obtain a standing balance, and may be maintained in position by keying the lugs in the notches, as described.

The above specification of my invention signed by me this 10th day of July, 1880.

JAMES COMERFORD.

Witnesses:

ROGER HILL, *Rathdrum*.

J. RUTH, *Rathdrum*.