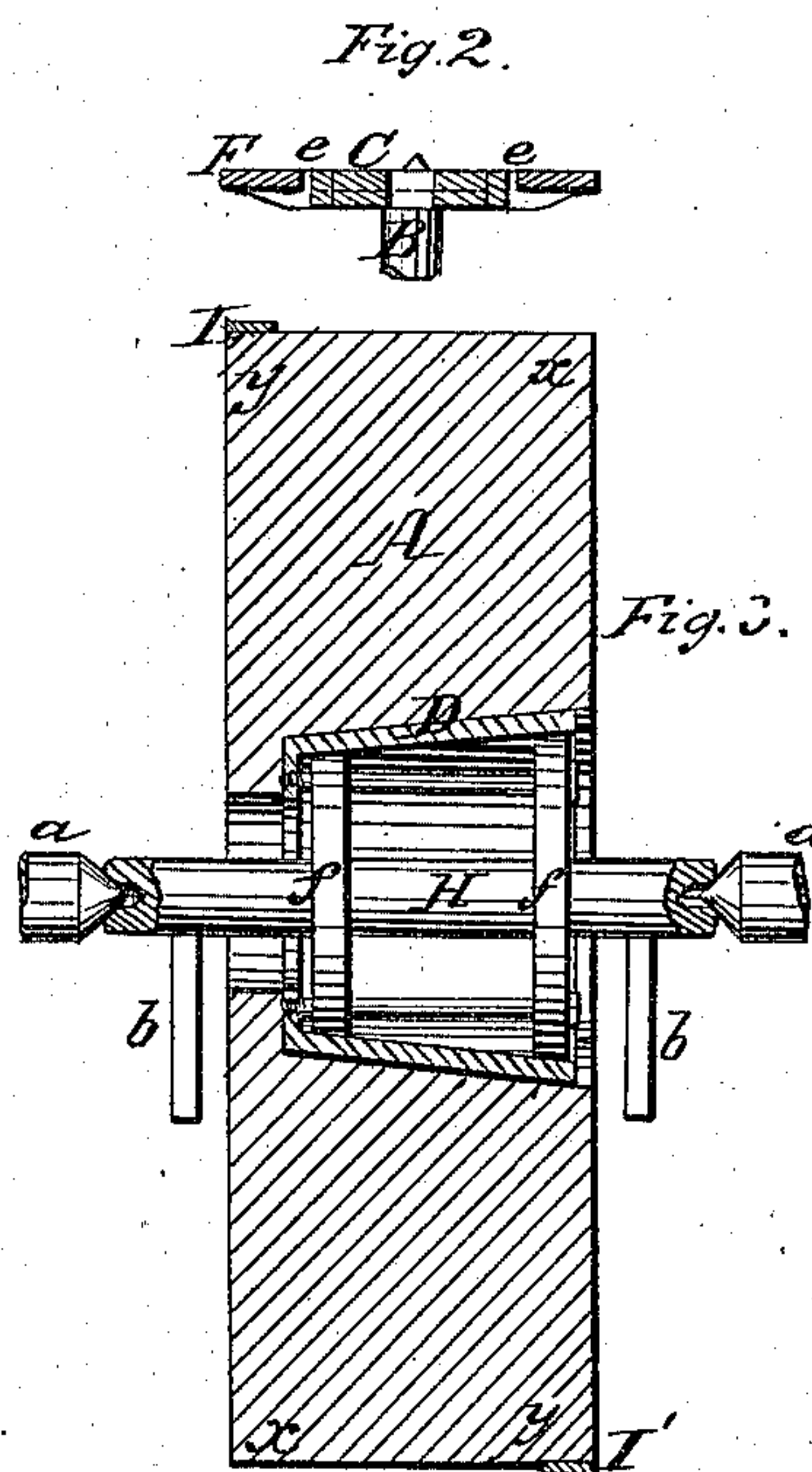
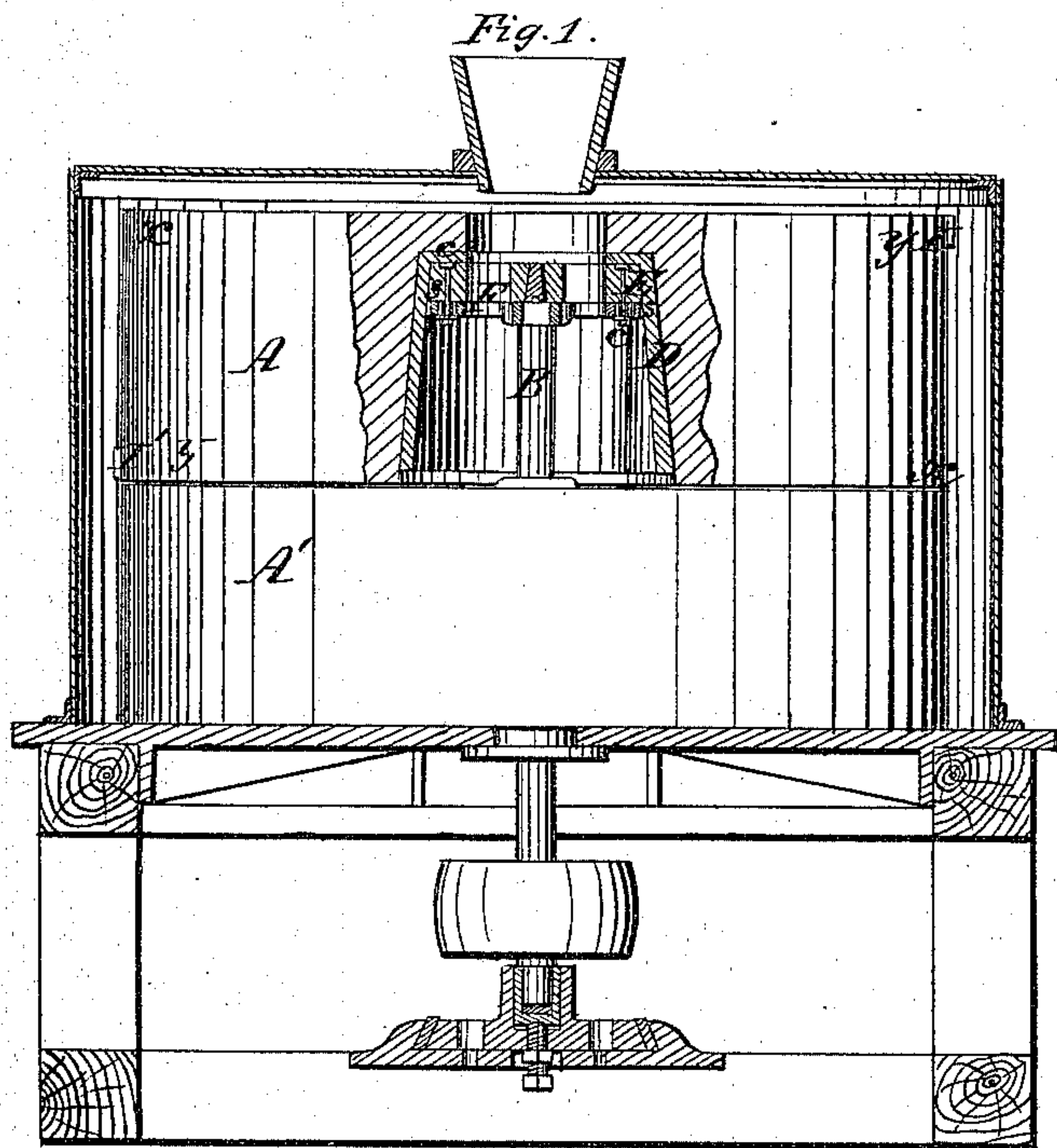


*Weston, Broadbent & Culver,*

*Balancing Mills.*

*No. 104,384.*

*Patented June 14, 1870.*



Witnesses.  
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# UNITED STATES PATENT OFFICE.

CHARLES T. WESTON, SIDNEY BROADBENT, AND WILLARD B. CULVER, OF  
SCRANTON, PENNSYLVANIA.

## IMPROVEMENT IN GRIST-MILL.

Specification forming part of Letters Patent No. **104,384**, dated June 14, 1870.

*To all whom it may concern:*

Be it known that we, CHARLES T. WESTON, SIDNEY BROADBENT, and WILLARD B. CULVER, of Scranton, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Improvement in Grist-Mills; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification.

In the hanging of the rotating stone of a grist-mill great difficulty is often experienced in so balancing it on the spindle that when in motion it shall rotate with its face perfectly parallel to the face of the fixed or bed stone—or, in other words, in a horizontal plane.

To remedy this evil is the object of our invention; and it consists, first, in a novel construction of yoke and method of inserting it in the eye of the stone; second, in a peculiar construction of socket and balancing-mandrel.

To enable others to use our invention, we will describe it by reference to the drawing, in which—

Figure 1 represents an elevation of a pair of our burr-stones, the rotating one being broken away the better to show the application of our improvements. Fig. 2 represents an enlarged sectional view of the driver and carrier, taken at right angles to the position of the same parts as represented in Fig. 1. Fig. 3 is a sectional view, representing the manner of constructing the conical eye and of balancing the stone thereon after its insertion.

The same letters occurring on the several figures indicate corresponding parts.

A indicates the running stone; A', the bed or stationary one; B, the mill-spindle.

D is a conical metallic shell, inserted centrally in the running stone and secured firmly therein. E is the yoke-plug, fitted and secured within the upper end of the cone D, and which has a ring, F, loosely connected to the plug E, so as to be capable of slight motion radially in every direction relatively to the latter, and is provided with lugs or ears *e* on its opposite sides, between which the ends of the driver C on the spindle B enter, and against which said driver operates to rotate the stone.

According to our method of hanging the stone, the cone D is first turned out on its in-

ner side and then cemented in the eye of the stone, and a mandrel, H, provided with disks *ff*, having been previously turned off corresponding in diameter, or thereabout, with the two ends of the interior of the cone, is inserted and secured by bolts. The stone A, supported by the mandrel, is then to be placed upon the two iron or steel straight-edged bars *b*, arranged perfectly level, as represented in Fig. 3, and on which the mandrel H is free to roll, so that the heavier side of the stone will find the lowest position, which, being thus ascertained, is to be counterbalanced by weighting the opposite side in any suitable manner until the stone will remain perfectly still in any position on said bearing. This may be termed "circumferential balancing," to distinguish it from that hereinafter to be described.

The mandrel H, with its disks, may then be detached from the shell D, and the yoke-plug E, which is of conic form on its periphery, corresponding in diameter with the inner periphery of the smaller end of the shell D, and provided with a female center or step in its yoke to rest upon the male center of the spindle B, is then inserted and bolted to the shell D, if necessary, with its lug-ring or bearing-plate F attached, as before described.

The stone is then to be placed upon the spindle B, on which, in close proximity to its male center, is provided the driver C, which consists of a cross-head fitted on a square portion of said spindle, and its ends resting between the lugs *e* of the ring F, which constitutes the carrier to communicate rotary motion to the stone A.

The next thing is to balance the stone horizontally, as, although it may hang perfectly horizontal when at rest, (if the center of gravity perpendicularly is not all around at right angles to the spindle,) when the stone is rotated at a high velocity its center of gravity will seek a horizontal plane and one side of the stone will run low. To remedy this evil I load the stone in such manner as to raise the plane of its greatest specific gravity at the lighter side of the stone and lower it on the opposite side, as represented by the weights I and I', the former being attached near its upper edge to the side inclined to rise, the latter near its lower edge to the drooping one, but



opposite each other radially, so that its circumferential balance is not changed by the addition of such weights.

When the runner is balanced in this manner there will be no tendency to grind the bed-stone convex on its face, nor to grind a portion of the bran too fine while other portions are scarcely cleaned of the flour.

Another feature of our invention consists in the arrangement of the driver C in close proximity to the upper bearing of the spindle B in the eye of the stone. In the ordinary method of hanging the stone with the inverted U-yoke, the cross-head or driver is arranged on the spindle at some distance below the top of said spindle and near the face of the stone, whereby, if the spindle at any time should get the least fraction out of perpendicular, the driver would operate only by one end to rotate the stone, thus causing backlash, as the two ends would bear alternately against the legs of the yoke, instead of both operating together. By our construction of compound driver, as before described, and its arrangement rela-

tively to the yoke-plug E, much friction and wear of such parts are avoided and the stone caused to run much steadier, even regardless of the absolute perpendicular of its spindle.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The taper-formed socket D and the removable yoke-plug E fitted therein, in combination with the driver C and self-adjusting ring or bearing-plate F of the rotating stone of a grist-mill, substantially as herein described.

2. In combination with the taper shell D, straight-edge bars *b*, and weights I, or their equivalent, the detachable and removable mandrel H and disks *f*, for balancing the running stone circumferentially, in the manner described.

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Witnesses:

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