2 Sheets—Sheet 1.

J. MILLS.

Middlings-Grinding Mill.

No. 213,922. Patented April 1, 1879.

Fig. 1.

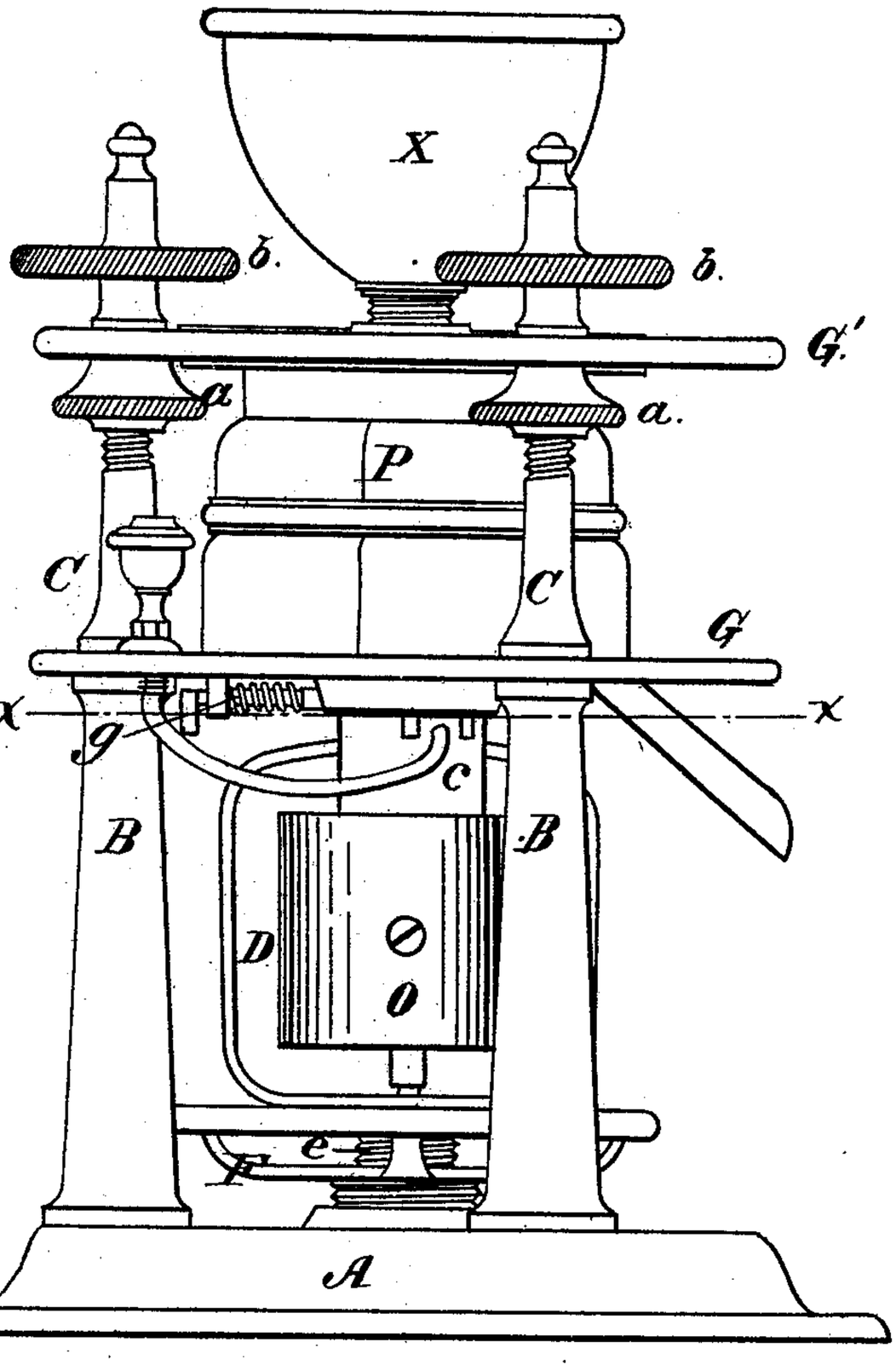


Fig. 2.

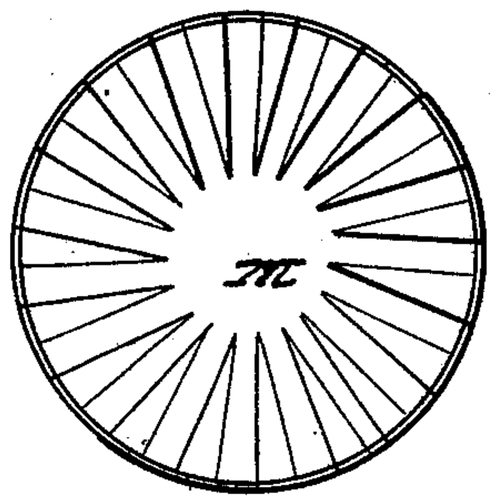


Fig. 3.

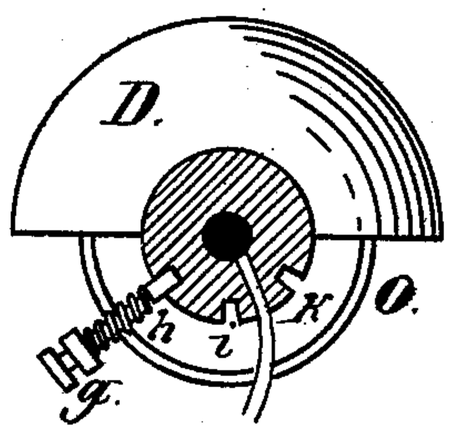
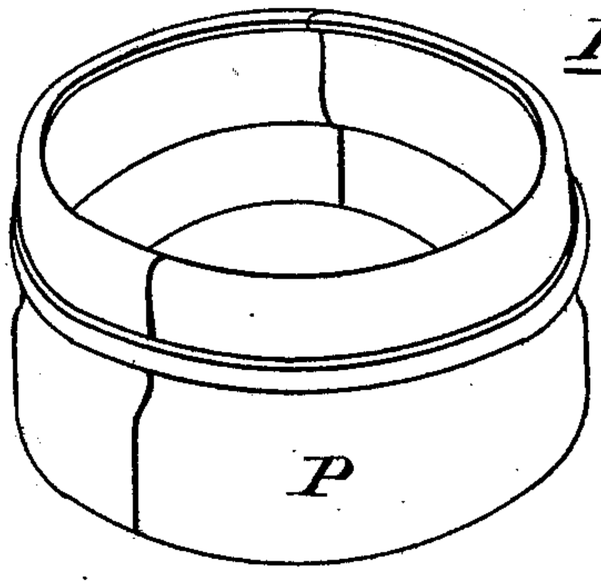


Fig. 4.



WITNESSES:

Harry A. Bruce

Irving T. Ford.

INVENTOR:

Jonathan Mills

By E. B. Bottum

Atty

2 Sheets—Sheet 2.

J. MILLS.

Middlings-Grinding Mill.

No. 213,922. **Patented April 1, 1879.**

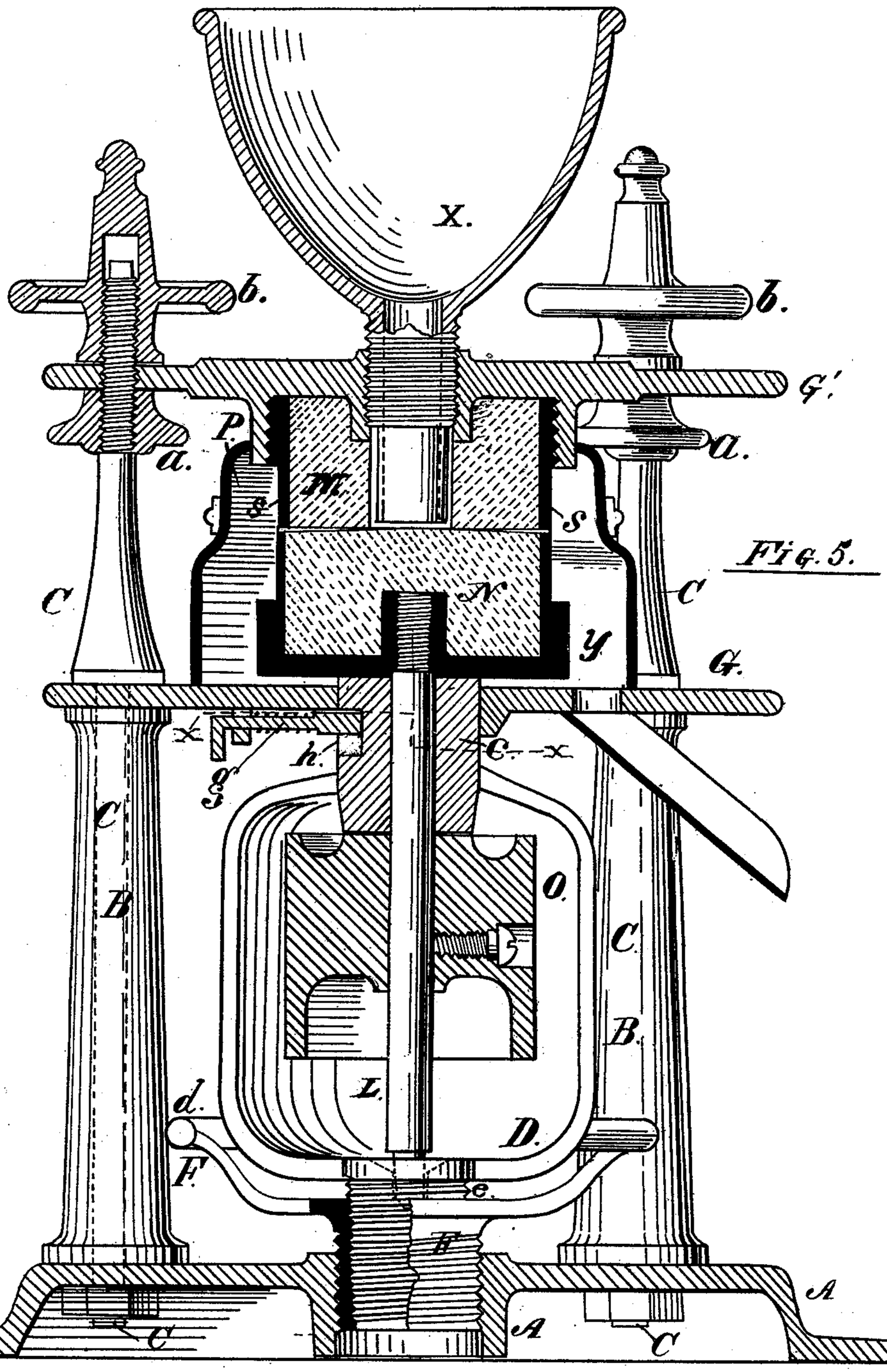


FIG. 5.

WITNESSES:

Harry A. Bruns

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UNITED STATES PATENT OFFICE.

JONATHAN MILLS, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO MILWAUKEE MIDDLINGS MILL STONE COMPANY.

IMPROVEMENT IN MIDDLINGS-GRINDING MILLS.

Specification forming part of Letters Patent No. **213,922**, dated April 1, 1879; application filed October 5, 1877.

To all whom it may concern:

Be it known that I, JONATHAN MILLS, of Milwaukee, in the county of Milwaukee, Wisconsin, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification:

This invention relates to that class of portable mills which are used for regrinding middlings; and its objects are to cheapen and simplify the construction, avoid the usual tremulous motion of the parts, facilitate the adjustment of the stones, and secure a uniform action.

With these ends in view, the invention consists in the use of an adjustable yoke provided with bearings for both ends of the spindle, in special means for adjusting and fastening the yoke, and in various minor details.

Figure 1 represents a side elevation of my improved mill; Fig. 2, a face view of one of the grinding-stones; Fig. 3, a cross-section of the mill on the line *x x;* Fig. 4, a perspective view of the curb; Fig. 5, a vertical central cross-section of the mill.

A represents a base-plate supporting three hollow iron pillars, B, which, in turn, sustain a horizontal plate, G. The above-named parts are firmly united by means of vertical rods or bolts C, which have their upper ends shouldered to bear upon the plate G, and their lower ends threaded and provided with nuts underneath the bed-plate. The upper ends of the rods C are extended a considerable distance above the plate G, to receive and sustain a second plate, G′, and are threaded and provided with nuts *a* and *b*, by which the plate G′ is held and adjusted. D represents my yoke or frame, mounted in the lower part of the mill, for the purpose of sustaining and adjusting the spindle L, to which the runner-stone N is attached. The yoke is made in one piece, hollowed out, or made concave at the middle, to admit the driving-pulley O of the spindle, and provided at the upper and lower ends respectively with central vertical necks or journals *c* and *e*, the former seated in and extending through the plate G, and the latter threaded and seated in a hand nut or wheel, F, which is threaded on its exterior and seated in the base-plate, as shown. This arrangement admits of the yoke being turned horizontally, so that the driving-belt may be brought to the pulley from any desired direction; and as the threads of the nut and the yoke are of different pitches, it also admits of the yoke being raised or lowered bodily. Ordinarily I provide the neck *e* with six, and the exterior of the nut with five, threads to the inch, so that the yoke is adjusted one-thirtieth of an inch at each rotation of the nut; but, of course, the relative pitch may be varied as desired.

In order to prevent the accidental rotation of the yoke, it is provided with a series of notches, *h i k*, and the plate G provided on the under side with a sliding spring-bolt, *g*, to engage therein, as shown in Figs. 1, 3, and 5.

The spindle L has its lower end seated in a step in the lower end of the yoke, and its upper end extended upward through a bearing in the top of the yoke, the yoke thus serving as the sole support of the spindle, and also as a means of adjusting the same vertically. By mounting the two ends of the spindle and stepping it in the yoke, as described and shown, it is given a firm and solid support, the bearings are prevented from getting out of line, and a steadiness and smoothness of action secured.

The runner-stone N, which is also the lower or bed stone, is seated and cemented firmly within a cup-shaped metal head, *y*, the center of which is provided with an upwardly-extending hub, which is threaded and screwed down upon the end of the spindle against a shoulder thereon, as represented in Fig. 5. By thus supporting the stone under its entire surface and at the periphery, and screwing the metal support upon the long neck or bearing, the stone is held with great rigidity and perfect accuracy, and prevented from varying or changing its relation to the spindle in the slightest degree.

The use of the screw as a means of connection between the spindle and the stone-carrying plate is particularly advantageous, in that the numerous threads afford a long bearing-surface, and that they have a tendency, in connection with the shoulder, to hold the stone accurately in the horizontal position instead

of tending to tip or incline it to one side, as is the case when keys or jam-screws are used as a means of fastening the plate in place.

The upper stationary stone, M, is cemented firmly within a metal hoop or band, S, which is provided with an external thread, and screwed into a depending flange or collar on the under side of the plate G', this arrangement serving to unite the stone to said plate in a rigid manner. By adjusting the nuts *a* and *b* the plate and stone may be raised or lowered as desired.

X represents the feed-hopper, which is provided with a threaded neck screwed down through the plate G' and through the eye of the upper stone nearly to the face of the bed-stone, as shown, this arrangement serving both to regulate the flow of the grain and to exclude, to a great extent, the entrance of air.

Around the stones there extends a curb, P, resting upon the plate G, and bearing at the top closely around the flange on the under side of the plate G'. This curb is divided vertically into two parts, and held together by means of an encircling band or hoop, which may be lifted off at will, so as to permit the removal of the curb.

In order to prevent any vertical movement or vibration of the spindle within the yoke, the driving-pulley is arranged to bear at its upper side against the upper end of the yoke in the manner shown.

In practice I find it best to make the grinding-stones of quite small diameter—say, from five to eight inches—and to run them at a high speed, two thousand turns per minute giving good results.

They may be made of any ordinary material, but the material which I prefer is a species of fine white stone found in the State of Arkansas, and commonly known as "Ouachita or Arkansas stone."

While any ordinary form or style of dress may be employed, it is believed that the best results are secured with the dress represented in Fig. 2, the center being bosomed out, and the narrow grinding-face provided with furrows of about one-quarter of an inch in width and one-sixteenth of an inch in depth. The construction of the yoke with the two spindle-bearings therein and its vertical adjustment constitute the main features of my mill. The peculiar form and arrangement of mechanism for adjusting the yoke are of secondary importance. That shown is considered the best; but it is manifest that other equivalent adjusting devices, such as a lever or wedge, would give the same result.

This construction of the frame I do not claim herein, it being my design to make the same subject-matter of a separate patent.

Having thus described my invention, what I claim is—

1. In a grinding-mill, the vertically-movable yoke or frame D, provided at its ends with the two guiding-necks, and mounted in the main frame, in combination with the central spindle, having its ends sustained in said necks, and adjusting devices, substantially such as shown.

2. The combination of the main frame, the spindle-supporting yoke provided with the threaded neck *e*, and the intermediate differential nut F, as shown.

3. The yoke provided with the two spindle-bearings and the central enlargement, and arranged for rotary adjustment on its vertical axis in the main frame, as and for the purpose described.

4. In a grinding-mill, the combination of the main frame, the spindle-supporting yoke D, capable of a rotary and a vertical adjustment, and the locking-bolt *g*, arranged to lock the yoke in position, as shown.

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

JONATHAN MILLS.

Witnesses:

E. H. BOTTUM,

GEO. SCHMITT.