

(No Model.)

2 Sheets—Sheet 1.

J. R. RICHARDSON.

PULVERIZING MILL.

No. 261,955.

Patented Aug. 1, 1882.

Fig. 1.

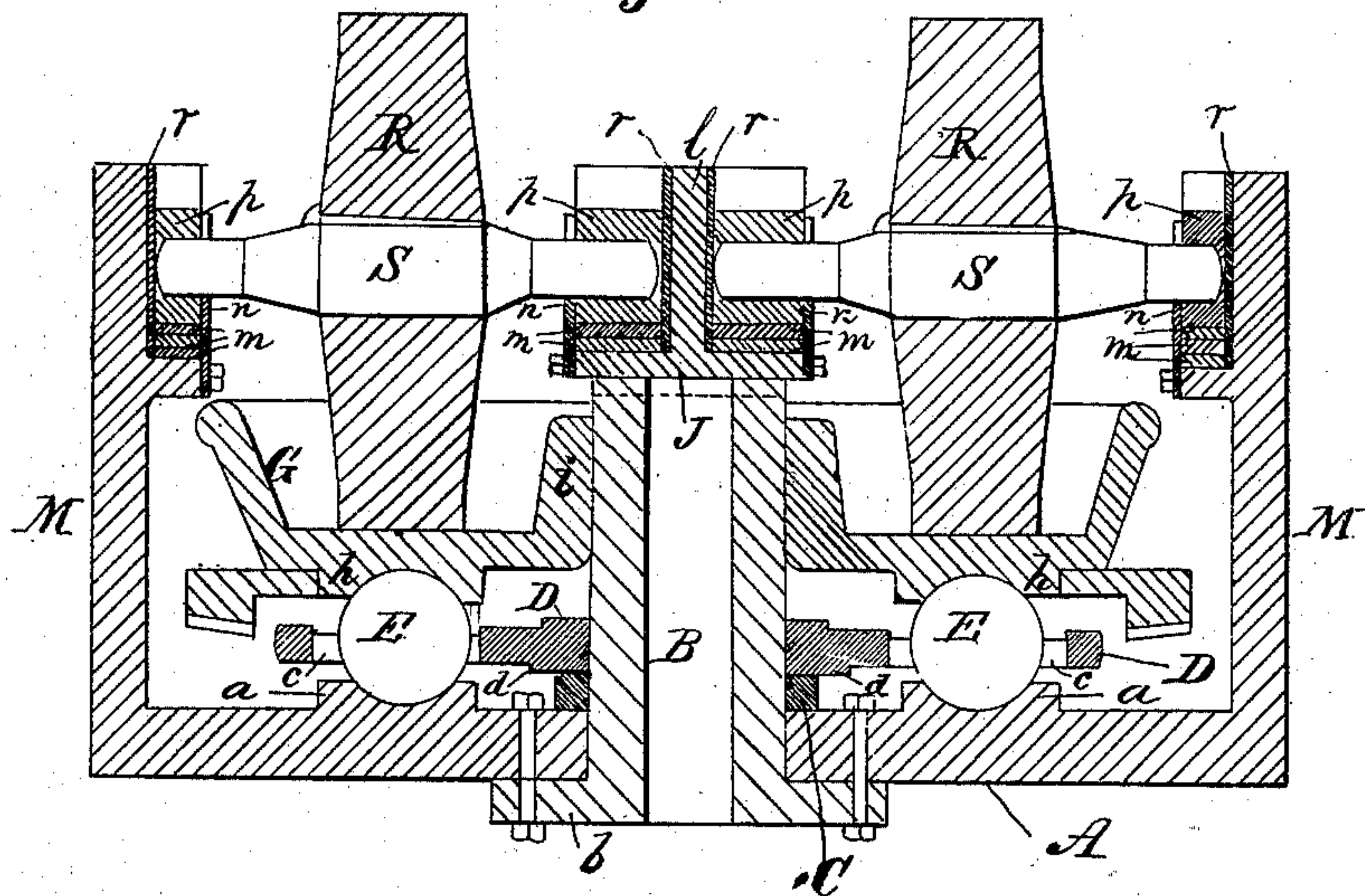
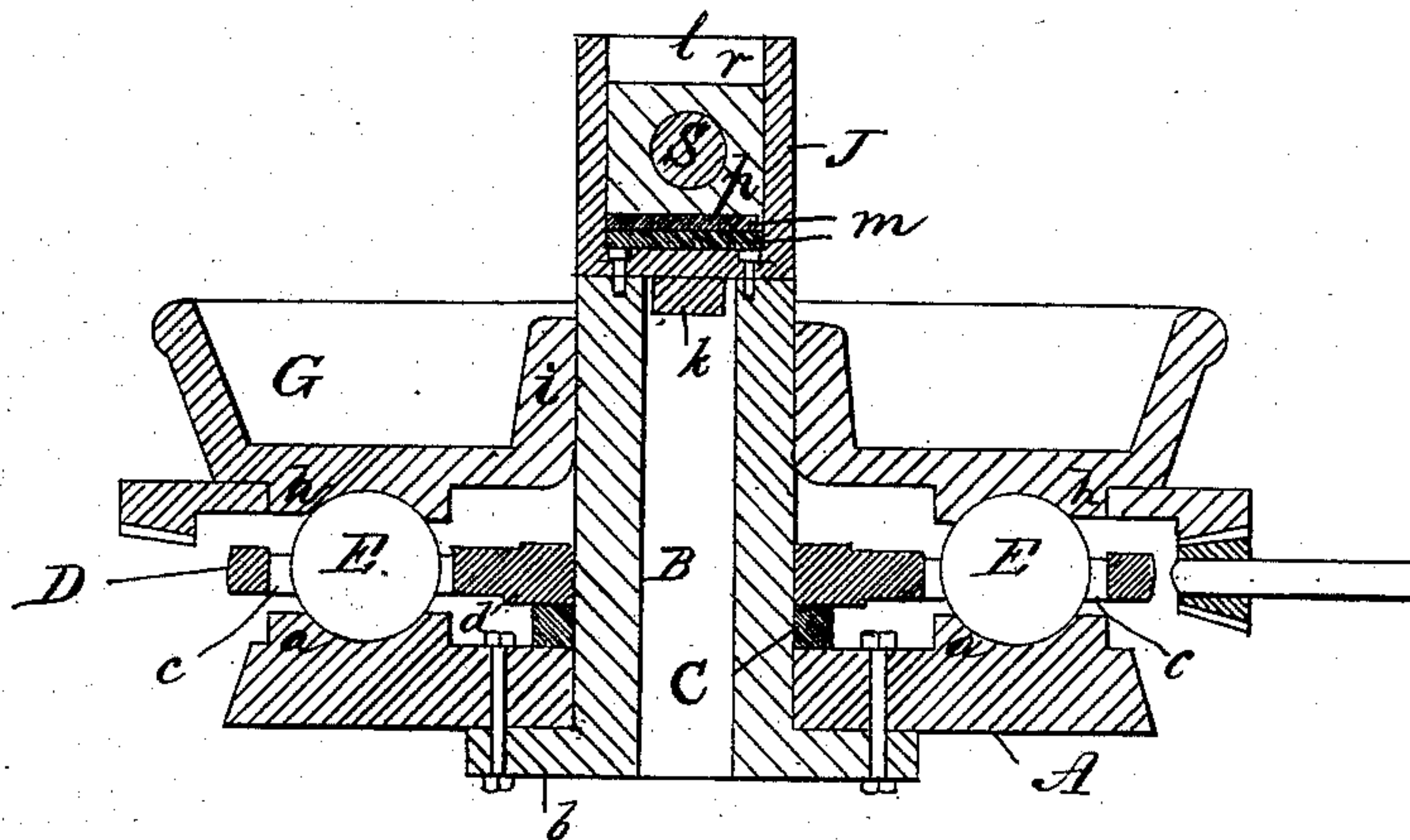


Fig. 2.



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G. A. Smith

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Fig. 3.

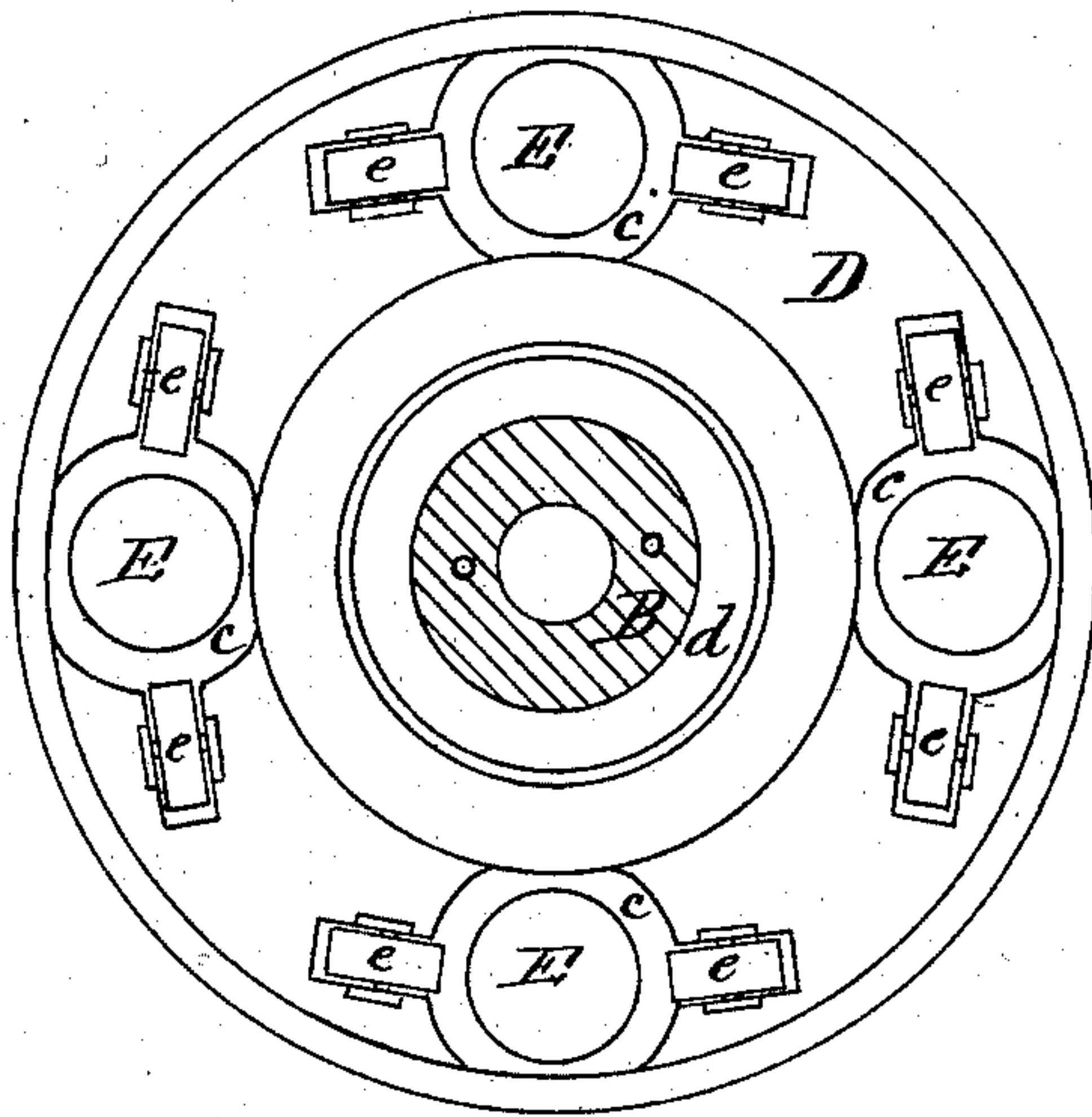


Fig. 4.

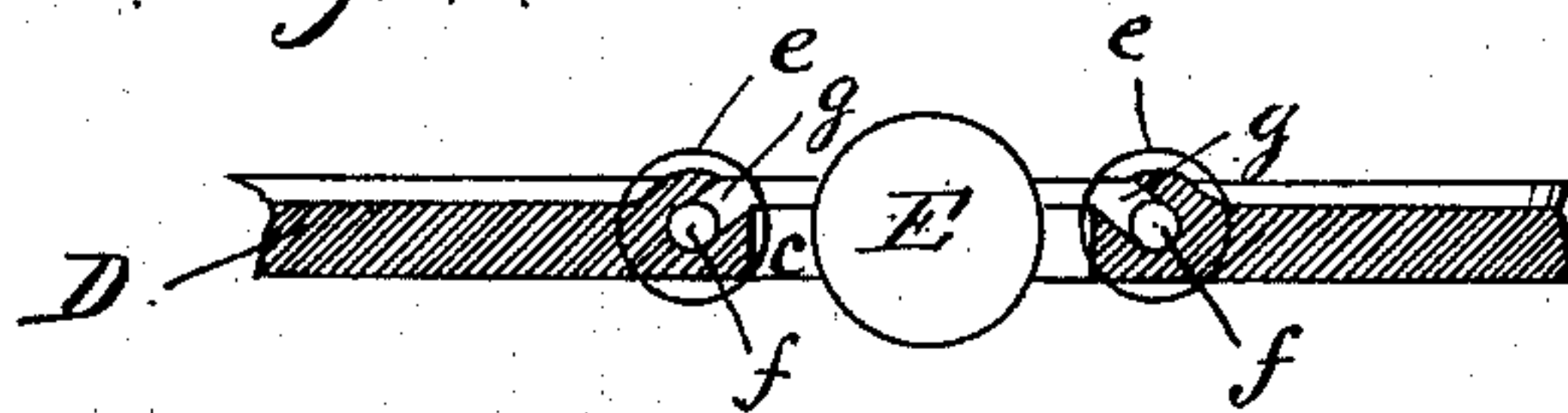
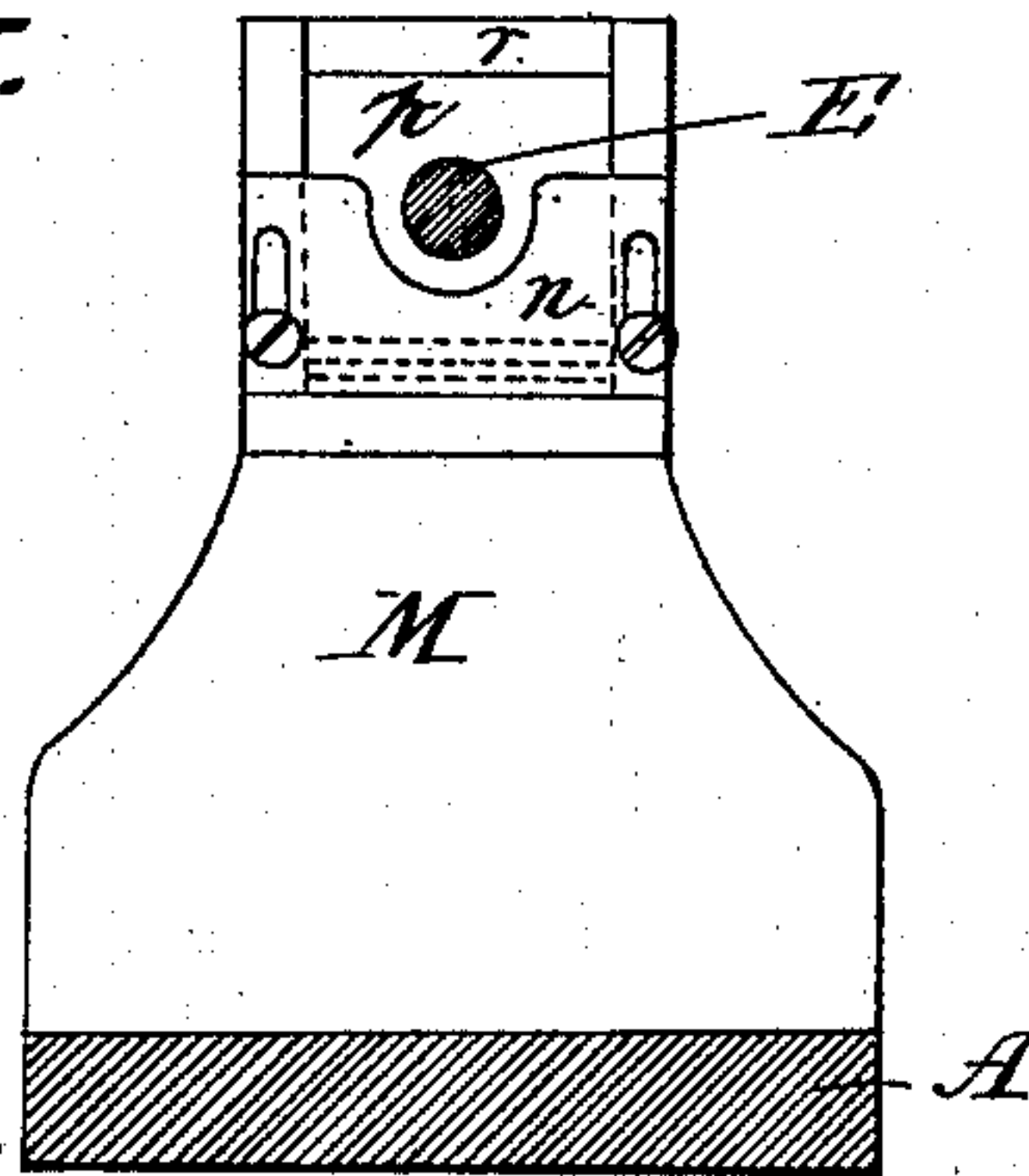


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN R. RICHARDSON, OF PITTSBURG, PENNSYLVANIA.

PULVERIZING-MILL.

SPECIFICATION forming part of Letters Patent No. 261,955, dated August 1, 1882.

Application filed May 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. RICHARDSON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Pulverizing-Mills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a longitudinal vertical section at the middle. Fig. 2 is a transverse vertical section at the middle. Fig. 3 is a plan showing the guide-plate, balls, and anti-friction rollers. Fig. 4 is a detail of the guide-plate and rollers. Fig. 5 is an inside elevation of one of the end brackets or supports.

This invention relates to that class of pulverizing or grinding machines known as "Chilian mills," in which the material is fed into a pan revolving under two heavy rollers or chasers hung on a shaft, the two rollers being located at respectively opposite sides of the axis of revolution of the pan. Such mills are used variously for pulverizing ore clay, for mashing seeds, &c.

My invention consists in the novel construction and combination of parts hereinafter fully described and claimed, reference being made to the accompanying drawings.

A is the bed-plate, which is provided on its upper surface with the circular rail or way *a*, having its wearing-surface concave, as shown.

To the bed A is bolted the center post, B, by means of the flange *b*. Post B is hollow and extends upwardly above the bed A. A loose collar, C, of wrought-iron, is slipped down around the post B and rests on the bed-plate A. Post B is turned true throughout. A flat disk or guide-plate, D, is then lowered down around post B till the shoulder *d* of plate D rests on collar C, its rim being thereby kept from contact with the concave way *a*. The guide-plate D has a number of openings, *c*, arranged circularly above the way *a*, such openings being elliptical, with their greatest length in the circumferential direction. At both ends of each opening *c* the guide-plate D is slotted to receive the anti-friction rollers *e*,

whose shafts *f* are slipped into inclined slots *g*, formed in the plate D, as seen at Fig. 4. Comparatively large iron balls *E* are then dropped into the openings *c*, so as to ride in the concave way or rail *a*, and are retained therein by its concavity and by the guide-plate D, and prevented from grinding against the edges of openings *c* by the anti-friction rollers *e*. Should a ball tend to be retarded, the roller *e* back of it meets it and prevents undue friction on the ball. The pan *G* is also provided with a concave way or rail, *h*, on its under surface, corresponding in position to the rail *a* on bed-plate A. The pan has a hub, *i*, which fits the post B and revolves horizontally on the same, being driven in the usual manner by a beveled pinion and horizontal shaft. The weight of the pan thus comes on the balls *E*, which in turn bear upon the rail *a* of the bed-plate. These balls are placed immediately under the line in which the pan rotates under the rollers or chasers. As these balls have no journals, but are free in all directions, their ability to stand wear is very great. There is no outward thrust upon them, such as always is present with conical rollers. They do not require to be turned true. Indeed, they may be simply cast and put to use without any machine-work upon them, as may also the circular ways *a* and *h*. The friction thus encountered by the pan is in all respects a rolling friction, except that upon the post B, which is so slight as to be disregarded.

Upon the top of the post B, I bolt the double box-saddle J, having a tongue, *k*, which fits down into a groove in the top of the post B. The saddle J is recessed on both sides for the journal-boxes, leaving the partition-wall *l* in the middle.

Rising from the bed-plate A, or from the foundation-timbers, are the two outer standards, M, each recessed on its inside similarly to the corresponding faces of the saddle J. At the bottoms of the recesses in the standards M and saddle J, I place a number of packing-plates, *m*, of wood, iron, or other suitable material, and retain them by means of the face-plates *n*, which are so bolted by means of vertical slots as to be capable of vertical adjustment over the recesses in the standards and saddle.

I key the heavy rolls or chasers R upon independent shafts S, and after slipping over the shafts S the journal-boxes *p*, I lower them into position, so that the boxes *p* rest upon the packing or spacing plates *m*, as shown. The ends of the shafts S are convex or rounded off, and between them and the faces of the standards M and the wall *l*, I insert the steel plates *r*, which thus bear against the ends of the shafts S and prevent their rocking or oscillation from wearing away the surfaces behind them. After the machine has been in operation and the chasers R have become so worn that they no longer bear down upon the pan sufficiently, I loosen the face-plates *n*, lower them, and draw out one or more of the packing-plates *m*, thus allowing the bearings of the chasers to drop sufficiently to throw their weight downwardly to the required extent. The two chasers R are thus independent and can be adjusted in any desired manner without the one influencing the other.

The balls E may be readily lubricated with the cheapest form of lubricant, which will not waste, as it remains in the concave rail *a* with no tendency to escape.

The whole construction is exceedingly cheap and the wearing qualities remarkable. The friction is very slight and enables the machine to be operated with a minimum expenditure of power. All the parts are removable and can readily be replaced.

I claim as my invention—

1. The combination of bed-plate A, having

concave circular rail *a*, balls E, supporting the pan, and guide-plate D, having oblong openings *c* and anti-friction rollers *e*, substantially as described. 35

2. The combination, with balls E, supported on rail *a* of bed-plate A, of the guide-plate D, having openings *c* and inclined slots *g*, and the anti-friction rollers *e*, having shafts *f*, substantially as described. 40

3. In a pulverizing-mill of the described class, the combination of the bed-plate A, guide-plate D, center post, B, having flange *b*, bolted to said bed-plate, and loose collar C, substantially as described. 45

4. The combination of post B, grooved at its top, with box-saddle J, having tongue *k* and journal-box recesses, boxes *p*, and shafts S, substantially as described.

5. The combination of standards M and wall *l* with convex-ended shaft S and interposed plate of hard metal, substantially as described. 55

6. The combination of post B, having the box-saddle J, independent journal-boxes *p*, and standards M, having similar boxes *p*, with the rollers R, mounted on the independent shafts S, substantially as described. 60

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

JOHN R. RICHARDSON.

Witnesses:

T. J. McTIGHE,
D. E. DAVIS.