

(No Model.)

O. SIMPSON.  
GRINDING MILL.

No. 594,101.

Patented Nov. 23, 1897.

Fig. 1.

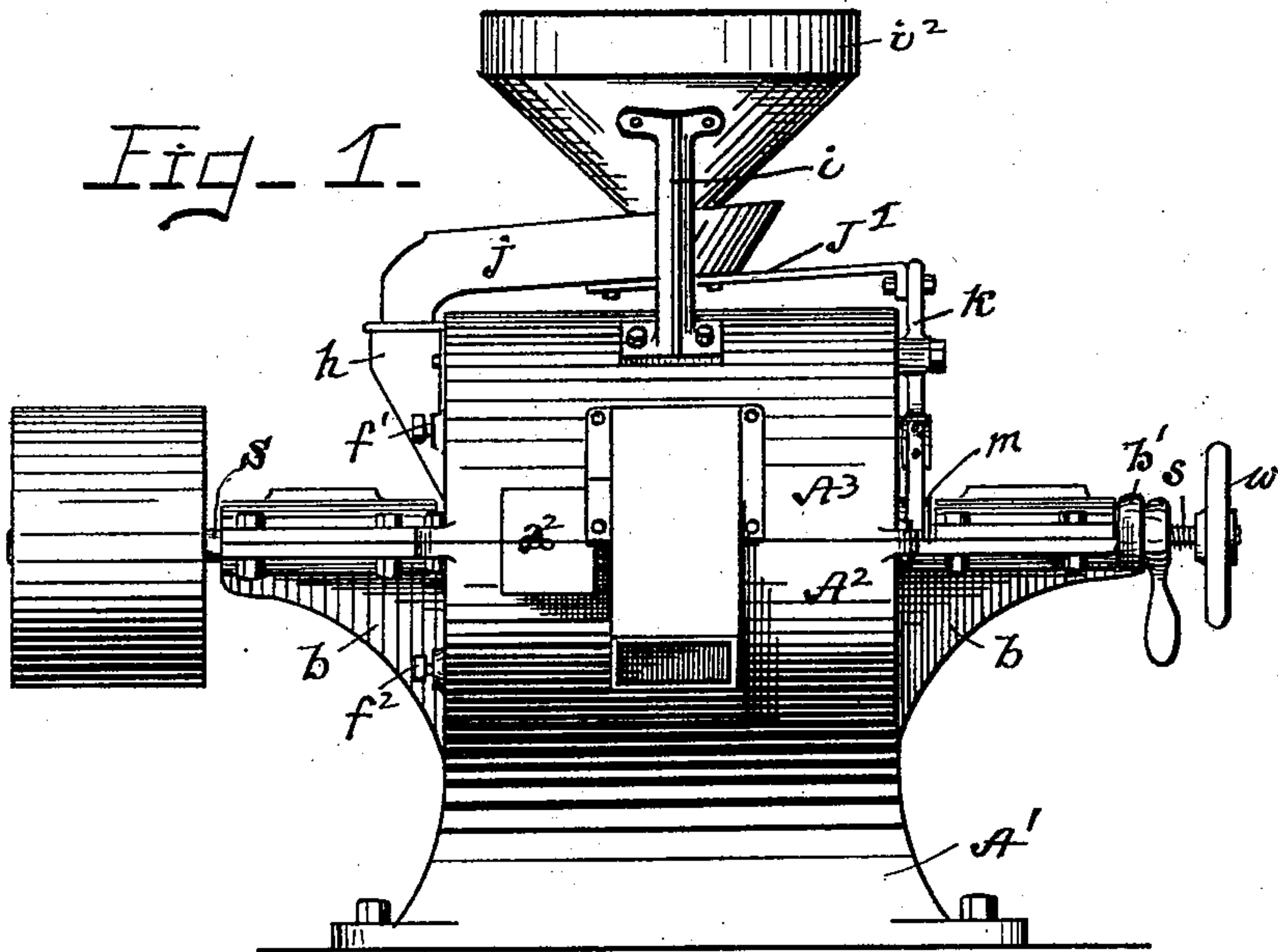


Fig. 2.

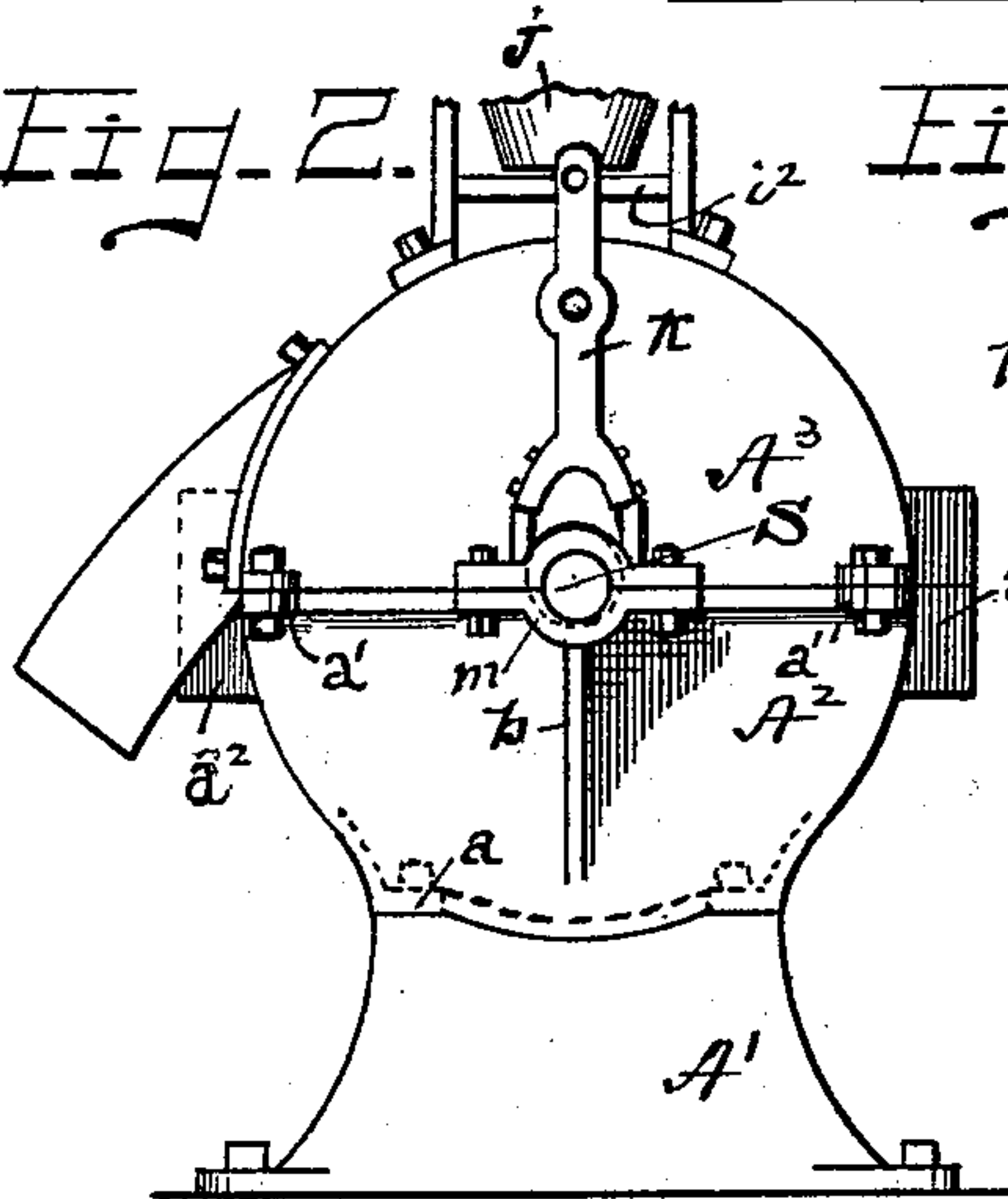


Fig. 3.

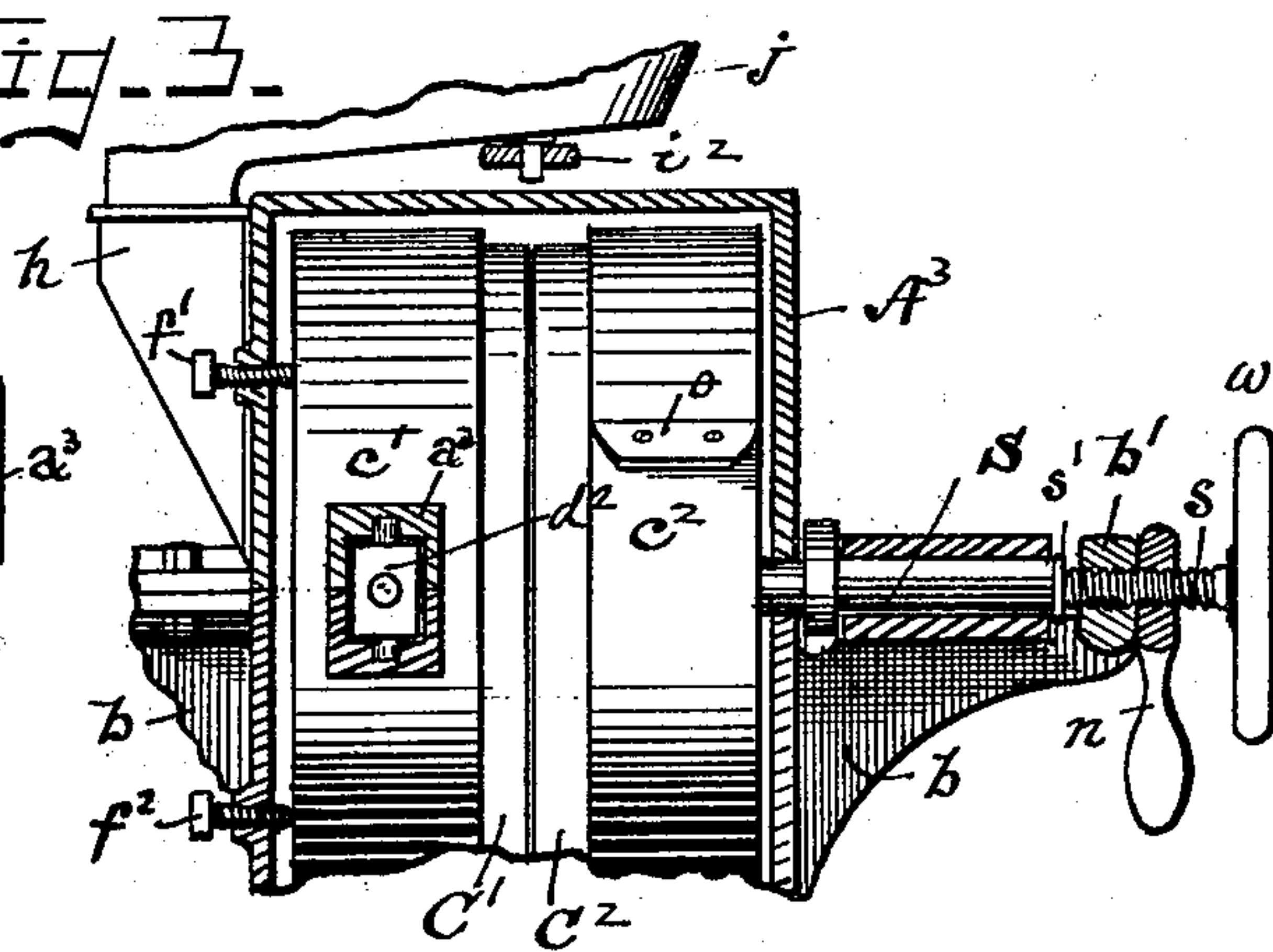
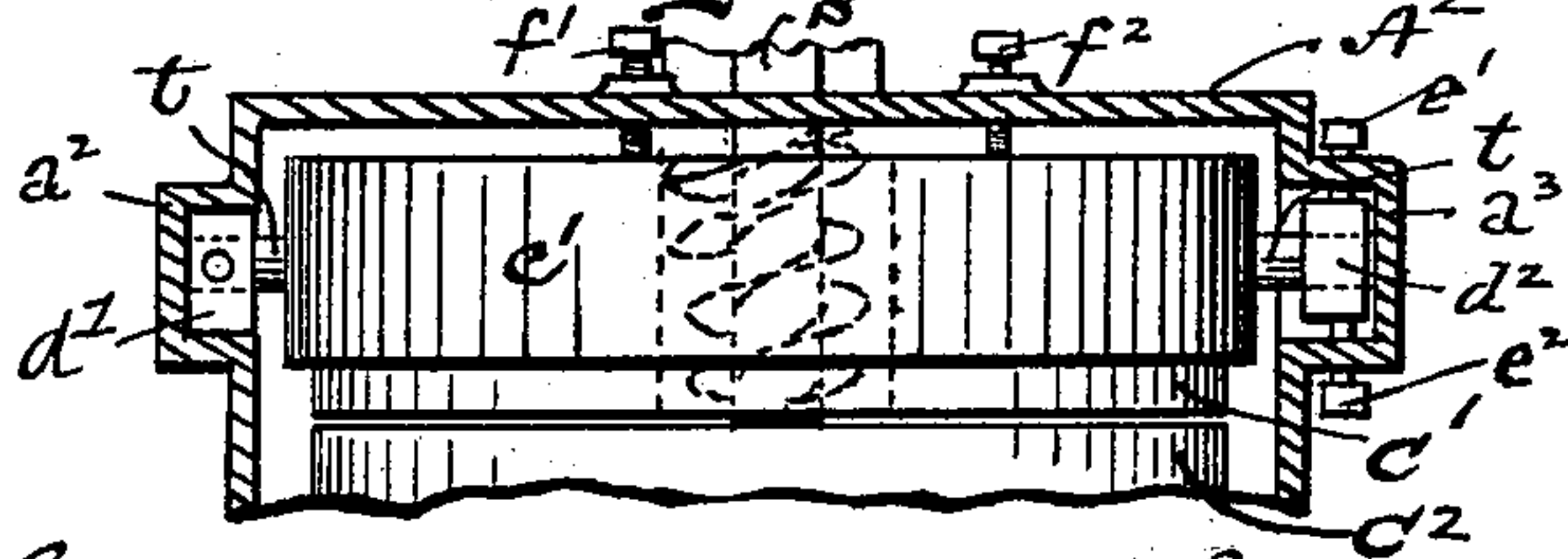


Fig. 4.



Witnesses:

H. C. Cochran

Orville Simpson

Franklin J. Brown

Inventor,  
by L. M. H. H. H. H.



# UNITED STATES PATENT OFFICE.

ORVILLE SIMPSON, OF CINCINNATI, OHIO.

## GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 594,101, dated November 23, 1897.

Application filed November 25, 1895. Serial No. 570,035. (No model.)

*To all whom it may concern:*

Be it known that I, ORVILLE SIMPSON, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful  
5 Improvements in Grinding-Mills, of which the following is a specification.

My invention relates to grinding-mills such as used for grinding flour, &c., and to the class known as "vertical-bur" mills, its ob-  
10 ject being to produce a mill of enlarged capacity for work, economical in cost, and of such simplicity of construction and arrangement of parts as that it may be retained in proper running relations and order without  
15 special skill on the part of the attendants, and also one that may be run at high speed to grind rapidly and to be capable of quick, easy, and accurate adjustment to grind to any desired grade of fineness.

20 To these ends my invention consists in the mill herein described and illustrated, embodying the following features: a supporting-frame and casing divided into three portions on horizontal planes; the first or lower portion being the base proper and adapted to be  
25 attached to and remain permanently on the fixed foundation, the second or intermediate portion being fitted to the base and removably attached by screws or bolts and being  
30 the lower half of the housing of the stones, and the third or upper portion being the upper half of the housing, divided from the lower half of the horizontal plane of the shaft and carrying the feed devices. The entire  
35 housing and all operating parts can thus be removed from the base portion without disturbing the union of the base with the foundation, and the true alinement is therefore never lost.

40 The invention also includes certain minor features of construction and combination hereinafter specified.

My invention is embodied in the accompanying drawings, in which—

45 Figure 1 is a side elevation of my improved mill complete; Fig. 2, an end elevation complete, omitting the regulating-screw for adjusting the fineness of the product; Fig. 3, a partial side elevation sectioned through the  
50 casing and one of the shaft-bearings with a supplemental section through the protuberance of the housing containing the pivotal

bearing of the bed-stone casing; and Fig. 4 a horizontal section through the housing, showing both bearings of the bed-stone casing. 55

Referring now to the drawings illustrating my improved mill, A' designates the base portion, A<sup>2</sup> the mid portion, and A<sup>3</sup> the top or cover portion, of the general supporting-frame and housing of the machine. 60

The construction of the base portion A' will be sufficiently understood from the drawings, Figs. 1 and 2, the latter figure showing clearly the line of junction and mode of union with the mid portion. The immediate ob- 65 ject of this construction is to permit all the working parts and their attachments to be removed at will for repairs, &c., without disturbing the lower portion, which therefore always remains attached to the foundation 70 and insures the proper fundamental alinement of the machine, which is most important to its perfect working at high speed.

The mid portion or section A<sup>2</sup> is the lower half of the cylindrical housing, containing the 75 grinding-stones of the mill, making a junction with the base at each end by inside flanges *a* and bolts, as indicated by dotted lines in Fig. 2, and is provided with marginal ears *a'* at the horizontal diameter plane for 80 securing the top portion A<sup>3</sup>. At each end of the mid portion A<sup>2</sup> are brackets *b*, sustaining long bearings for the main shaft S, constructed in the usual form for "Babbitt" fillings to obtain exact alinement for the shaft. 85 At the end nearest the running-stone the bracket is extended into or provided with a screw-seat *b'*, carrying a screw *s* in the prolonged axis of the shaft, for a purpose presently to be explained. 90

The shaft S, seated in its bracket-bearings *b*, passes through the hollow annular bed-stone C' and carries the running-stone C<sup>2</sup>, rigidly secured thereto, both stones being set in casings *c'* *c*<sup>2</sup>, respectively, in the usual man- 95 ner. The shaft is allowed a limited amount of end play for longitudinal adjustment by the screw *s*, which is provided with a hand-wheel *w* and a handled set-nut *n*. The screw *s* bears, with an interposed washer *s'* of steel 100 or gun-metal, against the end of the shaft S, as indicated in Fig. 2, and determines the outer limit of the space between the stones, no inner limit other than the face of the



stones being necessary, as the grain itself in being ground tends to hold the faces of the stones apart.

The bed-stone casing  $c'$  is furnished at diametrically opposite sides with trunnions  $t$ , provided with bearings in the casing, as follows: The mid housing-section  $A^2$  is provided at corresponding opposite sides with the lower half of box-shaped enlargements  $a^2 a^3$ . At one side the enlargement  $a^2$  is fitted to receive a bearing-block  $d'$ , having vertical pivot extensions and a horizontal aperture for the reception of a trunnion  $t$  of the casing  $c'$ . The opposite box-shaped opening  $a^3$  is plain and fitted to receive and furnish a sliding fit for a bearing-block  $d^2$ , horizontally perforated to receive the remaining trunnion of the casing  $c'$  and held adjustably between set-screws  $e^1 e^2$ , threaded through opposite end walls of the enlargement  $a^3$ . I may, however, substitute an adjustable block, such as last described, for the pivotal block first mentioned. There is thus constituted a means for adjusting or tramming the bed-stone in one plane, the adjustment in the opposite plane being effected by set-screws  $f^1 f^2$ , (two or more,) threaded through the wall of the top housing  $A^3$  above and below the horizontal axis.

The cover or top part  $A^3$  of the housing is the corresponding upper half of the general cylindrical casing, provided with corresponding ears, &c., with end apertures for the feed-in chute  $h$  and with corresponding upper halves of the enlargements  $a^2 a^3$ . It is provided with two standards  $i$ , carrying the receiving-funnel  $i^3$ , and upon a cross-brace  $i^2$  between the standards is pivoted the shaker or trough  $j$  for conveying grain from the funnel  $i^3$  to the feed-in chute  $h$ . To the trough  $j$  is bolted a bar  $j'$ , connecting with a vibrating arm  $k$ , pivoted to the end of the casing and bifurcated at its lower end to straddle an eccentric  $m$  on the shaft  $S$ . The rotation of the eccentric therefore causes a pivotal oscillation of the trough  $j$  from side to side. Upon disengaging the top  $A^3$  and removing it the stones, shaft, &c., are exposed conveniently for repairs, adjustment, removal, &c., while the feed mechanism, &c., remains connected and ready for operation upon replacing the top  $A^3$  in position.

The machine thus constructed, with wide bearings for the shaft at both sides of the running-stone, and when properly adjusted

and in connection with the adjustment for fine or coarse grinding shown, may be run at higher speed than is generally practicable in mills of this class, and the relative capacity of the mill is thereby increased.

To insure proper clearance in delivery, I attach to the casing of the running-stone a radial wing  $o$ , which assists in maintaining a free outward flow of the ground material and ample clearance-space for the rotating casing.

The shaft  $S$  is provided with a feed-screw conveyer operating in the hollow center of the bed-stone casing, as indicated by dotted lines in Fig. 4.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a grinding-mill of the character indicated a supporting-frame and casing embodying in combination the following elements or features of construction: viz: a base adapted to be attached to and remain permanently upon a fixed foundation; an intermediate removable section fitted to said base and extending to the axial plane of the shaft, constituting the lower half of the grinding-chamber and provided with outer supporting-brackets for the shaft-bearings, and adjustable supports for the bed-stone; and a removable cover constituting the upper half of the grinding-chamber carrying the hopper, grain-feed conduits and agitating devices adapted to be brought into operative engagement with the shaft by placing the cover in position, substantially as set forth.

2. In a grinding-mill of the character indicated, the combination of the casing or housing divided on the axial plane of the shaft, provided with opposite box extensions similarly divided; perforated blocks resting in the lower half of said box extensions, a bed-stone casing with opposite trunnions extended into said blocks, thereby suspending the bed-stone in the housing and adjusting-screws threaded through the wall of one or both of the housing extensions, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ORVILLE SIMPSON.

Witnesses:

L. M. HOSEA,  
FRANK K. BOWMAN.