

(No Model.)

3 Sheets—Sheet 1.

T. L. & T. J. STURTEVANT.
GRINDING MILL.

No. 572,386.

Patented Dec. 1, 1896.

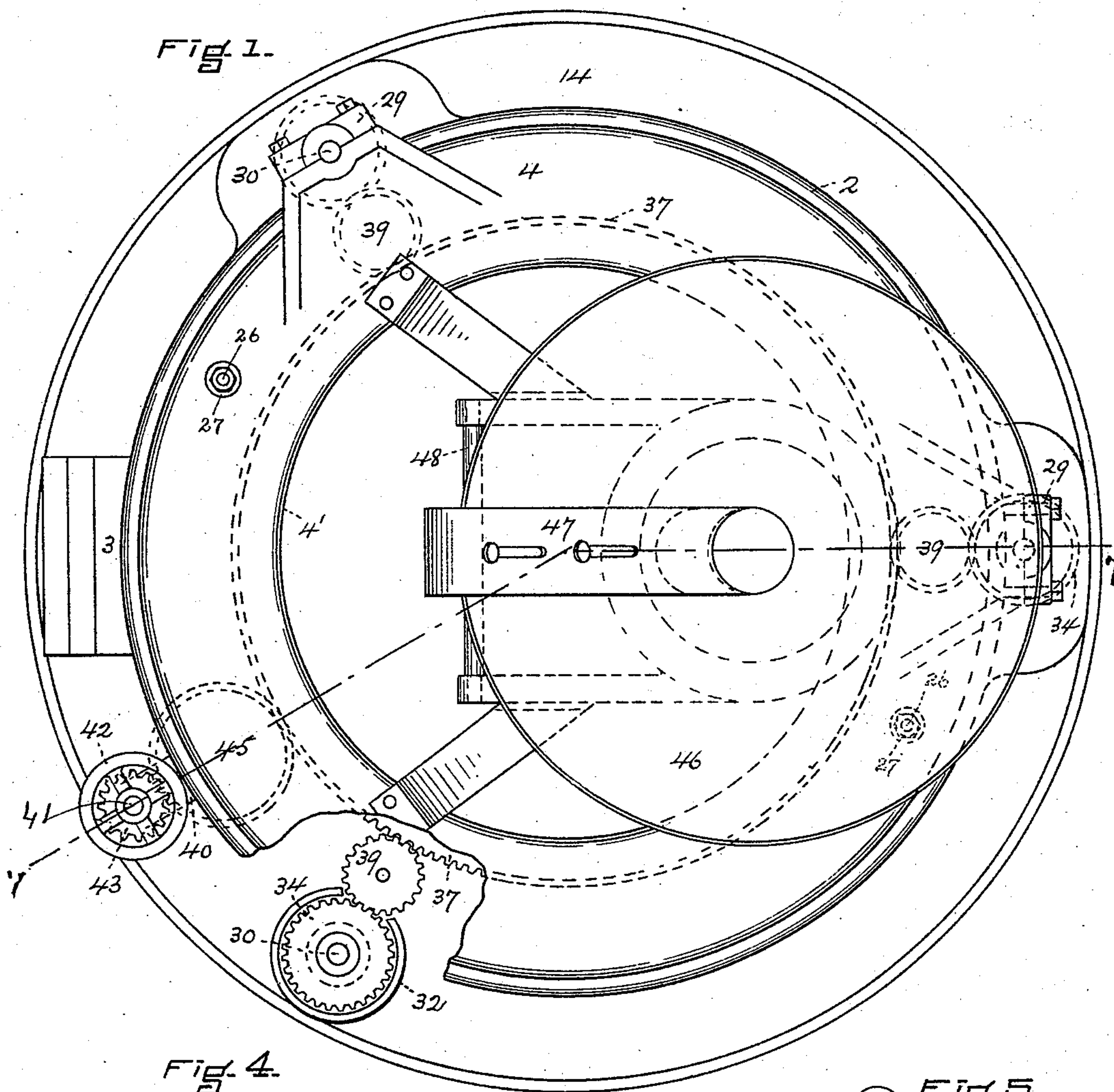


FIG. 4.

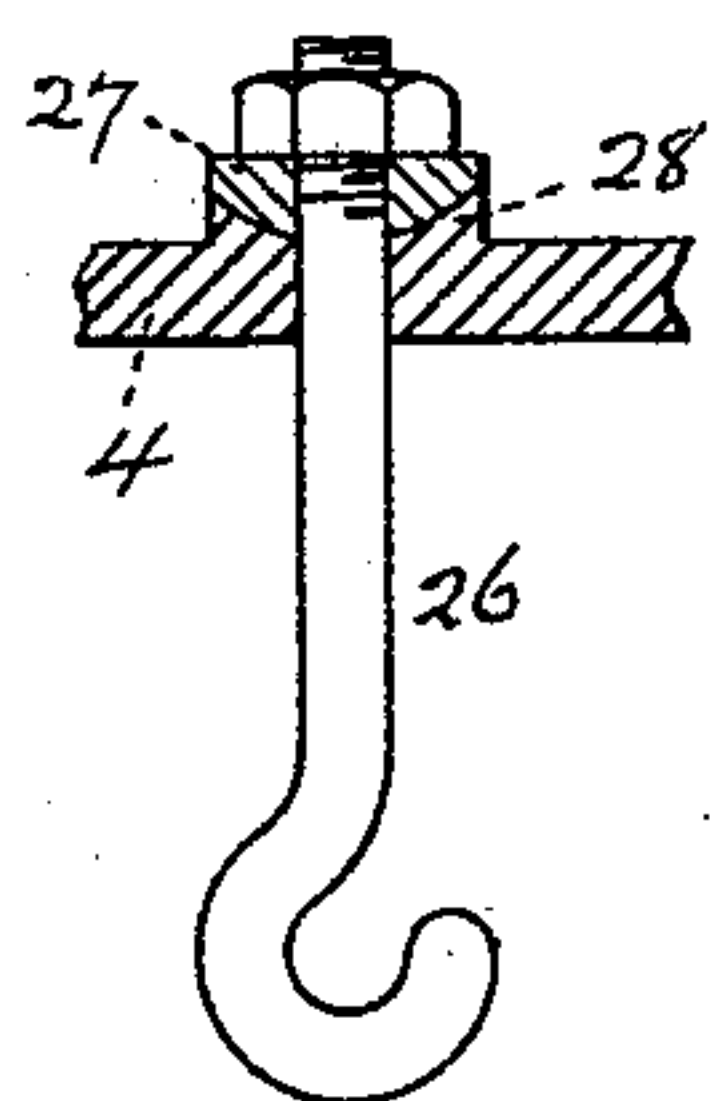


FIG. 3.

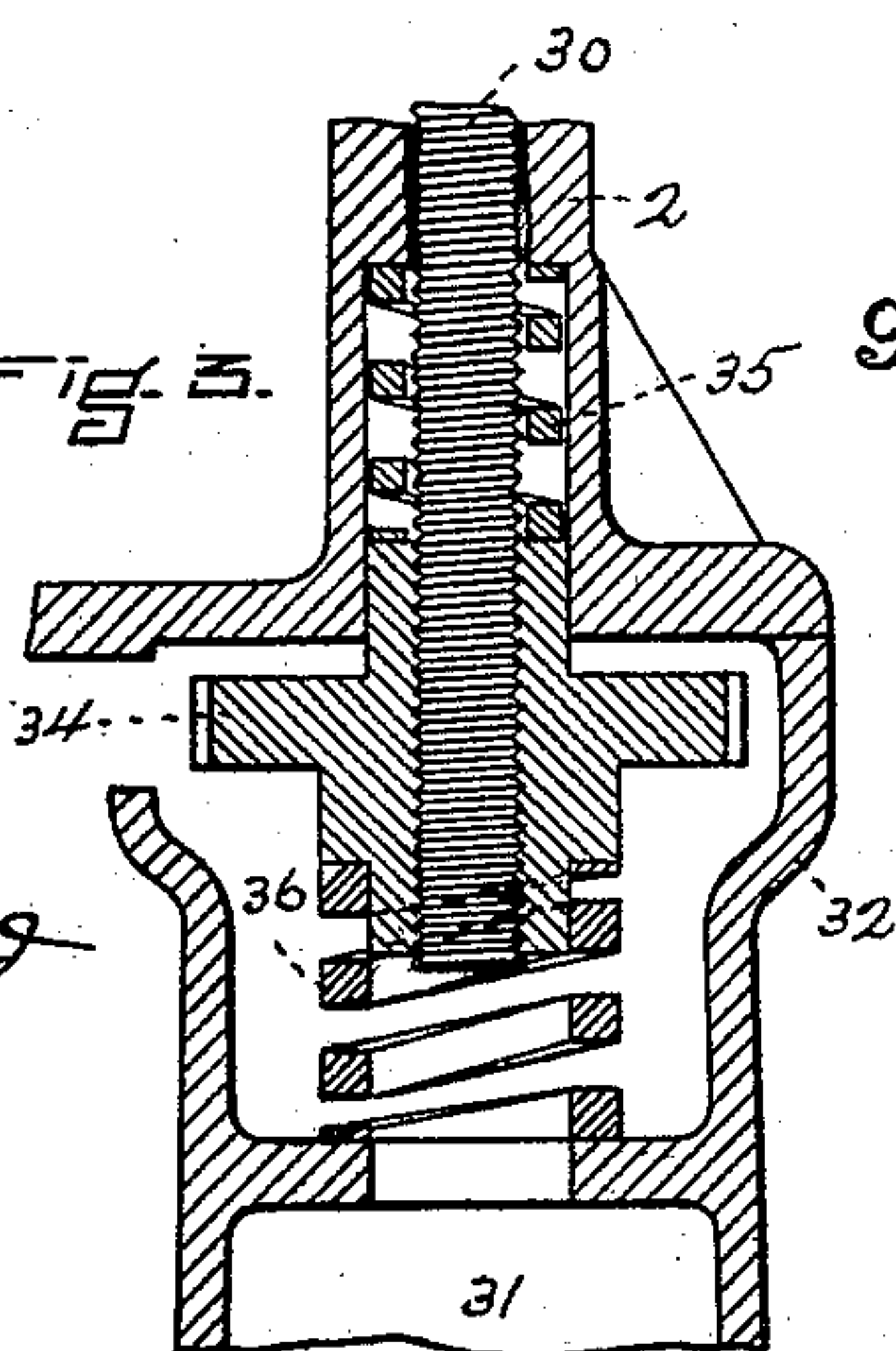
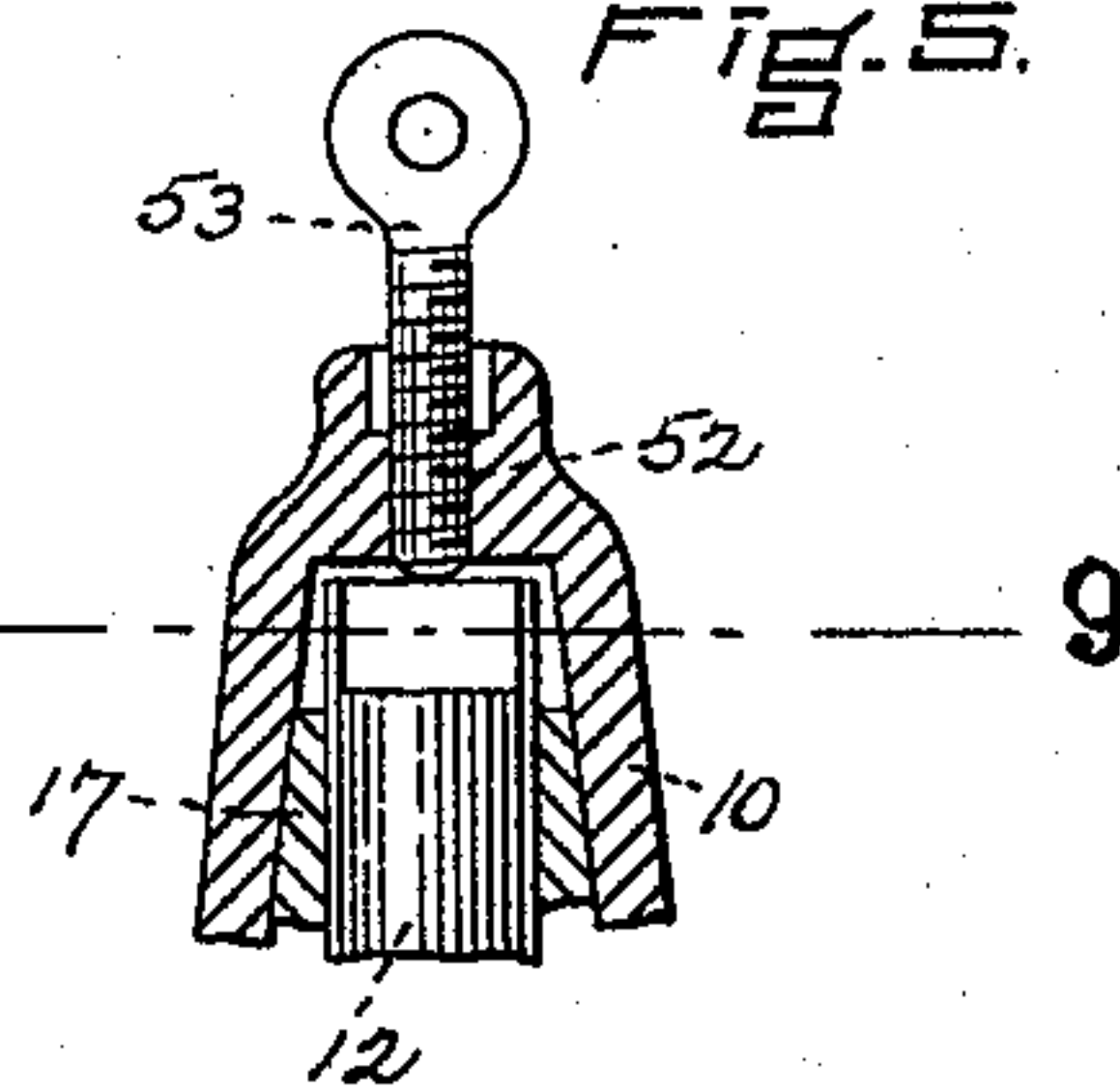


FIG. 5.



WITNESSES.

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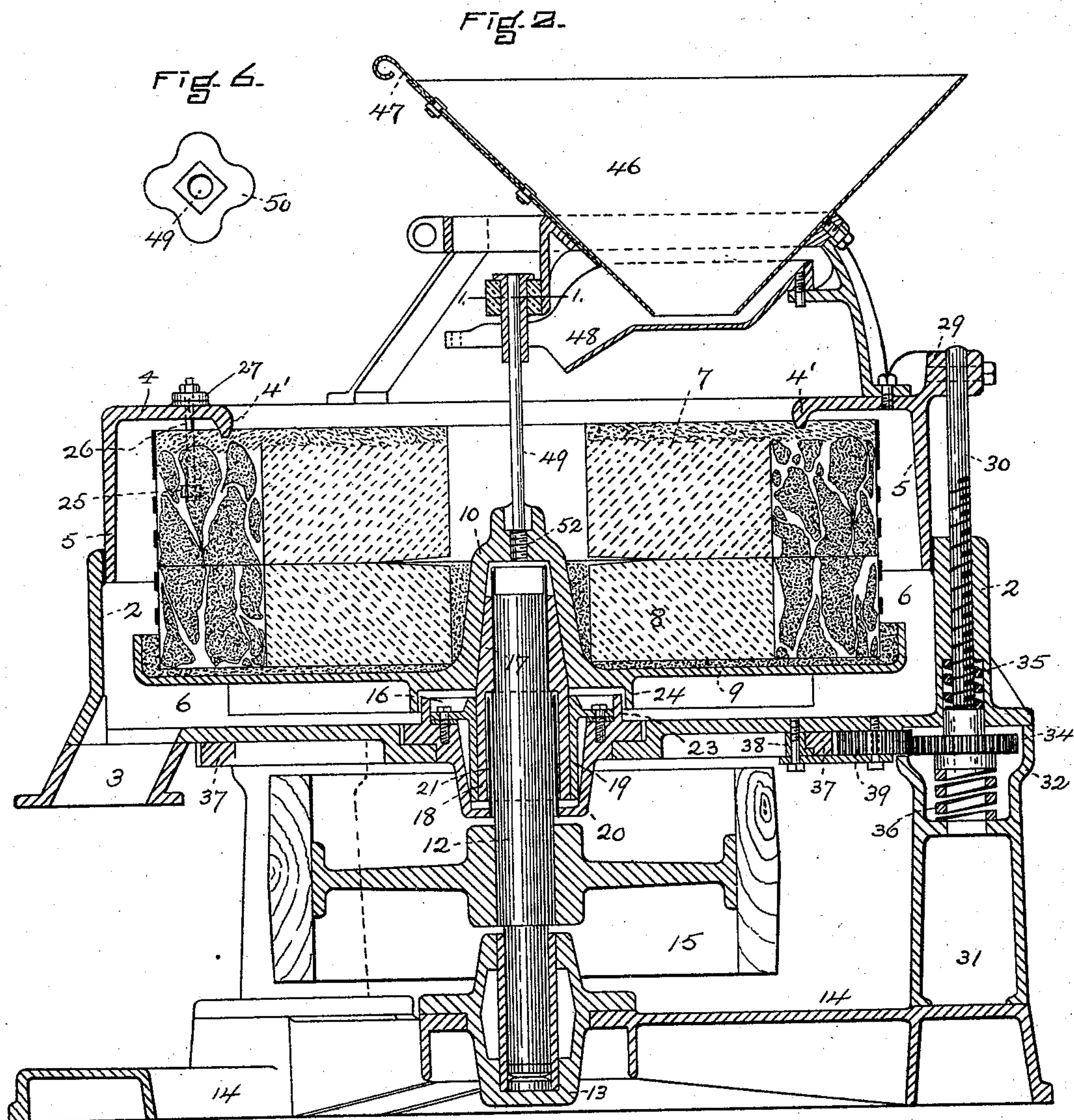
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Fig 7.

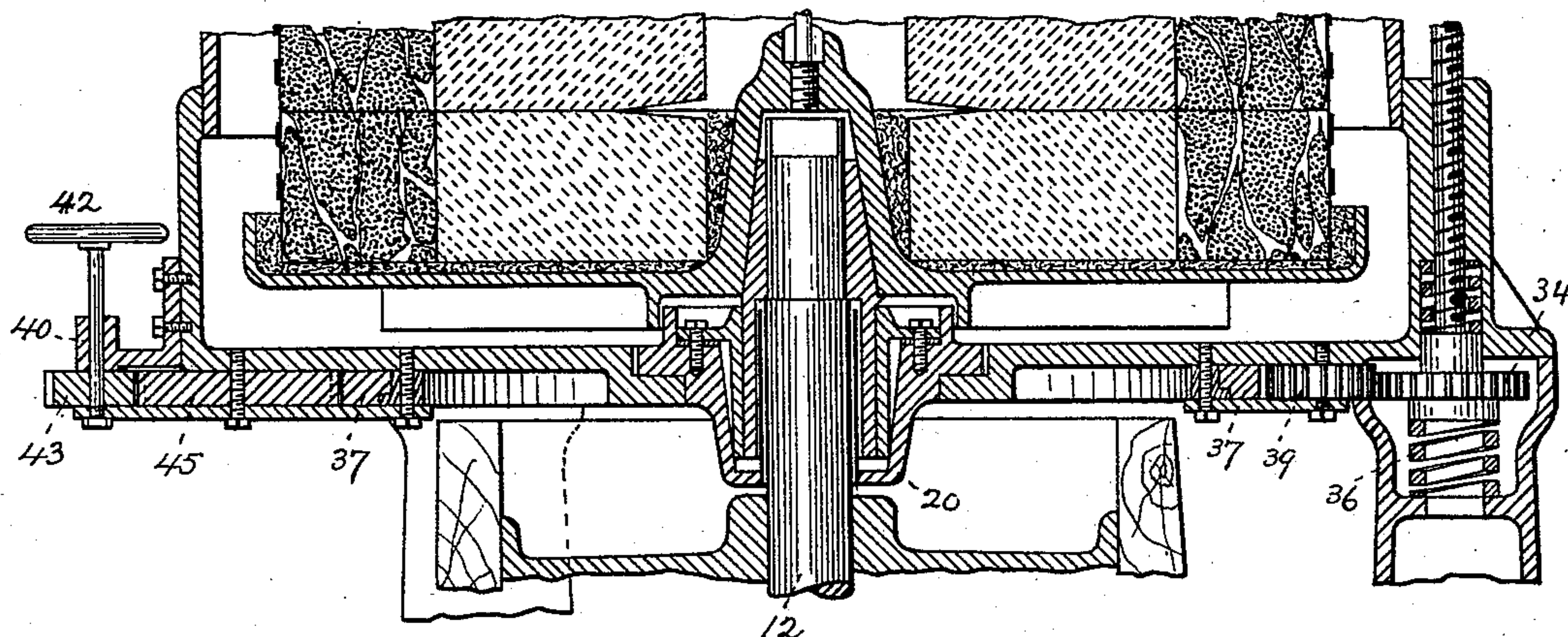


Fig 8.

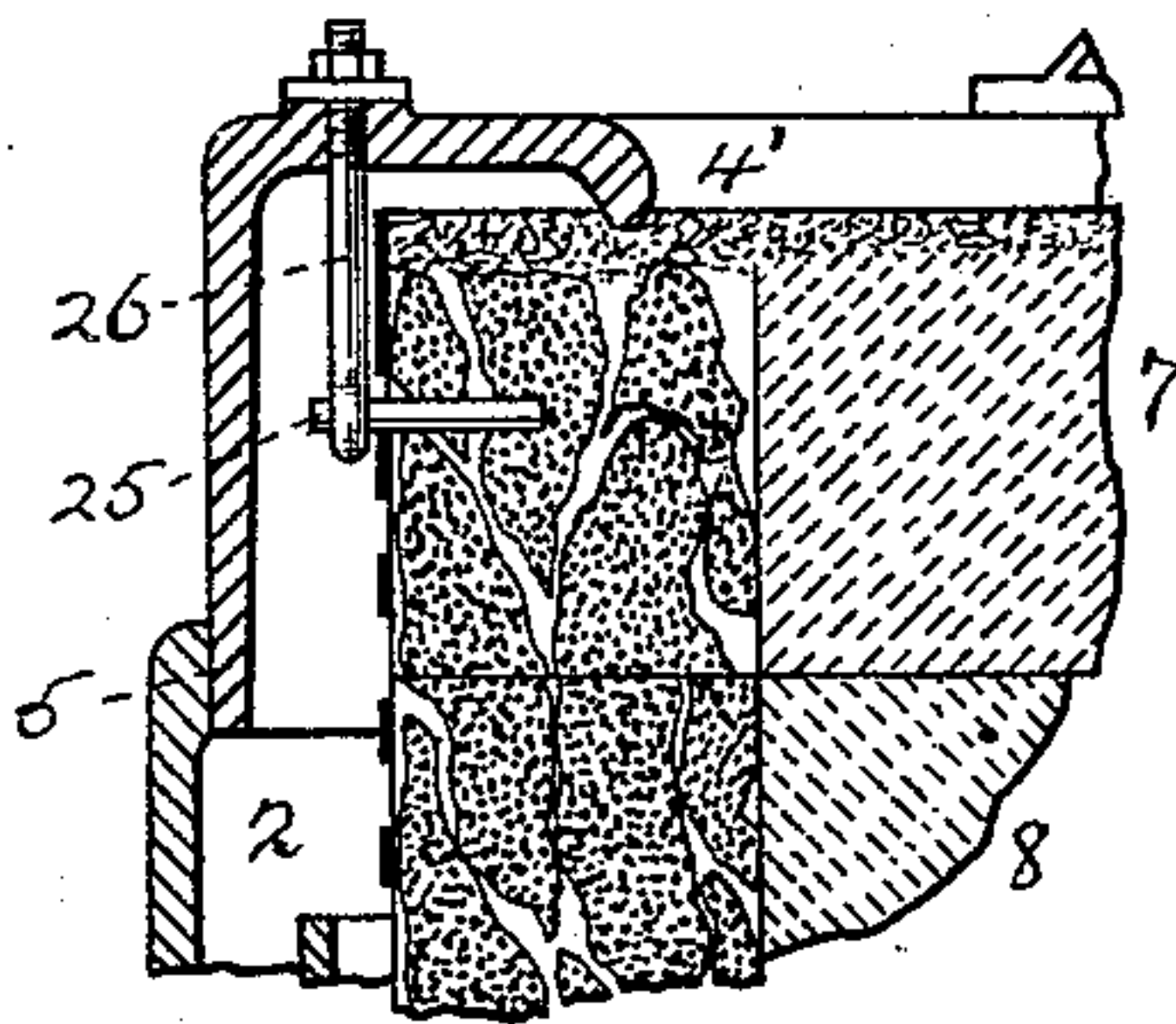
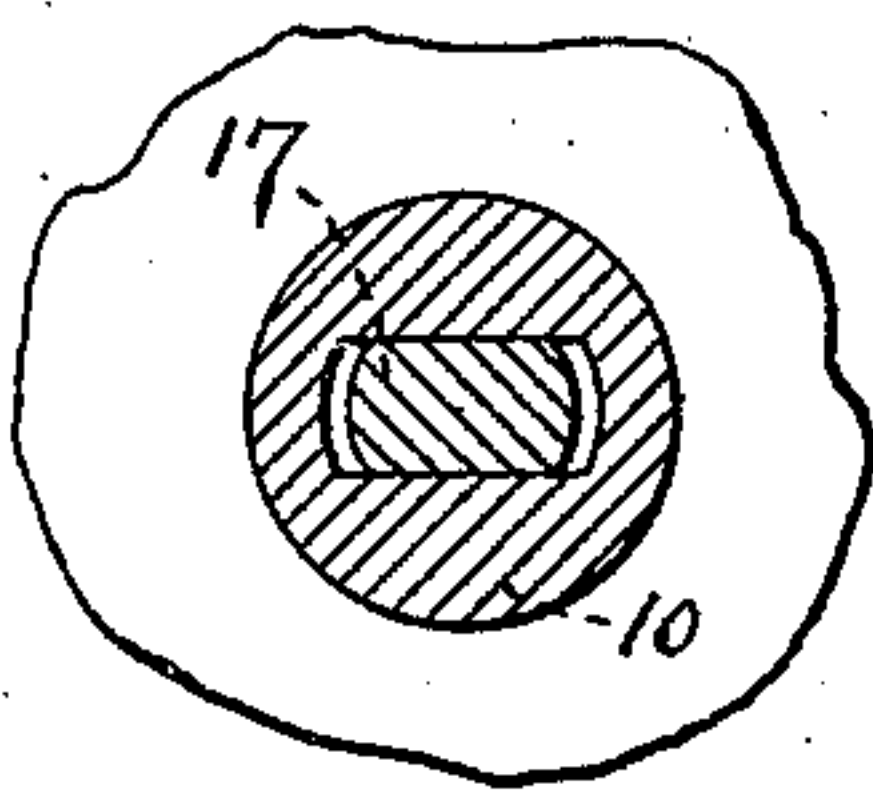


Fig 9.



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UNITED STATES PATENT OFFICE,

THOMAS L. STURTEVANT, OF QUINCY, AND THOMAS J. STURTEVANT, OF FRAMINGHAM, MASSACHUSETTS, ASSIGNORS TO THE STURTEVANT MILL COMPANY, OF PORTLAND, MAINE, AND BOSTON, MASSACHUSETTS.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 572,386, dated December 1, 1896.

Application filed January 16, 1896. Serial No. 575,802. (No model.)

To all whom it may concern:

Be it known that we, THOMAS L. STURTEVANT, residing at Quincy, in the county of Norfolk, and THOMAS J. STURTEVANT, residing at Framingham, in the county of Middlesex, State of Massachusetts, citizens of the United States, have invented certain new and useful Improvements in Grinding-Mills; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in grinding-mills, particularly that class in which a stationary grinding-disk or bed-stone is employed with a coöperating rotating grinding-disk or runner.

Our improvements relate to the manner of mounting and adjusting the bed-stone to the mill-casing; and they consist in creating an annular groove in the back of the grinding-disk, which is to receive a circular flange or lip on the casing, whereby the stone is easily centered; also, in the method of securing the bed-stone fast in the casing by means of toggle-bolts; furthermore, in providing for the ready adjustment of the stone to compensate for wear. This includes clamps upon the casing, said clamps being made fast to supports or upright rods vertically adjustable simultaneously and equally by a ring-gear and interconnecting mechanism to a hand-wheel, as will be further explained.

Other features of importance include the spring adjustment of the supporting-rods for the bed-stone, whereby the grinding-faces of the runner and bed-stone are held together elastically, while the standards which support the mill are formed with hollow heads, these latter serving to contain and conceal certain necessary operating parts. The method employed in the construction of the oil-cup for lubricating the shaft which operates the runner-stone also is embodied in and forms an important feature of our invention.

Other peculiar characteristics will be hereinafter more fully explained and set forth.

The drawings herewith presented represent, in Figure 1, a general plan of a grinding-mill embodying our improvements. Fig. 2 is a vertical central section through the mill. Fig. 3 is an enlarged sectional view in detail of the tubular posts, showing supports for the bed-stone with the operating adjusting mechanism therefor. Fig. 4 is a detail view of the toggle-hooks for securing the bed-stone to the mill-casing. Fig. 5 is a sectional view in part of the bearing which supports the runner-stone. Fig. 6 is a section on line 1 1, showing an eccentric to vibrate the feed-pan. Fig. 7 is a sectional view on line 7 7 of Fig. 1, showing the adjusting mechanism for the bed-stone. Fig. 8 is a section of a portion of the casing and bed-stone, showing the supporting-pins for the bed-stone. Fig. 9 is a sectional view on line 9 9 of Fig. 5.

In the drawings the mill is shown as a circular one, composed of a cup-shaped casting or lower case 2, provided with a discharge-spout 3, while an annular ring or upper case 4, having a pendent rim 5, is intended to slide within the casting 2. These two pieces create a hollow chamber 6, in which are located the grinding-stones 7 8, respectively a bed-stone and a runner. This latter element is secured and rigidly affixed to a rotary plate 9, formed with a central upraised boss or runner-head 10 as a bearing for the rotary spindle 12. This latter is mounted in a suitable step 13, secured in the base or bed piece 14 of the mill and is further fitted with a pulley or drive-wheel 15 to connect with some prime motor.

One of the features in our invention is included in the arrangement of the parts to create an oil-pocket, (shown at 16.) Inasmuch as the entire weight of the runner-stone is sustained by the spindle or shaft 12 proper and sufficient lubrication is necessary. To provide for this, as likewise to interlock the runner with said shaft in order to create the proper rotating movement, the interior of the boss or runner-head 10 is cone-shaped and fitted to receive a sleeve 17, made fast to or

shrunk upon the upper end of the spindle, which is squared at the extreme upper end and engages with a similar-shaped socket in the said runner-head.

5 It will be seen by the above construction that the sleeve performs only the duty of centering the shaft and does not serve to rotate the runner-stone. The shaft alone performs this office by its engagement in the
10 socket of the boss 10. Furthermore, this sleeve is made up of two portions, an upper cone-shaped part and a lower cylindrical piece 18, which snugly fits and is adapted to rotate in a short tube 19, having a flange which rests
15 upon a shoulder forming part of a cup 20, which serves as the outer shell of the oil pocket or chamber 16. Since the spindle extends through the bottom of the cup and in order to create an oil-tight compartment and
20 prevent outflow and waste of the lubricant, a metallic cylinder 21 is expanded into the opening in the cup-bottom and extends upwardly between the spindle and the interior surface of the piece 18, but out of contact
25 with the adjacent parts, to wit, the shaft and the sleeve. In this way much valuable room is saved, while said cylinder forms the inner wall of the oil-pocket and extends up to a level with the top of an annular lip 23, formed
30 in the cup. A pendent circular flange 24 on the rotary plate 9 overlaps said lip and thus protects or seals the top of the oil-pocket.

From the above construction it will be seen that the lubricant is free to enter between
35 the bearing-surfaces of the contiguous parts, to wit, the cylindrical piece 18 and the tube 19, which latter is a fixture, while the other is revoluble.

In carrying out our improvements we propose to compensate for the wear between the
40 two stones by making the bed-stone adjustable with respect to the runner. A further feature is embodied in the construction of the mill-casing, which contains said bed-stone,
45 whereby this element can be removed and replaced with little or no trouble and without disturbance of any other portion of the mill. To this end, as before stated, we have equipped the annular ring 4 with an inturned lip or
50 flange 4', which fits a groove in the stone. Stout radially-disposed pins 25 are firmly embedded in the stone 7, while hooked bolts 26 engage the projecting ends of said pins. The upper end of each bolt is screw-threaded and
55 is fitted with a nut which rests upon a hemispherical washer 27, located in a dish-shaped boss 28, positioned upon the upper surface of the casing. (See Fig. 4.) To fasten the stone securely in place, the nuts are turned down
60 until the flange 4' is firmly pressed into the groove; but should there be any tendency for the stone to turn axially the rocker adjustment of the bolts 26, acting as a toggle, at once serves to stop all such movement, since the
65 more the bolt is inclined from the vertical the greater the pressure between the flange

and the groove. Said bolts swing tangentially of the stone.

Inasmuch as the pendent rim 5 of the upper case is free to slide down within the lower
70 casing 2, it is evident that there is nothing to prevent the bed-stone from advancing downwardly until both stones are used to the limits of wear.

To provide for equal and simultaneous
75 movement of the bed-stone at all points when such adjustment is required to compensate for wear, we provide the following mechanism: At two or more points upon the circumference of the annular casing 4 we cast or otherwise provide posts 29, through which pass
80 upright adjusting-rods 30. These extend through the rim of the lower casting 2, which serves as a bearing for them. Since the weight of the bed-stone is borne by said rods, these
85 latter are preferably positioned over the posts 31, on which the mill-casing proper is mounted. Furthermore, the posts or pillars are tubular and formed with enlarged heads 32, which serve to contain certain operating ele-
90 ments to be described. These include a toothed gear 34, centrally bored and screw-threaded, which serves as a sleeve-nut to engage the lower end of the rod 30, likewise screw-threaded. This sleeve is cushioned at
95 both ends with stout coiled springs 35 36, or otherwise, in order that the meeting or grinding faces of the two stones may have elastic contact. The upper hub portion of the gear
100 34 is adapted to enter the casting 2, which serves as a journal-support for the same. Beneath the lower casing 2 is affixed a ring-gear 37, secured at divers points by segmental castings 38, L-shaped in cross-section, as shown
105 in Fig. 2. Intermediary gears 39 complete the train.

From the above arrangement it is evident that rotation of the ring-gear will, through the agency of the gears 39, produce rotation
110 of the gears 34. By the rotation of said gears equal and simultaneous rise and fall of the rods 30 will occur, and in this way any adjustment of the bed-stone can be made with precision, rapidly, and with ease.

In order to actuate and control the ring-
115 gear, a bracket 40 is attached to the lower casting 2 and to extend outwardly beyond it, while a short shaft 41, carrying a hand-wheel 42 and a toothed gear 43, is mounted therein. An intermediate gear 45 interconnects said
120 gear 43 with the ring-gear. Hence by movement of the single hand-wheel the adjustment of the bed-stone may be regulated up or down at pleasure, or any other obvious method of moving the ring-gear may be adopted.
125

This mill is equipped with a hopper 46, a gate 47, and a feed-trough 48, which latter is to vibrate. These vibrations are produced by means of a small shaft 49, squared at its
130 lower extremity in order to have motion imparted to it from the runner-stone. A cam 50 is affixed to the upper end of said shaft

and produces the necessary shake to equalize the delivery of the material to the ground.

Several features of our present invention have been conceived with the view to embody certain advantages which by peculiar construction of the parts accrue in the way of ease of adjustment and ease with which the various pieces may be dismembered and again as easily assembled without dismantling the entire mill. To this particular end we have perforated at 52 the top of the cone-shaped boss 10 on the casting 2 and screw-threaded the aperture. The purpose of this is as follows: In order to remove the runner-stone, the shaft 49 is taken out and an eyebolt 53 (see Fig. 5) is inserted into the aperture 52. In this way a thrust is exerted, whereby the spindle is separated from its bearing, and after this act a hook is put in the eyebolt and the runner-stone may be quickly and easily lifted out and swung to one side. Previous to this, however, the bed-stone is to be taken out. This is effected by first loosening the posts 29, which clasp the rods 30. After this is done the bed-stone is in readiness to be swung out. To remove the bed-stone from the circular casing 4, the nuts on the hooked bolts are loosened, the latter are disengaged from the bed-stone pins 25, and the bed-stone is in readiness to be separated from the casing in which it is secured.

What we claim is—

1. In a grinding-mill, the combination with a fixed casing, of a series of hollow posts surrounding said casing, a runner-stone rotatably mounted within said casing, a vertically-adjustable casing sliding within said fixed casing, a bed-stone supported by said adjustable casing, screw-threaded supporting-rods for said adjustable casing mounted in said hollow posts, sleeve-gears to actuate said rods, and means for driving said sleeve-gears.

2. In a grinding-mill, the combination with the stationary casing 2, of the rotatable bed-stone mounted therein, the posts 29 formed integral with said casing 2, the vertically-adjustable casing 5 sliding in said casing 2, the bed-stone 7 hung from said casing 5, the screw-threaded rods 30 supporting said casing 5 and moving freely in posts 29, sleeve-gears 34 engaging the lower ends of rods 30, and the ring 37 and means to drive said sleeve-gears 34.

3. In a grinding-mill, the combination with a fixed casing having a runner-stone mounted therein, of a movable casing having an in-turned circular rib, a bed-stone having a circular groove into which the said rib fits, and

supports for said bed-stone depending from said movable casing.

4. In a grinding-mill, the combination with suitable runner and bed stones, of a supporting-casing for the bed-stone having a downwardly-turned rib or flange which fits into a corresponding groove in the upper surface of said bed-stone, radially-disposed pins projecting from the circumference of said bed-stone, hooks to engage said pins, and nuts and washers which secure said hooks to the bed-stone casing in such a manner as to prevent axial movement of the bed-stone.

5. In a grinding-mill, the combination with a mill-casing, of a bed-stone mounted therein, said bed-stone being provided with an annular groove in its upper surface to receive a centering flange or rib on the mill-casing, and means for supporting said bed-stone so as that the said flange or rib is caused to grip the stone and prevent axial movement of the said bed-stone under the friction of the runner-stone.

6. In a grinding-mill, the combination with a bed-stone, of a runner-stone, a runner-head secured to said runner-stone and having a tapering socket terminating in a squared extremity, a cylindrical spindle having a squared end engaging the squared extremity of said socket, and a tapering shaft-sleeve fixed to said spindle to center the shaft.

7. In grinding-mills, a rotary spindle, a sleeve for centering the same affixed thereto and comprising a tapered upper part and a cylindrical lower portion, combined with an oil-pocket within which said sleeve projects, as specified.

8. In combination with a rotary shaft, a centering-sleeve affixed thereto, and a tube which clasps the lower end of said sleeve, combined with a flaring cup as a bearing for the tube, and a cylinder 21 made fast to said cup and extending centrally therethrough and out of contact with the said shaft, as stated.

9. In a grinding-mill, the combination with a stationary casing, of a runner-stone-supporting plate within said casing, a central cone on said plate having a screw-threaded aperture in the apex, a rotary shaft projecting into said cone, and a bed-stone adjustable toward and from said runner-stone.

In testimony whereof we affix our signatures in presence of two witnesses.

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