

No. 728,289.

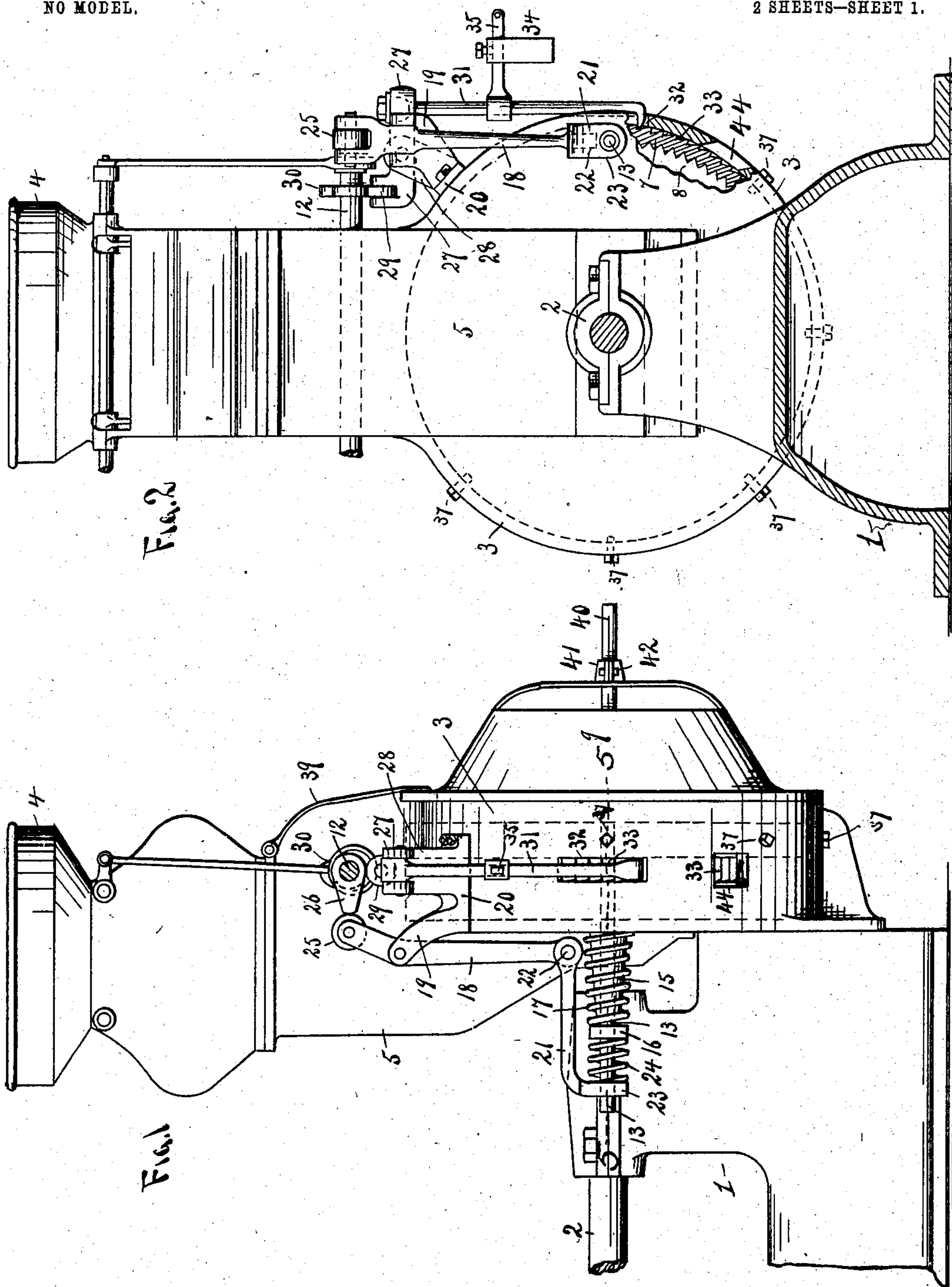
PATENTED MAY 19, 1903.

H. D. PHILLIPS.
GRINDING MILL CLEANER.

APPLICATION FILED JULY 29, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
C. H. Woodward
R. J. Shepard

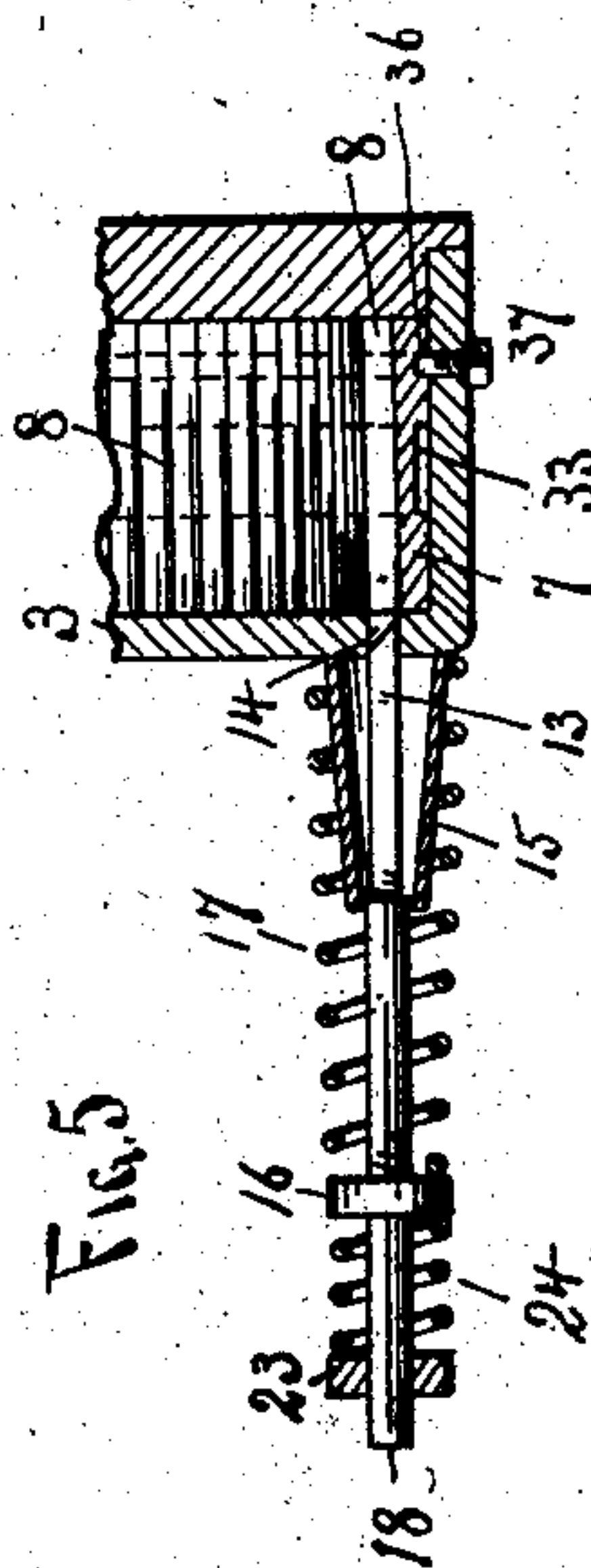
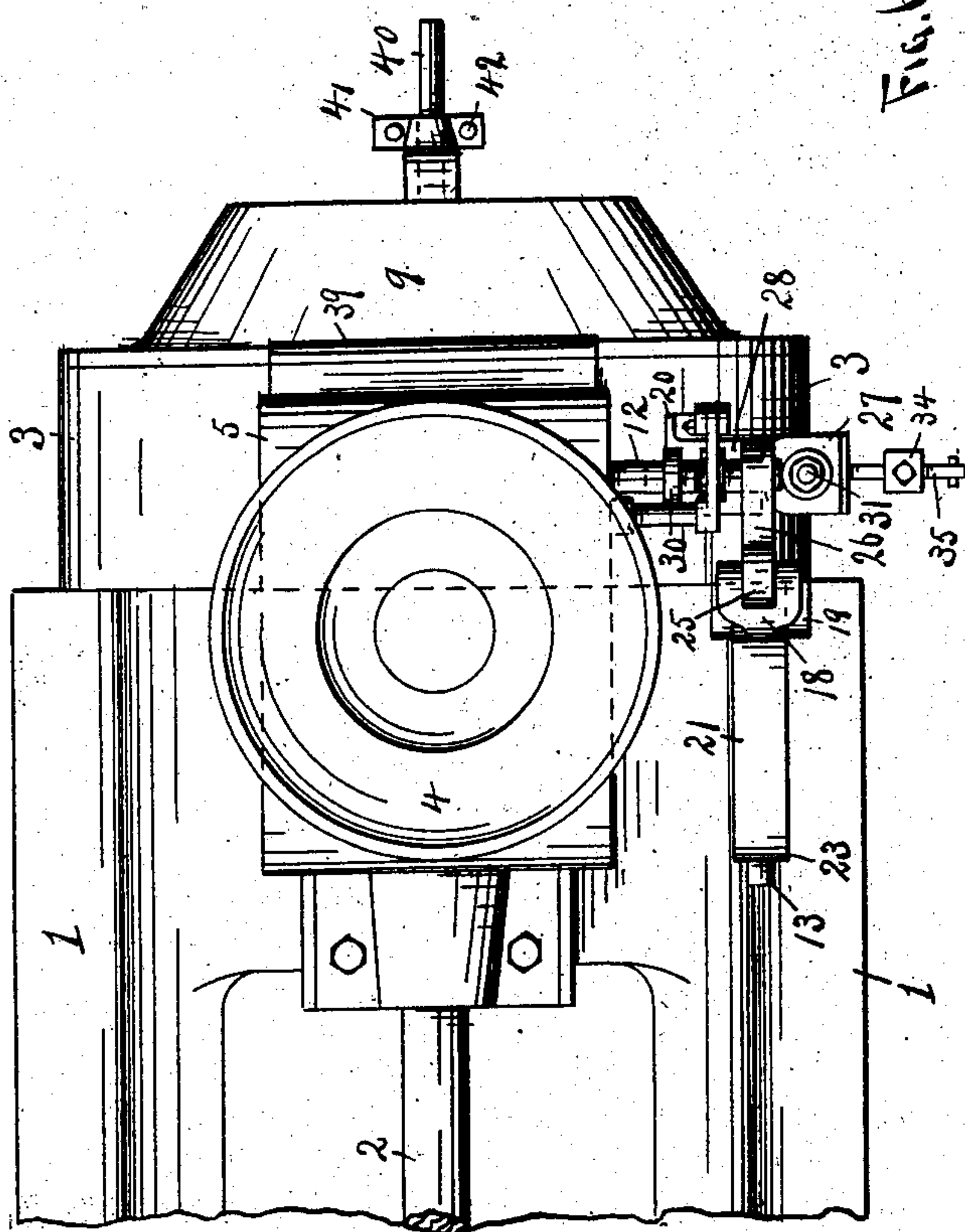
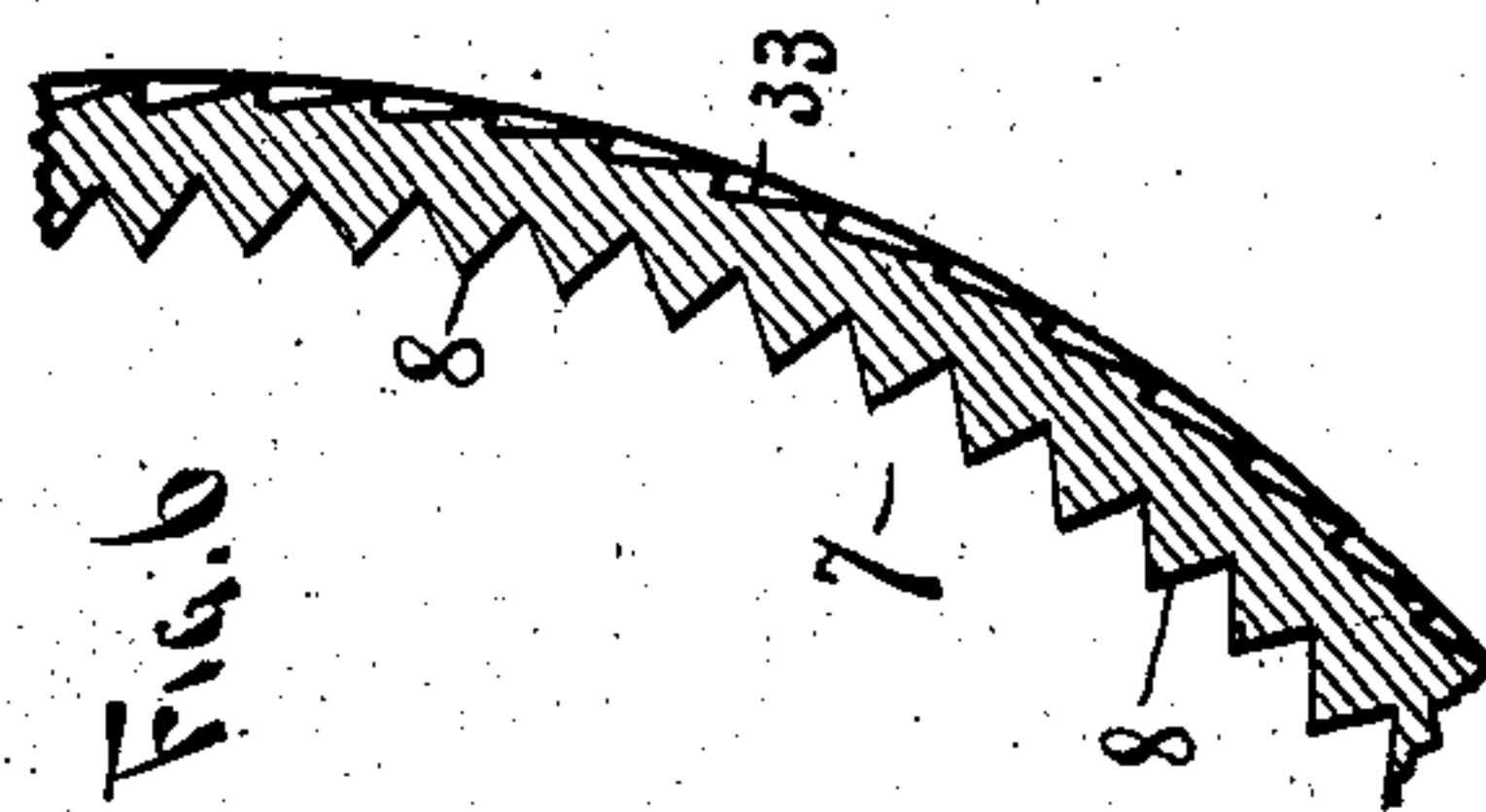
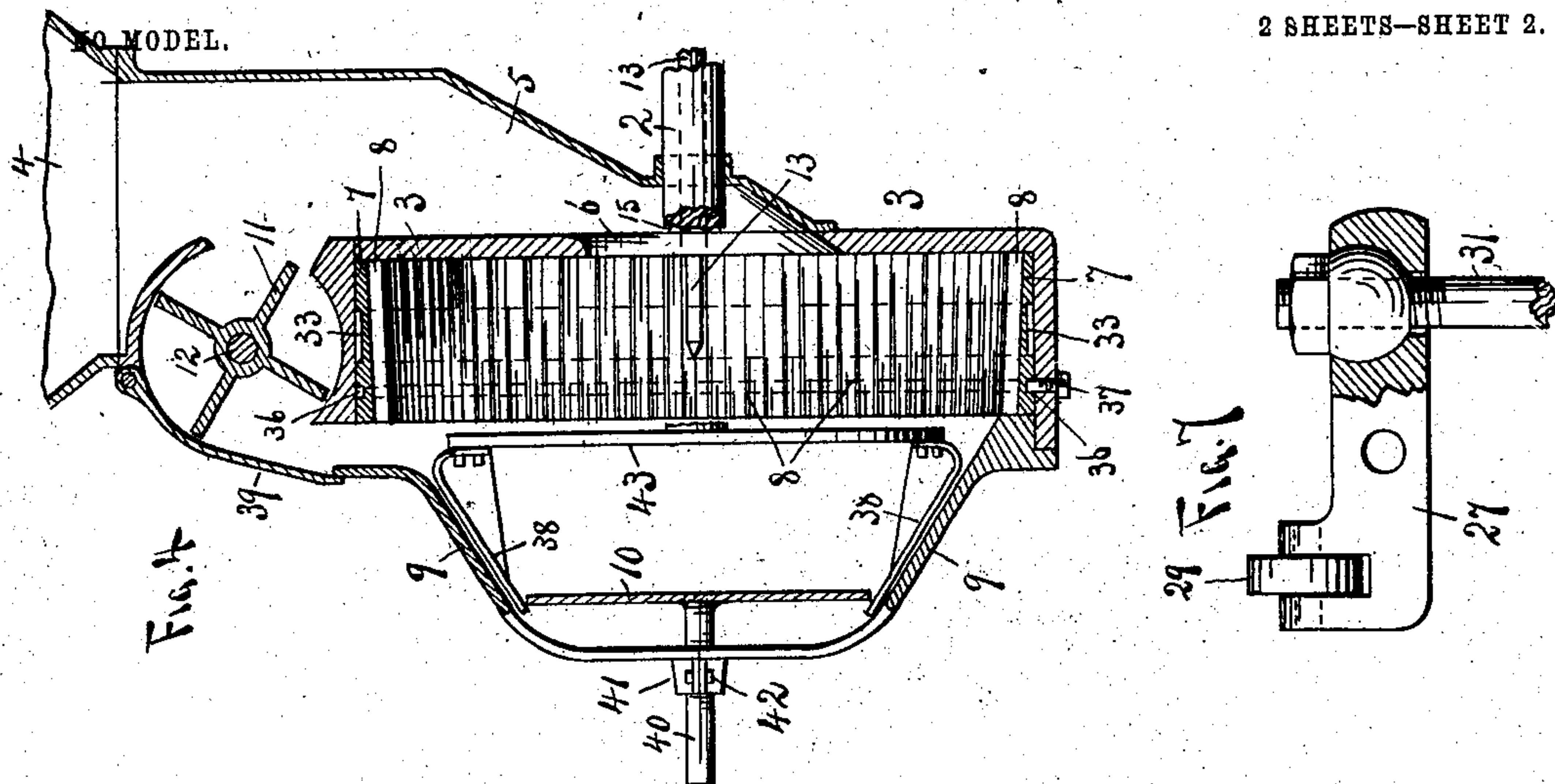
H. D. PHILLIPS, Inventor
by C. H. Woodward, Attorneys

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2 SHEETS—SHEET 2.



Witnesses

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by

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UNITED STATES PATENT OFFICE.

HIRAM D. PHILLIPS, OF CHATTANOOGA, TENNESSEE.

GRINDING-MILL CLEANER.

SPECIFICATION forming part of Letters Patent No. 728,289, dated May 19, 1903.

Application filed July 29, 1901. Serial No. 70,133. (No model.)

To all whom it may concern:

Be it known that I, HIRAM D. PHILLIPS, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Grinding-Mill Cleaner, of which the following is a specification:

This invention relates to grinding-mills, and particularly to that class of mills which are employed for grinding spice and the like, and has for its object to provide for conveniently cleansing the grinding-shell of the accumulation of oil and oily matter which escapes from the products under treatment, and thereby to prevent the toothed or corrugated shell from becoming smooth by reason of such accumulation. It is furthermore designed to arrange for cleansing the shell without stopping the mill and also to provide for applying the present invention to mills already constructed and to connect the same to some working portion of the mill for operating the cleansing means during the running of the mill.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side elevation of a grinding-mill equipped with the present cleaning means. Fig. 2 is a rear elevation thereof, parts being broken away to show an operative connection with the grinding-shell. Fig. 3 is a top plan view thereof. Fig. 4 is a central vertical sectional view taken through the grinding-shell and adjacent parts. Fig. 5 is a detail plan section on the line 5-5 of Fig. 1. Fig. 6 is a detail sectional view of a portion of the grinding-shell. Fig. 7 is a detail view of the pivoted lever for transmitting movement to the shell-turning pawl.

Like characters of reference designate corresponding parts in all of the figures of the drawings.

To adequately illustrate the application

and operation of the present invention, there has been shown a common form of grinding-mill, consisting generally in a bed 1 for the support of a power-shaft 2, which has its outer end projected centrally through a cylindrical casing 3, to which the products to be ground are fed through the hopper 4 and the throat portion 5. As best shown in Fig. 4, the back of the casing is provided with a central opening 6 for the reception of the products, and fixed within the casing is the grinding-shell 7, which is provided upon its inner side with transverse corrugations or teeth 8. The shell or ring is open at opposite ends, and cooperating with the inner corrugated margin thereof is a plurality of beaters, (not shown,) which are mounted upon the shaft, which extends centrally through the shell. The ground products are designed to pass outwardly from the shell and through the substantially conical chute or discharge member 9. The outer side of the shell is partly closed by a circular plate 10, carried by the shaft and rotatable therewith, the plate being slightly smaller in diameter than the shell or ring, and thereby forming a marginal discharge-opening. Above the shell there is mounted a bladed rotatable tailings cross-valve 11, which directs the tailings to the throat and thence again to the shell. This valve is mounted upon a shaft 12, projected externally of the throat and in operative relation to the power-shaft, such relation, however, not being shown.

In carrying out the present invention it is first designed to provide for scraping the corrugations of the shell to clean therefrom the accumulation from the products treated—as, for instance, by means of an endwise-movable scraping rod or punch 13, (best indicated in Fig. 5,) mounted to pass through a perforation 14, formed in the back of the mill-casing, so that the beveled inner end of the rod may scrape the respective corrugations when said rod is moved inwardly. This rod is mounted in a tubular casing 15, projected from the back of the mill-casing, the outer end of the rod being projected beyond said casing and carrying a marginal collar or shoulder 16. A helical spring 17 embraces the tubular casing and rod and bears in opposite directions against the casing and the

collar to shoot the rod outwardly after it has been forced forwardly in its scraping operation. For the operation of the cleaning-rod there is provided a lever 18, located above the rod and in rear of the mill-casing, said lever being fulcrumed intermediate of its ends upon a rearwardly-directed arm 19 of a bracket 20, applied to the exterior upper portion of the mill-casing. A substantially horizontal link 21 is pivotally connected to the lower end of the lever, as at 22, and its outer end has a lateral and downwardly-offset eye or loop 23 loosely embracing the outer end portion of the cleaning-rod and in rear of the collar thereof, there being a helical spring 24 interposed between the eye and the collar, so that should the cleaning-rod strike a tooth instead of entering a corrugation in the shell there will be no forward movement of the rod, as the movement of the link will be taken up by the spring 24. At the upper end of the lever there is provided an antifriction-roller 25, which is in operative relation to a cam 26, secured to the adjacent portion of the tailings-valve shaft 12, so as to operate the cleaning-rod once at each rotation of the shaft. In order that the cleaning-rod may have access to all of the corrugations of the shell, it is designed to rotate the latter with respect to the rate of operation of the cleaning-rod by means of a ratchet mechanism in operative relation to the tailings-valve shaft. To carry out this object, there is provided a substantially horizontal lever 27, which is fulcrumed intermediate of its ends upon an arm 28 of the bracket 20, with its inner end provided with an antifriction-roller 29 in operative relation to the separate cam 30, mounted upon the shaft 12. From the outer end of this lever there is loosely hung a ratchet-pawl 31, which has its hooked lower end working in a vertical slot 32, formed in the adjacent marginal edge of the mill-casing, so as to be in operative relation to a marginal series of ratchet-teeth 33, formed in the intermediate portion of the exterior of the grinding-shell, whereby the latter is designed to be rotated to bring one corrugation at a time in alinement with the opening in the back of the mill-casing and the cleaning-rod. A weight 34 is adjustably carried upon a lateral arm 35, projected outwardly from the ratchet pawl or bar, so as to maintain the latter in engagement with the ratchet-teeth of the shell. Ordinarily the shell does not turn within the casing, which it fits rather snugly, and to prevent lateral displacement by the movement of the shell the latter is also provided with an external marginal groove or way 36 for the reception of a plurality of projections 37, carried by the casing and preferably formed by headed screws piercing the casing.

It will be understood from the foregoing description that the plate or disk 10 is designed to operate as a gage to control the area of the discharge-opening between its periphery

and the wall of the cone, and thus regulate the degree of fineness to which the material is ground, and in order to provide for adjustment axially of the cone it is preferred to provide said disk with a stem 40, fitted in a clamping-collar 41 in the center of the cone, said collar having adjusting devices 42 consisting of bolts and engaging nuts or the equivalent thereof. Upon loosening the bolts the stem may be adjusted inward or outward to vary the position of the disk.

Referring particularly to Fig. 4, it will be apparent that the interior of the conical discharge member 9 is likely to collect the oily matter of the products treated, and in order to maintain this surface free from such accumulations and at the same time to prevent choking of the discharge-opening between the periphery of the gage-disk and the wall of the cone there is provided one or more knives 38, carried by a plate or disk 43, which is secured to and carried by the operating-shaft 2, said knives being directed outwardly from said plate or disk and operating close to the surface of the wall of the cone, but sufficiently removed therefrom to avoid unnecessary friction in operation.

Access to the tailings-valve 11 may be had by way of the hinge-door 39, covering an opening formed in the front of the door portion of the casing.

In order to allow any accumulation of material which may work under the grinding-shell from the interior of the mill to escape, and thus avoid choking or clogging the mechanism, it is preferred to provide one or more vent-openings 44 in the casing. The revolution of the shell has a tendency to draw the material toward these openings.

From the above description it will be seen, moreover, that the present invention relates, essentially, to an attachment for application to mills already constructed, no material changes being required in connection with the fitting of the cleaning means.

What is claimed is—

1. In a grinding-mill, the combination with the runner and the normally stationary grinding member, of a cleaning device, means for causing it to traverse the furrows of said member, and means for imparting a step-by-step rotative movement to said member.

2. In a grinding-mill, the combination with the runner and the normally stationary grinding member, of a longitudinally-movable cleaning device, means for reciprocating the same to clean successive furrows of said member, and means for imparting a step-by-step rotative movement to said grinding member to permit the access of the cleaning device to all parts of said grinding member.

3. In a grinding-mill, the combination with the runner and the normally stationary grinding member, of a cleaning device, means for causing it to traverse the furrows of said member, ratchet-teeth on the periphery of said grinding member, and a pawl for engag-

ing the ratchet-teeth and moving said grinding member progressively to permit the access of the cleaning device to all parts of said grinding member.

5 4. A cleaning attachment for the grinding member of a mill, comprising an endwise-movable cleaning device adapted to traverse the furrows of said member, a cam, a pivoted lever for transmitting movement from the
10 cam to the cleaning device, and means for imparting a step-by-step rotative movement to the grinding member.

5 5. In a grinding-mill, the combination with the runner and the normally stationary grinding member, of a longitudinally-movable
15 cleaning device adapted to traverse the furrows of said member, a fixed collar or shoulder on the cleaning device, a revoluble cam, a pivoted lever having one end in engagement
20 with the cam, a link pivotally connected to the opposite end of said lever and slidably engaging the cleaning device, a spring dis-

posed between the link and the collar or shoulder, and means for imparting a step-by-step rotative movement to the grinding member. 25

6. In a grinding-mill, the combination with the runner and the normally stationary grinding member, of a longitudinally-movable cleaning-rod adapted to traverse the furrows of said member, a spring normally holding
30 the rod out of engagement with said member, a pivoted lever, a link connected thereto and having an eye for the reception of the rear end of said rod, a yielding connection between the link and rod, and a cam for engag- 35
ing the opposite end of said lever.

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

HIRAM D. PHILLIPS.

Witnesses:

J. G. TUCKER,

W. H. HAMBLIN.