

T. J. SLOAN.
Grinding Mill.

No. 54,260.

Patented April 24, 1866.

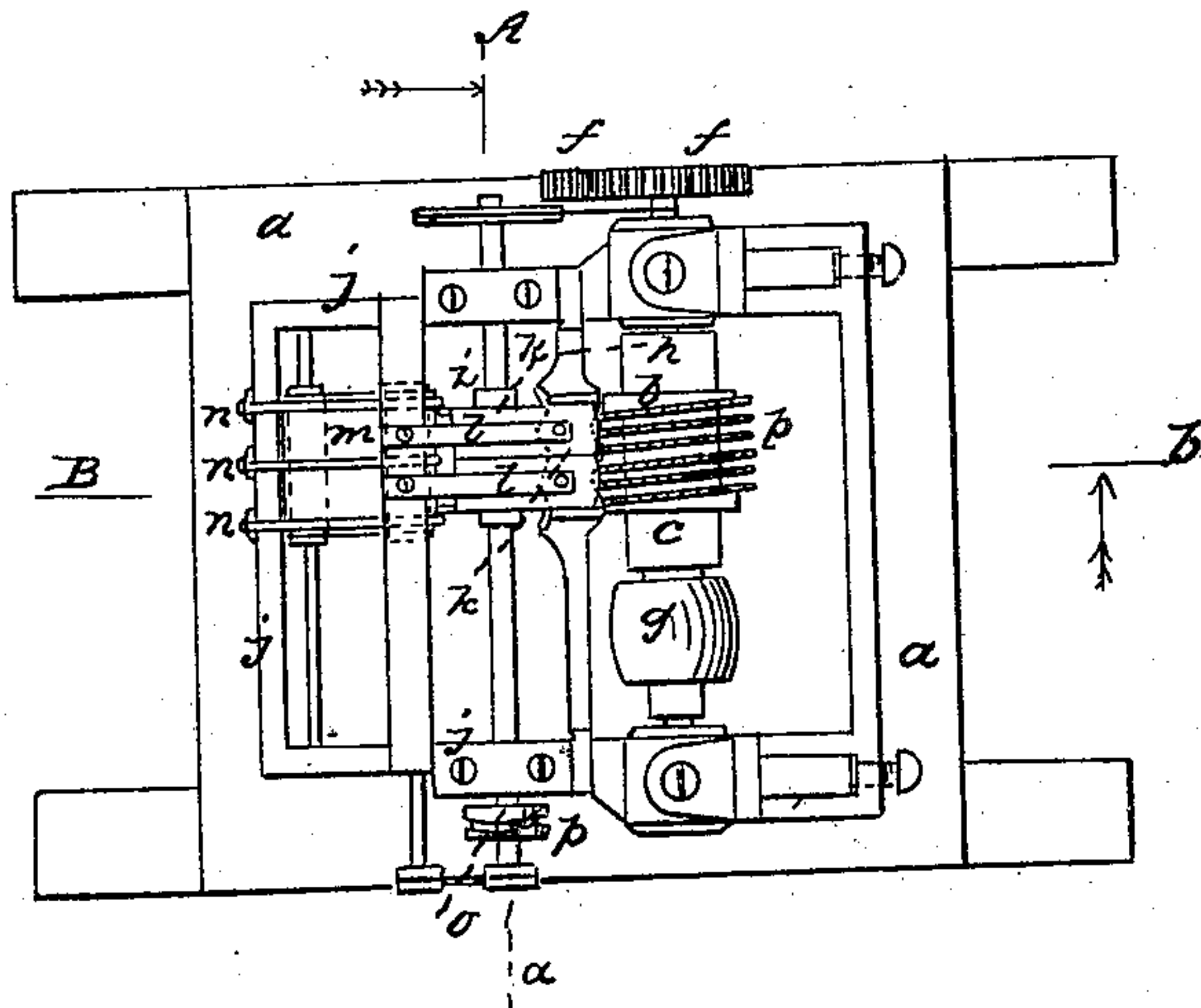


Fig. 3. B. b.

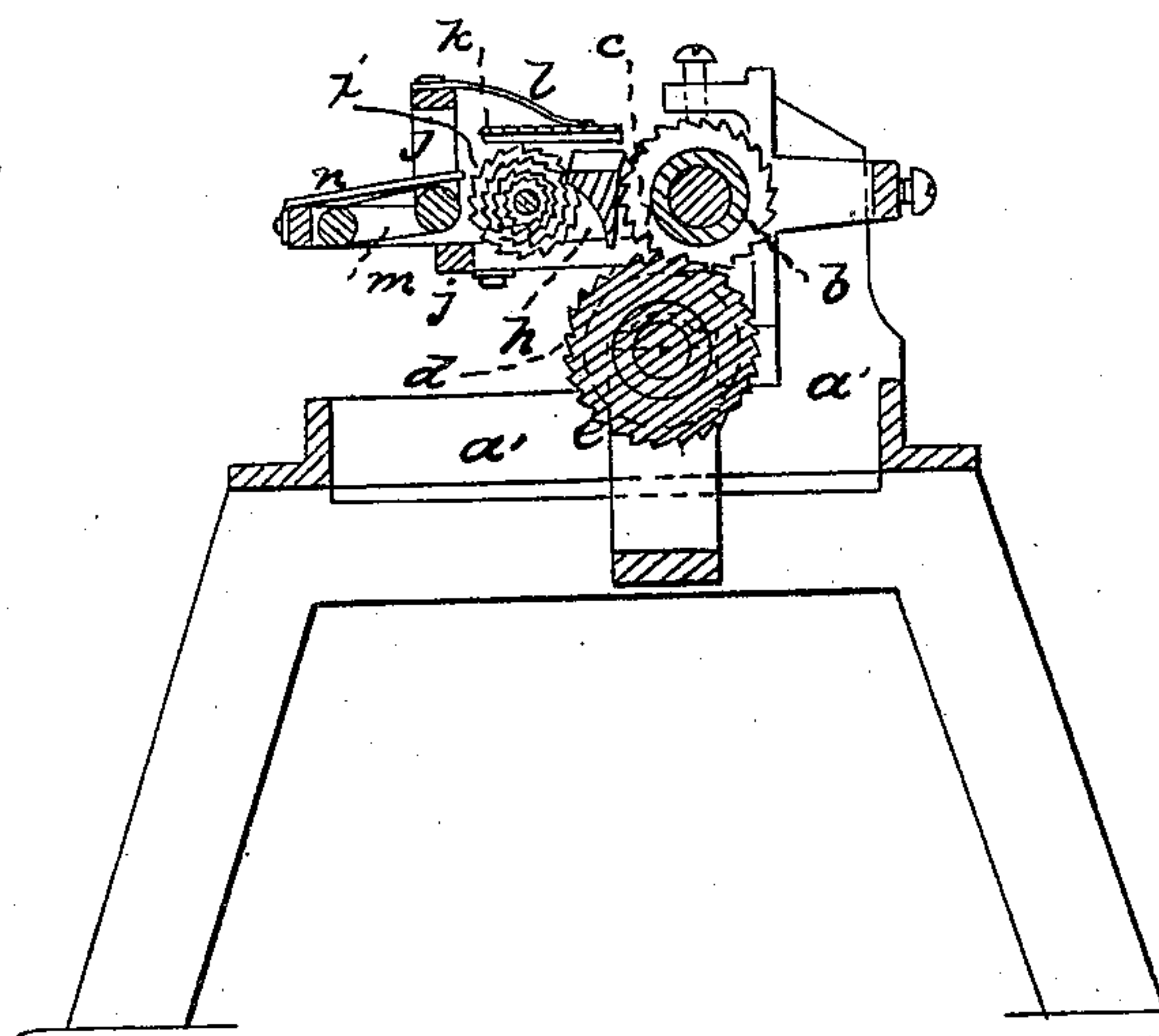
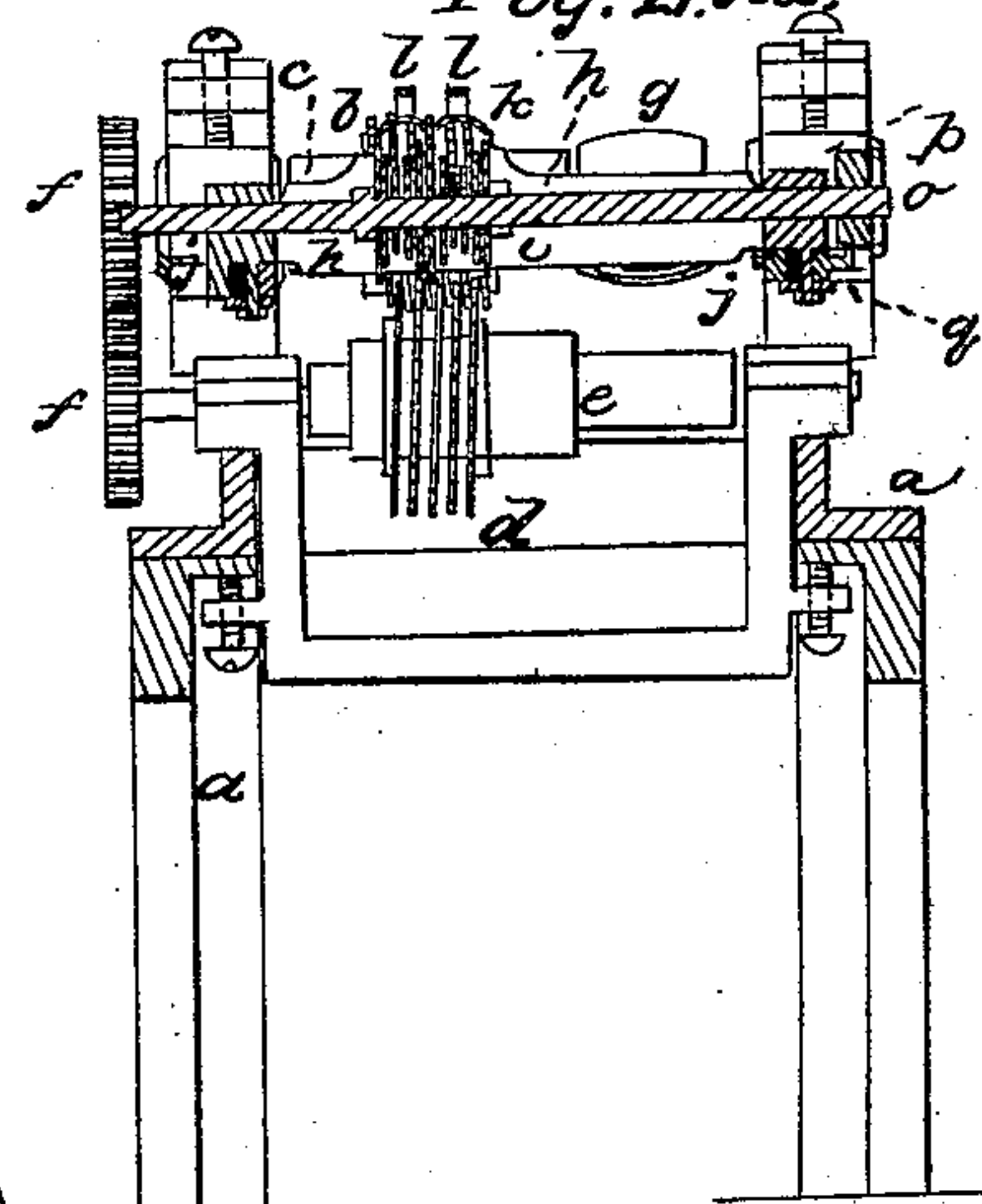


Fig. 2. A. a.



Witnesses:
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IMPROVEMENT IN GRINDING-MILLS.

Specification forming part of Letters Patent No. 54,260, dated April 24, 1866.

To all whom it may concern:

Be it known that I, THOMAS J. SLOAN, of the city, county, and State of New York, have invented a new and useful Machine for Grinding or Reducing Corn-Cobs and other Vegetable Substances; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan; Fig. 2, a vertical section taken in the plane of the line A *a* in Fig. 1, and Fig. 3 a cross-vertical section taken at the line B *b* of Fig. 1.

The same letters indicate like parts in all the figures.

In the machine which I have invented I employ the well-known device of a series of circular saws with washers interposed between them, and mounted on a shaft with their planes slightly inclined from a plane at right angles with the axis of rotation, and generally termed "drunken saws," so that each saw will make a cut as wide as its thickness plus the extent of its inclination. Such a device has been frequently used for grinding bark, dye-woods, and other dry substances; but when used for grinding or reducing vegetable substances of a pulpy nature or in the green state they soon become clogged between the teeth and in the spaces between the several saws, and for that reason have not heretofore been used to any extent for such purpose.

The first part of my said invention relates to a means for clearing both the teeth and the spaces between the saws; and it consists in combining with such a series of drunken saws for grinding or reducing another series of similar drunken saws on another and parallel shaft, for the purpose of clearing the first series, the said second series being inclined to the same extent, but in a reversed direction, and made of a greater diameter, and extending into the spaces between the saws of the first or grinding series, and the shafts of the two sets being geared to rotate with equal velocities.

And my said invention also relates to the method of feeding the material to the action of the grinding or reducing series of saws; and it consists in combining with the series of grinding or reducing saws, first, a feeding-

roller formed with one or more grooves in the direction of the circumference, and with a pointed or serrated surface to take hold of and force forward the material to be reduced; second, one or more concave pressure-plates above the grooved roller; and, third, a grooved rest or bearing-surface between the grooved roller and the series of reducing-saws, by reason of which combinations corn-cobs, cornstalks, beets, and other like vegetable substances presented by a pad-apron or other means will be taken by the asperities of the feed-roller and pushed forward, under the pressure of the pressure plate or plates, onto the grooved rest and toward the reducing-saws.

And this part of my invention also consists in giving to the feeding mechanism a reciprocating motion in a direction parallel with the axis of the reducing-saws, for the purpose of making every part of the grinding or reducing surface of the series of saws effective.

In the accompanying drawings, *a* represents a suitable frame, and *b* a series of drunken saws on a horizontal shaft, *c*—that is to say, a series of circular saws parallel with each other, but inclined from a plane at right angles to the axis of the shaft to an extent at least equal to the width of the space between any two of the saws. Just below there is another like series of drunken saws, *d*, mounted on a shaft, *e*, which is parallel with shaft *c*, and the two shafts are geared to rotate in opposite directions and with equal velocity by means of two cog-wheels, *f f*, of equal diameter. The series of saws *d* are termed "the clearers," and are inclined to the same extent as the grinding-saws *b*, but in the reversed direction, and they are so placed relatively to the other series as to work in the spaces between the saws of the first series, and the saws of the clearing series are of greater diameter than the grinding series, so that their peripheries shall travel faster, notwithstanding the two series rotate in equal spaces of time.

It results from the arrangement above described that the saws of the clearing series clear out all the matter which otherwise would accumulate in and clog the teeth and the spaces between the grinding-saws, notwithstanding the two series of saws are inclined, and that the clearing-saws are of greater diameter than

and extend into the spaces between the saws of the grinding series.

The shaft of the grinding series is provided with a pulley, *g*, to receive motion from some suitable motor by a belt.

Just in front of the grinding series of saws there is a rest-bar, *h*, which is secured to a reciprocating carriage, to be presently described, and this bar is formed with one or more V-shaped recesses to receive corn-cobs or other articles to be ground or reduced. Two such recesses are represented in the accompanying drawings, but the number of such recesses will depend upon the length of shaft occupied by the series of saws, and their form may be varied to suit the judgment of the constructor and the material to be reduced.

In front of the rest-bar *h* there is a feed-roller, *i*, on a horizontal shaft mounted in a carriage, *j*, working in ways in the frame, so that it can be reciprocated in a line parallel with the axis of the grinding-saws. A slow rotary motion is to be given to the feed-roller by any of the well-known means—such, for instance, as are represented in the accompanying drawings. The feed-roller is formed of a series of serrated rings mounted on the shaft, the said rings being of various diameters to form grooves in the direction of the circumference corresponding in form and number with the recesses in the rest-bar above described. This mode of constructing the feed-roller I have found to answer a good purpose; but any other mode of construction may be substituted, provided the surface be such that it will take hold of the material to be reduced and force it forward toward the grinding-saws.

Just above the feed-roller and the rest-bar are pressure-plates *k k*, two being represented; but the number should correspond with the number of grooves in the feed-roller. The under faces of these plates are concave, as represented, so that the material to be reduced may slide under them, and they are borne down by springs *l l*, to keep the material down onto the feed-roller and on the rest while being fed forward to the reducing-saws.

In front of the feed-roller there is a feed-apron, *m*, passing around two rollers receiving motion from the shaft of the feed-roller; and just over the upper surface of the feed-apron are guides *n*, to guide the material to the grooves of the feed-roller and the pressure-plates.

On the end of the shaft of the feed-roller there is a wheel, *o*, with a cam-groove, *p*, formed in its periphery, which runs on a pin, *q*, attached to the frame, so that every revolution of the feed-roller will impart a reciprocating motion to the carriage *j* and to the rest-bar and feeding mechanism. The object of giving a reciprocating motion to the carriage of the feeding mechanism is to insure an equal wear of the grinding-saws. Without such motion some of the saws would do very little, if any portion, of the work, but by reason of this motion the work is equally distributed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the series of drunken saws for grinding with the series of drunken saws for clearing, the two series being mounted on two shafts geared to rotate with equal velocity, and the series of clearing-saws being of greater diameter than and extending into the spaces between the grinding-saws, substantially as and for the purpose specified.

2. The combination of the series of grinding-saws with the feed-roller and the interposed rest-bar and pressure-plates, or the equivalent thereof, substantially as and for the purpose specified.

3. In combination with a series of drunken or inclined saws for grinding, as described, the means, or the equivalent thereof, for giving to the feeding mechanism a lateral reciprocating motion for the purpose of presenting the material equally to all the saws, as set forth.

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Witnesses:

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