(No Model.)

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R. McCULLY.

GRINDING MILL.

No. 274,209. Patented Mar. 20, 1883.

Fig. 1

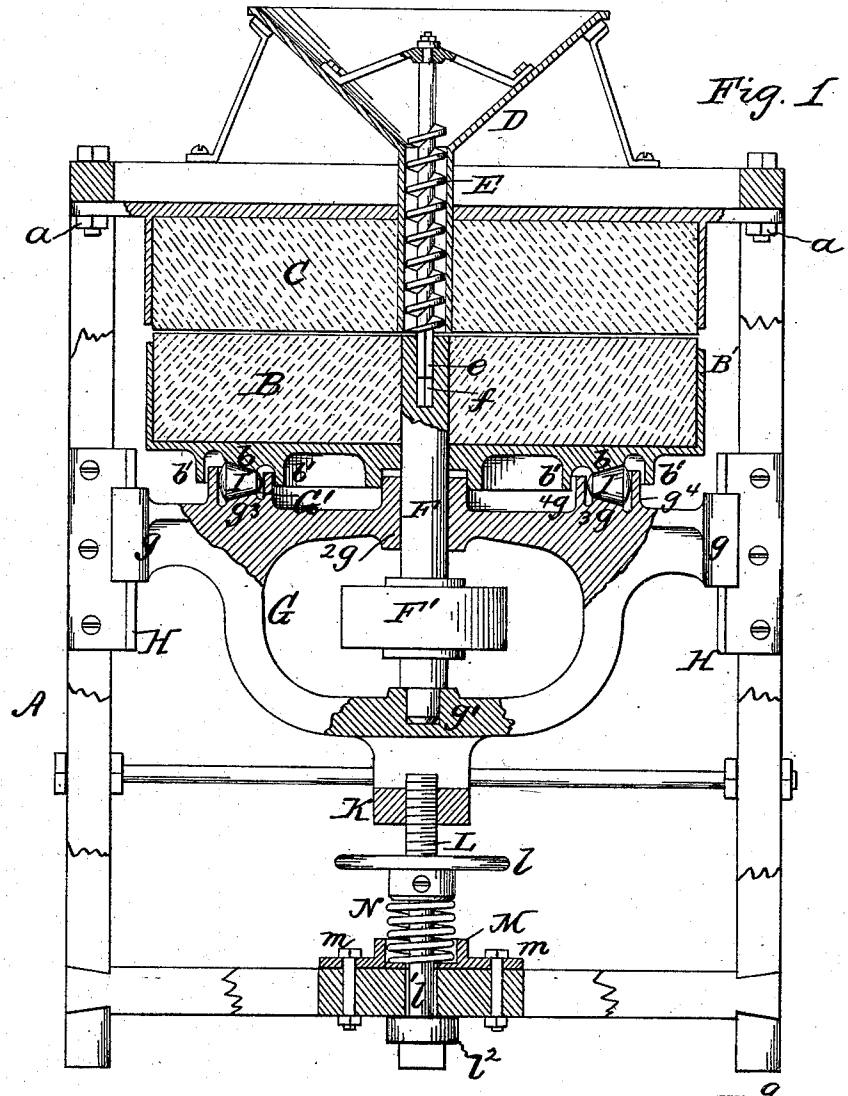
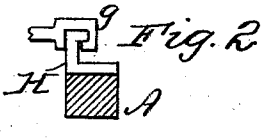


Fig. 2



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(No Model.)

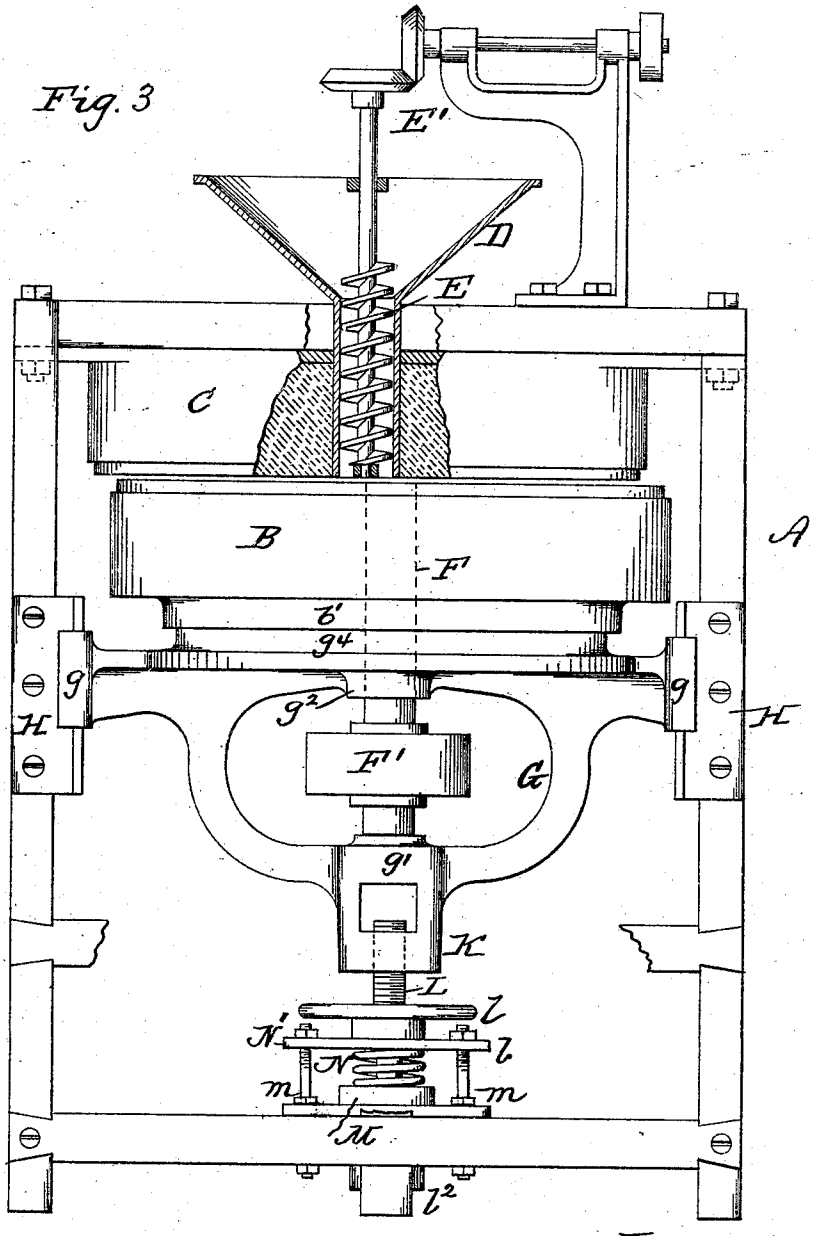
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Fig. 3



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(No Model.) 3 Sheets—Sheet 3.

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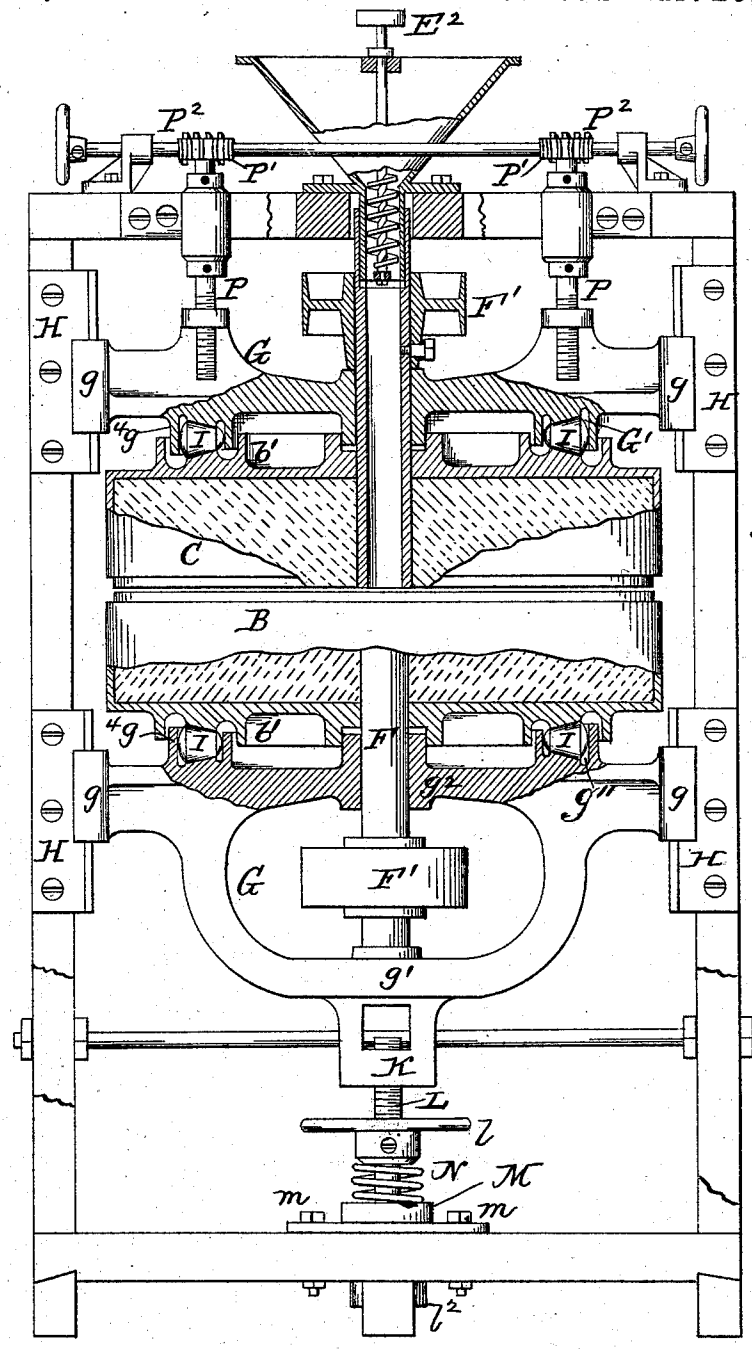


Fig. 4

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UNITED STATES PATENT OFFICE.

ROBERT McCULLY, OF PHILADELPHIA, PENNSYLVANIA.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 274,209, dated March 20, 1883.

Application filed July 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MCCULLY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification, reference being had therein to the accompanying drawings, wherein—

Figure 1 is an elevation, partly sectional, of a mill embodying my invention. Fig. 2 is a detail view thereof. Fig. 3 is an elevation, partly sectional, showing the stones or grinding-plates slightly out of center with each other; and Fig. 4 is a like view of a grinding-mill, illustrating both stones or plates provided with anti-friction-roller mechanism.

My invention has relation to that class of grinding-mills having a central feed and wherein burr-stones or iron or other plates are employed to effect the reduction of the grain or other material, and has for its object to support the stones or plates in such manner that their weight does not fall upon the driving-shafts, thereby relieving the latter of vertical strain or friction.

My invention has for its further object to so support the stones or disks that any desired degree of grinding-pressure may be applied thereto without producing an end or vertical strain on the driving-shaft or step supporting the same.

My invention accordingly consists of a grinding-mill with a central feed, having its running stone or stones supported upon anti-friction rollers sustained in adjustable frames provided with mechanism for effecting and determining the extent of the adjustment therefor.

My invention further consists of the novel combination, construction, and arrangement of parts, as hereinafter specifically described and claimed.

Referring to the accompanying drawings, A represents the frame of a grinding-mill, the stones or plates of which are arranged to revolve in a horizontal plane, B being the runner, and C the bed-stone. The latter is represented in Figs. 1 and 3 as being rigidly secured to frame A by means of bolts *a a;* or such securement may be accomplished in any other usual or suitable manner or by any other desired means. D represents a hopper therefor, provided with a screw, E, its angular shaft end *e* entering a correspondingly-shaped opening in the end of driving-shaft F, as shown at *f*, or the eye or opening in the grinding stone or disk. As said shaft revolves the screw E feeds the grain, &c., from or through the hopper to the eye of the runner, thereby providing a central forced feed therefor. The runner B is firmly fastened to shaft F in the customary or any other suitable manner, and its casing B′ is formed with an annular inclined or other shaped way or seat, *b*, and with flanges *b′ b′*.

G represents a frame having grooved ends *g g*, designed to interlock with and slide on the tongued blocks or plates H H, as shown in Fig. 2. Said frame is provided with a bearing, *g′*, for shaft F, which also passes through an upper bush or bearing, g^2, on said frame. The upper surface of the latter is formed with an annular inclined or other configured way or seat, g^3, and with flanges g^4. When the adjacent ends of casing B′ and frame G come together a space, G′, is formed between the ways $b\,g^3$ for the reception of anti-friction rollers I I, and the flanges *b′* fit over flanges g^4, so that said flanges serve as dust-excluders for said rollers, as plainly shown in Figs. 1 and 4. It will thus be seen that the runner B rests upon and rotates on the anti-friction rollers I. Hence its weight does not fall upon the shaft F, thereby relieving the latter of all vertical or end strain.

The frame G is provided with a threaded nut, K, for screw L, having an operating wheel or lever, *l*, between which and a socket, M, secured to frame A at *m m*, is a spiral or other elastic spring or buffer, N, surrounding the smooth part *l′* of screw L, as shown. Said spring forms an elastic cushion or seat for frame G and runner B. When screw L is adjusted the frame G is raised or lowered, causing the runner to approach or recede from the bed-stone, thereby varying the fineness of the grinding, and also regulating the pressure with which the grinding is to be effected.

F′ represents the driving pulley or gear for shaft F.

The spring N permits the runner to yield

when undue bulky or hard substances accidently find their way between the stones or grinding-plates. The latter may be provided with any usual or desirable arrangement of dressing, for which I do not herein make any claim, and which need not therefore be more particularly described. If desired, said stones or plates may be smooth throughout their entire grinding-surfaces.

In Fig. 3 I have shown the stones or plates B C slightly out of axial line or center with each other. I have shown the stones arranged eccentric to each other, to a slight degree only; but I do not confine myself thereto, as the extent of the eccentricity may be varied, as desired. When such construction is adopted a gear mechanism, E′, may be used to drive the screw E, or a belt-pulley, E^2, may be substituted therefor, as indicated in Fig. 4, or any other suitable means may be used. In the last-named figure both stones are arranged to revolve, each of which is provided with a frame, G, and rollers I I. The upper frame, G, is adjusted by means of gear and worm mechanism P P′ P^2. The shaft for stone C is a hollow tube, as shown, and also acts as a hopper-tube. In all other respects the constructions shown in Figs. 3 and 4 are substantially the same as that illustrated in Fig. 1.

I have shown and described my invention as applied to grinding-mills having horizontally-located stones or disks with a central feed; but it is evident that the same may be used in connection with vertically-revolving stones or plates having a feed through the center or eye of one of said plates with like beneficial results. When the stones or plates B C are arranged out of line with one another, as shown in Fig. 3, the upper stone or disk is preferably made to rotate either in the same or in a direction opposite to that of the lower running stone or disk, in order that the grinding-surfaces of both disks may wear away evenly throughout their entire surfaces. In such case said upper stone may be provided with a frame, G, and appurtenances, as shown in Fig. 4, or it may be otherwise constructed and arranged to revolve, as desired. To prevent the spring N acting to cause the disk to come together a collar, l^2, is formed on or secured to screw-rod L, as shown.

If desired, the tension of the spring N may be adjusted or regulated to any wished-for extent by means of the devices shown in Fig. 3, wherein the plate N′ is located between the wheel *l* and the top of the spring. The bolts *m m* extend up through said plate, as shown. By screwing up or loosening said bolts or the nuts thereon the spring is compressed or expands to a greater or less degree, to increase or decrease its tension. In such manner the tension of the spring is quickly and positively regulated to correspond with the load which it is designed to carry.

What I claim as my invention is—

1. In a grinding-mill, the combination of a central feed for the stones or disks, an adjustable frame and anti-friction rollers for the runner to rest upon and revolve against, substantially as shown and described.

2. In a grinding-mill, the combination of a central feed, horizontally-located stones or plates, anti-friction rollers therefor, and adjustable supporting-frames for said stone or plates, substantially as shown and described.

3. In a grinding-mill, the combination of the following elements, viz: the grinding plates or disks having a central feed, a sliding frame, anti-friction rollers interposed between the running plate or disk and the sliding frame, a driving-shaft carried by said frame, and mechanism for adjusting it to and from the runner, substantially as shown and described.

4. In a grinding-mill, the combination of the following elements, viz: the grinding stones or disks, arranged to be out of axial line with each other, a central feed therefor, a sliding frame, anti-friction rollers interposed between said frame and disk or runner, a driving-shaft for the latter, and means for adjusting said frame, substantially as shown and described.

5. In a grinding-mill, the combination, with the stones or disks having a central feed, of a sliding frame, anti-friction rollers between said frame and runner, a driving-shaft therefor, and means for effecting the adjustment of the sliding frame, substantially as shown and described.

6. In a grinding-mill, the combination, with the disks or plates thereof, having a central feed, of a sliding frame and interposed anti-friction rollers, a driving-shaft having bearings in said frame, mechanism for adjusting the latter, and a spring or elastic support, substantially as shown and described.

7. In a grinding-mill, the combination of stones or disks B C, the frame or frames G, adjusting mechanism L, collar l^2, and spring N, substantially as shown and described.

8. The combination, with the running plate or disk of a grinding-mill, of a sliding frame and interposed anti-friction rollers between said frame and disk, the adjusting-screw L, having spring N, plate l^2, socket-plate M, and bolts *m m*, substantially as shown and described.

9. A grinding-mill having disks or plates B C, anti-friction rollers I, and adjustable supporting-frame G, and in combination therewith the screw-feed E, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT McCULLY.

Witnesses:
CHAS. F. VAN HORN,
S. J. VAN STAVOREN.