

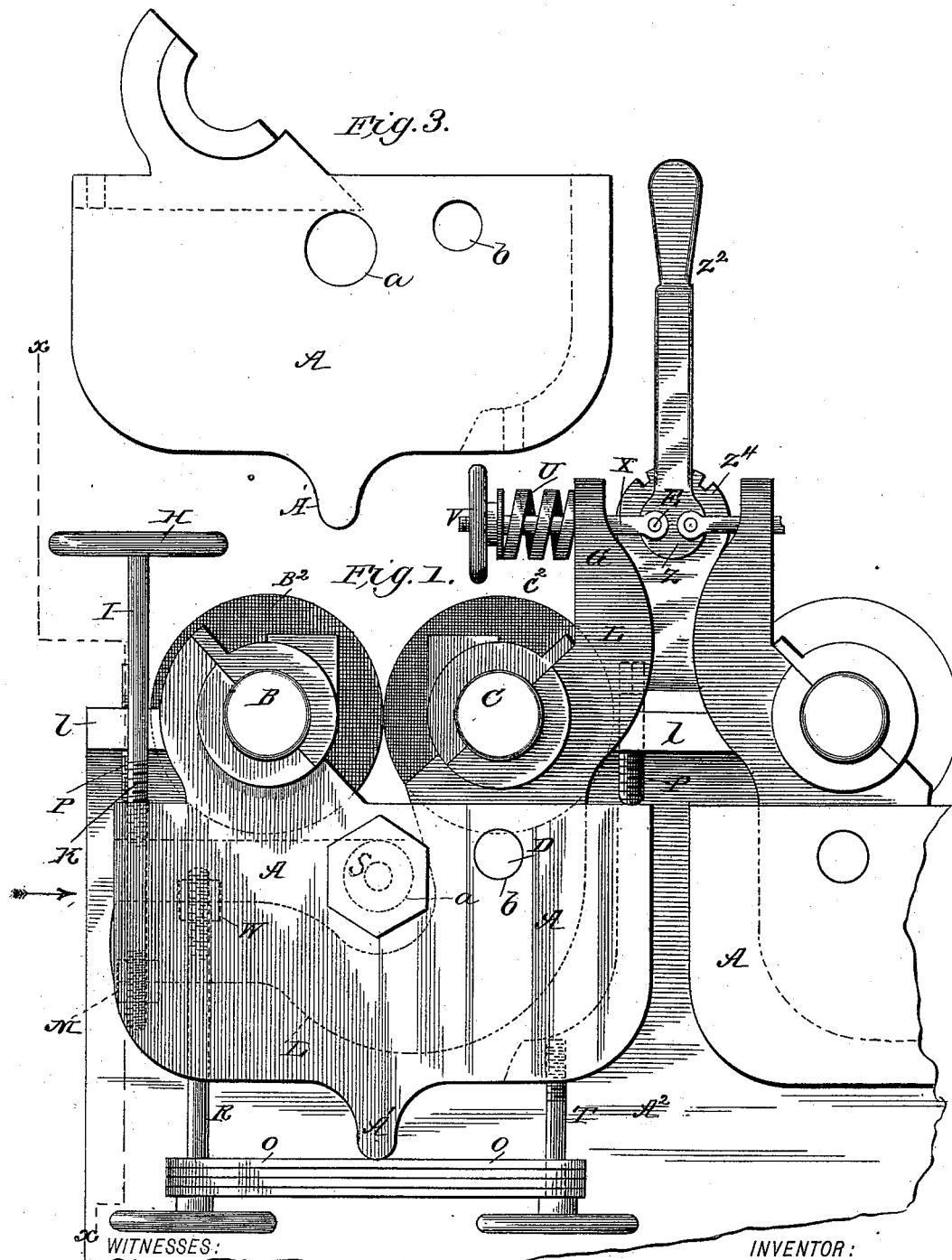
(No Model.)

2 Sheets—Sheet 1.

H. BOWMAN.
ROLLER GRINDING MILL.

No. 421,658.

Patented Feb. 18, 1890.



WITNESSES:
Fred G. Dietrich
Edw. H. Byrne.

INVENTOR:
Henry Bowman.
BY *Munn & Co.*
ATTORNEYS

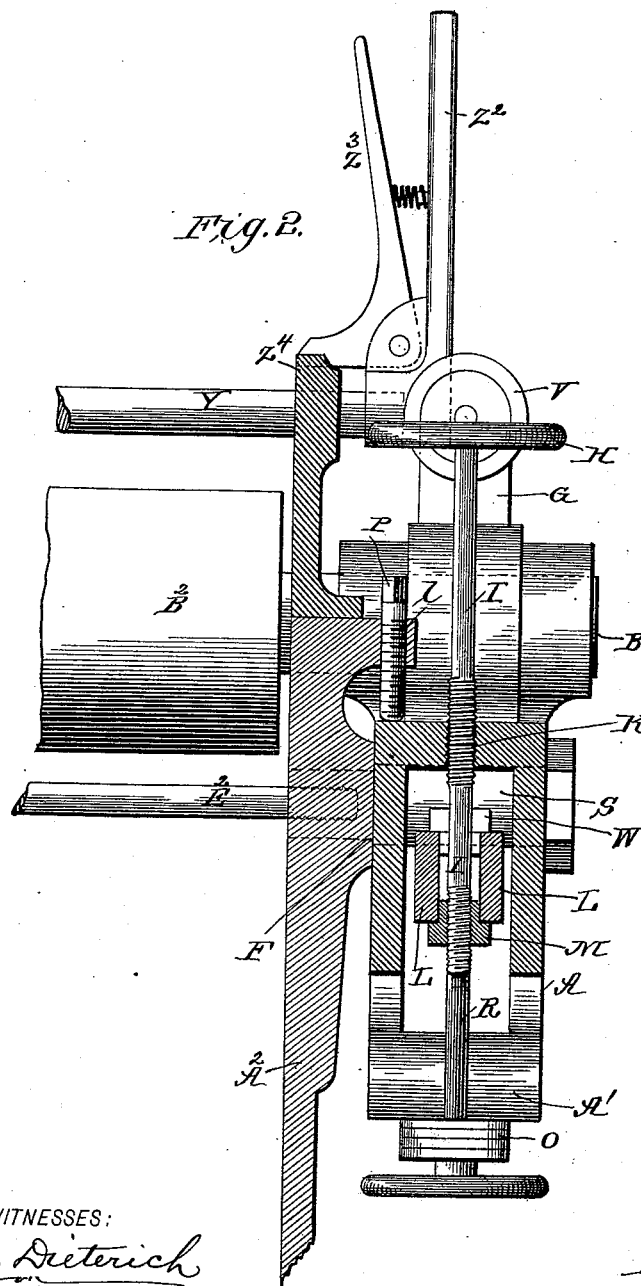
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UNITED STATES PATENT OFFICE.

HENRY BOWMAN, OF ST. JOSEPH, MISSOURI.

ROLLER GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 421,658, dated February 18, 1890.

Application filed November 25, 1889. Serial No. 331,568. (No model.)

To all whom it may concern:

Be it known that I, HENRY BOWMAN, of St. Joseph, in the county of Buchanan and State of Missouri, have invented a new and useful
5 Improvement in Roller Grinding-Mills, of which the following is a specification.

My invention relates to roller grinding-mills; and it is in the nature of improved means for regulating or adjusting the rolls
10 with reference to each other, so as to render them parallel and also spring-seated or yielding to obstructions which may pass between them.

It consists in the peculiar construction and
15 arrangement of parts for securing this adjustment, which I will now proceed to fully describe, and afterward point out in the claims.

Figure 1 is an end view of a portion of a
20 roller-mill embodying my invention. Fig. 2 is a vertical section of the same through line $x x$ of Fig. 1, looking in the direction of the arrow. Fig. 3 is a detail side view of the frame A.

A² represents one of the stationary end
25 frames of the roller-mill. Outside of this is hung a hollow frame A, which carries a bearing for the journal B of one of the rolls B². This hollow frame A has near its center a circular
30 bearing a , which fits over a stud S, projecting from the main frame, and which stud serves as a support for this frame and also a center of adjustment. At the opposite ends of this hollow frame A there are disposed set-
35 screws P P, which are tapped through lugs or flanges ll of the main frame and bear at their lower ends upon the upper side of the frame A upon opposite sides of its center. By means of these set-screws the said frame
40 may be moved on its pivotal stud S and adjusted so as to level the grinding-rolls.

C² is the companion roll to B², and its journal C is carried in a bearing in a lever-arm L. This arm is of a somewhat right-angular
45 shape and is contained within the chamber of the hollow frame A, being pivotally connected thereto by a stud D, which fits in the circular hole b , Fig. 3, of frame A. The hori-

zontal portion of this arm L is slotted vertically and is connected to a vertical screw-
50 rod I, having at its upper end a hand-wheel H for turning it. This screw-rod at K is screw-threaded and tapped into a corresponding screw-thread in the top portion of frame A. The rod I is turned one-eighth of an inch
55 smaller in diameter immediately below K, and passes thence down through the vertical slot of arm L, and is screw-threaded with a much smaller pitch than at K, and is tapped into a nut M, which bears against the lower
60 side of the arm L.

When the rod I is turned by means of its hand-wheel, the differential effect of the two screw-threads at K and M gives a very fine
65 adjustment between the arm L and frame A, that causes the rolls C² and B² to approach or recede from each other according to the direction of the movement of the screw-rod, thus regulating the grinding-set of the rolls. When the arm L is raised by nut M, the roll
70 C² is thrown away from the roll B², and when said nut is lowered the rolls are brought together.

In combination with the aforementioned frame A and arm L, I employ a spring O,
75 composed of a number of flat pieces of spring-steel having a hole in each end and together forming a leaf-spring. This spring at its middle bears against a projection A' of the frame A, and the ends of said spring are
80 held up by screw-rods T and R, which extend through the holes at the ends of the spring and are each provided with a hand-wheel. The thread of the screw-rod T is tapped into the frame A, while the screw-rod R extends
85 up through the slot in the arm L and is tapped into a nut W, resting upon the top of the arm L. The tension of this spring is regulated by tightening of the screws T and R, and this tension in tending to pull
90 down the arm L about its pivot D serves to press the roll C² against the roll B² with an elastic or yielding pressure. This permits the roll C² to automatically move away from the other in case a nail, screw, or other
95 hard and unyielding substance should pass

between the rolls, the said rolls in that case yielding to permit the said foreign substance to pass without great damage to the rolls and the derangement of the adjusting devices.

5 In combination with the above-described device I also provide another spring-adjustment, as follows: The arm L is extended above its roll C² in the form of a vertical projection G. Through a hole in this pro-
10 jection passes a rod X, having one end screw-threaded and provided with a screw-threaded hand wheel or nut V, and a spiral spring U, coiled about said rod between the hand-wheel and the projection G. The other end of the
15 rod X is connected loosely to a stud E on a hub or boss Z, having a rigid hand-lever Z² projecting upwardly therefrom. This hand-lever has upon its side a spring-locking latch Z³, adapted to engage a notched segment Z⁴.
20 This hand-lever Z² is used to compress the spring U, so that while no interference is made with the grinding set of the rolls this lever and spring U serve to throw away the roll C² from B² in starting the machine or
25 when running without feed. This is accomplished through lever Z² by compressing the spring U until its tension is greater than the tension of the spring O, at which time the rolls will separate, and upon release of the
30 lever Z² again they will go together with the same set and same tension originally given them by the spring O and its adjusting-screws.

35 The hub Z is formed on the end of a shaft Y, Fig. 2, which extends across the machine parallel to the rolls, and is upon the opposite side of the machine provided with a similar set of connections for acting upon the exten-
40 sion G of another arm L on the opposite side.

In connecting the parts of the main frame and the frame A the inner end of the stud S on each side is bored out and screw-threaded (see dotted lines, Fig. 2) to receive the screw-threaded end of tie-rod E², which extends
45 across the machine from one stationary frame A² to the other. The stud is provided with a hexagonal or angular head, so as to receive a wrench with which to turn it, and is cut away or reduced in size at F, so as to form a
50 shoulder which bears against the main frame when turned to place. The parts are connected by first putting the tie-rod E² in the stationary frames A², and then passing the
55 stud S through the hollow frame A and screwing it onto the ends of the tie-rod E². When turned up, the tie-rod connects the two sections of the main frame, and the frame A is hung loosely upon the stud S between the
60 shoulder F and the hexagonal head of the stud. The rod E² may be further utilized as a support for scrapers for the rollers.

65 From the foregoing description it will be seen that while the rolls B² and C² have a yielding adjustment with reference to each other they are also both carried in the frame

A outside of the main frame, and are together given an adjustment by set-screws, whereby the rolls may be leveled or trammed without disturbing the set of the grinding-adjustment. The differential adjusting-screw I also per-
70 mits of a very fine and delicate grinding set. Having thus described my invention, what I claim as new is—

1. In a roller grinding-mill, the combination of two rolls having independent bearings,
75 springs for rendering one of them spring-seated or yielding to and from the other, movable frames sustaining both bearings of the rolls, a stationary main frame, and set-screws for adjusting the said movable frame
80 upon the stationary frame, substantially as shown and described.

2. In a roller grinding-mill, the combination of two rolls arranged in bearings, one of which is made movable to and from the other,
85 a spring and adjusting devices located below the rolls for transmitting a regulated pressure to the rolls for a grinding set, and another spring and adjusting devices arranged above the rolls to antagonize the first spring and
90 to separate at will the rolls without disturbing their grinding adjustment, substantially as shown and described.

3. In a roller grinding-mill, the combination, with the main frame, of a frame A, hung
95 thereon and carrying one of the rolls, a lever-arm L, pivoted or hung in frame A and carrying the other roll, and the subjacent spring O, bearing at its middle against a projection of frame A and connected at one end adjust-
100 ably to the lever-arm L by screw R, and at the other end to frame A by screw T, substantially as shown and described.

4. In a roller grinding-mill, the combination, with the main frame, of a hollow frame A,
105 hung upon a projecting stud or bearing of the main frame and carrying one of the rolls, the lever-arm L, pivoted or hung to the frame A and extending inside its hollow chamber and bearing the other roll, and a spring
110 and adjusting devices for rendering the arm L and its roller adjustable to the frame A and its roll, substantially as shown and described.

5. In a roller grinding-mill, the combination,
115 with the roll B² and its carrying-frame, of the lever-arm L, carrying roll C², a spring and adjusting device for pressing the two rolls together, the said lever-arm being provided with an extension G, rod X, spring U,
120 nut V, and adjusting-lever Z², for separating the rolls without disturbing their grinding adjustment, substantially as shown and described.

6. In a roller grinding-mill, the combination
125 of the two rolls, independent frames carrying the same, springs for forcing them together, and a differential screw for adjusting the rolls to each other with a fine adjust-
130 ment, one of the threads of the differential

screw being arranged to act upon the frame of one roll, and the other thread of different pitch being arranged to act upon the frame of the other roll, substantially as shown and described:

5 7. In a roller grinding-mill, the combination of the main frame A², the tie-rod E², screw-threaded at its end, the stud S, with angular end and having an interior screw-thread fit-

ting the tie-rod, and a shoulder F, and the 10 carrying-frame for the roll-journals hung upon the said stud, substantially as shown and described.

HENRY BOWMAN.

Witnesses:

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C. A. HUBACHER.