No. 791,833. PATENTED JUNE 6, 1905.

S. SNYDER.

ROLLER MILL.

APPLICATION FILED APR. 11, 1903.

2 SHEETS—SHEET 1.

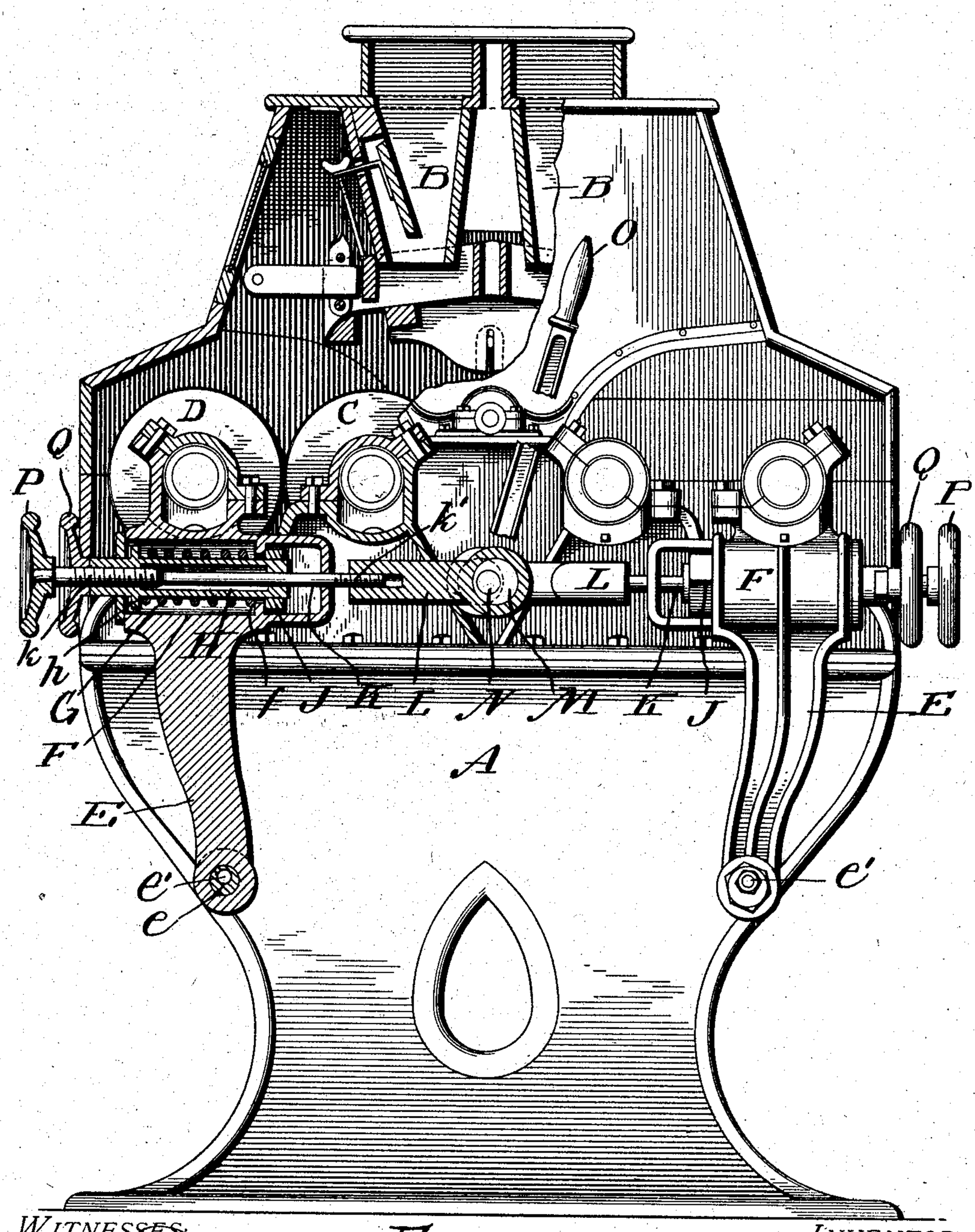

Fig 1

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2 SHEETS—SHEET 2.

Fig. 2.

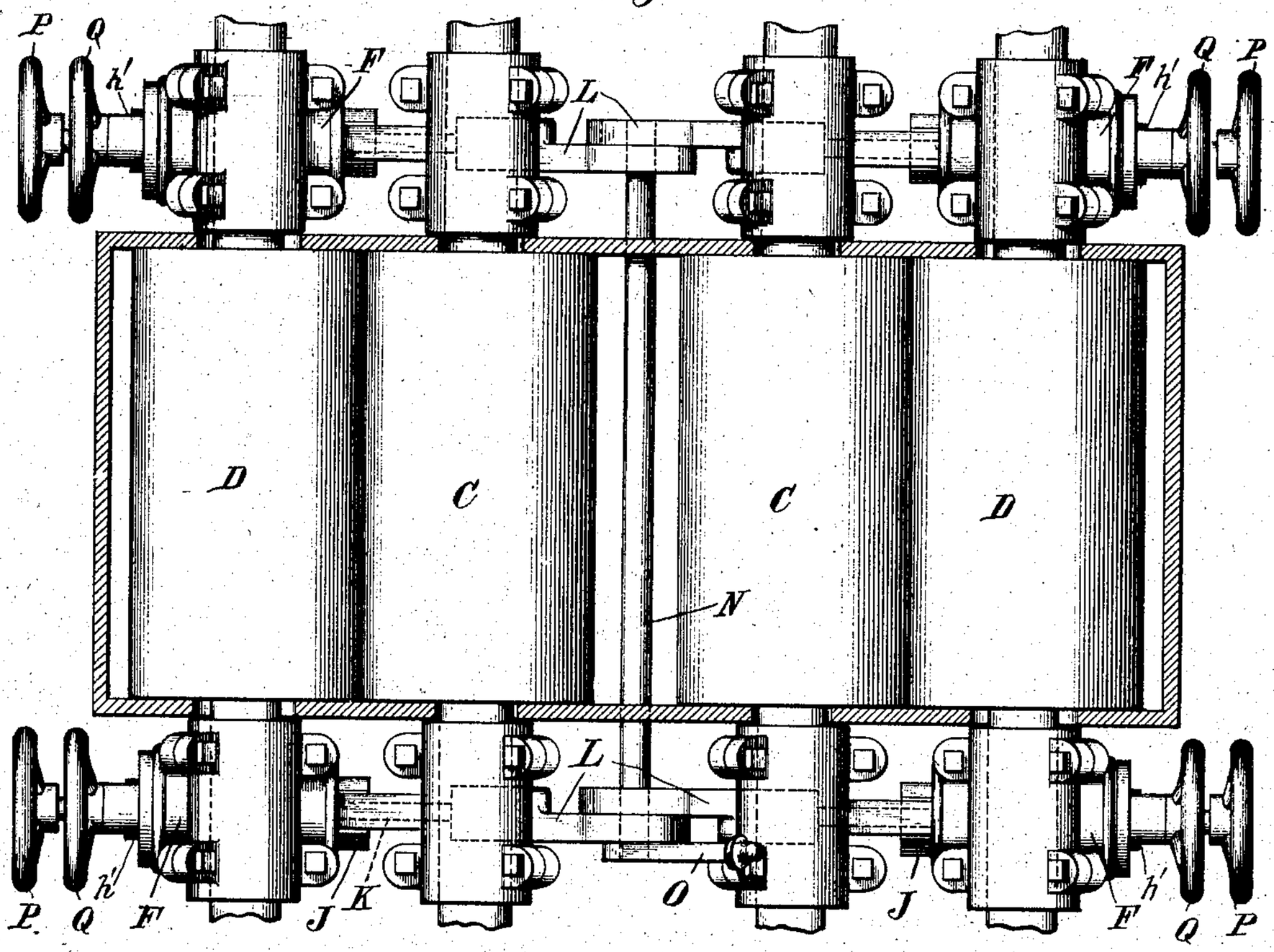
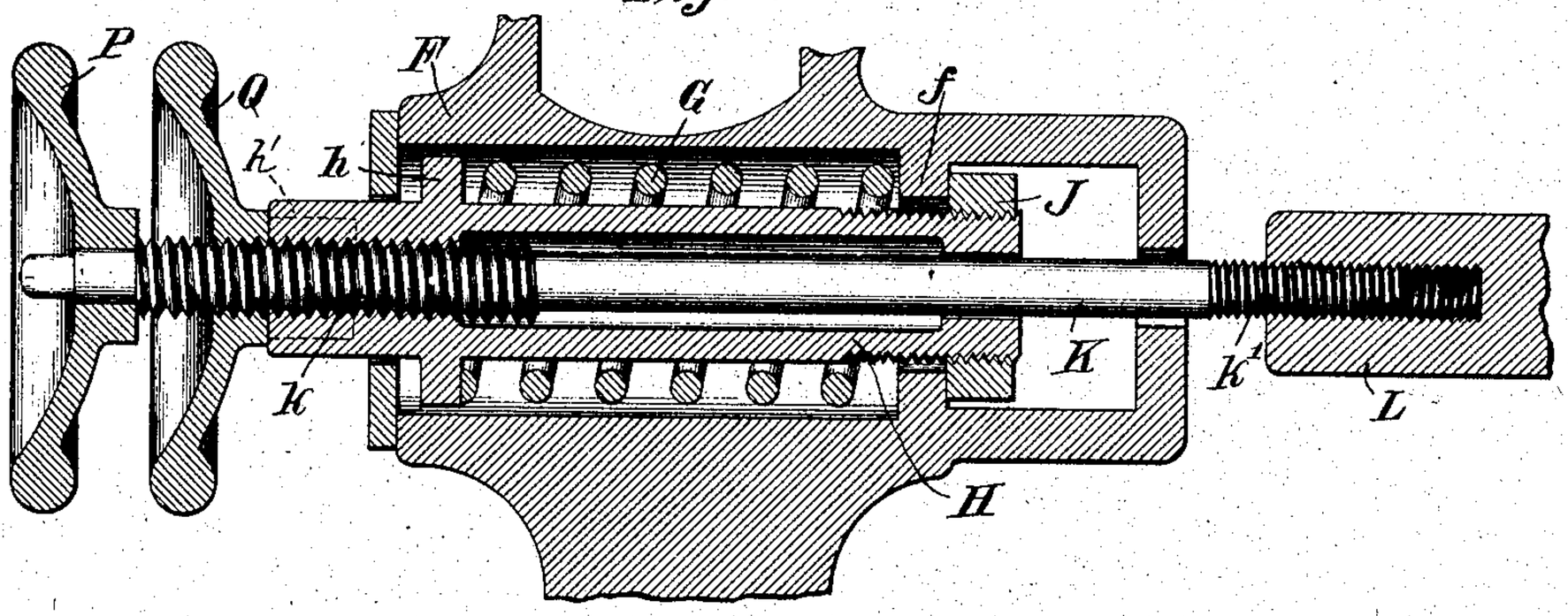


Fig. 3.



Witnesses

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No. 791,833. Patented June 6, 1905.

UNITED STATES PATENT OFFICE.

SIMON SNYDER, OF MUNCY, PENNSYLVANIA, ASSIGNOR TO SPROUT, WALDRON AND COMPANY, OF MUNCY, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ROLLER-MILL.

SPECIFICATION forming part of Letters Patent No. 791,833, dated June 6, 1905.

Application filed April 11, 1903. Serial No. 152,166.

To all whom it may concern:

Be it known that I, SIMON SNYDER, a citizen of the United States, residing at Muncy, in the county of Lycoming and State of Pennsylvania, have invented certain new and useful Improvements in Roller-Mills; and I 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.

This invention relates to roller-mills in which the grain or middlings is fed from a hopper or hoppers to one or more pairs of grinding or crushing rolls, one of which rolls of every pair is adjustable or mounted in movable bearings held with yielding pressure against the other roll and capable of being gradually adjusted thereto as well as suddenly shifted for the purpose of opening and closing the rolls.

The invention refers more particularly to the roll regulating and adjusting mechanism; and its principal object is to provide an improved device whereby the spring which maintains the adjustable roll yieldingly against the other can be adjusted to any desired tension, while the movable roll can be gradually adjusted as well as suddenly shifted without affecting the tension of such spring and by means of which much more delicate and finer adjustments of the rolls can be obtained than with prior devices of the same character.

The invention will hereinafter be first fully described, with reference to the accompanying drawings, which form a part of this specification, and then pointed out in the claims following the description.

In said drawings, Figure 1 represents a double roller-mill embodying my invention, principally in side elevation, but with parts in vertical section. Fig. 2 is a top plan view of the rolls and adjusting mechanism with the covers removed. Fig. 3 is a detail longitudinal vertical section of one of the boxes or shells containing a pressure-spring and other parts.

In general arrangement and design the mill may be of the usual or any suitable type.

The letter A in the drawings denotes the framework, and B indicates the hoppers, between which is shown a central exhaust-passage, while beneath them is shown a suitable shaking-shoe for evenly distributing the material to the rolls.

The letter C designates the inner non-adjustable rolls, and D the outer adjustable rolls, the bearings of which latter are shown mounted in movable supports or rock-arms E. Said arms are shown fulcrumed on sleeves *e*, journaled on eccentric pivots *e'*, for the purpose of adjusting said fulcrums to obtain parallelism of the inner and outer rolls. Each of said arms or supports E has a box or shell F, inclosing a coiled spring G, such as ordinarily used for maintaining a yielding pressure between the grinding-surfaces to allow obstructions to pass through them without injuring the connecting parts. Said spring surrounds a sleeve H, being interposed between a projection or flange *h* on and near the outer end of said sleeve and an internal projection or flange *f* on and near the inner end of the box or shell. At its inner end the sleeve is exteriorly threaded and screws into a fixed or non-rotatable nut J, located at the inner side of the flange or abutment *f*, which nut may be fitted in a suitably-shaped part of the box to prevent its rotation and may be slipped into such part of the box through a side opening therein, as shown at the right-hand box of the present machine.

The roll operating or adjusting rods K pass through the sleeves H, each of which is preferably chambered out except for a suitable length at its outer end, where it is bored and internally threaded to receive a correspondingly-threaded part *k* of its inclosed rod. The inner ends *k'* of the rods are also threaded with threads of lesser or different pitch from those of the outer parts *k*, and in the present embodiment of the invention said inner ends are screwed into castings L, mounted on eccentrics M on a shaft N, said shaft having a handle or lever O for rocking it to shift the rods, and thereby open and close the rolls in the usual way. However, other arrangements may be adopted, as well as other forms of shifting devices, to which the adjusting-rods may be connected by any suitable thread-

ed couplings. The adjusting-rods may be provided at their outer ends with hand-wheels P or other suitable devices for turning them, and lock-nuts Q, preferably of the wheel or wing type, may be screwed on the outer threaded parts *k* of said rods.

The operation of the roll regulating and adjusting mechanism is as follows: The tension of each of the springs G is adjusted by turning the sleeve H, inclosed thereby, thus screwing or unscrewing said sleeve in its non-rotatable nut J, and thereby compressing the spring between the abutments *f* and *h* or allowing it to retract. To this end the lock-nut wheel Q may be unscrewed or loosened, the adjusting-rod held stationary, and the sleeve turned independently thereon, for which purpose the outer ends of the sleeves are shown formed with flattened parts *h'* for engagement by a wrench or turning-tool, or, if desired, the sleeve H and rod K may be turned together, though the former way is preferred. In either event any difference of pitch existing between the threads of *k* and J or *k'* and J, as the case may be, will be compensated for by movement of the rock-arm or support E, thus avoiding any lock-nut action between such threads. The desired tension of the spring being obtained, the proper adjustment of the rolls for grinding is attained by loosening the lock nut or wheel Q and rotating the roll-operating rod K by means of its hand-wheel P, which causes the arm E to advance or move back, carrying with it the bearing of the roll. Now, as before stated, the threads on the outer and inner ends of the rod are of different pitch, those at the outer end being preferably of greater pitch. Hence on turning the rod it will advance or withdraw different distances in the sleeve H and casting L, causing said sleeve to move oppositely to the longitudinal movement of the rod a distance equal to the difference between the relative movements of the rod in its sleeve and the rod in its eccentric casting. For instance, in practice the threads on the part *k* are usually cut about seven to the inch, while those at the inner end *k'* are usually cut about twelve to the inch. Hence for each rotation of the rod in a direction to advance the sleeve H thereon said sleeve H advances one-seventh of an inch, while the rod moves back from its casting L one-twelfth of an inch, so that the total advance of the outer roll is five eighty-fourths of an inch. By this means one can effect exceedingly fine and delicate adjustments, which are not obtainable with the ordinary adusting-screws usually employed, since each turn or rotation of the latter causes the roll to advance several times as far as the same turn of my adjusting-rod. The sleeve H does not turn when the rod K is rotated to adjust the rolls, and consequently the tension of the spring G is in no wise affected by the grinding adjustments and remains unaltered unless the operator changes the tension by rotating the sleeve H. Preferably the threads of J are different in pitch from either those of *k* or *k'*, so as to prevent sleeve H from turning when rod K is rotated, though this need not necessarily be so, for if the threads of J were equal in pitch to those either of *k* or *k'* the sleeve could be held stationary during rotation of the rod. The construction allows the rolls to yield or move apart to a great extent to allow the passage of any large obstruction, since the abutment *f* can move outward any extent permitted by the spring. To open the rolls, the shaft N is turned to shift the roll-operating rods, and the spring-boxes are moved outward by the nuts J abutting against the projections or flanges *f*. It is obvious that such movement does not affect the tension of the springs, since the movable roll-supporting arms, spring-boxes, and inclosed parts can be moved or operated at all times as integral parts.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a roller-mill, the combination of a pair of grinding-rolls, one of which is adjustable to and from the other, a movable journal-support for said adjustable roll, a shifting device, and an adjusting-rod connecting said device and support and coupled to them by screw connections the threads of which are of different pitch, with yielding or spring-opposed means permitting backward movement of said support along the length of said rod to allow separation of the rolls for passage of obstructions.

2. In a roller-mill, the combination of a pair of grinding-rolls, one adjustable from and to the other, a movable journal-support for said adjustable roll, a shifting device, an adjusting-rod connecting said device and support, said rod having adjustable connections with said device and support which when the rod is moved independently effect different adjustments of said device and support along the length of said rod, the connection to said support also permitting it to move longitudinally along said rod away from the bearing of the other roll, and means yieldingly opposing such movement.

3. In a roller-mill, the combination of a pair of grinding-rolls, a movable journal-support for one roll, a shifting device, and an adjusting-rod connecting said device with said support, a nut on said hub, a spring acting between said nut and support permitting the latter to move longitudinally along the rod to allow yielding of the movable roll, means for adjusting the tension of the spring, and means independent of said spring-adjusting means whereby the rod can be differentially adjusted with relation to said support and shifting device.

4. In a roller-mill, the combination of a pair

of grinding-rolls, a movable journal-support for one of said rolls, a shifting device, an adjusting-rod coupled thereto, a member screwed to said rod having means for engaging said support when the shifting device is moved to open the rolls, and a spring acting between said member and said support normally resisting independent movement of the latter for separation of the rolls.

5. In a roller-mill, the combination of a pair of grinding-rolls, a movable journal-support for one of said rolls having a spring-box, a shifting device, an adjusting-rod coupled thereto and passing through said box, a sleeve inclosed in said box in which the rod is screwed, a non-rotatable nut in which said sleeve is screwed adapted to engage the box when the rod is shifted to open the rolls, and a spring acting between said box and sleeve normally resisting separation of the rolls.

6. In a roller-mill, the combination of a pair of grinding-rolls, a movable journal-support for one of said rolls having a spring-box, a sleeve in said box, a non-rotatable nut in which said sleeve is screwed adapted to engage the box when the sleeve is moved in a direction to open the rolls, a shifting device, an adjusting-rod screwed in said sleeve and screwed to said shifting device, the threads of said screw connections being of different pitch, and a spring interposed between a suitable stop on said sleeve and a stop in said box normally resisting separation of the rolls.

7. The combination of a pair of rolls, a movable support for one of said rolls, a spring-box rigid therewith having an inward projection, a sleeve in said box having an outwardly-disposed external projection, a non-rotatable nut abutting the inner side of said inward projection on the box and in which the inner end of the sleeve is screwed, a compression-spring acting between and against the said projections on the sleeve and box, an adjusting-rod having a threaded part screwed in said sleeve and a threaded part of different pitch screwed to a shifting device, means for rotating said rod, and means for locking said sleeve to said rod.

8. In a roller-mill, the combination of a pair of grinding-rolls, a movable journal-support for one of said rolls, a shifting device, an adjusting-rod coupled thereto, a sleeve through which said rod is threaded having a non-rotatable nut threaded thereon adapted to engage said support when the shifting device is moved to open the rolls, and a spring acting between said sleeve and said support normally resisting separation of the rolls.

9. In a roller-mill, the combination of a pair of grinding-rolls, one of which is adjustable to and from the other, a movable journal-support for said adjustable roll, a shifting device, an adjusting-rod coupled to said device and support by threaded connections, the coupling to one of said parts permitting an independent movement thereof longitudinally along said rod, and a spring yieldingly opposing such movement.

10. In a roller-mill, a movable roll-support, a shifting-rod, a sleeve screwed on said rod having means for engaging said roll-support when the rod is moved in one direction, and a spring acting between said sleeve and roll-support yieldingly resisting independent movement of said roll-support in the same direction.

11. In a roller-mill, a movable roll-support having a spring-box, a shifting-rod, a sleeve screwed therein in said spring-box, a non-rotatable nut in which said sleeve is screwed adapted to engage or abut said spring-box when the rod is moved in one direction, and a spring interposed between said spring-box and a stop on said sleeve yieldingly resisting independent movement of the roll-support in the same direction.

12. In a roller-mill, the combination of a pair of grinding-rolls, a movable journal-support for one of said rolls, a shifting device, an adjusting-rod connecting it with said support, a nut on said rod, a spring acting between said nut and support permitting the latter to move independently along the rod to allow yielding of the movable roll, said nut affording means for adjusting the tension of the spring, and means for adjusting the length of the rod between said shifting device and support without affecting the adjustment of the spring.

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

SIMON SNYDER.

Witnesses:
STEPHEN SOARS,
C. C. PFLEEGOR.