(No Model.) 2 Sheets—Sheet 1.

C. F. WALTERS & P. SHELLENBACK.

ROLLER MILL.

No. 421,996. Patented Feb. 25, 1890.

Fig. 1

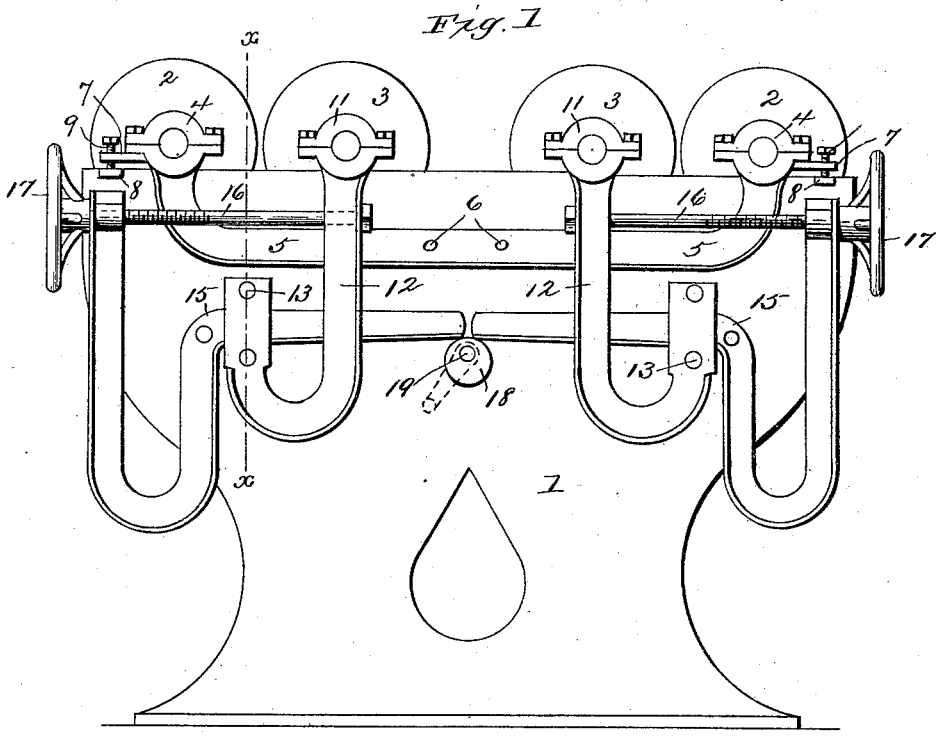


Fig. 2

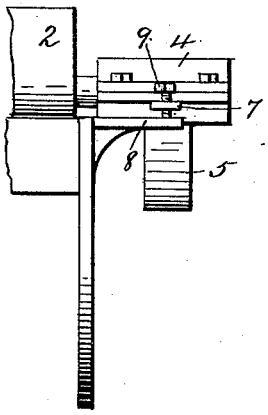
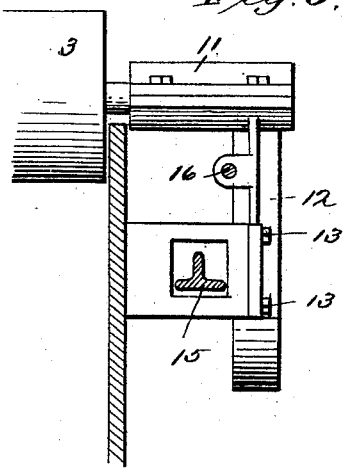


Fig. 3.



Witnesses
E. L. Smith
Alex. F. Stewart

Inventors
Charles F. Walters and
Peter Shellenback
By their Attorneys
Church & Church

(No Model.) 2 Sheets—Sheet 2.

C. F. WALTERS & P. SHELLENBACK.

ROLLER MILL.

No. 421,996. Patented Feb. 25, 1890.

Fig. 4.

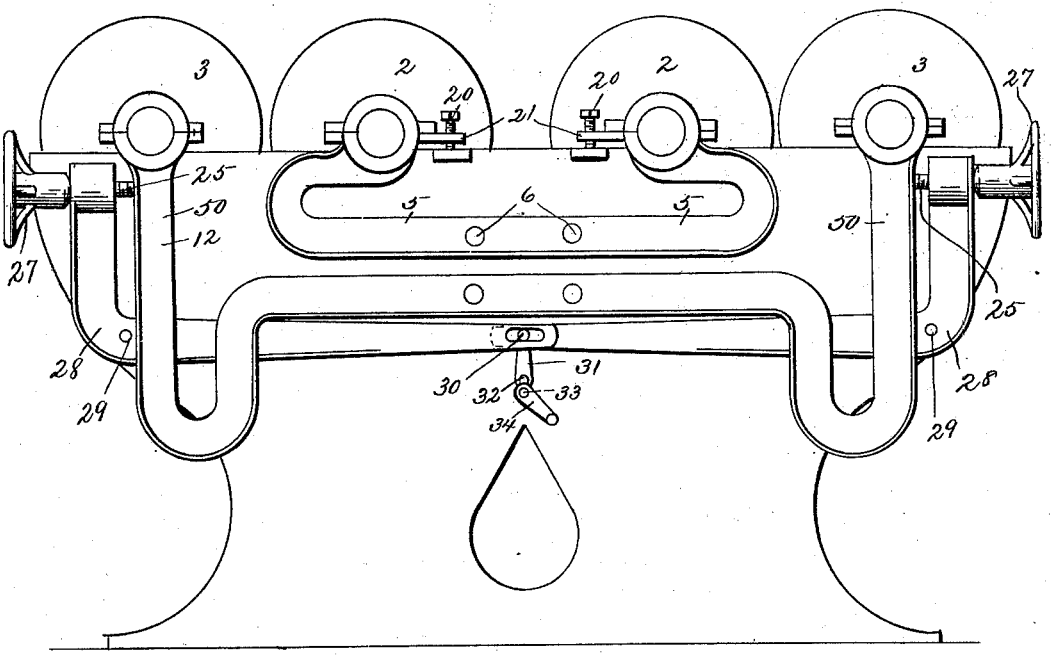
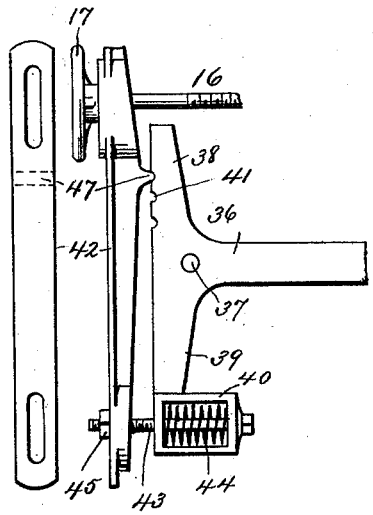


Fig. 5



Witnesses
E. D. Smith
Alex. F. Stewart

Inventors
Charles F. Walters
and Peter Shellenback
By their Attorneys
Church & Church

UNITED STATES PATENT OFFICE.

CHARLES F. WALTERS AND PETER SHELLENBACK, OF RICHMOND, INDIANA.

ROLLER-MILL.

SPECIFICATION forming part of Letters Patent No. 421,996, dated February 25, 1890.

Application filed August 9, 1889. Serial No. 320,287. (No model.)

To all whom it may concern:

Be it known that we, CHARLES F. WALTERS and PETER SHELLENBACK, both of Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Roller-Mills; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures of reference marked thereon.

Our present invention relates to roller-mills, and particularly to the means for supporting and providing for the necessary adjustments of the grinding-rolls, whereby construction of the parts is not only simplified and cheapened, but the adjustments can be very easily made; and to these ends the invention consists in certain novelties of construction and combinations of parts, all as will be hereinafter fully described, and the novel features pointed out in the claims at the end of the specification.

In the drawings, Figure 1 is a side view of a roller-mill constructed in accordance with our invention, with the hopper and feeding devices removed; Fig. 2, an end view; Fig. 3, a section on the line *x x*, Fig. 1; Fig. 4, a side view of a modification; Fig. 5, a view of a modified form of movable roll-adjusting device.

Similar figures of reference in the several figures indicate similar parts.

In the drawings, 1 represents the body or casing of the mill; 2 2, the stationary or non-yielding rolls, and 3 3 the movable or yielding rolls. The rolls 2 2 are mounted in boxes 4 4 on the ends of spring-arms 5 5, bolted to the side of the casing at 6 and preferably formed of cast metal and in the shape indicated in Fig. 1—that is, with webs—for the purpose of strengthening them. We have found that even these arms formed of cast metal, when the point of fastening to the casing or support is sufficiently removed from the roll, will give sufficient elasticity to permit a slight movement and thus serve to take the "wind" out of the rolls and render them parallel. The outer ends of the arms 5 5 are provided with extensions 7, passing over lugs 8, formed on the sides of the frame, and through these extensions are passed adjusting-screws 9, resting upon the lugs, as shown. It will be seen that the tendency of the spring-arms being to depress the roller-bearings the screws will be kept in contact with the lugs and any adjustment can be given the roll, the spring moving it in one direction and the screw in the other. While the spring-arms 5 are, in the present instance, formed in a single piece, and in practice we prefer this construction, it is obvious that they could be made separate and secured in any desired manner to the casing.

The adjustable or yielding rolls 3 3 are secured in boxes 11 11, formed in the ends of spring-arms 12 12, preferably similar to arms 5, and bent in loop shape and secured to the casing by bolts 13 13, as shown. The ends of these arms are preferably slotted, as in Fig. 3, for the passage of an adjusting and spreading lever, and the ends on which the rolls are mounted are arranged to carry the said rolls parallel with the stationary rolls.

For the purpose of adjusting the yielding rolls accurately, and permitting the separation of the rolls for the passage of foreign substances, and also to provide means for spreading them, we pivot upon the frame levers 15, formed of cast metal in a manner similar to 5 and 12, and like them permitted a slight springing action. The pivotal point of each of the levers in the construction in Fig. 1 is just beyond the end of the point of fastening of arm 12, and it is bent downward and upward, forming a spring-loop, and the upper end is provided with a yoke or perforation through which passes a bolt or rod 16, connected at its inner end to the arm 12, preferably near the roller 3, while its outer end is threaded and upon it is screwed an adjustable hand-wheel 17, bearing against the lever 15, said wheel and bolt constituting an adjustable connection between the lever and arm 12, carrying the yielding roll 3, through which the pressure of the resilient lever is transmitted to and exerted against the resilient arm 12, and operates to force the latter to one side and hold the roll 3 in operative relation to the other roll 2 while grinding, at the same time permits the separation of the rolls when a foreign body is carried between them, and effects their return to normal working position upon the removal or

expulsion of said body. The position of the arm 12 is such that when relieved from pressure it will stand with its roll 3 held separated from the roll 2 and out of working position, and the pressure of the resilient lever 15 is exerted against the arm 12 to draw or force the latter in a direction to cause the approach of the rolls. The lever 15 is engaged by a cam 18, or equivalent device, to sustain it in operative position—that is to say, under tension and exerting pressure upon the arm 12—and permit of an instantaneous release of the lever and a relaxation of pressure, so that the yielding roll may be drawn or forced back by the springing of its supporting-arm 12. The several cams or equivalent relief devices are preferably mounted upon a through-shaft 19, journaled in the casing, and may be operated by a hand-lever or other devices to cause the advance or retraction of all the levers 15.

The operation of the devices thus far described will be obvious. The spring-arms carrying the non-yielding roll are separately adjusted to bring the rolls parallel or in train by means of the set-screws or equivalent devices engaging said arms. The yielding roll, mounted upon the resilient arms 12, is drawn or forced toward the non-yielding roll and held in working position by the action of the levers 15, the latter being retracted by the cams and exerting pressure upon the arms 12 through the adjustable connections. By moving the cams so as to allow the levers to be retracted the pressure upon the arms 12 is relieved, and the latter are permitted to spring back, carrying the roll with them.

In Fig. 4 we have shown a modification in which the inner rolls are stationary, the arms 5 5 being somewhat shorter, though sufficiently long to give the slight spring necessary for the small vertical adjustment, and they are also capable of a slight lateral adjustment, set-screws 20, passing through lugs 21 in the casing, serving to adjust them outward slightly, if desired. The outer rolls in this instance are yielding and adjustable, being mounted in boxes on the ends of spring-arms 50, similar to those in which the stationary or non-yielding rolls are mounted, but connected or formed in one piece instead of on separate castings, as in Fig. 1, though it will be understood that these constructions are regarded as equivalents. The tendency of the arms 50 is, as before, to separate the rolls, and the necessary adjustments are had by means of adjusting-screws 25, provided with hand-wheels 27, and passing through the levers 28, and abutting against the rear side of arms 12. These levers 28 are pivoted at 29 to the casing, and their inner proximate ends lap and are slotted for the accommodation of a pin or pins 30 on the end of a depending link 31, connected by a crank 32 with a shaft 33, preferably passing from side to side of the machine, and provided with a handle 34 for operating it, said connections being adapted, when the shaft 33 is turned, to lift the inner ends of the lever and permit the spring-arms 12 to cause the separation of the rolls.

It will be understood that the spring-arms, adjusting-screws, levers, &c., are the same on both sides of the machine, and also that instead of the cams in Fig. 1 and the links in Fig. 4 any ordinary or preferred form of device may be employed for operating the spreading-levers.

While we have shown our invention as embodied in a double mill, we do not desire to be confined to this form as a single pair of rolls could as well be used and our improvements embodied therein.

In Fig. 5 is shown a modified form of roll-adjusting device applicable to the yielding roll. In this construction the lever 36 is not a self-springing one, but is pivoted to the casing at 37, its inner end extending to a spreading-cam, as shown, for instance, in Fig. 1, while its outer portion is formed with an upper extension 38 and a lower extension 39, the lower extension being provided with a perforation and guiding-ears 40 on the inner side, and the upper extension with a series of recesses 41.

As a means for providing for the attachment of the rod 16, connected to the movable roll, and of affording some spring between the lever and roll, we provide a lever 42, having a pivotal lug or projection 47, entering one of the recesses 41 and slotted at top and bottom, as shown, the lower end of the lever being connected to the lower lever-extension 39 by a bolt 43 passing through the slot in the lower end, a spring 44 being interposed between the head of the bolt or a plate thereon and the end of lever 36. A nut 45 on the outer end of the bolt bearing on the lever 42 serves to adjust the tension of the spring as may be desired. The rod 16 passes through the upper end of lever 42 and the hand-wheel 17 operates on the outer side to regulate the yielding roll, as before. By adjusting the lug 47 in one or the other of the recesses 41 the movement of the lever and pressure of the rolls can be regulated as desired.

The employment of springs to regulate the horizontal as well as the vertical adjustments of the rolls simplifies the construction and facilitates quick adjustment.

In using the terms "adjustable" or "yielding" roll in the claims we refer to the one that is moved to spread the rolls and the one which yields to permit the passage of a foreign substance, and the rolls 2, which are normally fixed, though capable of a vertical movement, we term the "stationary" or "non-yielding" rolls.

Numerous modifications could be made without departing from the spirit of our invention, and, except as limited by the claims, we do not desire to be confined precisely to the construction shown.

Having thus described our invention, what we claim as new is—

1. In a roller-mill, the combination, with the casing or support, the spring-arms secured at one end thereto having the bearings, and the adjustable or yielding roll mounted in said bearings, the tendency of the spring-arms being to separate the rolls, of the stationary or non-yielding roll, the spring-arms secured to the casing on which it is mounted, and adjusting devices, such as screws, operating to adjust said roll against the tension of the spring-arms in a plane at right angles to the plane of the rolls, substantially as described.

2. In a roller-mill, the combination, with the casing or support, the spring-arm having bearings at opposite ends and secured at the center to the casing or support, and the stationary or non-yielding rolls mounted in said bearings, of the adjustable or yielding rolls movable toward and from the first-mentioned rolls, substantially as described.

3. In a roller-mill, the combination, with the casing or support, the spring-arms having bearings in opposite ends and fastened at their centers to the casing or support, and the stationary or non-yielding rolls mounted in said bearings, of the spring-arms fastened at their centers to the casing or support and having bearings in the ends, the adjustable or yielding rolls mounted in said bearings, and devices, substantially as described, for adjusting said rolls toward the fixed rolls against the tension of the spring-arms, substantially as described.

4. In a roller-mill, the combination of the casing or support, the stationary or non-yielding roll, the spring-arms fastened to the casing and having the bearings, the adjustable or yielding roll mounted in said bearings, the spreading-lever and adjustable connection between it and the spring-arm supporting the adjustable or yielding roll, and the spring interposed in said connection, substantially as described.

5. In a roller-mill, the combination of the casing or support, the stationary or non-yielding roll, the spring-arms fastened to the casing and having the bearings, the adjustable or yielding roll mounted in said bearings, the pivoted spreading-lever formed with a spring or elastic end, the rod connected to the spring-arm supporting the adjustable or yielding roll, and the hand-wheel forming the connection between it and the spreading-lever, substantially as described.

6. In a roller-mill, the combination, with the rolls, of spring-arms secured to the frame and carrying the boxes for one of said rolls, said spring-arms or a portion thereof extending in a plane substantially parallel with a plane passing through the axis of both rolls, with adjusting devices, such as set-screws, interposed between the spring-arms and a fixed portion of the frame and operating to adjust the ends of the roll in a direction transverse to a plane passing through the axis of both rolls, substantially as described.

7. In a roller-mill comprising two co-operating rolls, the combination, with one of said rolls, of bearings supported upon the free ends of spring-arms, said arms being secured to the frame and extending in a plane or planes substantially parallel with a plane intersecting the axis of both rolls, and adjusting devices, such as set-screws, interposed between the outer or free ends of said spring-arms and fixed portions of the frame, substantially as described.

CHAS. F. WALTERS.
PETER SHELLENBACK.

Witnesses:
BENJ. F. HARRIS,
LEWIS D. STUBBS.