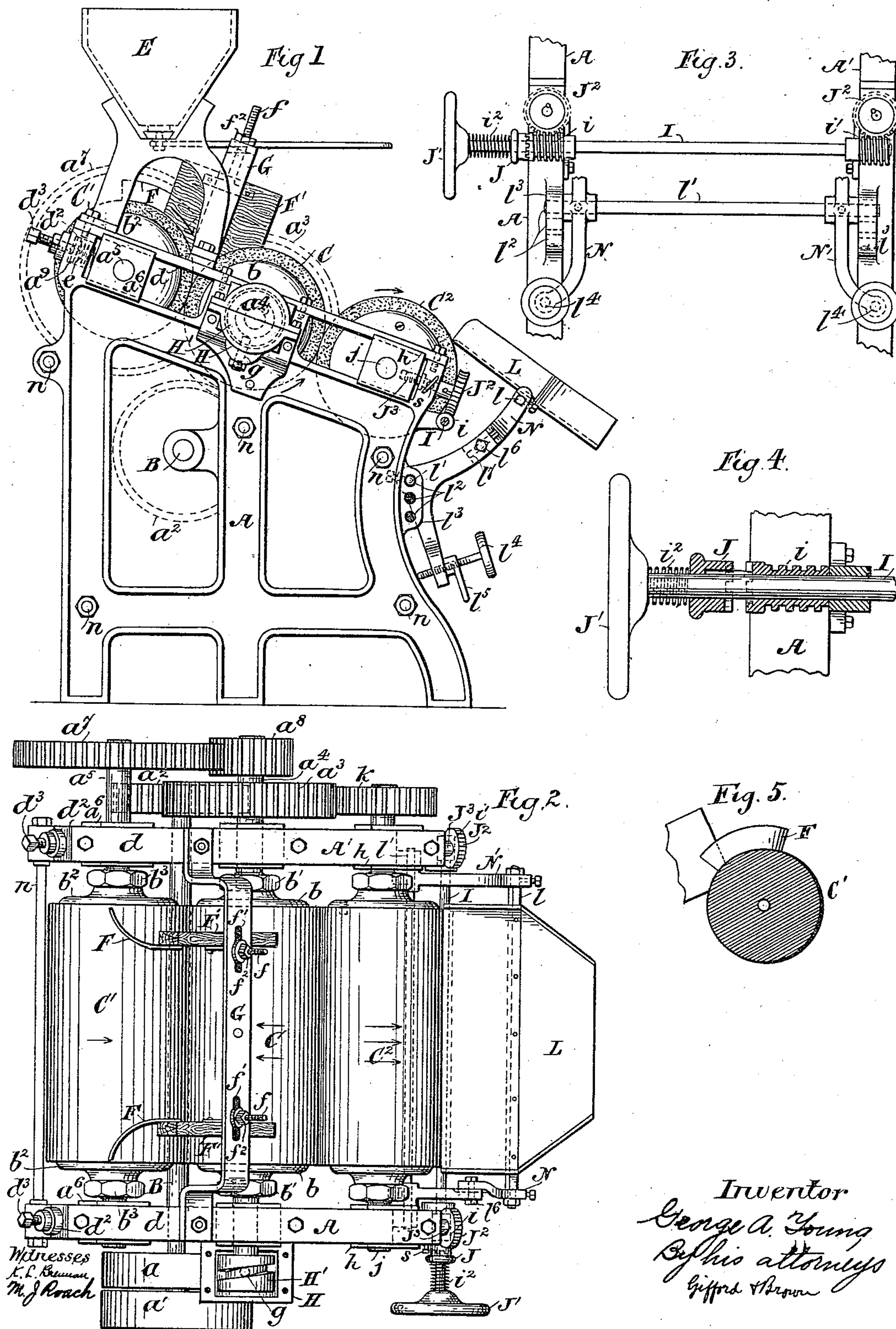


G. A. YOUNG.
GRINDING MILL.

Patented Dec. 16, 1890.



THE NORRIS PETERS CO.. PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE A. YOUNG, OF BROOKLYN, NEW YORK.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 442,848, dated December 16, 1890.

Application filed June 15, 1888. Renewed November 18, 1890. Serial No. 371,801. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. YOUNG, of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Grinding-Mills, of which the following is a specification.

My improvement relates to the class of mills adapted for grinding paint and similar materials.

I will describe a grinding-mill embodying my improvement in detail, and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a side elevation of a paint-mill embodying my improvement. Fig. 2 is a plan or top view of the same. Fig. 3 is a front view showing in detail certain mechanism for adjusting one of the rollers of the mills. Fig. 4 is a view on an enlarged scale, illustrating certain of the mechanism shown more clearly in Fig. 3. Fig. 5 is a detail showing one of the guides conforming to the curve of the roller.

Similar letters of reference designate corresponding parts in all the figures.

A A' designate the side portions of the main frame of the machine. These side portions are secured together by the rods *n*.

Journalled in the side portions A A' of the frame is the main shaft B, upon which are fast and loose pulleys *a a'*. Upon the main shaft is a gear-wheel *a²*, which gear-wheel meshes with a gear-wheel *a³*, mounted on a shaft *a⁴*, journalled in suitable bearings on the main frame.

Upon the shaft *a⁴* is mounted a roller C. Plates *b*, centered upon the shaft *a⁴* and arranged at the ends of the roller C, are adapted to be clamped by nuts *b'* to secure the roller in position. Motion is transmitted from the main shaft to the roller C by means of the gear-wheels *a² a³*.

C' designates a roller mounted upon a shaft *a⁵*, journalled in movable bearings *a⁶* and located to the front of the roller C. Plates *b²* and nuts *b³* secure the roller C' in position on the shaft in manner similar to that described for the roller C. Upon the shaft *a⁵* is a gear-wheel *a⁷*, which meshes with a gear-wheel *a⁸* on the shaft *a⁴*. Motion is thus transmitted to the roller C'. The movable bearings *a⁶* for the shaft C' are adapted to move to and fro

in slideways *d*, formed in the portions A A' of the frame. As shown, the upper and lower sides of these bearings are grooved, so as to receive portions of the main frame and prevent displacement of the bearings, while admitting of their to-and-fro movement. The roller C' bears against the roller C with a yielding pressure. This is accomplished by means of springs *e*, arranged in housings *d²* to the front of the bearings *a⁶*. These springs bear at one of their ends against the bearings *a⁶* and at their other ends against plates *a⁹* within the housings *d²*. Set-screws *d³*, adapted to bear against the plates *a⁹*, may be adjusted to vary the resistances of the spring *e*. The object of causing the roller C' to bear against the roller C with a yielding pressure is to admit of the passage of foreign substances—such, for instance, as pieces of metal—between the rollers without causing injury to the rollers. The paint or other material to be ground is delivered from a hopper E to the roller C' and is taken off from such roller onto the roller C.

F F designate guides for directing the material to be ground toward the center of the roller C' and prevent its passing off at the edges of the roller. These guides are longitudinally curved, and are secured near one of their ends to blocks F', preferably made of wood. These blocks are supported upon a bar G, which bar extends over and above the rollers and is secured near its ends to the portions A A' of the frame. The blocks are thus supported by means of screw-threaded rods *f*, secured near one of their ends to the blocks and extending near their other ends through elongated apertures *f'* in the bar G. Nuts *f²* on the rods *f* may be employed to secure the rods and thus the blocks and guides in any desired position. This adjustment provides for varying the position of the guides in the direction of the length of the roller C'. By curving the guides F F longitudinally the material is caused to be directed toward the center of the roller. The lower edges of the guides are also curved, in this case to conform to the curve of the roller, so that they may set closely against the same.

The roller C' has a reciprocating movement in the direction of its length. This movement is imparted to it by a pin or pro-

jection g , extending through a box or casing II, secured to the portion A of the frame. The pin or projection g enters a peripheral cam-groove in a cam H' , mounted on the shaft a^4 . When the shaft a^4 is rotated, it will be readily seen that a to-and-fro motion will be imparted to the roller C. This motion materially facilitates the grinding of the paint or other material. I have shown a cam so constructed that there will be a single complete reciprocation of the roller C at each rotation of the roller.

C^2 designates a third roller mounted upon a shaft j , journaled in movable bearings h in the portions A A' of the frame, arranged in manner similar to the bearings a^6 for the roller C. The roller C^2 may be adjusted toward and from the roller C, but is not held against the latter with a yielding pressure.

The mode of adjustment of the roller C^2 is as follows: I designates a shaft journaled in suitable bearings on the main frame. Upon this shaft are mounted worms $i i'$. The worm i is loose on the shaft; but the worm i' is fixed thereon.

J designates a clutch-piece having a feathered connection with the shaft I, so that it may be slid freely to and fro thereon, but will yet be prevented from rotation independently of the said shaft. This clutch-piece is provided with teeth adapted to engage other teeth upon one end of the loose worm i . A spring i^2 , surrounding the shaft I and bearing at one end against the clutch-piece J and at the other against a hand-wheel J' , operates to maintain the clutch-piece J and the worm i normally in engagement. The worms $i i'$ engage worm-wheels J^2 , mounted upon screws J^3 , extending through suitable apertures in the portions A A' of the frame. The inner portions of these screws engage tapped holes in the bearings h for the shaft j . When the hand-wheel J' is manipulated, the worms $i i'$ cause the rotation of the screws J^3 and thus the adjustment of the roller C^2 toward and from the roller C. When it is desired to adjust but one end of the roller, the clutch-piece J may be moved backwardly by hand out of engagement with the worm i . The rotation of the shaft will then operate to cause a rotation of the worm i' only, and consequently the adjustment of the screw J^3 with which it is engagement. A set-screw s may be employed to secure one of the screws J^3 in position. Motion is transmitted to the roller C^2 by a gear-wheel k on the shaft j , which meshes with the gear-wheel a^3 .

I prefer that the rollers C C' C^2 should be made of some hard stone—say, for instance, granite. It is advantageous also that the rollers C C' C^2 rotate at different speeds, the roller C rotating at an increased speed over the roller C' and the roller C^2 at an increased speed over the roller C. This facilitates the removal of paint from the rollers and assists in the grinding.

It will of course be understood that paint

or other material will be taken off from the roller C by the roller C^2 .

L designates a scraper for removing the paint or other material from the roller C^2 . This scraper has a knife-edge which bears quite firmly against the surface of the roller, so as to remove all or nearly all the paint or other material therefrom. The scraper is mounted, as here shown, upon a rectangular bar l , which bar is secured near its ends in adjustable supports N N'. The supports are in shape like bell-cranks, and are pivoted at their angles on a bar or rod l' , extending across the front of the machine and into suitable apertures l^2 , formed in projections l^3 upon the portions A A' of the frame.

It is often desirable in grinding different kinds of material to cause the same to be scraped from the roller C^2 at different heights on the roller. To provide for this, I provide a series of the apertures l^2 , arranged one above another in the projections l^3 and at corresponding heights in both projections. By shifting the bar or rod l' into different corresponding pairs of the apertures l^2 the height of the scraper relatively to the roller C^2 may be varied. The lower arms of the supports N N' are provided with screw-threaded apertures, through which extend set-screws l^4 . These set-screws bear at their inner ends against the portions A A' of the frame. By manipulating them in one direction the scraper may be adjusted toward the roller C^2 , and by manipulating them in the other direction the scraper may be moved away from the said roller. Jam-nuts l^5 may be employed to set the screws in any desired position into which they may be adjusted.

In order to admit of the adjustment of one side of the scraper only, I make the upper arm of the support N in sections secured together by a screw l^6 , passing through longitudinal slots l^7 in the two sections and held in position by a nut. By loosening this nut one of the sections may be adjusted relatively to the other, so as to bring the scraper nearer to or farther from the roller C^2 upon one side, and by tightening the nut the two sections may be again secured together.

It will be seen that the teeth of the gear-wheels $a^4 a^8$ are longer than those of the gear-wheels $a^2 a^7$ and k . This admits of the longitudinal movement of the roller C without at the same time maintaining the teeth of the gears in full engagement. The arrangement of the gear a^2 on a main or driving shaft, which is independent of the shaft upon which the roller C is mounted, is also advantageous, because it admits of the free longitudinal play of said roller.

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

1. In a grinding-mill, the combination of a rotary roller having yielding bearings, a rotary roller having movable bearings, and a reciprocating rotary roller arranged between the first-named rollers and bearing against

the same, the said rollers rotating at different rates of speed and the central roller having one reciprocation at each complete revolution, substantially as specified.

5 2. In a grinding-mill, the combination, with a roller, of a scraper therefor, a support upon which said scraper is mounted, said support being in two adjustable sections and vertically adjustable on the frame, substantially
10 as specified.

3. In a grinding-mill, the combination, with the frame having apertures and a roller, of a scraper therefor, a support for said scraper, comprising two adjustable sections, said sup-
15 port being capable of vertical adjustment in said apertures, and an adjusting device comprising a set-screw for adjusting the scraper toward and from the roller, substantially as specified.

20 4. In a grinding-mill, the combination, with a roller, of a scraper therefor, and a support for said scraper, comprising two sections, one

of said sections being longitudinally adjustable relatively to the other, substantially as specified.

25 5. In a grinding-mill, the combination, with a roller, of longitudinally-curved guides for material to be ground, said guides having curved surfaces to conform to the arc of the roller, and adjustable supports above the
30 roller for said guides, substantially as specified.

6. In a grinding-mill, the combination, with a roller, of guides for material to be ground, said guides having longitudinally-curved sur-
35 faces to conform to the arc of the roller and being also longitudinally curved, and adjustable supports above the roller for the said guides, substantially as specified.

G. A. YOUNG.

Witnesses:

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FRANK W. ELY.