(No Model.) 2 Sheets—Sheet 1.

F. WEGMANN.

ROLLER GRINDING MILL.

No. 339,241. Patented Apr. 6, 1886.

Fig. 2.

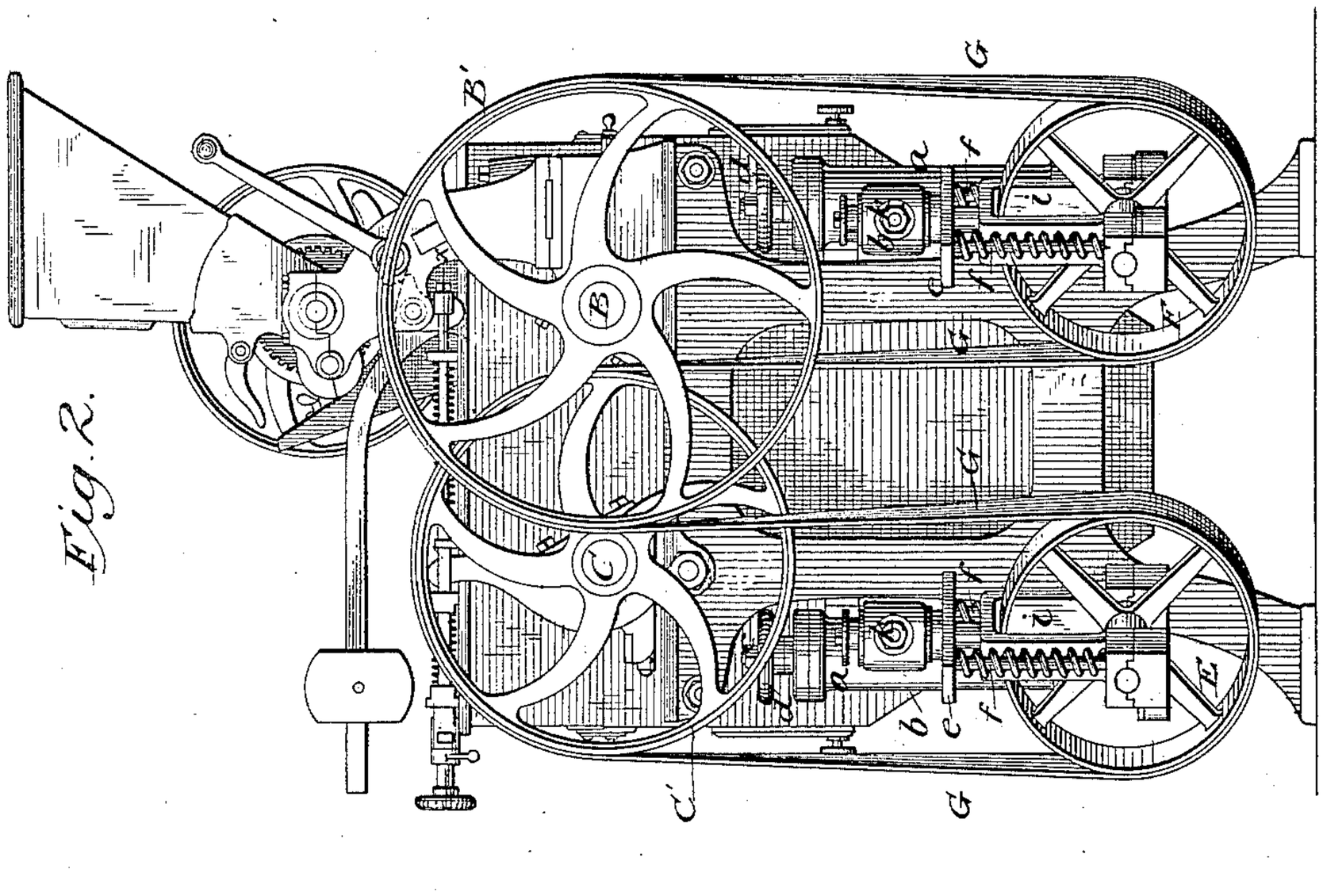
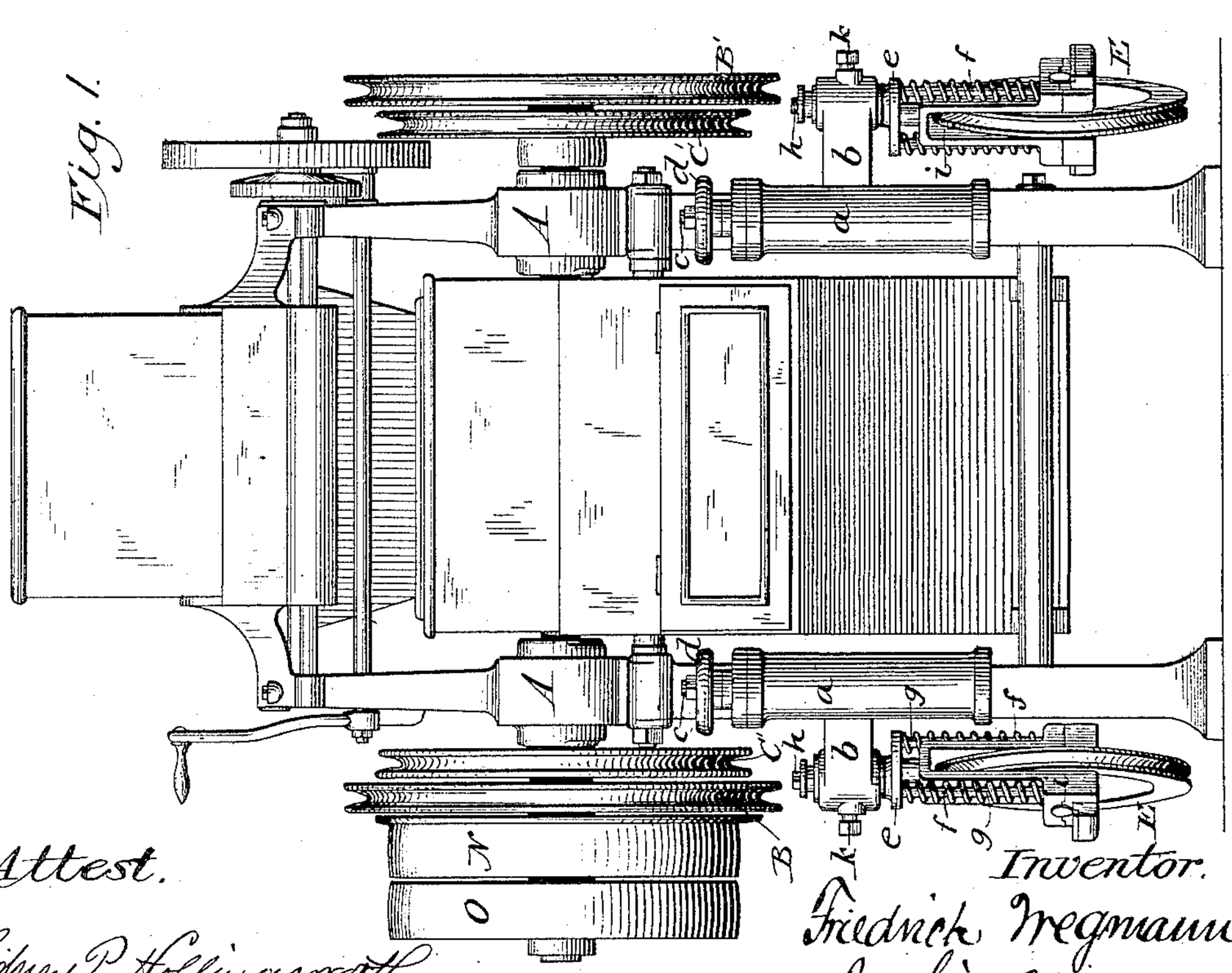


Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

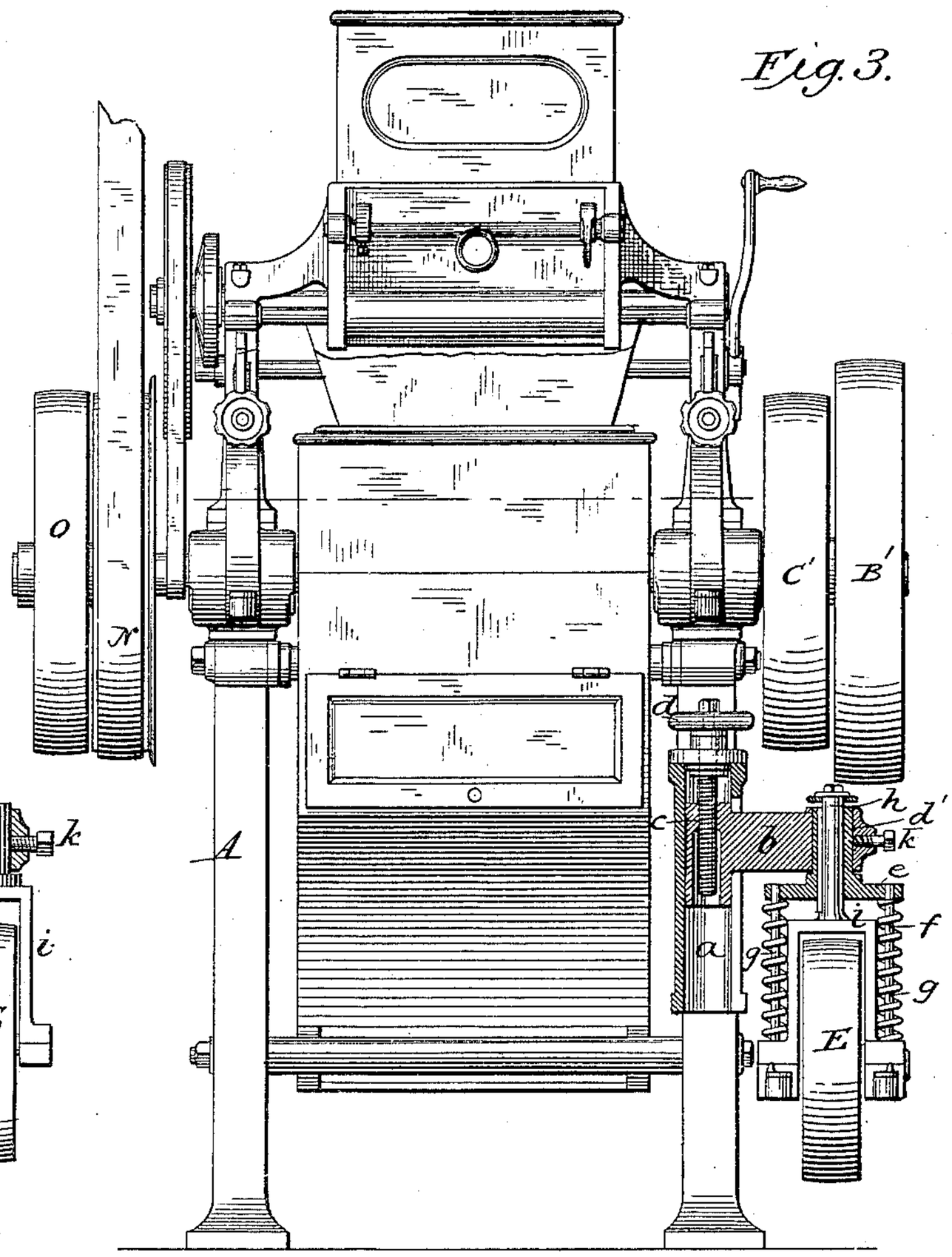


Fig. 5.

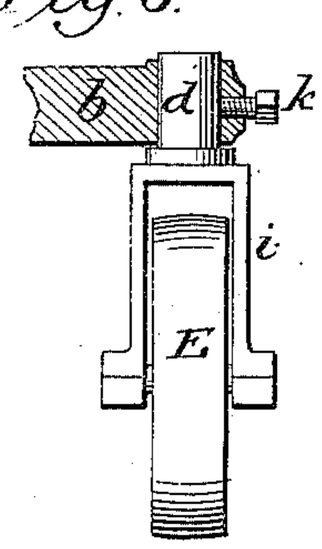
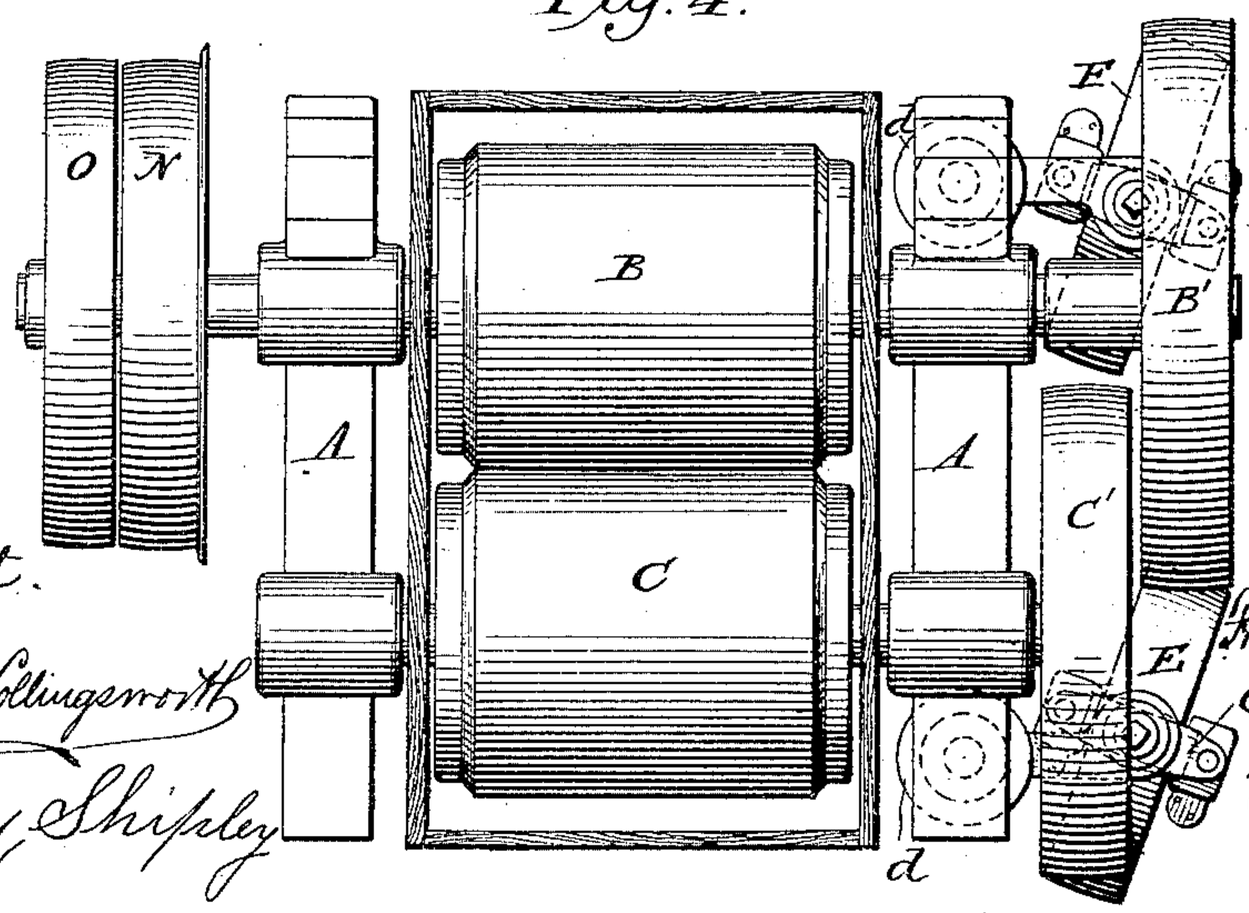


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRIEDRICH WEGMANN, OF ZURICH, SWITZERLAND.

ROLLER GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 339,241, dated April 6, 1886.

Application filed January 3, 1883. Serial No. 80,832. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH WEGMANN, of Zurich, in the Canton of Zurich and Republic of Switzerland, have invented certain Improvements in Roller Grinding-Mills, of which the following is a specification.

The invention has reference to that class of mills for reducing grain, grain products, and other materials wherein co-operating rolls are rotated toward each other at equal or at different surface-speeds.

The invention relates to the combination, with the driving-pulleys of the two rolls, of a single driving-belt and obliquely-arranged guide-pulleys, whereby the single belt is carried from the surface of one driving-pulley to the surface of the other driving-pulley revolving in a different plane, and thereby enabled to impart motion directly to the two rolls, in the manner hereinafter fully described and claimed.

The invention also relates to various details employed in connection with the above combination, as hereinafter described and claimed.

Referring to the drawings, Figure 1 represents a front elevation of a grinding-mill provided with my improvement, the mill being adapted for round or narrow belting, and provided with duplicate driving-gear on the two sides. Fig. 2 represents a side elevation of the same mill, with the exception that the flat-faced pulleys receiving a flat belt are substituted in place of the grooved pulleys and round belt of the first figure. Fig. 3 is a front elevation of the mill shown in Fig. 2. Fig. 4 is a top plan view of the same. Fig. 5 represents in side elevation a modified form of the adjustably-turning fork in which the guiding-pulley or idler is mounted.

In the form of all features except those forming the subject of the present invention, which are specifically described herein, the mill may be of any ordinary or suitable construction.

A represents the body of the mill, consisting, as usual, of two upright side frames provided with bearings for the journals of the horizontal grinding-rolls B and C. The roll B is mounted in fixed bearings and provided at one end with a loose pulley, N, and with a fixed driving-pulley, O, through which motion is transmitted to the entire mill. The roll C is sustained in swinging adjustable supports, forming no part of the present invention. At one end the roll C is provided with a driving-pulley, C′, and the roll B, provided on the same side of the machine, with a driving-pulley, B′.

To secure reliable results, it is found advisable to make the driving-pulleys of greater diameter than the rolls to which they are applied. In order that these large pulleys may be used, the journal of one roll, B, is extended outward beyond the pulley C′ of the companion roll, and has the driving-pulley B′ applied to its outer end. The two driving-pulleys extend past or overlap each other in parallel planes, as represented in the several figures.

At the base of the machine, below the driving-pulleys B′ C′, respectively, I mount two guide-pulleys or idlers, E and F, arranged in vertical planes oblique to the planes in which the driving-pulleys revolve. Each of the guide-pulleys is arranged with one edge in the same vertical plane with the driving-pulley C′, and its opposite edge in line vertically with the pulley B′, whereby they are adapted to guide a driving-belt from the surface of the one driving-pulley to the surface of the other. The manner in which the single belt is thus applied is plainly shown in Figs. 2 and 4, in which it will be seen the belt G is passed first over the pulley B′, thence downward beneath the pulley F, thence upward over the pulley C′, thence downward beneath the pulley E, and finally to the point of commencement. Being thus applied, the one belt moved in the proper direction will turn the two driving-pulleys and their rolls positively toward each other.

By changing the relative sizes of the pulleys B′ and C′ the surface-speeds of the two grinding-rolls with reference to each other may be varied as desired. The rolls may be driven by a single belt at one side of the machine; or, if preferred, the belts and pulleys may be duplicated at the two sides of the machine, as represented in Fig. 1, to give increased steadiness and certainty of action. When a wide flat-surfaced belt is employed, it is ordinarily found sufficient to use the same on one side of the machine only.

The oblique guide-pulleys E and F may be sustained in any suitable manner; but, for convenience of adjustment, it is preferred to sustain them in forks or bearings sustained by vertical journals and locking devices therefor, which will admit of their obliquity being changed as required to insure the proper guidance of the belt and prevent it from leaving the guiding-pulley. It is also preferred to provide for a vertical adjustment of the guide-pulleys to maintain the proper tension of the belt and to sustain them in movable supports subject to the action of springs, whereby they are permitted to adapt themselves to the contraction and extension of the belt, and to permit the passage of the belt-couplings without jar or concussion.

A simple construction securing the three ends named is represented in Figs. 1, 2, and 3, each pulley being sustained in the following manner: A vertical guide, *a*, on the frame receives one end of a horizontal arm, *b*, which is supported and adjusted vertically by a screw, *c*, journaled in the top of the guide, and provided with a hand-wheel, *d*, by which it may be rotated. The outer end of the arm *b* receives and supports a vertical journal or wrist, *d'*, on the upper end of plate *e*, having two depending rods or arms, *g*, encircled by spiral springs *f*. Through the neck *d'* there extends a second vertical neck, *h*, formed on the upper end of a forked frame, *i*, the lower ends of which are provided with bearings for the journals of the guide-pulley, and arranged to slide upon the vertical rods, subject to the depressing action of the springs. The springs tend to urge the frame *i* and the guide-pulley carried therein downward, and thus to keep the belt under the proper strain or tension. The yielding of the springs will, however, permit the frame *i* and the pulley to rise in the event of excessive strain being applied to the belt.

It will be observed that the pulley and its various attachments are all sustained by the plate *e* and its neck *d'*, which may, when set free, turn horizontally in the supporting-arm *b*, thus permitting the obliquity of the guide-pulley to be varied as required. A set-screw, *k*, is inserted into the arm *b*, and bears against the neck *d'*, to lock the pulley-frame and pulley at the desired angle.

In place of the set-screw, any equivalent fastening device may be employed.

In some cases it may not be desired to give the yielding support to the guide-pulley. In such case the springs may be omitted and the supporting-fork constructed in one piece, as represented in Fig. 5, its lower end being adapted to receive the bearings of the pulley, and its upper end provided with a journal to be mounted directly in the supporting-arm *b*, as shown.

While it is preferred to provide for the adjustments of both guide-pulleys in a vertical direction to maintain the tension of the belt, it will be manifest to any person of intelligence that good results may be obtained by the adjustment of either one of the pulleys.

It will be perceived that under my system one face of the belt is necessarily in contact with the face of the pulley of one roll, while the opposite face of the belt is in contact with the face of the pulley of the other roll.

I believe myself to be the first to apply a belt to drive the two rolls of a roller-mill toward each other and to utilize both faces of the belt for this purpose.

I am aware that guide-pulleys have been variously arranged in different classes of machinery; but I believe myself to be the first to construct a mill in which a single belt is arranged to turn two co-operating rolls.

The roll-adjusting devices constitute no part of the present invention, as they form the subject-matter of a separate application filed August 7, 1885, No. 173,809.

Having thus described my invention, what I claim is—

1. As an improvement in roller grinding-mills, the combination of two co-operating rolls, each provided with a driving-pulley, a single driving-belt acting upon both of said pulleys, and two oblique pulleys, substantially as described, acting to guide said belt from one of the driving-pulleys to the other.

2. The combination of the two overlapping pulleys revolved in parallel planes, the driving-belt, and the two oblique guiding-pulleys arranged one beneath each of the main pulleys, substantially as described.

3. In a grinding-mill, the two co-operating grinding-rolls and their respective driving-pulleys, in combination with the driving-belt, the two oblique guide-pulleys, and the vertically-journaled supports for said pulleys, substantially as described.

4. The combination of two grinding-rolls, two pulleys secured to the respective rolls in different vertical planes, a belt passing from one of said pulleys to the other, and a guide-pulley, F, arranged to carry the belt at a point between the roller-pulleys, said guide-pulley arranged obliquely with reference to the main pulleys, substantially as described.

5. In a grinding-mill, two driving-pulleys in parallel planes, a belt passing from one to the other of said pulleys, an intermediate oblique belt-guiding pulley, and an adjustable support for said pulley, substantially as shown, whereby the pulley is adapted to serve the twofold purpose of guiding the belt and regulating its tension.

6. In a grinding-mill, the combination of the roller-driving pulleys B' and C', the single belt G, the two oblique guide-pulleys, and elastic or yielding supports for said pulleys, substantially as described.

7. In combination with the two pulleys revolved in parallel planes, the connecting-belt, the oblique pulleys, the plates *e*, their locking-bolts, the springs *f*, and the sliding pulley-supports *i*, sustained by the plates.

8. In combination with a support, *b*, the

vertically-journaled plate *e*, its rods *g*, springs *f*, sliding pulley-frame *i*, provided with neck *h*, and with bearings for the guide-pulley.

9. In combination with the pulleys B′ and C′, revolving in parallel planes, a connecting-belt, the oblique pulleys, the movable arms *b*, the screws for adjusting and fixing said arms, and the pulley-supports journaled to the arms, substantially as described.

FRIEDRICH WEGMANN.

Witnesses:
ROBERT RENOLD,
ROBERT STOLZ.