(No Model.)

3 Sheets—Sheet 1.

J. M. FINCH.

ROLLER MILL.

No. 261,697. Patented July 25, 1882.

Fig. 1.

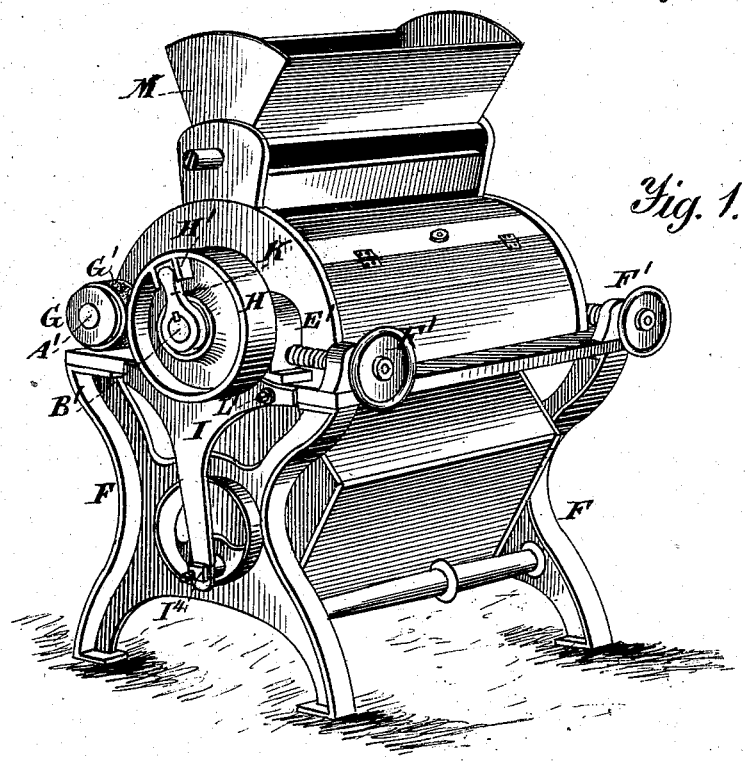
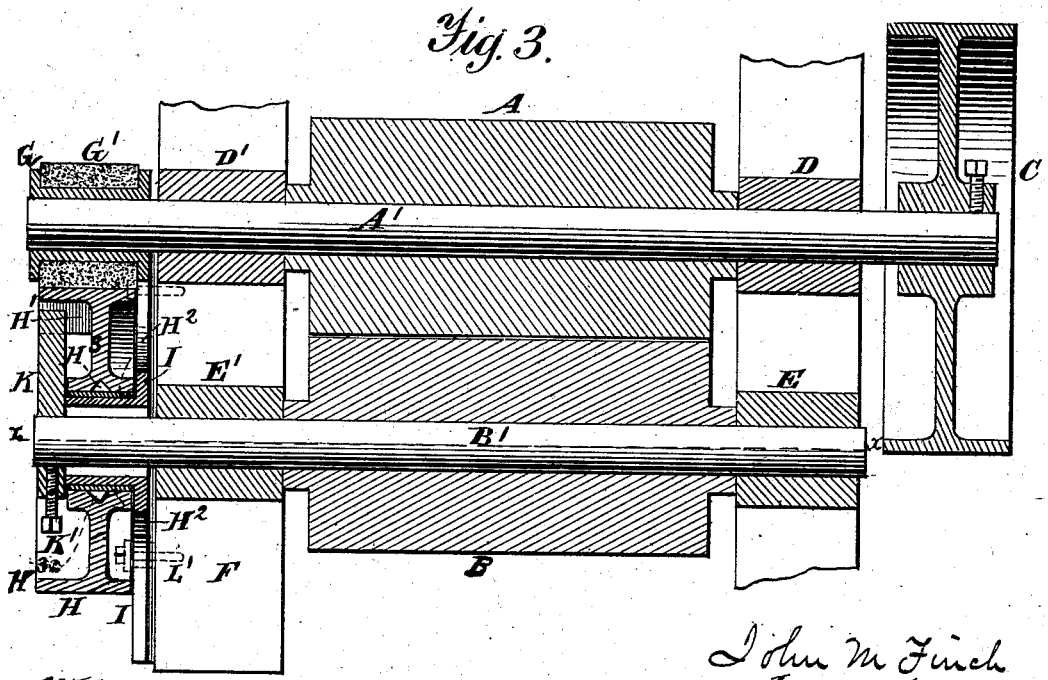


Fig. 3.



Witnesses.
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by
R. Mason atty.

(No Model.) 3 Sheets—Sheet 2

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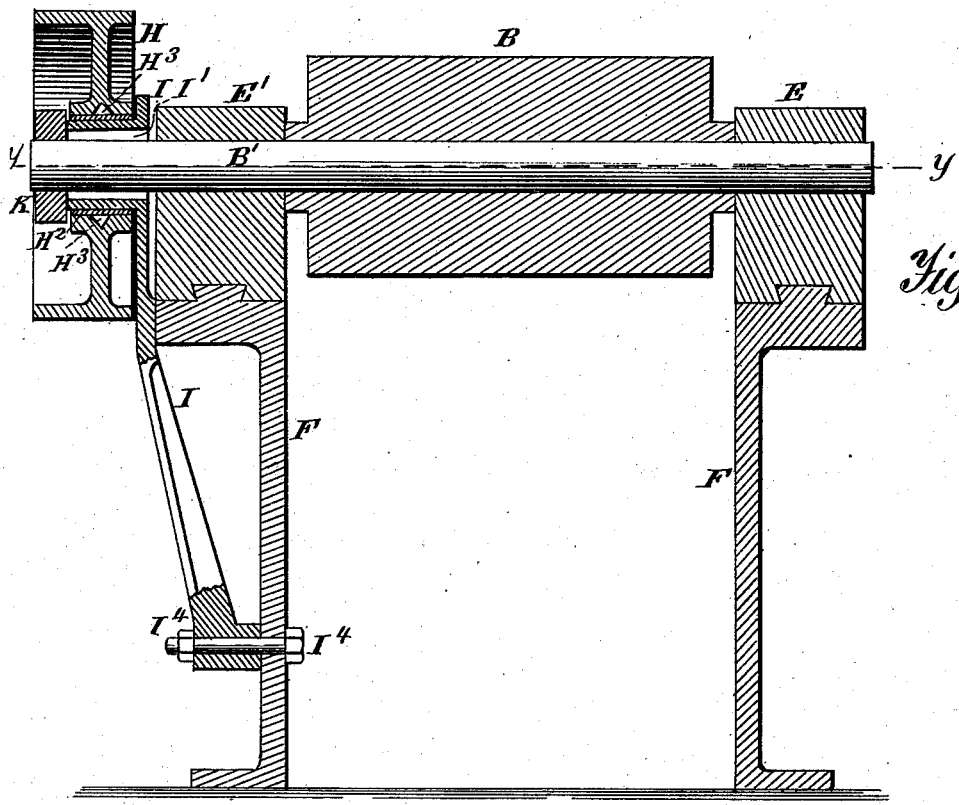

Fig. 2.

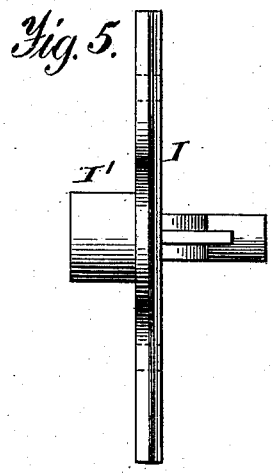

Fig. 5.

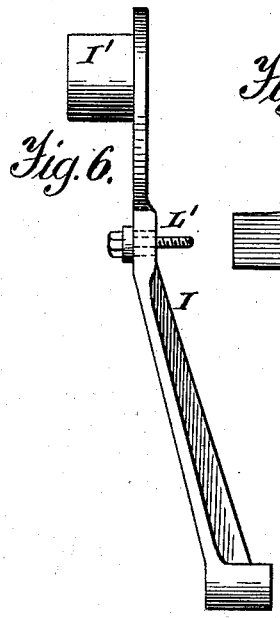

Fig. 6.

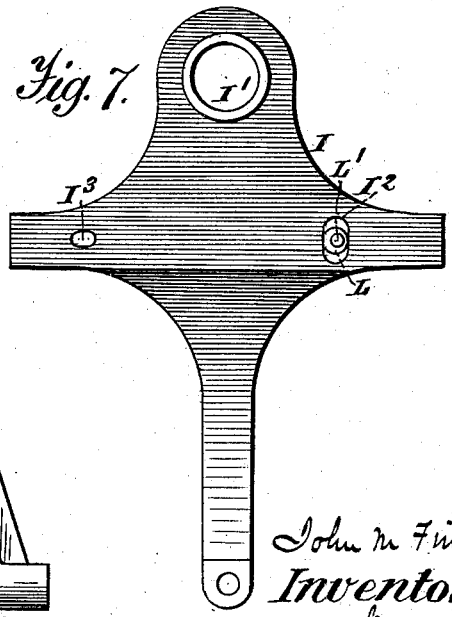

Fig. 7.

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(No Model.) 3 Sheets—Sheet 3.

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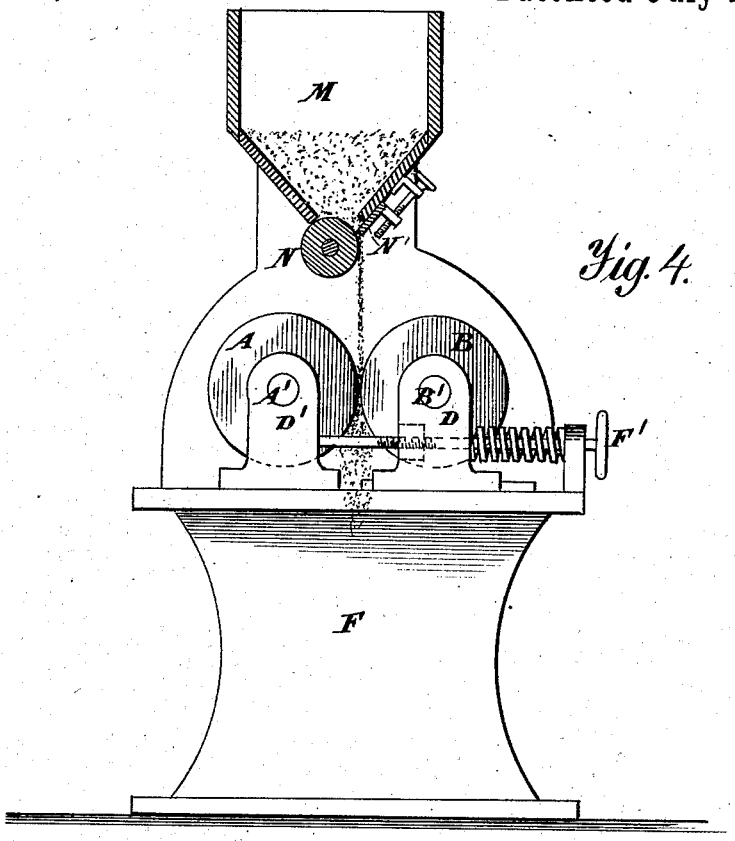


Fig. 4.

Fig. 8.

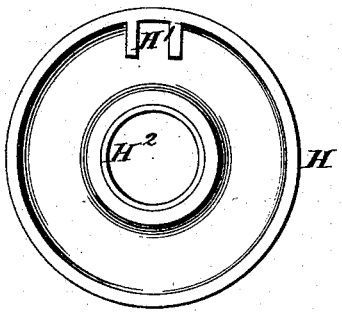


Fig. 9.

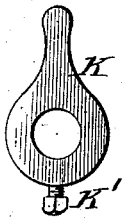
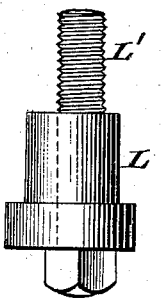


Fig. 10.



Witnesses.
A. Ruppert,
J. G. Mason.

John M Finch
Inventor.
by
R. Mason
Atty

UNITED STATES PATENT OFFICE.

JOHN M. FINCH, OF JACKSON, MICHIGAN.

ROLLER-MILL.

SPECIFICATION forming part of Letters Patent No. 261,697, dated July 25, 1882.

Application filed February 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. FINCH, of Jackson, in the county of Jackson and State of Michigan, have invented a new and useful Improvement in Roller-Mills, of which the following is a specification.

My invention has for its object, primarily, the application of frictional gearing to the operation of rollers used for crushing wheat; but it is obvious that the same principle may be applied to the operation of spur-wheels as well as to analogous rollers employed for other uses in the arts.

In the annexed drawings, making part of this specification, I have illustrated a pair of differential rolls and their attendant mechanism for grinding or crushing wheat, in which—

Figure 1 is a perspective view. Fig. 2 is a vertical section on line *x x* of Fig. 3. Fig 3 is a longitudinal section on line *y y* of Fig. 2. Fig. 4 is an end elevation. Fig. 5 is a top view of the bracket. Fig. 6 is a side view. Fig. 7 is a front view of same. Fig. 8 is a front view of the driven pulley or wheel. Fig. 9 is a sectional elevation of the dog which communicates motion from the loose pulley or wheel to the shaft. Fig. 10 is an enlarged view of the eccentric-bolt which operates the adjustable bracket, Figs. 5, 6, and 7.

The same letters are employed in all the figures in the designation of identical parts.

A is one of the rolls, and A′ is its shaft. In this case it is the driving-shaft.

B is the other roll, and B′ is its shaft. In this case it is the driven shaft.

C is the pulley on the driving-shaft, to which motion is communicated from any prime mover.

D D′ are the boxes of the shaft A′. In this case these boxes are stationary.

E E′ are the boxes of the shaft B′. In this case these boxes are adjustable, sliding on the frame F by means of the adjusting-screws F′, which move the boxes and with them the shaft B′ and roll B.

The foregoing parts are common in this class of machines, and the power may be applied to either of the shafts, and either may be made adjustable, the connected parts, hereinafter to be described, being modified to such variations in construction as will be indicated.

G is the driving pulley or wheel keyed to shaft A′, and having a facing, G′, of composition after any of the well-known modes.

H is the driven pulley or wheel, which in this case is larger than the corresponding driver G, in order to give to roll B a slower rotation than is communicated to roll A. Should they be desired to revolve at the same speeds the pulleys or wheels must be modified accordingly. On the inner face of the exterior flange of the wheel H are two projections, H′, extending toward the center a distance somewhat more than the width intended to be given between the faces of the rolls, and far enough apart to receive the end of the dog K, which communicates motion from the pulley or wheel H to the shaft B′, to which it is fastened by a key or set-screw, K′. The face of the pulley H is turned smooth, to engage the corresponding face of the pulley G. If they are spur-wheels of course they will have teeth of proper form and proportions formed on their peripheries. The hub of the wheel or pulley H is lined with brass, as shown at H^2, and is formed with a chamber, H^3, to receive oil through the oil-hole in the usual manner. This oil is fed through the brass lining by means of porous plugs in holes formed through such lining in a well-known manner, or any other known mode of lubrication may be adopted.

I is a bracket, pivoted to the frame F by a bolt, I^4, and carrying the hollow stud I′, which forms the axle for wheel H. The hole through the stud I′ is greater in diameter than the shaft B′ which passes through it, the space between the surfaces being sufficient to allow for whatever adjustment is intended to be given to roll B in its relation to roll A. The boxes E and E′ can thus be adjusted by the screws F′ without affecting the action of the wheel H, which revolves around but not on the shaft B′, so that it makes no difference whether the shaft is central or not. The form of the stem of the bracket may and of course must be modified to adapt it to the frame of the particular machine employed, so as while being pivoted on the frame to hold the stud I′ in its proper position. Where wheel H is a friction-pulley it is essential that means shall be provided for its adjustment in relation to the face of wheel G independently of the adjustment of the rolls in relation to one another,

so as to enable the operator to apply the necessary pressure to maintain the peripheral contact, and so communicate motion from the driving to the driven pulley. This is provided for by the elongated slots I^2 and I^3, through which bolts pass. The bolt which passes through slot I^2 is provided with an eccentric collar, L, attached to the threaded bolt L′, which is tapped into frame F if the pulleys are arranged as shown. If, however, the boxes D D′ are adjustable and E E′ are stationary the bolt L′ must be tapped into box D′ so as to move with it, as in that case it is necessary that both the shaft A′ and stud I′ shall move together. This freedom of motion of either of the shafts is provided for by the action of the dog K, which, playing in the space between the lugs H′, will communicate motion from the wheel to the shaft or from the shaft to the wheel, without reference to position of the shaft in the eye of the stud I′. By turning the bolt L′ its collar L, bearing on the edges of the slot I^2, will move the bracket and with it the wheel H, so that the pressure of the latter against the face of the wheel G may be increased or diminished at will. Even if the pulleys are not used, but spur-wheels are used instead, this adjusting-bolt L L′ will be advantageous for the perfect adjustment of the teeth on their pitch-lines, although no further use may be made of it afterward.

The wheat is contained in the hopper M, and fed in a thin stream between the rolls by means of a roller, N, and sliding gate N′, which extend the entire length of the rolls, thus affording a continuous feed across the entire length of the rolls, and uniformly supplying the grain to the rolls, so as to insure a perfect and equal reduction.

Feeding-hoppers and rolls adjustable in their relation to one another are in common use; but the effect of such adjustment is either to throw the gear-wheels off of their pitch-line or, if pulleys are used, to increase or diminish the strain on the belts by shifting the position of the driven pulley in its relalation to the driver.

I have shown in the drawings and described in the specification the arrangement of the parts as they would exist if my improvements were applied to the roller-mills in common use, which have the shafts of the rollers extended, as shown, so as to carry pulleys or spur-wheels by which motion is communicated from one roller-shaft to the other; but it is obvious that it is not necessary that the roller-shaft B′, as in the case illustrated, should extend through the hub of the wheel H, since that shaft has no relation to the wheel H, except that it carries the dog K. It is therefore not necessary that the shaft B′ should extend beyond the box E′ farther than is necessary to attach to it the dog K, which, in that case, would revolve in the space between the outer end of the box and the bracket I, the stem of which would require to be carried out far enough to admit the dog between it and the box, and the studs H′ H′ would have to be transferred from their position, exterior to the arms of the wheel, to the inner flange thereof. In such case the stud I′, instead of being hollow, as in the case illustrated, could be made solid and consequently smaller. It is only necessary that the wheel H shall be in the axial line of the lower roller, so as to give motion to or receive motion from the shaft by means of any suitable dogging mechanism which will leave the shafts free to be adjusted in their relation to one another. In the modification here suggested, the dog being placed on the inside of the wheel H, it would be preferable to reverse the stud and still further carry out the arm of the bracket I, so that the stud I′, instead of projecting outward, should project from the inner face of the bracket toward the box E′, so that the bracket should form a flange to confine the hub of the wheel on its outer face, instead of on the inner face, as shown.

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

1. In combination, rollers A and B, means for adjusting one of the same in relation to the other independently of its driving mechanism, and driving mechanism which is adjustable independently of the relative position of the rolls, substantially as set forth.

2. In combination with the rolls A and B, one of which is adjustable, wheels or pulleys G and H, stud I′, supporting-wheel H, and dog K, and suitable means for connecting the dog to the wheel and roll shaft, so as to transmit motion from one to the other, substantially as set forth.

3. In combination with the shaft B′ and wheel H, the bracket and stud I I′, supporting the wheel at its center independently of the shaft, and leaving the shaft free to be moved with the adjustment of the roll without affecting the wheel, substantially as set forth.

4. In a roller-mill, the bracket I I′, the frame F, and the pulley or wheel H, in combination with the eccentric bolt L L′, for adjusting the driving mechanism independently of the roller-shaft, substantially as set forth.

5. In a roller-mill, in combination with the shaft B′, a wheel, H, which is independently adjustable and independently supported in line with the axis of said shaft, and suitable means for connecting said wheel with the shaft in such manner as will cause motion to be communicated from one to the other without reference to the adjustment of either, substantially as set forth.

As witness my hand this 24th day of January, A. D. 1882.

J. M. FINCH.

In presence of—
WM. H. DICKEY,
WM. A. KING.