(No Model.)

J. PYE.

WHEAT AND MIDDLINGS REDUCING MILL.

No. 260,784. Patented July 11, 1882.

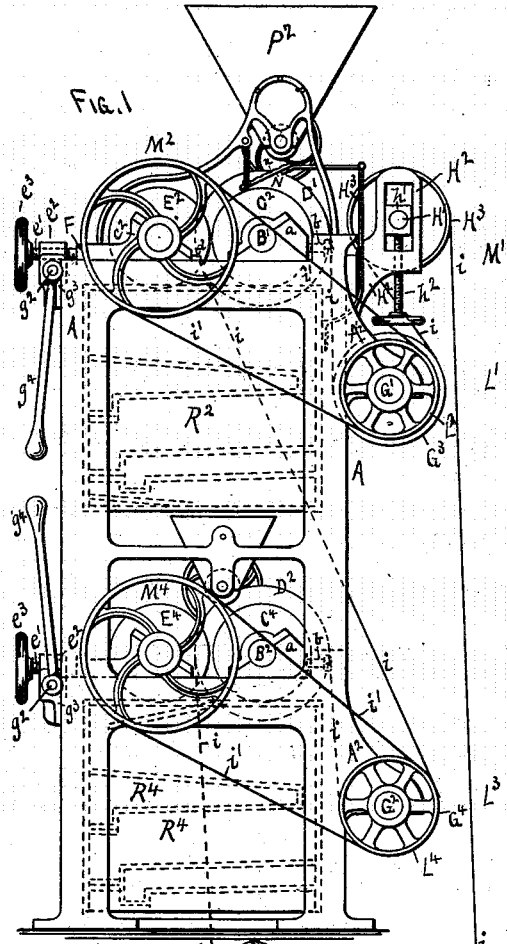

FIG. 1

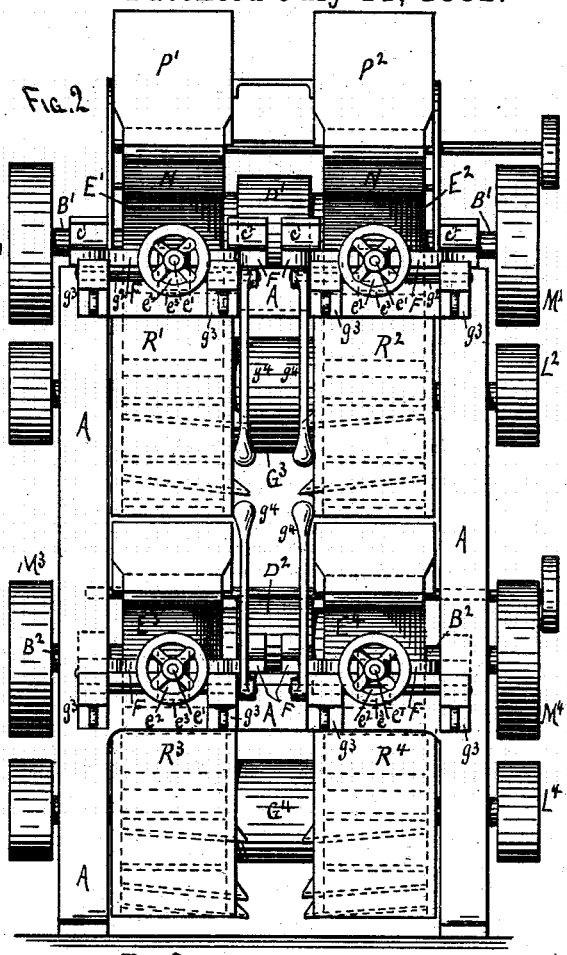

FIG. 2

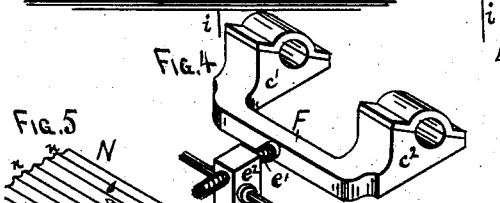

FIG. 4

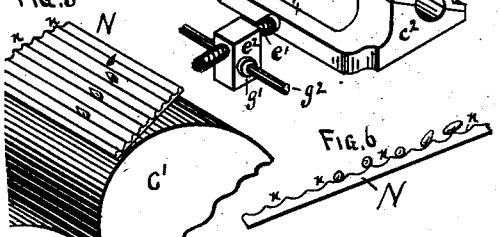

FIG. 5

FIG. 6

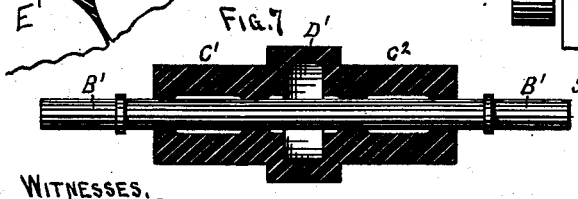

FIG. 7

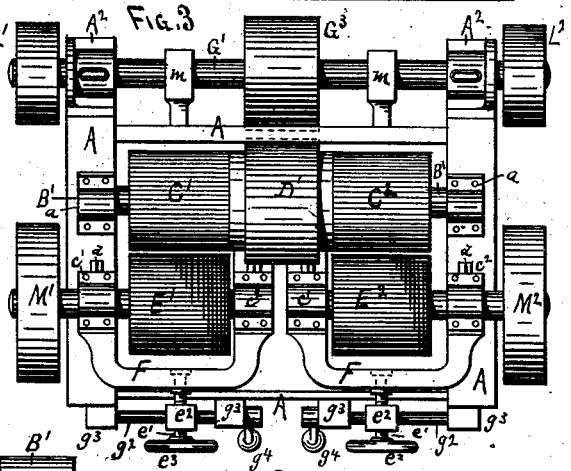

FIG. 3

James Pye,

INVENTOR, BY Louis Feeser Sons, Atty's.

WITNESSES.
H. V. Rutherford.
Louis Feeser Jr.

UNITED STATES PATENT OFFICE.

JAMES PYE, OF MINNEAPOLIS, MINNESOTA.

WHEAT AND MIDDLINGS REDUCING MILL.

SPECIFICATION forming part of Letters Patent No. 260,784, dated July 11, 1882.

Application filed November 9, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES PYE, a citizen of the United States, and a resident of Minneapolis, in the county of Hennepin and State of Minnesota, have made certain new and useful Improvements in Wheat and Middlings Reducing Mills, of which the following is a specification.

This invention relates to machines used in flour-mills for reducing the wheat and middlings to flour by furrowed or smoothed rolls; and it consists in the construction and combination of parts hereinafter particularly described, and then sought to be specifically defined by the claims.

I attain these objects by the use of the mechanism illustrated in the drawings hereto annexed, in which—

Figure 1 is a side elevation. Fig. 2 is a front elevation, and Fig. 3 is a plan view with the feed mechanism removed. Fig. 4 is a perspective view of the adjusting mechanism (detached) of the movable rolls. Fig. 5 is an enlarged perspective view of a portion of a pair of rolls and the grooved feed-plate. Fig. 6 is an enlarged end view of the grooved feed-plate, illustrating the manner in which the wheat is caused to pass over its surface. Fig. 7 is a longitudinal section of one of the double rolls and intermediate pulley, showing one method of forming them.

A is the frame-work, across the upper part of which a shaft, B′, is journaled by its ends in boxes *a*, the latter being adjustable by set-screws *b*, so that the shaft may be adjusted by the ends. Upon this shaft B′ two wheat or middlings reducing rolls, C′ C², are secured, and with a driving-pulley, D′, attached to the same shaft between them. The two rolls C′ C² and the pulley D′ will ordinarily be cast in one piece, as shown in Fig. 7; but under some circumstances all three may be made separately and attached to one shaft. The surfaces of the rolls C′ C² will be "chilled" and turned smooth, or provided with the grooves or furrows in the ordinary manner. By this means two independent rolls, C′ C², will be operated by one belt running upon one pulley, D′, midway between their journals, whereby an equal pressure will be brought to bear upon both ends of the shaft B′ to insure equal wear, and thus maintain the parallel position of the rolls C′ C². This is a great advantage, as with the ordinary manner of driving by gears or belts from one end only of the roll the wear upon the boxes and shaft is not uniform. Hence frequent adjustment is required to maintain the parallel position of the rolls; but by operating them from the center an equal pressure, and consequently a uniform wear, is secured upon both ends of the shaft and the face of the rolls maintained in the same horizontal position. Another advantage I claim for this arrangement is the reduction in the number of belts used, and consequent lessening of the friction and expense.

In front of the rolls C′ C² two other rolls, E′ E², will be arranged with their journals running in boxes *c′ c²*, adapted to slide back and forth upon the frame A by means of ways *d*, so that the boxes may be moved back and forth and adjust the rolls E′ E² nearer to or farther from the rolls C′ C². Each pair of the boxes *c′ c²* of each roll E′ E² is connected together by a yoke, F, cast in one piece with the boxes, (see Fig. 4,) and the yoke is provided at the center with a screw, *e′*, passing forward through a large nut, *e²*, and having a hand-wheel, *e³*, by which it is adjusted.

The nut *e²* is provided with a large circular slot through it at right angles to and below the screw *e′*, in which an eccentric, *g′*, on a shaft, *g²*, fits. The shaft *g²* is mounted by its ends in brackets *g³ g³* on the frame A, and provided with a hand-lever, *g⁴*, on its inner end, as shown. By this arrangement the revolving of the eccentric *g′* will move the nut *e²* back and forth and carry the screw *e′* with it; but when the lever-arm *g⁴* is held down or left hanging the eccentric *g′* will hold the nut *e²* in place upon the screw *e′*, so that the latter may be revolved within the nut and the latter act as if immovable. When the lever *g⁴* is raised the eccentric *g′* will be revolved and throw the nut *e²* backward, and with it the screw *e′*, yoke F, and roll E′, so that the roll may be instantaneously drawn away from the roll C′ in event of any foreign matter getting in between them.

By the construction described both ends of the rolls are moved precisely alike, and their parallel position with relation to the rolls C′ C² will be maintained at all times, and the adjustment can be very quickly and accurately made.

The arrangement of the single eccentric *g′* and nut *e²*, whereby the movable roll may be instantaneously thrown out of action, is a very important feature, as by this means the roll is

not thrown out of its parallel position, as it frequently is when two eccentrics are used, as the torsional twist on the shaft and mechanical inaccuracies will cause one eccentric to act before the other.

A short distance below the rolls C′ C² E′ E², in the same frame A, I arrange another similar set of rolls, C³ C⁴ E³ E⁴, with a pulley, D², upon the shaft B² of the rolls C³ C⁴ similar to and in line with the pulley D′.

Mounted in brackets A², and running across the rear of the frame A a short distance beneath the line of each of the shafts B′ B² and parallel with them, are two other shafts, G′ G², carrying on their centers pulleys G³ G⁴ in line with the pulleys D′ D², the two shafts G′ G² acting as counter-shafts to the shafts B′ B².

In the rear of the shaft B′, and above the shaft G′, is another shaft, H′, mounted in adjustable bearings *h′* in brackets H² upon the frame A, the said bearings *h′* being adjustable up or down by screws *h²*, so that the shaft H′ may be raised or lowered. Upon the center of this shaft H′ is a pulley, H³, in line with the pulleys D′ D² G³ G⁴, the pulley H³ thus acting as a belt-tightener, as hereinafter shown. By this arrangement of the pulleys D′ D² G³ G⁴ H³ one belt, *i*, may be passed from the main driving-pulley (not shown in the drawings) up over the tightener-pulley H³, down around the first counter-pulley, G³, up over the pulley D′, down around the second counter-pulley, G⁴, up over the pulley D², and thence back to the main driving-pulley, above mentioned, and both sets of the double rolls C′ C², C³ C⁴ driven by one belt.

Upon the outer ends of the counter-shafts G′ G² four pulleys, L′ L² L³ L⁴, are keyed in line with pulleys M′ M² M³ M⁴ on the ends of the shafts of the rolls E′ E² E³ E⁴, by which the latter are driven with belts *i′*, (see Fig. 1,) passing over them. All of the rolls are thus driven by belts, and gearing is entirely dispensed with. The pulleys M′ M² M³ M⁴ will be larger than the pulleys L′ L² L³ L⁴, so that the necessary slower running of the rolls E′ E² E³ E⁴ will be secured.

Between the two sets of rolls C′ C² E′ E² and C³ C⁴ E³ E⁴, and beneath the lower set of rolls, separating-screens R′ R² R³ R⁴ will be suspended on the usual vibrating rods and adapted to be vibrated by eccentrics *m* upon the counter-shafts G′ G², whereby the material passing through one set of rolls may be separated and purified in the ordinary manner before being passed to the next set, as hereinafter explained.

The germ of the wheat, lying loosely in the hull at the base or large end of the berry, is much more easily released if the berry be split open along the line of its longest axis, and as the first reduction or first treatment of the wheat by the first set of rolls is merely intended to "crack" or "split" the berries open, the more of the wheat that passes through the rolls with the longest diameter of the berries parallel with the rolls of the furrows therein the more easily will the germ be released and the less trouble met with in the after separations, and to secure the passage of the wheat-berries into the rolls in this position I arrange an inclined plate, N, between the feed-hopper P′ and first rolls, C′ E′, as shown, over which the wheat runs to the rolls. This plate N is provided with grooves *n*, (see Figs. 5 and 6,) parallel with the axes of the rolls or the grooves therein and somewhat farther apart than the length of the wheat-berries, so that when wheat runs over them, the large or germ ends being heavier than the small ends, the berries will be tilted into the grooves *n* and turned around with their longest diameters parallel with the grooves and roll over and over in that position between the rolls. A slight vibratory motion in any suitable direction will be given to the plate N to assist in its operation, and it will be made adjustable to enable its angle of inclination to be adapted to different qualities of wheat. After passing through the first set of rolls, C′ E′, the material is passed through the first separating-screen, R′, and from thence to the second set of rolls, C³ E³, and second separator, R³, and is then elevated to the hopper P², (the elevator not being shown in the drawings,) from which it passes down through the rolls C² E², separators R², rolls C⁴ E⁴, and separator, R⁴, and from thence to the bolts. By this means four reductions and four separations are obtained in one machine, and with but four sets of rolls, as shown, and one set of driving-belts, and without the use of gearing.

The yoke F may be made of spring-steel and attached to the boxes *c*, so as to give slightly in case of any hard substance getting in between the rolls, but stiff enough to hold the rolls for grinding wheat.

What I claim as new is—

1. In a machine for reducing wheat and middlings, two rolls mounted on one shaft and a driving-pulley mounted between them on the same shaft, in combination with opposing rolls, whereby the several parts will operate as and for the purpose set forth.

2. The rolls C′ C² and intermediate pulley, D, formed in one piece, whereby they are adapted to be applied as and for the purpose set forth.

3. The combination of the rolls C′ C², mounted upon one shaft, and with a pulley upon the same shaft between them, and the rolls E′ E², counter-shaft G′, counter-pulleys G³ L′ L², and adjustable roll-driving pulleys M′ M², whereby all of said rolls may be operated by one set of belts, substantially as set forth.

4. The combination of roll E′, boxes *c′ c²*, yoke F, screw *e′*, nut *e²*, eccentric *g′*, and means for moving the eccentric, as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES PYE.

Witnesses:
C. N. WOODWARD,
EDWARD ROTERT.