

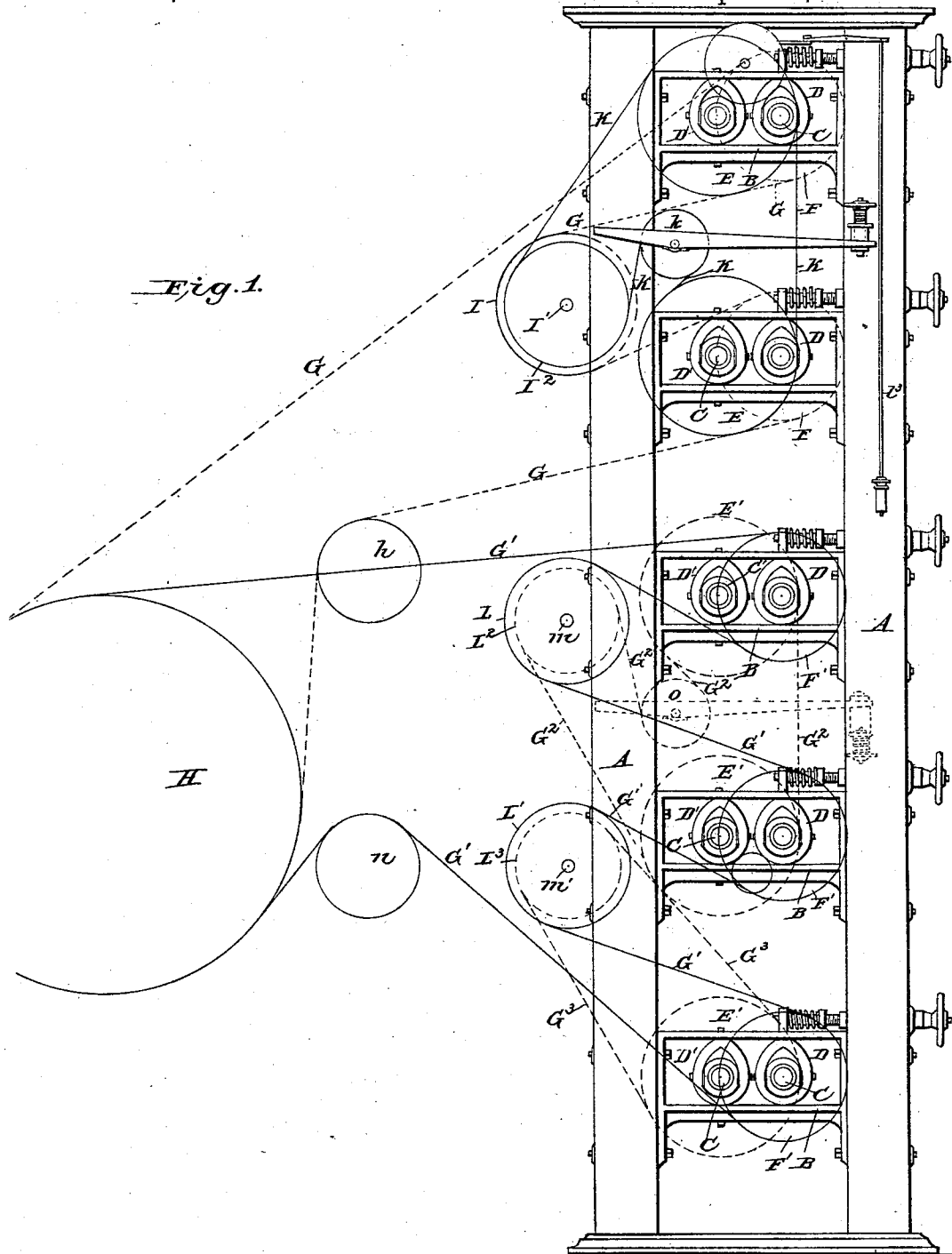
(No Model.)

3 Sheets—Sheet 1.

W. TENNANT.
ROLLER GRINDING MILL.

No. 275,543.

Patented Apr. 10, 1883.



Witnesses:
A. M. Long.
E. J. Wadsworth.

Inventor.
William Tennant
by his attorney
J. E. Cox

(No Model.)

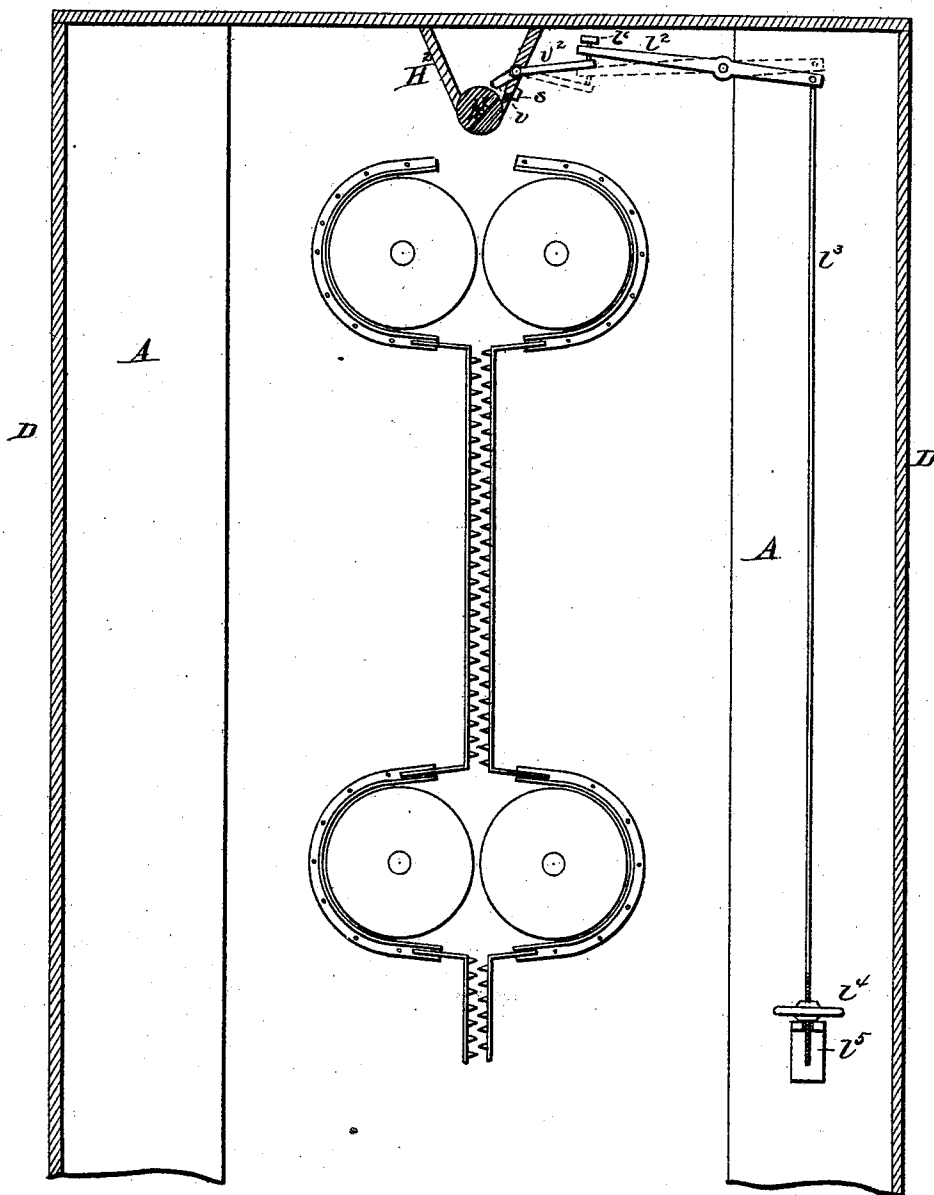
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W. TENNANT.
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Patented Apr. 10, 1883.

Fig. 2.



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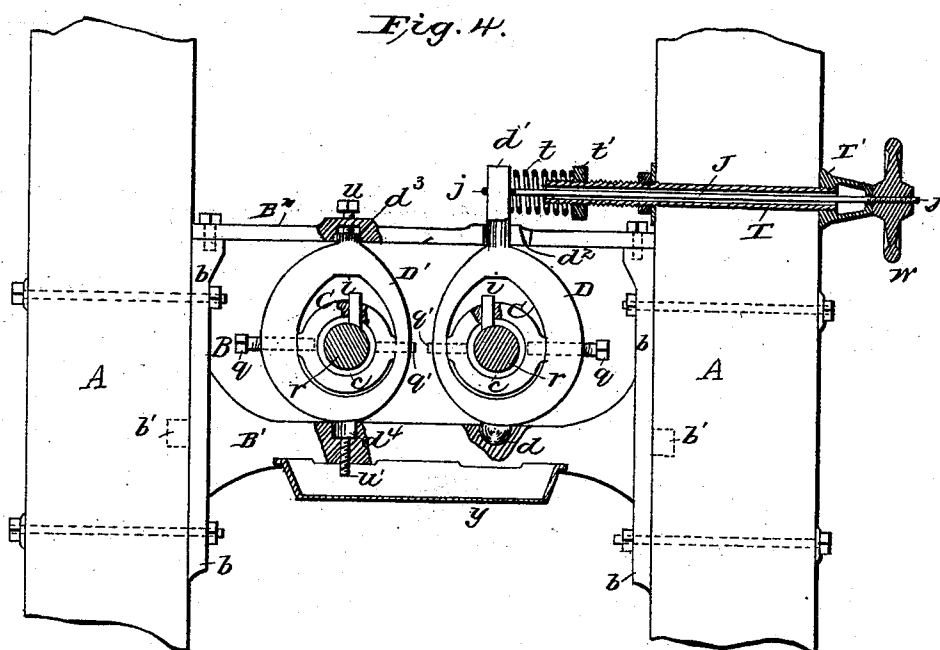
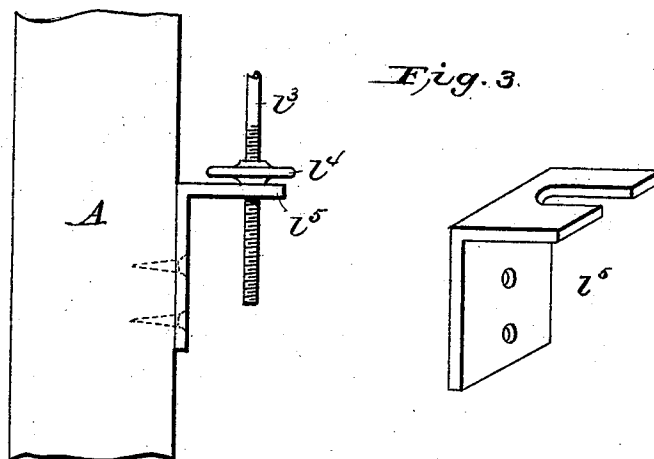
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W. TENNANT.
ROLLER GRINDING MILL.

No. 275,543.

Patented Apr. 10, 1883.



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UNITED STATES PATENT OFFICE.

WILLIAM TENNANT, OF FARIBAULT, MINNESOTA.

ROLLER GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 275,543, dated April 10, 1883.

Application filed November 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM TENNANT, a citizen of the United States, residing at Faribault, in the county of Rice and State of Minnesota, have invented certain new and useful Improvements in Roller Grinding-Mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of this invention are to obviate wrenching strains upon the roller-supporting frame by the driving-belts and secure even wear and strain upon the bearings at both ends of the rollers, to facilitate the adjustment of the rollers, and to provide for ready regulation of the quantity of grain passing to the rollers from the feed-hopper.

With these ends in view the invention consists in certain novel constructions and combinations of devices for the accomplishment thereof, as will be hereinafter particularly described and claimed.

In the accompanying drawings, Figure 1 is an end elevation of a mill provided with my improvements. Fig. 2 is a vertical section, illustrating the feed-regulating devices. Fig. 3 is a detail view, in elevation and perspective, of the feed-gate-adjusting devices. Fig. 4 is a view mainly in vertical section, illustrating the devices for adjusting the rollers.

Referring to Fig. 1, the letter A designates the vertical end beams of the supporting-frame, and B indicates the bridge-trees which support the roller-bearings C, mounted in adjustable yokes D and D', which, with the devices for adjusting the same, will be presently described. The left-hand rollers of the upper two pairs, as shown in the drawings, carry their belt-pulleys E at one end, (the end next the observer in the present instance,) while the corresponding rollers of the lower three pairs carry their belt-pulleys E' at the opposite end of the frame, these pulleys being attached to the rollers in the usual manner. The right-hand rollers of the upper two pairs carry their belt-pulleys F at the end of the frame opposite the end at which the pulleys E of the left-hand rollers are arranged, and the corresponding rollers of the lower three pairs carry their pulleys F' at the end opposite that at which are

located the pulleys E' of the left-hand rollers of their pairs. The right-hand pulleys, F, of the upper two pairs of rollers are driven by a belt, G, which passes around a main-belt-driving wheel, H, a guide-pulley, h, and a transmitting-pulley, I, fixed upon a counter-shaft, I', near one end thereof. Near its other end the said shaft carries a second transmitting-pulley, I², around which passes a belt, K, which drives the pulleys E of the left-hand rollers, said belt K passing intermediately around a belt-tightener, k. The pulleys F' of the right-hand rollers of the lower three pairs are driven by a belt, G', passing around the main driving-wheel H, and also around transmitting-pulleys L and L', fixed upon counter-shafts m and m', respectively, said belt passing also around a guide-pulley, n. The pulleys E' of the left-hand rollers of the third and fourth pairs from the top are driven by a belt, G², which receives its motion from a transmitting-pulley, L², fixed upon the counter-shaft m, and passes around a belt-tightener, o, while the pulley E' of the left-hand roller of the lowermost pair is driven by a belt, G³, receiving motion from a transmitting-pulley, L³, fixed upon the counter-shaft m'. By the arrangement of the pulleys and driving-belts as now described, a portion of the belts being at each end of the frame, the driving strain of the belts is divided as evenly as practicable between the two ends of the said frame, which is therefore not subjected to those wrenching strains and vibrations which result from driving the rollers by means of pulleys and belts all arranged at the same end, or where all the slow rollers are driven from their ends at one end of the mill, and all the fast rollers from their ends at the other end of the mill.

Referring to Fig. 2, the letter H² indicates the feed-hopper, which is shown in vertical section; h², the feed-roller, and v a valve or feed-gate arranged to govern an opening or feed-throat left at the bottom of one of the hopper-walls. This gate is pivoted at its upper edge, and normally rests against a stop, s, in which position it closes the throat. An arm, v², projects outwardly from the upper edge of the gate v, and over the outer end of this arm stands the inner end of a lever, l², which is pivoted to one of the vertical beams A of the frame,

and has its outer end pivoted to a rod, l^3 , which depends alongside said beam and has its lower end screw-threaded to receive the correspondingly-threaded hub of a hand-wheel h^4 . From the beam A, near the lower end of the rod l^3 , there projects a plate, l^5 , having an open slot to receive said rod, the said plate having its upper surface adapted to form a rest or bearing for the hub of the hand-wheel h^4 . The lever l^2 has at its inner end an adjustable screw, l^6 , the tip of which is arranged to bear downwardly upon the outer end of the arm v^2 of the feed-gate. When it is desired to open the feed-gate the lower end of the rod l^3 is placed in the slot of the plate l^5 , with the hub of the hand-wheel h^4 resting upon said plate, and then by turning the wheel the rod is moved upward, depressing the screw l^6 at the inner end of lever l^2 against the arm v^2 of the feed-gate v , and thus opening said gate to any desired extent, and the said gate may obviously be at any time adjusted, as desired, to regulate the feed by turning the hand-wheel one way or the other, the weight of the rod l^3 keeping said wheel down upon its rest. When it is desired to entirely cut off the flow of grain from the hopper the rod l^3 is swung clear of the plate and allowed to hang free, its weight causing the inner end of the lever l^2 to be raised away from the arm v^2 of the feed-gate, and then the weight of the grain in the hopper forces the gate down against the stop s and closes the feed-throat. The feed may be resumed by first lifting the rod and then pushing it laterally into the slot of plate l^5 , and since the hand-wheel h^4 has remained undisturbed the feed will be the same as before the gate was temporarily shut.

Referring to Fig. 4, the letter B, as before stated, indicates a bridge-tree for supporting the rollers at one end. The lower bar, B^1 , of this bridge-tree is provided with vertical end plates, b , by means of which and suitable bolts, as shown, it is secured to the opposite inner surfaces of the vertical beams A A, and said bar is also provided with end lugs, b' , which enter sockets formed to receive them in the beams, and thus give said bar a firm support. The upper bar, B^2 , of the bridge-tree rests upon the upper ends of the plates b , and is secured thereto by suitable screws.

The ring-yokes D and D' are arranged between the upper and lower bars of the bridge-tree, their weight being supported by the lower bar, and within these yokes are arranged the journal boxes or bearings C, which receive the journals r of the grinding-rollers, said journals revolving directly in contact with the linings c of said boxes. The boxes C are approximately circular in shape, and are pivoted on their horizontal diameters by means of pivot-screws q and q' , passing through the opposite limbs of the yokes, the inner screws, q' , passing through the boxes and impinging upon the linings c , in order to adjust the same for taking up wear. The boxes are also provided

with suitable oil-cups, i . The yokes D and D' are pivoted in line of their vertical diameters, the right-hand yoke having projected from its lower edge a rounded boss, d , which fits in a corresponding socket formed in the lower bar of the bridge-tree, while from the upper edge of said yoke a stud, d' , extends through a longitudinal slot, d^2 , formed in the upper bar, B^2 . The yoke may be either swung edgewise or turn horizontally on the boss d . The upwardly-projecting portion of the stud d' is loosely embraced by a loop, j , formed on the end of a rod, J, which extends outwardly through a tube, T, arranged horizontally through the right-hand vertical beam A of the frame, said tube being screw-threaded on part of its exterior surface, and having its outer end engaged with a nipple, T' , through which passes the rod J, the outer end portion of which is screw-threaded to receive a hand-wheel, W, the hub of which has a bearing upon the end of said nipple. The inner ends of the rod J and the tube T are surrounded by a spiral spring, t , one end of which bears against the stud d' and the other against an adjustable nut, t' , arranged upon the tube T. The spring t forces the stud d' and yoke D to the left, or toward yoke D' , and by turning the wheel W in the proper direction the rod J may be either drawn outwardly or allowed to yield inwardly for the purpose of adjusting the yoke edgewise, so that it may hold the roller which it supports at any desired distance from the adjacent roller. The left-hand yoke, D' , has no edgewise play; but from its upper and lower edges, respectively, project the journals d^3 and d^4 , which turn in bearings formed for them in the upper and lower bars of the bridge-tree. Against the ends of these journals bear the tips of adjusting-screws u and u' , passing through the bridge-tree bars, so that the yoke and its journal-box may be adjusted vertically to hold the supported roller at any desired elevation with respect to the other roller.

Owing to the vertical pivoting of the yokes D and D' and the horizontal pivoting of the journal-boxes C C, the roller-bearings have a universal self-adjustment with respect to each other, which guarantees their parallelism and a uniform grinding of the grain which passes between them, while by means of the lateral adjustment of the yoke D and the vertical adjustment of the yoke D' the rollers may be placed in such proximity and relative positions as will secure their most efficient action.

Under the bridge-tree a drip-pan, y , may be arranged in the ordinary manner to catch any oil which may fall from the bearings above.

Having thus fully described my invention, what I claim is—

1. In a roller grinding-mill having pairs of rollers arranged in vertical series, the combination, substantially as before set forth, of a single driving-shaft, a system of belt-gearing for driving one roller of each upper pair from one end and the other roller of each upper pair

from the other end, and a second system of belt-gearing for similarly driving the corresponding rollers of the lower pairs, but from ends respectively opposite to the driven ends of the upper rollers.

2. The combination, with a pair of grinding-rollers, of the adjustable yokes D D', pivoted vertically, the roller journal-boxes pivoted horizontally within said yokes, suitable devices for adjusting the yoke D' vertically, and mechanism for swinging the upper end of yoke D toward and from said yoke D', substantially as described.

3. The combination, with the feed-gate and the depending rod connected therewith and having its lower end screw-threaded, of the adjusting hand-wheel arranged upon said rod, and the stationary plate B, having the open slot to receive said rod and to permit its ready

removal and replacement, whereby the gate may be shut and opened without disturbing its adjustment as regards the feed, substantially as described.

4. The combination, with the feed-gate having the outwardly-projecting arm, and the lever having its inner end arranged to force said arm downwardly, of the depending rod connected to the outer end of said lever, and suitable devices connected with the lower end of said rod for adjusting the same longitudinally, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM TENNANT.

Witnesses:

CHAS. J. HUMPHREY,
CHAS. E. WHITE.