(No Model.) 2 Sheets—Sheet 1.

J. B. CORNWALL.

FEEDER FOR ROLLER MILLS.

No. 532,141. Patented Jan. 8, 1895.

Fig. 1.

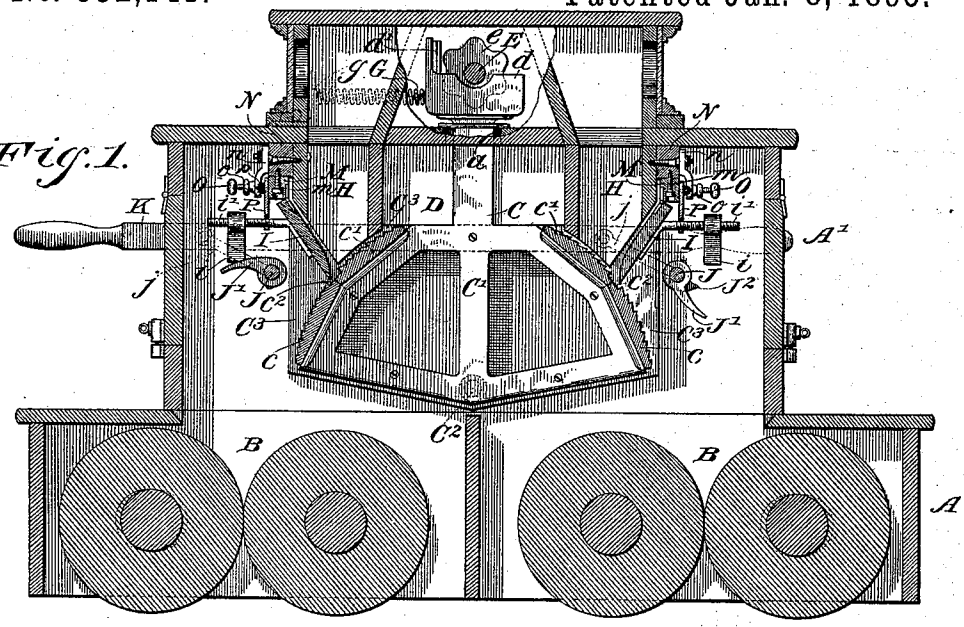
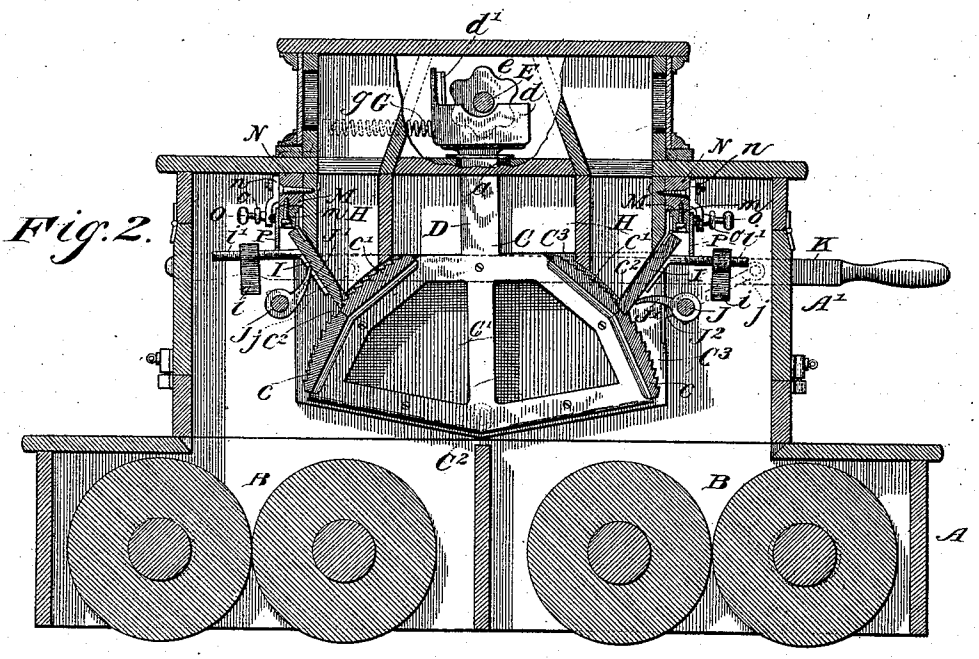


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

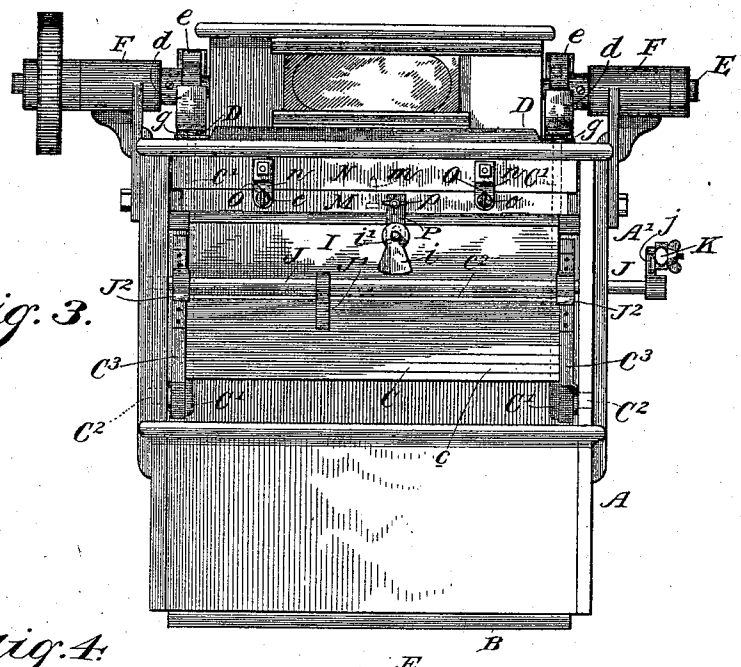
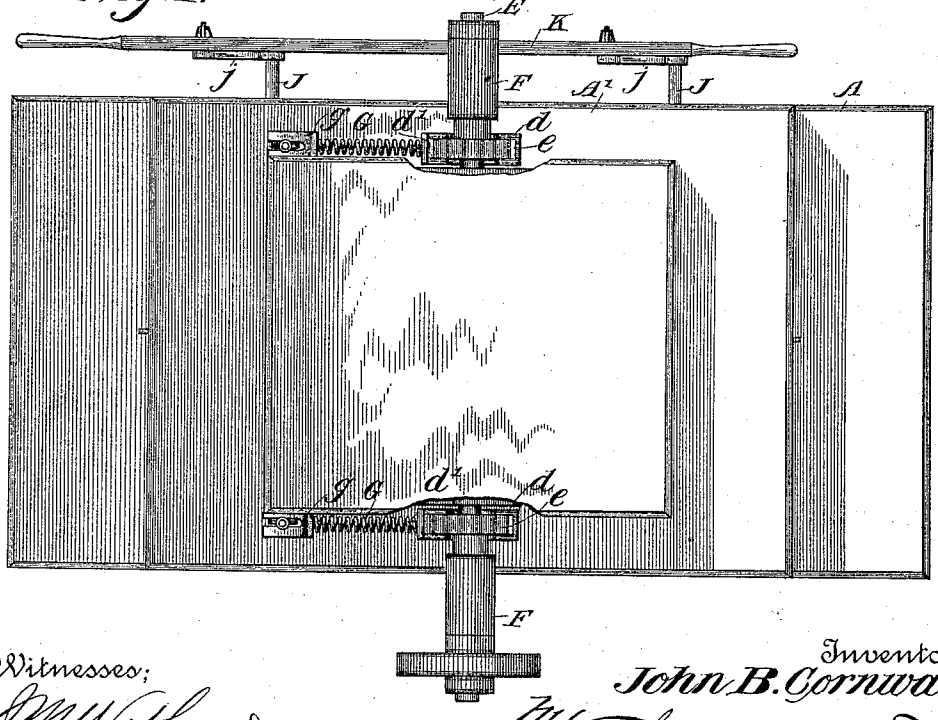


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN B. CORNWALL, OF MOLINE, ILLINOIS, ASSIGNOR TO THE BARNARD & LEAS MANUFACTURING COMPANY, OF SAME PLACE.

FEEDER FOR ROLLER-MILLS.

SPECIFICATION forming part of Letters Patent No. 532,141, dated January 8, 1895.

Application filed October 23, 1894. Serial No. 526,760. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. CORNWALL, of Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Feeders for Roller-Mills; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention is an improved vibrating feeder for feeding bran, middlings and wheat to double roller mills, &c., and it consists in the novel construction and combination of parts hereinafter described and claimed.

In the accompanying drawings: Figure 1 is a central longitudinal section through the upper part of a double roller mill casing showing my improved vibrating feeder attached thereto, in working position. Fig. 2 is a similar view showing the feeder out of action. Fig. 3 is a side view of the feeder, the end of casing being removed so as to disclose the operating parts. Fig. 4 is a top plan view of the feeder.

Referring to the drawings by letter: A designates the mill casing, and B, B, the opposite pairs of crushing rolls.

A′ is the feeder casing mounted on the mill casing.

C is a double vibrating feeder, composed of two metallic end frames C′ nearly semicircular in contour, pivoted centrally of their lower edges by trunnions C^2 in proper bearings in the end walls of the casing (or pivotally mounted on other suitable supports) over and intermediate the pairs of rolls B, B, as shown. The frames are connected by transverse upper and lower boards or plates *c*, *c′*, at their opposite sides, the outer faces of said boards forming roughly arcs of a cylinder whose axis is in line with the trunnions C^2. The upper boards *c′* are longitudinally corrugated or serrated, the serrations pointing downwardly as shown, and the lower boards *c* are similarly corrugated but the corrugations preferably point upwardly. At the meeting edges of the boards their outer faces are dressed smooth and on arcs of a cylinder concentric with the pivots of the feeder, said smooth surfaces c^2 being flush with the bottoms of the serrations and slightly greater in width than the length of vibrations of the feeder. The utility of this construction is hereinafter explained.

End boards C^3 are fastened to the frames C′ and project beyond and above the ends of boards *c*, *c′*, to prevent any material escaping over the ends of said boards.

From the top side of frames C rise upright arms D which extend through openings *a* in the top of the casing below a shaft E journaled in castings F, F, attached to the top of the casing A′ the shaft lying parallel with and above the feeder and having knocker-disks *e* on it which rotate within cups *d* on the upper ends of arms D and engage contact blocks *d′* in said cups.

When shaft E is rotated the feeder is oscillated or vibrated rapidly. Coiled springs G interposed between the upper ends of the arms and stops *g* adjustably secured to the top of casing, press the arms D toward the knockers so as to maintain the feeder in upright position.

The feed hoppers H, H, are shorter than the feeder, and rise above the top of the casing A′, the knockers *e* being exterior thereto and at the ends thereof, so that the operating parts of the vibrating feeder are in convenient position for adjustment, oiling, &c. The lower ends of the hoppers are closed by the boards *c′*, *c′*, and at the lower outer side of each hopper is a hinged feed regulating valve I, the position of which is regulated by adjustable weights *i* mounted on threaded rods *i′* attached to the outer side of the valves.

The lower edges of valves I lie over or against the smooth surfaces c^2 of the feeder, as shown, so that the valves are not affected by the vibration thereof.

The material is fed into the hoppers through openings in their tops, and the hinged feed valves I on each side are caused to regulate the amount of feed to the rolls by the movable weights which are moved in to feed more, and out of to feed less, they counteracting the weight of material in the hoppers. The two opposite smooth surfaces c^2 on the sides of the vibrating feeder being on arcs of the same circle will maintain equal sized openings between it and the feed valves at any point of its vibrating stroke. Consequently the mate-

rial passing through is uniform in quantity, the great desideratum in a roller feeder.

The smooth surfaces c^2 effectually prevent an uneven feed of material as the size of opening between such surfaces and the valves continues the same width at any and all points of the stroke. The upper corrugations agitate the material and feed it down to the outlet valve, thus preventing clogging in the hopper and insuring a full supply to the outlet at all times, and the lower corrugations assist in disseminating the material evenly onto the rolls. If the surfaces c^2 were corrugated like the rest of the boards an entirely uniform feed would be impossible for the corrugations vibrating under the edge of the valve would make the opening larger at some points of the stroke of the feeder than at others, thus causing an uneven feed and vibrating the valve. The feeder is therefore preferably corrugated its entire surface, except on the parts which vibrate under the discharge valves as shown.

In the double feeder described the pressure of the material in one hopper upon the feeder is counteracted by the pressure of material in the other hopper, and the rapid tremulous vibrations imparted thereto, are highly advantageous in feeding the material uniformly. Access may be had to the weighted valves by doors A^2 in the sides of the casing.

Opposite each valve I and journaled in the casing A′ is a shaft J on the outer ends of which, at one side of said casing, are crank arms j pivotally connected to a horizontal hand-bar K by which the shafts can be simultaneously rocked. On said shafts are secured cams J′ which, when the shafts are rocked in one direction press the valves I against the feeder, cutting off the feed, as shown in Fig. 3. On the shaft J at the side of the feeder opposite springs G, are also mounted small cams J^2 which are so arranged that the same movement which causes cams J′ to shut the valves I, causes cams J^2 to engage the vertical edges of the end-boards C^3 of the feeder and rock the latter so as to compress the springs G and throw blocks d' out of contact with the disks e, as shown in Fig. 2, thus stopping the vibration of the feeder simultaneously with the cut-off of the feed. The reverse movement of bar K releases the valves I and the feeder is again thrown into vibrating position, as shown in Fig. 1.

Each valve I is hinged to a bar M which is suspended and centrally pivoted on a bolt m fastened to a bar or block N on the side of the hopper, so that bar M can swing horizontally.

O, O, are adjustable bolts tapped through brackets n, n, secured to bar N at opposite sides of bolt m; and o are locking nuts on said bolts O. By means of these bolts O the bar M can be adjusted on its pivot so as to compensate for wear on the lower edge of the valve, as is evident.

P is a slotted plate secured to bar M by a thumb screw p above rod i', which plate can be adjusted so as to hold the valve closed, or to prevent too great outward swing thereof.

Having thus described my invention, what I therefore claim as new, and desire to secure by Letters Patent thereon, is—

1. In combination with the hopper and feed-regulating valve, a vibrating feeder having a corrugated feed board provided with a smooth surface immediately under or opposite the edge of the feed-regulating valve, whereby the feed opening will be kept the same size at any point of the vibration of the feeder, substantially as described.

2. The combination of a hopper and feed regulating valve, with a vibrating feeder having its surface longitudinally corrugated except under or opposite the edge of the feed valve, substantially as described.

3. In a feeder, the combination of the hopper and the feed regulating valve; with a feeder having its surface concentric to its pivots and longitudinally corrugated to feed the material to the discharge opening, but smooth under or opposite the edge of the regulating valve; with means for vibrating said feeder, substantially as described.

4. The combination of the hopper, the adjustable feed valve, and the vibrating feeder pivoted below the hopper having its feed surface, forming the bottom of the hopper, convexly curved on an arc concentric to its pivots, and also having upstanding arms in rear of the hopper; with a shaft journaled parallel with but above the feeder and in rear of the hopper, having knocker disks engaging the upstanding feeder arms, and springs for upholding the feeder and keeping said arms in contact with the knocker disks, all substantially as described.

5. The combination of the hopper, the adjustable feed valve and the vibrating feeder pivoted below the hopper having its feed surface forming the bottom of the hopper, curved on an arc concentric to its pivots and longitudinally corrugated except that portion of its surface which vibrates under the feed-regulating valve, and also having upstanding arms in rear of the hopper; with a shaft journaled parallel with but above the feeder and in rear of the hopper, having knocker disks engaging the upstanding feeder arms and springs for upholding the feeder and keeping said arms in contact with the knocker disks, all substantially as specified.

6. The combination of the pair of feed hoppers, with the double vibrating feeder C having its pivots below the hoppers and opposite convex surfaces concentric with its journals, forming the bottoms of the hoppers, upstanding arms rising beside and between the hoppers and projecting exterior to the hoppers and the springs for forcing said arms and rocking the feeder in one direction; the shaft journaled intermediate the hoppers and the knockers on said shaft engaging the projecting ends of said arms, substantially as specified.

7. The combination of the pair of feed hop-

pers and their feed-regulating valves; with the double vibrating feeder C, having journals below and intermediate the hoppers, opposite convex feeding surfaces concentric with its journals, respectively forming the bottoms of the hoppers, and arms D; the shaft E, and knockers *e* for vibrating said feeder, and the springs G, substantially as specified.

8. The combination of the pair of feed hoppers and their feed regulating valves; with the double vibrating feeder C having journals below the hoppers and opposite feeding surfaces concentric with its journals, respectively forming the bottoms of the hoppers, said feeding surfaces being corrugated except that portion which vibrates under or opposite the edge of the regulating valves and means for vibrating said feeder, substantially as set forth.

9. The combination of the pair of feed hoppers and their hinged feed-regulating valves, with the double vibrating feeder C having its pivots below the hoppers and opposite surfaces concentric with its journals, forming the bottoms of the hoppers, upstanding arms rising beside and between the hoppers and the springs for forcing said arms and rocking the feeder in one direction; the shaft journaled intermediate the hoppers and the knockers on said shaft engaging said arms, the shafts beside the hoppers carrying cams adapted to simultaneously close the valves and rock the feeder so as to throw the arms away from the knockers and means for rocking said shafts, substantially as set forth.

10. The combination of the feed hoppers and the hinged and weighted feed-regulating valves at the lower ends of the hoppers with the double vibrating feeder C journaled in the casing below the hoppers, composed of the frames C′ having arms D and the boards *c*, *c*′, attached to frames C′ curved on arcs of a circle concentric with the journals, the shaft E lying intermediate the hoppers and above the feeder journaled in castings on and exterior to the casing and means for vibrating arms D from said shaft, substantially as set forth.

11. The combination in a double roller mill, of the pairs of rolls, the pair of feed hoppers above the same and the adjustable weighted hinged feed valves on the hoppers; with the double vibrating feeder C composed of frames C′ boards *c*, *c*′, and C^3 pivoted in the casing above the rolls and constituting the bottoms of the hoppers, the springs, engaging arms on the frames and the shaft carrying knockers which vibrate said arms, all constructed and arranged to operate substantially as and for the purpose set forth.

12. The combination of the feed hoppers and the hinged and weighted feed regulating valves at the lower ends of the hoppers with the double feeder C journaled in the casing below the hoppers, having its opposite sides curved on arcs of a circle concentric with its journals, said sides being smooth on that portion vibrating under the feed regulating valve, but having downwardly pointing longitudinal corrugations above the smooth surface and upwardly pointing longitudinal corrugations below the smooth surface, said feeder also having upright arms rising intermediate but exterior to the hoppers; the shaft lying intermediate the hoppers and above the feeder journaled in castings on and exterior to the casing and means for vibrating the feeder arms from said shaft, all constructed and arranged to operate substantially as and for the purpose set forth.

13. The combination with a vibrating feeder and a knocker for vibrating it of a rock shaft and cams on said shaft adapted to hold the feeder out of contact with the knocker when the rock shaft is rocked in proper direction without affecting the feed opening, or the feed regulating valve, all substantially as and for the purpose specified.

14. The combination of the vibrating pivoted feeder, having upstanding arms and a shaft carrying knockers engaging said arms for vibrating the feeder; with a cammed shaft and means for rocking said shaft to cause the cams to rock and hold the feeder out of contact with the knockers without thereby altering the size of the feed opening, all substantially as and for the purpose described.

15. The combination of the hopper, its hinged valve, the vibrating pivoted feeder and the shaft carrying knockers for vibrating the feeder; with the rock shaft beside the valve, the cams thereon adapted to respectively close the valve and tilt and hold the feeder out of contact with the knockers, substantially as and for the purpose set forth.

16. The combination with the hopper of the feed-regulating valve hinged to a pivoted bar, and means for adjusting said bar horizontally on its pivot, substantially as and for the purpose specified.

17. The combination of the hoppers, its feeder and the adjustable feed regulating valve, the pivoted bar M carrying said valve and the adjustable bolts O for regulating the position of bar M, all substantially as and for the purpose described.

18. The combination of the feed hopper, its feed regulating valve, the adjustable weight on said valve and the adjustable slotted plate P attached to the side of the hopper over the weighted arm of the feed regulating valve, and adapted to engage said arm for the purpose and substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN B. CORNWALL.

Witnesses:
J. S. LEAS.
W. R. MOORE.