(No Model.)

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APPARATUS FOR FEEDING ROLLER MILLS.

No. 245,463. Patented Aug. 9, 1881.

Fig. 1.

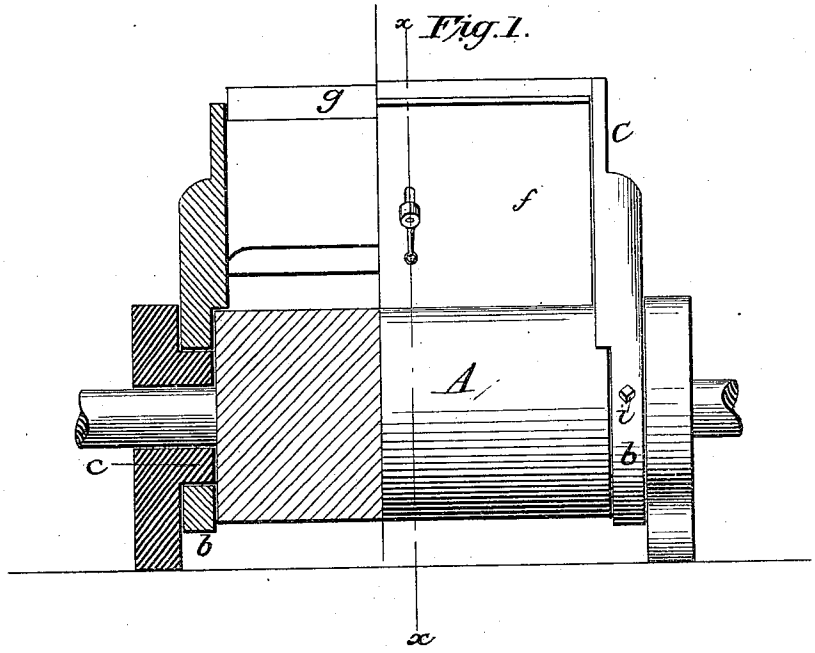
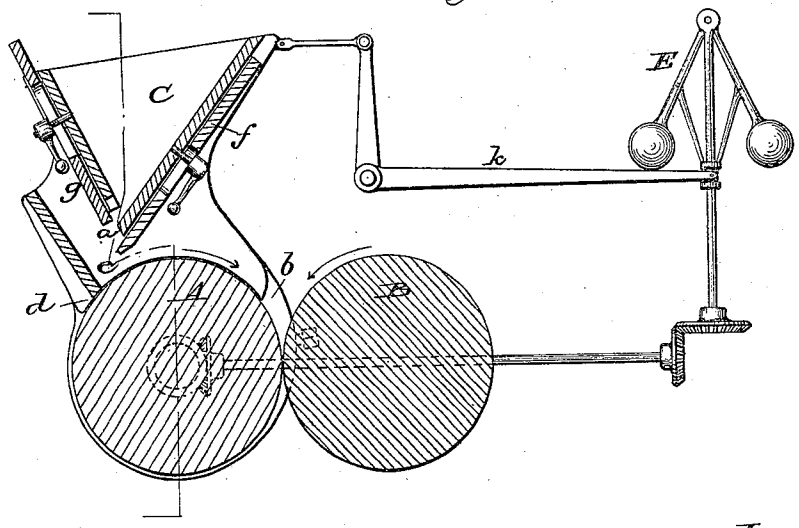


Fig. 2.



Attest.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FEEDING ROLLER-MILLS.

SPECIFICATION forming part of Letters Patent No. 245,463, dated August 9, 1881.

Application filed June 21, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM TELL DUVALL, of Georgetown, in the county of Washington, District of Columbia, have invented certain Improvements in Apparatus for Feeding Roller-Mills, &c., of which the following is a specification.

My invention relates to the feeding of materials to roller grinding-mills, middlings-purifiers, rice-scouring machines, and other machines and apparatus which require a gradual and uniform delivery of material thereto in a thin sheet or layer.

The main object of the invention is to secure the uniform feeding of middlings under the varying conditions and circumstances encountered in practice. Many methods and arrangements of apparatus have been devised to this end, such as agitators, endless belts, rolls arranged to force the material through a feeding-throat, and rolls arranged to turn upward against the material and loosen the same, that it may descend by gravity; but it is found that the changes in the humidity of the atmosphere, the fineness of the material, the amount of moisture therein, and other causes render the feed uneven, the material flowing at one time too fast and at another time too slow, and often feeding at one side of the machine when it has ceased to flow at the other side. It is to overcome these difficulties that my invention is intended.

The invention consists in delivering the material upon a smooth feeding-roll on the outer side in such manner that the surface of the roll, moving upward beneath the mass, carries a thin layer of material therefrom upward over its top and thence downward over its front, and regulating the rate of this feed by changing the point at which the material is delivered upon the feeding-roll, so that the roll will be required to lift the same to a greater or less extent. The feeding-roll presents a smooth upwardly-revolving surface to carry the material, while the hopper forms a means adjustable upward and downward with relation to the revolving surface for delivering the material thereon. While it is preferred to make use of these specific devices, it is obvious that other devices the mechanical equivalent of those named may be used in their place.

The invention consists, secondly, in the combination of a rotary feeding-roll and a hopper delivering upon the rear side of the same, the hopper being adjustable circumferentially with regard to the roll; in connecting the hopper with a governor arranged to adjust the hopper automatically to compensate for changes in the speed of the rolls, and in various minor details.

The essential and leading feature of the invention is the arrangement of a smooth unobstructed feed-roll to turn upward against the superincumbent material and carry the same gradually upward over its top, and the controlling of the rate of feed mainly by changing the point at which the material is delivered upon the feed-roll.

The construction of the apparatus may be varied to any desired extent, provided the above-named characteristics are retained.

The drawings represent a pair of middlings-rolls with my improvements applied thereto.

Figure 1 represents a front elevation of the feeding-roll and hopper, with one end shown in section. Fig. 2 represents a vertical cross-section of the same on the line *x x*.

A and B represent the two smooth parallel grinding-rolls, of ordinary construction and arrangement; and C represents the hopper, mounted above the roll A and sustained at the ends by its legs B, which have their ends journaled on hubs *c*, formed on the main frame concentric with the roll A, as shown. This arrangement allows the hopper to be adjusted forward and backward circumferentially around the roll, so as to change the point at which the material passes upon the roll. The hopper has at the bottom a throat or feed-opening, *a*, extending lengthwise of the roll A, over the outer or rear side of the same, a greater or less distance below its top or highest point. The location of the feed-throat in rear of the center of the roll and over the outer or upwardly-moving side of the same is of the utmost importance. It is also important that the roll shall have a smooth unobstructed surface, and that there shall be nothing between the hopper and roll to prevent the middlings from covering the roll in a smooth unbroken sheet.

Between the rear side of the hopper and the roll at *d* a close joint is maintained; but be-

tween the roll and the front side of the hopper there is a throat or opening, *e*, to permit the material to flow outward and upward on the roll. The size of the throat *e* may be varied by means of an adjustable board or gate, *f*, which may be slotted and secured by a bolt, as shown, or secured and adjusted in any other manner.

In order to render the feed more uniform by avoiding the effect of changes in the amount of material in the hopper, I provide the latter with an internal adjustable board or gate, *g*, which serves to sustain the mass of material and control the flow of the same to the bottom of the hopper and the discharge-throat. This arrangement is the same in effect as providing a main hopper to carry the material in mass and receive the weight and pressure and a second hopper supplied from the first and delivering in turn to the feed devices proper. The rate at which the material is carried by the roll depends mainly upon the distance which the latter is required to elevate it in order to carry it over the top. This distance is varied by adjusting or swinging the hopper forward and backward, so as to carry the feed-throat *a* up or down with relation to the roll. When the hopper is moved forward the throat approaches the top of the roll and the rate of feed increases, and vice versa.

The hopper may be adjusted by hand and fixed by set-screws *i*, (shown in the drawings,) or adjusted and secured by means of a screw, rack and pinion, lever, or equivalent device.

As the rate of delivery is affected somewhat by changes in the speed of the roll, it is desirable that the hopper shall be adjusted automatically, and to this end I connect therewith an automatic governor or regulator in any suitable manner. In the drawings an ordinary governor, E, having pendent weighted arms, is connected by driving-gear with the roll, and also connected by an elbow-lever, *k*, with the hopper. When the speed of the roll exceeds the proper limit the governor causes the lever to tip the hopper backward.

When my apparatus is in use the middlings placed in the top of the hopper descends gradually to the lower part thereof and passes thence to the roll, by which it is gradually carried forward and upward over its top in a thin uniform stream and delivered over the inner side between the two rolls. Owing to the fact that the surface of the roll moves upward beneath and against the mass, there is no tendency of the material to clog or choke or form into dough-balls. By changing the position of the hopper the delivery may be increased or diminished to any desired extent.

The regulating-gates are not necessary; but as they give a greater range of adjustment and adapt the mill for feeding different kinds of material, it is preferred to use them.

The manner of sustaining the hopper may be changed as desired.

A throat adjustable in reference to the roll may be employed in connection with a fixed hopper, instead of moving the entire hopper, if preferred, the same result being thereby accomplished.

Having thus described my invention, what I claim is—

1. In an apparatus for feeding middlings, &c., the combination of a smooth upwardly-revolving surface and means, substantially such as described, arranged to deliver the material upon the ascending surface, said means being adjustable circumferentially with reference to the revolving surface, substantially as described and shown.

2. The combination of a feeding-roll and a hopper provided with a throat above the ascending side of the roll, and arranged substantially as described, to be adjusted around said roll.

3. The combination of the roll, the adjustable hopper, having the throat over the ascending side of the roll, and an automatic governor connected with the hopper, substantially as and for the purpose described.

4. The combination of the roll and the adjustable hopper, arranged to swing on journals concentric with the roll.

5. The combination of the roll, the hopper, and the governor connected with and driven by the roll, and also connected with the hopper, substantially as shown.

6. In combination with the roll, the main hopper, arranged to deliver upon the ascending side of the roll, and the internal gate or secondary hopper to sustain principally the mass of material.

7. In combination with a feeding-roll, a hopper having its mouth adapted and arranged to be adjusted circumferentially in reference to the roll, substantially as described.

WILLIAM TELL DUVALL.

Witnesses:
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MAYHEW PLATER.