

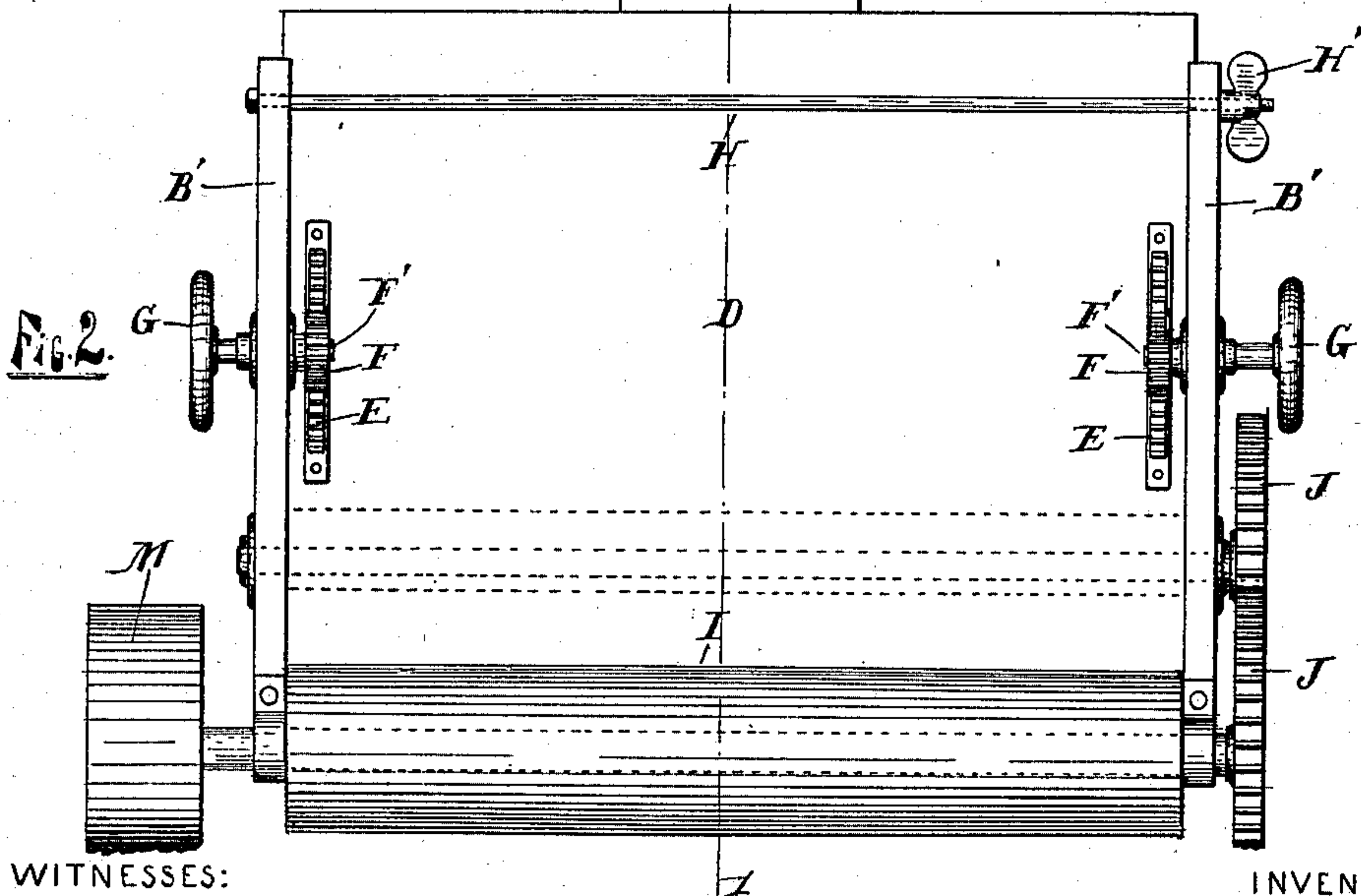
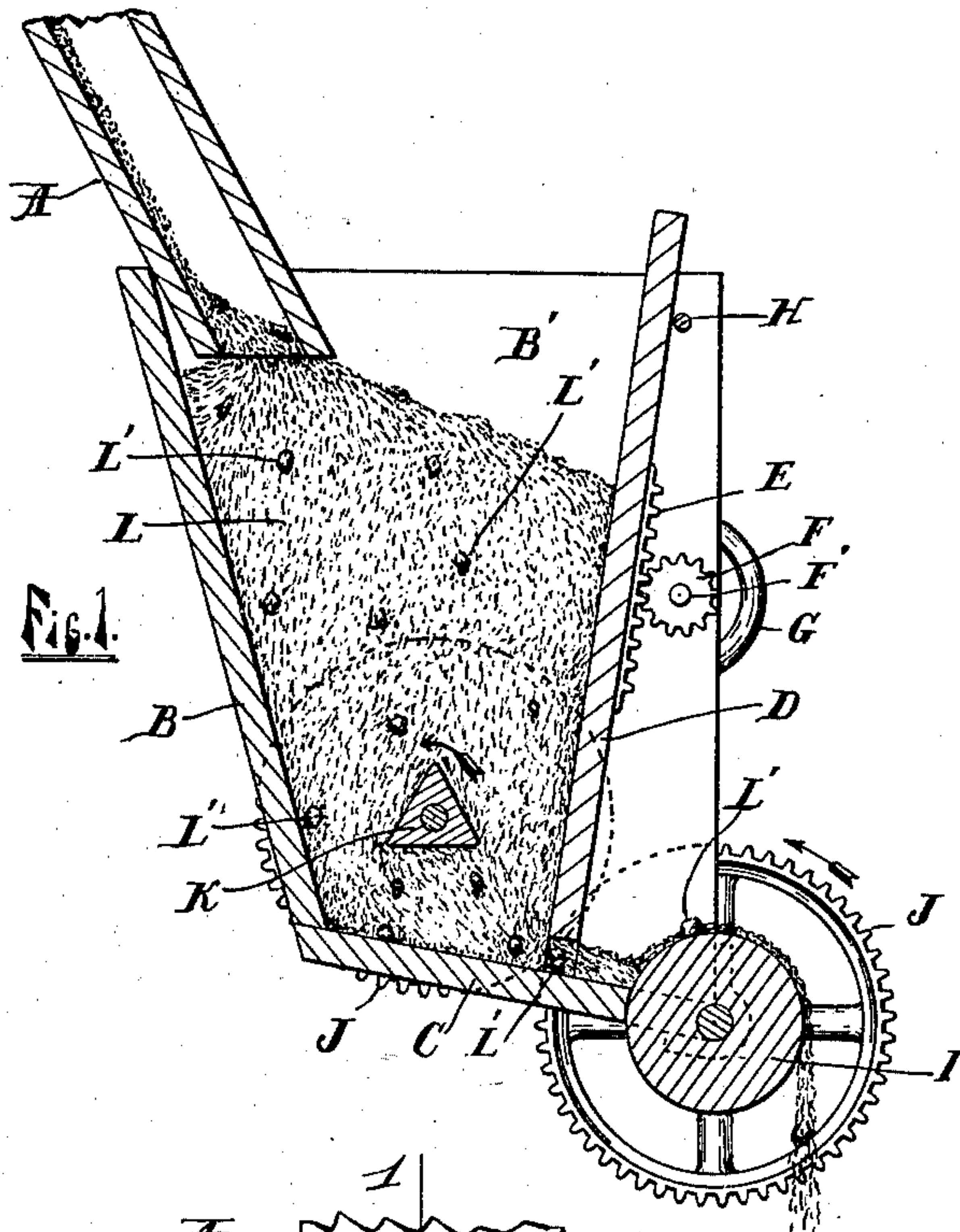
No. 663,902.

Patented Dec. 18, 1900.

J. HUTCHISON.
FEED REGULATOR.

(Application filed Feb. 17, 1898.)

(No Model.)



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN HUTCHISON, OF JACKSON, MICHIGAN.

FEED-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 663,902, dated December 18, 1900.

Application filed February 17, 1898. Serial No. 670,614. (No model.)

To all whom it may concern:

Be it known that I, JOHN HUTCHISON, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Feed-Regulators; 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.

My invention relates to improvements in feed-regulators adapted to be used in conjunction with grinding-mills and for various other purposes, and more particularly to that class in which the stock is delivered over a rotating roll commonly called a "feed-roll;" and its object, primarily, is to overcome the unevenness of feed and difficulty of regulating the same incidental to such structures as heretofore constructed; to provide a machine that will satisfactorily feed stock containing lumps or masses of matter thicker than the stream of stock passing over the feed-roll, and to adapt the device to feeding a great variety of stock heretofore found difficult or impossible to feed by such machinery. These previous devices consist of two distinct classes having two distinct modes of operation. In one of these classes, which may properly be called the "bucket-feed," the feed-roll is supplied with buckets or cavities adapted to contain a definite amount of stock. These will feed "lumpy" stock, but the feed is pulsating and uneven, due to the discharge of the contents of each bucket in succession, and the amount of feed is determined wholly by the speed of the feed-roll, thus requiring special means for changing the same. The other class have substantially smooth rolls and depend upon regulating the amount of feed by regulating the gate-opening to correspond to the thickness of the stream of stock passing over the feed-roll. In this class the feed-roll forms one side of the gate-opening. In all this latter class any lump or solid mass thicker than this thin stream of stock cannot pass the gate, and the gate-opening necessarily being very narrow it will easily clog. Therefore many kinds of stock cannot be fed at all by this class of devices. Yielding gates have been tried to permit lumps to pass, but such are unreliable, as they vary in opening

with the varying pressure of the stock and when momentarily opened wider by the passage of a lump suddenly discharging excess of stock. I overcome all these difficulties by a device having a totally different mode of operation from either of the foregoing classes of devices.

My device consists, essentially, of a feed-roll having a substantially smooth surface and rotating at an unchangeable speed, a plane surface extending some distance from this feed-roll to and beneath the hopper, over which plane surface the stock is pushed or crowded by a suitable angular or bucketed roll in the hopper, and a gate adjustable to and from said plane surface and located between the feed-roll and said angular roll and at a considerable distance from each, the distance of said gate from the plane surface, the feed-roll, and the angular roll being much greater than the thickness of the stream of stock flowing over the feed-roll, whereby no obstruction is presented to the passage of lumps of stock, no change of gate-opening induced by their passage, no change of speed required to change the feed, and the feed regulated solely by change of gate-opening, which latter is at all times much greater than the thickness of the stream of stock passing over the feed-roll and various kinds of material successfully fed, as will more fully appear by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of a device embodying my invention, taken on the line 1 1 of Fig. 2; Fig. 2, a front elevation of the same.

Like letters refer to like parts in both figures.

A represents any convenient spout to carry the stock to the hopper B, said hopper having forwardly-extended sides B' and an adjustable gate D, movable in grooves in the sides B' and clamped by a bolt H, passing through the same and provided with the thumb-nut H'. Said gate is independently adjusted at each end within certain limits by means of racks E on the gate engaged by pinions F, mounted on shafts F', journaled in bearing in the ends B' and operated by hand-wheels G.

C is the bottom of the hopper and forms the plane surface heretofore referred to, said

bottom extending beneath the hopper and also beneath the gate D, and thence outward a suitable distance beyond the same, where it abuts against the side of the feed-roll T, 5 said roll having its axis substantially in the plane of the bottom C. For feeding some kinds of stock said bottom is preferably inclined more or less; but this inclination is not very material.

10 K is an angular or chambered roll, the form of which is not very material, so that it is provided with projecting parts or angles that adapt it to carry or crowd the stock forward over the surface of the bottom C toward the 15 feed-roll I, for which purpose it must be rotated in the direction indicated by the adjacent arrow, the lower side turning toward said feed-roll, which latter is rotated in the direction of the other arrow and carries the 20 stock over by frictional contact therewith. To rotate said rolls, they are preferably connected by gears J J on their respective shafts, and one of said shafts is provided with a driving-pulley M to be engaged by a suitable belt.

25 The operation of my device, it will be observed, is wholly different from one having a bucketed feed-roll or from one having a smooth roll and a gate adjacent thereto, with the gate-opening no greater than the stream 30 of stock flowing over the roll. The angular roll K not only operates as an agitator to break up the stock and permit it to flow, but by virtue of its direction of rotation and projecting angle it sweeps or crowds the stock 35 forward over the surface of the bottom C and against the adjacent side of the feed-roll I, where it banks up to a greater or less depth, depending on the gate-opening, which opening is quite wide to accommodate the slowly- 40 moving mass between the rolls K and I instead of narrow, as necessary if it were adjusted to the thickness of the more rapidly-moving stream of stock passing over the roll, which latter roll, moving at all times at a uni- 45 form speed, but much faster than the flow between the rolls, thins out and accelerates the flow and carries over more or less, according as the stock comes to it in greater or less depth, which depth is wholly regulated by 50 the gate adjustment.

With freely-flowing material the angular roll K may be dispensed with and the inclination of the bottom C relied upon to induce the flow of stock against the feed-roll I. In 55 some cases a comparatively larger angular roll K or one of different form may be advan-

tageously used; but in every instance the operation peculiar to my device occurs—to wit, a slow flowing mass of stock over the plane surface of the bottom C, regulated in 60 depth by a comparatively wide gate-opening above and adjacent thereto and at a distance from the feed-roll, and the carrying over of the stock by frictional contact with the feed-roll in greater or less amount, dependent upon 65 the depth of this slow flowing stream and wholly unobstructed by any adjacent gate or other obstruction forming a narrow passage to stop any lumps that may pass through the wide gate or to clog the flow of stock over the 70 roll.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a hopper having a 75 bottom forming a plane surface extending outside the hopper, a gate adjustable toward and from the bottom and at a distance from the outer edge thereof, a substantially smooth feed-roll adjacent to the outer edge of the 80 bottom, and an angular roll in the hopper, rotating toward the feed-roll at its lower side, to cause the stock to flow forward over said bottom, substantially as described.

2. The combination of a hopper having a 85 vertically-adjustable side forming a gate, a bottom to said hopper forming an inclined plane surface extending beneath and beyond said adjustable side, a substantially smooth feed-roll adjacent to the outer edge of said 90 bottom, and rotating upward at the side toward the same, an angular roll in the hopper, and rotating toward the feed-roll at the under side substantially as described.

3. In a feed-regulator a smooth feed-roll, 95 and an angular roll at a distance from each other the feed-roll rotative upward at the side toward the angular roll and the angular roll rotating toward the feed-roll at its lower side, a plane surface abutting against the side of 100 this feed-roll in the plane of its axis and extending beneath, the angular roll, and a gate midway between said rolls and adjustable toward and from the said plane surface, substantially as described. 105

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

JOHN HUTCHISON.

Witnesses:

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