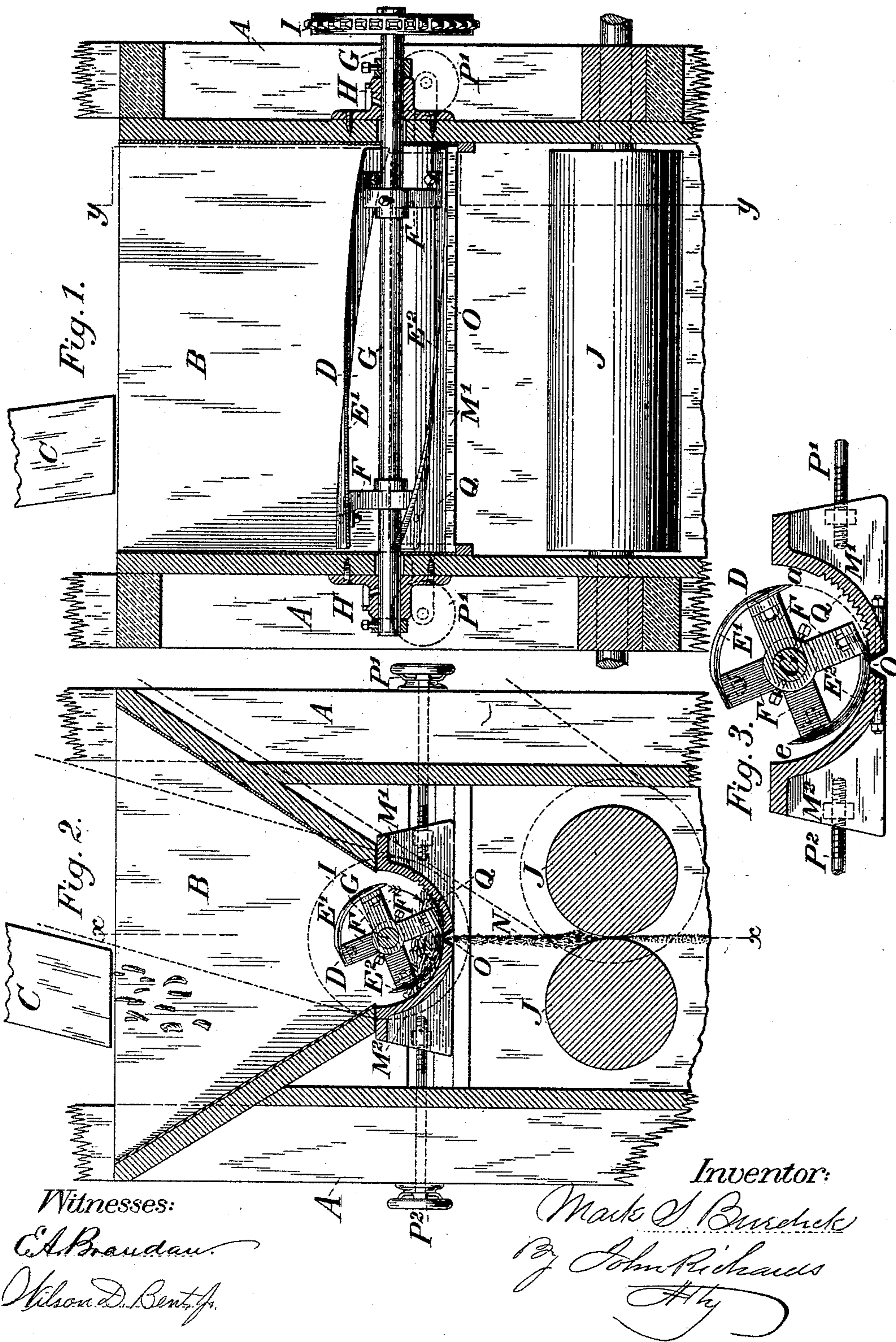


(No Model.)

M. S. BURDICK.
FEED APPARATUS.

No. 497,703.

Patented May 16, 1893.



UNITED STATES PATENT OFFICE.

MARK S. BURDICK, OF ALAMEDA, CALIFORNIA.

FEED APPARATUS.

SPECIFICATION forming part of Letters Patent No. 497,703, dated May 16, 1893.

Application filed January 3, 1893. Serial No. 457,123. (No model.)

To all whom it may concern:

Be it known that I, MARK S. BURDICK, a citizen of the United States, residing at Alameda, county of Alameda, and State of California, have invented certain new and useful Improvements in Feeding Apparatus for Grinding, Crushing, and Macerating Machinery; and I hereby declare the following description and drawings therewith to be a full, clear, and exact description of my improvements.

My invention relates to machinery such as is employed in grinding, crushing, and reducing various substances, such as coffee, spices, barks, herbs, that require to be ground or pulverized for commercial purposes, and for use.

The object of my invention is to secure a uniform supply of such substances to rollers or other reducing apparatus, and in the case of roller grinding to distribute the material uniformly throughout the length of the rollers, or the width of their faces.

My invention consists of a revolving cylinder, provided with helical shearing cutting edges; an adjustable throat, and concaves, as they are technically called, at each side of the shearing cylinder, so that various substances, whether of a granular or fibrous nature, can be selected, disintegrated, and fed through the throat at a uniform rate, and evenly distributed throughout the length of the cylinder and through the throat beneath.

Referring to the drawings herewith, and constituting a part of this specification—Figure 1 is a vertical longitudinal section on line $x-x$, Fig. 2, through one of my improved feeding devices, as it is applied to a roller grinding machine. Fig. 2 is a transverse vertical section through the same apparatus, on broken line $y-y$, Fig. 1. Fig. 3 is an enlarged detail in transverse section of the feeding cylinder and its connected parts.

Similar letters of reference on the different figures are employed to indicate corresponding parts thereof.

Referring now to the manner of constructing my improvements, and the method of their operation, it may first be pointed out that there is always great difficulty in attaining a uniform and even feed for grinding and pulverizing machinery that has to operate on various different substances. Such

machinery is commonly employed for various purposes, such as crushing and grinding coffee, pimento, cinnamon and other barks, also dried roots and herbs, so that the feeding mechanism employed must deal with these various substances or else be changed to suit grains, barks, roots or herbs. There is also in the case of grinding rollers, the difficulty of uniform distribution of the material lengthwise of the rollers, so that their action and the product will be of uniform fineness. These objects I attain with one feeding apparatus, as herein shown, in which—

A is a main supporting frame, and B a hopper in which the material is placed before being acted upon by the feeding apparatus. This hopper is fed from a spout C, by hand or in any manner most convenient, and contains a sufficient quantity to secure some pressure and a regular supply to the feeding cylinder D beneath. This feeding cylinder D I make preferably with helical, set knives or cutters $E' E^2$, preferably two in number, fastened at two or more points in their length to cross flanges F F, the latter keyed to a shaft G, mounted in bearings H H, as shown in Fig. 1. This shaft G is driven by any suitable gearing that will impart a positive movement to the shaft. In this case I have shown a pitched chain wheel I, to be connected to the guiding rollers J J, or other parts moving in connection therewith.

The knives E', E^2 , as may be seen, are set opposite in respect to their helical position for reasons that will be presently explained. Beneath these knives or cutters are two adjustable members $M' M^2$, technically called concaves, their curved faces set eccentric to the cylinder D, so as to form a tapering throat at the intake side, and a diverging throat or escape at the other side, as shown at a and e , Fig. 3. These concaves are moved outward or inward independently, by means of the screws $P' P^2$, as shown in Fig. 2, so that the throat O may be directly beneath the cylinder D, or to one side, as may be required. When these concaves $M' M^2$ are closed up at the center, the cylinder D sweeps around in close contact therewith, and none of the material escapes, but by moving the concaves back a throat O is opened, and the material N is forced through, as shown in Fig. 2, falling be-

tween the grinding rollers J J, or into any suitable grinding apparatus for pulverizing or reducing. I have shown in this case, rollers, because these are most commonly employed for such purposes. This adjustment of the concaves or throat members $M' M^2$, is an important function in my apparatus, because not only is the amount of material fed to the rolls regulated by the position and the size of the throat O between, but both being adjustable, the extreme edges at O can be set in such relation to the knives or cutters $E' E^2$ that the material can be sheared or cut to such extent as its nature may demand. If in the case of herbs it is necessary to cut the material into short sections, the concave M^2 is advanced accordingly, and the concave M' drawn back so as to open a sufficient throat at O. If coffee, pimento or grain of any kind is to be fed in, no cutting or shearing action is required, and the concave M^2 is drawn back by means of the screw P^2 , and the concave M' advanced by means of the screw P' , until a proper width of the throat O is secured in advance of the center of the cylinder D. It will be observed that the helical knives or cutters $E' E^2$ are set in reverse positions on the cylinder, that is, their helical course is right and left, the purpose being to avoid a conveying action toward the ends. With the cutters, arranged as herein shown, this conveying action is equal each way, securing an even distribution along and through the throat O. In the case of feeding herbs or bark it is found desirable to corrugate the face of the concave M' , as shown at Q, Figs. 2 and 3, so as to impart a rolling action to the material, and thus condense it for more effectual shearing and cutting when it comes to the throat O.

Having thus explained the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In feeding apparatus for grinding or pulverizing machinery, a revoluble cylinder provided with helically set knives or cutters, as herein described; eccentrically arranged concaves beneath the latter, adjustable so as to form a throat of varying size through which the material to be fed can pass to rollers, or other machinery for grinding or pulverizing, in the manner substantially and for the purposes specified.

2. In feeding apparatus for grinding and pulverizing machinery, a revoluble cylinder connected with and driven by the grinding

or pulverizing mechanism, provided with cutters or knives, as herein described; two concaves beneath the cylinder set eccentrically therewith, and independently adjustable, so that one of the concaves may be set to form a shearing edge in conjunction with the cutters or knives on the revolving cylinder, and the other concave adjusted to form a suitable throat or escape for the material, in the manner substantially and for the purposes described.

3. In feeding mechanism for grinding and pulverizing machinery, a revoluble cylinder provided with shearing knives or cutters set oppositely in respect to their helical position, so the shearing action will alternate from right to left; adjustable concaves set eccentrically beneath the cylinder, producing a shearing edge at one side opposed to the helical knives or cutters on the feeding cylinder; so herbs, bark or other material will be reduced and feed equally along the length of the cylinder and concaves, in the manner and for the purposes substantially as set forth.

4. In feeding mechanism for grinding or pulverizing machinery, a revoluble feeding cylinder, provided with helically and oppositely set cutters or knives, adjustable and eccentrically set concaves beneath, so as to produce a tapering inlet at one side, and an expanding inlet at the other side of the revolving cylinder; the concaves adjustable relatively, with respect to each other, and also in respect to the feeding cylinder, so there may or may not be a shearing action, as the nature of the material being fed may demand, in the manner substantially and for the purposes as specified.

5. In feeding mechanism for grinding or pulverizing machinery, the combination of a feeding cylinder, provided with helical and reversely set knives or cutters, two adjustable concaves or throat pieces, as herein described; adjusting screws for the concaves or throat pieces; a superimposed hopper, so arranged that a body of the material to be fed, will rest upon and be treated by the revolving feeding cylinder, in the manner substantially and for the purposes specified.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

MARK S. BURDICK.

Witnesses:

O. D. WHEELER,
ALFRED A. ENQUIST.