(No Model.) 2 Sheets—Sheet 1.

C. S. BELL.

MAGUEY CRUSHING MILL.

No. 595,137. Patented Dec. 7, 1897.

Fig. 1.

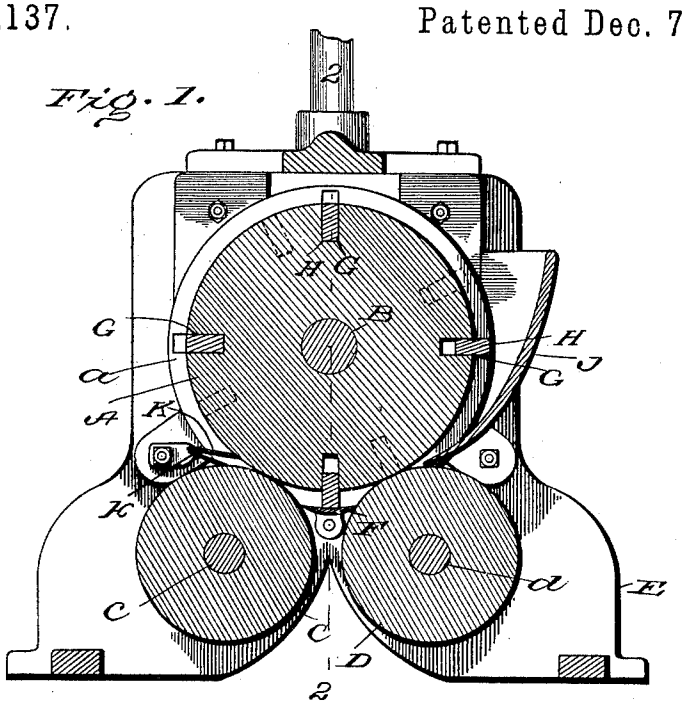
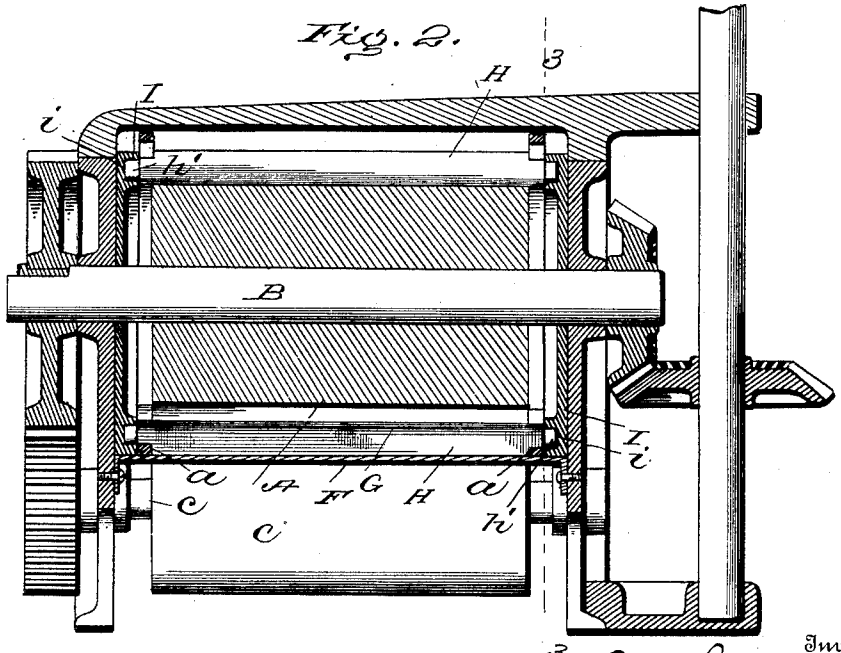


Fig. 2.



Witnesses

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

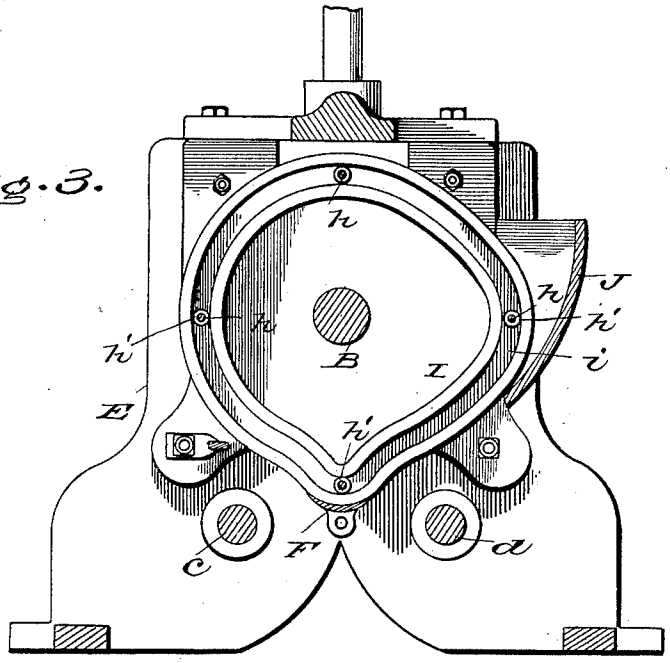
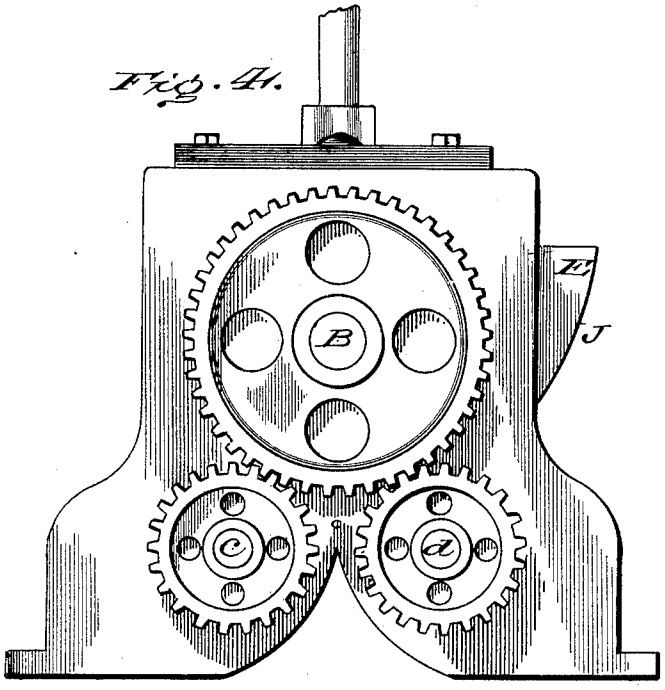


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES S. BELL, OF HILLSBOROUGH, OHIO.

MAGUEY-CRUSHING MILL.

SPECIFICATION forming part of Letters Patent No. 595,137, dated December 7, 1897.

Application filed July 29, 1897. Serial No. 646,380. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. BELL, of Hillsborough, in the county of Highland and State of Ohio, have invented certain new and useful Improvements in Maguey-Crushing Mills; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to machinery for crushing and separating the juice from the bagasse or refuse fiber of roots, fruits, vegetables, and like pulpy or fibrous materials, and is especially designed for use in reducing maguey-roots and like vegetable growths which by reason of their size and nature cannot be crushed by ordinary rolls and cane-mills because the rolls cannot acquire a sufficient bite or grasp on the material to draw it therebetween.

The maguey-plant is a product of the Republic of Mexico, and the roots, after being roasted or otherwise cooked by heat, yield a juice that is used after fermentation to produce a liquor similar to rum, called "mescal." For this class of material there has been no ready or economical means for separating the juice from the fiber. It has been customary to roll large stones over the roots confined in a circular pit, which was both wasteful and slow in operation. Sometimes rolls similar to the rolls of cane-mills have been used, but in this case the roots have to be cut in small slices and fed into the mill by hand, which was a very slow and very dangerous process; but my invention enables this class of materials to be reduced at once by the crushing-rolls; and my invention therefore consists, essentially, in providing one or more of the rolls with feeding means by which the maguey-roots, after being roasted or cooked, or like materials can be forced into the embrace of the rolls. The feeding devices move with the rolls, but are so arranged as not to interfere with the proper impingement of the peripheries of the rolls or their proper relative adjustment in relation to each other necessary for the proper crushing of the material therebetween.

The invention therefore consists in the novel means and combinations set forth in the claims appended hereunto, and the accompanying drawings illustrate a crushing-mill embodying my invention in the best form now known to me, although modifications and changes therein will readily suggest themselves and can be made within the scope of my invention, which I do not wish to limit to the particular form and construction of parts shown and described.

Referring to said drawings, Figure 1 is a vertical transverse sectional elevation of a mill embodying my invention especially designed for reducing maguey-roots. Fig. 2 is a longitudinal section on line 2 2, Fig. 1. Fig. 3 is a section on line 3 3, Fig. 2, showing one of the race-cams. Fig. 4 is an end view of the machine.

The mill, as shown, has a large crushing-roll A, mounted upon a central shaft B, which is suitably journaled in the end frames E E of the casing. Below roll A are two parallel rolls C D, mounted on shafts *c d*, respectively, also properly journaled upon the ends of the casing or on other suitable supports. Between the rolls C D and under roll A is arranged a shield or bridge F, over which material is passed from roll D to roll C. As shown, roll A has flanges *a a* on its ends, which assist in keeping material in position between the rolls A B A C and prevent it squeezing out at the ends of the rolls.

The roll A is not merely a crushing-roll, but is also a feeder, or, in short, it may be termed a "self-feeding" roll. For this purpose it is provided with one or more radial slots G in its periphery, in which slots are placed radially-movable blades H, which are adapted to project at the proper point to catch material and drag or force it to the crushing-points between rolls A D A C. These feed-blades are automatically projected and retracted, so that they will feed the material properly, but will withdraw out of the way when passing rolls C or D, and when retracted their edges may constitute part of the working surface of roll A. These feed-blades may be operated in any suitable manner, and any desired number may be employed. As shown, roll A has four such blades H, each of which is provided with pins *h* on its ends that project beyond the ends of the roll and carry friction-rollers *h'*, which run in race-camways *i* in castings I,

formed on or secured to the end frames, as indicated in the drawings. These race-camways are so formed that the blades will be fully projected as or before they enter the feed-hopper J of the machine and then will be gradually retracted as they approach the meeting-point of rolls A D and be out of the way as they pass roll D, and after passing roll D they will be again projected sufficiently to feed material lying on shield F to the rolls A C, but retracted again before reaching the meeting-point of said rolls.

The outer side and bottom of hopper J, as shown, is formed of a single plate which is curved inward toward roll A, so that its lower edge comes close to the peripheries of rolls A D. The hopper thus gradually narrows from top to bottom. It results, therefore, that as blade H forces material down the hopper the material is compressed both by the movement of the blade and by the narrowing of the hopper and is forced in between the rolls A A sufficiently to enable these rolls to bite and crush it. Further, as the material is compressed in the hopper and its resistance to the movement of blade H increases the blade is gradually retracted, so that while the material is forcibly fed down the area of the blade lessens as the hopper narrows, and thus the strains upon pins *h* and raceway *i* is lessened as the resistance to the blade increases.

The material crushed between rolls A D falls upon shield F and is then fed between rolls A C and further reduced or pressed. Any material adhering to rolls D can be removed by the edge of shield F, and any adhering to rolls C A can be removed by suitably disposing scrapers K *k*.

The rolls may be driven by suitable gearing, as in cane-mills.

The mill shown is especially well adapted for crushing the liquid juice from the magueyroots, which cannot be crushed in ordinary cane-mills by reason of their irregular shapes and sizes. The mill is also adapted for crushing sugar-cane and like stalks, although when operating on cane the feed-blades are practically needless. The invention, however, is principally designed for use in crushing large irregular vegetable growths which will not feed through ordinary crushing mills or rolls.

I am well aware that the idea of providing a rotary cylinder with radially-movable blades is old, *per se*, and that such rolls or cylinders have been employed in brick-machines, peat-machines, cider-presses, &c., but none of such cylinders or rolls was itself one of a pair or set of crushing-rolls coacting with it to reduce the material and in which the feed-blades constituted at times a working part of the periphery of the crushing-roll. I have therefore produced an entirely new machine adapted to new uses and accomplishing a result long sought for but heretofore unobtainable—to wit, the crushing of irregular vegetable growths, like maguey-roots, at one operation in a single mill.

The invention is adapted for either vertical mills or horizontal mills.

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

1. In a crushing-mill the combination of the main frame, the crushing-roll A journaled therein having radial slots in its periphery substantially as described, radially-movable blades in said slots having their ends projecting beyond the ends of the roll, and a hopper beside said roll; with a plain crushing-roll below the hopper coacting with roll A and stationary race-camways attached to the frame and adapted to engage the projecting ends of said blades so as to cause the latter to project in the hopper but retract when passing the plain roll, substantially as described.

2. In a crushing-mill the combination of a pair of crushing-rolls, a shield lying therebetween, a combined crushing and feeding roll overlying and contacting both of said rolls, having radial slots substantially as described; with feed-blades working in the slots of said roll and means for automatically projecting and retracting said blades so as to cause them to force material in the hopper to the first rolls, and to subsequently force material off the shield to the second rolls, but to withdraw out of the way in passing the lower rolls, substantially as and for the purpose described.

3. The combination of the rolls A, B, C, arranged substantially as described, the hopper J and the shield F, said roll A having two or more peripheral radial slots; with the feed-blades H in said slots projecting beyond the ends of roll A, and the stationary race-camways *i* engaged by friction-rollers on the projecting ends of said blades, 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.

CHARLES S. BELL.

Witnesses:
S. F. STEELE,
O. N. SAMS.