(No Model.)

# J. F. WINCHELL.

## CRUSHING AND GRINDING MILL.

No. 461,789. Patented Oct. 20, 1891.

Fig. 1

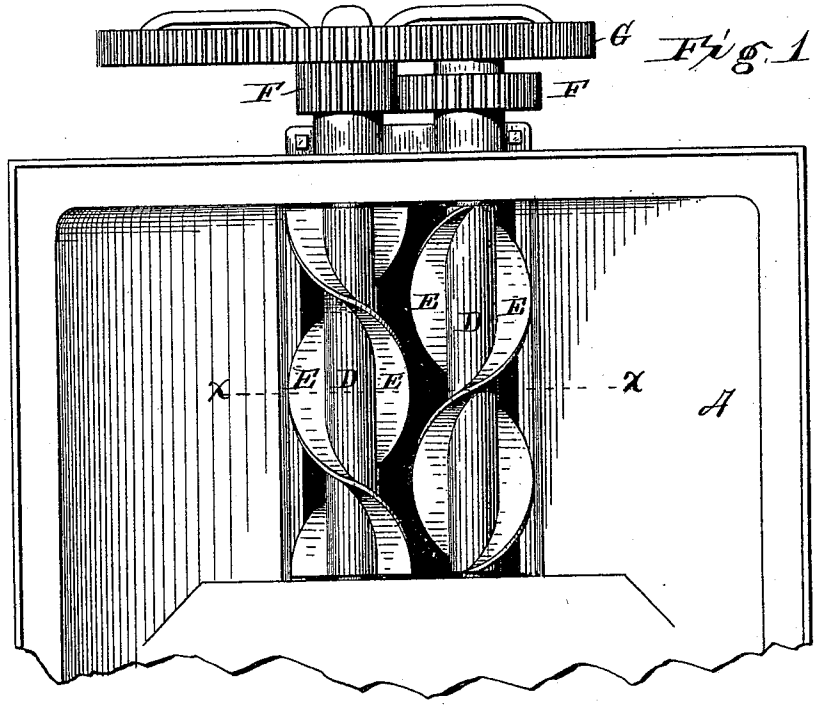
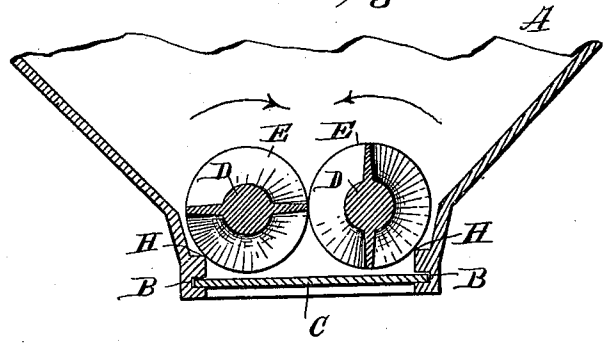



Fig. 2




WITNESSES

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# UNITED STATES PATENT OFFICE.

JAMES F. WINCHELL, OF SPRINGFIELD, OHIO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE FOOS MANUFACTURING COMPANY AND THE O. S. KELLY COMPANY, OF SAME PLACE.

## CRUSHING AND GRINDING MILL.

SPECIFICATION forming part of Letters Patent No. 461,789, dated October 20, 1891.

Original application filed April 2, 1888, Serial No. 269,294. Divided and this application filed April 1, 1889. Serial No. 305,592. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES F. WINCHELL, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Crushing and Grinding Mills, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in crushing and grinding mills for reducing corn-cobs with and without the corn and shuck on them, roots, bark, bones, cotton-seed and linseed meal cakes, and other substances, first to a broken state, secondly to a finer state, and lastly to a granular state. It is designed as an improvement upon the mill for which Letters Patent were issued March 15, 1887, No. 359,588, for crushing and grinding mills, to the Foos Manufacturing Company, of Springfield, Ohio, my assignee of that and the present invention.

The object of my present invention is to secure the proper partial reduction of the material fed into the hopper by the crushing, disintegrating, and cutting-like action of crushing and feeding mechanism having peripheral flanges, whether such flanges coact with each other or coact with a fixed part or parts of the mill, or both, as hereinafter more fully pointed out.

In the accompanying drawings, forming a part of this specification, and on which like reference-letters indicate corresponding parts, Figure 1 represents a plan view of the essential part of a hopper with my improved crushers mounted therein and suitable gearing applied thereto for conveying motion to the crushers, and Fig. 2 a sectional view of the hopper and crushers on the line *xx* of Fig. 1.

The letter A designates the upper portion of the hopper or the upper portion of the mill-casing, preferably of the type illustrated, and constructed with ways B, in which is fitted to slide a cut-off C for the purpose of regulating the quantity of material that may pass downward from the crushers to the lower mechanism of the mill, and for the further purpose of affording a rest or support, by which more or less of the material may be caught and subjected to the further action of the crushers after having been passed between them.

The letter D designates the crusher-shafts, upon which are cast or otherwise secured spiral flanges E of such pitch and other contour as may be preferred and according to the material to be acted upon and other conditions incident to the particular circumstances or classes of work. These shafts and flanges constitute what I term the "crushers." The shafts are mounted in suitable bearings in the hopper A or other suitable portion of the mill-casing and are provided with pinions F of equal or unequal diameter, preferably the latter. These pinions intermesh so that rotary motion imparted to either crusher-shaft will be thereby imparted to the other. One of the crusher-shafts is additionally provided with a gear-wheel G, which is designed to receive rotary motion from the main shaft of the mill when these improvements are mounted upon the latter.

In operation the material (as, for instance, corn-cobs, shelled or unshelled, and with or without the shucks) is thrown into the hopper and caught by the flanges E of the crushers as they rotate toward each other. This action serves to draw the cobs inward and downward to crush or disintegrate them and to cut and tear the shucks into fragments and short pieces of varying lengths, which mix up with the broken cobs and grain. This mass of material in this disintegrated state is fed by the flanges along the cut-off C and is forced or fed over the inner end of the cut-off, whence it descends to the lower part of the mill. The differential speed of the crushers when different-sized pinions F are used tend to produce more or less of a draw cut, which is very effective, particularly in the disintegration and chopping up of the shucks and other fibrous material. The spiral contour of the flanges also causes them to coact, irrespective of their relative speed, with a draw-cut action with the fixed parts of the mill,

as the ribs or cleats H. (More clearly seen in Fig. 2.) This action assists in the degree and rapidity with which the fibrous material is disintegrated and chopped up. This feature is particularly valuable in freeing the crushers of any fibrous parts, as strips of shuck which may lodge upon the flanges and tend to accumulate, for the fixed part or parts of the mill in proximity to which the flanges rotate oppose such pieces and cause them to be cut and stripped from the crushers.

The present application is a division of an application filed by me April 2, 1888, Serial No. 269,294, for crushing and grinding mills.

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

In a mill, the combination, with the upper portion of the casing or the hopper thereof, of two crushers mounted therein and each having spiral flanges which coact with each other when the crushers are rotated, a pinion on each crusher-shaft, said pinions being intergeared, a gear-wheel on one of said shafts, fixed part or parts of the mill in close proximity to said flanges, and a cut-off mounted in said casing beneath the crushers with which the flanges coact to feed the material, &c.

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

JAMES F. WINCHELL.

Witnesses:
WARREN HULL,
CHASE STEWART.