(No Model.)

J. F. WINCHELL.

CRUSHING AND GRINDING MILL.

No. 381,515. Patented Apr. 17, 1888.

Fig. 1.

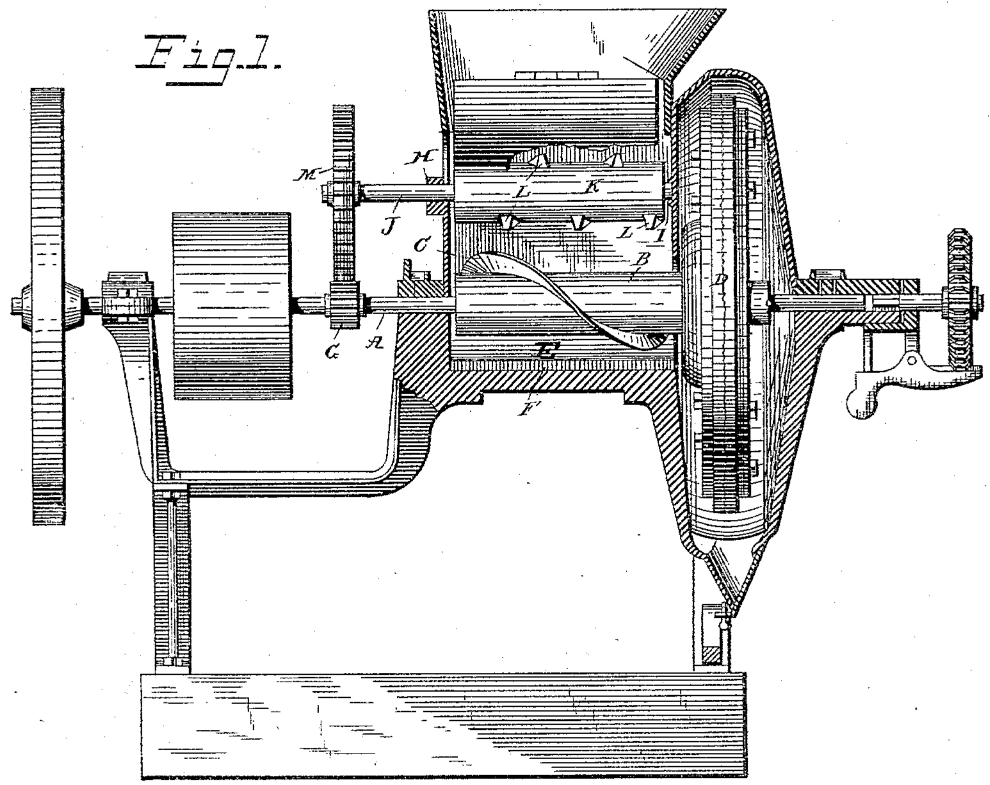


Fig. 2.

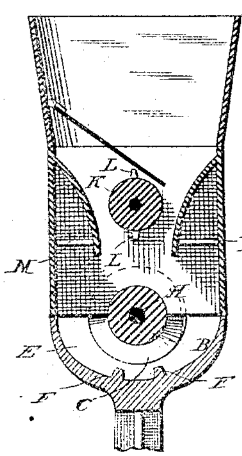


Fig. 4.

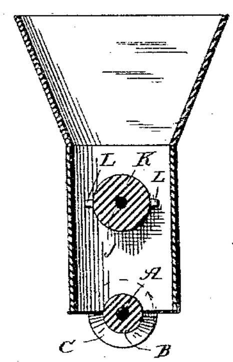


Fig. 5.

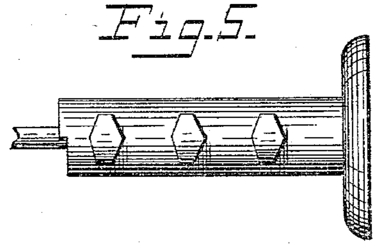
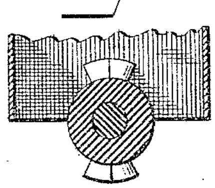


Fig. 3.



WITNESSES,

Edwin L. Bradford.

Chas. A. [illegible]

INVENTOR,

James F. Winchell

By [illegible]

his Attorneys

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JAMES F. WINCHELL, OF SPRINGFIELD, OHIO.

CRUSHING AND GRINDING MILL.

SPECIFICATION forming part of Letters Patent No. 381,515, dated April 17, 1888.

Original application filed November 16, 1885, Serial No. 182,953. Divided and this application filed September 21, 1886. Serial No. 214,176. (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, roots, bark, and bones and like substances first to a broken state and, secondly, to a granular or finer state; and this application is intended as a division of the application filed by me November 16, 1885, Serial No. 182,953, in which two crushers are mounted above a conveyer.

In the accompanying drawings, forming a part of this specification, and on which similar letters of reference indicate the same or corresponding features, Figure 1 represents a vertical sectional view of a grinding-mill substantially of the character which is the subject of the patent to which reference will hereinafter be made, this view showing my improvements applied to such a mill; Fig. 2, a transverse sectional view of Fig. 1; Fig. 3, a like view showing a modified form of conveyer; Fig. 4, a like view to Fig. 2, showing the walls proper of the upper portion of the casing narrowed together to permit the crusher to act; and Fig. 5, a side elevation of the form of crusher shown in Fig. 3.

The machine illustrated in Fig. 1 is of the same type and character as that upon which Letters Patent issued to me on the 18th day of May, 1886, and numbered 342,311, for improvements in crushing and grinding mills, when that machine is arranged for the purpose of crushing, as explained in said patent.

The letter A in the accompanying drawings refers to the main shaft of the machine, on which is secured rigidly a roller or cylinder, B. This cylinder is constructed with a conveyer-flange or worm, C, the function of which is that of feeding the crushed material to the grinding plates or disks D, as also that of further crushing or reducing the material as it comes from the crusher, to which reference will presently be made.

The letter E designates the crushing and conveying chamber, in which the conveyer is mounted, and which is provided with one or more ribs, F. The distance between the flanges or periphery of the conveyer and these ribs is less than the distance between the flanges or periphery of the conveyer and of the side walls of the chamber. The result of this construction is to cause the conveyer to more readily draw the material to the lower part of the chamber and to further crush the same, the presence of the ribs assisting in effecting this latter result.

The shaft A carries a pinion, G, the use of which will shortly appear.

In bearings in the upper portion of the casing of the mill, as at H and I, I mount a shaft, J, upon which is secured a crusher, K, in any convenient manner. The crusher is of roller form, and is provided with a number of crushing protuberances, L.

The shaft J carries a gear-wheel, M, which intergears with the pinion G, whereby rotary motion is imparted to the crusher. The disparity in the diameter of the gear and pinion effects a corresponding difference in the speed of rotation of the conveyer and grinding-plates from the speed of the crusher.

The less speed of the crusher gives it more power and prevents it from crushing more material than the grinders could act upon.

The hopper and flap alluded to in my said Letters Patent may be employed in the present instance, and the hopper mounted upon the upper portion of the casing. The flap, however, may be omitted.

As represented in Fig. 2, the interior of the upper portion of the casing is provided with walls which are extended inwardly and strengthened by braces M, and serve to contract the inner transverse dimension of the casing along the sides of the crusher, so as to form a surface against which the crusher acts upon the cobs or other material.

As illustrated in Fig. 4, the casing is made sufficiently narrow for the crusher, and hence any further contraction is unnecessary, the gist of the matter being that there shall be walls sufficiently near the crusher to enable it to act properly.

The term "conveyer" will be understood in this specification to mean not only a conveyer,

but a conveyer capable of crushing to some extent.

When the conveyer is provided with lugs, its crushing capacity is increased, and may even become its conspicuous function, according to the particular material, for instance, upon which it is acting.

It is obvious that the crusher must act to agitate the material and facilitate its feed to a considerable extent, as well as to crush. It is also observable that the grinding protuberances in a certain sense form projections extending from the shaft J, inasmuch as these protuberances are a part of the crusher and the crusher is securely mounted upon the shaft. In practice these protuberances or projections from the shaft may be varied in length, and it should be stated that the longer they are the more they act in the capacity of agitating the material and the less their crushing function comes into play.

I hereby disclaim the combination, with grinders and a moving conveyer, of two crushers mounted above the conveyer and having crushing protuberances, the same forming the subject-matter of the application hereinbefore alluded to.

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

1. In a mill, the combination, with grinding-disks, a moving conveyer having also the capacity of crushing, and a chamber in which said conveyer operates, of a crusher mounted between the supply of the material and the said conveyer and geared to rotate at a less speed than the conveyer.

2. In a mill, the combination, with the main shaft, the grinding-disks mounted thereon, a moving conveyer having also the capacity of crushing and mounted upon the said main shaft, and a chamber in which said conveyer operates, of the crusher mounted above the conveyer and having protuberances and geared with the said main or conveyer shaft and rotating at less speed than the same.

3. In a mill, the combination, with a moving conveyer having also the capacity of crushing and a chamber in which the conveyer operates, of a rotating crusher having protuberances and mounted above the conveyer geared thereto and rotating at a lower speed than the same.

4. In a mill, the combination, with the grinding-disks, a moving conveyer having also the capacity of crushing, and a chamber in which the conveyer operates, of a shaft mounted between the supply of the material and the said conveyer and having projections, and means to actuate the said shaft.

5. In a mill, the combination, with the grinding-disks and a moving conveying-crusher operating, substantially as described, to crush as well as convey, and a chamber in which the conveying-crusher operates, of the upper portion of the mill and a shaft mounted therein and between the supply of the material and said conveying-crusher, and having projections operating, substantially as described, to agitate the material, and means to actuate the said shaft.

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

JAMES F. WINCHELL.

Witnesses:
EDWIN L. BRADFORD,
M. P. CALLAN.