(No Model.)

J. F. WINCHELL.

CRUSHING AND GRINDING MILL.

No. 342,158. Patented May 18, 1886.

Fig. 1.

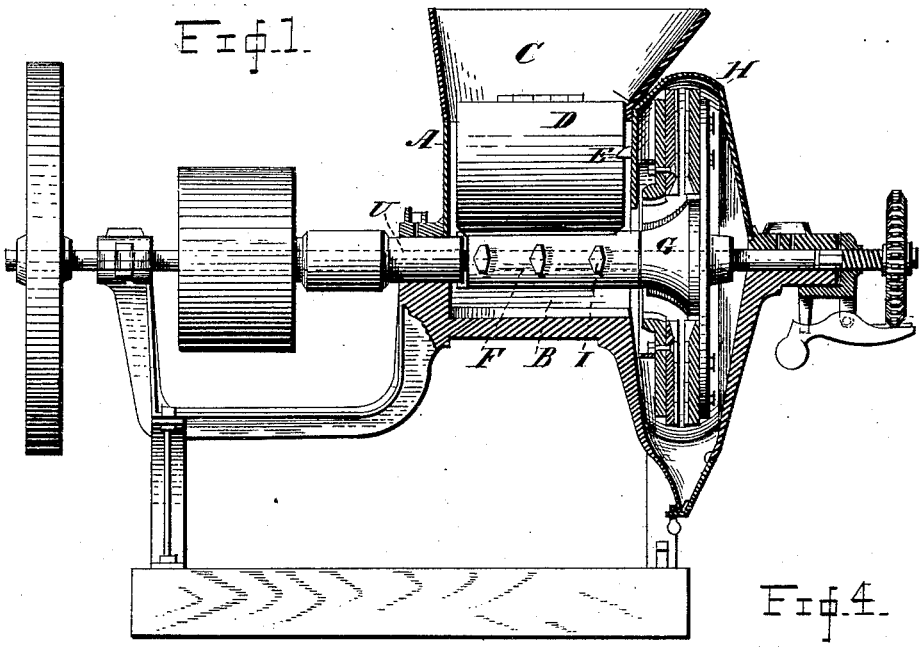

Fig. 4.

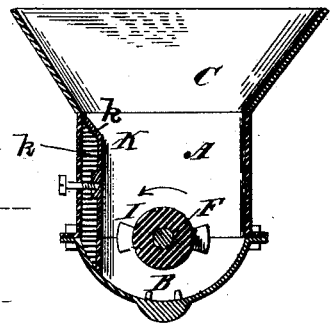

Fig. 2.

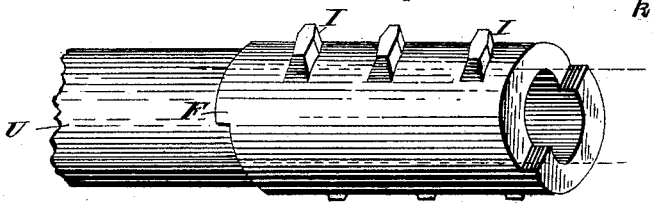

Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

JAMES F. WINCHELL, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE FOOS MANUFACTURING COMPANY, OF SAME PLACE.

CRUSHING AND GRINDING MILL.

SPECIFICATION forming part of Letters Patent No. 342,158, dated May 18, 1886.

Application filed February 27, 1886. Serial No. 193,464. (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 improvements in crushing and grinding mills, and is designed to reduce corn-cobs, (with and without the grain upon them,) bark, bones, and roots, and other substances first to a broken or coarse state, and then to such finer state as may be desired, and it has for its object to combine a reversible crusher having peripheral projections with a crushing-chamber and a suitably-constructed hopper for preventing the escape of the material from the crusher.

In the accompanying drawings, forming a part of this specification, and on which like reference-letters indicate corresponding parts and features, Figure 1 represents a vertical sectional view of the casing generally of the machine, showing a portion of the mechanism in section and a portion in side elevation; Fig. 2, a detached perspective view of the crusher; Fig. 3, a view of one of the lugs alone; and Fig. 4, a transverse section of the crusher and chamber.

The construction and arrangement of the frame, the casing, the main shaft, and the grinding heads and plates, as also the adjusting mechanism for the shaft, are the same in the present case as in my application filed November 9, 1885, Serial No. 182,241, for improvements in grinding-mills, and in my application filed January 25, 1886, Serial No. 189,679, for improvements in hulling-mills, in the former of which said parts are fully described. These features, however, may be varied at pleasure, and some other form of frame and grinding mechanism adopted. Therefore a minute description of the machine generally, exclusive of the features peculiar to the organization necessary to crush material, is superfluous in this place. Furthermore, the machine generally is used interchangeably with the devices peculiar to crushing comparatively large substances, the devices peculiar to grinding cereals, and the devices peculiar to hulling seed.

The present novelty, then, consists in the devices peculiar to the machine when organized for crushing purposes, and in said devices in their combined relation with the remainder of the machine. A part of the upper portion of the casing envelops the grinding mechanism, and the other part, A, constitutes a box, which fits over and conducts the corn-cobs, bones, bark, &c., to the crushing-chamber B. Upon the part A of the casing is fitted and secured, in the manner described in my said application filed November 9, 1885, a hopper, C, which supplies the material or substances to be acted upon. This hopper is provided with a hinged flap, D, which serves the purpose of preventing the particles of broken bones, or bark, or corn-cobs, (and the grain, when the cobs are ground with the grain on them,) from being thrown up by the crusher at the side opposite to the one at which they are fed into the crushing-chamber B, the flap being dropped down partly over the crusher and prevented from flying up by the lug E projecting from the casing A.

The letter F designates the crusher, constructed preferably of cast-iron and of cylindrical form, and mounted upon the main shaft of the machine, and having both ends offset and adapted to register or clutch, respectively, with the face of the boss G of the rotating grinding-head H. The exterior of the crusher is provided with a series or number of lugs, I, cast integrally or otherwise, secured thereto, whose sides are fashioned each into two surfaces. The angle of said surfaces to each other, on one side, is slight, while the angle of the surfaces to each other on the other side is increased, the result of which is to crush the material with more or less rapidity and to feed it from the chamber into the space between the grinding-surfaces more or less rapidly, according to the position in which the crusher is placed. When the greater angle of the lugs is placed toward the boss, increased crushing and feeding take place, and

when the lesser angle is placed toward the said boss slower crushing and feeding are produced. This change in placing of the crusher is what I term the "reversibility" of the crusher, and this reversibility and the different angularity of the sides of the lugs are the features which produce the difference in the rapidity of the reduction of the material and the feeding thereof.

The object in varying the rapidity in crushing and feeding is to supply the grinding mechanism only so fast as it can grind. For instance, wet cobs grind more slowly than dry ones, and therefore wet cobs must be crushed more slowly than dry ones, to avoid choking the grinders. The same remarks apply to other substances which grind more or less easily. Also, mounted upon the main shaft of the machine is a sleeve, U, having a bearing in the main frame. This sleeve has its end adjacent to the crusher provided with an offset adapted to register with that in the ends of the crusher, whereby the reversibility of the crusher is not interfered with, (and whereby rotary motion imparted to the crusher by the rotating grinding-head will rotate the sleeve.)

In order to reduce the size of the chamber, so as to crush cobs or substances somewhat smaller than the average cob, I provide a plate, K, preferably of cast-iron, having ribs *k* across the top and sides, which stand against the inner wall of the chamber, and present the plate opposite the crusher. The plate is held in place in any convenient manner, and a cheap plan is by a screw extending through the wall of the chamber and entering a threaded hole in a boss on the plate.

In some instances it is found that the flap in the hopper may be dispensed with—that is, it may be raised up and thrown back and not used. Such is the case when crushing material of such size and shape that it will not unite and arch over the crusher, as coke, when not more than four or five inches in any direction, or when grinding apples for making cider. In such cases the hopper is required to be well filled, however, to prevent the material from being thrown out by the upcoming lugs of the crusher.

I learn through the trade that the best results are obtained in crushing and grinding crackers when the flap is thrown back. No change whatever is required to be made in the hopper, however, when the flap is thrown back.

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

1. In a crushing and grinding mill, the combination, with a crushing-chamber, and the reversible crusher having peripheral projections adapted to feed more or less rapidly, according to the position of the crusher, of the hopper constructed and mounted to discharge cobs, &c., upon the crusher, and to prevent the cobs, &c., from being thrown from the chamber.

2. In a crushing-mill, the combination, with a crushing-chamber and a reversible crusher having lugs with angular sides, the angle of one side being greater than that of the other, of a hopper mounted to discharge cobs upon the crusher, and provided with a flap to prevent the cobs from being thrown up.

3. In a crushing and grinding mill, the combination, with a crushing-chamber, and a reversible crusher having offset ends and lugs with angular sides, the angle of one side being greater than that of the other, of a shaft, a sleeve, and a grinding-head mounted on said shaft, the head having an offset corresponding with the offsets of the crusher, another grinding-head to act with the head on the shaft, and a hopper mounted to discharge the cobs, &c. upon the crusher, and provided with a flap to prevent the cobs from being thrown up.

4. In a crushing-mill, the combination, with a frame having a casing and a crushing-chamber, and grinders, and a shaft having a sleeve, of a hopper having a flap, and mounted over said chamber, and a reversible crusher having offset ends adapted to register with one of the grinders and with the sleeve, and provided with angular lugs, the angle of one side being greater than that of the other.

5. In a crushing-mill, the combination, with the crusher and its chamber, of a detachable plate fitted within the chamber, and adapted to lessen the space between the wall of the chamber and the crusher.

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

JAMES F. WINCHELL.

Witnesses:

A. A. YEATMAN,

CHASE STEWART.