(No Model.)

J. F. WINCHELL.

HOPPER FOR GRINDING MILLS.

No. 355,740. Patented Jan. 11, 1887.

Fig. 1.

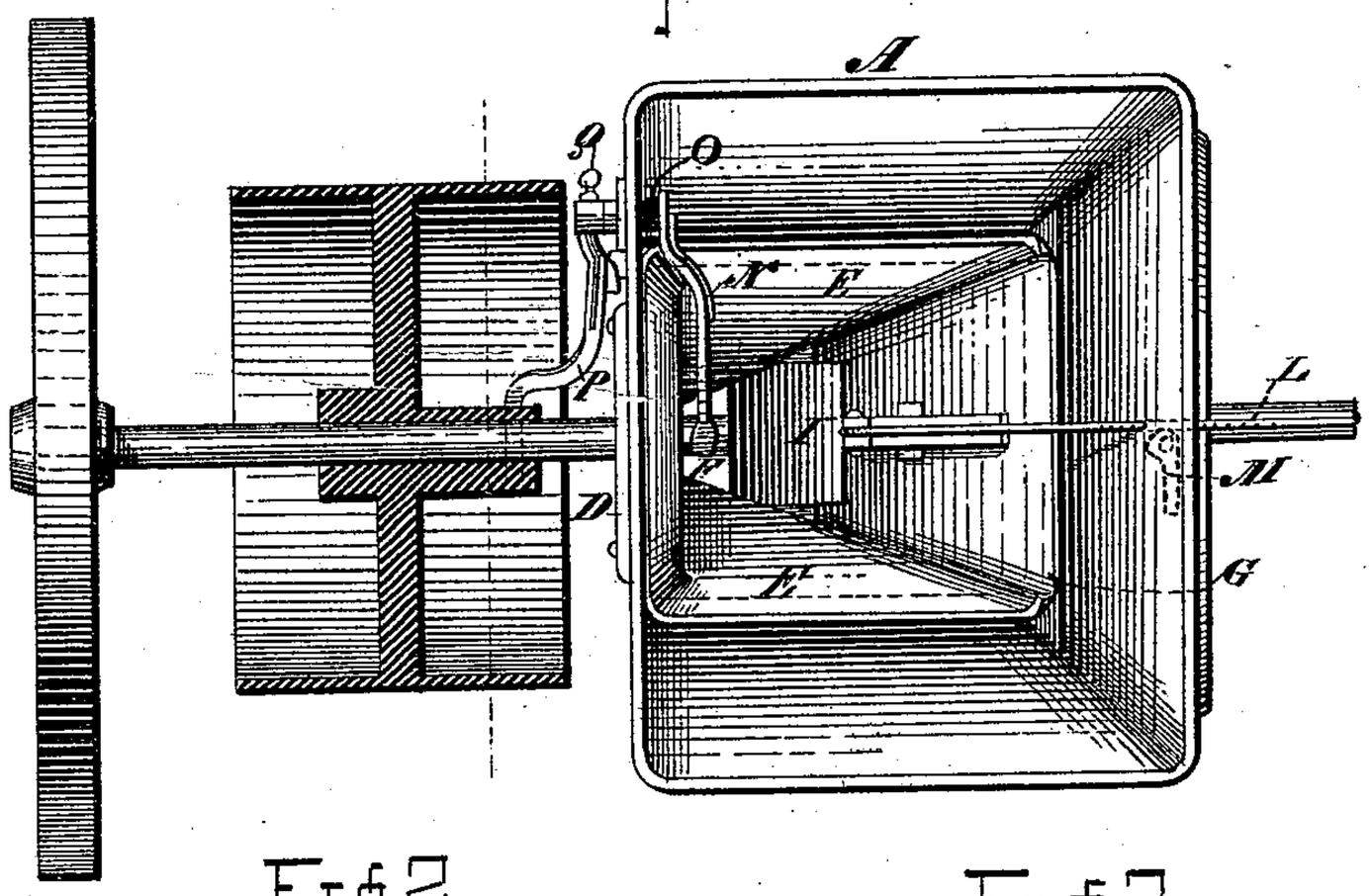


Fig. 2.

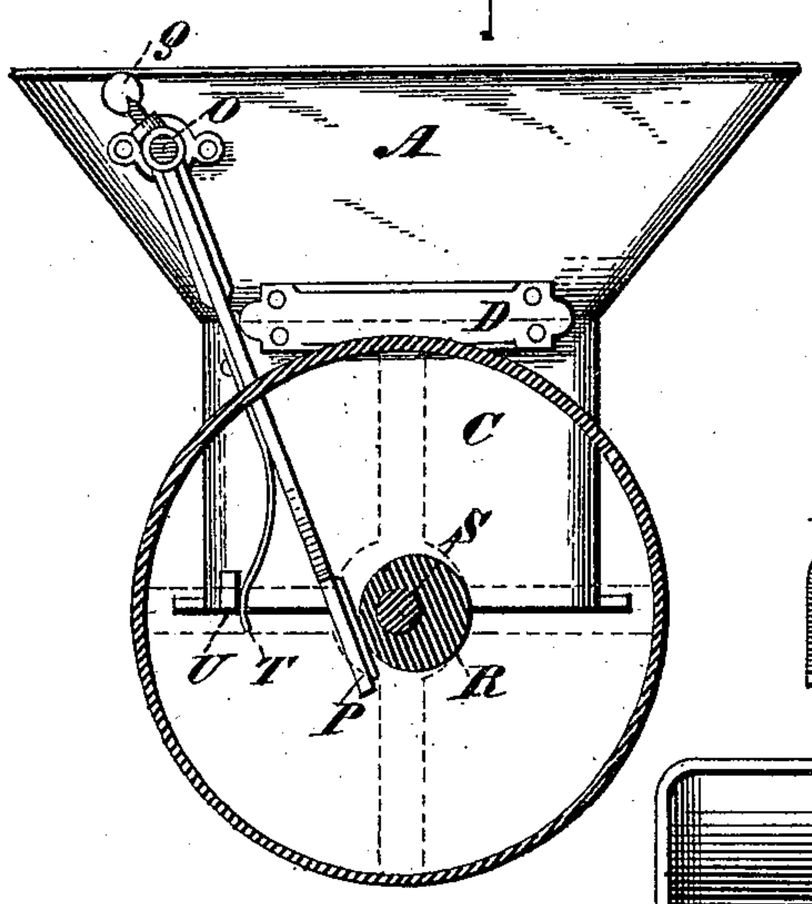


Fig. 3.

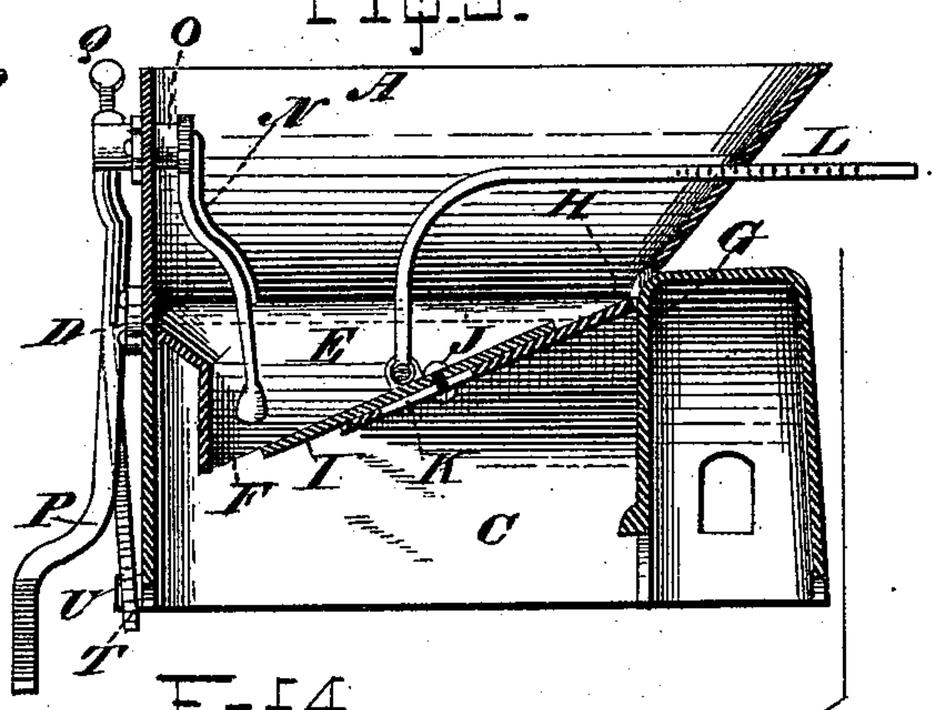
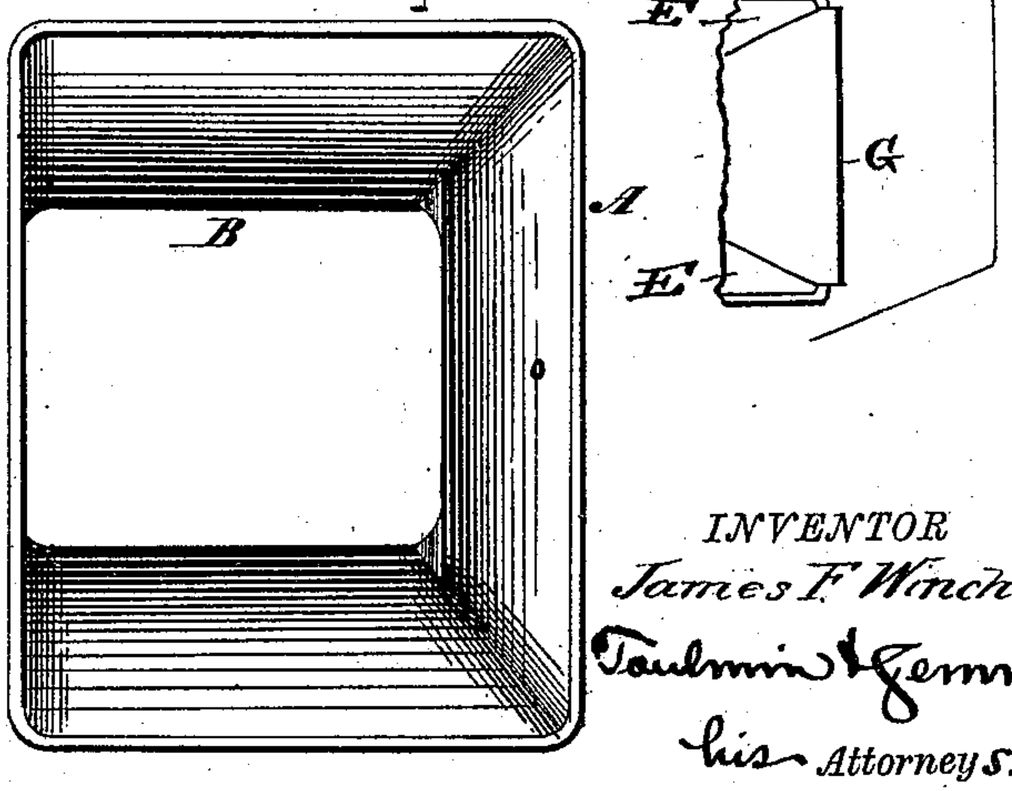


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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HOPPER FOR GRINDING-MILLS.

SPECIFICATION forming part of Letters Patent No. 355,740, dated January 11, 1887.

Application filed February 1, 1886. Serial No. 190,531. (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 Hoppers for 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 hoppers for grinding-mills.

In hoppers as ordinarily constructed, with an opening or throat of considerable size, across which a plate or slide is adapted to be adjusted, so as to vary the size of the opening, a practical difficulty arises in the use thereof. For instance, when it is desired to feed material of considerable bulk—as corncobs—the slide is drawn out to increase the size of the opening, and when it is desired to feed smaller material—as the different cereals—the slide is pushed in and the size of the opening reduced, leaving a narrow throat across the entire or a portion of the width of opening at the bottom of the hopper, and presenting a flat surface constituted by the slide, upon which a large proportion of the material rests. Should the material, as frequently happens, be somewhat damp, it is found to pack in the hopper and to arch over the narrow throat, causing a spasmodic and irregular feeding of the material, sometimes failing to supply the grinding mechanism with as much material as it can act upon, and sometimes supplying it with more than it can act upon. The former causes loss of time and the latter a choking or straining of the mill.

My invention is to overcome these difficulties, as hereinafter 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 my improved hopper and agitating mechanism, showing the main shaft, the balance-wheel, and belt-pulley, the latter in section, of a grinding-mill; Fig. 2, an end elevation of the hopper, a portion of the mill-casing, and the agitating mechanism, showing the shaft, the operating eccentric, and the belt-pulley in transverse section; Fig. 3, a vertical sectional view of the hopper and the upper casing of the mill, showing the agitating mechanism in side view; and Fig. 4, a plan view of the hopper proper, with the supplemental hopper removed.

The letter A designates the hopper proper, constructed, preferably, of cast-iron, and having some or all of its walls inclined, so as to cause the material to properly settle when fed into it. An opening or throat, B, considerably smaller than the mouth of the hopper, is formed at the bottom thereof, but of about the size of the opening in that part of the mill upon which the hopper is mounted. In the present instance the casing C is the same or substantially the same as that shown and described in my application for Letters Patent for improvements in grinding-mills, filed November 9, 1885, Serial No. 182,241. This hopper may be secured in place in any convenient manner, as by one or more plates, D, bolted or riveted to the casing C and to the hopper itself. As thus described, the hopper is adapted to feed corncobs, bones, bark, and other comparatively large substances to the reducing mechanism—such, for instance, as that described in my said application.

The letter E designates the supplemental hopper, constructed, preferably, also of cast-iron, and with its walls inclined, so as to form a tapering and shallow receptacle having an opening, F, in the bottom thereof, and preferably near one end or side, yet also forming a substantial continuation of the walls of the hopper proper. A portion of one of the walls of the supplemental hopper is vertical; but this may be varied to an inclination, if desired. The opening F constitutes a throat, which, as shown, is considerably smaller than the throat of the hopper proper.

The upper edge or circumference of the supplemental hopper is slightly larger than the opening B, and therefore, when dropped into the hopper A, seats itself well down into it, but cannot pass through, the sides of the supplemental hopper lapping over the adjacent portions of the hopper proper. and serving to support the supplemental hopper. By preference, the edge G of the inner hopper sets under the edge H of the hopper proper, the edge G being projected slightly for this purpose, as seen in

small view under Fig. 3. Furthermore, the edge G and the opposite end of the supplemental hopper bind somewhat against the adjacent portions of the hopper proper, which binding additionally acts in sustaining the supplemental hopper.

A slide, I, is mounted in the hopper E, its lower corners projecting more or less under the side walls of the hopper, as seen in Fig. 1, whereby that end is guided, while a bolt, J, passing through a slot, K, in what may be termed the "bottom" of the hopper E, is also employed to act as a guide. This slide is designed to be adjusted back and forth, so as to vary the size of the opening, to regulate the quantity of material fed through it, and is held in any set position by a rod, L, attached to it and passing through a wall of the hopper A, a pivoted latch, M, (shown in dotted lines in Fig. 1,) being used to engage serrations in the rod. Of course this is only one of many ways of adjusting and holding the slide. Others may be adopted.

It will be noticed that the walls about the aperture F are not only inclined, (or one of them vertical,) but the slide is also inclined, the result of which is, that the material will not stick and arch, as above noted, but will uniformly pass through the opening. Thus it will also be observed that with this hopper comparatively large material as well as the finest grades may be fed to the grinding mechanism, and yet the cost of production is little, if any, more than the cost of the ordinary old hopper with the slide, as alluded to in the beginning of the specification.

In order to cause a more rapid feeding of the material, no matter what its condition, whether dry or damp, I provide an agitating mechanism consisting of an agitating-arm, N, which extends down over the opening F and has a lateral projection, O, which extends through a bearing formed in the wall of the hopper, and carries a detachable actuating-lever, P, held by a set-screw, Q, and adapted to engage at its lower end with an eccentric, R, mounted on the main shaft S of the mill. This lever is provided with a spring, T, which serves to maintain its engagement with the eccentric and causes the lever to vibrate in both directions, a lug, U, being provided at some convenient point, against which the spring acts. By these means the agitating-arm is given a rapid oscillating motion to and fro over the opening F, stirring the material and causing it to rapidly pass through that opening.

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

1. The combination, with a hopper proper having inclined walls and a throat in the bottom thereof, of a tapering supplemental hopper having a smaller throat and fitted to the throat of the hopper proper, depending therefrom and forming a continuation of the walls of said hopper and acting to reduce the throat thereof, a cut-off or slide to regulate the size of the throat of the supplemental hopper, and agitating mechanism which operates above the opening in the supplemental hopper and stirs the material to cause it to feed with increased rapidity, and means to actuate said agitating mechanism.

2. The combination, with the hopper proper having a throat and a supplemental hopper fitted within and depending from said throat, and having itself a throat and an adjustable slide, of an agitating-arm extending into the supplemental hopper, a lateral projection and a bearing, a lever mounted on said projection, a spring to actuate said lever in one direction, and a mill-shaft provided with an eccentric to actuate it in the other direction.

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

JAMES F. WINCHELL.

Witnesses:

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