2 Sheets—Sheet 1.

A. VOELK.

Grinding Mill.

No. 231,512. Patented Aug. 24, 1880.

FIG. 1.

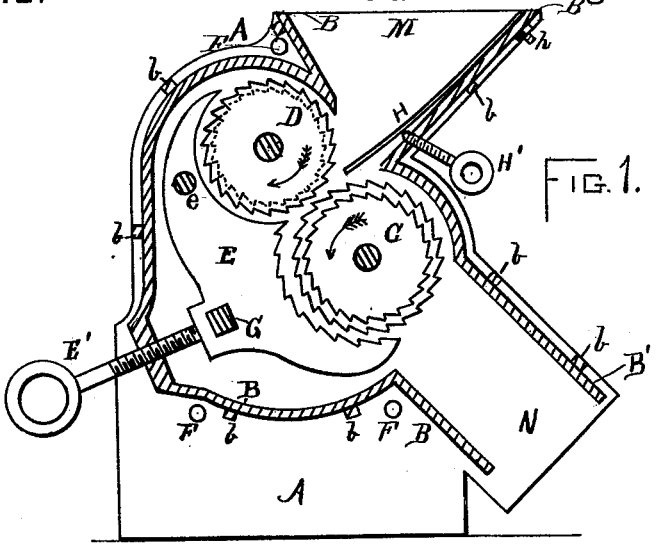


FIG. 2.

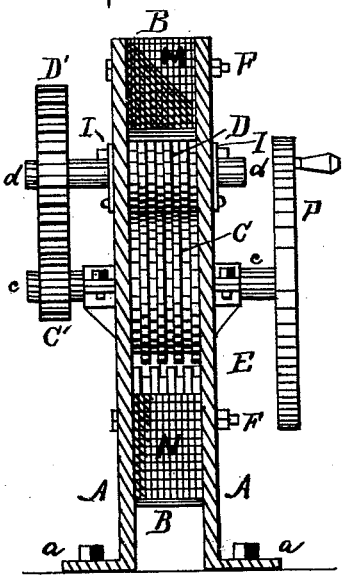
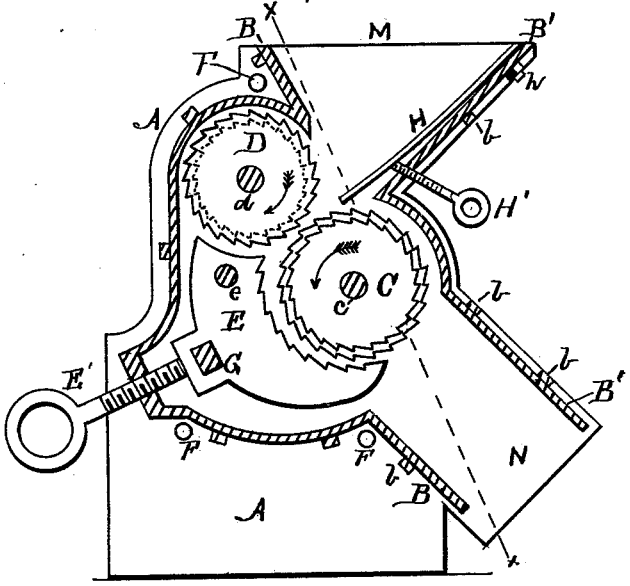


FIG. 3.



WITNESSES

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INVENTOR

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ATTY

2 Sheets—Sheet 2.

A. VOELK.

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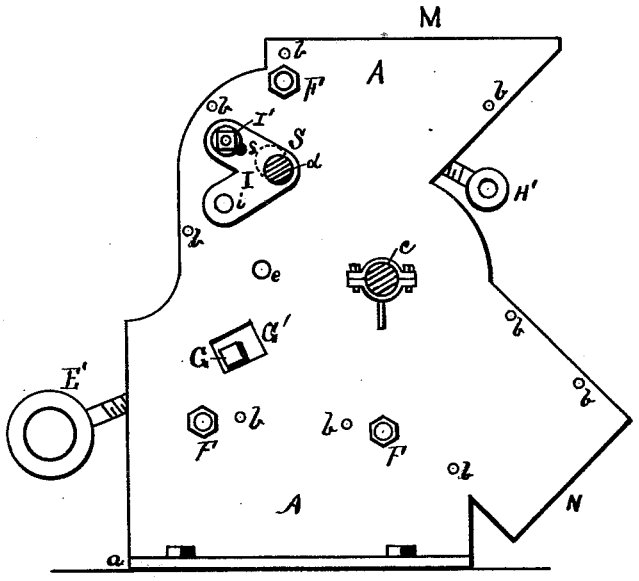

FIG. 4

Witnesses

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UNITED STATES PATENT OFFICE.

ANDREW VOELK, OF ERIE, PENNSYLVANIA.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 231,512, dated August 24, 1880.

Application filed February 11, 1880.

To all whom it may concern:

Be it known that I, ANDREW VOELK, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Grinding-Mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention consists in providing a new and improved grinding-mill for grinding grain, corn and cob feed, or bones, plaster, &c.

My mill is not intended to be used for grinding grain for flour, but for coarse grinding, such as oatmeal, cracked wheat, and feed for cattle and horses. It may also be used for grinding coffee and spices.

The grinding apparatus of my mill consists in two burrs and a concave grinding-surface, upon which one of the burrs operates. The same part which forms this concave also extends partly around the other burr, and therefore has the appearance of a double concave; but the second concave only serves to prevent the article being ground from following the other burr. The grinding is done between the two burrs and between one of the burrs and one of the concaves. The concave surface, however, may be omitted for some kinds of work, as the two burrs are sufficient.

The construction and operation of my device will fully appear in the following general description.

The drawings represent my invention as follows: Figures 1 and 3 are side elevations of the works with the frame or case in vertical section. Fig. 2 is an end view with the frame in section on the line *x x* in Fig. 3, the works being in elevation. Fig. 4 is a plane side elevation with the gearing removed.

A A are the side plates of the frame or case, and B B′ are webs connecting the side plates and forming the remainder of the case. These webs are so formed as to leave openings M and N, of which the former is for the admission of the material to be ground and the latter is for the discharge of the same when ground. These webs may be separate pieces, or they may be cast with one of the side plates. They are provided with lugs *b b b b*, &c., which pass through openings in the side plates; or the side plates may be provided with internal flanges or grooves to receive the webs. The frame or case is secured together by bolts and nuts F F F, &c., as many as may be desired. The side plates afford bearings for the journals of the works.

C and D are the burrs, and E the concave grinding-surface, and *c* and *d* are respectively the shafts of the burrs C and D.

P is the driving-wheel, and is shown on the shaft *c;* but it may be on a counter-shaft, from which gearing will connect it to the shaft *c*.

C′ and D′ are spur-gears on their respective shafts *c* and *d*, of which C′ is the minor, and D′ the major, gear, so that the burr D will move much slower than the burr C. The burrs move in the direction indicated by arrows thereon—that is to say, they move toward each other and from the opening M. The burrs are made with their faces toothed like a saw, and preferably of a series of plates of saw-steel toothed like a saw, and of each series of plates half are of one diameter and the other half of a less diameter, and these are arranged alternately on the shaft or arbor and secured firmly together. The alternate arrangement of these series is the reverse in one burr from what it is in the other, so that the plates of greatest diameter in the adjoining burrs will break joint—that is to say, a plate of greatest diameter in one burr will come opposite a plate of less diameter in the other burr. The teeth of the burr C point in the direction of its motion, and the teeth of the burr D point in a direction opposite to its motion; hence, while the two burrs run in the same direction, their teeth are opposed to each other, and as one will run so as to make a number of revolutions—say four or five—while the other makes one, the result is, that while the article being ground is continually drawn into the mill, it is more or less ground while passing between the rolls or burrs, and if the burrs are set close together the grinding will be quite fine, and for some articles all that will be required.

The bearing of the shaft *d* is movable, so as to permit the burr D being adjusted near or removed from the burr C. This is accomplished by having the shaft *d* pass through a slot, S, (shown in dotted lines in Fig. 4,) in the side plate, and an adjustable journal-bearing, I, which is pivoted at one end, as at *i*, and has a slot, *s*, and a binding-nut, I′, at the other end, by which means it is adjustable.

The concave E is made to conform to both burrs, and may extend more or less around the burr D, as shown in Figs. 1 and 3. If the burrs are made of plates, as above described, the concave is also so made, as shown at E, Fig. 2. The concave is pivoted on a bearing, *e*, and is adjusted from or toward the burrs by a screw, E′. It also has a bearing, G, which slides in a slot, G′, on the side plates, A. The concave serves at its upper end to prevent the article being ground from passing around with the burr D. Its lower concave or face is toothed like the burr C, with its teeth set in opposition to the teeth of that burr. The office of this part of the concave is to assist in the work of grinding. In this respect it is not new, for there are other mills thus provided with concaves, and when two burrs have been used double concaves have been used in connection therewith.

The novelty in my concave consists in its serving as a grinding-surface under one burr and to prevent the article being ground passing under the other burr.

From the above it will be seen that I do not consider the use of two burrs as new, (see patent to H. W. Pitts, July 1, 1840, No. 1,670, and to A. Lindsay, December 26, 1845, No. 4,335, in which the double burrs are shown, and in the former a double concave is shown.)

The novelty in my device consists in placing these burrs with relation to the feeding or receiving opening so that one of the burrs will draw the article to be ground into the mill. The burr which does this work is the slow-moving burr, while the fast-running burr does the grinding—first, by acting against the slow burr, and, second, by acting upon the concave.

In the mouth M is an apron, H, which is adjusted by the screw H′, so as to close more or less the throat or passages to the burrs. This is varied in accordance with the character of the articles to be ground—as, for example, with small grains it is nearly closed and with large it is opened wide.

The operation of grinding is as follows: The articles to be ground are drawn in by the burr D and carried between the two burrs, and as the two burrs turn together like rollers, and as one moves faster than the other and they are toothed in opposite directions, the process of grinding is begun while the articles are passing in between the burrs. So it will be seen that one of the offices of the burr D is to serve as a feed-roller and another office is to serve as a burr for grinding. Much of the same effect would be accomplished if the burr D were only a smooth or corrugated roller. The partially-ground matter next falls between the serrated concave and the burr C, and is there ground to the fineness required.

What I claim as new is—

1. In a grinding-mill, the combination of the following elements: a case or frame having a receiving and a discharging opening, two burrs adjusted on counter-shafts, one of which is made adjustable from and toward the other and geared to revolve toward each other from the receiving-opening, a double concave having one of its concaves serrated and placed substantially as shown, to receive the partially-ground substance which has passed between said burrs and divert the same from following one of said burrs, and causing it to pass between the serrated concave and the other burr, said double concave being pivoted and made adjustable from and toward the said burrs.

2. In a grinding-mill, the combination of the following elements: a case or frame having a receiving and discharging opening, two burrs adjusted on counter-shafts journaled in said frame or case, a double concave placed with relation to said burrs substantially as shown, and having a pivot, *e*, and supported by bearings G in segmental slots G′ in the sides of said case, and adjusted toward or from said burrs by a set-screw, E′, working through the back of said case.

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

ANDREW VOELK.

Witnesses:
JNO. K. HALLOCK,
LOUIS VOLKMAN.