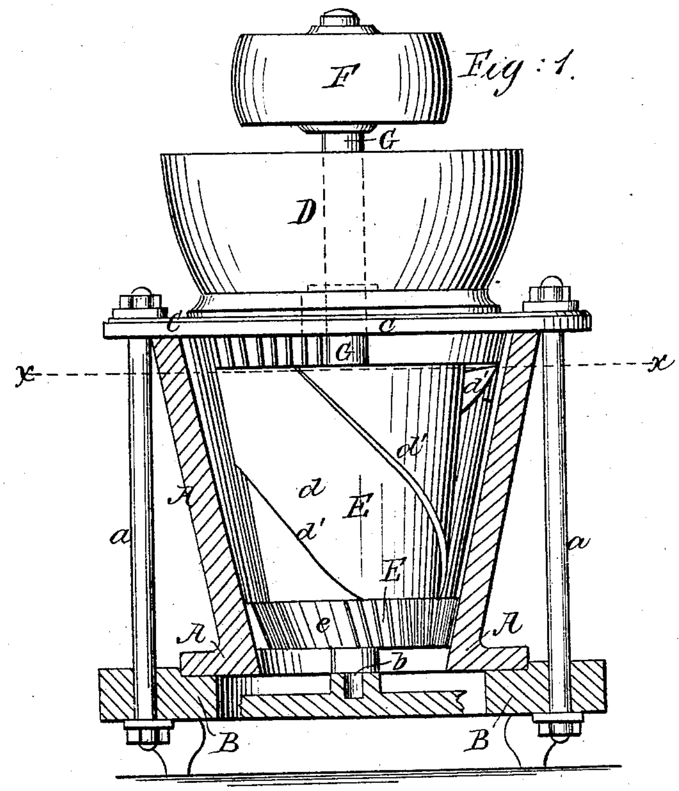
J. BURNS.

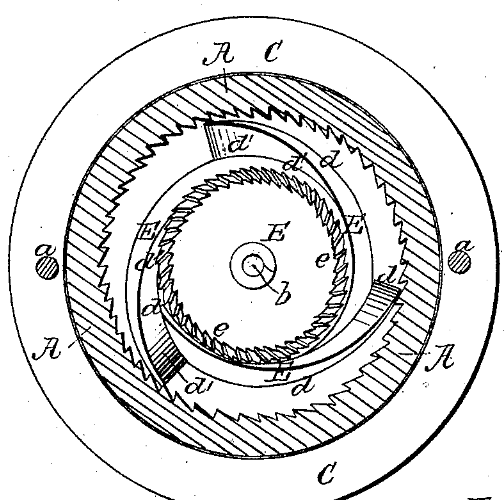
Grinding Mill

No. 69,174. Patented Sept. 24, 1867.

Fig: 1.



Fig; 2.



Witnesses.
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JABEZ BURNS, OF NEW YORK, N. Y.

Letters Patent No. 69,174, *dated September* 24, 1867.

IMPROVEMENT IN GRINDING-MILLS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JABEZ BURNS, of the city, county, and State of New York, have invented a new and improved Grinding-Mill; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved grinding-mill partly in section.

Figure 2 is an inverted sectional plan view of the same, the plane of section being indicated by the line *x x*, fig. 1.

Similar letters of reference indicate like parts.

The object of this invention is to construct a mill for grinding coffee and other substances, whereby the same will be granulated, and not ground to dust, or pulverized, as is done by the mills now in general use, and whereby the article to be ground is moved by centripetal and not by centrifugal force, and is gradually crushed or broken to small lumps, so that for the actual grinding process but little power and surfaces are required.

The invention consists chiefly in the application of a crusher and grinder, which is made in the shape of an inverted truncated cone, and which is arranged within a corrugated case or shell of conforming shape and dimensions. The upper crushing or breaking portion of the cone, which occupies about three-fourths of the whole length of the same, is provided with a series of projecting spiral shoulders, which gradually taper towards the surface of the cone, and which are highest at the top of the cone, gradually diminishing towards its bottom. Thus a series of grooves is formed between the surface of the cone, the inner surface of the corrugated shell or casing, and the projecting shoulders, which grooves are gradually diminishing in width towards the lower end of the crusher, so that the article placed into the said grooves from a hopper above is gradually crushed finer and finer as it descends. The lower end of the cone is corrugated obliquely, and the article that is broken by the crusher is, between the corrugated grinder and the corrugated inner surface of the shell, ground or granulated to a degree of fineness sufficient for all practical purposes. The peculiar construction, and in fact the application of the crushing apparatus, enables me to reduce the grinding surfaces to a minimum, so that the grinding of the article to dust, or to a powder intermixed with dust, which is, especially in coffee, a great inconvenience and loss, is effectually prevented. Another advantage of my apparatus over others is, that by moving the article to be ground through the mill by centripetal instead of centrifugal force, a further reduction of grinding surfaces may be effected, and also the superior granulating of the article.

In those mills where centrifugal force is applied, that is to say, where the cylinder is in the shape of a truncated cone, the largest grinding surface is at the bottom, and consequently most of the grinding is done when the article is already pulverized. But in my apparatus, where an inverted truncated cone is used, most of the grinding or crushing is done at the top, or when the article is coarsest, while the finer it is ground or broken the smaller will become the grinding surfaces, and consequently the better will the article be granulated and not pulverized.

A is the case or shell, which is made of cast iron or of any other suitable material, and the inner surface of which is corrugated, as seen more particularly in fig. 2. This case is made in the shape of a hollow truncated inverted cone, as shown in fig. 1, and is supported by a platform, B. It is covered by an annular plate, C, to which the hopper D is secured. The plate C and bed-piece B are connected and held together by means of screw-bolts *a a*, or in any other suitable manner. The crusher and grinder E, the shape of which has been already described, and is shown completely in the drawing, is provided with a spindle, *b*, at its lower end, which fits into a step arranged in or upon the plate B. Rotary motion is imparted to the cone E by means of a crank or pulley, F, secured to the axle G of the cone; and proper guidance for the said axle is provided by cross-bars in the plate C, which pass through the circular hole in the centre of said plate and surround and guide the axle. The cone E consists of two parts, *d* and *e*, the former or upper portion acting as a crusher or breaker, while the latter lower portion acts as a grinder. The crusher *d* is provided with spiral projections *d'*, as shown in the drawings, which are gradually diminishing towards the bottom, as shown more particularly in fig. 2. The coffee or other article is fed to the crusher by the hopper, and falls on the upper surface of the cone E. By centrifugal force the particles of the material to be ground are thrown into the openings left between the body of the cone,

the spiral shoulders *d'*, and the corrugated shell A, and are, as the cone revolves, gradually fed down by the said spiral shoulders, being crushed or broken finer the more they descend. They are then ground between the corrugated grinding portion *e* of the cone, and the corrugated shell A, and are then sufficiently fine for all practical purposes, and then drop out through openings in the plate B.

What I claim as new, and desire to secure by Letters Patent, is—

The construction of the crusher *d*, the same being provided with spiral tapering shoulders *d'*, which are made and operating substantially as herein shown and described.

JABEZ BURNS.

Witnesses:

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