J. BROUGHTON.

Grinding Mill.

No. 26,412. Patented Dec. 13, 1859.

Fig. 3.

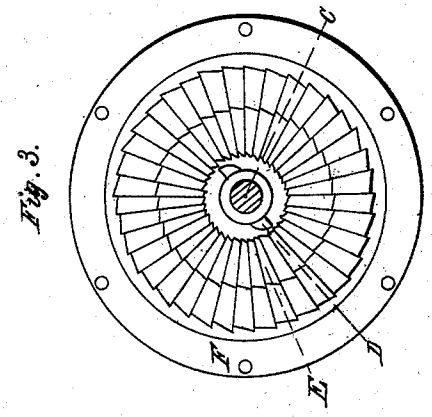


Fig. 2.

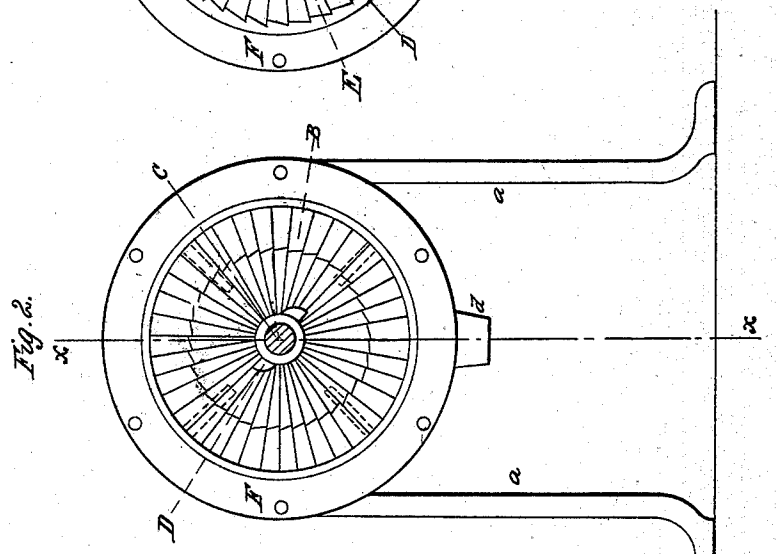
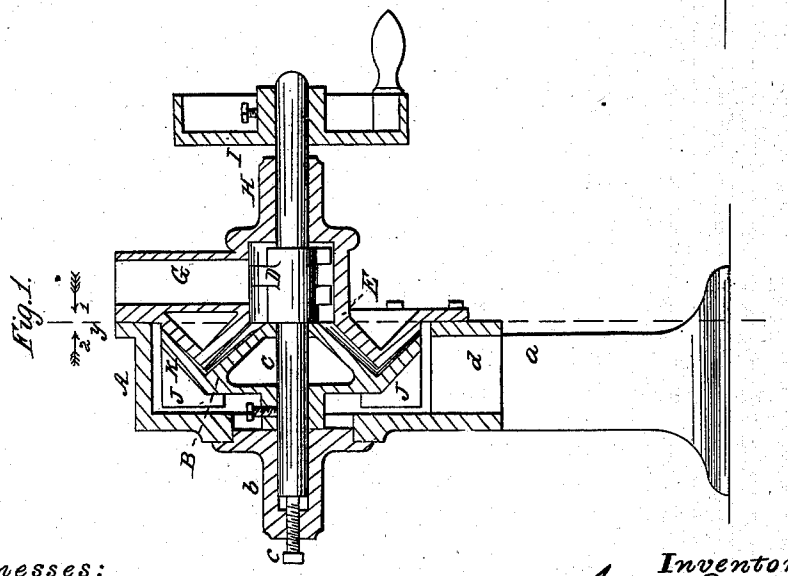


Fig. 1.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN BROUGHTON, OF NEW YORK, N. Y.

GRINDING-MILL.

Specification of Letters Patent No. 26,412, dated December 13, 1859.

To all whom it may concern:

Be it known that I, JOHN BROUGHTON, 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 of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a vertical section of my invention, taken in the line *x*, *x*, Fig. 2. Fig. 2, is a vertical section of ditto, taken in the line *y*, *y*, Fig. 1, and viewed in the direction indicated by arrow 1. Fig. 3, is a vertical section of ditto, also taken in the line *y*, *y*, Fig. 1, but viewed in the direction indicated by arrow 2.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain improvements in metallic grinding mills, the class formed of a cone or frustum of a cone revolving within a co-centric and stationary shell.

The object of the invention is to prevent the clogging and consequent heating of the mill and at the same time obtain a perfect and rapid grinding operation with a very simple and economical arrangement of parts.

The grinding mills of this class hitherto constructed possess a serious defect, which arises from the following causes, viz., in order to prevent the clogging and consequent heating of the grinding surfaces and insure a rapid discharge of the meal, the teeth are formed at an angle or in a winding direction upon the surface of the cone, the consequence of which is that owing to the centrifugal action throwing the meal in a direction at right angles with the edge of the teeth, a large portion is allowed to escape in a coarse or unground state, this being invariably the case where the angle is sufficient to prevent the mill clogging, while any diminution of the angle of the teeth, or an increase of grinding surface in order to insure the meal being properly and finely ground before it is discharged as invariably results in an increase of friction and clogging and a consequent heating of the grinding surfaces and meal.

In the construction and arrangement hereinafter shown the above described defect is entirely obviated, and while the capacity of the mill is greatly increased the cost of manufacture is considerably reduced.

To enable those skilled in the art to fully understand and construct my invention I will proceed to describe it.

A, represents a hollow cylindrical case or drum supported at a suitable height by uprights *a*, *a*, or any suitable framing. The case or drum A, is open at its front end, its back end is closed and provided with a shaft bearing *b*, which has a set screw *c*, passing longitudinally into it through its end, as shown clearly in Fig. 1. From the lower part of the case or drum A, a discharge spout *d*, depends.

B is a revolving grinder secured to a shaft C, by a set screw *e*.

D, is a cob-cutter or cracker keyed on the shaft C.

E, is a stationary grinder bolted by the flanches F, to the open end of drum A.

G, is a vertical spout communicating with the interior of the stationary grinder E, and into which spout the grain or other substance to be ground is fed from a suitable hopper.

H, is the front bearing of the revolving shaft and I, the driving pulley.

J, J, are wings or fan blades. Two or more of these wings or blades may be used and they may be cast on or secured to the revolving grinder B. The revolving grinder B, consists of an obtuse cone provided at its base with the co-centric and conical rim or flanch K, the interior or grinding surface of which, in relation to its axis forms the opposite or reverse angle of the cone B, while the surface of the stationary grinder J, is made to coincide with it.

This arrangement of double conical grinding surfaces has the effect of changing or reversing the action of the mill upon the grain or other substance to be ground, first it is the convex surface of a revolving cone acting within the concave surface of a stationary shell, and lastly, the concave surface of a revolving shell acting upon the convex surface of a stationary cone.

The operation is as follows:—Grain or other substance is fed into the spout G, and if in lumps or masses sufficiently large, is first operated upon and reduced by the cob cutter or crusher D, and serrated surface of the shell in which the cutter or crusher D, rotates. It then passes between the convex surface of the revolving cone B, and the concave surface of the stationary grinder

E. Through this portion of the mill the teeth are formed so that their edges approach or meet each other and produce a cutting action. When it arrives at the angle at the base of the cone it is returned in an opposite direction and is operated upon by teeth formed to pass over each other and produce a crushing action, while the centrifugal action of the revolving grinder causes the meal to cling to, instead of being thrown from, the concave surface of the revolving rim or flanch K, thus insuring its being perfectly crushed and ground previous to being discharged at the spout E, the sudden increase in the diameter of the revolving grinder insuring the meal being carried through and effectually preventing all tendency to clog. The wings or fan-blades J, revolving within the close case or drum A, draw a current of air down the feed spout G, and through and between the grinding surfaces into the hollow case or drum A, from whence it is discharged by the spout *d*. This current of air constantly passing between the grinding surfaces, serves to keep them cool and effectually prevents heating and a consequent spoiling of the meal. It also serves to draw through the grain and meal independently of the angle at which the teeth are formed on the grinding surfaces, and also increases the capacity of the mill by allowing it to be run at a greater velocity without any tendency to heat. The proximity of the grinding surfaces may be regulated by adjusting screw *c*.

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

1. The double and reverse acting conical grinding surfaces B, E, constructed and operated substantially as herein set forth.

2. In combination with a revolving grinder and a hollow case or drum A, I claim the wings or fan-blades J, operating substantially as, and for the purpose herein set forth.

JOHN BROUGHTON.

Witnesses:
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