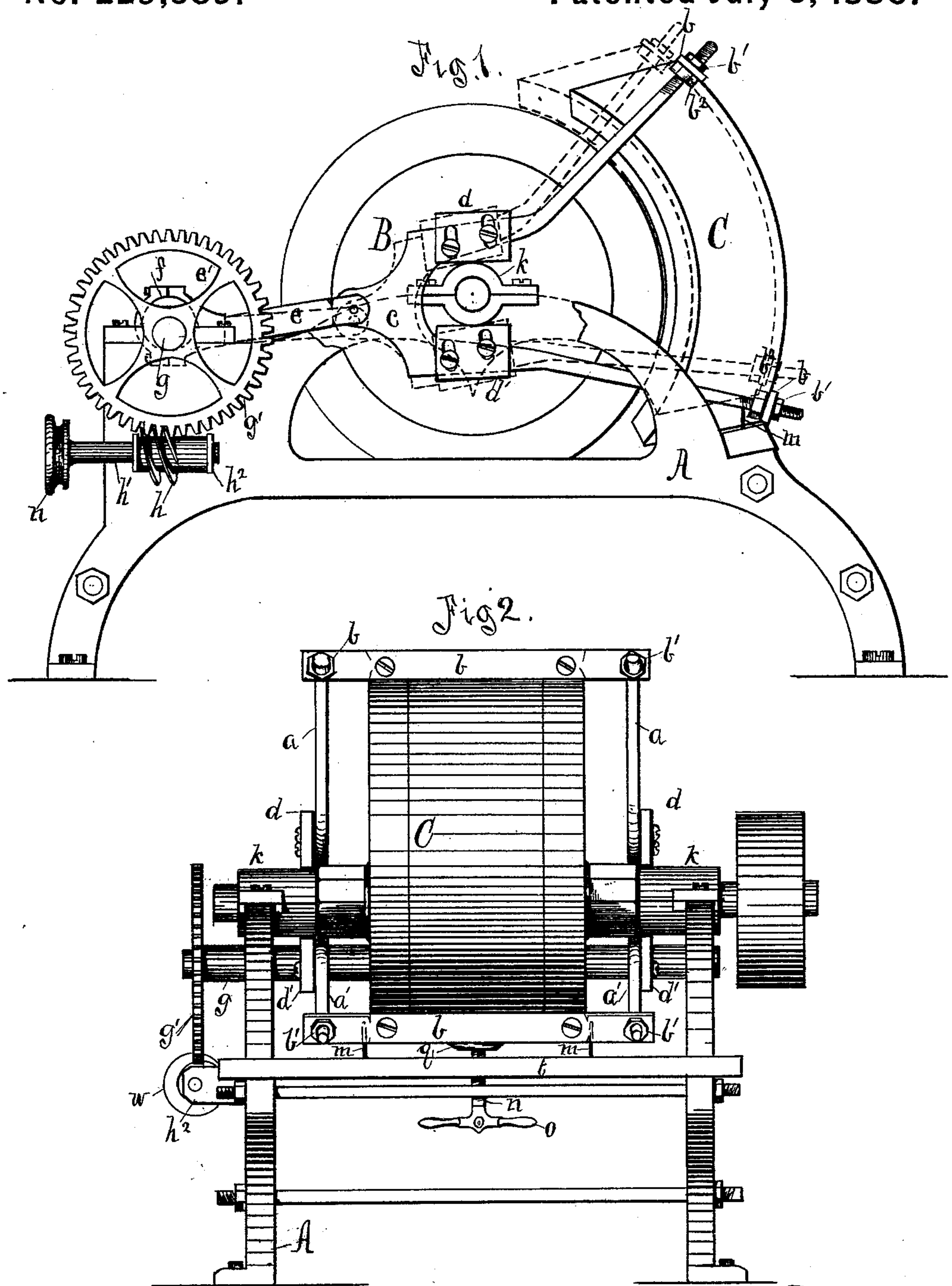


(No Model.)

B. F. CRABBS.
Mill for Grinding and Reducing.
No. 229,589. Patented July 6, 1880.



Witnesses.
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UNITED STATES PATENT OFFICE.

BENJAMIN F. CRABBS, OF WASHINGTON, DISTRICT OF COLUMBIA.

MILL FOR GRINDING AND REDUCING.

SPECIFICATION forming part of Letters Patent No. 229,589, dated July 6, 1880.

Application filed April 7, 1880. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. CRABBS, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Milling-Machines; 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 relates to improvements in that class of milling-machines in which the grain is fed between a vertical revolving circular stone and a stationary concave that may be adjusted with reference to the circular stone in order that a fine or coarse quality of material may be produced from the substance passed through the mill.

My improvement consists of the mechanical devices used for the purpose of moving the concave laterally, whereby it may be brought near to or caused to recede from the circular stone uniformly; or, as more specifically stated, it consists of vertically-adjustable guides, in combination with the means employed for sustaining the concave after being set up, by which the relative positions of the faces of the stones may be regulated, if required, and the circumferential distance between the face of the concave and that of the circular stone sustained afterward, when the concave is raised or lowered vertically, either mechanically or from unavoidable causes.

The object of my invention is to supply such devices for the regulation of the concave in its relation to the circular stone as shall best accomplish the purpose for which the mill is designed.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation of a mill having my invention combined therewith, a portion of the supporting frame-work being represented in broken lines. Fig. 2 is an end ele-

vation of the same, showing a modification of one of the features of my invention.

Similar letters indicate like parts.

The letter A designates a frame-work, on which is mounted in suitable bearings the circular grinding-stone B, which is actuated in the usual manner.

C represents the concave, which rests on a cross-bar, *t*, of the frame A, and is held in position by two converging arms, *a a'*, on each side, that pass through slots in the straps *b b*, which are firmly attached to the concave C in any manner.

The arms *a a'* have on their ends which pass through the straps *b b* screw-threads, and are connected thereto by the nuts *b'* and jam-nuts *b²*. The said arms *a a'* terminate in a cross-head, *c*, and pivoted to this cross-head *c* are connecting-rods *e*, which have eccentric straps *e'* at their ends, that encircle eccentrics *f*, formed on shaft *g*, which is journaled in bearings on the frame A opposite to that part which sustains the concave C.

On the shaft *g* is keyed the worm-wheel *g'*, gearing with the worm *h* on a shaft, *h'*, having bearings in the brackets *h²*, attached to or formed on frame A.

The end of the shaft *h'* is provided with a hand-wheel, *w*, by which it may be turned.

On each of the arms *a a'*, adjacent to the cross-head *c*, are guides *d d'*, bearing against extensions of the boxes *k k*, Fig. 2, provided with elongated slots, Fig. 1, through which pass set-screws, that serve to keep the guides *a a'* in position.

By means of the set-screws and slots it is evident that the said guides *a a'* may be vertically adjusted, for reasons more fully herein-after stated.

The standard-rods *m m* on the cross-bar *t* prevent a sidereal displacement of the concave C.

In Fig. 1 of the drawings the stones B and C are represented with their faces parallel, that position being, in my judgment, the best for the purpose of attaining the most satisfactory results in grinding with this class of mills.

It is evident that the distance between the faces of the stones may be increased or diminished by turning the hand-wheel *w* through

the medium of the intervening parts connecting with the concave C after the concave C has been set up and been attached to the arms *a a'* by means of the nuts *b'* and jam-nuts *b²*,
 5 with an equal pressure on both sides exerted at one and the same time.

The gages or guides *d d'*, whose inner edges are parallel and rest on the extensions of the boxes *k k*, Figs. 1 and 2, serve to sustain the
 10 arms *a a'*, cross-heads *c*, and connecting-rods *e*, and prevent them from moving vertically when properly secured to the arms *a a'*. Consequently the relative position of the faces of the stones B and C will not be changed when
 15 the concave C is laterally adjusted.

The guides *d d'*, when adjusted, as designed, so that the faces of the stones shall be parallel, as represented in Fig. 1, are secured to the arms
 20 *a a'*, so that their edges which bear against the extensions of the boxes *k k* are parallel to each other, as shown. It is obvious, therefore, the laterally-adjusting mechanism being allowed to remain at rest, that if the concave C be raised, as represented in Fig. 1 by the broken
 25 lines, so as to come in contact with the circular stone B, the stones will not lose their parallelism when they have been set as stated with that relative position of their faces, and the same principle will hold when the distance between the faces of the stones, as shown,
 30 has been but one-half reduced; nor will the proportionate distance between the faces of the stones B and C be changed should the concave C have been set so that either its top or
 35 bottom was closest to the stone B if raised in a similar manner. It is manifest that a like result will be obtained if the concave C be lowered instead of raised, as shown. This peculiarity of my invention I consider a highly important
 40 feature in connection with mills of this class, for in grinding the concave may be depressed slightly, when an overcrowding of the mill occurs from any cause, by reason of a yielding of the frame-work, and were the stones not thus
 45 absolutely prevented from losing the perfect parallelism of their faces the top of the concave would be depressed upon the revolving circular stone and the grain or other material to be ground barred from entering between them,
 50 thereby causing the machine to become clogged.

A somewhat similar unsatisfactory effect is produced should the concave spring upward, and thus cause the bottom to come in contact with the circular stone, and in either case a poor result would be obtained from the machine in its operation compared to that attained from the use of my invention, which serves to maintain the parallelism of the faces of the stones under all ordinary circumstances in grinding when the concave has once been
 55 thus properly set.

The concave C may be mechanically raised or lowered vertically by means of a screw-stem, *n*, Fig. 2, the upper end of which presses against a plate or socket, *q*, fastened to the
 60 bottom of the concave C, while its lower end is journaled in the cross-bar *t* of the frame A, and it may be operated by a hand-bar, *o*.

A shaft having eccentrics suitably arranged, similar to those on the shaft *g*, may be located
 70 beneath the concave C in a position corresponding to that of the cross-bar *t*, and the said shaft, being journaled in the frame A, may be, with its eccentrics, used to produce a like result to the stem-screw *n*, and also serve
 75 as a support for the concave C instead of the cross-bar *t*.

Either of the above-mentioned devices may be used in conjunction with the laterally-adjusting mechanism described, or separately,
 80 and will serve to produce similar results by causing the faces of the stones to approach or recede from each other.

Having thus described my invention, what I wish it to be understood that I claim as new,
 85 and desire to secure by Letters Patent, is—

In a vertical grinding-mill, the means employed for obtaining a lateral adjustment of the concave, consisting of the arms *a a'*, cross-head *c*, guides *d d'*, connecting-rods *e*, eccen-
 90 trics *f*, shaft *g*, worm-wheel *g'*, and operating-worm *h*, all arranged and operating substantially as shown and described.

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

BENJAMIN F. CRABBS.

Witnesses:

H. A. HALL,
 JAMES H. SMITH.