

(No Model.)

J. E. HOLMES.
GRINDING MILL.

No. 264,697.

Patented Sept. 19, 1882.

Fig. 1.

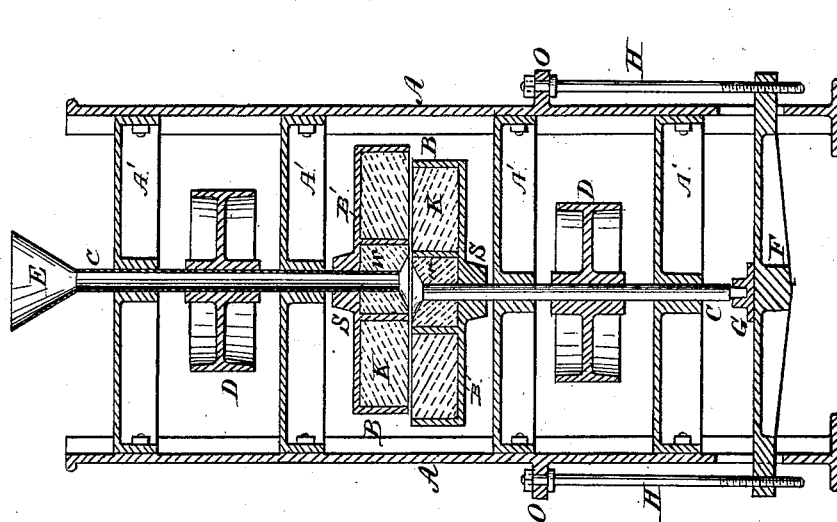


Fig. 4.



Fig. 2.

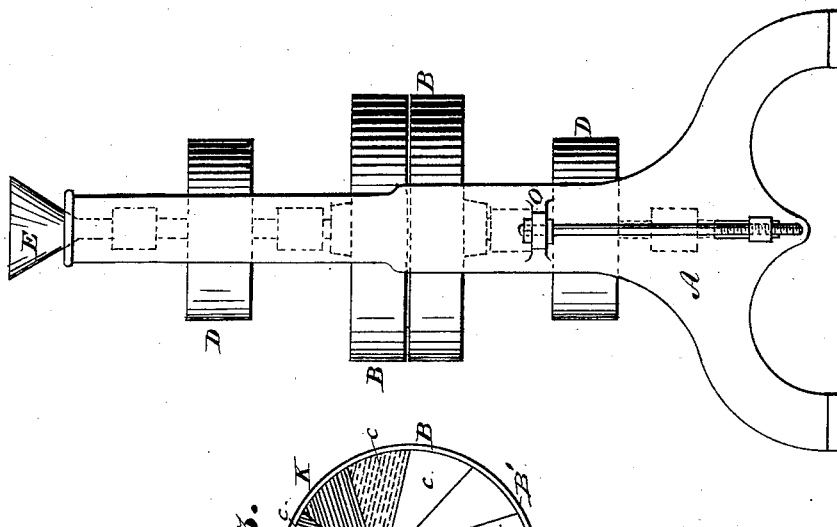
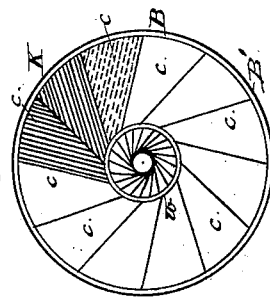


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOSEPH E. HOLMES, OF WASHINGTON, DISTRICT OF COLUMBIA.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 264,697, dated September 19, 1882.

Application filed April 4, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. HOLMES, a citizen of the United States, residing at Washington, in the District of Columbia, United States of America, 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 relates to that class of mills known as "horizontal-disk mills," in which positive motion is given to the stones or disks in opposite directions; and it consists in the grinding-disks, as constructed, in combination with the means employed whereby said disks are eccentrically arranged and independently operated with respect to each other, as will be hereinafter more fully set forth and claimed.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe the same with reference to the annexed drawings, in which—

Figure 1 is a vertical sectional view of a grinding-mill embodying the features of my invention; Fig. 2, a side elevation of the same; Fig. 3, a plan view of one of the disks, showing the grinding-surface; and Fig. 4, an edge view of one of the cells or compartments into which the disks are divided, showing the grinding-surface placed in position therein.

A suitable frame for containing the working parts of the mill consists of two uprights or side pieces, A A, made of cast-iron, of the form substantially shown, and four cross-beams, A', &c., also of cast-iron, arranged at about equal distances apart, and bolted at their ends to the inner faces of the side pieces. This frame is constructed about six feet high, with a width between the sides considerably greater than the diameter of the disks intended to be used, and with a strength sufficient to sustain said disks and the means employed for operating them.

B B represent the grinding-disks, which for ordinary purposes are from twenty-four to thirty-six inches in diameter. In constructing

the disks I provide a strong shell, B'. In the center I form a division, about one-fourth to one-third of the diameter of the shell, by means of a ring, *w*, cast with it, and divide the annular space between the ring and shell into ten or twelve equal-sized cells or compartments, *c*, of the shape substantially shown. I then fill the division within ring *w* (leaving a space for the shaft at the center) with preferably chill cast plates of such wedge shape as, when alternated with plates of wood (or similar material) of the same shape and dimensions, will occupy the space firmly and compactly. This part of the disk I use as a cracker, for the purpose of breaking and crushing all coarse substances prior to their reaching the grinding-surface proper. The plates within ring *w* are intentionally left coarse and harsh, with ample soft divisions that wear below the surface of the hard plates and insure the proper corrugations, keeping the edges of the hard plates sharp, and allowing the material to feed outwardly upon the grinding-surfaces proper of the disks. I then fill the cells or compartments *c* with thin plates of very hard steel, or plates of case-hardened wrought-iron, or plates of thin chill castings, alternated with thin plates of soft-metal or wood, veneer, or hard-rolled paper; or I may use plates of glass alternated with plates of a softer material, as wood, veneer, or paper hard-rolled. For ordinary purposes I use plates of wrought-iron from four to six inches wide and one-sixteenth to three thirty-seconds of an inch in thickness. Enough of the plates to fill one-half the face surface of all the cells *c* are nicely case-hardened on each side to about one-third the thickness of the plate. These plates are then placed in the cells *c* in alternate order with the soft metal, wood, or paper plates until all the spaces are firmly and compactly filled, as shown at K in Figs. 3 and 4.

By consulting Fig. 3 of the drawings it will be seen that while the plates in each cell are parallel to one another the arrangement of the series is such as to have the plates of any one cell at an angle to those in the cells adjacent. By such an arrangement I am enabled to obtain a shearing cut with the case-hardened plates, and also provide a proper draft to the grinding-surfaces of the disks. I am also enabled by this arrangement to produce grinding-

surfaces that will always be sharp and true without the slightest dressing, and can be used with satisfactory results until the plates are entirely worn out. Of course for very fine 5 flouring thinner plates must be used than are necessary for corn-mills or for grinding ores, while plates of glass should be used for fine mineral paints and substances which might be injured by any particles of iron.

10 The disks, as above constructed, are placed, one upon the other, in the space between the center cross-beams of the supporting-frame, and rotating shafts C C, connected firmly to the centers of the disks by means of hubs S S, 15 pass vertically through the cross-beams respectively above and below said disks. These shafts are placed eccentrically to each other, as shown, so as to insure the even wearing of the grinding-surfaces, which otherwise would be worn in 20 grooves or unevenly; also, the faces of the disks are parallel, so as to produce perfectly true faces for grinding without the necessity of dressing the stones.

The materials to be ground may be fed by 25 making the upper rotating shaft of a tube provided with a funnel, E, which can deliver substances on the central portion of the lower disk, which is made with a coarser arrangement of the cutting-plates, as heretofore described, so as to more perfectly crush or grind 30 the materials, and thus allow a more even distribution over the entire grinding-surface. The lower rotating shaft has bearing in a step, G, with which the bearing-beam F is provided. 35 This bearing-beam is arranged as shown, being adapted to raise or lower the disks by means of bolts H H and lugs O O. Pulleys D D (or

any other suitable gearing) are arranged upon the rotating shafts in the spaces between the cross-beams respectively above and below the grinding-disks, whereby a positive independent 40 motion can be given said disks in opposite directions.

By rotating the disks B B as above constructed and arranged independently and in 45 opposite directions the grinding capacity of this class of mills is greatly increased, and while in ordinary burr-millstones much expense is entailed in the constant dressing of the stones, their first cost being also very considerable, the cost of these disks is very little 50 compared therewith, and no necessity whatever arises for dressing their grinding-surfaces, which are always kept true and sharp until entirely worn out. 55

Having thus described my invention, what I claim is—

The combination, with frame A A, provided with the bearing-beam F, of the grinding-disks B B, constructed and arranged substantially 60 as described, the vertical rotating shafts C C, secured firmly to the centers of said disks and arranged eccentric to each other, and the pulleys D D, provided upon said shafts, whereby a positive motion is imparted to the disks in 65 opposite directions, as and for the purposes specified.

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

JOSEPH E. HOLMES.

Witnesses:

GEO. F. GRAHAM,
L. C. YOUNG.