(No Model.)

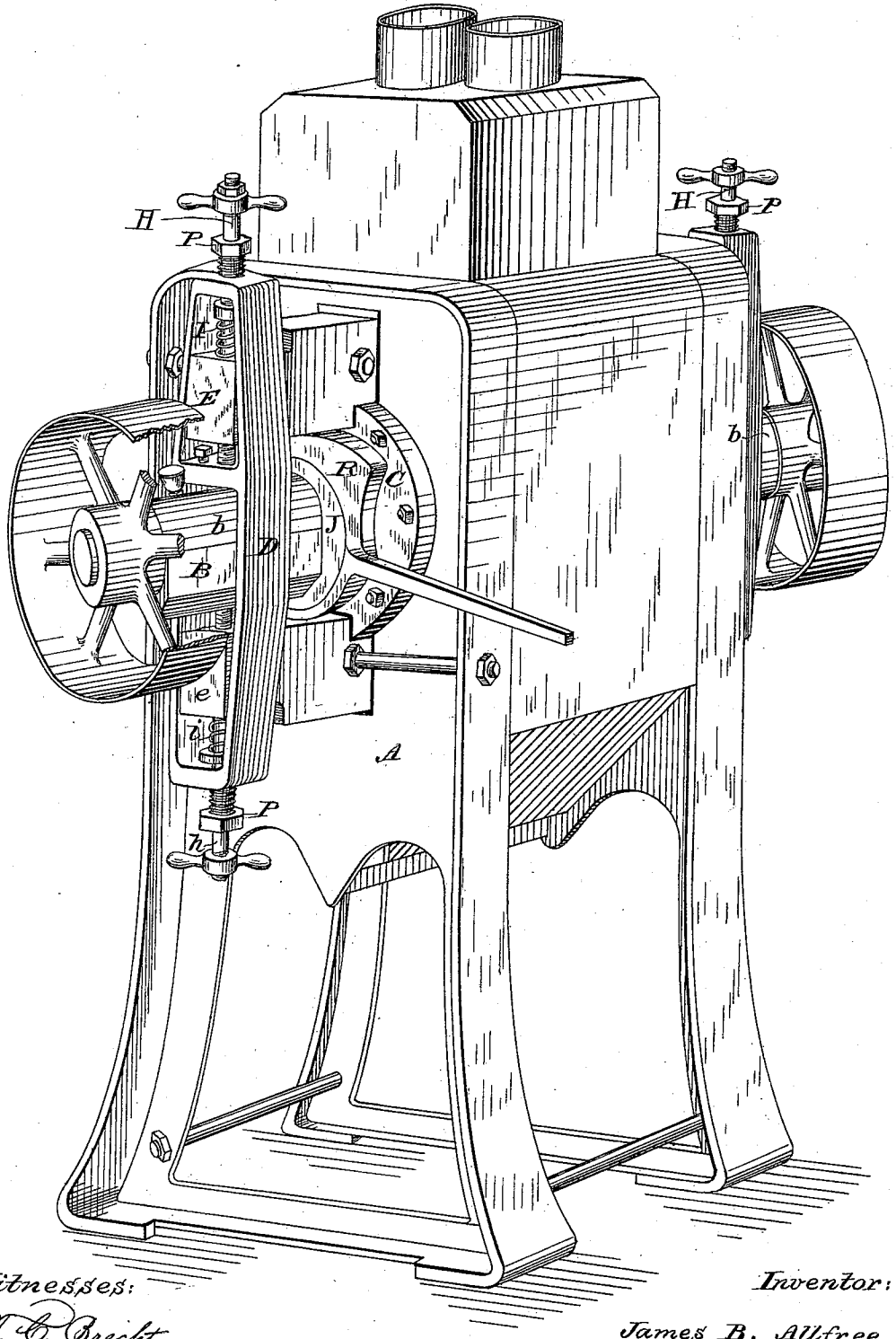
2 Sheets—Sheet 1.

J. B. ALLFREE.

GRINDING MILL.

No. 336,979.

Fig. 1. Patented Mar. 2, 1886.



Witnesses:

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2

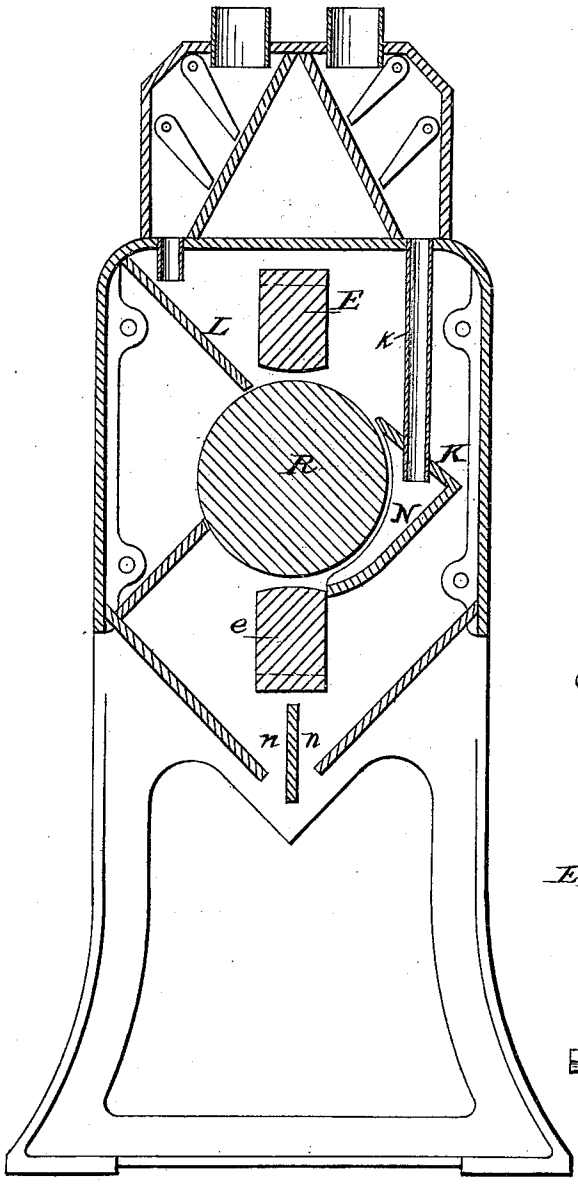


Fig. 3.

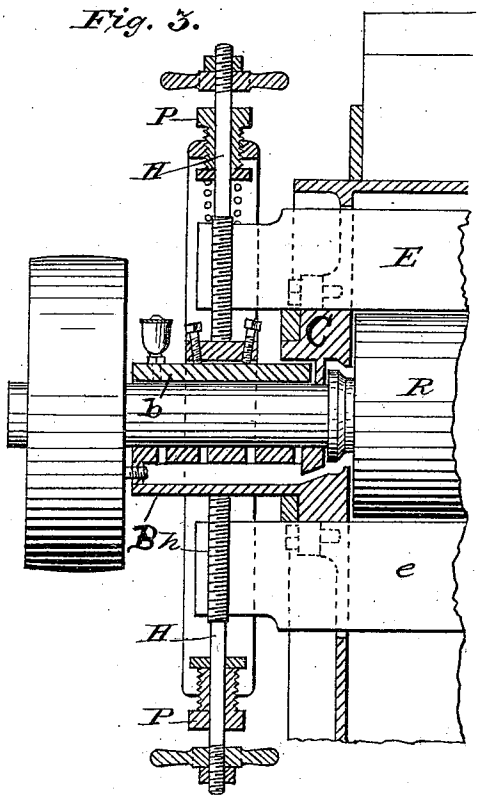
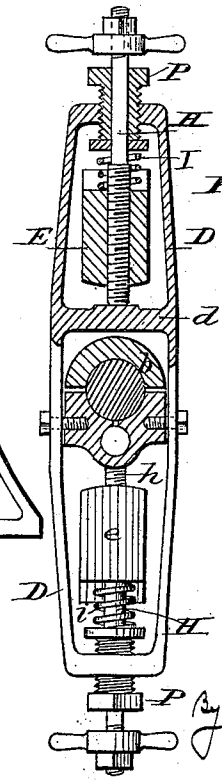


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES B. ALLFREE, OF CUMBERLAND, MARYLAND, ASSIGNOR OF ONE-HALF TO HARRISON SWARTZWELDER AND ROBERT SHRIVER, BOTH OF SAME PLACE.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 336,979, dated March 2, 1886.

Application filed July 2, 1884. Serial No. 136,641. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. ALLFREE, a citizen of the United States, residing at Cumberland, Maryland, have invented new and useful Improvements in Grinding-Mills, of which the following is a specification.

My invention relates to an improvement in grinding-mills of the class used to make the first reduction in the process of milling known as "gradual" reduction. The purpose of mills of this kind is to divide the kernels as nearly as may be at the crease, so that the escape of the flour may be prevented, and at the same time the kernel be put into a condition to be readily freed from "crease-dust" by a subsequent process of "scalping."

Roller-mills have been constructed with two or more moving rolls, between the contiguous moving surfaces of which the grain was grasped as it was fed in. This form has many and obvious defects, paramount among which is the fact that the kernels are crushed in irregular shape, the direction of the break being regulated by the position in which the kernels pass between the rolls, so that there is a liability to have the grain split so as to allow the flour to escape.

The objects of my invention are to remedy this defect, to produce a mill employing but one roll, and also to produce one in which two independent reductions may be accomplished simultaneously with separate inlets and outlets for the different sizes of grain to be operated upon.

With these objects in view my invention consists of a mill having a single roll, with two contiguous parallel grinding-surfaces arranged on opposite sides of said roll, and, further, in various details of construction, whereby the reception and discharge of the grain, the equalization of the strain on the roll, and the adjustment of the operative parts are accomplished.

In order that those skilled in the art may know how to make and use my invention, I will now proceed to minutely describe the same in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of the mill. Fig. 2 is a central vertical section of the mill, the section being taken transverse to the roll. Fig. 3 is a side elevation, partly in section, of the bearing of the roll and means for adjusting and supporting the brake-bars between which and the roll the grain is crushed. Fig. 4 is a detail side view of the form of the device used for adjusting the bars.

In the drawings, A represents the main frame of the machine, which is made preferably of cast-iron, and of a strength and configuration to receive and support the operative portions of the mill. The sides of this frame are provided with elongated openings, through which project the ends of the roll and of the brake-bars, which are situated one above and one below the said roll. Situated about the center of these openings are the bearings in which the roll rests. These bearings each consist of a tubular portion, B, having a removable upper section, *b*, and provided with an upturned flange, C, which has openings for the passage of bolts, by means of which it is firmly secured to the casing.

The reduction of the grain takes place between the roll R and two bars, E *e*, running parallel thereto, and situated a distance from the roll commensurate with the size of the grain to be reduced. The positions of the bars E *e* are regulated by means of the device shown more clearly in Fig. 4, one of which is placed on each side of the mill. This consists of a yoke, D, having screw-threaded openings in its end pieces, in which fit screw-plugs P. These screw-plugs are hollow, and their central passages are of a size to admit of the free sliding back and forth of the rods H *h*. One end of each of these rods is provided with a cross-bar for grasping when it is desired to turn them, and the other end is screw-threaded, so as to take into correspondingly-screw-threaded openings in the bars E *e*. Each journal end of the roll R is inclosed by the tubular bearing, and this bearing is surrounded by the yoke, the set-screw *h* of which bears against it. The upper set-screw, H, bears against a cross-piece, *d*, of the yoke. From the foregoing it will be manifest that the position of one or both of the bars E *e* may be regulated relative to the roll by turning one or both of the handles with which the screw-rods H *h* are provided. This motion, through

the medium of the screw-threaded ends of the rods, accomplishes the desired effect of increasing or diminishing the distance between the roll and bars. In order that any foreign substance, such as a stone or the like, may pass through the machine without doing injury thereto, I prefer to secure the bars E *e* in such position that should an extraordinarily hard substance be encountered in the operation of the mill the bars may be automatically removed from their normal positions and returned after the objectionable material has passed. As a simple means of accomplishing this result, I provide the springs I *i*, which inclose the rods H *h*, and bear at one end against the bars E *e*. The strength of these springs is such as to hold the bars to their work during ordinary strain, and at the same time to be overcome by the passage between the grinding-surfaces of a hard substance before harm could be done to the mill.

In the operation of the mill the grain is fed in at the top and carried down between the roll and the upper brake-bar, E, by means of an inclined way, L.

Practical tests have shown in nearly every case that the grain is split at the crease by reason of the fact that instead of being taken between the reducing-surfaces in various positions the pressing of the kernels by the moving roll against the stationary bar has the tendency to lay the grain all in the same direction, and it is only a question of adjusting the position of the brake-bar relative to the roll to accomplish the dividing of different grades of wheat. After the grain has passed between the top of the roll and the bar E it passes over the incline K, and down through the discharge-passage *n*. In the second reduction the grain is fed into a hopper in the top, from which it is conveyed by means of a series of tubes, *k*, into the covered hopper N, which directs it between the lower surface of the roll and the brake-bar *e*.

From the foregoing it will be seen that when the machine is in operation there will be a minimum amount of strain upon the bearings of the roll, because of the fact that the strain naturally caused by the grinding between the top of the roll and the bar E will be counterbalanced by the similar operation at the under side of the roll.

In order to furnish a simple and effective means for removing the brake-bars from the roll, should it be desired to do so, to allow the passage of a hard substance, or for any other reason, I provide the double cam R, which is mounted upon a collar, J, secured to the roll-shaft, and which when turned brings its enlarged faces into contact with the ends of the bars, and forces them apart in an obvious manner. One of these double cams is mounted at each side of the mill, so that by moving them simultaneously the bars may be evenly removed from the roll.

Having thus described my invention, what I claim is—

1. A grinding-mill having one horizontal roll and two parallel bars arranged contiguous thereto—one above and one below the said roll—and suitable conduits for conducting the grain to the respective points of reduction.

2. A grinding-mill having one horizontal roll and two parallel bars arranged contiguous thereto and on diametrically-opposite sides of the said roll, whereby two reductions may be accomplished simultaneously, and the friction of the roll-bearings relieved.

3. A grinding-mill having one horizontal roll and two parallel bars arranged contiguous thereto and on diametrically-opposite sides of the said roll, the said bars being provided with elastic means for retaining them in operative position.

4. A grinding-mill having one horizontal roll and two parallel bars situated contiguous thereto, and two cams arranged one at each end of the roll and bearing against the said bars.

5. In a grinding-mill, a horizontal roll and parallel grinding-bars situated contiguous thereto, and elastic yokes situated independent of the frame for retaining said parts in operative position, for the purpose set forth.

6. In a grinding-mill, the combination of a single roll and two parallel grinding-bars, with the yokes having the rods sliding therein and attached to the bars, and the springs bearing at their inner ends against the bars, and at their outer ends against the yokes.

7. The combination, in a grinding-mill, of the roll, the two parallel grinding-bars, the yokes, the hollow movable plugs in the ends of the yokes, the rods passing through the said plugs and attached to the parallel bars, and the springs bearing at one end against the bars, and at the other against the screw-plugs, for the purpose set forth.

8. The combination, in a grinding-mill, of the roll, the bearings made in two parts, one part being permanently secured to the casing, and the other detachable, the yokes connected to the said bearings independent of the frame, the parallel bars, and means for securing them yieldingly in position, substantially as described.

9. In a grinding-mill, the combination of one roll and two grinding-bars arranged contiguous thereto, with the conduit for conducting the grain to the first point of reduction and thence to a point of discharge, consisting of the incline L, covered hopper N, having inclined top, and the discharge-passage *n*, substantially as described.

10. In a grinding-mill, the combination of one roll and two bars arranged contiguous thereto, with the conduit for conducting the grain to the second point of reduction, consisting of the hopper, the depending tubes *k*, the covered hopper N, and the discharge-passage *n*, substantially as described.

11. In a grinding-mill, the combination of one roll and two grinding-bars with the conduits for conducting the grain to the two points of reduction, consisting of the incline L, the covered hopper N, the tubes leading from the upper hopper to the covered hopper N, and the discharge-passages *n*, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JAMES B. ALLFREE.

Witnesses:
ROBT. SHRIVER,
F. M. OFFUTT.