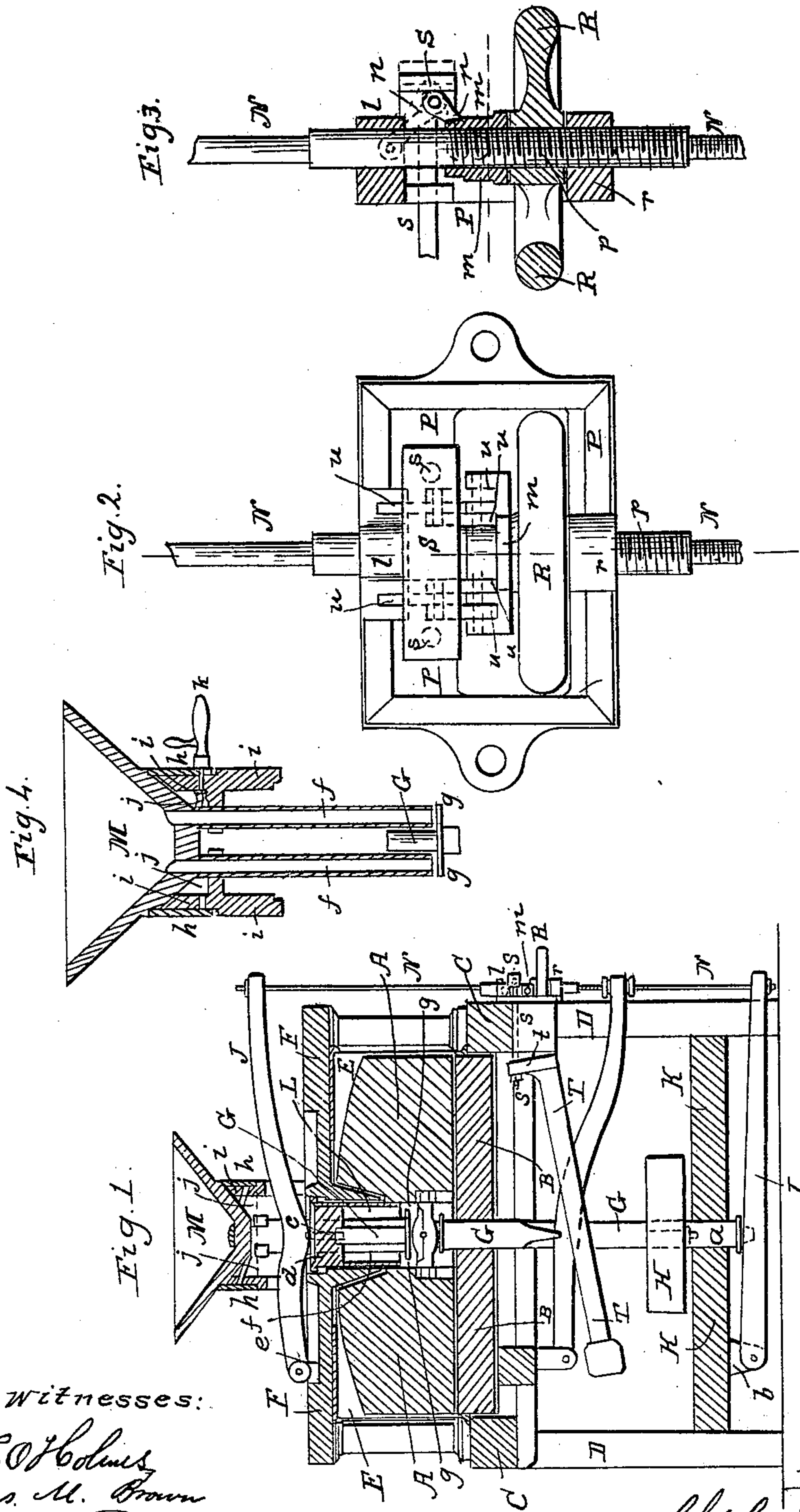


C. W. BROWN.

Grinding Mill.

No. 25,173.

Patented Aug 23, 1859.



Witnesses:
E. C. Holmes
Chas. M. Brown
Le

Inventor:
Charles W. Brown

UNITED STATES PATENT OFFICE.

CHARLES W. BROWN, OF BOSTON, MASSACHUSETTS.

GRINDING-MILL.

Specification of Letters Patent No. 25,173, dated August 23, 1859.

To all whom it may concern:

Be it known that I, CHARLES W. BROWN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Grinding-Mills; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, in which—

Figure 1 represents a vertical sectional elevation of my mill, showing the several parts in position for operation. Figs. 2 and 3 are views in detail of my arrangement for adjusting the pressure of the runner stone. Fig. 4 is a vertical section of the hopper, showing the manner of regulating the flow of grain.

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

The object of my invention is to regulate the runner stone of a grinding mill by a compensating device which will allow the stone to rise and free itself of any hard substance getting between the faces thereof which would injure the face of the stone or derange the mill; and also to form a passage in the eye of the upper stone which will allow the grain to have a free and constant flow from the hopper and not be affected by the centrifugal action of the runner on its passage, through the center of it, to be ground.

My invention consists in regulating the runner stone so as to grind finer or coarser grain, by means of a hand-wheel upon a vertical rod connected at top and bottom to levers which serve as bearings for the spindle; and in connection with this vertical adjustment of the stone it consists in arranging weighted arms upon a movable bearing plate which is constantly pressing upon the knees of toggles, the upper joints of which are fixed while the lower arms are jointed to a sliding collar which rests upon the hub of the hand-wheel, and sustains the weight of the runner; all arranged in such a manner that when a stone or any hard substance gets between the grinding surfaces of the stones the runner will be instantly raised, or allowed to rise, and by the action peculiar to the toggles employed, the pressure of the stone will be diminished and this foreign substance thrown to the circumference by the motion of the runner, and discharged from

the mill without retarding the motion of the stone or deranging the parts of the mill.

It also consists in placing within the eye of the upper running stone, what may be technically called, a dead-eye, which remains fixed with respect to the rotary motion of the stone, but which has a free vertical play with the spindle serving to prevent the grain from being retarded in its passage to be ground by the centrifugal action of the runner, which, where this eye is fixed to the runner, the grain will not feed regularly, but will be thrown to the sides of the eye in obedience to the law of motion, and will not pass freely through the eye to be ground.

It also consists in a peculiar mode of regulating the flow of grain from the hopper, by adjusting the hopper and tubes to or from a circular plate fixed to the spindle, all as hereinafter set forth.

A represents the runner stone hung upon the shaft and rotating with it in the usual manner. B is the fixed, or stationary stone, fixed upon the bed, C, of the frame, D. E is the curb; F, the arch over the stones, and G, the spindle with a pulley, H, upon its lower end for communicating motion to the runner. The spindle has its bearings in adjustable levers, I J, one above and the other below the machine. These several parts are now in practice.

The peculiarities of my mill, and those which constitute my invention are as follows: The spindle, G, upon which the upper stone is hung has its lower bearing in a step-block, *a*, which has a square projection fitting into a corresponding mortice in the lever or adjustable beam, I, which is pivoted to a bracket, *b*, supported by a cross piece, K. The upper bearing of the spindle is in a pin, *c*, which passes through a bridge, *d*, of a cylindrical piece, L, termed the dead-eye. The pin, *c*, proceeds through the bridge, and has a square end which fits into a similar recess in the upper beam, J, which is pivoted at *e*, immediately above the pivot of the lever, I, so that both levers will have the same motion. The cylindrical portion or dead-eye, L, is therefore prevented from rotating with the spindle and upper stone but can be raised and lowered with the spindle. Above this eye, and supported by the arch, F, is the adjustable hopper, M, shaped like a funnel, with two tubes, *f f*,

proceeding from its bottom and extending down to a fixed collar, *g*, upon the spindle, *G*, as shown by the sectional drawings, Figs. 1 and 4. This hopper rests upon a ring, *h*, which encircles a cylindrical standard, *i*, resting upon the arch, *F*, as above stated, and having oblique slots, *j j*, through one of which passes the stem of a loose handle, *k*; this stem also passes through the ring, *h*. Now by rotating the ring, *h*, it will be elevated or depressed and raise or lower (parallel) the hopper, *M*, and with it the tubes, *f f*. When the hopper is adjusted as desired, by giving the handle, *k*, a turn it will set it rigidly in the desired position. It will be seen that this raising or depressing the hopper throws the lower ends of the tubes, *f f*, nearer or farther from the collar, *g*, and allows more or less grain to escape. Surrounding these tubes is the dead-eye, *L*, which protects the grain from being brought in contact with the rotary motion of the upper stone, and permits the grain to flow rapidly from the hopper, as before stated.

The ends of the two levers, *I J*, are connected together by a vertical rod, *N*, which passes through a collar, *l*, fixed to a plate, *P*, which latter is secured rigidly to one side of the bed, *C*. The rod, *N*, also passes through a similar collar, *m*, which is loose upon the rod, *N*, and connected to the fixed piece, *l*, by toggles, *n n*. Immediately below the loose collar, *m*, is a hand wheel, *R*, which is placed upon the screw portion, *p*, of the connecting rod, *N*, with its hub bearing upon the portion, *r*, of plate, *P*, so that by turning this wheel in one direction, the stone, *A*, will be raised, and by reversing the motion the stone will be depressed. *S* is a movable bearing plate which has two rods, *s s*, passing through the plate, *P*, on each side of the collars, *l m*, and connecting with the right angular part, *t*, of weighted arm or arms, *T*, (only one of which is shown in the drawings) which arms keep the plate, *S*, against the knee portions of the toggles, *n n*, and prevent the toggles contracting during the ordinary operation of the runner, *A*; but should a substance get between the grinding surface of the stones, which would injure the stones, the weighted arms, *T*, will be raised by the action of the toggles upon

the plate, *S*, and the stone will also rise and diminish in its pressure according to the height to which it is raised, and thus allow the substance to be thrown from the mill without injury to the stones or derangement to the mill. Thus it will be seen that I combine with the adjustment of the runner stone so that it may grind finer or coarser by merely turning the hand-wheel, *R*, and as the step, *a*, is raised and lowered in a vertical line, the stone, *A*, will be raised and lowered in a vertical position, a compensating arrangement which will operate automatically to free the stones of any hard foreign substance, and, at the same time, the pressure of the runner will be diminished, the action of the toggles allowing the weights on the arms, *T*, a greater preponderance, yet not sufficient to prevent the stone from assuming its original position and having its original pressure.

What I claim as my invention, and desire to secure by Letters Patent, is:—

1. Regulating the adjustable stone of a grinding mill that the stone may have a vertical adjustment, so as to grind finer or coarser at the same time, so that the pressure of the runner, with respect to the stationary stone will be automatically equalized, and be raised and lowered to free itself of any foreign substance getting between the two stones, by means of levers, *I J*, and vertical rod, *N*, toggles, *n n*, sliding collar, *m*, and weighted arms, *T T*, acting upon the movable bearing plate, *S*, or the equivalents thereof, when the same are arranged, and operate in the manner essentially as specified.

2. I claim the method, herein set forth, for regulating the flow of the grain from the hopper, *M* by adjusting the same vertically, in the manner herein set forth.

3. I claim the dead eye, *L*, arranged within the eye of the upper stone, *A*, and capable of being raised or depressed with the spindle, *G*, for the purposes and in the manner specified.

CHARLES W. BROWN.

Witnesses:

E. O. HOLMES,
CHAS. M. BROWN, Jr.