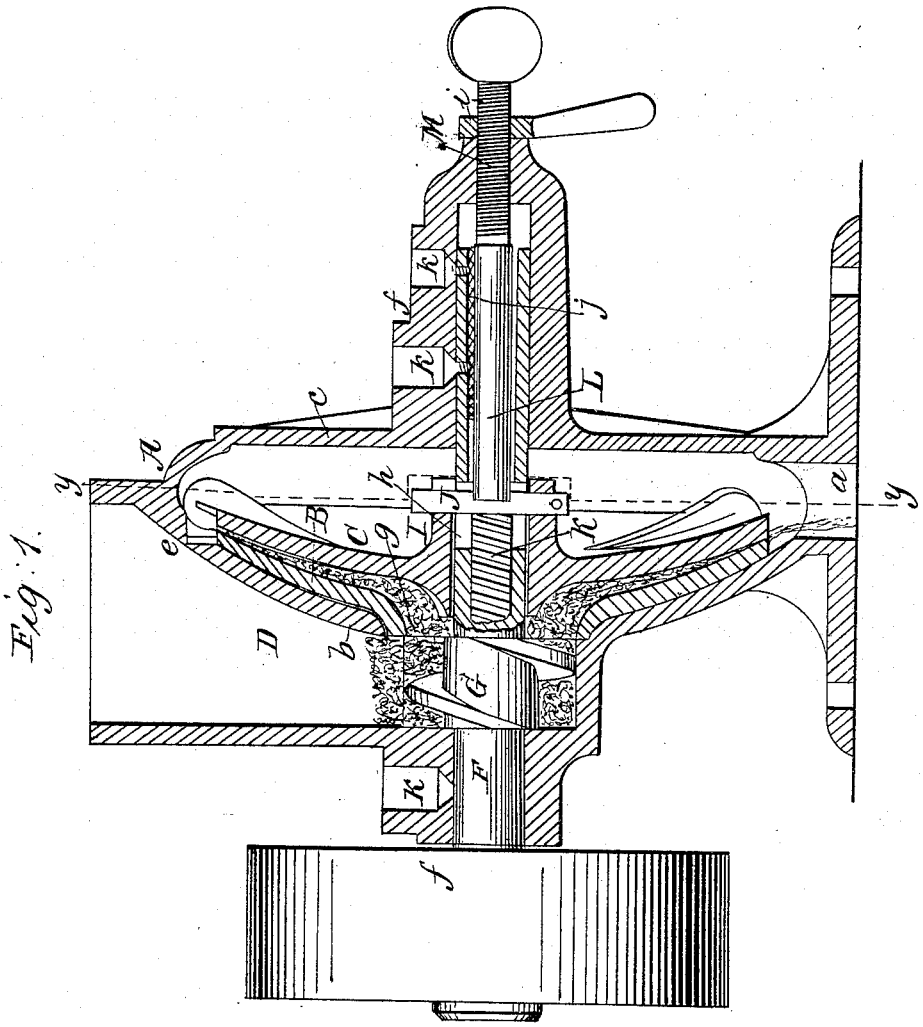
2 Sheets—Sheet 1.

W. STEWART.

Grinding Mill.

No. 27,579. Patented March 20, 1860.

Fig. 1.



Witnesses.
J. W. Coombs
R. S. Spencer

Inventor.
William Stewart
by
Munn & Co
attys

W. STEWART.

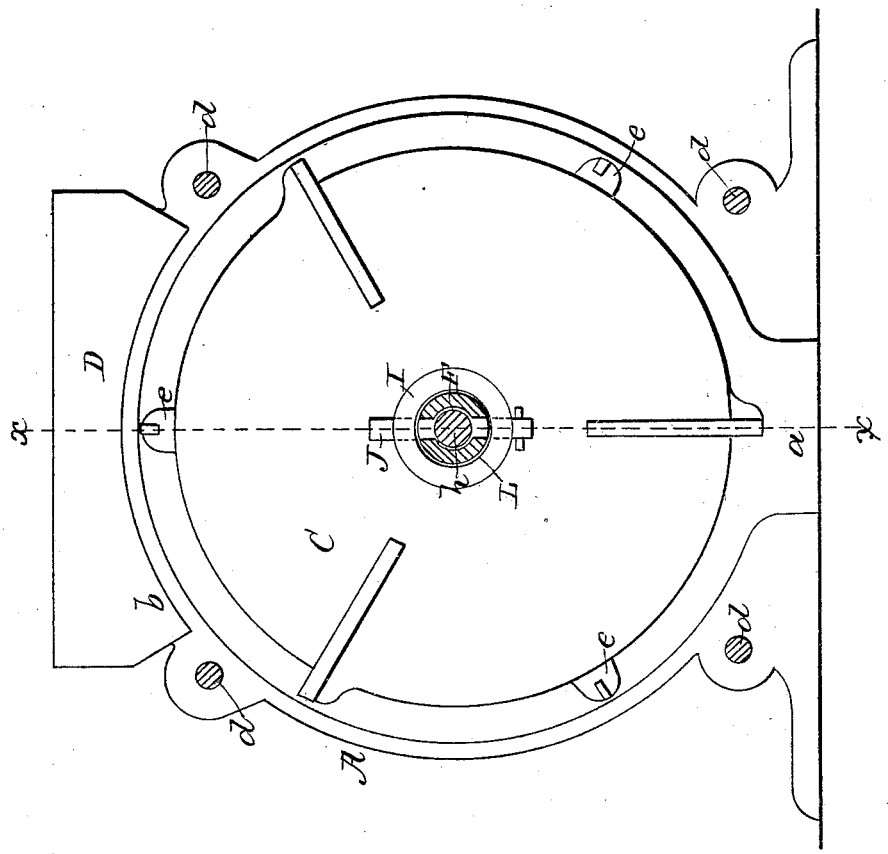
Grinding Mill.

2 Sheets—Sheet 2.

No. 27,579.

Patented March 20, 1860.

Fig: 2.



Witnesses

D. W. Coombs,

R. S. Spencer

Inventor.

William Stewart

by

Munn & Co

attys

UNITED STATES PATENT OFFICE.

WILLIAM STEWART, OF PHILADELPHIA, PENNSYLVANIA.

GRINDING-MILL.

Specification of Letters Patent No. 27,579, dated March 20, 1860.

To all whom it may concern:

Be it known that I, WILLIAM STEWART, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, 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, a vertical section of ditto taken in the line *y*, *y*, Fig. 1.

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

The invention consists in attaching the running grinder to its shaft in such a manner, that it will have a certain degree of play and be self-adjusting so as to conform to the position of the stationary grinder and at the same time be rendered capable of being adjusted manually to grind fine or coarse.

The invention also consists in the employment or use of a screw placed on the shaft of the running grinder at the bottom of the hopper and in such relation with the eye of the stationary grinder as to effect the desired end.

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

A represents a cast-iron shell or case which incloses the grinders B, C, and has a discharge opening *a*, at its lower part and a hopper D, at one side as shown more particularly in Fig. 1. The shell or case A is formed of two parts *b*, *c*, connected together by bolts *d*. The inner side of the part *b* of the case which has the hopper attached is made concave in order to receive a stationary grinder B, the face of which is also concave and is provided with a proper dress or corrugated grinding surface. The grinder B is attached to the part *b* of the case by bolts *e*.

F is a shaft which passes horizontally and centrally through the shell or case A each part of which is provided with a suitable bearing for it both of which are shown in Fig. 1, and designated by *f*, *f'*. On the shaft F and at a point which is in the lower part of the hopper D there is a screw G which is shown clearly in Fig. 1, said screw serving as a feeder as will be hereinafter referred to. This screw G is in line with the central opening or "eye" *g*, of the stationary grinder B, and is equal in diameter to the eye.

The shaft F is tubular and on it the revolving grinder or runner C is placed and secured as follows. The runner is provided with a central hub I which internally is of slightly conical form so as to admit of the runner having a certain degree of lateral or wabbling play on its shaft. Through this hub I a key J passes, said key also passing loosely through an oblong slot *h*, in the shaft F. Within the shaft F in front of the key J a spiral spring K is placed, and a rod L is placed in the shaft behind the key J, against the end of which a screw M bears—said screw passing through the end of the bearings *f* and provided with a jam nut *i*. The spring K, has a tendency to keep the runner C, off from the stationary grinder B, the screw M governing or restraining the action of the spring and keeping the grinders the desired distance apart, according to the degree of fineness the substance is to be ground.

The rod L is made somewhat smaller in diameter than the interior of the shaft so as to admit of an absorbent material *j*, being placed thereon, as shown in Fig. 1. Each bearing *f*, *f'*, is provided with oil receptacles *k*, *k*.

The runner or revolving grinder C has a convex surface corresponding approximately in an inverse manner to the face of the stationary grinder B, as shown in Fig. 1.

The operation is as follows: The shaft F, is rotated by any convenient power and the substance to be ground being placed in the hopper D, it is fed by the screw G through the eye *g* between the two grinders B, C, the latter rotating with the shaft F, and in consequence of being connected therewith as shown, being allowed to conform to the position of grinder B, if the same, have an oblique position relatively with shaft F. This manner of connecting the grinder C, to the shaft F, allows the former a universal adjusting movement like a universal joint and consequently that great care and nicety hitherto required in adjusting the stationary grinders of similar mills is avoided. This self-adjusting movement of the grinder C also compensates for any irregularity of surface due to an unequal shrinkage of the grinders in casting, a contingency which frequently occurs and which cannot be com-

pensated for, so far as I am aware, in any of the mills in use.

The spring K prevents the grinder C coming in contact with the grinder B when the substance passes entirely out of the mill leaving the space between the grinders empty. In ordinary mills this contact of the grinders occurs in consequence of the revolving grinder or runner being attached rigidly to the driving shaft and the necessary end play, the latter has in order to admit of an adjustment of the former to grind coarse or fine. By my invention it will be seen that this regulating movement of the grinder C, is totally independent of the shaft F, the slot *h* being sufficiently long to admit of such movement. This arrangement or manner of connecting the revolving grinder or runner to the shaft F, also, admits of a plurality of grinders being attached to one driving shaft which cannot be done in the usual mills where the runners are attached rigidly to the driving shaft, as a separate shaft is required for each to admit of the adjustment of the runners to grind coarse or fine.

The screw G will always feed the substance to the grinders as fast as desired, for the screw being attached to the same shaft as the revolving grinder or runner, its speed will always correspond therewith and the feed made to correspond with the grinding capacity at all times.

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

The arrangement of the runner C, tubular shaft F, conical hub I, key J, slot *h*, spring K, absorbent *j*, and screw M, as and for the purpose herein shown and described.

WILLIAM STEWART.

Witnesses:

JOHN THOMPSON,

D. K. HATFIELD.