(No Model.) 2 Sheets—Sheet 1.

J. T. CLARK & C. C. CLAWSON.

MILL FOR GRINDING COFFEE, SPICE, &c.

No. 349,693. Patented Sept. 28, 1886.

Fig. 2.

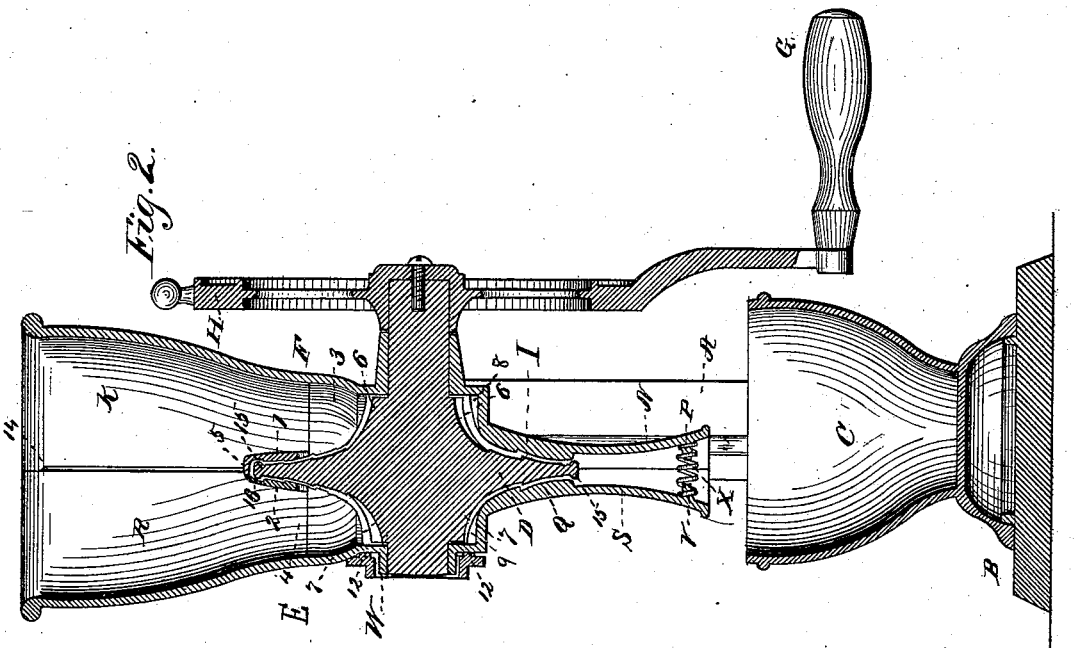
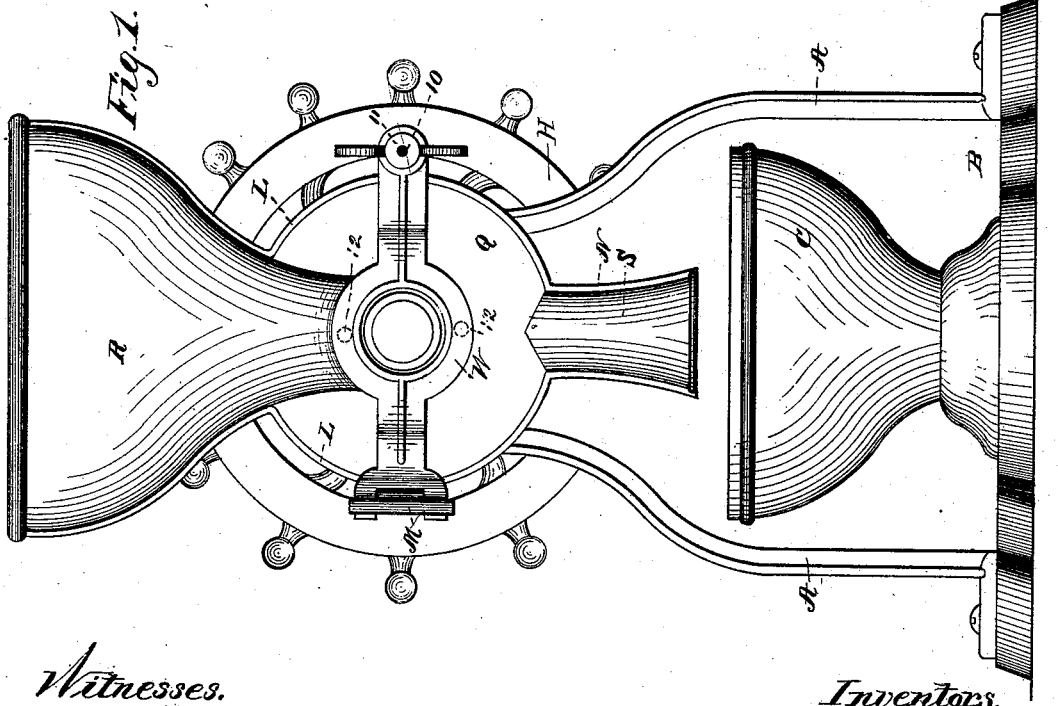


Fig. 1.



Witnesses.
Wm. Rheem.
Philip Adams

Inventors.
James T. Clark and
Clement C. Clawson
by Chas. J. Hedrick
their attorney

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

J. T. CLARK & C. C. CLAWSON.

MILL FOR GRINDING COFFEE, SPICE, &c.

No. 349,693. Patented Sept. 28, 1886.

Fig. 4.

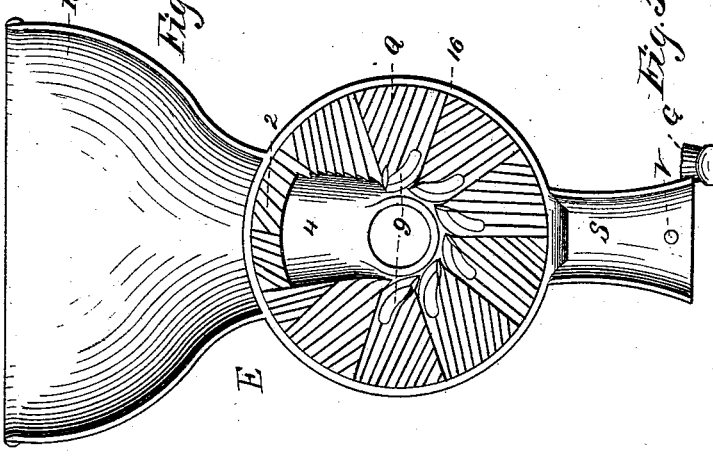


Fig. 5.

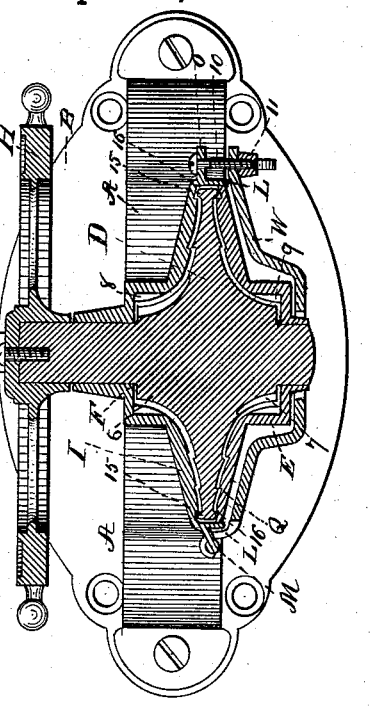
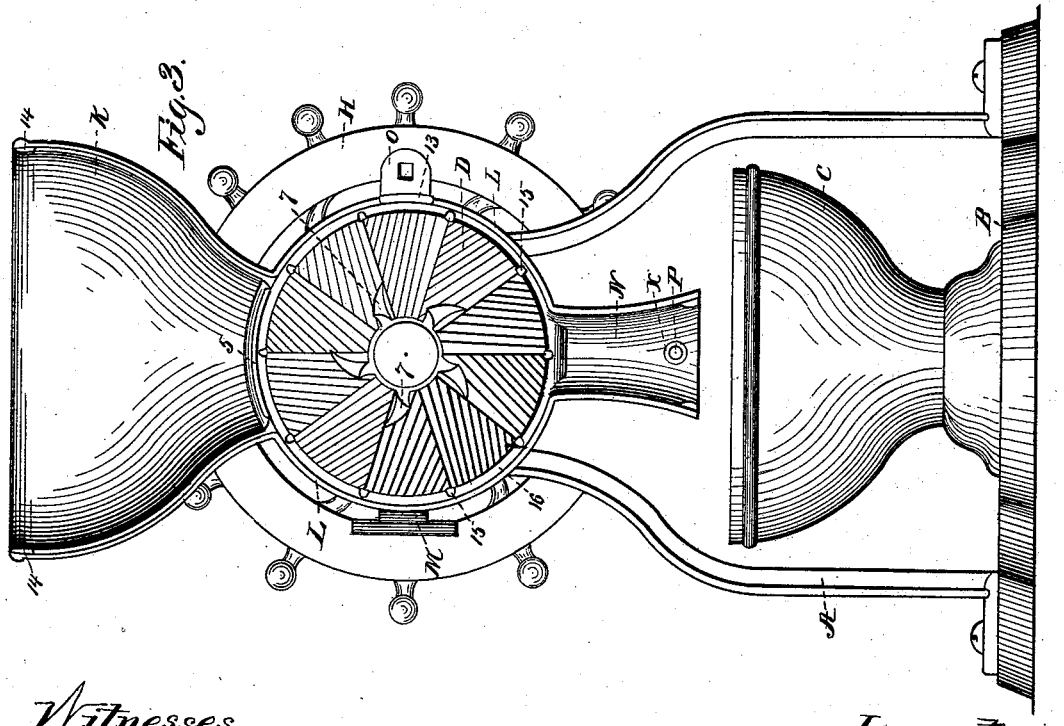


Fig. 3.



Witnesses.
Wm. Rheem.
Philip Mauro

Inventors.
James T. Clark and
Clement C. Clawson
by Chas. J. Hedrick
their attorney

UNITED STATES PATENT OFFICE.

JAMES T. CLARK AND CLEMENT C. CLAWSON, OF NEWARK, NEW JERSEY.

MILL FOR GRINDING COFFEE, SPICE, &c.

SPECIFICATION forming part of Letters Patent No. 349,693, dated September 28, 1886.

Application filed December 10, 1885. Serial No. 185,303. (No model.)

To all whom it may concern:

Be it known that we, JAMES T. CLARK and CLEMENT C. CLAWSON, citizens of the United States, residing at Newark, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Mills for Grinding Coffee, Spice, and other Materials, of which the following specification is a full, clear, and exact description.

This invention relates to that class of upright mills with a runner rotating in vertical planes, in which a stationary grinding shell or plate is adjusted laterally, in order to make the mill grind coarse or fine, and has more particular reference to upright duplex mills in which the runner is provided with grinding-surfaces on both sides and rotates or moves between a pair of grinding shells or plates, although the improvements are not wholly limited to duplex mills, they or some of them being applicable to single grinders as well. Heretofore such upright mills have been made in which more or less of the hopper is rigidly attached to or cast in one piece with each side of the adjustable grinding-chamber. Usually a half of the hopper is attached to or cast on each side of said chamber; but in one or more instances a smaller portion has been so formed. Thus, for example, a short neck or throat has been cast on the grinding-chamber—a part of the neck or throat on each side of the chamber—the main body of the hopper fitting over this neck or throat. Usually, also, the discharge-spout, placed at the bottom of the grinding-chamber, is made in two parts, one attached to each side of said chamber. In this kind of mill the facility of adjustment is with the constructions heretofore employed apt to be diminished or destroyed by the ground material packing between the adjustable shell or plate and an opposing part of the frame or casing.

To overcome this difficulty is mainly the object of the first part of this invention, which, to that end, consists in the combination, with the vertical runner and the two grinding shells or sides of the adjustable grinding-chamber, each shell or side having a portion of the hopper rigidly attached to or cast on the same, of a frame or flange rigidly attached to or in one piece with one of said shells or sides and surrounding the edges of the other, the latter being of the same diameter as the runner, and fitting the said frame or flange so as to prevent escape of material at the joint while permitting adjustment to be made, and being prevented from turning by the portion of the hopper attached thereto. The projecting portion of the spout, when this is attached to or cast on the adjustable grinding-shell, also assists in retaining said shell in place. The adjustable grinding shell or plate having the same diameter as the runner, or it may be somewhat less, so that the runner itself is opposite the whole surface of the grinding shell or plate, there is no place in which the ground material can collect and interfere with the adjustment.

Heretofore in upright mills having an adjustable two-part casing with a grinding shell or plate attached to or in one piece with one or both parts of the casing, it has been customary, if not universal, for the two parts to have no contact with each other, except by means of such overlapping flanges as may be necessary to prevent movements at right angles to the axis of the runner. So far as movements toward and away from each other are concerned, they have been left free to be adjusted equally over the whole surface, so far as the user is able to do so.

The second part of the invention consists in establishing a pivotal connection between the two parts of the casing, so that at one point there is or need be no adjustment of the said parts. It is, however, desirable for the adjustment of the grinding shell or shells to be practically equal over the entire surface, and therefore the pivotal connection is made outside the said surface, preferably at the top of the hopper. This gives such a long radius to the curve in which each part of the grinding-shell moves that, practically, for the short distance in which adjustment is desirable the motion is in a straight line. The hopper is made integral with or is otherwise rigidly attached to the rest of the casing, the front of the hopper being on one part of the casing and the back on the other, as is not uncommon in this class of mills.

Heretofore in upright mills having a two-part adjustable casing provided with a grinding shell or surface on one or both parts, it has been customary to use means for drawing the parts together, simply leaving it to the mate-

rial being ground to keep them as far apart as the adjusting means will allow.

The third part of the present invention consists in the combination, with the vertical runner and the two-part adjustable casing provided with a grinding-surface, of a spring or springs for holding them apart, so that the grinding-shell will not be loose when adjusted for coarse grinding.

The invention also consists in the combination, with the vertical runner and the two-part adjustable casing having a portion of the hopper integral with or otherwise attached to each part, and pivotally connected at the top of said hopper, of the adjusting means placed at the middle of the casing for drawing the parts together and the spring at the bottom for holding them apart; and it further comprises certain other special constructions and combinations, as hereinafter set forth.

The following is a description of what is considered the best mode of applying the principle of the invention, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is a side elevation of a mill constructed in accordance with the invention; Fig. 2, a central vertical section of the same in a plane at right angles to that of Fig. 1; Fig. 3, a side elevation with one part of the casing and the adjusting means removed; Fig. 4, an inside elevation of the part of the casing not shown in Fig. 3, and Fig. 5 a horizontal section, looking down.

The mill is shown provided with legs A, fastened to the base B, the legs being of such length as to admit of the introduction of a cup, C, below the spout of the mill, to receive the ground material; but the manner of supporting the mill is immaterial. The runner D is journaled in the two parts E and F of the casing, and is or may be revolved by any suitable means. As shown, there is a crank, G, and fly-wheel H on one journal. Both surfaces of the runner are provided with grinding-teeth, and on each side there are at the center large teeth for cracking the material. The part F is cast in one piece with the legs A; but it may be otherwise attached to its support. This casting, as shown, includes the grinding shell or plate I, the back K of the hopper, the flange L, the T-shaped lug M, the ear O, the back N of the spout, and the projection P, in addition to the legs A. The part E consists, as shown, of one casting, which includes the grinding-shell Q, the front R of the hopper, the front S of the spout, and the projection V. It will be observed that each grinding shell or plate I and Q, respectively, has a bridge-piece, 1 and 2, respectively, which separates the mouth 3 or 4 of the front and back of the hopper from the outer part of the runner, and has a grinding-surface on the side adjacent to the runner. These bridge-pieces while desirable are not essential to the invention. The bridge-piece 1 has a flange, 5, which projects over the top of bridge-piece 2. Below the two sets of large teeth 6 and 7 on the runner the grinding-shells are provided with coarse teeth 8 and 9, for co-operating with them. The grinding shell or plate Q has substantially the same diameter as the runner D, and fits within the frame formed by the flange L, so as to prevent escape of material at the joint while permitting adjustment to be made. This frame (or flange) incloses the periphery of the runner and extends laterally beyond it. (See sectional views.) This grinding-shell is adjusted within the frame or flange toward or away from the runner D. As the latter covers the face of the grinding-shell, it is impossible for the ground material to collect in front of any part of said shell so as to interfere with the facility of adjustment. The adjustment is effected by means of the strap W, held at one end by the T-shaped lug M, with which it forms a hinge, and at the other engaged by the screw 10 (which passes through the ear O, and also through the end of the strap) and wing-nut 11, which engages the screw and presses upon the strap. By turning the nut in one direction or the other the grinding-shell is drawn toward the runner or is allowed to move away from it. At the middle the strap has small teats 12, which bear upon the grinding-shell Q near the center of the same, above and below the journal of the runner. The edge of the flange L at 13 forms a stop to prevent a too close adjustment of the grinding-shell.

As already stated, the grinding shell or plate Q is attached to the front R of the hopper, being made in one casting with it. It is prevented from turning by this part of the hopper, and also by the portion of the spout which depends from said shell. At 14 there is a bearing between the front and back of the hopper, upon which bearing the part E may turn, so that it forms between the two parts of the casing a pivotal connection, which permits the shell Q to be adjusted in a curve practically coincident with a straight line. The axis of the pivotal connection is of course transverse to that of the runner. A spiral compression-spring, X, is interposed between the front S and back N of the spout, the ends of the spring being placed over the projections P and V. It tends to press apart the lower ends of the two parts E and F of the casing. The runner D is movable endwise in its bearings to a sufficient extent for enabling it to place itself midway between the grinding shells or plates I Q, whatever the adjustment of the shells or plates may be. The teeth 6 and 7 are of such length that they prevent contact of either grinding-surface of the runner with the opposite grinding-shell. The runner D is provided on the periphery with spaced teeth 15, which project laterally as well as radially, as shown in Figs. 2 and 5, and the grinding shells or plates have each a groove, 16, to receive the projecting edges of the teeth. These spaced teeth carry the ground material from all parts of the grinding-chamber and deliver it into the spout. The cup C has at the

top a bead, and can be used as a cover to the mill when not in use, the edge of the cup fitting within the top of the hopper.

Modifications may be made in details without departing from the spirit of the invention, and parts of the invention may be used separately.

Having now described the invention and the manner of carrying the same into effect, what we claim, and desire to secure by Letters Patent, is—

1. The combination, with the vertical runner and the two grinding shells or sides of the adjustable grinding-chamber, each shell or side having a portion of the hopper rigidly attached to or cast on the same, of the frame or flange rigidly attached to or cast on one of said shells or sides and surrounding the edge of the other, the latter being of the same diameter as the runner and fitting the said frame or flange, so as to prevent escape of material at the joint while permitting adjustment to be made and being prevented from turning by the portion of the hopper attached thereto, substantially as described.

2. The combination, with the vertical runner provided with journals and the frame or flange forming part of the casing and extending laterally beyond the runner, of the adjustable grinding shell or plate, of the same diameter as the runner, fitting within said frame or flange, so as to prevent escape of material at the joint while permitting adjustment to be made, and provided at the center with a bearing for the journal of said runner, substantially as described.

3. The combination, with the vertical runner, of the casing formed of two castings adjustably connected with each other, one casting comprising a part of the hopper, a grinding shell or side of the grinding-chamber, a laterally-projecting frame or flange, and the legs or support for the mill, and the other casting comprising another part of the hopper and a grinding shell or plate of the same diameter as the runner, said shell fitting within the frame or flange in the other casting, substantially as described.

4. The combination, with the vertical runner provided with journals, and the frame forming part of the casing and inclosing and extending laterally beyond the periphery of said runner, of an adjustable grinding shell or plate of the same diameter as said runner, fitting within said frame and provided with a journal-bearing for the runner, and the adjustable strap for adjusting the position of the grinding-shell within said frame, substantially as described.

5. The combination, with the adjustable grinding shell or plate, of the adjusting-strap bearing at the middle on said shell, the T-shaped lug engaging one end of said strap, and the ear, screw, and nut for drawing in the other end, and thus adjusting the position of said shell or plate, substantially as described.

6. In combination with the vertical runner, an adjustable two-part casing provided with a grinding shell or shells, and having a pivotal connection between said parts, the axis of the pivotal connection being transverse to the axis of the runner, so that the grinding-shell can be adjusted laterally, substantially as described.

7. The adjustable two part casing for an upright mill, one part consisting of the front of the grinding-chamber and the front of the hopper, and the other of the back of the grinding-chamber and the back of the hopper, and the two parts being pivotally connected at the top of said hopper, substantially as described.

8. The combination, with the runner, of the adjustable two-part casing and the spring for separating the said parts so far as the adjustment will permit, substantially as described.

9. The combination, with the two parts of the mill-casing pivotally connected at the top, of the adjusting-strap at the middle for drawing them together, and the spring at the bottom for pressing them apart so far as the strap will permit, substantially as described.

10. The combination, with the vertical runner provided with journals and an adjustable shell or plate having at the center a journal-bearing for the runner, of an adjusting-strap having teats for bearing upon the grinding shell or plate above and below the journal, substantially as described.

11. The improved duplex mill herein described, comprising the following elements: a vertical runner provided with spaced teeth in the periphery and grinding-surfaces on both faces and movable endwise in its bearings, the two grinding shells or plates, one of said shells or plates being of the same diameter as the runner and fitting within a frame inclosing the periphery of the runner, the hopper attached to said shells or plates, the front on one shell, the back on the other, and the adjusting strap and spring for regulating the distance between the runner and the grinding-shells, substantially as described.

In testimony whereof we have affixed our signatures in presence of two witnesses.

JAMES T. CLARK.
CLEMENT C. CLAWSON.

Witnesses:
C. A. DEHART,
GEO. H. BALDENECKAR.