No. 640,845. Patented Jan. 9, 1900.

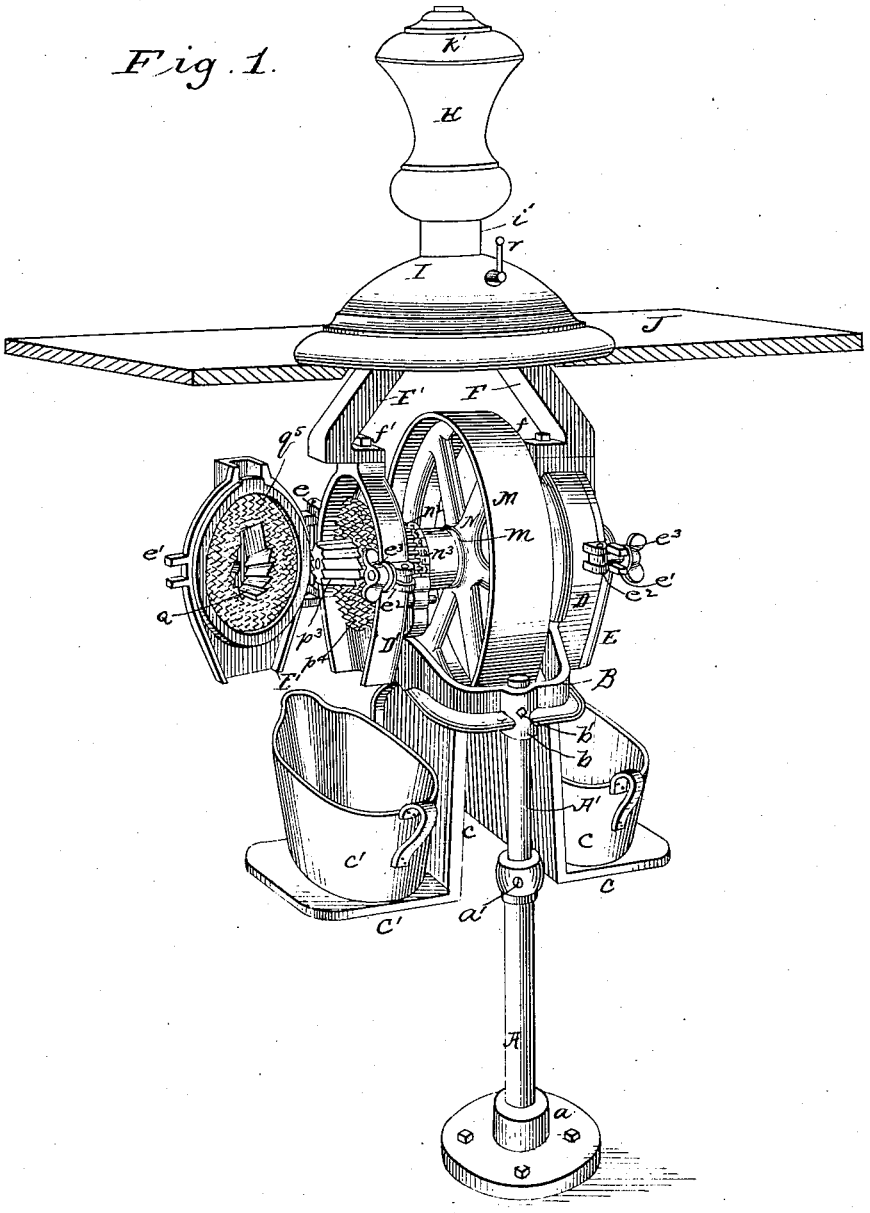
E. H. WEBSTER.

DUPLEX GRINDING MILL.

(Application filed Mar. 12, 1898.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



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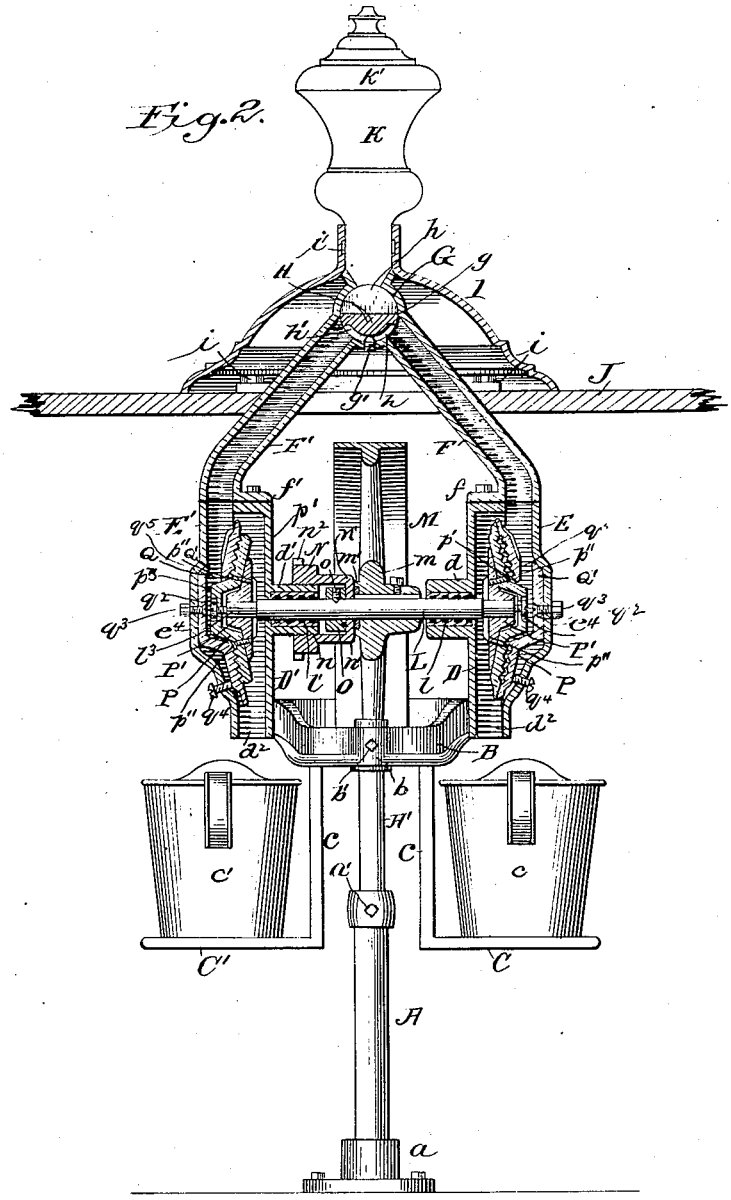
(No Model.) 4 Sheets—Sheet 2.

Fig. 2.



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DUPLEX GRINDING MILL.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 3.

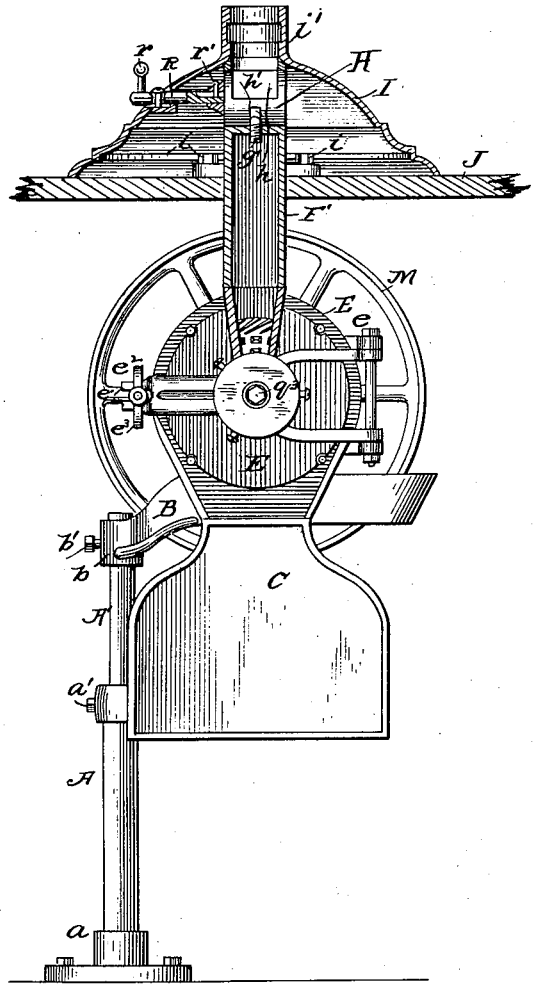
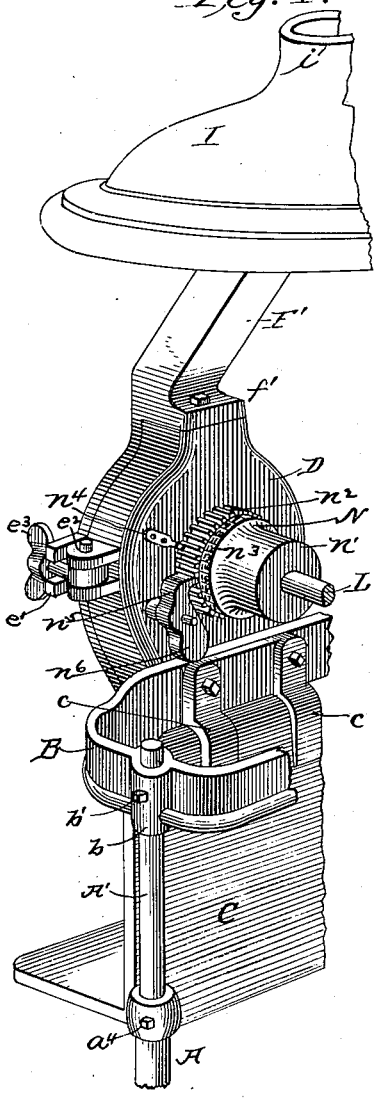


Fig. 4.



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(Application filed Mar. 12, 1898.)

(No Model.) 4 Sheets—Sheet 4.

Fig. 5.

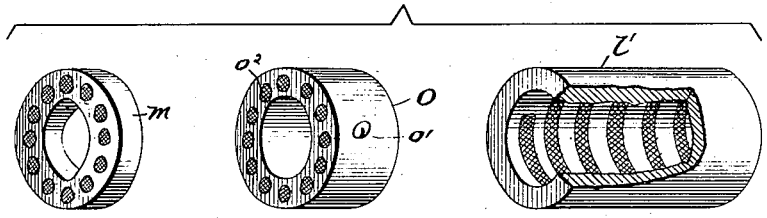


Fig. 6.

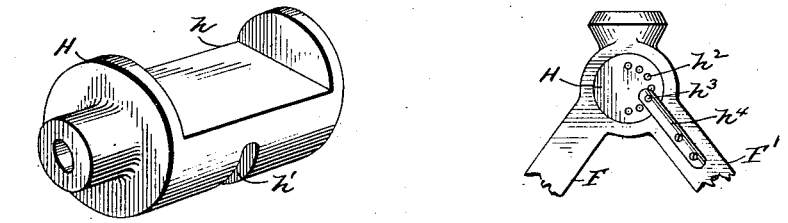


Fig. 7.

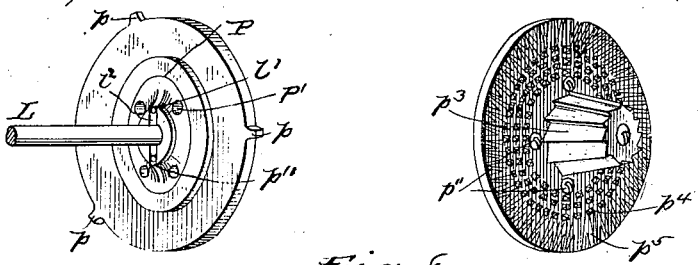
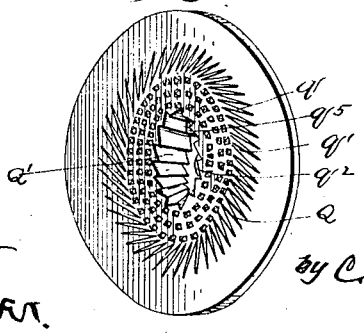


Fig. 8.



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UNITED STATES PATENT OFFICE.

EDWARD H. WEBSTER, OF RUTLAND, VERMONT, ASSIGNOR TO THE HOWE SCALE COMPANY OF 1886, OF SAME PLACE.

DUPLEX GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 640,845, dated January 9, 1900.

Application filed March 12, 1898. Serial No. 673,602. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. WEBSTER, a citizen of the United States, residing at Rutland, in the county of Rutland and State of Vermont, have invented certain new and useful Improvements in Duplex 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.

This invention relates to improvements in a duplex grinding-mill and adjustments therefor for grinding coffee, spices, &c.

An object of the invention is to provide a duplex coffee-mill which is simple in construction, strong and durable, positive of action, and economical in the use of power.

A further object is to provide such a mill so that by one adjustment the mill will grind any material—such as coffee, &c.—either as a fine powder or granulate the same, depending upon to which chute the material is admitted from a common receptacle.

A further object is to provide certain novel adjustments for the grinding-plates and other minor details, which will be more fully pointed out in the specification and claims.

Reference is to be had to the accompanying drawings for a clear and complete understanding of the invention, in which—

Figure 1 is a general perspective view of the mill in position for operation. Fig. 2 is a central transverse sectional view of the same. Fig. 3 is an end view of the mill, the upper part being shown in section for better illustration. Fig. 4 is a perspective view of a part of the mill, the other part being broken away for clearer illustration, showing the adjustment device and indicator on the same to set the adjustment. Fig. 5 represents graphite bearings used on the shaft of the device. Fig. 6 are views of a hopper-valve and securing device for the same. Fig. 7 are front and rear views of the revolving or rotary inside grinders, and Fig. 8 is an inside view of a stationary grinder-plate in and against which a rotary grinder operates.

In the drawings, A represents an upright standard suitably secured to the floor by a base *a* to steady the mill and prevent vibration while running. Only one standard is shown; but for larger mills another standard may be used when necessary. This standard is tubular and has a suitable collar at its upper end, in which is a set-screw *a'*, by means of which a second standard A' is adjusted and held at any desired elevation within the first standard. This second standard A' has secured in a plane at right angles to it one end of an elliptical-shaped yoke B by means of a set-screw *b'*, as shown, there being a sleeve *b* formed on said yoke for the insertion of the upper end of standard A'. Secured to the inside of this yoke are oppositely-arranged depending hangers *c*, and bolted or otherwise secured to the latter are outwardly-projecting seats C C' for the support of receptacles to receive the ground material from the delivery-spouts of the mill.

Bolted to the middle portions of the exteriors of yoke B are the lower interior sides of the grinder-casings D D', which are of cylindrical form, and these interior sides are centrally provided with inwardly-projecting journal-bearings *d d'* for a shaft to project through, as hereinafter described, and one of these bearings *d'* has its exterior surface threaded. (See Fig. 2.) The fronts or exterior sides of these casings are provided with doors E E', suitably hinged at *e* at corresponding points on the exterior surfaces, and the opposite sides of the doors are provided with suitable securing devices, such as a slotted projection *e'* on the doors and a pivoted bolt e^2 to engage the same, having a wing-nut e^3 upon its outer end, said bolt being threaded and secured to the side of the casing, as shown. The central portions e^4 of said doors project outwardly, forming offsets upon their interior surfaces, in which stationary grinding-plates are secured, hereinafter referred to.

F F' are two chutes leading from an upper and common valve H to the upper ends of casings E and E', respectively, with which they communicate, and the lower ends of these chutes are bolted to the upper interior sides of the casings at *f f'* to hold the parts securely in place. On the chutes F F' are also four lugs, through which the bolts *i* pass, securing the mill to the counter J and supporting the mill. At the upper ends of these chutes at

the point of jointure there is provided a suitable valve-seat G, in which there is mounted a valve H, (see Fig. 6,) which is partly cut away at h and has a transverse groove h' in the remaining portion, into which projects the upper end of a screw g' from the under side of the valve-seat to limit the play of the same, and this valve has upon one of its ends a series of apertures h^2, into which a pin h^3 upon the end of a spring-rod h^4, secured to one of the chutes, is forced to hold the valve in any desired position, the chute being cut away opposite this end of the valve for that purpose.

I is a dome or hood which fits over the top of the chutes and has a central opening registering therewith, and this dome rests on the counter or platform J, as shown, its weight being sufficient to hold it in place. In the upper end i' of this dome is removably fitted or inserted a hopper K of any approved design to receive the coffee or other substance to be ground.

L is the driving or power shaft, of less length than the distance from door E to E', which passes through journals $d\,d'$ and suitable bearings $l\,l'$ in the interiors of the journals. Upon the center of this shaft is securely mounted to revolve therewith a driving-wheel M, and the hub m of this wheel has a suitable graphite washer m' on its side toward casing D' for the abutment of adjuster N, mounted on the shaft next thereto. This adjuster is thimble-shaped and threaded on its interior surface n and screws onto the threaded surface on journal d', before referred to, and the end thereof n' is apertured to receive the shaft L. Secured to said shaft at a short distance from the end of journal d' is a collar O, which is preferably held rigid on the shaft by a screw o, passing through the collar and into a recess in said shaft. When the adjuster N is turned or rotated upon the threads of the journal d', it shifts the shaft L longitudinally to the right or the left, according to the movement of the adjuster, and the displacement may be accomplished with precision and the shaft retained in its shifted position by means of the mechanism coöperating with said adjuster. The collar O and hub m being fixtures on the shaft and the adjuster being free from the rotatory influence thereof, the turning of the said adjuster imparts only the desired longitudinal movement to the shaft. To reduce the friction incident to the contact of the collar O with the adjuster, the former is recessed at intervals o^2 and provided with fillings of some suitable substance, such as graphite. This adjuster has a cogged outer rim n^2 and a series of numerals n^3 opposite said cogs to designate the same, as shown.

n^4 is a suitable indicator-finger secured to the inner side of casing D' above said cogs and numerals n^3. n^5 is a weighted lever centrally pivoted to the same casing, having an upper end suitable to engage and hold said cogged surface from revolving by means of a weight n^6 on its lower end. The ends of shaft L are preferably turned down and have apertures through the same. Upon these ends are secured the rotary grinders P by means of slots l^2 in the backs thereof and pins l' in said slots passing through said apertures, which hold the rotary grinders securely on said shaft to revolve therewith. These rotary grinders are preferably made up of a circular casting P' for a base, which is centrally apertured to fit snugly upon the ends of shaft L, and these castings P have centrally-located nubs or projections p', which are of truncated-cone shape, as shown. Screwed to these bases by screws p'' are the grinders proper of substantially dish shape and designed to fit over the cone-shaped nub and be secured, as described. The truncated cone p^3 of the rotary grinder has suitable grooves and sharpened edges upon its outer surface, as shown, and to make the grinder more secure a screw p^2 is passed through its head and screws into the end of shaft L. The faces p^5 of the rotary grinders have next to the cones p^3 a series of teeth p^4 and nearer the rims thereof are grooved finely, as at p^5, after the manner of ordinary millstones, which are used for similar purposes.

Q are correspondingly-shaped stationary grinders, minus the bases P', having grooves q arranged in a reverse direction to grooves p^5 and teeth q' to alternate with and revolve between the series of teeth p^4 on rotary grinder P, and each has a depression or basin Q' with grinding edges the reverse of the rotary grinder, within which said rotary grinder cones p^3 revolve. The bottoms of these stationary grinders are apertured at q^2, centrally of the same, and are thereby screwed to the doors E E' by screws q^3, as shown, and q^4 are screws passing through the lower parts of doors E E' and bearing against the lower parts of the stationary grinders for the purpose of adjusting the same with respect to the rotary grinders. On account of this construction the grinders may at any time be removed and others substituted, and it is further apparent that when one of the rotary grinders is adjusted to grind finely by manipulating the adjuster, as before described, the other rotary grinder will be farther and correspondingly withdrawn from its adjacent stationary grinder, so that one part of the mill will grind finely while the other part or set of grinders will grind coarsely or cause granulations, provided the coffee or other material is admitted at the same time to both sets of grinders. This is especially advantageous for filling two orders at the same time for finely-ground and granulated material. Besides it is a saving in power and is economical, inasmuch as one mill serves the purposes of two mills.

The upper conical parts or the depressions Q' are cut away at q^5 (see Figs. 2 and 8) in alinement with chutes F F' to readily admit the material to be ground directly upon the

conical-shaped parts p^3 of the rotary grinders P, which break the material so admitted up into smaller parts or granulate the same and reduce it to convenient size to be further reduced by the teeth and grooves on the grinders before described, from whence the material passes out of the lower ends or chutes d^2 d^2 of the casings into suitable receptacles C C' below.

The material to be ground after having been placed in hopper K is admitted, alternately when desired, first into chute F and then into chute F' by valve H, which is operated by means of a suitable rod R, secured at its inner end to a projection r' of said valve, thence supported in suitable guideway on dome I, and having a handle r on its outer end for manipulating the same.

Power is applied to wheel M in any desired method for operating the mill.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a grinding-mill, the combination with a hopper, and a forked or two-way chute leading therefrom, of a one-way, rotary valve, seated in the angle of the chute, to direct the contents of the hopper to either branch of the chute, a pin engaging with a groove in the surface of the valve, to limit its rotary movement, and a spring-pressed pin adapted to engage with a series of holes in the end of the valve, to lock the same in a fixed position.

2. In a grinding-mill, the combination with a hopper, and a forked two-way chute leading therefrom, of a one-way rotary valve, seated in the angle of the chute, to direct the contents of the hopper to either branch of the chute, a pin engaging with a groove in the surface of the valve to limit the rotary movement, a spring-pressed pin adapted to engage with a series of holes in the end of the valve to lock the same in a desired position, of a rotatable shaft, a grinding-disk secured to each end of the shaft to rotate therewith, stationary grinding-disks located in juxtaposition to the said rotary grinding-disks and means for shifting said shaft longitudinally in either direction to simultaneously vary the space between the faces of the two sets of grinding-disks, consisting of a sleeve loosely mounted on said shaft, between the sets of disks, with one end threaded upon an extension of the support for the stationary disks, a ratchet-and-pawl arrangement to secure the sleeve in a fixed position and means for preventing longitudinal movement of the shaft independently of the sleeve pockets or chutes on the rear of the stationary grinding-disks leading to the central openings in said disks, and opening into said two-way chute, substantially as described and set forth.

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

EDWARD H. WEBSTER.

Witnesses:

C. B. HINSMAN,

C. H. HAZELTON.