

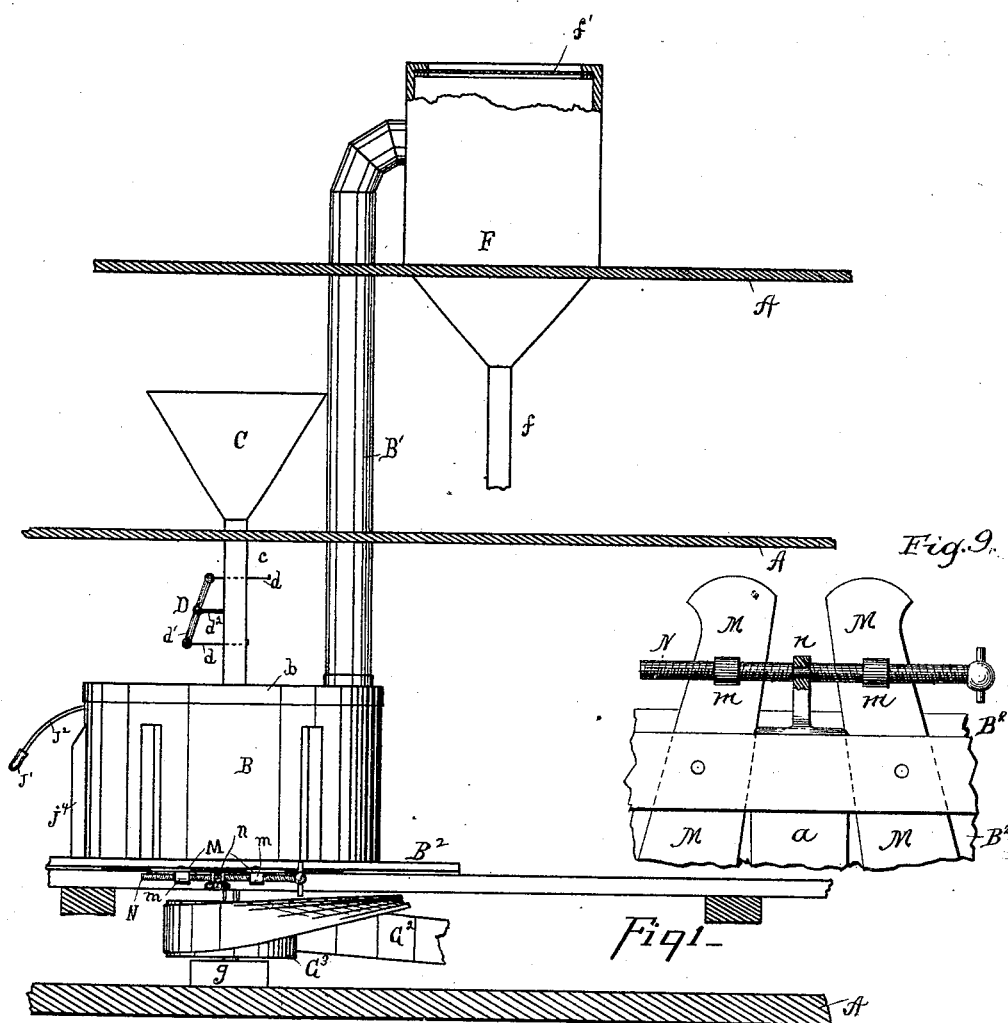
(No Model.)

2 Sheets—Sheet 1.

B. KANE.
CHASING MILL.

No. 348,524.

Patented Aug. 31, 1886.



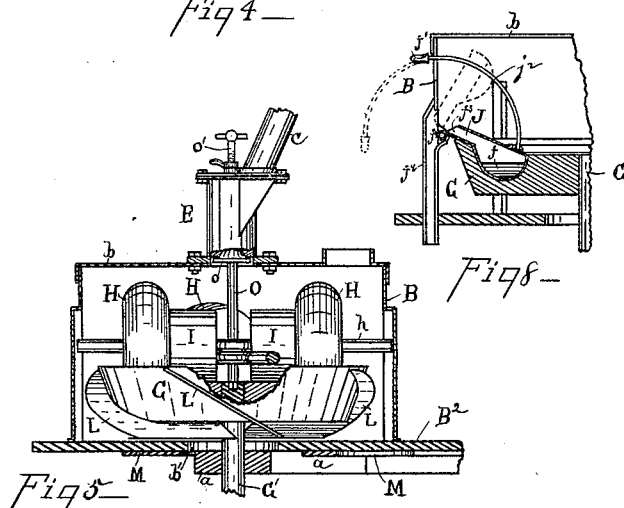
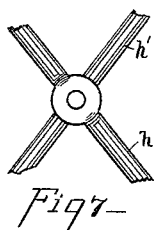
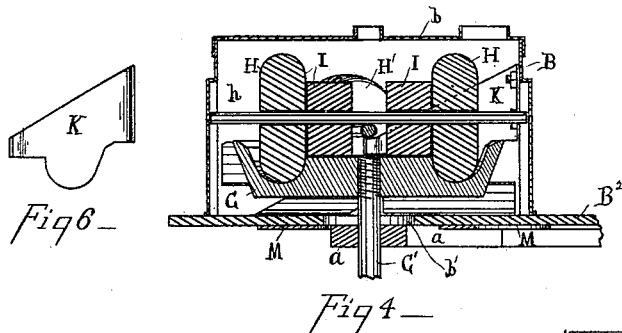
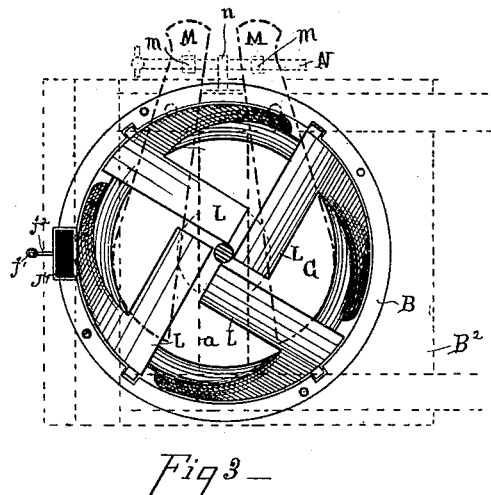
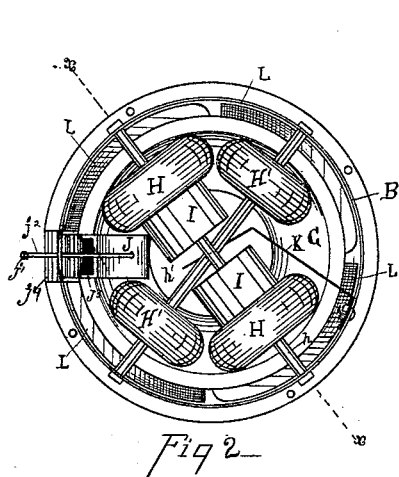
Attest—
G. S. Oliver
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Inventor—
Bart Kane
By Geo. Murray Atty

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UNITED STATES PATENT OFFICE.

BART KANE, OF CINCINNATI, ASSIGNOR TO JOHN D. CHAMBERS, OF CLEVELAND, OHIO.

CHASING-MILL.

SPECIFICATION forming part of Letters Patent No. 348,524, dated August 31, 1886.

Application filed September 7, 1885. Serial No. 176,368. (No model.)

To all whom it may concern:

Be it known that I, BART KANE, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Chasing-Mills, of which the following is a specification.

My invention relates particularly to mills for grinding mineral substances, such as founder's facings, cements, paints, &c.

Its objects are, first, a means to separate the finished goods as soon as finished from the unfinished stock, so as to relieve the grinders and leave them free to act upon the coarser particles, and thus produce a greater yield; and, second, to prevent the dust and consequent waste and annoyance caused by it.

With these objects in view my invention consists of a new machine or mill, which will be first fully described in connection with the accompanying drawings, and particularly referred to in the claims.

Referring to the drawings, in which like parts are represented by similar reference-letters wherever they occur, Figure 1 is a side elevation of my improved mill placed in a building for use. Fig. 2 is a plan view of the grinders and the case which incloses them, the top of the case being removed for the purpose of exposing the grinding-rollers and the pan and its attachments. Fig. 3 is an inverted plan view of the same, the platform upon which the mill is supported and the air-valves being shown in dotted lines. Fig. 4 is a central vertical section taken through line *xx* of Fig. 2. Fig. 5 is a similar view of the case, the grinders being shown in elevation, except a portion of the periphery of the pan, which is broken away, and the center of the pan shown in section to illustrate the means of driving the preliminary grinder and feed-regulator, which is attached on top of the case when such is used. Fig. 6 is a side elevation of the fence or scraper, which is intended to return the material toward the center of the pan, so as to insure every portion of it being acted upon by the grinders. Fig. 7 is a plan view of the central portion of the wheel-shafts shown in Fig. 5. Fig. 8 is a vertical section of a part of the case and the pan (with the grinding-wheels removed) and the discharger,

which is used when the mill is intended as a preliminary grinder to prepare the material for the finishing-mill. Fig. 9 is an inverted plan view, in detail, of the valve opening and closing device shown upon an enlarged scale. The bracket-bearing is shown in broken section to show the means by which longitudinal motion of the opening and closing screw is prevented.

Referring first to Fig. 1, A represents the different floors of the mill-building. As usual, the first floor is occupied by the packers and the mill-driving mechanism, neither of which are shown, as they form no part of my invention. In the second floor are placed the grinding-mills, which are inclosed within the metal cylinders B. In the third story is located the mill-hopper C, which is fed by the ordinary elevator. (Not shown.) The feed-spout *c* extends from this hopper down to the center of the cap *b* of cylinder B. Interposed between the hopper and the cap *b* is a charger, D, and below it the preliminary grinder E, Fig. 6, when such is used. In the upper story of the building is located the receptacle F, for the finished goods. The lower part of this is cone-shaped, like the ordinary hopper, the cone end extending into the room below, and from it extends the spout *f*, which leads to the packers in the first story. In practice one of these receptacles is employed to receive the finished goods from three or four mills. The spouts *B'* extend from the mills up to the receptacle. The spouts *f* of this receptacle are provided before they reach the hoppers with the customary valves, to close off the supply of material while the filled barrels are changed from the packers and empty ones replaced.

Referring, now, to the detail views shown on Sheet 2 of the drawings, G is a cast-metal pan. The outer portion of it is formed into an annular depression counter to the rounded peripheries of the wheels H, which are loosely fitted upon a transverse shaft, *h*, the ends of which extend through the case B, which is vertically slotted to receive them. They extend into vertically-slotted guides secured upon the outside of the case. The edge of the case and the slotted guides form bearings which permit the shaft to have vertical play within

them. The central portion of the bottom of the pan is flat, like the bottom of the ordinary chaser, and upon this portion rest the flat rollers I, which do not differ materially from the rollers now used in the common chasers. The pan G is firmly secured upon the upper end of the spindle G', the lower end of which rests upon a step, *g*. The pan is revolved by a belt, G², which passes over a pulley, G³. The rollers H', like the rollers H, are secured loosely upon a shaft, *h'*. The ends of this shaft also pass through the case B, and are fitted in bearings like shaft *h*. These rollers H' are of less diameter than the rollers H, and their shaft is placed diagonal to the shaft *h*, and underneath it. The object of placing the shaft diagonally, instead of at a right angle to each other, is to make room for a discharger, J, which is used when my mill is used as a preliminary grinder, and a scraper, K, which is placed diagonally to the radius of the cylinder. The lower edge of the scraper conforms to the shape of the pan, as clearly shown in Fig. 6. The purpose of this arrangement is to return the heavier particles of the material which are thrown by centrifugal force toward the outer edge of the pan toward its center. By this means none of the material is liable to escape the action of the rollers H H' I. The outside rim or periphery of the pan G is provided with fan-blades L, which are arranged spirally from the top edge down toward the bottom edge of the pan, and extend below it to the bottom of the case B², under the pan, to near the shaft G', as clearly seen in Fig. 3. The bottom of the platform has a central opening, *b'*, which extends upon each side of the timber *a*, through which the shaft G' passes, and immediately below the bottom of the platform are arranged two valves, M, to close against the timber *a* and shut off the supply of air to the mill. The front ends of these valves are fitted with nuts *m*, which turn upon screws passed through the valves. One of these nuts is a left and the other a right hand nut, and they receive a screw, N, one end of which is threaded to the right and the other to the left. The middle of the screw N has a groove turned around it, and the neck within the groove is fitted in a box, *n*, which is secured to the platform or some other stationary part, to prevent longitudinal movement of the screw. One end of the screw is fitted with a hand wheel or lever. By this arrangement the valves are simultaneously opened or closed and the supply of air to the case B regulated.

The bottom edges of the wing-blades L come in close proximity to the bottom, B², of the casing, so that if any heavy particles of the material should be thrown by centrifugal force over the edge of the pan they will be picked up by the blades and carried back into the pan. As the pan is revolving rapidly, these blades coming, as they do, to near the outer casing, form a blowing-engine, which forces the dust or finished goods up through tube B' into the receptacle F, from which it

passes through spout *f* to the packers. During the revolution of the pan the material is constantly thrown outward by centrifugal force and constantly returned toward the center by the scraper K, so that the goods are in a constant state of commotion, and as the blades L and case B cause a strong blast the lighter or finished goods are separated from the heavier and unground parts and carried up to the receptacle. The force of the blast is regulated by the valves M. Should it appear that the material carried up to the receptacle contains particles that are too coarse, the valves are partially closed by the screw N and the supply of air limited. When the valves M are entirely closed against the timber *a*, the blast is completely cut-off. In grinding very heavy material, or when it is not necessary to grind the material to an impalpable powder, or whenever it is found that the force of the fan-blades L is not sufficient to carry the finished stock to the receptacle F, an exhaust-fan may be placed in the upper part of tube B'; but for ordinary purposes, when the receptacle is not too far removed from the grinders, the blades L will furnish sufficient blast to completely separate the finished from the unfinished and partially-finished stock. It is understood, of course, that the contact or grinding-surfaces of the wheels and pan are provided with the usual "chills." The top of the receptacle F is cut out and the opening closed by a muslin screen, *f'*, which is stretched across it. This permits the escape of air, but prevents the escape of dust. The fine dust will in time collect upon the under side of the screen *f'* and prevent the escape of air. When this occurs, which will be indicated by the force with which the material is discharged from the tube *f*, the screen is freed from the dust by passing a brush over the top of it. I use an ordinary flat paint-brush for this purpose.

In practice I use six wheels, as shown, the two large round-faced ones H, and the flat-faced ones I being upon the same shaft, and the two smaller round-faced ones H' upon the shaft *h'*, the wheels H' being of a less diameter than the wheels H, to admit of the shafts *h* and *h'* crossing at the center. By this arrangement the mill will do more work. The action of the mill would, however, be the same if the wheels H' and shaft *h'* were omitted, except that the yield would not be so great.

In order to prevent the mill from clogging, as well as to prevent the escape of dust through spout *c* and hopper C, when the blast is from the bottom of the mill, I have provided the charger D, Fig. 1. This consists of two shut-off valves, *d d'*, which are hinged to the opposite ends of a swinging arm, *d'*, which is centrally pivoted in the end of a stud, *d''*, which projects out from the tube *c*. The valves are sheet-metal gates, which are arranged to slide transversely through the spout *c*. The inner end of each gate has an opening which registers with the opening in the spout *c*, when its

upturned inner end is drawn against the back of the spout. As shown in the drawings, the supply from the hopper is cut off by the upper gate while the lower one is open discharging into the mill. So soon as the charge which was between the gates *d d* enters the mill the position of the gates is reversed, and the material fills the tube above the lower gate, when they are again thrown into the position represented and another charge, which would be the amount contained in the tube *c* between the two valves, is let into the mill. When a steady feed is required, the lever *d'* is brought to a vertical or nearly vertical position. This partially opens both valves and allows the material to pass directly from the hopper to the mill.

In practice it is better, where there are six or more mills used, to have one mill fitted to prepare or partially grind the material for the others. The mill shown in Figs. 1 to 4, inclusive, with the preliminary grinder E omitted, will be necessary for this purpose. It is preferable, however, to use the preliminary grinder E on the finishing-mills, and this is placed, as shown in Fig. 5, on top of the case B, and between it and the charger D. The only change necessary to adapt my mill to receive the preliminary grinder is the provision shown in Fig. 7, to permit the spindle of the grinder E to pass through the crossed shafts H and H'. This is arranged by forming a boss on the center of the shafts, and then flattening them down to the form shown in Fig. 7, and perforating the bosses to permit the spindle O of the grinder to pass through them. The shaft G', which passes through the bottom of the pan, and is keyed to it or secured to it by a screw, has an angular depression to receive the angular foot of the spindle O, to which spindle is secured the lower grinding-cone, *o*. The preliminary grinder E, Fig. 5, consists of the grinding-cone *o* and a hollow grinding-shell adapted to be vertically adjusted with relation to the grinding-cone *o* by a screw, *o'*, to which it is attached. This preliminary grinder it is not necessary to describe in detail, as it is the invention of Louis E. Kane, and is fully shown and described in a pending application of his, Serial No. 169,895, June 26, 1885.

It is now only necessary to describe my improved means for discharging the partially-prepared material from the preparing-mill into the ordinary receptacle, by which the material is now fed to the elevator, which conveys it from the chaser to the hopper C. As seen in Figs. 2 and 8, the discharger J is a box, which is hinged to the inside of the case B, and has an opening, *j*, in the side, which, when it is let down into the pan while it is revolving, as shown in full line, Fig. 8, will gather the material from the groove in the pan G; and when it becomes well filled with the material, it is drawn up from the outside by a handle, *j'*, which is attached to the outer end of a wire or cord, *j''*, the opposite end of which is secured

to the top of the box J. The box has also in its top an opening, *j''*, which registers with an opening in the side of the case B, which opening discharges into a spout, *j'*, upon the outside of the case B, and this spout discharges into the receptacle from which the goods are taken by the elevator to the hoppers of the finishing-mills. While this preliminary grinding or preparation is in progress, the fan-blades will of course carry the finished material up through a spout, B, to the receptacle F, so that when the unfinished portion is conveyed to the elevator it will not contain the material already finished in this mill.

It is obvious, of course, that the blast or exhaust above described may be applied to the ordinary chasing-mills now in common use, and that part of the material which is finished in this mill, and which causes so much dust and waste, will be forced through a tube like B' to a receptacle, F, in the upper portion of the building. A portion of my invention may thus be applied to the mills now in general use for preparing the material for the burr stones; but in my system I contemplate doing away entirely with the burrs, which involve a great loss of time and labor to keep in proper condition. I have shown in the views, Figs. 2 to 5, inclusive, the fan-wings attached to the pan G, and forming a blower by their close proximity to the shell B, and I believe this to be the best arrangement; but it is obvious that the blower might be arranged outside of the case to discharge into it through the bottom B', but I do not regard this as so convenient as the arrangement I have shown, because it is necessary that a space be left around the pan and between it and the case, and some of the unground material will necessarily be thrown over the edge of the pan. By my arrangement this will be carried up by the inclined wings L and discharged into the pan to be brought under the action of the grinding-wheels, while if the fan-blower were arranged upon the outside it would be necessary from time to time to remove the material that would be thrown over the edge of the pan.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as specified, in a chasing-mill, of the revolving pan having an annular groove or depression surrounding its flat or horizontal center, with the wheels H, having rounded edges counter to the groove in the pan, the flat-faced wheels I, mounted to revolve upon the flat central portion of the pan, the shaft *h*, the case B, and the vertically-slotted guides secured to the case to furnish bearings for the shafts and permit the wheels to accommodate themselves to the material being acted upon.

2. The combination, substantially as specified, of the pan G and the vertically-slotted case B with the wheels H H' I and the shafts *h h'*, the said wheels being journaled upon the shafts, as shown, the said shafts having their bearings in the vertical slots in the case,

whereby the wheels are permitted to play vertically, for the purpose set forth.

3. The combination, substantially as hereinbefore set forth, of the case B B², tube B', 5 and receptacle F, with a revolving pan provided upon its periphery with inclined wing-blades, forming with the case a blower, the grinding-wheels resting in said pan, the shafts upon which the said wheels are journaled, and 10 the bearings for said shafts secured to the case.

4. The combination, in a chasing-mill, of the inclosing-case B B², tube B', receptacle F, the revolving pan G, wing-blades L, secured to said pan, as shown, the grinding-wheels, 15 their shafts and bearings, with the valves M M, arranged below the case to regulate the supply of air to the same, substantially as shown and described.

5. The combination, in a chasing-mill, of 20 the case B, the pan G, having a groove around its flat center, round-faced rollers to act in said groove and flat-faced rollers to act upon

the surface inclosed by the groove, the shafts upon which said rollers are journaled, the shaft-bearings secured to the case, and the 25 scraper K, secured to the case diagonally to the radius of the pan, and having its lower edge shaped to fit the pan, for the purpose of returning the material to near the center of the pan, substantially as shown and described. 30

6. A chasing-mill comprising the following parts: a revolving grooved pan, wheels to fit the same, as shown, the case B, tube B', receptacle F, a force-blast to force the finished material from the case to the receptacle, the dis- 35 charger J, having openings $j j^3$ and hinged to the inside of the case, and a cord, j^2 , to draw the filled discharger up and lower it into the pan, substantially as set forth.

BART KANE.

Witnesses:

GEO. J. MURRAY,
C. W. MILES.