

(No Model.)

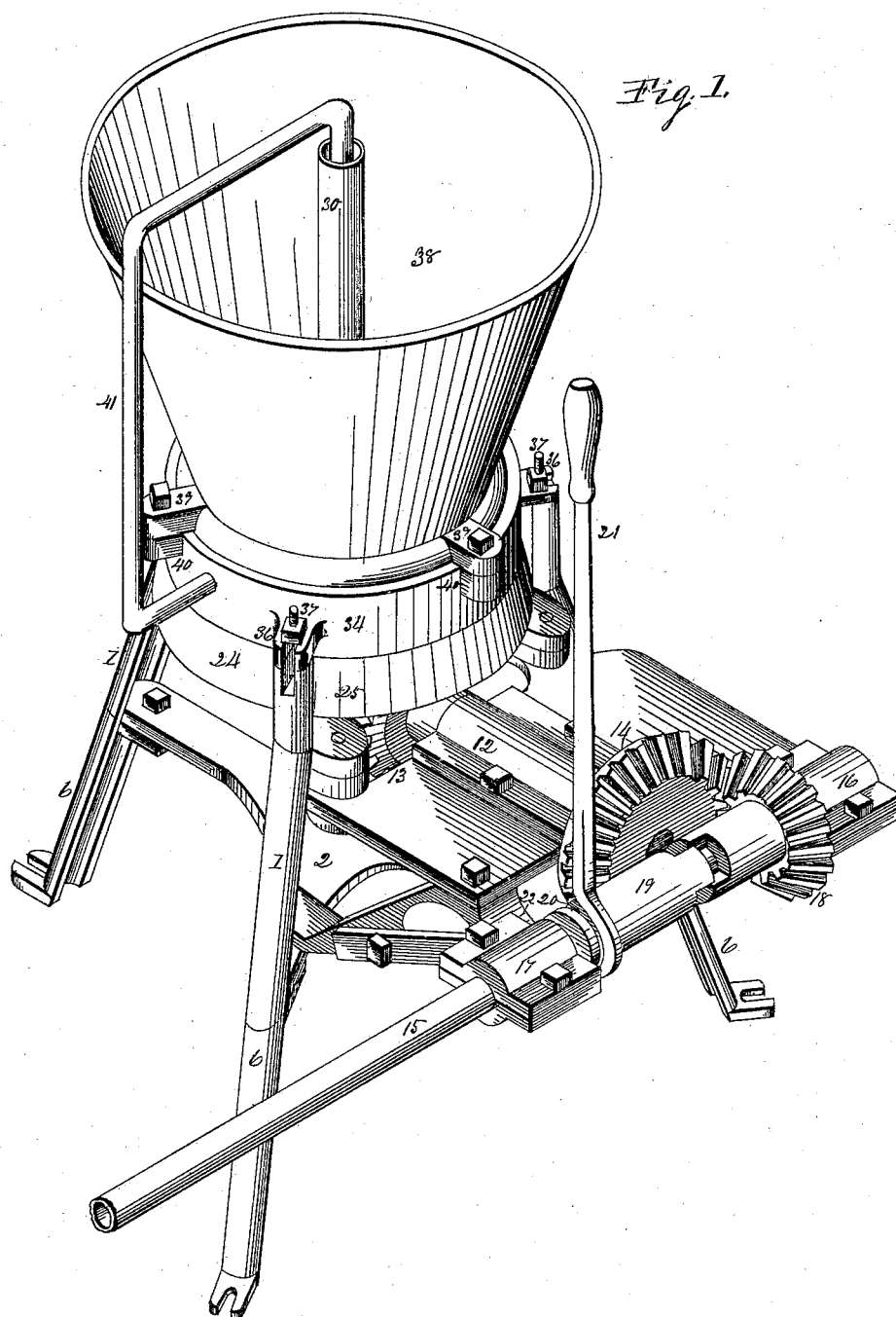
2 Sheets—Sheet 1.

A. J. GASTON.

PAINT MILL.

No. 383,352.

Patented May 22, 1888.



Witnesses,
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Evans Blake

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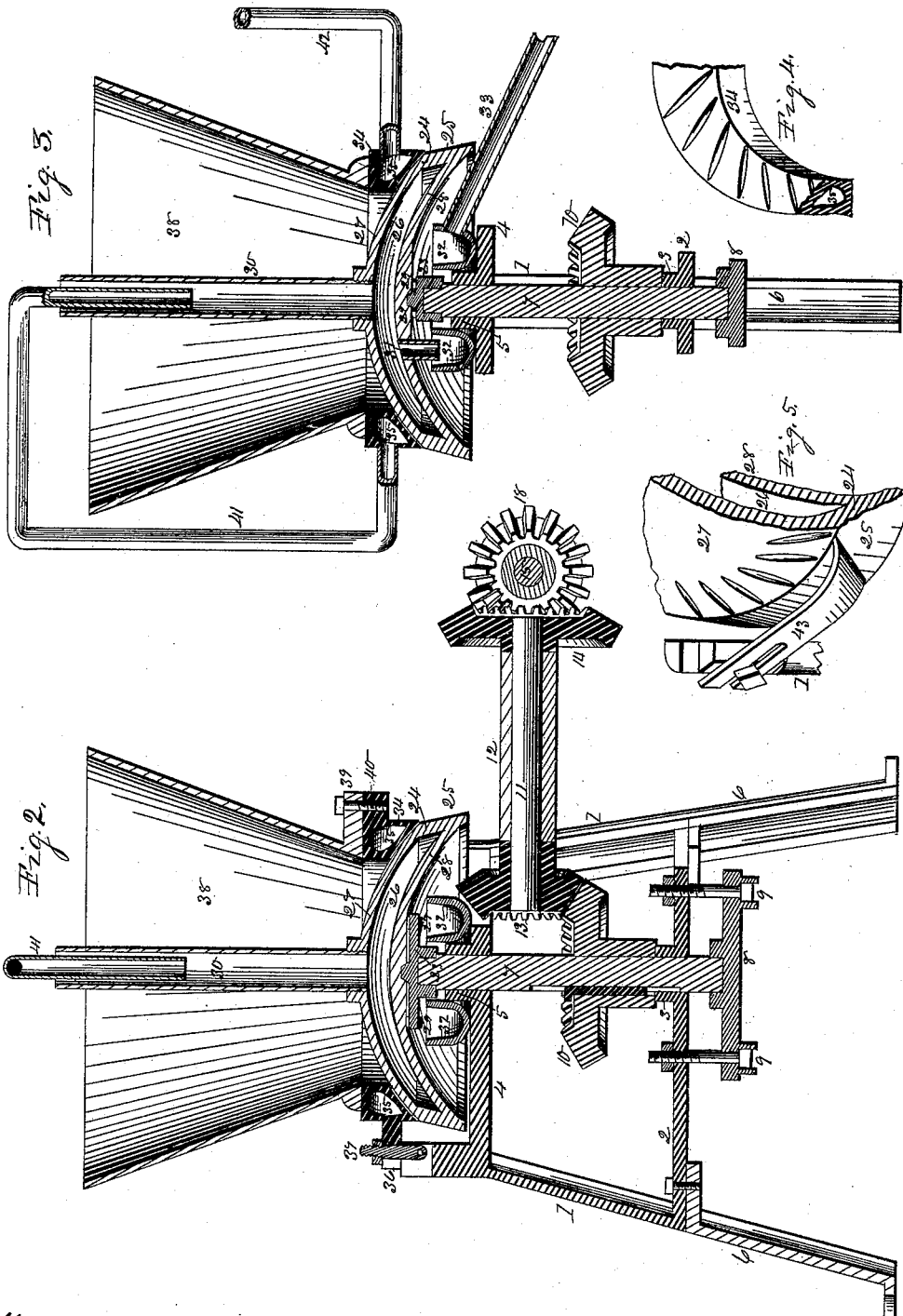
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UNITED STATES PATENT OFFICE.

AUGUSTINE J. GASTON, OF BELOIT, WISCONSIN.

PAINT-MILL.

SPECIFICATION forming part of Letters Patent No. 383,352, dated May 22, 1888.

Application filed March 4, 1887. Serial No. 229,700. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTINE J. GASTON, a citizen of the United States, residing in the city of Beloit, county of Rock, State of Wisconsin, have invented certain new and useful Improvements in Paint-Mills, of which the following is a specification.

This invention relates to mills employed in the manufacture and preparation of pigments or paints.

The difficulty heretofore experienced with many mills employed for this purpose has been that the grinding-plates, when operated rapidly, are expanded by the heat caused by friction, and thus the distance between the grinding-faces is varied, which prevents the substance operated upon from being reduced to a uniform degree of fineness, and the pigment usually employed is liable to become discolored when brought into contact with the heated grinding-plates, and its market value thereby depreciated.

To obviate the foregoing difficulties and provide a more efficient mill capable of increased running velocity, and consequently having an increased capacity, is the object of my invention. To this end I have designed and constructed the mill represented in the accompanying drawings, in which—

Figure 1 is an isometrical representation of a mill embodying my invention. Fig. 2 is a vertical central section lengthwise of the counter-shaft. Fig. 3 is a vertical central section parallel with the driving-shaft, or at right angle to the counter-shaft. Fig. 4 represents a fragment of the fixed upper grinder. Fig. 5 represents a fragment of the runner with the scraper in position.

The upper portion of the supporting-frame of my improved mill, consists of the upright supports 1, connected at their lower ends by a horizontal spider, 2, with a hub, 3, rising centrally from its upper face, and near their upper ends by a horizontal spider, 4, with a hub, 5, rising centrally from its upper face, and is preferably cast in a single piece.

Extensions 6 of the uprights 1 are respectively made in a single piece, and are fixed in place to the upper portion of the supporting-frame by suitable screw-bolts passed through their flanged connections, as clearly shown in

the drawings, and, as a whole, constitute the supporting-frame of the mill.

The uprising hubs of the spiders are bored to receive a spindle, 7, to revolve therein, whose lower end is supported in a step formed in a bridge-tree, 8, made vertically adjustable by means of screw-bolts 9, connecting its end portion with the lower spider, 2.

A gear-wheel, 10, is mounted on the spindle to revolve therewith by means of a free feather-connection, to permit a vertical adjustment of the spindle through the hub of the wheel without changing its position. The lower end of the hub of the wheel 10 is supported to revolve on the upper end of the hub 3 of the lower spider.

A counter-shaft, 11, is supported to rotate in box-bearings 12, projecting laterally in a horizontal position from the main frame, to which it is attached. A gear-wheel, 13, is keyed to the inner end of the counter-shaft, and is adapted to mesh with gear-wheel 10.

The outer end of the counter-shaft is also provided with a gear-wheel, 14, fixed in place thereon to revolve with the shaft.

A driving-shaft, 15, is supported to revolve in bearings 16 and 17, projecting from the mill, and this shaft is provided with a driving gear-wheel, 18, of proper size and construction, loosely mounted in position thereon to place its gear-teeth in working contact with the teeth of the gear-wheel 14.

The inner end of the hub of the driving gear-wheel 18 is produced in clutch form, and a clutch-head, 19, of sleeve form, fitted to engage the clutch-formed end of the wheel-hub, is mounted on the driving-shaft, and by means of a feather or other equivalent connection therewith is made to revolve with the shaft, and is capable of a free endwise movement thereon to be shifted into and out of engagement with the clutch end of the driving gear-wheel to cause it to revolve with the shaft, or permit the shaft to revolve in the wheel-hub.

An annular groove, 20, formed in the clutch-head, receives a shifting-lever, 21, having its depending end fulcrumed in a bracket, 22, depending from the bearing of the counter-shaft and curving outward under the driving-shaft. This shifting-lever furnishes the means for shifting the clutch-head into or out of con-

nection with the clutch-formed end of the driving-wheel.

The upper end of the spindle 7 is provided with a transverse driving-arm, 23. The said arm may be fixed to the spindle or formed integral therewith. The extreme upper end of the spindle if the arm 23 be formed integral therewith, or the upper face of the arm itself directly above the end of the spindle if the arm is fixed to the spindle, is provided with an upwardly-projecting cone-shaped portion, as shown, on which the runner is supported to revolve with the spindle.

The runner 24 is of a concave form on its under face, and of a convex form on its upper face, having its outer discharging edge face, 25, of a downward and outward beveled form. This runner is hollow, containing a water-chamber, 26, formed by the discharging edge 25, the upper convex wall, 27, and the concave under wall, 28. The central portion of the runner is formed on its under concave face with depending lugs 29 on opposite sides of its center to embrace the opposite ends of the driving-arm. The runner on its under face is provided centrally with a conic depression to receive the conic upper end of the spindle, or of the driver fixed to its upper end.

An induction-tube, 30, communicating with the chamber 26 in the runner, rises from the center of its upper face, and an outlet-tube, 31, communicating with the water-chamber 26, depends from its under face in position to discharge into an annular receptacle, 32, supported centrally on the upper face of the upper spider, 4, of the main frame. A waste-pipe, 33, opening into the annular receptacle 32, extends therefrom outward to carry off the waste from the receptacle.

The fixed grinder 34 is in annular ring form, with an annular water-chamber, 35, formed therein. This grinder is provided with laterally-projecting slotted ears 36, overlapping the vertically-slotted ends of the uprights of the main frame, and screw-bolts 37, pivoted in the slotted uprights, enter the slotted ears of the grinding-ring and serve to fix it in place on its upright supports.

A hopper, 38, of the usual form, is fitted in position on the upper face of the fixed grinding-ring by means of screw-bolts passed through ears 39, projecting from the base of the hopper, and screw-threaded into corresponding ears, 40, projecting from the fixed grinder.

A water-conducting pipe, 41, is fixed in the outer edge of the stationary grinder and communicates with the annular chamber therein, and its projecting portion rises in siphon form, with its open discharge end depending in the upper open end of the water-induction tube 30, rising centrally from the runner.

A water-induction pipe, 42, is fixed in the outer edge of the annular ring-grinder and opens into the annular chamber formed therein, and its outer end is designed to connect with a water-supply having a head sufficient to insure

a flow of water from the conducting-pipe 41 into the vertical induction-pipe 30.

The grinders of my improved mill I prefer to make from white iron cast with chilled grinding-surfaces corrugated at proper intervals, after the manner shown in Figs. 4 and 5, or in other suitable known form, and then grinding their working-faces to engage each other in working contact.

I also grind the beveled edge of the runner in a manner to receive the free end of a discharge-scaper, 43, which is made adjustable in its connection with the main frame to place it in position to engage the beveled outer face of the runner to deliver the ground paint in the best manner.

In the process of grinding paints in my improved mill the articles to be ground are first prepared for the grinding process in the manner known to the art, and are then placed in the hopper of the mill.

Motion from the prime mover imparted to the driving-shaft is transmitted, through the gear-train hereinbefore described, to the spindle, and thence to the runner connected therewith, and by means of the adjustable bridge-tree support of the spindle the grinders are adjusted to produce an article of the required consistency.

During the process of grinding, water of the required temperature and quantity to keep the grinders from heating is made to flow through the chambers of the grinders. The water for this purpose having the required force is introduced through the induction-pipe 42 to the annular chamber in the fixed grinder, through which it flows, and is discharged therefrom through the siphon-formed pipe, and is delivered into the induction-pipe of the runner and into the chamber thereof, from which it is discharged through the outlet-pipe in the under face of the runner into the annular receptacle under the runner, and is thence discharged through the waste-pipe 33.

In the employment of water as a means to prevent heating in the grinders I am enabled to run them at much higher speed, and consequently accomplish a greater amount of work in a given time.

The employment of water as a means to maintain substantially a uniform temperature of the grinders prevents unequal expansion, preserves a uniform adjustment of the grinders, and consequently the product will be substantially uniform, and the mill can be run constantly.

Parts of my improvements are capable of use in connection with unlike parts—as, for instance, a chambered fixed grinder may be employed in connection with an unchambered runner; or a chambered runner may be employed in connection with an unchambered fixed grinder and accomplish satisfactory results.

In the drawings I have represented but one mill connected with the driving-shaft; but when required more than one mill may be em-

ployed, and may be connected at suitable intervals to the same driving-shaft in substantially the same manner that the mill shown in Fig. 1 is connected therewith.

5 I claim as my invention—

1. In combination, a feed-hopper, an annular hollow stationary grinder surrounding the base of the hopper, a vertical spindle, a rotary hollow grinder seated on the top of the spindle and provided with a tube fixed thereto and extending centrally upward through the hopper and communicating with the interior of the grinder, a water-inlet pipe in communication with the interior of the annular stationary grinder, a water-outlet pipe extending from the stationary grinder over the hopper and loosely into the said upwardly-extending tube, and an outlet-pipe in communication with the interior of the rotary grinder, substantially as set forth.

2. In combination, a stationary hollow grinder, a vertical spindle, a rotary hollow grinder seated on the top of the spindle, a water-inlet to the stationary grinder, water

communication between the stationary and the rotary grinder, a water-outlet pipe depending from the bottom of the rotary grinder at one side of its center, a stationary annular trough located beneath the path of the depending outlet, and a waste-pipe leading from the stationary trough, substantially as set forth.

3. The combination, with the vertical spindle, of a hollow rotary grinder having a convex grinding-face and a concave under face, the said hollow grinder being seated on the top of the spindle at the center of its under or concave face, and provided with a discharge-pipe depending from its under or concave face, an annular trough fixed beneath the path of the free end of the depending pipe, the ends of the trough extending upwardly on opposite sides of the depending pipe, and a discharge-pipe leading from the annular trough, substantially as set forth.

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