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SELF-DUMPING FINISHING AND POLISHING MACHINE

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Fig. 1.

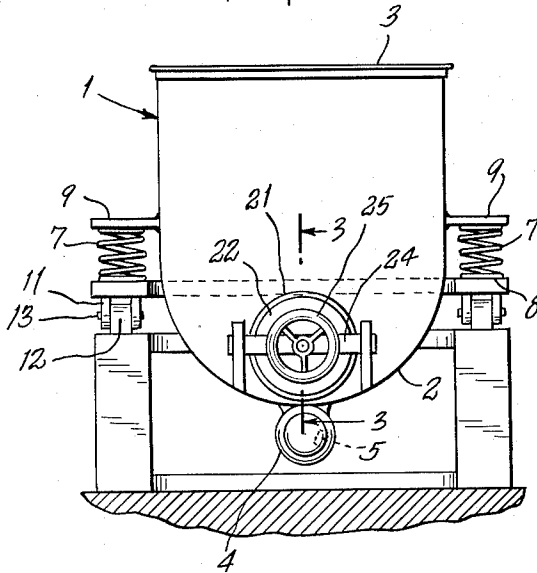


Fig. 3.

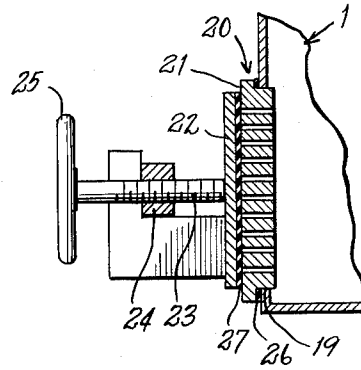
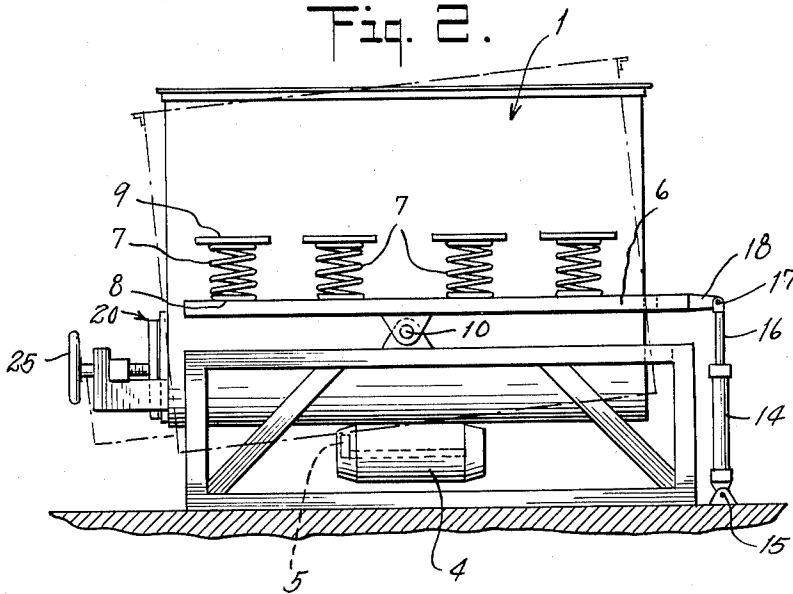


Fig. 2.



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3,093,940 SELF-DUMPING FINISHING AND POLISHING MACHINE

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This invention relates to finishing and polishing machines of the type in which the parts to be finished or polished may be admixed with finishing or polishing material, such as stone, chips or the like and are then vibrated.

Heretofore in such machines, particularly of the batch type, there has been provided a hopper to receive the pieces to be finished and the finishing or polishing material. This hopper has been mounted on pivots so that the entire hopper may be turned to a dumping position which generally necessitates rather cumbersome and room-taking equipment.

One of the objects of the present invention is to provide a finishing and polishing machine which obviates this difficulty.

Another object is to provide such a machine in which the parts are so arranged and disposed that it is unnecessary to tilt the machine to a dumping position, thus eliminating the equipment required heretofore.

Another object of the invention is to provide such a machine in which the dumping is accomplished with minimal effort, making use of the particular arrangement of the means for agitating the work pieces and the finishing or polishing material to cause efficient and speedy unloading of the hopper.

Other objects and advantages of the invention will appear from the following specification wherein a preferred illustrative form of the invention is shown and described, it being understood, however, that the instrumentalities there shown and described are merely illustrative and are not intended to limit the invention to the specific arrangement and organization described and shown.

In the drawings—

FIG. 1 is an end elevation of a machine embodying the invention;

FIG. 2 is a side elevation of the machine shown in FIG. 1; and

FIG. 3 is a detailed view partly in section showing the discharge opening and its cover and the means for mounting the same.

The invention consists generally in a hopper adapted to receive the finishing or polishing material and the pieces to be finished or polished. In the preferred form of the invention the hopper has a rounded semi-cylindrical bottom. A vibratory motor having its axis parallel to the axis of the semi-cylindrical bottom and carrying an eccentric weight adapted to give rotary vibrations to the hopper and its contents are mounted directly on the hopper.

In one end of the hopper there is a discharge opening adjacent the bottom of the hopper. It is adapted to permit the discharge of the pieces and the finishing and polishing material after the finishing and polishing operation. It is provided with a removable cover for sealing the opening.

A tiltable frame is provided and there are means thereon supporting the hopper and the motor with its eccentric weight as a unit for free movement in space. There are means supporting this tiltable frame for tilting on an axis generally perpendicular to the axis of the motor and the hopper and there are means preferably at the end of the hopper opposite the discharge opening for tilting the hopper.

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It is thus possible to discharge the contents of the hopper easily and simply by removing the cover, flushing the contents with a washing liquid if desired, and then operating the motor and its eccentric weight to vibrate the hopper and thus impart a feeding motion to the contents to discharge them from the discharge opening.

The specific embodiment of the invention shown in the drawings consists of the hopper 1 which has a semi-cylindrical bottom 2 and an open top 3 through which the hopper may be charged. Mounted directly on the hopper is a motor 4 having an eccentric weight 5 mounted for rotation about the axis of the motor, which axis in the preferred form of the invention extends parallel to the axis of the semi-cylindrical bottom of the hopper.

The hopper is mounted for free movement in space on a tiltable frame 6 by means of coil springs 7 which rest at 8 on top of the frame and engage beneath supports 9 which are rigidly secured to the hopper 1.

The tiltable frame 6 is mounted on pivotal supports 10 which extend generally perpendicular to the axis of the motor and the rounded semi-cylindrical bottom of the hopper and consist of the members 11 and 12 and the pivot pins 13.

In FIG. 2 the hopper is shown in the normal operative position in full lines, and in dotted lines it is shown in tilted position for discharge.

Means are provided at one end of the hopper to achieve this tilting. They consist of a hydraulic or pneumatic cylinder 14 which is pivotally mounted at its lower end to the floor, as is indicated at 15, and is provided with a plunger and rod 16 which is pivotally connected at 17 to a lever 18 rigidly secured to the hopper 1. The operating lines and controls for this member are not shown since they are conventional.

At the outer end of the hopper is a discharge opening 19 which is provided with a cover generally indicated at 20 which consists of a perforated member 21 through which flushing water may be discharged and a solid cover member 22 which overlies the member 21 and may be held in place by screws 23 which are threaded in brackets 24 and are provided with hand wheels for operation. Suitable gaskets 26 and 27 are provided.

In operation of this machine the parts are charged into the machine with the finishing or polishing material. The motor 4 and its vibrating eccentric weight are energized. This imparts a rotary vibratory motion to the contents of the hopper which moves orbitally in a path generally following the contour of the bottom of the hopper, discharging or spilling back across the hopper and continuing in this way. This causes the polishing to take place because of the intimate contact and movement between the pieces and the finishing or polishing material.

After the pieces have been finished the outer cover may be removed and the machine may be flushed to remove objectionable grit or the like. Thereafter the entire cover is removed and the machine is tilted to the position shown in dotted lines in FIG. 2. The motor is energized with the hopper in this position and the vibratory rotary motion imparted to the contents of the hopper causes the contents to feed along the hopper and out through the discharge opening into any suitable container.

It will be apparent that with this arrangement the amount of tilting of the hopper is relatively small. A tilting of a few degrees, such as the amount shown in the drawings which is about 10°, is adequate. This tilting can be achieved with the simple equipment shown or with other suitable equipment. The equipment is not extensive and the amount of tilting is such that very little floor space in addition to that required for operating the machine is needed.

Because the motor is mounted directly on the hopper

and is free with the hopper for free movement in space, the tilting operation is materially simplified, as is the driving of the motor and the vibrator to cause the material to flow from the hopper.

The provision of the hopper with its semi-cylindrical bottom and the mounting of the motor with its eccentric weight on an axis parallel to the axis of the semi-cylindrical bottom and the tilting on an axis generally at right angles thereto greatly simplifies and facilitates the unloading of the hopper because the energization of the motor causes rotary vibrations generally orbital about the axis of the semi-cylindrical bottom. This simplifies the feeding since the parts and the finishing or polishing material all tend to orbit about a line which extends generally in the direction of the desired flow.

The mounting of the hopper on the spring 7 is materially simplified, and since the tilting is not great there is no untoward strain on the mounting equipment as might be involved if the entire hopper had to be tilted more than 90° for discharge.

It will be apparent that the present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof. It is therefore desired and intended that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than the foregoing description to indicate the scope of the invention.

I claim:

1. In a finishing and polishing machine the combination of a hopper adapted to receive finishing or polishing material and the pieces to be finished or polished having a rounded semi-cylindrical bottom and a vibratory motor having its axis parallel to the axis of said semi-cylindrical bottom and carrying an eccentric weight adapted to impart rotary vibrations to said hopper and its contents mounted directly on said hopper, said hopper having at one end thereof adjacent the bottom a discharge opening for the contents of said hopper and a cover for sealing said opening, a tiltable frame, and means on said tiltable frame supporting said hopper and motor as a unit for free movement in space, and means supporting said tiltable frame for tilting on an axis generally perpendicular to the axis of said hopper and means for tilting said tiltable frame whereby said hopper may be simultaneously tilted and vibrated to empty said hopper when said discharge opening is open.

2. In a finishing and polishing machine the combination of a hopper adapted to receive finishing or polishing material and the pieces to be finished or polished having a rounded semi-cylindrical bottom and a vibratory motor

having its axis parallel to the axis of said semi-cylindrical bottom and carrying an eccentric weight adapted to impart rotary vibrations to said hopper and its contents mounted directly on said hopper, said hopper having at one end thereof adjacent the bottom a discharge opening for the contents of said hopper and a cover for sealing said opening, a tiltable frame, means on said tiltable frame supporting said hopper and motor as a unit for free movement in space, and means supporting said tiltable frame for tilting on an axis generally perpendicular to the axis of said hopper whereby said hopper may be simultaneously tilted and vibrated to empty said hopper when said discharge opening is open.

3. In a finishing and polishing machine the combination of a hopper adapted to receive finishing or polishing material and the pieces to be finished or polished having a vibratory motor carrying an eccentric weight adapted to impart rotary vibrations to said hopper and its contents mounted directly on said hopper, said hopper having at one end thereof adjacent the bottom a discharge opening for the contents of said hopper and a cover for sealing said opening, a tiltable frame, means on said tiltable frame supporting said hopper and motor as a unit for free movement in space, and means supporting said tiltable frame for tilting on an axis generally perpendicular to the axis of said motor and means for tilting said tiltable frame whereby said hopper may be simultaneously tilted and vibrated to empty said hopper when said discharge opening is open.

4. In a finishing and polishing machine the combination of a hopper adapted to receive finishing or polishing material and the pieces to be finished or polished having a vibratory motor carrying an eccentric weight adapted to impart rotary vibrations to said hopper and its contents mounted directly on said hopper, said hopper having at one end thereof adjacent the bottom a discharge opening for the contents of said hopper and a cover for sealing said opening, a tiltable frame, means on said tiltable frame supporting said hopper and motor as a unit for free movement in space, and means supporting said tiltable frame for tilting on an axis generally perpendicular to the axis of said motor whereby said hopper may be simultaneously tilted and vibrated to empty said hopper when said discharge opening is open.

References Cited in the file of this patent

UNITED STATES PATENTS

2,118,227	Ransohoff	May 24, 1938
2,143,610	Muller et al.	Jan. 10, 1939
2,519,060	Manley	Aug. 15, 1950