March 26, 1957 E. H. SHAFF 2,786,313

SANDING AND POLISHING MACHINE

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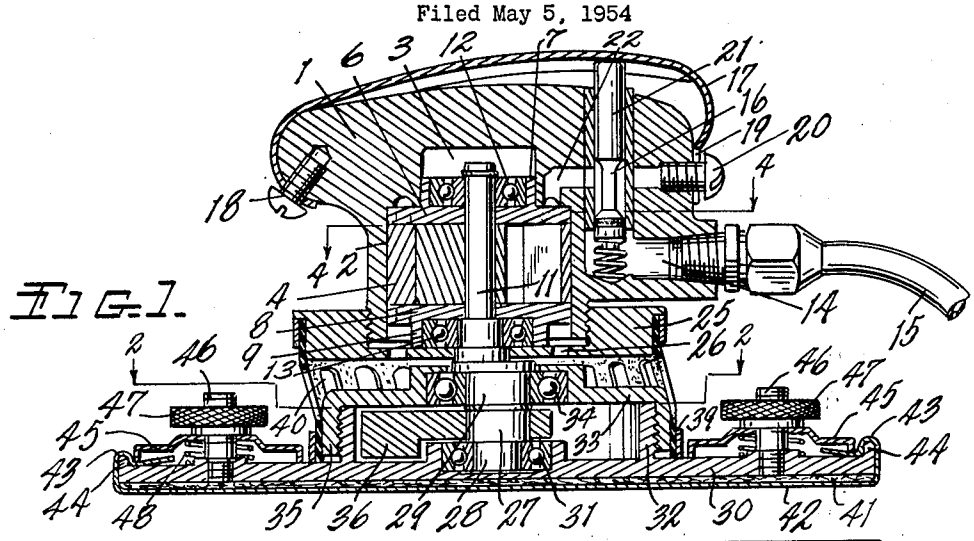


FIG. 1.

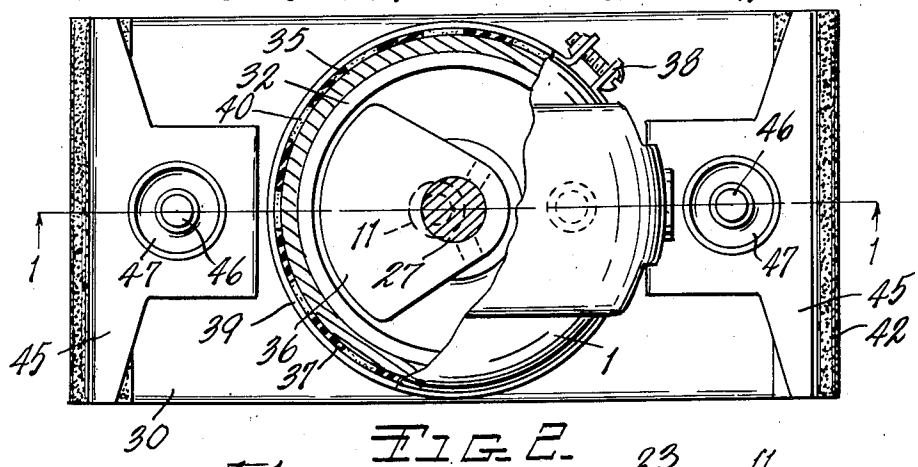


FIG. 2.

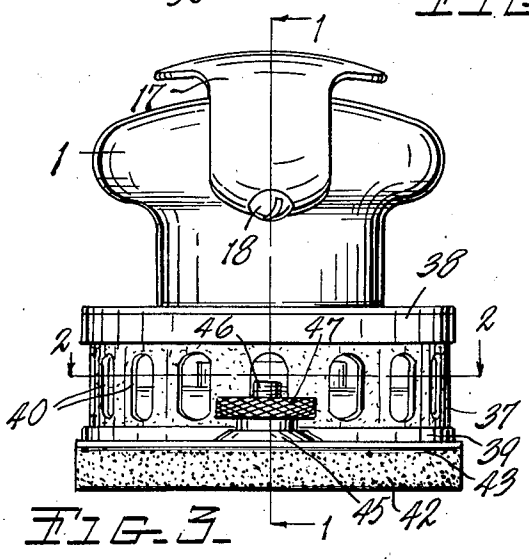


FIG. 3.

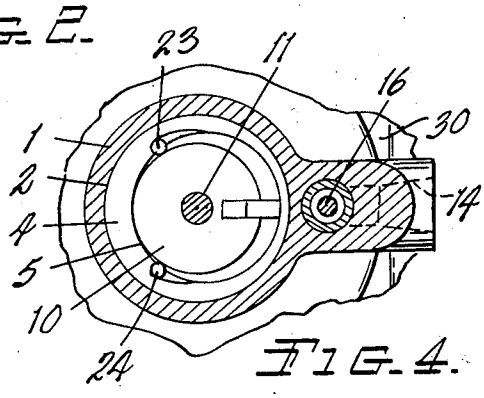


FIG. 4.

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SANDING AND POLISHING MACHINE

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4 Claims. (Cl. 51—170)

This invention relates to a sanding and polishing machine of the pneumatically driven manually manipulated type.

The main objects of this invention are:

First, to provide a sanding and polishing machine in which the shoe has a circular motion and is highly efficient both for polishing and sanding and cleaning the surfaces as the work proceeds.

Second, to provide a machine of this character which may be operated at a high speed and in which the operator is subjected to very little vibration.

Third, to provide a structure of this type in which the exhaust air from the motor is directed to clean work.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a view mainly in vertical section on a line corresponding to line 1—1 of Figs. 2 and 3.

Fig. 2 is a fragmentary view partially in horizontal section on a line corresponding to line 2—2 of Figs. 1 and 3.

Fig. 3 is an end elevational view looking from the left of Fig. 1.

Fig. 4 is a fragmentary view in section on line corresponding to line 4—4 of Fig. 1.

The embodiment of my invention illustrated is a hand tool and is pneumatically operated.

The embodiment illustrated comprises a head member designated generally by the numeral 1 and conformed to provide a hand piece or grip at its upper end. The head member 1 is provided with a chamber 2 opening at the lower end of the head member and having a reduced portion 3 at its upper end. The cylinder wall or body member 4 has an eccentric bore 5 therein. This body member 4 is a sliding fit within the chamber 2 of the head member. The upper cylinder end plate 6 is provided with an upwardly projecting flange 7 fitting within the reduced portion 3 of the chamber. The lower cylinder end member 8 is provided with a downwardly projecting flange 9. These end members fit within the head chamber with their inner sides in abutting relation to the ends of the body member 4. The rotor 10 is provided with a shaft 11 supported in ball bearings designated generally by the numerals 12 and 13 arranged in the flanges of the end plates and supporting the rotor shaft 11.

The head member is provided with an inlet 14 connected to a suitable supply of air under pressure, the connection being indicated at 15. The valve 16 is provided with an actuating member 17 of springable material and mounted at one end by the screw 18 and slotted at 19 to slidably engage the screw 20. This actuating member engages the stem 21 of the valve.

The air supply passage 22 opens to the inlet port 23 in the upper end member 6. The lower end member is provided with a discharge port 24.

The motor cylinder parts are retained within the head member by the clamping plate 25 which is threaded upon the lower end of the body member and is provided with air discharge ports 26.

The motor shaft 11 has an enlarged eccentric-like crank portion designated generally by the numeral 27 and provided with a lower bearing portion 28, and an upper bearing portion 29. The shoe 30 which is desirably elongated as illustrated, is provided with a centrally positioned ball bearing 31 for the lower bearing portion 28 of the crank. The shoe is provided with an annular flange 32 concentric with the bearing 31 and upon which is threaded the bearing plate 33 provided with a ball bearing 34 for the upper bearing portion 29 of the crank. This bearing plate is provided with a flange 35 which is threaded upon the flange 32. This provides a closure for the bearings of the shoe which is carried by the crank and also for the rotating counter-balance 36 which is fixedly connected to the crank between its upper and lower bearing portions thereof and in oppositely disposed relation to the eccentric offset of the crank.

The tubular flexible coupling member 37 embraces and is secured at its upper end upon the closure plate of the head member by means of the clamping band 38 and embraces and is clamped upon the flange 35 of the bearing plate 33 by means of the clamping band 39. This coupling member prevents rotative movement of the shoe and head relative to each other while permitting the circular movement of the shoe relative to the head. The coupling member is provided with an annular series of discharge openings 40 for the discharge of exhaust air from the motor through the ports or openings 26.

The shoe is provided with a pad 41 upon which the abrasive sheet or a polishing sheet 42 is secured, the ends of the sheet being folded upwardly at 43 over the retaining ribs 44.

Clamping members 45 engage these inturned ends 43 adjacent the ribs 44, the clamping members being secured upon studs 46 by means of nuts 47.

Springs 48 serve to lift the clamping members when the nuts are released, providing for rapid manipulation.

The exhaust air from the motor is discharged through the openings 40 in the closure plate 33 upon the work. This is particularly desirable when the machine is used in sanding, which results in more debris than is the case when the machine is used for polishing.

The shoe has a circular movement of a relatively short radial stroke and is desirably driven at a high speed.

I have illustrated and described my invention in a highly practical embodiment thereof. I have not attempted to illustrate or describe other modifications or adaptations as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

I claim:

1. In a machine of the class described the combination, of a head member provided with a hand piece and having a motor chamber therein, a closure plate for the motor chamber mounted upon the lower end of said head member, an air motor disposed within said chamber and having a rotor shaft projecting through said closure plate, said shaft having an eccentric crank portion on its projecting end provided with longitudinally spaced upper and lower bearing portions, said head member being provided with bearings for said shaft disposed within said chamber therein, a shoe provided with a bearing for the lower bearing portion of said crank and an upwardly projecting annular flange concentrically spaced from said bearing, a bearing plate mounted upon said flange and provided with a bearing for the upper bearing portion of said crank, a counter-weight for said crank fixedly connected to the eccentric portion of the

shaft between said bearing portions thereof and in opposed relation to the eccentric offset thereof, said shoe and bearing plate constituting a housing for the said bearings and said counter-weight, and a flexible coupling member for said shoe and head member preventing relative axial rotation thereof.

2. In a machine of the class described the combination, of a head member having a motor chamber therein, a motor disposed within said chamber and having a rotor shaft projecting from the chamber, said shaft having a crank positioned on its projecting end provided with longitudinally spaced upper and lower bearing portions, bearings for said rotor shaft disposed within said head chamber, a shoe provided with a bearing for the lower bearing portion of the crank, a bearing for the upper bearing portion of said crank carried by said shoe, a counter-weight fixedly connected to the eccentric portion of said crank between its said bearing portions and in opposed relation to the eccentricity of the crank, and a flexible coupling member connected at its upper end to said head member and at its lower end to said shoe.

3. In a machine of the class described the combination, of a head member having a motor chamber therein, a pneumatic motor disposed within said chamber and having a rotor shaft projecting from the chamber, said shaft having a crank positioned on its projecting end provided with longitudinally spaced upper and lower bearing portions, bearings for said rotor shaft disposed within said head chamber, a shoe provided with a bearing for the lower bearing portion of the crank, a bearing for the upper bearing portion of said crank carried by said shoe, a counter-weight fixedly connected to the eccentric portion of said crank between its said bearing portions and in opposed relation to the eccentricity of the crank, and a flexible coupling member connected at its upper end to said head member and at its lower end to said shoe.

4. A rubbing machine comprising a motor housing constituting a handle, an air motor in said housing having a rotatively balanced shaft disposed vertically in the housing, an eccentric extension on the lower end of said shaft, a weight fixedly secured to said extension in spaced relation to the ends thereof and projecting beyond the axis of the shaft oppositely from the eccentricity of the extension to locate the center of gravity of the combined shaft and extension and weight at a point substantially eccentric to the axis of the shaft, a shoe mounted on said extension, bearings relatively rotatively connecting said shoe to said extension above and below said weight whereby the center of mass of the combined shaft and extension and shoe and weight is located closer to the axis of said shaft than said center of gravity, means retaining said shoe axially on said extention and permitting oscillation of the shoe relative to said housing and means for securing a work engaging sheet to the bottom of said shoe.

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