Jan. 30, 1934. A. N. EMMONS 1,945,425

PORTABLE HAND ABRADING MACHINE

Filed Dec. 12, 1930 3 Sheets-Sheet 1

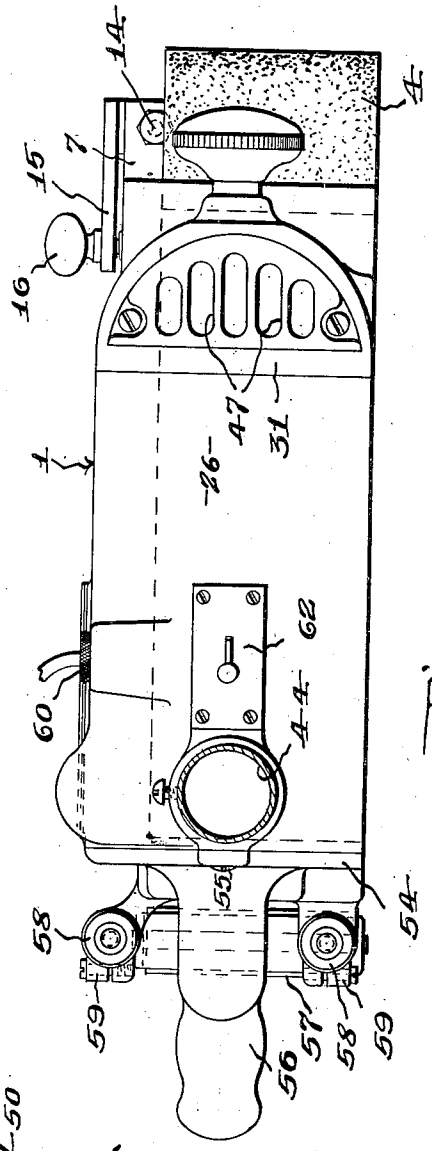


Fig. 1.

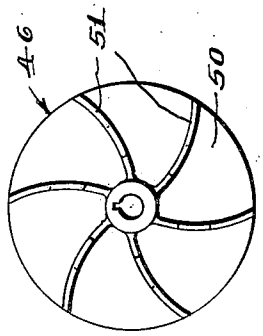


Fig. 5.

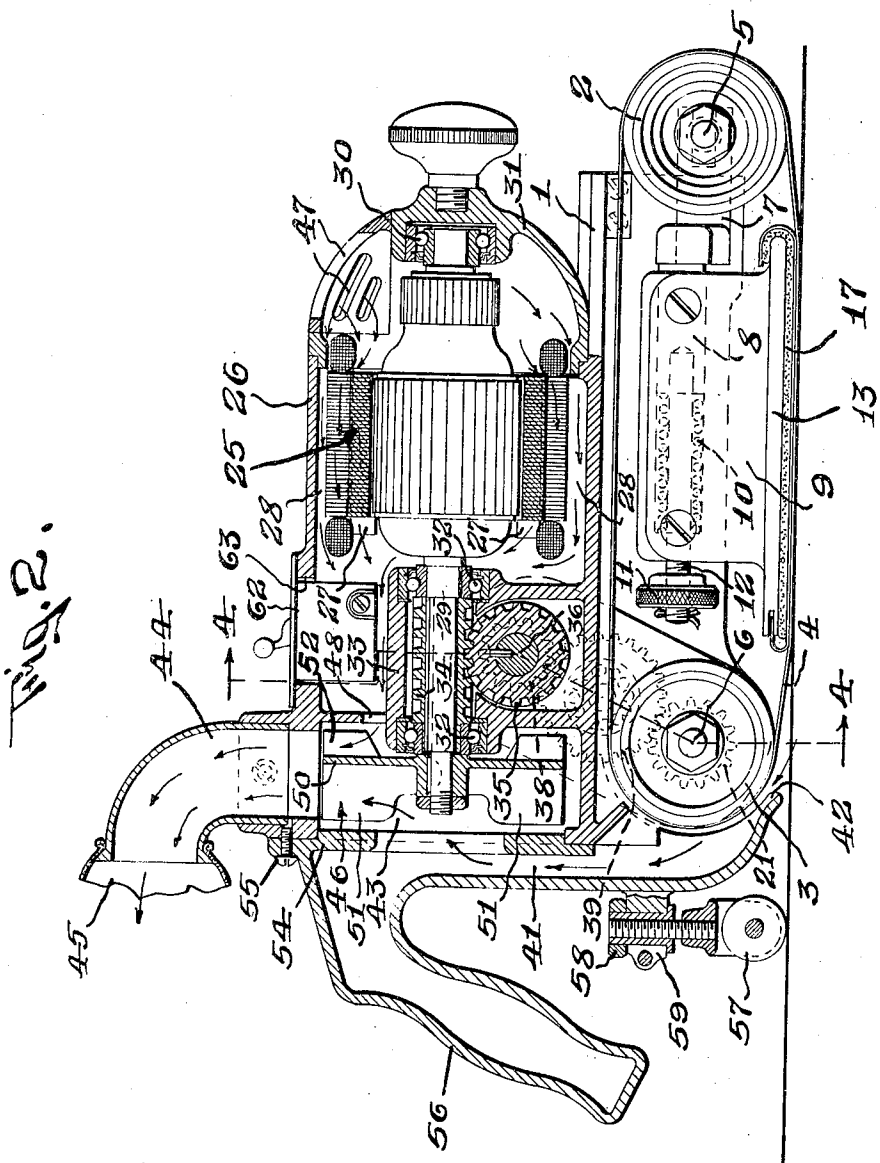
INVENTOR.
Arthur N. Emmons
BY
Bodell & Thompson
ATTORNEYS.

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Fig. 2.



INVENTOR.
Arthur N. Emmons
BY
Bodell & Thompson
ATTORNEYS.

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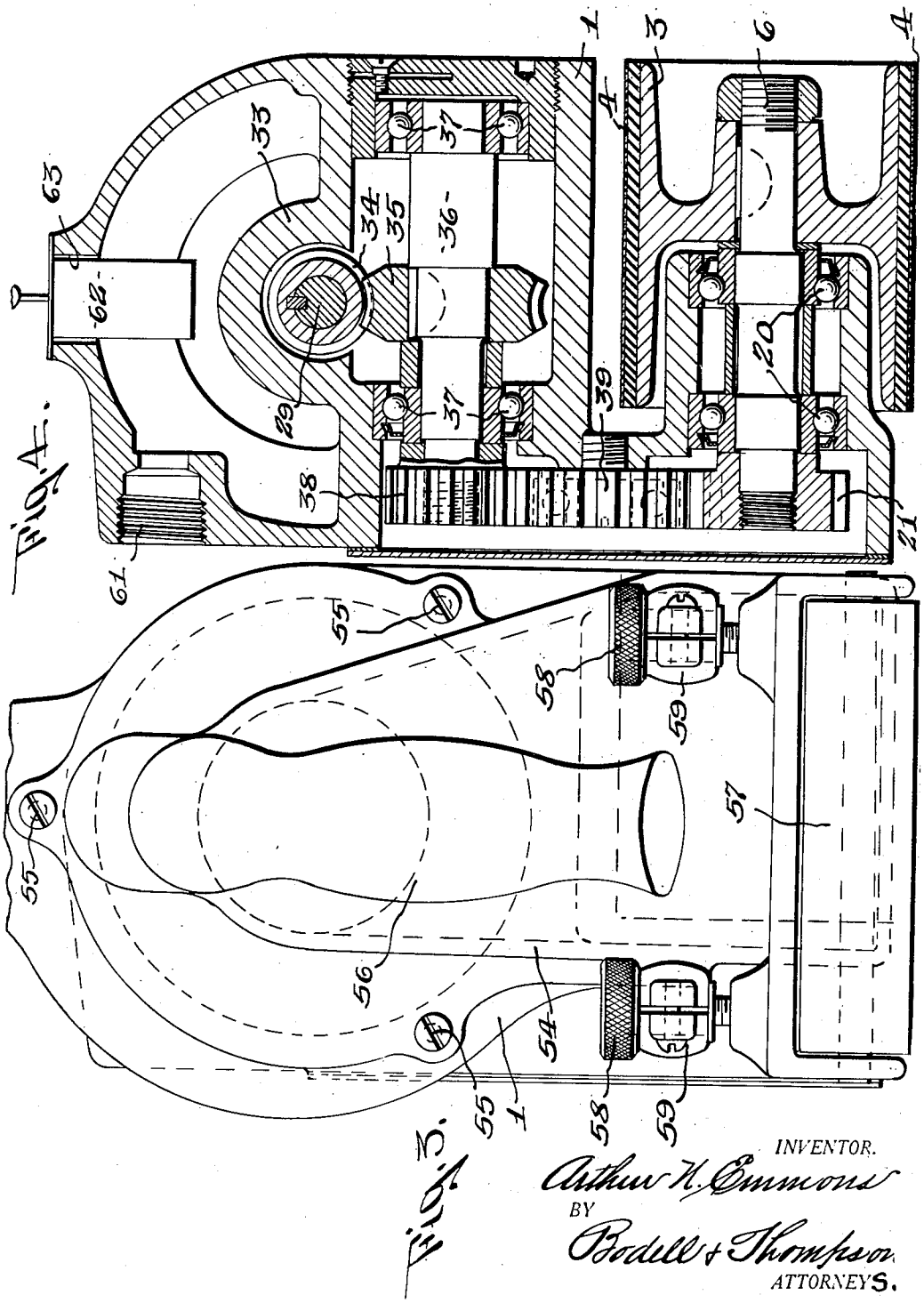


Fig. 4.

Fig. 5.

INVENTOR.
Arthur N. Emmons
BY
Bodell & Thompson
ATTORNEYS.

Patented Jan. 30, 1934 1,945,425

UNITED STATES PATENT OFFICE

1,945,425

PORTABLE HAND ABRADING MACHINE

Arthur N. Emmons, Syracuse, N. Y., assignor to The Porter-Cable Machine Company, Syracuse, N. Y., a corporation of New York

Application December 12, 1930
Serial No. 501,909

9 Claims. (Cl. 51—174)

This invention relates to portable hand sanding or abrading machines for finishing surfaces, as the surfaces of tables, or upright surfaces as doors or walls etc., or any surface where the tool must be readily and easily moved over the work, and particularly a compact and light portable machine which is readily manipulated, as distinguished from large, heavy movable floor finishing machines where considerable force is required to push them over the floor.

The invention consists in the novel features and in the relative arrangement of the various parts of the machine, and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings, in which like characters designate corresponding parts in all the views.

Figure 1 is a plan view of a portable abrading machine embodying my invention.

Figure 2 is a longitudinal, sectional view taken centrally of Figure 1.

Figure 3 is a rear elevation of this machine, partly broken away.

Figure 4 is an enlarged sectional view on line 4—4, Figure 2.

Figure 5 is a face view of the suction creating fan.

This portable abrading machine comprises generally, a suitable frame, an abrading element mounted on the frame and located to engage or run over the surface being finished while the machine is being moved over said surface, means for actuating the abrading element including an electric motor mounted on the frame above the abrading element, a suction conduit having its nozzle arranged to receive the dust formed by the abrading element, and suction creating means in said conduit, and motion transmitting means between the motor shaft and the abrading element and the suction creating means.

The invention further comprises a suction creating means for creating an air current through the motor in addition to creating suction in the suction conduit.

1 designates the frame, or chassis of the machine. The abrading element is here shown as front and rear rollers 2, 3, and an abrading belt 4 movable over the rollers. The frame is provided with suitable axles for supporting the rollers.

5 designates the axle for the front roller, and 6 the axle for the rear roller. The axle 5 is adjustable forwardly and rearwardly to tighten or loosen the belt, and also adjustable into various angles so that the belt runs evenly on the rollers. The support for the front roller forms no part of this invention, but briefly, it is supported by a carrier 7 carried by the frame between the front and rear rollers, and having a stem 8 guided in a suitable passage in a block or support 9 carried by the frame, the stem being pressed forwardly by a spring 10.

The motion transmitting means between the motor shaft and the abrading element, or one of the rollers thereof, preferably the rear roller 3, comprises a worm 34 mounted on the rear end of the motor shaft, or an extension thereof within the housing 33 and meshing with a worm wheel 35 mounted on a shaft 36 journalled in bearings 37 in the lower part of the housing 33, this shaft extending transversely of the frame, and gears 38, 39 and the gear 21 between the shaft 36 and the axle 6.

41 designates a suction conduit having its nozzle 42 arranged to receive the dust created by the abrading element, this conduit being located at the rear end of the frame substantially centrally thereof, and including a suction chamber 43 formed in the rear end of the casing 25, and an outlet portion 44 preferably extending upwardly from the upper side of the housing, or the chamber. A suitable dust collecting bag 45 is mounted on the end of the outlet 44. The suction is created through the conduit by means as a fan 46 mounted on the rear end of the motor shaft in the chamber 43. This fan also draws air through the motor housing to cool the motor through inlet openings or slots 47 provided in the cap 31 and outlet openings 48 in the wall of the chamber 43, so that the fan 46 not only creates suction through the suction conduit to pick up the dust, but also draws a cooling current of air through the motor.

As here shown, the fan is formed double, or with a discoidal back plate 50 having vanes 51 and 52 on opposite sides thereof, one set of vanes acting primarily to create the suction in the conduit 41, and the other to draw the air current through the motor housing. A portion of the suction conduit is formed on a removable back plate 54 which is detachably secured to the rear end of the housing 25, as by screws 55, and this back plate is formed with an opening connecting the portion of the conduit formed in the back plate and the chamber 43. The back plate is also provided with an upright handle 56 located in the rear of, or overhanging the rear of the frame and preferably, located midway between the side edges of the frame.

The roller is adjusted by a nut 11 turning on the end of a threaded stem 12 extending through the block 9 and secured to the stem 8. The adjustment is against the action of the spring 10. The axle 5 is pivoted at 14 to the carrier 7, and is adjusted to various small angles on its pivot by means of an angle lever 15 secured to the axle, and held in its adjusted position by a screw, as a thumb screw 16. The mounting of the front roller is substantially the same as in my pending application, Sr. No. 318,143, filed November 9, 1928.

The support or block 9 is provided with a suitable pressure foot 13 for bearing on the intermediate part of the lower run of the belt 4 and pressing it against the surface being finished. A suitable backing strip 17 of cushioning material as felt is interposed between the foot and the surface of the support 9.

The rear axle 6 is a stud journalled in spaced apart bearings 20 carried by the frame and extending into one end of the roller, the stud having a pinion 21 at its outer end.

25 designates the motor which is supported by the frame, the frame being provided with a housing 26 in which the motor is located. The motor is supported on suitable lengthwise ribs 27 in the housing in order to provide air spaces 28 around the field or stator, and the rotor with its shaft 29 is journalled in suitable bearings in the housing, and extends lengthwise of the frame. The front end of the shaft is supported in a bearing 30 provided in a detachable cap 31 at the front end of the housing 26, and the rear end of the shaft is mounted in spaced apart bearings 32 located in a housing 33 located within the housing 26.

The rear end of the frame is also provided with a roller 57 located beneath the handle 56, this roller being adjustable vertically by means of adjusting screws 58 threading through brackets 59 at the rear end of the frame, and as here shown, is provided on the detachable back plate 54.

Owing to the relative arrangement of the handle and the roller 57, the tool can be readily manipulated and guided over the surface being finished, as by tilting the frame upwardly about the roller as a fulcrum, the belt will be lifted more or less off the surface and the tool readily turned. Also, the degree of pressure applied can be regulated by applying a tilting force to the handle 56.

The service wires for the motor are led into the motor housing 25 through a suitable bushing 60, threading into a threaded opening 61 in one side of the motor housing 25, and the flow of current is regulated by a suitable switch 62 mounted in an opening 63 in the top of the housing.

Owing to the relative arrangement of the frame, abrading element, suction conduit, and the handle, the implement is particularly compact in construction, well balanced and readily manipulated by the handle, and is especially adapted for a hand tool and a hand tool having suction dust collecting means.

What I claim is:

1. A portable abrading machine comprising a frame, an abrading element mounted on the frame and located to run over the surface being finished, means for actuating the abrading element including an electric motor mounted on the frame, motion transmitting means between the motor and the abrading element, the frame having a housing surrounding the motor and provided with air inlets, a suction conduit having its nozzle arranged to receive the dust created by the abrading element, the conduit including a chamber in the housing at the rear end of the motor, and the housing having outlets into said chamber, a fan mounted on the motor shaft in the chamber and including a discoidal body having vanes on opposite sides thereof for creating respectively suction through the housing, and suction through said conduit.

2. A portable hand abrading machine of the type described including a frame, spaced apart rollers carried by the frame and extending transversely thereof, a belt movable over the rollers, the frame above the belt comprising a housing extending lengthwise of the belt and being formed at its forward end with a motor compartment and at its rear end with a suction chamber, and a gear compartment interposed between the motor compartment and the suction chamber, a motor mounted in the motor compartment and having its shaft extending through the gear compartment and into the suction chamber, an upright duct arranged in the rear of the frame and extending from the suction chamber to the rear of the rear roller, a fan carried by the motor shaft in the suction chamber, and motion transmitting means between the motor shaft and the rear roller including gearing arranged in the gear compartment.

3. In a portable hand abrading machine of the belt type comprising a frame, spaced apart rollers carried by the frame and extending transversely thereof, a belt trained about the rollers, that portion of the frame extending above the belt being formed with a housing extending lengthwise of the belt and formed with a motor compartment located centrally of the machine, a fan housing located at the rear of the machine, and a gear compartment interposed between the motor compartment and the fan housing, the rear end of the fan housing having an inlet, an upright duct detachably secured to the rear end of the fan housing and extending therefrom to the rear of the rear roller, a motor mounted in the motor compartment and having its shaft extending through the gear compartment into the fan housing, a fan carried by the motor shaft in the fan housing, and motion transmitting means, between the motor shaft and the rear roller, including gearing arranged in the gear compartment.

4. A portable hand abrading machine of the type described including a frame comprising a housing formed with side walls and provided with a motor compartment in its front end, a fan compartment in its rear end, and a gear compartment interposed between said motor and fan compartments, one side of said housing terminating adjacent the bottom of said compartments, the other side depending below said compartments, spaced apart rollers carried by said depending side portion, said rollers extending transversely of the frame and the housing, an upright duct mounted on the rear end of the housing and extending from the fan compartment to the rear of the rear roller, a motor mounted in the motor compartment having its shaft extending through the gear compartment and into the fan compartment and having a fan mounted thereon in said latter compartment, an abrading belt trained about the rollers, and motion transmitting means between the motor

shaft and the rear roller including gearing in the gear compartment.

5. An abrading machine of the type described including a frame, spaced apart rollers carried by the frame and extending transversely thereof, a motor located at one end of the frame and extending lengthwise thereof, a fan housing at the other end of the frame, motion transmitting means between the motor and one of the rollers including gearing carried by the frame and located between the motor and the fan housing, a fan mounted in the fan housing and driven by the motor and a suction conduit extending from one of the rollers to the fan housing.

6. A portable hand manipulated abrading machine of the type described including a frame formed with a motor compartment, a gear compartment, and a suction compartment, said compartments extending lengthwise of the frame and being arranged in axial alinement, one side of the frame terminating adjacent the bottom of said compartments, and the other side depending below said compartments, spaced apart rollers carried by the depending side of the frame below the compartments and extending transversely of the frame, an abrading belt trained over the rollers, a motor mounted in the motor compartment and having its shaft extending into the gear compartment and the suction chamber, a fan mounted on said shaft in the suction chamber, a conduit having an inlet arranged adjacent the abrading belt, and an outlet opening into the fan compartment, and motion transmitting means between the motor shaft and the rear roller including gearing arranged in the gear compartment.

7. A portable hand manipulated abrading machine of the type described including a frame formed with a motor compartment, a fan compartment and a gear compartment, the motor compartment being located centrally of the frame, and said other compartments being arranged to the rear of the motor compartment, said compartments extending lengthwise of the frame and being arranged in substantially axial alinement; one side of the frame terminating adjacent the bottom of said compartments, and the other side depending below said compartments; spaced apart rollers carried by the depending side of the frame, and an abrading belt trained over the rollers; a presser foot carried by the frame and arranged between the rollers beneath the motor compartment and contacting the lower run of the abrading belt; a motor mounted in the motor compartment; a fan mounted in the fan compartment and being driven by the motor; a conduit having an inlet arranged adjacent the abrading belt, and an outlet opening into the fan compartment; and motion transmitting means between the motor shaft and the rear roller including gearing arranged in the gear compartment.

8. A portable hand manipulated abrading machine of the type described including; a frame formed with a motor compartment, a gear compartment, and a fan compartment, said compartments arranged one behind the other and extending lengthwise of the frame; one side of the frame terminating adjacent the bottom of said compartments, and the other side depending below said compartment; a roller journalled in said depending side of the frame near the rear end thereof; a support carried by said depending side and extending transversely of the frame below the motor compartment; a roller carried by said support and extending transversely of the frame forwardly of the support; an abrading belt trained over the rollers and having its lower run passing under said support; a motor mounted in the motor compartment; a fan mounted in the fan compartment and being driven by the motor; and motion transmitting means between the motor shaft and the rear roller including gearing arranged in the gear compartment.

9. A portable hand manipulated abrading machine of the type described; a frame formed with a motor compartment; a gear compartment; and a fan compartment; said compartments arranged one behind the other and extending lengthwise of the frame; one side of the frame having a depending portion extending below said compartments; a roller journalled in said depending side near the rear end thereof and extending transversely of the frame; a support carried by said depending side and extending transversely of the frame forwardly of said roller; a second roller carried by said support and extending transversely of the frame near the forward end thereof; an abrading belt trained about the rollers; a presser foot carried by the support between the rollers and contacting the lower run of the abrading belt, and means for resiliently attaching the presser foot to the support; a motor mounted in the motor compartment; a fan mounted in the fan compartment and being driven by the motor and motion transmitting means between the motor shaft and the rear roller including gearing arranged in the gear compartment.

ARTHUR N. EMMONS.

CERTIFICATE OF CORRECTION.

Patent No. 1,945,425. January 30, 1934.

ARTHUR N. EMMONS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, strike out lines 1 to 37, inclusive and insert the same after line 63, on page 1; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of March, A. D. 1934.

F. M. Hopkins

(Seal) Acting Commissioner of Patents.