Jan. 5, 1954 D. R. WICKES 2,664,678

PNEUMATIC SANDING DEVICE

Filed Nov. 27, 1951 2 Sheets-Sheet 1

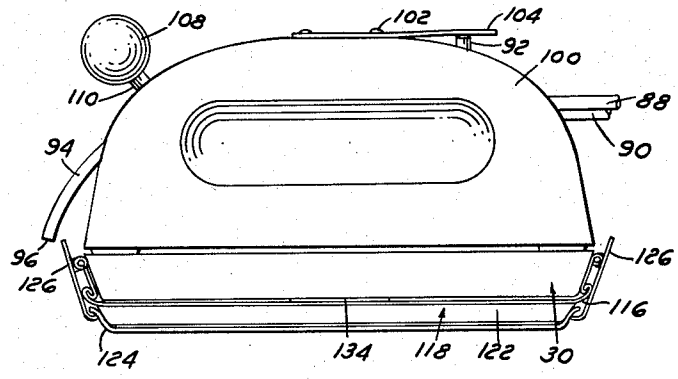


FIG. 1

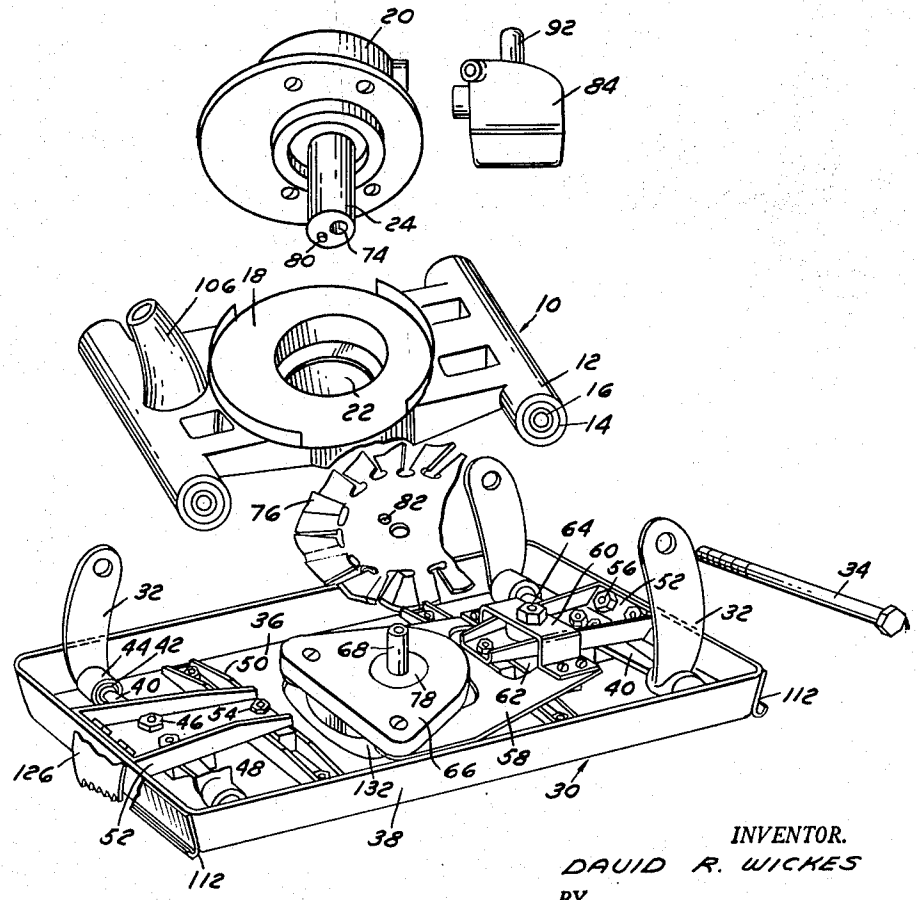


FIG. 2

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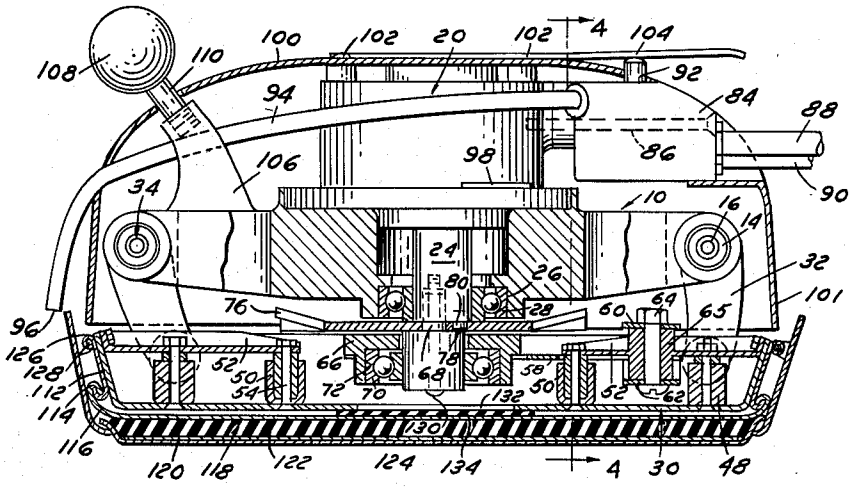


FIG. 3

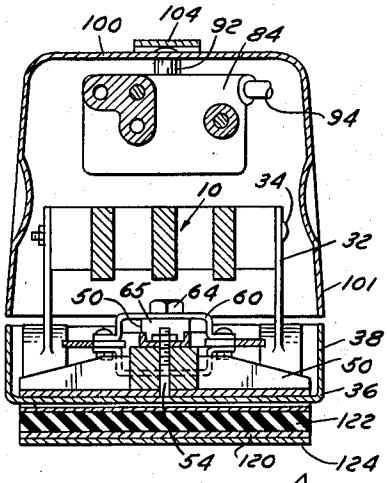
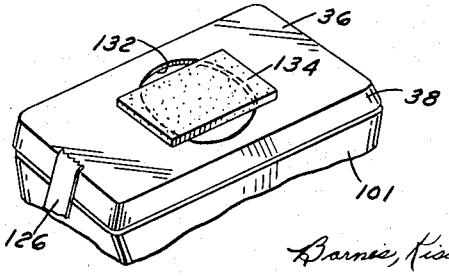


FIG. 5

FIG. 4



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UNITED STATES PATENT OFFICE

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PNEUMATIC SANDING DEVICE

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Application November 27, 1951, Serial No. 258,373

6 Claims. (Cl. 51—170)

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This invention relates to a pneumatic sanding device.

It is an object of this invention to provide a sanding device which is of light weight, economical construction, and adapted for various applications in either wet or dry sanding.

A further object of the invention resides in the provision of a pneumatic sanding device having means for distributing the air discharged from the air motor, uniformly outwardly from around the sander, and thereby blow out of the path of the sanding pad the particles removed from the surface being sanded.

In the drawings:

Fig. 1 is a side elevation of a sanding device of this invention.

Fig. 2 is an exploded perspective view of the sanding device with the cover removed therefrom.

Fig. 3 is a vertical longitudinal sectional view through the sanding device.

Fig. 4 is a sectional view taken substantially along the lines 4—4 in Fig. 3.

Fig. 5 is a fragmentary perspective view of the bottom plate of the sander as seen from the bottom side thereof.

Referring to the drawings, the sanding device there illustrated includes a generally rectangular frame 10 having transversely aligned bosses 12 at each end thereof which are bored to receive rubber bushings 14 provided with a central steel sleeve 16. Frame 10 is preferably formed as an aluminum casting and is machined on its top face to provide a seating socket 18 for an air motor 20. Frame 10 is provided with a central opening 22 therethrough for accommodating the shaft 24 of motor 20. On the under side of frame 10 the opening 22 is counterbored as at 26 to form a seat for the outer race of a bearing 28, the inner race of which receives the lower end of shaft 24.

A sanding plate 30 is disposed horizontally below frame 10 and is pivotally connected thereto as by four links 32. Bolts 34 pass through the upper ends of links 32 and through the bushings 14 at each end of frame 10 so that the links are pivotally supported on frame 10 for movement in parallel planes extending longitudinally of frame 10. Sanding plate 30 is preferably fashioned as an aluminum stamping having a bottom wall 36 and upturned side walls 38. The links 32 are connected with sanding plate 30 by transversely extending axles 40 at each end of plate 30. Axles 40 are journalled at each end in bushings 42 press fitted into sockets 44 at the lower

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ends of links 32. The central portion of shafts 40 is flattened and is connected with the bottom wall 36 of sanding plate 30 by means of screws and nuts 46. Axles 40 are spaced above bottom wall 36 of plate 30 and there are therefore provided spacer blocks 48 beneath the flattened central portion of each of the axles 40.

The screws 46 clamp the central portions of the axles 40 and the spacer blocks 48 tightly against the bottom wall 36 of sanding plate 30. A pair of transverse struts 50 extend across bottom wall 36 for reinforcing the sanding plate. The sanding plate is further reinforced adjacent its opposite ends by means of brackets 52 which have rigid connections at one end with struts 50 by means of the screw 54, with the side wall 38 at its opposite ends by means of screws 56, and at the central portion thereof brackets 52 have a rigid connection with the axles 40 by means of the previously mentioned screws 46. It will be observed that with this arrangement sanding plate 30 is suspended from and below frame 10 and is arranged to be reciprocated in a direction longitudinally of the frame 10 by the oscillation of links 32.

The driving connection between motor 20 and sanding plate 30 includes a yoke member 58 preferably formed of a spring material such as spring steel which is connected with the reinforcing bracket 52 at one end of plate 30 by means of upper and lower U-shaped, spring metal brackets 60 and 62. Brackets 60 and 62 are rigidly connected with the spaced apart ends of yoke 58 and are pivotally connected at the central portion thereof with the reinforcing bracket 52 by means of a screw 64 and spacer bushing 65. An upright stub shaft 68 is journalled on hub 66 by means of a bearing 70 which is seated in a counterbored socket 72 on the bottom face of hub member 66. The upper end of stub shaft 68 is received within the socket 74 in the lower end portion of the motor shaft 24. Socket 74 is formed eccentrically in shaft 24 so that, as the shaft 24 rotates, it causes the stub shaft 68 and the hub member 66 which supports the stub shaft 68 to revolve around the circular path. This circular motion of hub 66 is transmitted by the yoke 58 into a reciprocatory movement of the sanding plate 30. A fan member 76 is supported on stub shaft 68 between the upper face of hub 66 and the lower end face of the motor shaft 24. Stub shaft 68 is formed with a shoulder portion 78 on which fan member 76 seats. Fan 76 does not contact the upper face of hub member 66. A pin 80 projecting from the lower face of motor

shaft 24 is arranged to engage in a corresponding opening 82 in fan 76 to provide a driving connection between shaft 24 and fan 76 so that the fan rotates with shaft 24.

Motor 20 is of conventional construction and need not be described in detail. The motor is suitably apertured for admitting air thereto from the valve body 84. Valve body 84 is secured to motor 20 by means of a pair of screws 86. Valve body 84 is adapted for connection with a compressed air line 88 and a water line 90. The flow of air and water through valve body 84 is controlled by a conventional valve (not shown) and provided with a stem portion 92 which projects upwardly through the top face of valve body 84. Water is discharged from valve body 84 through a conduit 94 which extends forwardly around motor 20 to a discharge outlet 96 spaced forwardly and above the front end of sanding plate 30. The air which travels through motor 20 and causes the rotation of shaft 24 is discharged from the motor through an arcuately fashioned discharge port 98. The arrangement is such that, when the stem portion 92 is depressed, air and water from lines 88 and 90, respectively, are permitted to travel through valve body 84, the air passing through motor 20 and being discharged therefrom through port 98, and the water being conducted through conduit 94 to the discharge port 96.

Motor 20 and frame 10 are enclosed by a housing 100 which housing is mounted on the upper end of motor 20 as by the screws 102. Housing 100 has a skirt portion 101 which terminates around its lower edge in a plane spaced slightly above the upper edge of side wall 38 of the sanding plate 30, thus providing a clearance space therebetween to accommodate the air discharged from outlet port 98 of motor 20. A strip of resilient material 104 is secured to housing 100 by screws 102, the member 104 extending rearwardly such as to overlie the upper end of the stem 92. When member 104 is depressed it serves to actuate stem 92 and thereby actuate the valve connected therewith for permitting the passage of water and air through the valve body 84. At its front end frame 10 is fashioned with a boss 106 with which a handle member 108 is adapted to be threadedly engaged. Handle 108 has a shank portion 110 which projects through housing 100.

At each end sanding plate 30 has secured thereto a clip member 112 adapted to engage with the hooked ends 114 of the top plate 116 of a sanding pad 118. Sanding pad 118 includes the top plate 116 and a bottom plate 120 with a compressible rubber pad 122 interposed therebetween. Plates 116 and 120 are preferably formed of relatively thin sheet metal so as to be relatively distortable. The abrasive paper 124 is arranged to extend over the lower face of lower plate 120 and secured to the sanding pad 118 by means of spring-biased clamps 126 pivotally mounted on plate 30 as at 128.

Stub shaft 68 and hub 66 are secured to the lower end of motor shaft 24 by means of a screw 130 which extends upwardly through stub shaft 68 and threadedly engages with motor shaft 24. In order to permit access to screw 130 and bearing 70, the bottom wall 36 of plate 30 is apertured as at 132. The top plate 116 of sanding pad 118 has cemented thereto a resilient rubber pad 134. Pad 134 is relatively thin as compared with the compressible rubber pad 122 and is dimensioned such as to extend longitudinally of the sander beyond the ends of the opening 132. The interpositioning of pad 134 between bottom wall 36 of plate 30 and the upper face of the pad assembly 118 causes the pad assembly 118 to assume a slightly arcuate contour, the opposite end portions of the pad being arched slightly upwardly. I have found that the provision of a compressible rubber pad such as illustrated at 134 improves considerably the performance of the sander. It appreciably reduces the tendency for the sander to vibrate in a vertical direction because of the action of the links 32.

In use the air line 88 is connected with the source of air under pressure and the water line 90 is connected into a water supply. Thus, when the sander is gripped and the resilient strip 104 is depressed with the palm of the hand, stem 92 is actuated to permit the passage of air and water through valve body 84. The water passes through the valve body into conduit 94 and is discharged therefrom as at 96 just ahead of the path of movement of the sanding pad. The compressed air enters motor 20, produces rotation of the shaft 24, and is discharged from the motor through the discharge port 98. The eccentric connection between shaft 24 and stub shaft 68 causes the hub member 66 to revolve about the axis of shaft 24. Since the hub-supported yoke 58 is pivotally connected with the sanding plate 30 as at 64 and since the rocker arms 32 are supported on frame 10 for movement in a vertical plane, the sanding plate 30 is caused to reciprocate along a straight line path.

It is obvious that the air discharged through port 98 has to escape from within housing 100 through the clearance space between the lower edge of the skirt 101 and the upper edge of the side wall 38 of sanding plate 30. Ordinarily this air would travel the path of least resistance and the majority would be directed as a stream from a particular point around the sander. The provision of fan member 76 produces turbulence of the air within housing 100 and directs the air radially outwardly from substantially entirely around the periphery of skirt 101. This action of fan 76 is very desirable for several reasons.

In the first place, by causing the air to be discharged from substantially around the entire periphery of skirt 101, it will be appreciated that the air thus discharged will serve to blow away from the path of sanding the particles removed from the surface being sanded. In addition, it will be appreciated that there is always a small amount of oil in compressed air lines. The presence of oil in the compressed air line is desirable from the standpoint of lubrication of air motor 20. As the air is discharged from port 98, the oil therein would tend to accumulate at some portion of the sander, and when it has accumulated sufficiently to form a large drop, the oil would drop to the surface being sanded. The provision of fan 76 causes such turbulence of the air within housing 100 that the oil in the air is maintained in an atomized condition and is therefore discharged in a condition in which it is not likely to do any damage to the surface being sanded as would be the case if the oil were discharged in the form of a drop.

I claim:

1. In a pneumatic sanding device, the combination of a frame, a pneumatic motor on said frame having a downwardly extending operating shaft, said shaft being rotated in response to the operation of said motor, a sanding plate below said frame, means connecting said shaft with said

plate for reciprocating said plate, a cover member on said frame having depending side walls terminating at their lower edges adjacent said sanding plate, said motor having an exhaust port opening into the space defined by said cover, and a fan member below said frame and operatively connected with said motor shaft for directing the air discharged from said exhaust port outwardly beneath the lower edges of said cover.

2. In a pneumatic sanding device, the combination of a frame, a pneumatic motor supported on said frame in a position generally centrally of the frame, said motor having an operating shaft which extends downwardly through said frame, a sanding plate below said frame and connected with said frame for reciprocation along a path extending longitudinally of the frame, said shaft being rotated in response to operation of said motor and being connected with said plate such that the plate is reciprocated along said longitudinal path when the motor is operated, a cover member extending over said frame and having depending side walls which terminate along their lower edges along a line adjacent but spaced from said plate, said motor having an exhaust port opening into the space defined by said cover, and a fan member connected with the lower end of said shaft and disposed to rotate in a generally horizontal plane, said exhaust port being disposed above said fan, said fan having blades thereon adapted when rotated to direct the air from said exhaust port downwardly and outwardly beneath the lower edges of said cover.

3. The combination set forth in claim 2 wherein the fan member is supported for rotation in a plane generally parallel to the plane of said plate and is disposed in a position generally centrally of said plate.

4. The combination set forth in claim 2 wherein the lower edges of the side walls of said cover

member are spaced from the edges of said sanding plate to provide therebetween an opening extending around the lower portion of the sanding device.

5. In a pneumatic sanding device, the combination of a frame, an air motor on said frame, a reciprocable sanding plate below said frame, a driving connection between said motor and said sanding plate, a cover enclosing said frame and said motor and extending downwardly thereover with its lower edges spaced from said sanding plate, said motor having a discharge port opening into the confines of said cover, a fan positioned in a plane generally parallel to the plane of said plate and below said discharge port between said frame and said plate, and a driving connection between said fan and said motor, said fan having blades arranged when rotated to direct air from said discharge port downwardly through said cover and radially outwardly through the space between said sanding plate and the lower edges of said cover.

6. The combination set forth in claim 5 wherein the lower edge of said cover and the peripheral edge of said plate are spaced apart to define an opening therebetween, said fan being disposed generally at the level of said opening.

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