

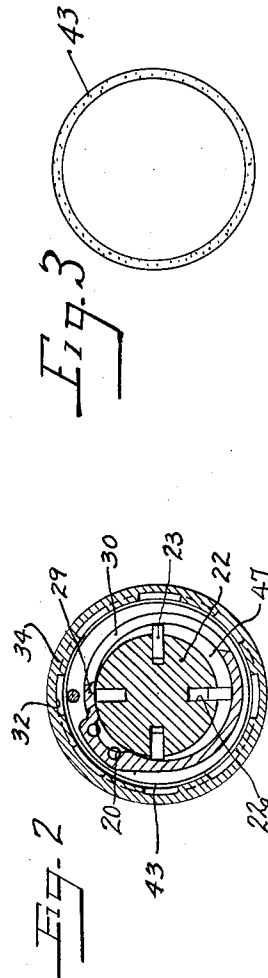
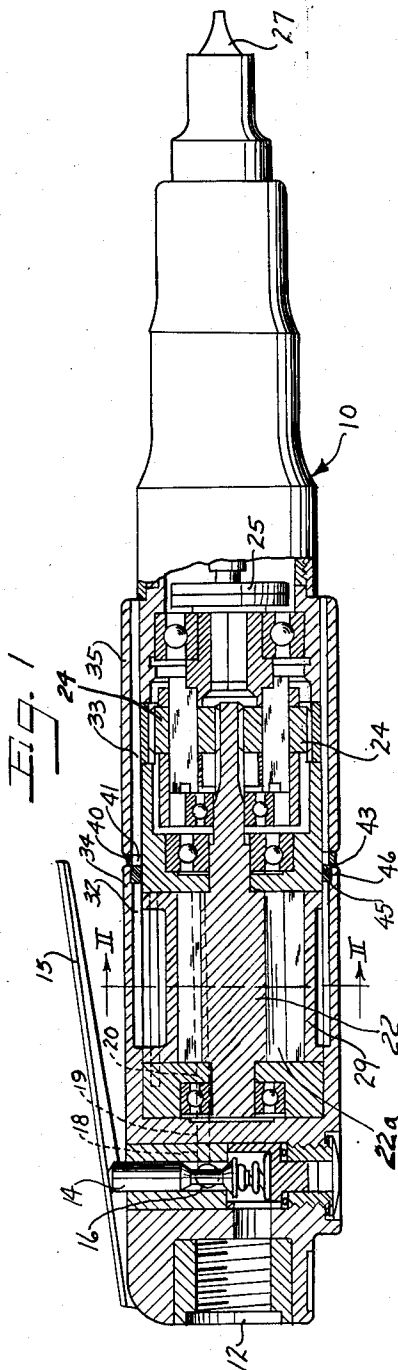
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PNEUMATIC TOOL CONSTRUCTION

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PNEUMATIC TOOL CONSTRUCTION

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This invention relates to improvements in a pneumatic tool, more particularly, it has to do with a combination sound absorbing and air filtering member in the form of a ring of porous material disposed across the discharge air passage of a pneumatic tool and effective to reduce the noise incident to the operation of the tool and to filter the air passing therethrough.

The air that is discharged from a typical pneumatic tool makes a shrill, high-pitched noise that is very objectionable to the operator of the tool. The noise is due chiefly to the high velocity of the air as it passes over the operating mechanism of the tool and through the exhaust ports. It is, therefore, an important object of the present invention to provide means for decreasing the velocity of the air through the exhaust passages of a pneumatic tool.

Another object of this invention is to provide means for absorbing or cancelling out sound waves incident to the operation of a pneumatic tool with the said means simple in construction and very easily installed in the tool.

According to the general features of the present invention, there is preferably provided an annular ring of porous metal, such as sintered bronze, which is arranged to be positioned in the path of flow of the high velocity air as it leaves the motor assembly of the pneumatic tool. While the sound deadening device of the present invention is particularly described as a porous bronze ring adapted for use with small portable power tools, it is to be understood that other materials, e. g., synthetics, laminated crimp paper, other metals, etc., can be advantageously used in this installation where the noise level is high due to high velocity air.

Still a further object of this invention is to provide a means of deadening noise in the operation of a pneumatic tool while the said means also operates as a filter member on the air passing through the said tool.

Other and further features, objects and advantages of the present invention will be apparent to one skilled in the art from the following detailed description taken in connection with the accompanying drawings.

In the drawings:

Figure 1 is a partially sectioned side elevational view showing in a preferred embodiment the novel noise deadening device of the present invention mounted in a pneumatic screw driver.

Figure 2 is a sectional view taken on line II—II of Figure 1.

Figure 3 is a free body view of a noise deadening device of this invention.

As shown in the drawings:

In Figure 1 the reference numeral 10 indicates generally a pneumatic screwdriver of the rotary vane type, wherein air under pressure impinges against the blades or vanes, which are slideably mounted in radial grooves of the rotor and causes the rotor to rotate, and, through a suitable drive mechanism, to rotate the effective end of the screwdriver.

In the embodiment chosen for illustrating the device of this invention, air under pressure enters through a port 12 rearwardly located in the tool 10. A valve 14 positioned within the tool 10 with its stem extending therefrom to be actuated through a hand-operated lever 15, controls the flow of air from the port 12 into a passage 16 which is in flow communication with two aligned passages 18 and 19 in the body of the tool and port 20 of a cylinder 29 which is also in the tool 10. It will be understood that the location, size or extent of the inlet air passages described above form no part of this invention, being illustrated only to show an operative mechanism.

The air passage 20 directs air to the inlet side of a rotor 22 disposed within the cylinder 29, and the air causes the rotor to rotate around its axis and, through gears 24 and a coupling 25 which form the internal drive mechanism of the tool 10, to drive a screwdriver 27 in a manner well known in the art. It should be noted that a plurality of vanes 23 are slideably mounted in radial grooves 22a of the rotor 22, as best seen in Figure 2, and thereby provide the means of operating the rotor 22 and its corresponding drive mechanism as hereinafter further described.

As best seen in Figure 2, the rotor 22 mounted concentric with the housing 34 and eccentric relative to the bore of the cylinder 29 creates a crescent shaped chamber 47, which receives live air at one end through ports 20 and exhausts through port 30 of the cylinder the longitudinal recesses 32 of housing 34 and the passage 33 of housing 35. A resilient seal ring 40, disposed between the housing members 34 and 35, is provided with cut-out portions 41 to conform to the shape and location of the recesses 32 and 33.

Thus it is seen that the vanes form pockets in the chamber 47, each pocket being connected in turn to the air under pressure and to the exhaust as the rotor revolves in response to the air under pressure acting on the successive vanes.

As shown in Figure 1, a preferred embodiment of this invention comprises an annular metal member 43 positioned against a shoulder 45 formed by an annular recess 46 at the end of the

housing 34. This ring is held in position by the assembly of the various housing members. It may be made of any relatively rigid porous material but in a preferred embodiment it is made of sintered bronze. However, the ring need not be made of metal as long as it is relatively rigid so that exhaust air will not distort it and so long as it provides a series of tortuous paths for the exhaust air (without materially raising the back pressure) to effect the noise deadening feature and filter the exhausting air. The porous ring may thus be made of any relatively rigid acoustical material that will absorb sound waves or will cancel them out by interference of sound waves from the same source and also prevent the passage of fine granular particles.

It should be further noted that the ring 43 serves as an air filter in the tool, as the air passes therethrough in the operation of the tool. This feature is particularly desirable when the tool motor is idling with the air supply shut off. Under these conditions the motor acts as a fan to suck air back into the tool through the exhaust passages. Frequently, the air sucked in is contaminated by the dust created in the operation of the tool, such as that encountered in a grinding operation. Thus, it should be apparent that this invention is a highly useful device which serves the compound function of noise deadening and air filtering.

The operation of the present invention will be apparent from the foregoing description. It is to be particularly noted that the porous ring is very simple in design, is very easily installed, and replaced, and need not have any structural value.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In combination in a pneumatic tool, a generally tubular housing having separable fore and rear sections, a rotary air motor mounted in the rear section of said housing, a drive mechanism coupled to said motor contained within the fore section of said housing, annularly arranged air

exhaust passages longitudinally disposed within the housing connecting the outlet side of said air motor to atmosphere and carrying the exhaust air past the drive mechanism, said air exhaust passages discharging forwardly of the housing, and a relatively rigid porous member of sintered material mounted between the housing sections and across said exhaust passages in the path of flow of the exhausting air whereby to reduce the noise incident to operation of the tool and to filter air passing through said passages.

2. In combination in a pneumatic tool, a generally tubular housing having separable fore and rear sections, a rotary air motor mounted in the rear section of said housing, a drive mechanism coupled to said motor contained within the fore section of said housing, annularly arranged air exhaust passages longitudinally disposed within the housing connecting the outlet side of said air motor to atmosphere and carrying the exhaust air past the drive mechanism, said air exhaust passages discharging forwardly of the housing, an annular recess at the forward end of the rear section of the housing, a relatively rigid porous member of sintered material positioned in the annular recess, said member thereby being mounted across said exhaust passages in the path of flow of the exhaust air whereby to reduce the noise incident to operation of the tool and to filter air passing through said passages.

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