

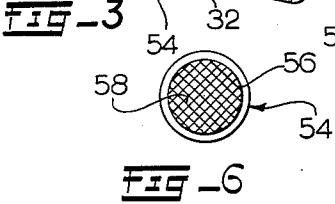
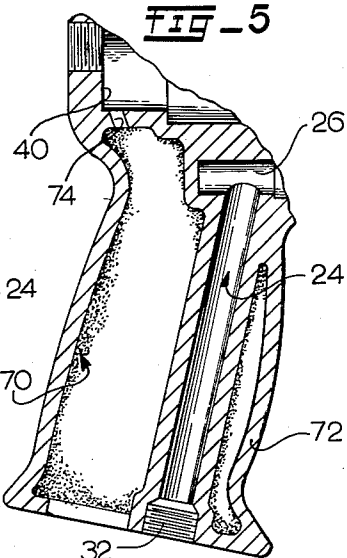
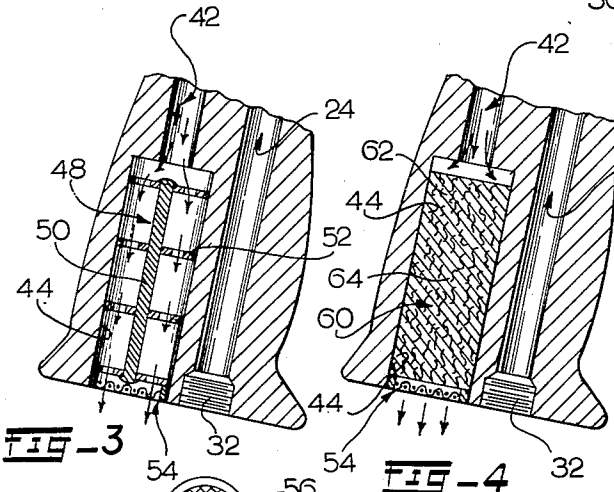
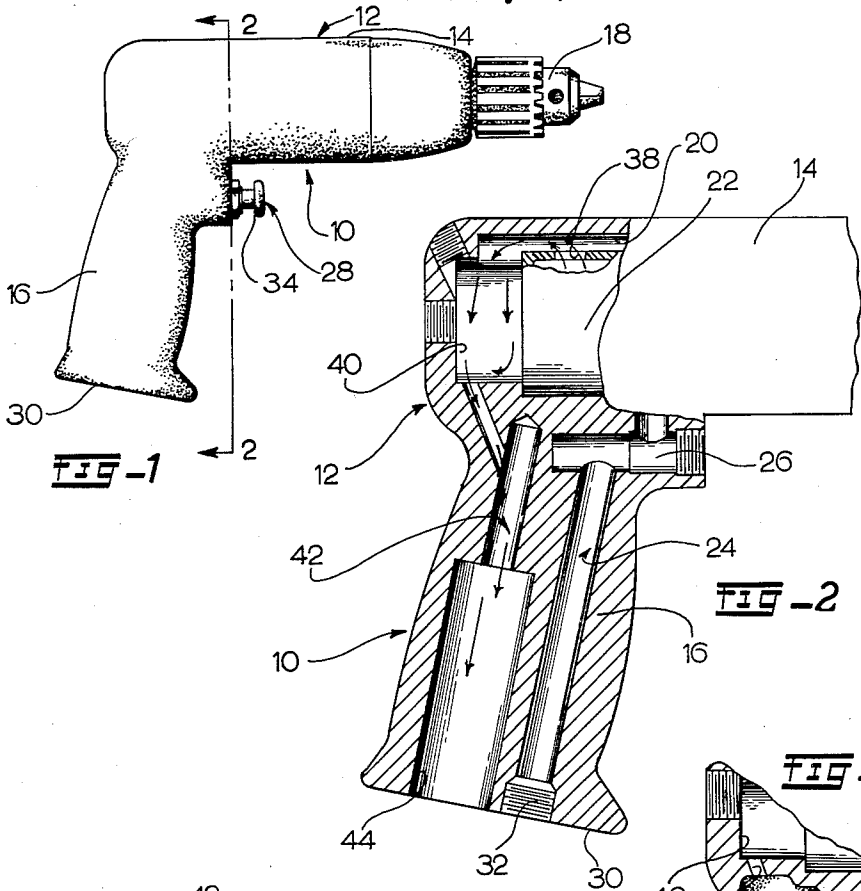
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MUFFLER CONSTRUCTION FOR PORTABLE PNEUMATIC TOOL

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MUFFLER CONSTRUCTION FOR PORTABLE PNEUMATIC TOOL

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This invention relates to a pneumatic hand tool and, more particularly, to a pneumatic hand tool incorporating means for muffling the exhaust noise characteristic of such hand tools.

Pneumatic hand tools customarily incorporate a rotary type motor which is driven by air under pressure. Conventionally, such motors exhaust directly to atmosphere through radial slots incorporated in the housing of the hand tool contiguous to the motor chamber of the housing and a characteristically high pitched whine results from the emission of pressure air from the exhaust outlets provided in the wall of the housing. When a large number of such tools is utilized in a factory, the noise level frequently becomes so high as to render verbal communication extremely difficult and is also a factor in causing fatigue and discomfort to workers utilizing the tools for long periods of time.

It is, therefore, an object of my invention to provide a pneumatic hand tool which is characterized by the relatively low noise level of the exhaust air issuing therefrom, such relatively low noise level being attributable to the incorporation in the hand tool of muffling means adapted to reduce said noise level.

Another object of my invention is the provision of a pneumatic hand tool which is incorporated in a housing having a handle formed integrally therewith or provided thereupon, said housing having a motor chamber incorporated therein and the associated handle having an elongated air intake passage communicating with said motor chamber so that a pneumatic motor located therein may be driven by air under pressure fed to it from said air intake passage. Also incorporated in the handle of the pneumatic hand tool of my invention is an exhaust air passage which communicates with the motor chamber at one extremity and with a muffler chamber also incorporated in the handle at its other extremity. Therefore, instead of permitting the emission of exhaust air directly to atmosphere through restricted openings, the exhaust air is fed, in the hand tool of my invention, through an exhaust passage in the handle into a muffler chamber in the handle, thus materially reducing the noise level of the exhaust air.

A further object of my invention is the provision, in a hand tool of the aforementioned character, of a muffler located in the muffler chamber in the handle of the hand tool and adapted to materially reduce the noise level of the exhaust air.

I believe that the reduction of the noise level of the exhaust air achieved by the hand tool of my invention is attributable to two factors, namely: the provision of the muffler chamber which permits the rapid expansion of the exhaust air, and the incorporation in the muffler chamber of auxiliary muffler means which serves to baffle the exhaust air and to further reduce the noise level thereof.

Other objects and advantages of the invention will be apparent from the following specification and the ac-

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companying drawing which is for the purpose of illustration only and in which:

Fig. 1 is a side elevational view of a pneumatic hand tool constructed in accordance with the teachings of my invention;

Fig. 2 is an enlarged, fragmentary, sectional view taken from the broken line 2—2 of Fig. 1;

Fig. 3 is an enlarged, fragmentary, sectional view showing the incorporation, in the muffler chamber of the handle, of a particular type of muffler;

Fig. 4 is a view similar to Fig. 3 showing an alternative form of muffler;

Fig. 5 is an enlarged, fragmentary, sectional view showing an alternative construction of the muffler chamber of the hand tool of my invention; and

Fig. 6 is a plan view of a screen adapted to be utilized in conjunction with the muffler chamber of the hand tool of my invention.

Referring to the drawing and particularly to Figs. 1 and 2 thereof, I show a pneumatic hand tool 10 constructed in accordance with the teachings of my invention and embodied in a housing 12, said housing being formed by die-casting or similar processes and including a motor chamber portion 14 and a handle portion 16 formed integrally therewith. While I disclose the handle portion 16 of the housing 12 formed integrally with the motor chamber portion thereof, it is, of course, obvious that the motor chamber portion and handle portion 14 and 16, respectively, of the housing 12 can be formed as separate sub-assemblies and subsequently connected to each other by conventional fabricating and fastening means.

Mounted at the forward extremity of the motor chamber portion 14 of the housing 12 are a rotatable spindle, not shown, and a conventional tool receiving chuck 18. A motor chamber 20 is provided in the portion 14 of the housing and a motor 22 is located therein, said motor being of the pneumatic type and being adapted to be energized from a source of air under pressure, not shown.

The handle portion 16 of the housing 12 incorporates an elongated air intake passage 24, said air intake passage 24 including an intermediate, horizontally oriented section 26 in which is located an air control valve indicated generally at 28 in Fig. 1 of the drawing. The lower extremity of the air intake passage 24 terminates at the bottom 30 of the handle portion 16 of the housing 12 and the lower extremity of the intake passage 24 is threaded at 32 to provide for the reception of a conventional fitting, not shown, which will receive an air hose, not shown, to conduct air to the intake passage 26.

When the hand tool 10 is in use, depression of the control button 34 of the control valve 28 will permit air to flow through the air intake passage 24 and past the valve 28 into the motor chamber 20 and the pneumatic motor 22 to cause the energization of the same and concomitant rotation of the chuck 18.

As previously indicated, in conventional pneumatic hand tools the housing is provided with radial slots in the wall of the motor chamber portion 14 to permit immediate exhaust of air from the motor chamber after it has passed through and energized the motor 22.

In the hand tool 10 of my invention the motor 22 is provided with one or more exhaust ports 38 from which exhaust air is conducted into an exhaust chamber 40 at the rearward extremity of the motor housing 12 and thence into an elongated exhaust passage 42, the major portion of which is disposed in parallelism with the air intake passage 24 and the lower extremity of which communicates with a substantially cylindrical expansion or muffler chamber 44 which has its lower extremity

communicating with the bottom 30 of the handle portion 16 of the housing 12.

The muffler chamber 44 is adapted to receive any one of a number of different types of mufflers, a typical example being the muffler 48 shown in Fig. 3 of the drawing, said muffler including a centrally located mounting rod 50 supporting a plurality of perforated baffles 52 disposed in spaced relationship with each other. The lower extremity of the muffler chamber 44 can be closed by a screen 54 having a metallic rim 56 surrounding and supporting a screen portion 58.

The screen 54 may be a pressed fit and serve to retain the muffler 48 in operative relationship with the muffler chamber 44 or may be threaded or otherwise retained in the lower extremity of the muffler chamber 44.

An alternative form of muffler 60 is shown in Fig. 4 of the drawing and includes a substantially cylindrical cartridge 62 formed from screening or from perforated metal and embodying a mass 64 of fibrous material such as rock wool or the like. A screen 54 is associated with the muffler 60 and serves to retain it in operative relationship with the muffler chamber 44.

An alternative type of muffler chamber 70 is shown in Fig. 5 of the drawing, said muffler chamber being cast in the handle 72 during the casting of the housing 12 of which the handle 72 constitutes a part and said muffler chamber being maintained in communication with the exhaust chamber by means of a relatively short exhaust passage 74. Casting of the muffler chamber 70 in the handle 72 eliminates the necessity for drilling the same after the housing has been cast and also provides a larger area for the reception of an appropriate muffler or muffling material.

When the control button 34 of the valve 28 is depressed and the motor 22 energized by the flow of air under pressure through the air intake passage 24, exhaust air will issue through the exhaust ports 38 in the motor 22 and flow into the exhaust chamber 70 in the housing 12. Thence the exhaust air will flow through the exhaust passage 42 into the muffler chamber 44. A muffler such as the muffler 48 or muffler 60 can be located in the exhaust chamber 44 to dampen exhaust noise and reduce the noise level thereof. Of course, if it is desired the wall of the exhaust or muffler chamber can be coated with an appropriate sound deadening material and the necessity for the utilization of an auxiliary muffler such as the mufflers 48 or 60 can be dispensed with. By the provision of the hand tool 10 of my invention, the noise level in factories where such tools are utilized can be materially reduced and fatigue consequent upon high noise levels can be obviated. Furthermore, the exhaust air is discharged downwardly through the handle with the result that it is not discharged outwardly upon the person of the individual holding the hand tool.

I claim:

1. In a hand tool, the combination of: a housing; a pneumatic motor in said housing; a handle on said housing, said handle having an elongated air intake passage therein communicating with said motor and an elongated exhaust passage communicating with said motor, said handle incorporating an expansion chamber adapted to receive exhaust air from said exhaust passage; and a muffler mounted in said chamber to reduce the noise level of air emitted from said exhaust passage.

2. In a hand tool, the combination of: a housing having a motor chamber therein; a pneumatic motor disposed in said chamber; a handle on said housing, said handle having an elongated air intake passage formed therein and communicating with the bottom of said handle at one extremity and with said motor at its other extremity, said handle also incorporating an exhaust passage and a muffler chamber, said exhaust passage being disposed between and maintaining said motor and said muffler chambers in fluid communication with each other; and a muffler in said muffler chamber to reduce the noise level of exhaust air issuing from said exhaust passage.

3. In a hand tool, the combination of: a housing having a motor chamber therein; a pneumatic motor disposed in said chamber; a handle on said housing, said handle having an elongated air intake passage formed therein and communicating with the bottom of said handle at one extremity and with said motor at its other extremity, said handle also incorporating an exhaust passage and a muffler chamber, said exhaust passage being disposed between and maintaining said motor and said muffler chambers in fluid communication with each other, said intake passage and said muffler chamber being disposed in substantial parallelism with each other; and a muffler in said muffler chamber to reduce the noise level of exhaust air issuing from said exhaust passage.

4. In a pneumatic hand tool having a housing which includes a horizontally oriented motor chamber and a handle formed integrally with said housing and incorporating an elongated air intake passage communicating with said chamber, the improvement including an elongated air exhaust passage in said handle and a muffler chamber in said handle communicating with said exhaust passage and a muffler located in said muffler chamber.

References Cited in the file of this patent

UNITED STATES PATENTS

2,134,735	Reinhold	Nov. 1, 1938
2,643,731	Schmid	June 30, 1953
2,678,637	Doeden	May 18, 1954