My invention relates to hand-held motor tools, such as buffers and grinders and drills.

It is the object of my invention to provide such a hand-held motor tool with an effective mechanism for lighting the work area and for keeping that work area free of the debris formed by the tool operation.

In carrying out my invention, I provide a hand-held casing which at one end is provided with means for mounting a rotatable tool, such as a drill or a grinder or a buffering wheel, either coaxial with the casing or offset from the casing axis by being at a right angle thereto, and suitably drive the rotatable tool, conveniently by an electric motor within the hand-held casing; and provide a fan which is mounted on or otherwise driven from the shaft and discharges a stream of air through a nozzle directed at the area on which the tool operates; and provide in connection with the hand-held casing an electric light arranged to direct the light also on the area where the tool is operating, with that light direction conveniently obtained by having the air nozzle made of a light-conducting plastic which conducts the light to and discharges it with the air at the work area.

The accompanying drawing illustrates my invention:

Fig. 1 is a plan view of a hand-held motor tool embodying my invention, with some of the parts in section on the line 1—1 of Fig. 2 and with the axis of the tool proper perpendicular to the axis of the casing; Fig. 2 is a side elevation of the hand-held motor tool of Fig. 1, with some parts in section on the line 2—2 of Fig. 1; Fig. 3 is an end elevation of the hand-held motor tool of Figs. 1 and 2, with the plastic nozzle in section; Fig. 4 is a fragmental section showing a modification of the angle-drive gear, somewhat different from that illustrated in Fig. 2; and Fig. 5 is a fragmental elevation showing the hand-held motor tool with a tool coaxial with the casing.

My hand-held motor tool has a casing 10 within which an electric motor consisting of a field magnet 11 and an armature 12 is axially mounted. The operation of the motor 11—12 is controlled by a suitable switch, which as shown has two pairs of contacts 13 which are suitably movable by a rotatable end piece 14 of the casing to open and close the circuit for the electric current supplied through the cord 15. The motor 11—12 has a shaft 16 mounted in suitable bearings 17, of which one is shown in Figs. 1 and 2; and that shaft 16 is coaxial with and drivingly connected to the shaft 18 mounted in an end member 19 of the casing 10. As shown, the co-axial shafts 16 and 18 have a separable driving connection between them, separable by the removal of the casing end-member 18.

The shaft 18 has a driving connection to any suitable tool, such as the drill 20 of Figs. 3 and 5, or a sanding or buffering or grinding disk of Figs. 1 and 2. If such a sanding, buffering, or grinding disk 21 is used, it is suitably mounted on a stem 22. The tool, such as the drill 20 or the sanding or grinding or buffering disk 21 with its carrying shaft or stem 22, is desirably removably mounted, as in a suitable chuck 23. The chuck 23 may be coaxial with the shaft 18 and carried directly by it, as is shown in Fig. 5, or may be mounted on its own separate shaft 24 non-coaxial with the shaft 18, as by being at a right angle thereto as illustrated in Figs. 2, 3, and 4. If the chuck 23 is non-coaxial with the shaft 18, it may be coaxial with the shaft 18, as is shown in said chuck 23, as is shown in Figs. 1, 2, and 3.

Up to this point the structure of my hand-held motor tool is of known and more or less standard construction.

The casing 10 has a laterally offset portion 30 at and near the front end, in which the shaft 18 is mounted; and in that offset portion an electric lamp bulb 31 is suitably mounted. This lamp bulb 31 is supplied with current by a cord 32 which branches from the cord 15, and the lamp circuit is controlled by a suitable switch 34 conveniently mounted in the offset casing portion 30.

The end of the offset portion 30 of the casing receives and supports the mounting end of a nozzle 35, which has an opening through it and is suitably shaped so that its discharge end 36 is directed upon the general area on which the tool 20 or 21 operates. This nozzle may be substantially straight if the chuck 23 is mounted on and co-axial with the shaft 18, as is shown in Fig. 5; but is suitably bent by about a right angle if the chuck 23 is mounted on its own shaft 24 and has its axis perpendicular to the axis of the shaft 18 and of the casing 10, as is shown in Figs. 1, 2, and 3.

A fan 37 mounted on the shaft 16 draws air in through openings 38 at the rear end of the casing 10, and through the motor 11—12 by way of air passages provided in known ways in such a manner, and discharges that air from the main casing body 10 into the offset casing portion 30, and thence into and through the nozzle 35 on to the
area where the tool 20 or 21 is working. This discharge of air keeps the work area clear, by blowing away the debris created by the tool operation.

The nozzle 35 not only discharges air, but has another function of discharging light upon the work area. To this end, the nozzle 35 is made of a light-conducting and light-guiding transparent plastic, such as methyl methacrylate (sold under the trade-mark “Lucite”). This light-guiding plastic receives the light from the lamp-bulb 31, and conducts it lengthwise through the nozzle to the nozzle-discharge end 36; which thus discharges both light to illuminate the work area and air to keep that work area clear.

My hand-held motor tool may be used for various purposes, with various tools 20 or 21 mounted in the chuck 23. For instance, it may be used for drilling holes, as with the drill 20; or it may be used to grind or polish various articles, ranging from articles of considerable size down to small articles that are held in the hand, such as instances of dental inlays; or it may be used for buffing callouses, such as corns, as by chiropodists. In all of these uses, and whether the tool is coaxial with or offset from the casing, the nozzle 35 discharges both light and air upon the area being worked upon, to illuminate that work area and keep it clean.

I claim as my invention:
1. A hand-held motor tool, comprising a casing, an electric motor mounted in said casing, tool-carrying means driven from said motor and mounted with its axis at an angle to the motor axis, a fan driven by said motor, a nozzle receiving air from said fan and discharging air on to the area being worked on by the tool, said nozzle being curved so that its discharge end is near said work-area, said nozzle being made of a transparent light-conducting and light-guiding plastic, and means mounted in said casing for supporting an electric lamp-bulb behind the said nozzle to supply light thereto.

2. A hand-held motor tool, comprising a casing, a driven shaft rotatably mounted in said casing, tool-carrying means driven by the shaft, a fan driven by said shaft, means carried by said casing for supporting an electric lamp-bulb, and a nozzle of transparent light-conducting and light-guiding plastic carried by said casing in position to receive air from said fan and light from said lamp-bulb and to discharge both said air and said light on to the area being worked on by the tool.

3. A hand-held motor tool, comprising a casing, an electric motor mounted in said casing, tool-carrying means driven by said electric motor, a fan driven by said motor, means carried by said casing for supporting an electric lamp-bulb, and a nozzle of transparent light-conducting and light-guiding plastic carried by said casing in position to receive air from said fan and light from said lamp-bulb and to discharge both said air and said light on to the area being worked on by the tool.

MOSES JOHNSON.

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