Jan. 10, 1928. 1,655,565

R. A. REID

GRINDER AND POLISHER

Filed Dec. 31, 1925

Fig. 1.

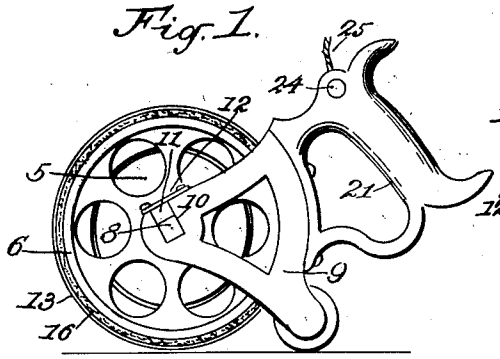


Fig. 2.

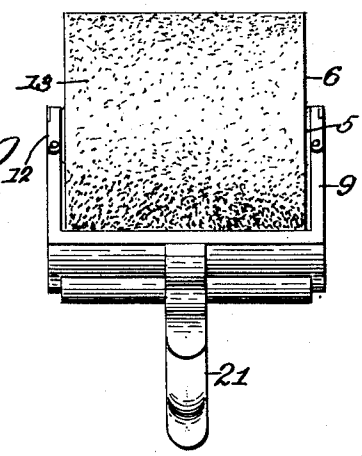


Fig. 3.

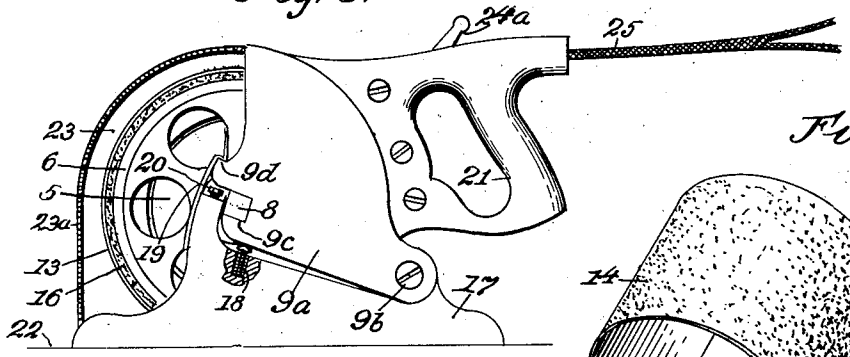


Fig. 6.

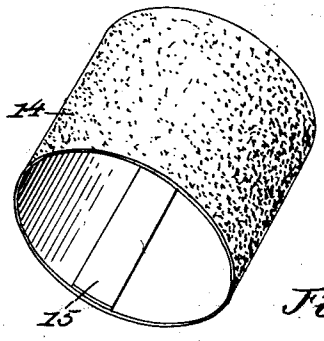


Fig. 4.

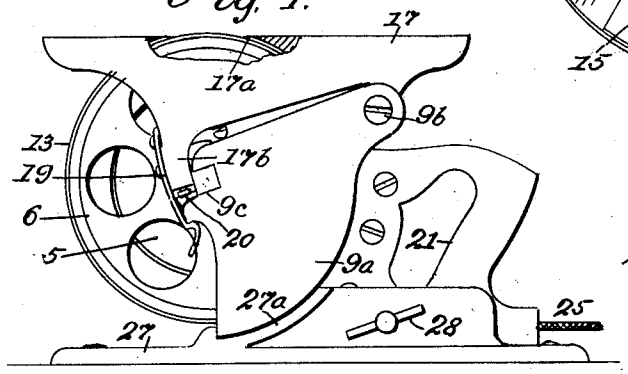


Fig. 7.

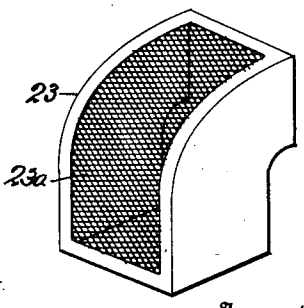
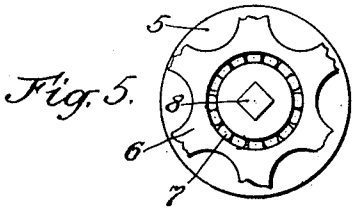


Fig. 5.



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UNITED STATES PATENT OFFICE.

RAYMOND A. REID, OF CEDAR RAPIDS, IOWA.

GRINDER AND POLISHER.

Application filed December 31, 1925. Serial No. 78,552.

This invention relates to grinders and polishers of the rotary type, and the object of the invention is to produce an electrically driven machine of this class composed of a minimum of operative and other parts, and adapted for easy and convenient application to a wide variety of uses where an abrasive is employed.

The invention consists in the main of the direct use of a rotary outer shell (commonly holding the field coils) of an electric motor as a rotor, and applying to its outer surface an abrasive, the inner (armature) element of the motor being held fast while the shell acts as a grinder or polisher.

The invention consists further in providing such an instrumentality with means for holding the armature in a stable position; for regulating the position of the rotor with respect to the work; for moving the apparatus over stationary work; for mounting it so that the work may be moved instead of the grinder; for arresting the scattering of dust, and for such other purposes as may hereinafter appear.

In the accompanying drawing, forming a part of this specification, Fig. 1 is a side elevation of a very simple implement embodying the invention. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of a somewhat more complex embodiment of the invention, with means for accurately adjusting the abrading surface to the work in hand. Fig. 4 shows the device illustrated in Fig. 3 inverted, and held on a suitable base, so as to be used as a stationary grinder. Fig. 5 is a fragmentary detail illustrating the bearing at one side of the motor. Fig. 6 shows in perspective a tube of abrasive material adapted to be slipped on the rotor. Fig. 7 shows a dust arrester adapted for attachment to the apparatus.

The invention is shown in one of its simplest forms in Figs. 1 and 2. It comprises an electric motor, and means for moving the same over a surface and holding the rotor with more or less accuracy to proper grinding or polishing position with respect to said surface. The motor comprises an inner member 5, corresponding to the ordinary armature, and an enclosing member 6, corresponding to the usual field. These are herein shown conventionally, with no attempt to show the wiring or other electrical details, as they form no necessary part of the invention, and are within the common knowledge of any skilled electrician. The essential mechanical features, however, include suitable bearings 7, (preferably ball bearings) whereby the cylindrical field member may rotate around the axis of the armature. This is in practice provided with square hubs or bosses 8, by means of which the armature is mounted and held securely in a suitable holder 9, provided with recesses 10 to hold the hubs. In the device shown in Fig. 1 the hubs are held in their recesses by space-blocks 11 and turnable clamp-plates 12. This admits of the motor being removed from its holder in a moment, for the attachment of a circumferential abrasive 13. For general use this is a sheet of sandpaper 14, turned to cylindrical form, so as to fit on the rotor, and fastened on the inside where the ends of the sheet abut by an adhesive strip 15. For most purposes it is preferred to face the metal circumference of the motor with felt 16, or the like, to slightly cushion the abrasive, and thereby soften its action as it performs its work. The ring of felt is made fast to the rotor, as by an adhesive, and the abrasive ring is made to slip snugly over the felt, to which it needs no other attachment. When used for grinding, more specifically, the cushioning ring is best omitted, as shown in Fig. 4, the abrasive being applied directly to the surface of the rotor, by an adhesive, for example, or by slipping on a closely fitting ring of abrasive such as is illustrated in Fig. 6. The device may then be used for grinding tools, and the like, without danger of catching and tearing the adhesive.

In the use of the device shown in Fig. 1 it will be evident that considerable care and skill is necessary to run the implement smoothly and uniformly over the work. The work of the operator is simplified by the construction shown in Figs. 3 and 4. In this case the motor carrier 9^a is hinged at 9^b to a base 17, which has a flat bottom, with an opening 17^a therein to permit the periphery of the rotor to project a little beyond the flat face of the base. The motor carrier or holder has recesses at 9^c to receive the hubs of the armature, and upwardly extended lugs 17^b on the base hold the hubs in normal position. Springs 18 tend to hold the rotor out of contact with the work. Spring latches 19 engaging shoulders 9^d hold

the carrier in proper position. The depression of the rotor is adjustably limited by screw studs 20. By this means the contact of the abrasive surface of the rotor with the work is very nicely adjusted.

For use at a bench in sanding interior finish, and the like, the implement is used like a smoothing plane. Forward pressure on the handle 21 attached to the holder tends to depress the rotor and so give it the proper abrasive contact with the work, the surface of which is herein indicated by the line 22. When the movement of the implement over the work is stopped, in an abrasive position thereover, the rotor is lifted by the springs out of contact with the work, and the making of hollow spots therein is thus avoided.

No provision is herein made for carrying away the dust arising from the work, but it is prevented from flying into the air by placing over the rotor a hood 23, having a screen front 23[a] which will allow the air to pass through, but arrests the centrifugally thrown dust, which falls down in front of the rotor to a space between it and the base. The screen may be a simple structure of sheet metal and wire gauze, as shown in Fig. 7, and made to slip into working position on the base, and between it and the holder at the sides and top.

Switches 24 and 24[a] serve to start and stop the motor, by controlling the circuit in the conductors 25, which are supposed to connect with an electrical system, not shown, as to an ordinary lamp socket.

In Fig. 4 the implement is shown inverted, so as to serve as a convenient grinder for tools, flat surfaces, and the like. For this purpose the bench or table 26 is provided with a base-plate 27 having seats 27[a] formed thereon to hold the rotor carrier, and socket 27[b] to receive the handle 21. A clamp-screw 28 serves to hold the implement stably in working position. The top of the rotor may now be used for grinding, the character of the abrasive being preferably modified, as above described.

Aside from its simplicity and lightness, the implement is very convenient, both as regards its working, and in the matter of shifting abrasives. It will be evident that it is but the work of a moment to detach the armature from the holder, when the entire motor may be lifted out, and everything is free for the detachment of the old abrasive and the slipping on of another.

For the sake of brevity, and to avoid the use of alternative terms, the word abrasive is herein used to indicate the working surface of the rotor. The term is to be understood, however, in its most comprehensive sense as a grinding, scouring or rubbing agent, and applicable as well to a soft rubbing polisher as to a harsh abradant, like sand-paper, emery, or emery cloth. The use of the cylindrical external member of an electrical motor as a drum for grinding, sanding, polishing or buffing is believed to be new.

Having thus described my invention, I claim:

1. The combination of an electric motor having a cylindrical, rotary, abrasive-faced field, an internal armature having angular axis terminals, a holder having open sockets for said terminals, and a guiding base-plate open for the passage of an arc of the field periphery, connecting movably with the holder, and provided with lugs to hold said axis terminals in their sockets.

2. The combination of an electric motor having a cylindrical, rotary, abrasive-faced field, an internal armature, provided with angular axis terminals, a holder with open sockets to receive and hold said terminals, a guiding base-plate having a plane face through which an arc of the field's periphery may project, and yieldingly attached to the holder, lugs on said base-plate to hold the axis terminals in position, and latched to lock the base-plate and holder together in operative position.

3. The combination of an electric motor having an abrasive-faced rotary field, an internal armature, a holder for the axis thereof, a guiding base-plate attached movably to the holder, and opened on its guiding face to admit an arc of the field's periphery, a handle whereby the base-plate is slid over the work planewise, and a bench-plate adapted to hold the implement in inverted position, means for removably attaching the bench-plate to the holder as inverted with the flat face of the guiding base-plate uppermost.

In testimony whereof I affix my signature.

RAYMOND A. REID.