Oct. 24, 1933. J. B. FLEMING ET AL 1,931,893

PORTABLE POWER DRIVEN POLISHING TOOL

Filed Jan. 15, 1932 2 Sheets-Sheet 1

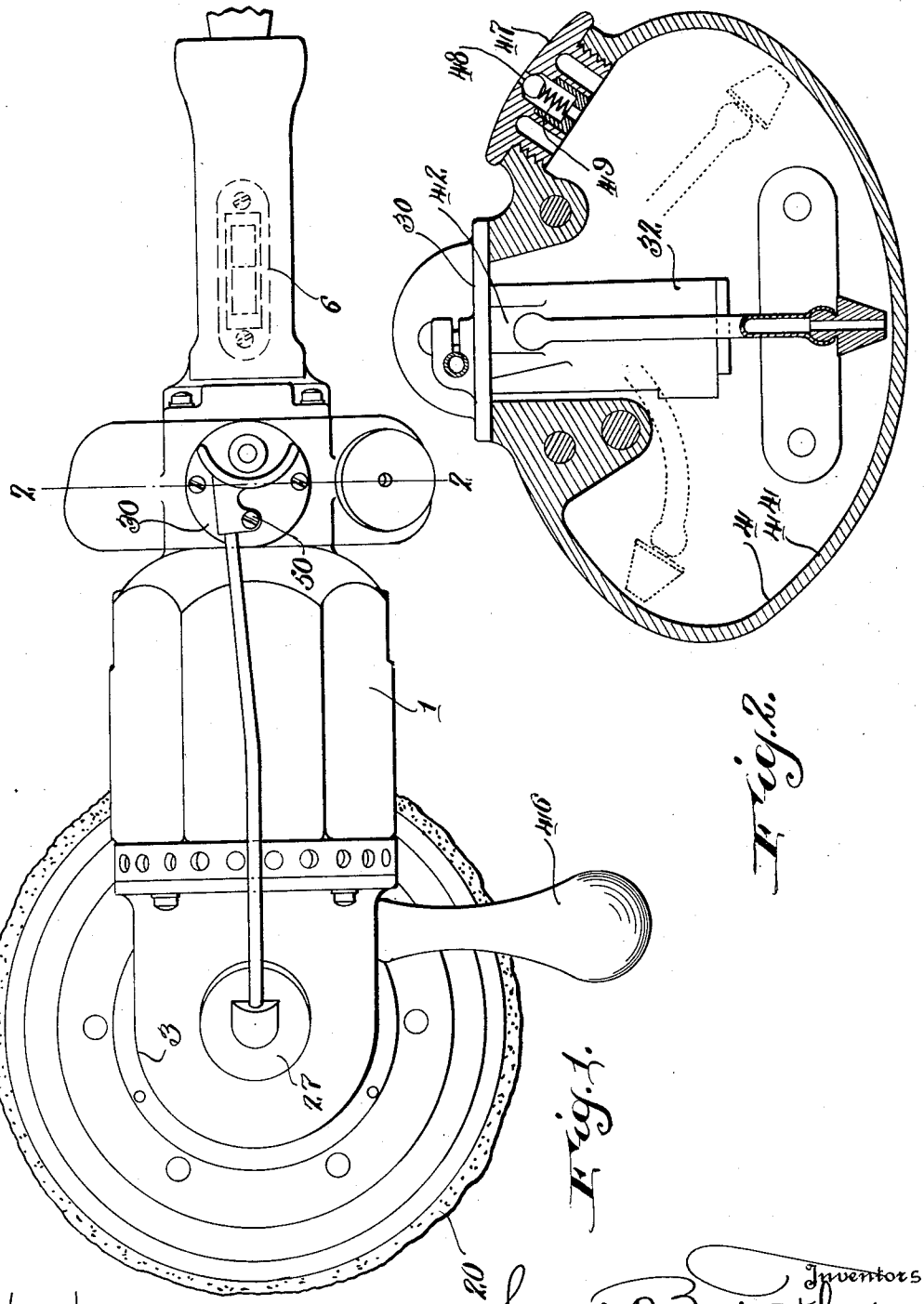


Fig. 1.

Fig. 2.

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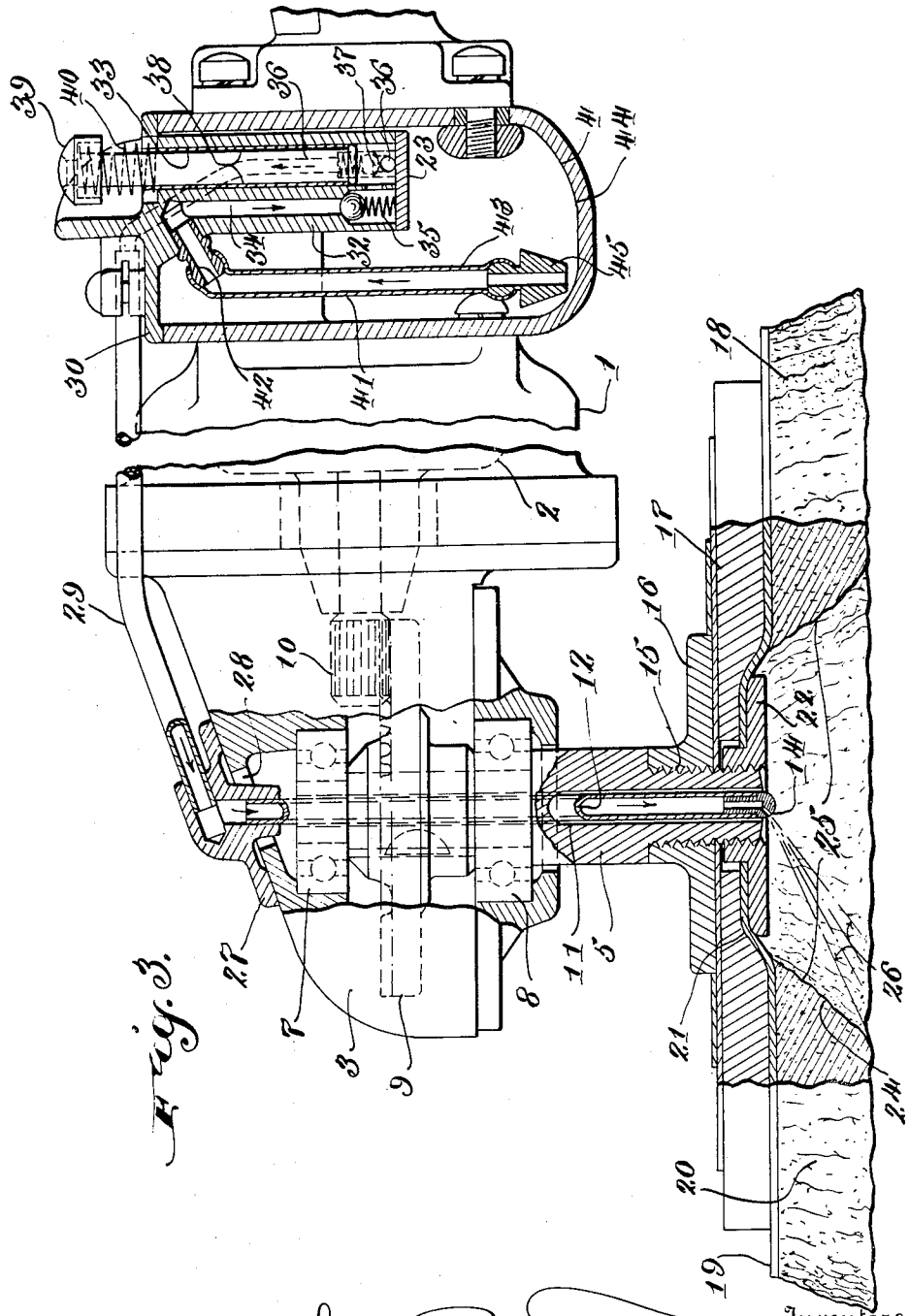


Fig. 3.

Witness

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UNITED STATES PATENT OFFICE

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PORTABLE POWER DRIVEN POLISHING TOOL

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11 Claims. (Cl. 91—39)

The polishing of motor vehicles by waxing has come to be recognized as so essential to the preservation of the finish and maintenance of a presentable appearance that this practice promises to attain the magnitude of a major industry, provided the work can be performed so economically as to place it within the reach of the public in general. This treatment has been too expensive to be indulged in frequency by the average owner of a motor vehicle principally because of the hand labor involved, the most important item being about six or ten hours rubbing to affix the wax to the surface and to distribute and polish it. The expense of this hand labor item has been so considerable as to act as a bar to the general, or it might be said, universal adoption of the polished wax coating as an external finish and preservative. While the wax coating lasts several months under favorable conditions, frequent cleaning and waxing is so beneficial and effective in preserving the appearance of a motor vehicle that except for the excessive expense it would long since have come to be regarded as essential.

The object of the present invention is to provide means whereby the cleaning, waxing and polishing and all or at least ninety-nine per cent. of the rubbing incidental to these operations can be performed quickly and efficiently by means of a portable power driven tool producing a result at least equal to that produced by hand without the exercise of a great deal of skill or effort and in one quarter to one third of the time previously required. This reduction of the time and effort required to perform the cleaning, waxing and polishing operations results in an important reduction in expense.

The reduction in expense effected by the power driven apparatus already on the market, has resulted in a greatly increased demand for this treatment, but the present apparatus is so much more efficient that it promises to effect a still further important increase with a corresponding increase of revenue to the garages or other agencies which undertake the application of the treatment in a commercial way. This increased demand for the treatment in turn has resulted and will further result in a correspondingly increased demand for labor.

The apparatus of the invention is in the nature of a strictly portable, hand controlled power driven tool including a rotary polishing pad which is applied to the work to which a liquid cleaning fluid containing wax in suspension is fed during the cleaning and polishing operations. It may be of interest at this point to explain that the liquid after being applied to the surface, is quickly evaporated by the friction of the pad and the circulation of air due to the motion of the pad. When the surface which has been wet with the liquid is thus dried, the dirt having been released by the dissolution of grease and other material holding it on the surface is thrown off by the action of the pad in the form of a fine dust or powder. The wax on the other hand adheres to the surface and is soon brought to a high polish.

The important features of the apparatus which is the subject of the invention are (1) the feeding of the liquid cleaning and waxing solution at will during the operation of the tool preferably while the pad is in motion, (2) the provision of a reservoir for the liquid so arranged that the supply therein is available for feeding in any and every position of the tool, (3) the hollow spindle in cooperation with the liquid reservoir mounted on the tool, (4) a special outlet nozzle whereby the liquid is directed toward the work, preferably forwardly from a point near the center of the pad, (5) the feeding means for feeding the liquid from the reservoir through the hollow spindle to the nozzle whereby it is projected upon the surface to be polished, said feeding means and nozzle being as to every element easily removable for cleaning, inspection and replacement, the various details of the apparatus being of particular importance in connection with the novel pickup device or intake to draw the polish from the reservoir in any position of the polishing tool. It is of interest that the material of which the pad is composed is trimmed away or otherwise arranged to leave the center of the pad open so that the center of the pad can not become saturated with polish which may remain wet on account of the low peripheral speed at the center and thus interfere with the final finishing or polishing of the work. These points or items of improvement are each of them regarded as of importance both in combination each with the others and separately considered.

In the accompanying drawings we have illustrated a tool embodying the features of the invention in the preferred form.

In the drawings:

Figure 1 is a plan view of the complete tool equipped with a rotary polishing pad of lambs wool or the like.

Figure 2 is a section on the line 2, 2 in Figure 1.

Figure 3 is a side elevation having the center of

the motor housing and motor broken away and removed for convenience of illustration. This figure also has portions broken away to show the underlying parts mainly in section on the longitudinal center line of the tool.

Referring to the drawings by numerals, each of which is used to indicate the same or similar parts in the different figures, the construction shown which is the preferred form of the tool, includes a motor housing or casing 1, in which is enclosed an electric or other suitable motor 2. At one end of the motor housing and secured thereto is a gear casing 3. and at the other end also secured to the housing 1 is a reservoir 4 for cleaning and polishing fluid. The spindle 5 for the polishing pad projects downwardly from the gear casing 3 preferably at right angles to the axis of the motor and the tool is shown as provided with a hand grip 6 which may be secured to the reservoir 4 projecting in a longitudinal direction oppositely to the gear casing. This may, of course, be otherwise arranged.

Referring more particularly to the details of the tool, the spindle 5 is mounted in suitable rotary and thrust bearings 7 and 8 seated in the gear casing on the opposite, i. e., the upper and lower sides thereof, and the spindle 5 carries intermediately of said bearings, a crown or similar toothed gear 9 which is engaged and driven by a corresponding pinion 10 on the motor shaft whereby the spindle and pad are driven in continuous rotation when the motor is energized.

The spindle 5 is hollow having an axial bore indicated by reference character 11. This serves as a passage for the polish for which purpose it is preferably provided with a non rotary tube 12 which extends downwardly therethrough and is shown as equipped at its lower end with a nozzle 14 to be further described. The spindle 5 is shown as reduced and threaded at 15 at its lower end where it carries at the top of the thread a flanged nut 16 or other positioning and supporting means for the disk 17 which supports the polishing pad 18. This is of the usual or any suitable construction except as hereinafter specifically described. The pad as illustrated consists of a circular sheet 19 which may, if necessary, be suitably reinforced. In the form of the invention shown the backing sheet 19 which may be of hide or any suitable material, is provided with a coat of natural wool 20 or other suitable soft fibre which constitutes the rubbing and polishing element of the tool.

At the center of the pad this wool or other fibrous material 20 has been removed or omitted, leaving a flat clear portion of the hide or other support at 21 and the pad is secured to the spindle by means of a flat nut 22 which bears against the under side of the hide or other sheet material, or the pad may be secured in any suitable manner. It will be noted that the wool is clipped back or otherwise removed at 24, leaving an outwardly flaring central opening 25 through which the polishing material 26 is sprayed on to the work as illustrated at 26. The absence of the polising fibre from a considerable area at the center of the pad is of importance in that it prevents the retention of the liquid at this point where the lack of sufficient velocity of the pad to evaporate it by frictional heat and air draft would cause the pad to remain wet throughout the process with the result that it would interfere with the final polishing of the waxed surface.

The axial tube 12 which is located in the bore 11 at the center of the spindle 5 enters and is secured at its upper end to a fitting 27 which overlies and covers an opening 28 in the top of the gear casing 3. This fitting is connected to the reservoir 4 by longitudinal delivery tube or pipe 29 which is secured at one end in said fitting which is suitably apertured to connect the pipes or tubes 12 and 29, and at its other end the tube 29 is connected to a fitting or cover 30 which closes the top of the reservoir 4.

The cover member 30 of the reservoir 4 in the preferred form of the invention shown is provided with an inwardly or downwardly projecting portion 32 which as shown is bored at 33 at right angles to the plane of the cover to form a pump cylinder and at 34 to form an intake passage for the pump. This intake passage is provided with a non-return valve 35 opening inwardly toward the cylinder, the projecting portion 32 as shown is also apertured or bored at 36 to provide a delivery passage which is closed against suction by a non-return ball valve 37. This passage 36 is connected as shown or in any suitable manner to the delivery pipe 29. The bottom end of the cylinder and said passages are as shown closed by a bottom plate 23 or in any suitable manner.

The pump cylinder or bore 33 contains as shown a piston 38 fitted to slide therein. This piston or plunger is provided at its upper end with a button 39 for engagement by the thumb or hand of the operator. The portion of the piston 38 above the cylinder 33 is shown as encircled by a helical spring 40 which bears at one end against the button or thumb seat 39, and at the other end against the cover 30 holding the piston 38 normally in raised position so that it may be pressed downwardly at the will of the operator in any convenient manner as by application thereto of the thumb of the hand which holds the grip 6. When the piston is thus pressed downwardly, it performs a pumping stroke in conjunction with the cylinder 33 and the valves 35 and 37 whereby the contents of the cylinder is forced into the delivery pipes 36, 29, and downwardly through the tube 12 to and through the nozzle 14.

An important feature of the invention consists in the pickup device 41. In accordance with the invention the intake or suction passage 34 which in the form of the invention shown is included in the cover casting 30 and particularly in the projection 32 in which the cylinder is formed, is equipped at a convenient point which is shown as immediately adjacent the cover proper, although this is not essential, with a nipple 42 connected directly to the intake or suction passage 34. This nipple 42 is adapted to receive and engage the end of a thin, highly flexible rubber or other suitable tube 43 which forms an extension of the intake or suction passage 34. This tube in the preferred form is preferably of a length approaching the length of the radius of the reservoir 4 which as shown has its bottom wall 44 formed on an arc the center of which is at the nipple 42. This exact arrangement is not absolutely essential, but it contributes to the efficiency with which the pump is enabled to deliver substantially the entire contents of the reservoir.

The pickup device 41 further includes an intake member referred to for convenience as a nozzle 45, which is preferably weighted to a sufficient extent to cause it to flex or bend the tube 43 as the tool is swung and its position changed, so that the nozzle or intake member 45 will be in the various positions of the tool occupy or approach the lowest point in the reservoir where the liquid is deepest, enabling the tool to utilize practically the

last drop of polish in the reservoir and avoid the normal tendency of the intake pipe of the pump to project above the liquid as the tool is rotated from the upright position shown, which would result in serious interference with the delivery of the polish to the work. Any suitable gravity controlled movable intake may be substituted for the one shown.

The reservoir is provided with a filler plug 47, in a conveniently located filler opening. This filler plug is provided with an air inlet valve which may be located in any desired position. As shown, it is in the form of a ball valve 48 opening inwardly and normally closed by a light spring 49 so as to permit the entrance of air and prevent the escape of the liquid when the tool is tipped so as to submerge the inner face of the plug. The air admitted in this way replaces the liquid consumed and prevents the formation of a vacuum which would interfere with the action of the pump in feeding the liquid.

In the operation of cleaning, waxing and polishing a lacquered surface which is the main function of the apparatus, the reservoir 4 is filled with a suitable liquid which preferably serves as a cleaning agent being easily evaporated by heat and draft from the polishing pad. This liquid preferably contains a sufficient quantity of wax to coat the surface being treated as hereinafter described or the wax may be otherwise applied.

When the tool thus prepared being placed with the pad in contact with the lacquered surface, the motor is started causing the pad to rotate it at the desired speed. The tool is at this time supported by a hand gripping the handle 6 and may be further controlled by the other hand which engages either the gear casing 3 or forward grip 46. Under these circumstances the button or thumb seat 39 of the piston 38 is within easy reach of the thumb of the hand holding the grip or handle 6. This button 39 is depressed one or two or three times depending on whether the passages 36, 29, 12 are already filled with the liquid. The spring 40 raises the piston after each down stroke resulting in a pumping action which projects a sufficient quantity of the polish from the nozzle 14 into contact with the lacquered surface as shown by the illustration of the spray 26. The tool is then moved back and forth with the polishing pad 18 in rotation and in contact with the surface to be treated.

The liquid described for which any suitable liquid cleaner and/or wax preparation may be substituted, serves first to clean the accumulated dirt from the surface, dissolving the adhesive element as grease or the like and as the operation progresses and the solvent is evaporated, the dirt is thrown off in the form of a fine dust and the wax is caused to adhere to the susface. As the operation is completed this wax is brought to a high polish. The pad is then moved from place to place treating the entire surface in units of relatively small area, the operation being completed and repeated for each new area encountered.

The inclination of the nozzle is of particular advantage in projecting the liquid forwardly into contact with the lacquer beneath the working surface of the pad, also in that it projects the liquid into more or less inaccessible areas which can only be reached to advantage by the forward edge of the pad.

As the tool is moved to various positions and rocked back and forth in passing the pad over the surface of the work, the supply of liquid in the reservoir is gradually depleted, leaving more or less of the space within the reservoir unfilled. Under these circumstances, the available supply of liquid moves to various locations within the reservoir, the force of gravity causing it to seek the lowest point at all times. An important advantage of the present apparatus is that the intake member or nozzle 45 being sufficiently weighted to flex the tube 43 follows the available supply of liquid and is kept constantly submerged particularly as to its intake end so long as there is any liquid available. This avoids interruption of the supply of liquid to the pump and hence to the discharge nozzle 14 and makes the tool capable of application to the work in any and every position in which the tool can be placed and held by the operator in contact with the surface being treated.

Whenever the liquid which has been applied to the work has evaporated in the operation of the polisher and the surface thus covered with liquid has been cleaned and polished, the thumb of the operator is again applied to the button 39 of the piston 38 causing one or more additional strokes of the piston whereby a further supply of liquid is passed through the tubes 36, 29, 12 and projected from the nozzle 14 as illustrated in Figure 3 in the operative relation to and with the pad. This spray is directed against a new area to be cleaned and polished.

It is of considerable advantage in the operation of the polisher that it is not necessary or desirable in thus providing a renewed supply of the liquid to stop the motor or in any way to interfere with the polishing operation. In this connection it is of interest that during the polishing operation it is necessary to give close attention to the work and that to be compelled to stop the work and remove the tool and lay it down to apply the liquid results in a distinct disadvantage as to the quality of the work as well as in an important loss of time. In an instance actually noted the operator was compelled to stop work sixty-two times to apply the liquid in polishing one motor vehicle. This resulted in the actual loss of about one half hour.

It is also of interest that the apparatus is so constructed that not only can cover 30 be removed, together with the pump cylinder 33 and the passages 34 and 36, and the flexible pickup 41, all of which can be thus overhauled at any time, but the tube 29 can be released from the cover fitting 30 by screw 50 and the fitting 27 being released, both tubes 29 and 12 and nozzle 14 can be removed and cleaned making the entire apparatus capable of instantaneous inspection and overhauling in case of clogging so that the operation of the device can not be interfered with in this way.

It is further of interest that the fleece or rubbing element 18 being removed from a considerable area at the center of the pad, the chance that the central portion of the pad which moves at a comparatively slow speed when the pad rotates will accumulate liquid polish and remain wet, thus interfering with the finish of the work is liminated.

We have thus described a polishing tool which is particularly adapted to the cleaning, waxing and polishing of the lacquered surfaces of motor vehicles and other lacquered surfaces, the description being specific and in detail in order that the manner of constructing, applying, operating and using the invention may be fully understood, however, the terms herein are used descriptively rath-

er than in a limiting sense, the scope of the invention being defined in the claims.

What we claim as new and desire to secure by Letters Patent is:

1. A portable power driven polisher having a hand grip whereby it is engaged by the operator to be supported and guided over the work, the portable structure including an electric motor, a rotary polishing pad having a rotary central spindle connected to said electric motor whereby it is driven, said spindle being hollow, the polisher being provided with a receptacle for liquid connected to the spindle whereby the liquid is fed through said spindle and means for controlling the flow of liquid polish through said spindle, said controlling means having actuating means immediately adjacent the hand grip whereby the fluid supply controlling means can be operated by the gripping hand, during the operation of the tool and without releasing the grip or discontinuing the operation of the tool or the guiding and controlling action.

2. A portable power driven polishing tool comprising a moving polishing pad, a delivery passage for polish extending toward the work in the vicinity of the pad, a hand grip whereby the polisher is supported by hand and moved over the work, a reservoir for polish, a pump having a spring retracted piston with means within reach of the hand of the operator as it engages the grip for advancing the piston, means connecting the delivery side of the pump to the delivery passage, the intake side of the pump being connected to the reservoir near the bottom thereof.

3. In a portable polisher for treating the lacquered surfaces of motor vehicles and the like and adapted to be manually supported and controlled, an electric motor having a casing, a power operated pad mounted on the casing with its axis transverse to the motor axis, means operatively connecting the pad to the said motor, means for discharging polishing liquid in operative relation to the work and pad, thereby bringing it in contact with the surface being treated, a reservoir for liquid polish mounted on the motor casing and having a wall curved about the motor axis, a pump also mounted on the polisher and having its delivery end connected to the said discharge, the pump having a freely movable intake pipe secured near said axis adapted to be swung by gravity, a weight at the intake causing the intake end thereof to follow said curve and to be normally submerged beneath the liquid in the reservoir in the various operative positions of the polisher.

4. In a portable power driven polisher having a power operated pad and means for discharging polish and bringing it in contact with the surface being treated during the operation of the polisher, a reservoir for polish having a removable cover, a pump cylinder mounted on the cover and extending downwardly into the reservoir, means connecting the delivery side of the pump to said discharge, the pump having an intake passage with its intake end beneath the liquid polish of the reservoir.

5. In a portable power driven polisher having a power operated pad and means for discharging polish and bringing it in contact with the surface being treated during the operation of the polisher, a reservoir for polish having a removable cover, a pump cylinder mounted on the cover extending downwardly into the reservoir, means connecting the delivery side of the pump to said discharge, the pump having an intake passage, said intake passage being flexible and gravity controlld to follow the supply of liquid and remaining submerged therein as the polisher is moved from one operative position to another.

6. In a portable power driven polisher adapted to be manually supported and controlled for use in treating lacquered surfaces of motor vehicles and the like, a rotary polishing pad, a hollow spindle on which the pad is mounted, a source of power connected to said spindle, a reservoir having a pump with controlling means within convenient distance to be operated by a hand of the operator without releasing the polisher or discontinuing its operation, said pump being removble and having a delivery pipe connected thereto, a tube with a nozzle extending downward through the hollow spindle and a fitting connecting the pipe to the tube whereby the tube, the nozzle, pipe and pump are instantaneously removable for cleaning and overhauling.

7. In a portable polisher for treating the lacquered surfaces of motor vehicles and the like a grip whereby the polisher is manually supported and controlled, an electric motor having a casing, a rotary pad, means connecting the pad to said motor to be operated thereby, means for discharging polishing liquid near the operating surface of the pad thereby bringing it in contact with the surface being treated, a reservoir for liquid polish secured to the motor casing at the axial end, the grip being secured to the reservoir on the side opposite the motor and in alignment with the axis, a pump also mounted on the motor casing adjacent the grip to be operated by the gripping hand and having its delivery end connected to the said discharge, the pump having a flexible intake pipe within the reservoir with a weight attached to the intake end of said pipe causing said intake end to be normally submerged beneath the liquid in the reservoir in the various operative positions of the polisher, the reservoir having a removable cover adapted to hold the pump and said connection in operative relation to and with the reservoir.

8. In a portable power driven polishing tool having a hand grip, a power operated pad and means for discharging polish whereby it is brought in contact with the surface being treated, a reservoir for polish, a pump having a spring retracted piston immediately adjacent the grip so that it can be depressed by the hand of the operator engaging the grip without releasing the grip, means connecting the delivery side of the pump to the discharge and means connecting the suction side of the pump to the reservoir beneath the liquid.

9. A hand supported portable power driven polishing tool for use in treating the lacquered surfaces of automobile hoods, fenders, etc. comprising an electric motor, a rotary polishing pad mounted at one end of the motor with its axis substantially at right angles thereto and connected to the motor to be operated thereby, a reservoir secured to the other end of the motor and a hand grip for supporting the tool extending beyond the reservoir oppositely to the motor in substantial alignment with the axis, a pump connected to the reservoir, the pump having a discharge for leading the fluid to the center of the pad, and means immediately adjacent the grip whereby the pump may be operated by the hand engaging the grip and controlling the tool.

10. A hand supported portable power driven polishing tool for treating the lacquered surfaces of motor vehicle bodies, hoods, fenders, etc. com-

prising an electric motor, a rotary polishing pad mounted at one end of the motor with its axis substantially at right angles thereto and connected to the motor to be operated thereby, a reservoir secured to the other end of the motor and a hand grip for supporting the tool extending beyond the reservoir opposite to the motor in substantial alignment with the axis, a pump connected to the reservoir, the pump having a discharge for leading the fluid to the center of the pad and means immediately adjacent the grip whereby the pump may be operated by the hand engaging the grip and controlling the tool, the reservoir being substantially flat in a plane transverse to the axis of the motor, the pump having a flexible intake inside the reservoir mounted to swing transversely to the axis as the tool is rocked causing the intake to remain submerged beneath the fluid in the reservoir.

11. A portable power driven polishing tool for treating the lacquered surfaces of automobile bodies, hoods, fenders, etc. comprising an electric motor having a casing, a polishing pad mounted on the casing and connected to the motor to be rotated thereby, a hand grip whereby the tool including the motor and the pad are guided and supported, means for supplying, a liquid to the center of the pad and means immediately adjacent the grip adapted to be controlled by the hand of the operator which is at the same time occupied in guiding and supporting the tool for controlling the supply of liquid independently of the operation of the polishing pad, the polishing means of the pad being spaced away from the center preventing accumulation of liquid at this point.

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