

Nov. 8, 1932.

W. L. HODEAUX

1,886,952

POWER TOOL

Filed Jan. 5, 1931

3 Sheets-Sheet 1

Fig. 1.

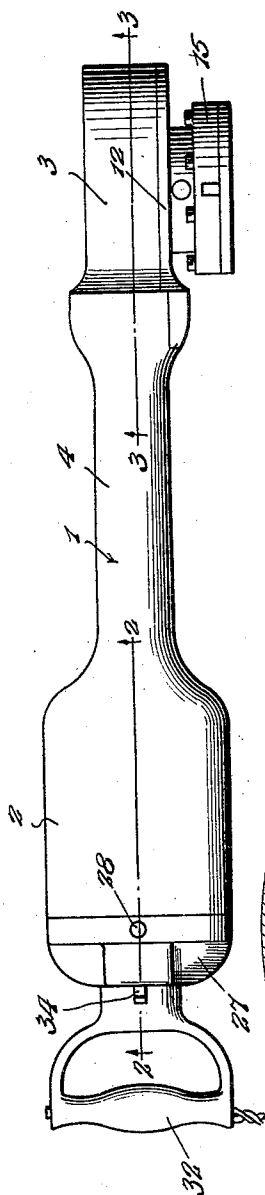


Fig. 6.

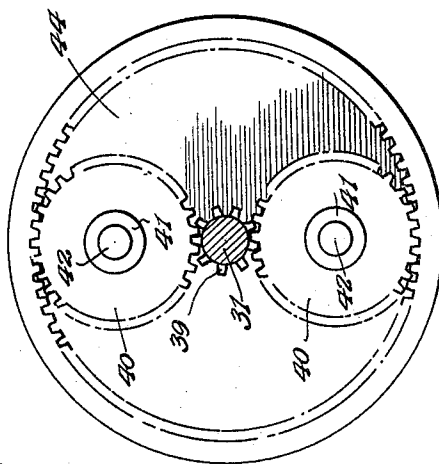
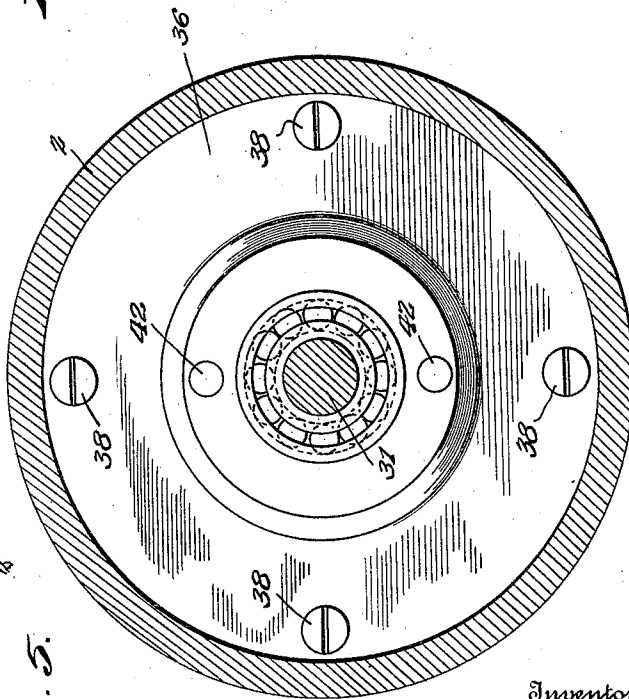


Fig. 5.



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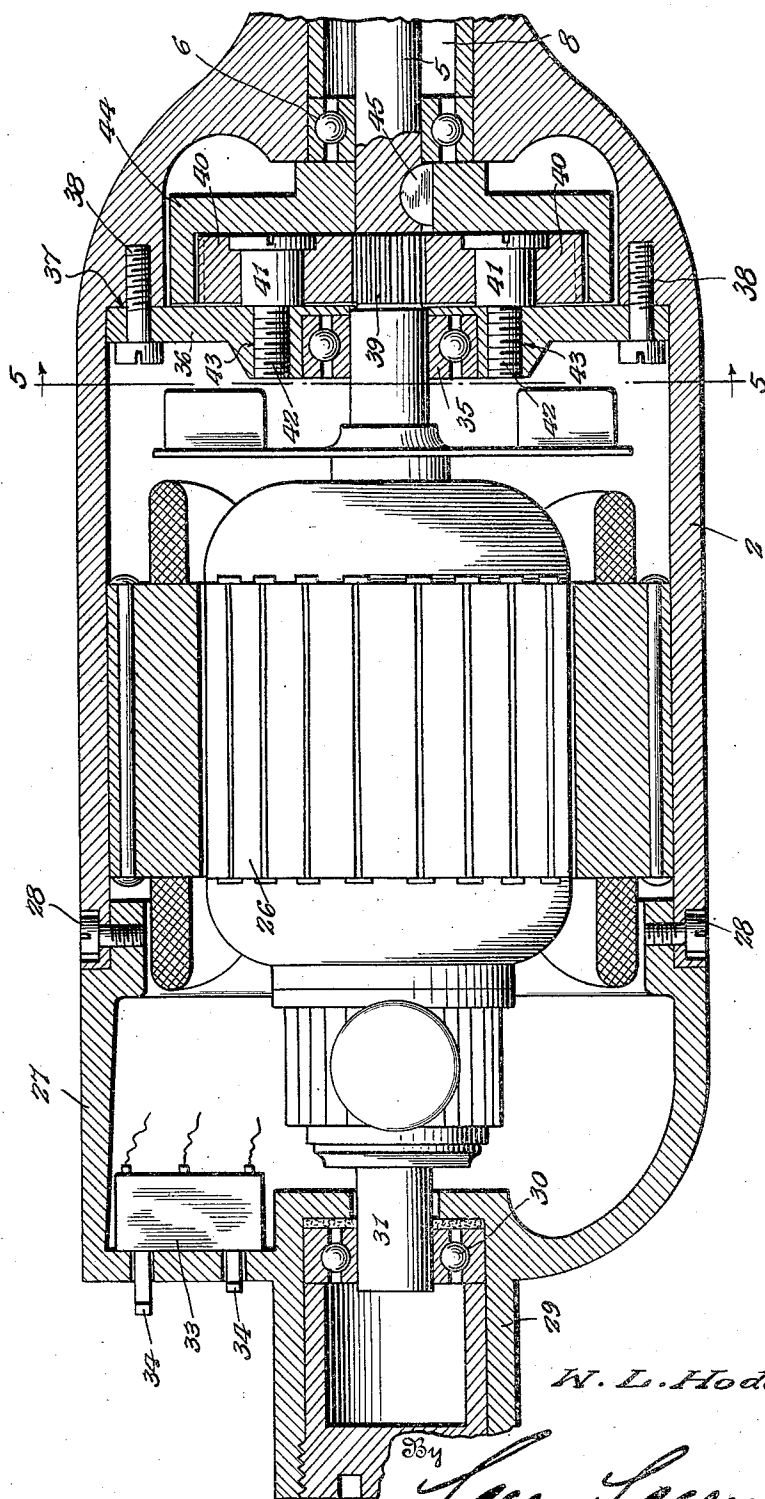
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Fig. 2.



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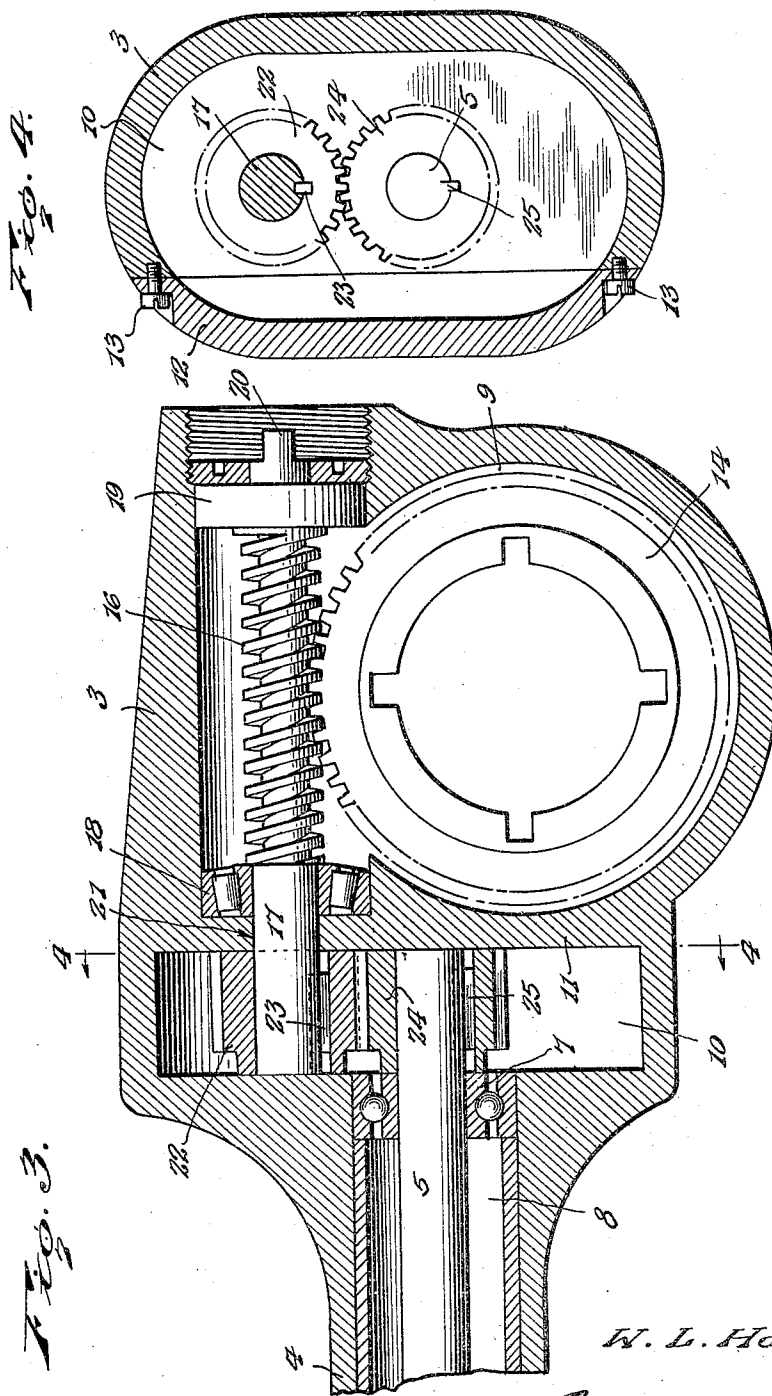
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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POWER TOOL

Application filed January 5, 1931. Serial No. 506,781.

This invention relates to a power tool of the type in which a motor is mounted in a housing forming the rear portion of the casing of the tool and motion transmitted from the motor to a tool holder mounted in the forward portion of the casing.

One object of the invention is to provide a power tool having an improved type of casing so constructed that the motor may be easily fitted into the motor housing and its shaft rotatably supported in operative relation to a transmission shaft by means of which motion is transmitted from the motor shaft to tool holding means in the forward portion of the casing.

Another object of the invention is to provide a power tool having the rear portion of its motor housing removably secured thereby permitting the motor to be easily mounted in the housing or removed therefrom and to further permit the removable rear end portion of the housing to be very firmly secured when the motor is in place.

Another object of the invention is to provide improved means for rotatably supporting the forward end of the motor shaft and permit the means for rotatably supporting the forward end of the motor shaft to also serve as a carrier for pinions forming part of a gearing by means of which rotary motion is transmitted from the motor shaft to the transmission shaft of the tool.

Another object of the invention is to permit the motor to be withdrawn when necessary without disturbing the means for rotatably mounting the forward end of its shaft and thereby permit the motor to be removed and after being repaired or inspected, replaced without disturbing the gearing.

Another object of the invention is to provide a power operated tool which is very compact in its construction and which may be safely handled by a workman without danger of the workman being injured by shafts and other moving parts of the tool.

The invention is illustrated in the accompanying drawings, wherein

Fig. 1 is a top plan view of the improved power tool,

Fig. 2 is a longitudinal sectional view

through the rear portion of the tool taken along the line 2—2 of Fig. 1,

Fig. 3 is a longitudinal sectional view through the forward portion of the tool taken along the line 3—3 of Figure 1,

Fig. 4 is a transverse sectional view taken along the line 4—4 of Figure 3,

Fig. 5 is a transverse sectional view taken along the line 5—5 of Figure 2, and

Fig. 6 is a view looking at the gearing from the rear.

The improved power tool has a casing indicated in general by the numeral 1. The rear portion 2 of the casing forms a motor housing and the forward portion 3 constitutes a hollow head which is connected with the motor housing by a tubular shank 4. A transmission shaft 5 extends longitudinally through the shank and is rotatably mounted in bearings 6 and 7 disposed in end portions of the shank and fitting against ends of a tubular sleeve 8 which fits snugly in the shank about the shaft and holds the bearings 6 and 7 in proper spaced relation to each other.

The hollow head 3 of the tool is divided into front and rear chambers 9 and 10 by a partition 11 and these chambers are closed at one side of the head by a closure plate or wall 12 which is removably secured by a suitable number of screws 13. By this arrangement the plate may be firmly secured but may be easily removed when access to the interior of the head is necessary.

A tool holder or socket 14 for carrying a thread cutter or any other tool for which it may be adapted is rotatably mounted in the chamber 9 and is formed with worm teeth about its circumference which mesh with a worm 16 formed upon a worm shaft 17. This shaft is rotatably supported in bearings 18 and 19 and has its forward end formed with a coupling member 20 so that a tool may be connected with the forward end of this shaft if so desired. The rear end of the worm shaft extends through an opening 21 formed in the partition 11 into the chamber 10 and fits within a gear or pinion 22 to which it is secured by a key 23. Therefore, the pinion will be fixed to this shaft and since the pinion meshes with a companion gear or pinion 24, secured upon

- the forward end of the transmission shaft 5 by a key 25, rotary motion will be transmitted to the worm shaft and tool carrier whenever the transmission shaft is rotated.
- 5 By removing the side plate 12, access may be had to the chambers 9 and 10 and, therefore, the mechanism in the hollow head 3 may be very easily assembled or removed in order to be cleaned or repaired when necessary.
- 10 Within the motor housing 2 is disposed a motor 26 which is of a conventional construction. The rear end portion 27 of the motor housing is detachably secured by screws 28 in order that it may be removed when the motor is to be fitted into the housing or removed therefrom and this removable rear end portion or head 27 of the motor housing is formed with a neck 29 in which is mounted a bearing 30 for the rear end of the motor shaft 31.
- 15 The handle 32 which the workman grasps, may be provided with a switch by means of which flow of current to the motor may be controlled and within the head is located a double throw switch 33 suitably wired to the motor circuit in order that the direction in which the motor shaft rotates may be controlled. The actuating buttons 34 for this double throw switch project rearwardly from the head 27 above the handle where they may be easily reached by the operator.
- 20 In order to rotatably mount the forward end portion of the motor shaft 31, there has been provided a bearing 35 fitted in an annular depression or seat in a plate 36 which fits snugly into the motor housing and is secured against an annular shoulder 37 near the forward end thereof and by screws 38. The forward end of the motor shaft which projects from the plate 36 is reduced and formed with gear teeth as shown in Figures 2 and 6, thereby defining a gear or pinion 39 which meshes with the gears or pinions 40 of a reduction gearing for transmitting rotary movement from the motor shaft to the transmission shaft. The gears or pinions 40 are rotatably mounted upon spindles 41 which have their stems 42 engaged in threaded openings 43 formed in the plate 36. It will thus be seen that the plate 36 serves not only as a carrier for the bearing 35 but also as a carrier for the pinions 40 of the reduction gearing. The pinions 40 mesh with the internal teeth of an annular gear 44 secured upon the rear end of the transmission shaft by a key 45 and it will be readily understood from an inspection of Figures 2 and 6 that when the motor shaft is rotating, rotary motion will be transmitted by the gearing from the motor shaft to the transmission shaft. Since the forward end of the motor shaft is reduced to form the gear or pinion 39, the motor may be very easily drawn inwardly out of the motor housing when the head 27 of the housing is removed without disturbing the plate 36 and the motor can also be easily thrust inwardly and its gear or pinion 39 engaged with the teeth of the pinions 40 when replacing the motor. After the motor has been removed, the fastenings 38 may be unscrewed, thereby releasing the plate 36 and permitting removal of this plate together with the pinions 40 if it is necessary to clean or repair these pinions. When the plate 36 is removed, the annular gear 44 together with the transmission shaft 5 may be moved rearwardly through the shank and since the gear or pinion 24 is keyed to the forward end of the transmission shaft, the shaft together with the gears 24 and 44 and the bearings 6 and 7 and sleeve 8 withdrawn as a unit.
- 70 I have therefore provided a power tool which is very compact in its construction and in which all moving parts are enclosed so that danger of injury to a workman will be prevented. I have further provided a power driven tool which can be easily assembled or taken apart and which when assembled will not be liable to get out of order.
- 75 While the power unit has been shown in the form of an electric motor it is to be understood that a motor actuated by compressed air, water pressure, steam or any other type of motor found suitable may be used.
- 80 What is claimed is:
1. In a power operated tool, a casing having a motor housing at its rear provided with an internal shoulder and a hollow head at its front, tool holding means in said head, a motor in said housing, a shaft for transmitting motion to the tool holding means rotatably mounted and aligned with the shaft of said motor, a plate bearing against and detachably secured to said shoulder and provided with an annular seat, a bearing for the front end of the motor shaft fitted in said seat, and gearing connecting adjacent ends of said shafts including pinions rotatably carried by said plate.
 2. In a power operated tool, a casing having a motor housing at its rear provided with an internal shoulder and a hollow head at its front, tool holding means in said head, a motor in said housing, a shaft for transmitting motion to the tool holding means rotatably mounted and aligned with the shaft of said motor, a plate bearing against and detachably secured to said shoulder and provided on one said thereof with an annular seat, a bearing for the front end of the motor shaft fitted in said seat, said motor shaft projecting through said plate and provided with a gear disposed on the other side of said plate, an internally toothed annular gear surrounding the first-mentioned gear, spindles removably carried by said plate and projecting forwardly therefrom into the annular gear, and pinions rotatably carried by said spindles and meshing with the annular gear and gear of the motor shaft.
- 85 90 95 100 105 110 115 120 125 130

3. In a power operated tool, a casing having a motor housing at its rear provided with an internal shoulder and a hollow head at its front, tool holding means in said head, a motor in said housing, a shaft for transmitting motion to the tool holding means rotatably mounted and aligned with the shaft of said motor, a plate bearing against and detachably secured to the shoulder and provided with a central seat, a bearing for the front end of the motor shaft fitted in said seat, the rear end portion of said housing being of substantially the same diameter as the plate and detachably secured to the main body of said housing, a bearing for the rear end of the motor shaft carried by the removable rear end portion of said housing, and gear connecting adjacent ends of said shafts including pinions rotatably carried by said plate.

facing the other side of said plate and pinions carried by the plate and meshing with the teeth of said internal gear.

In testimony whereof I affix my signature.

WALTER L. HODEAUX. [L. S.] 7C

4. In a power operated tool, a casing having a motor housing at its rear provided with an internal shoulder and a hollow head at its front, tool holding means in said head, a motor in said housing, a shaft for transmitting motion to the tool holding means rotatably mounted and aligned with the shaft of said motor, a plate bearing against and detachably secured to said shoulder and provided with a central seat, a bearing for the front end of the motor shaft fitted in said seat, the rear end portion of said housing being formed separate therefrom and removably secured thereto, a bearing for the rear end of motor shaft carried by and removable with the rear end portion of said housing, said motor shaft projecting through the seat in said plate and toothed to form a gear, an internally toothed annular gear carried by the rear end of the transmitting shaft and disposed on the rear side of the plate, spindles removably carried by said plate and projecting forwardly therefrom into the annular gear, and pinions rotatably carried by said spindles and meshing with the annular gear and gear of the motor shaft.

5. In a power operated tool, a casing having a motor housing at its rear provided with an internal shoulder and a hollow head at its front connected with the motor housing by a tubular shank, a transmission shaft extending longitudinally through said shank and rotatably mounted therein, with its ends projecting from front and rear ends of the shank, tool holding means in said head including a shaft rotated from said transmission shaft, a motor in said motor housing having its shaft aligned with said transmission shaft, plate detachably secured to the shoulder and provided on one side thereof with a central annular seat, a bearing fitted in said seat, and gearing between adjoining ends of the motor shaft and transmission shaft including an internally toothed gear

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