





# UNITED STATES PATENT OFFICE.

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## POWER-DRIVEN TOOL.

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The present invention relates to improvements in power driven tools and has for its principal object to provide means whereby a tool socket carrying shaft may be driven at a relatively high or low rate of speed depending upon the use of the tool when employed in drilling.

One of the important objects of the present invention is to provide a power driven tool wherein the tool socket carrying shaft may be interchanged with the driven shaft which is actuated by the drive shaft of a portable electric motor so that the speed at which the tool is to be rotated may be changed.

A further object is to provide a power driven tool wherein the parts are so arranged as to enable the same to be readily assembled or disassembled, the device being further adapted for attachment on the casing of a portable electric motor.

A further object is to provide a power driven tool of the above mentioned character which is simple in construction, inexpensive, and furthermore adapted to the purposes for which the same is designed.

Other objects and advantages of this invention will become apparent during the course of the following description.

In the accompanying drawings forming part of this specification and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is a side elevation of a power driven tool embodying my invention showing the same secured on the forward end of a portable electric motor.

Figure 2 is an enlarged sectional view through the shell forming an important part of the present invention showing the arrangement of the gearing which interconnects the driven shaft with the tool socket carrying shaft therein, and further disclosing the supporting means for the shell.

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 2 looking in the direction of the arrow.

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 1 looking in the direction of the arrows.

Figure 5 is a detail perspective view of the tool socket carrying shaft, the socket being detached and showing the gear carrying head secured on the inner end thereof.

Figure 6 is a detail perspective view of the driven shaft.

Figure 7 is a front elevation of a modification of the gear carrying head.

Figure 8 is a side elevation of a modification of the tool socket carrying shaft showing the modified gear carrying head secured thereon.

Figure 9 is a modification showing diagrammatically another form of driving connection between the driven shaft and the tool socket carrying shaft, and

Figure 10 is a similar view of a further modification of the driving connection between the two shafts.

In the drawings where for the purpose of illustration is shown the preferred embodiment of my invention, the numeral 1 designates the drive shaft which extends outwardly from the portable electric motor, not shown, the casing for the motor being illustrated at 2. A projection 3 is formed on the tapering portion 4 on the casing 2 in the manner well known in the art.

Carried by the outer end of this drive shaft 1 is a socket 5 in which is arranged the clamping jaws 6 which are employed for securing the inner end of the tool socket carrying shank for obtaining a direct drive for a drill or the like secured in said tool socket in the manner also well known in the art.

The present invention includes the provision of a shell 7, the inner face of which is open and a cover plate 8 is secured on the open inner face of the shell by any appropriate securing means such as is shown at 9. The shell 7 is formed with an outwardly projecting boss 10, the outer cross sectional shape of which is substantially rectangular. A similar boss 11 is formed on the outer face of the cover plate 8 and this boss 11 is also rectangular in cross section as is clearly illustrated in Figure 4.

These bosses are provided with longitudinally extending registering bores and arranged in each of the bores is the bushing 12 as is clearly illustrated in Figure 2. The purpose of this shell 7 and the hollow bosses will be hereinafter more fully described.

A supporting frame designated generally by the numeral 13 is provided for securing the shell rigidly on the tapered portion 4 of the casing 2 and this frame comprises the spaced ring members 14 and 15 respectively between which extend the bars 17. The ring 14 is formed with a substantially rectangular shaped bore in order to properly fit around

the boss 11 which extends outwardly from the cover plate 8 and this will prevent the ring 14 from rotating with respect to the boss. A thumb screw 18 extends radially through the ring 14 and engages the boss 11 in the manner as clearly shown in Figure 4 to further secure the ring in locked engagement with the boss.

The ring 15 has its bore tapered to permit the same to fit over the tapered portion 4 of the casing 2 and furthermore this ring 15 is provided with an extension 19 to accommodate the projection 3 formed on the tapered portion 4 of the casing 2 in the manner as clearly illustrated in the several figures of the drawing. A thumb screw is threaded through a suitable opening provided therefor in the ring 15 and the same engages the tapered portion 4 to secure the ring 15 against disengagement from the tapered portion 4.

The frame 13 thereby provides a means for rigidly attaching the shell 7 and its cover plate 8 in spaced relation with respect to the conical or tapered portion 4 of the motor housing or casing 2. Furthermore the frame will permit the shell to be readily removed from engagement with the casing of the motor whenever it is desired.

A driven shaft 21 is disposed through the bushing arranged in the bore of the boss 11, the rear or inner end of this shaft being reduced and externally threaded as indicated at 22 while secured on the outer or forward end of this shaft is the driving pinion 23. As is clearly illustrated in Figure 2 of the drawings the inner end portion of the shaft 21 is secured within the socket 5 by means of the clamping jaws 6 so that the shaft 21 will be operatively connected with the drive shaft 1 whereby the same will rotate simultaneously therewith. The gear 23 secured on the forward end portion of the shaft 21 is disposed within the intermediate portion of the shell 7 and the purpose thereof will be presently apparent.

Journalled for rotation in the bearing 12 arranged in the boss 10 which projects from the front or outer face of the shell 7 is the shaft 24, the outer end thereof being externally threaded and reduced as illustrated at 25 for carrying thereon the socket 26 which may be of any conventional construction and in which is to be secured the drill or reamer. Carried on the inner end of this shaft 24 is the plate-like head 27 and extending laterally from the head adjacent its upper and lower ends are the pins 28 and this construction is more clearly disclosed in Figures 2 and 5 of the drawings. A socket 29 is formed in the outer face of this head 27 at the intermediate portion thereof to provide a means for receiving the reduced outer end 30 of the driven shaft 21 whereby to provide a support or journal therefor.

The shell 7 is provided with the reduced

cut-out portion 31 to accommodate the plate-like head 27 while the shell is further formed with an enlarged cut-out portion 32 which has the gear teeth 32' cut in its periphery for accommodating the gears 33 which revolve on the upper and lower pins 28 in the manner as clearly shown in Figures 2 and 3. The pinion 23, secured on the outer end portion of the driven shaft 21 is interposed between the spaced gears 33 and meshes with teeth thereof in the manner clearly shown in the drawings so that the shaft 24 will be actuated when the drive shaft 1 drives the shaft 21 to transmit rotary movement to the tool socket carrying shank or shaft 24. The shell 7 may be filled with grease or any other lubricant for obvious purposes and a thrust washer 34 is interposed between the outer face of the plate-like head 27 and the adjacent face of the gear 23.

The provision of the gearing above described will provide a means whereby the tool socket carrying shaft 24 will be driven at a relatively low rate of speed whereby greater power may be had to assist in the drilling operation.

In Figures 7 and 8 of the drawings, I have shown a modification of the plate-like head and the same in this instance comprises a substantially triangular shaped member designated by the numeral 35. This triangular shaped head is secured at its central portion on the outer end of the tool socket carrying shaft 24', the other end of said shaft being externally threaded as at 25' to receive the tool receiving socket. A pin 36 extends laterally from the outer face of the triangular shaped head 35 at each corner thereof and a gear 37 is supported on each pin thereby providing three gears as is clearly shown in Figure 7 properly spaced apart and the driving gear 23 will be interposed between the three gears and will engage the teeth thereof for driving the same and the head as well as the shaft on which the head is keyed. This construction will further tend to reduce the speed at which the tool socket carrying shaft is to be driven.

In order that the tool socket carrying shaft may be driven at a high rate of speed, it is necessary to remove the shaft 21 from the clamping jaws 6; unlock the thumb screw 18; remove the boss 11 from ring 14; remove the socket 26 from the threaded end 25 of the shaft 24; insert boss 10 in ring 14 and secure the same by means of the thumb screw 18. While inserting the boss 10 in ring 14, the shaft 24 will find its way in jaws 6 of socket 5. Replace socket 26 on the threaded end of shaft 21, the outer threaded end at 22 receiving thereon the socket 26 and the gear 23 will be in engagement with the gears carried by the plate-like head in a manner readily obvious from the construction shown and above described. This will afford a means whereby the tool socket carrying shaft may be driven

either at a relatively low or high rate of speed depending upon the material which is being drilled.

In Figure 9 of the drawings, there is shown a modification wherein the driven shaft 38 which carries on its outer end the pinion or spur gear 39 and the latter meshes with the relatively large spur gear 40 secured on the inner end of the tool socket carrying shaft 41, the latter being disposed in parallel spaced relation with respect to the driven shaft 38.

In Figure 10, a further modification is disclosed wherein the driven shaft 41 carries on its outer end a relatively small bevel gear 42 which meshes with a relatively large bevel gear 43 secured on the upper end of the tool socket carrying shaft 44 which is arranged at right angles with respect to the driven shaft 41.

The shell 7 is further provided with laterally projecting tubular extension 45 on its outer peripheral face in which are removably inserted suitable handles to facilitate handling of the tool when used in heavy work, such as for example, in the re-boring of cylinders.

It will thus be seen from the foregoing description, that I have provided a power driven tool which may be readily and easily assembled or disassembled in order to permit the tool socket carrying shaft to be driven either at a high or low rate of speed and due to its simplicity, the device will at all times be positive and efficient in its operation and may furthermore be readily and easily attached to a portable electric drill or motor and its housing without necessitating any material alterations of the part of the motor with which the present invention is to be associated.

While I have shown the preferred embodiment of my invention, it is to be understood

that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit or sacrificing any of the advantages of the appended claims.

What I claim is:—

1. In a power modifying attachment for motor driven devices, comprising, a frame, a housing, said housing being provided with a sleeve projecting from opposite sides thereof and in substantial alignment, one end of said frame being adapted for attachment to the motor driven device, so that the usual rotary element thereof will project thereinto, the sleeve at one side of the housing being adapted for detachable association with the opposite end of the frame, a stub shaft projecting through each of said sleeves, the stub shaft projecting within the frame being detachably connected with the rotary member of the motor driven device, while the remaining stub shaft is provided with the detachable tool holding member, and speed reducing gears connecting the respective shafts.

2. In a power modifying attachment for motor driven devices, wherein said device is provided with a housing having one end portion thereof tapering, a frame including a pair of ring members connected by elongated spaced bars, the ring at one end of said frame being adapted for secured engagement over the tapering end of the housing, a pair of stub shafts, a geared speed reducing unit interposed between said shafts, said unit being detachably associated with the opposite end of the frame, one of the said shafts being detachably connected with the usual driving element of the motor driven device, and a tool holding member at the outer end of the remaining shaft.

In testimony whereof I affix my signature.

STEPHEN EMIL YANNES.