

2,705,896

Filed Nov. 17, 1952

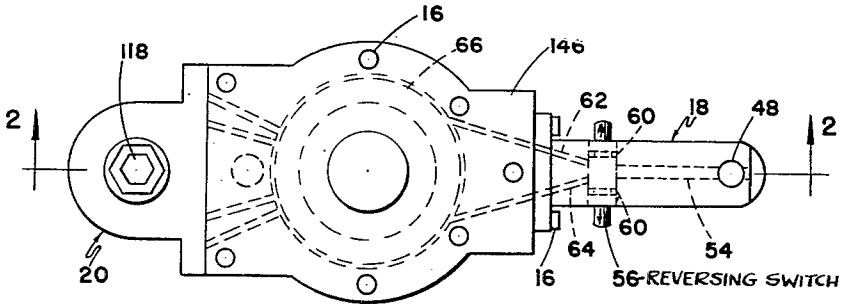


Fig.1.

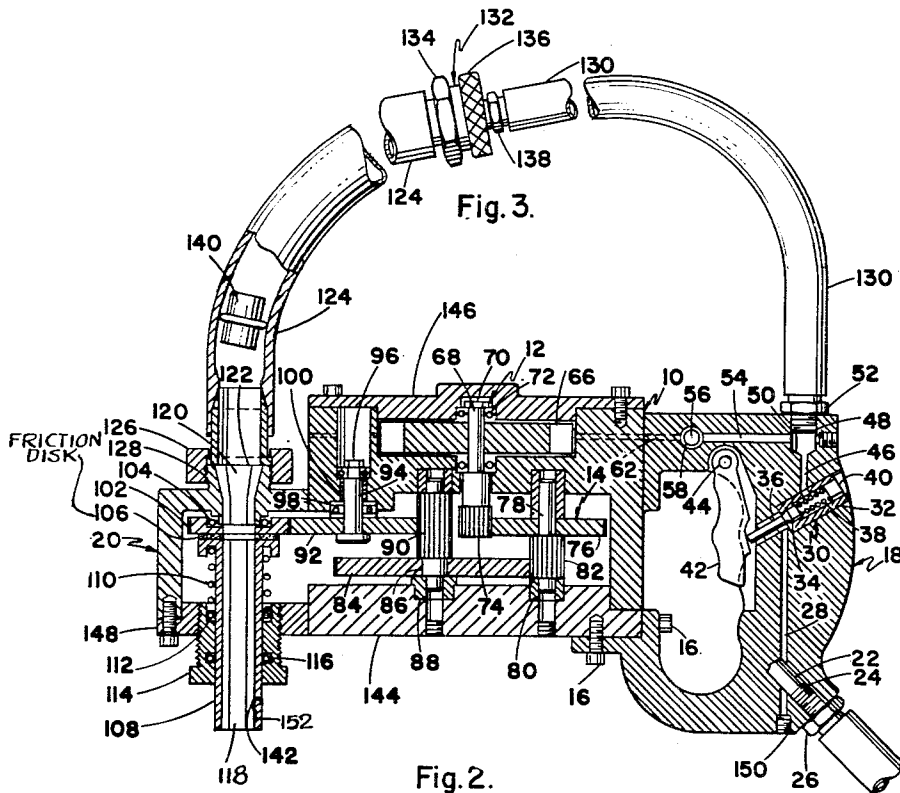


Fig.2.

INVENTOR.

JOHN P. HOLMES.

BY

Knox & Knox.

AGENTS.

1

2,705,896

PNEUMATIC REVERSIBLE TORQUE WRENCH

John P. Holmes, San Diego, Calif.

Application November 17, 1952, Serial No. 320,860

3 Claims. (Cl. 81—57)

The present invention relates generally to a power driven automatically loaded wrench and more particularly to an automatically loaded torque wrench power driven by pneumatic means which is an improvement over my co-pending application, Serial No. 229,245, filed May 31, 1951.

The primary object of this invention is to provide a power driven automatically loaded wrench to increase the speed of operation of the assembly or disassembly of parts which are held together by means of cap screws or nuts and having a magazine for retaining, feeding by pneumatic means or receiving cap screws or nuts.

Another object of this invention is to provide a power driven automatically loaded wrench which is easily and quickly adaptable for use with various sizes of cap screws and nuts.

Another object of this invention is to provide a power driven automatically loaded torque wrench with means to prevent damage to the cap screws or nuts being used and preventing damage to the mating parts being assembled or disassembled.

Another object of this invention is to provide a power driven automatically loaded wrench with means to remove dirt or other foreign matter from the cap screws or nuts being used or from the mating parts being assembled or disassembled.

Another object of this invention is to provide a power driven automatically loaded wrench which can be effectively used with the minimum of operation fatigue.

Another object of this invention, ancillary to the preceding objects, is to teach the best known mode of implementing the principles of the invention in carrying the invention into actual practice.

Another object of this invention is to provide a power driven automatically loaded wrench which is adapted for fabrication from many different materials, so that the choice of material can be according to the dictates of availability and price considerations, the exact sizes and proportions being matters easily determined to suit particular conditions and needs.

Another object of this invention is to provide a power driven automatically loaded wrench which is inexpensive and practicable to manufacture.

Finally, it is an object to provide a power driven automatically loaded wrench of the aforementioned character which is simple, safe and convenient to operate, and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawing which forms a material part of this disclosure and wherein similar characters of reference indicate similar or identical elements and portions throughout the specification and throughout the views of the drawing, and in which:

Fig. 1 is a plan view of the invention.

Fig. 2 is a sectional view taken from the line 2—2 of Fig. 1.

Fig. 3 is an elevational view of a portion of the invention.

Referring to Fig. 2 of the drawing the invention comprises an outer box type casing 10 of cast aluminum or other suitable material and which houses the motor 12 and power transmission assembly 14. Affixed by means of the cap screws 16 to the end of the casing 10 is the

2

handle assembly 18, while at the opposite end of the casing 10 and similarly secured is mounted the wrench housing 20.

The handle assembly 18 is cast aluminum or other suitable material and is provided with the diagonal bore 22 with the thread 24 adapted to receive the standard air line fitting 26. The vertical bore 28 connects the bore 22 with the trigger valve 30. The trigger valve 30 comprises the drilled valve body 32 having the conical seating 34 at its lower end to take the valve pin 36 which is retained in position by the spring 38 and the pressure adjusting screw 40. The trigger valve 30 is actuated by manual pressure on the trigger 42 which is pivotally mounted on the pin 44 in the handle assembly 18. The bore 46 connects the trigger valve 30 to the bore 48 the upper end of which is provided with the thread 50 to receive the air hose fitting 52. The bore 54 passes horizontally through the bore 43 to the valve 56, said valve being a cylindrical component positioned transversely through the handle assembly 18 in the bore 58 so that longitudinal movement allows either of the grooves 60 to become connected to the bore 54 and the bore 62, or to the bore 54 and the bore 64 dependent on whether right or left hand rotation of the motor 12 is desired.

The motor 12 drives the impeller 66 which is secured to the pinion shaft 68 by the nut 70. The pinion shaft 68 is rotatably mounted in thrust bearings 72 so that the pinion 74 meshes with the gear 76, said gear 76 being supported by the pinion shaft 78, which is rotatably mounted in the solid bearings 80. The pinion shaft 78 has at one end the pinion 82, said pinion 82 being in mesh with the gear 84. The gear 84 is secured to the pinion shaft 86 which is rotatably mounted in the solid bearings 88. The pinion 90 on the pinion shaft 86 is in mesh with the gear 92. The gear 92 is secured to the idler shaft 94 by means of the nut 96 and the idler shaft 94 is rotatably mounted in the thrust bearings 98 between which is positioned the spacer 100.

The gear 92 is in mesh with the socket wrench gear 102, the socket wrench gear 102 being positioned between the thrust bearing 104 and the friction disc 106, which locates against the upper end face of the socket wrench 108 by pressure of the spring 110. The spring 110 rests on the thrust bearing 112, said thrust bearing 112 being supported to prevent friction between the outside diameter of the socket wrench 108 and the inside diameter of the torque adjusting screw 114.

The socket wrench 108 is provided with the hexagonal bore 118 to ensure positive drive of the cap screws on nuts being used. Socket wrenches of other internal sectional configurations and of various sizes can be employed in this invention to suit any particular requirement.

The wrench housing 20 has a hexagonal bore 120 with a tapered mouth, the upper face 122 of the housing supporting the tubular magazine 124, said magazine being firmly secured by means of the knurled lock nut 126 engaging the screw thread 128 of the wrench housing 20.

The magazine 124 is of metal or other suitable material and is connected to air hose 130 by means of a lock assembly 132, said assembly 132 comprising the threaded hose fitting 134 which engages the knurled lock nut 136. The lock nut 136 is threadably connected to the special hose fitting 138. The magazine 124 is provided with the plunger 140 which enables full use to be made of the compressed air supply in feeding the cap screws or nuts to the socket wrench 108.

Accessibility to moving parts of the invention for inspection or maintenance purposes is accomplished by the provision of the removable motor cover plate 146, the gear cover plate 144 and the socket wrench housing base plate 148.

In actual operation the invention is both simple and effective. The assembly 132 is quickly disconnected and after the magazine 124 has been loaded with cap screws or nuts, is reconnected. The trigger 42 is depressed allowing compressed air to pass through air hose 130 to plunger 140 and simultaneously to valve 56, which can be set for either left or right hand operation, and thence to the motor 12. The transmission of power from the rotation of the motor 12 effects rotation of the socket

3

wrench 108 at approximately 60 r. p. m. Application of the invention to the work being performed can now be made. The retaining spring 142 located in the bore 118 of the socket wrench 103 prevents the cap screws or nuts from being forced from the socket wrench 103 so that as each cap screw or nut is applied to the work in hand and is pulled from the socket wrench 108 by the action of threading, the remaining cap screws or nuts are then forced downwards by air pressure, the lowest cap screw or nut then occupying the position of its predecessor. The bore 18 is recessed to receive the retaining spring 142 as indicated at 152.

The passage of a small amount of compressed air around the cap screws or nuts assists in the removal of dirt or foreign matter from the cap screws or nuts being used and the work being assembled or disassembled.

The possibility of the cap screws or nut jamming in the socket wrench 108 is very remote due to the provision of the taper mouth bore 120 in the wrench housing 20. Said taper mouth bore 120 ensures that the cap screws or nuts enter the socket wrench 103 in correct relation to the hexagonal or other bore 118.

When the work of disassembly of an object is required and cap screws or nuts are to be unscrewed, the assembly 132 is disconnected and as each cap screw or nut becomes removed from the work it is forced by successive cap screws or nuts up through the socket wrench 108 and thence into the magazine for storage.

It will be seen that set screws 150 are provided to prevent the loss of air or lubricant and also to prevent the ingress of dirt or other foreign matter.

The operation of this invention will be clearly comprehended from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the drawing and the above recited objects. It will be obvious that all said objects are amply achieved by this invention.

Further description would appear to be unnecessary.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawing are to be considered as merely illustrative rather than limiting.

I claim:

1. In a power wrench, a body member, a pneumatic motor operatively mounted in said body member, gear means operated by said motor, a cylindrical socket wrench operated by said gear means and having an internal bore adapted to engage the head portions of bolts or nuts, a magazine conduit having one end axially aligned with and connected with said bore, said body

4

member having a channel with a valve therein for connecting a source of pressurized air with the other end of said conduit for forcing nuts or bolts in said magazine towards said socket wrench.

2. In a power wrench, a body member, a pneumatic motor operatively mounted in said body member, gear means operated by said motor, a cylindrical socket wrench operated by said gear means and having an internal bore adapted to engage the head portions of bolts or nuts, a magazine conduit having one end communicating with said bore, said body member having a channel with a valve therein for connecting a source of pressurized air with the other end of said conduit for forcing bolts or nuts in said conduit towards said socket wrench, said body member having divergent bores communicating with said channel at a point between said valve and said other end of the magazine conduit, said divergent bores having valve control means and leading to said motor for driving said motor in two directions, and an adjustable torque control driving connection operatively mounted between said gear means and said socket wrench.

3. In a power wrench, a body member, a pneumatic motor operatively mounted in said body member and having means for reversing its direction of rotation, power transmission means, a cylindrical socket wrench operated by said power transmission means, a friction clutch means operatively connected in said power transmission means, said socket wrench having an internal bore adapted to engage the head portions of bolts or nuts, a magazine conduit having one end communicating with said bore, said magazine having nut aligning means to ensure the correct feeding of said bolts or nuts into said socket wrench, said body member having a channel with a valve therein for connecting a source of pressurized air with the other end of said conduit for forcing bolts or nuts in said magazine towards and into said socket wrench.

References Cited in the file of this patent

UNITED STATES PATENTS

2,256,012	Blair	Sept. 16, 1941
2,416,882	Parizo	Mar. 4, 1947
2,531,573	Konikoff	Nov. 28, 1950
2,534,140	Moore	Dec. 12, 1950
2,569,244	Larson	Sept. 25, 1951
2,607,252	Shaff	Aug. 19, 1952
2,616,322	Spreng	Nov. 4, 1952

FOREIGN PATENTS

224,429	Great Britain	Nov. 13, 1924
---------	---------------	---------------