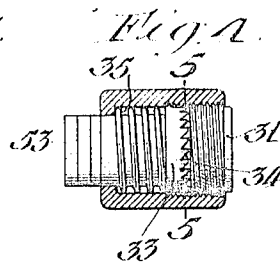
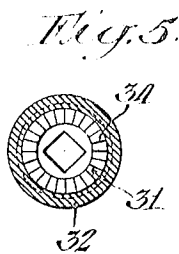
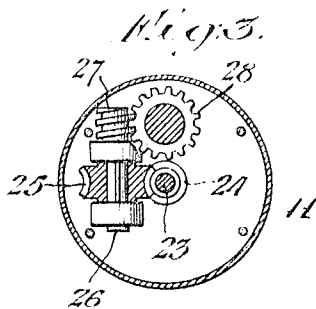
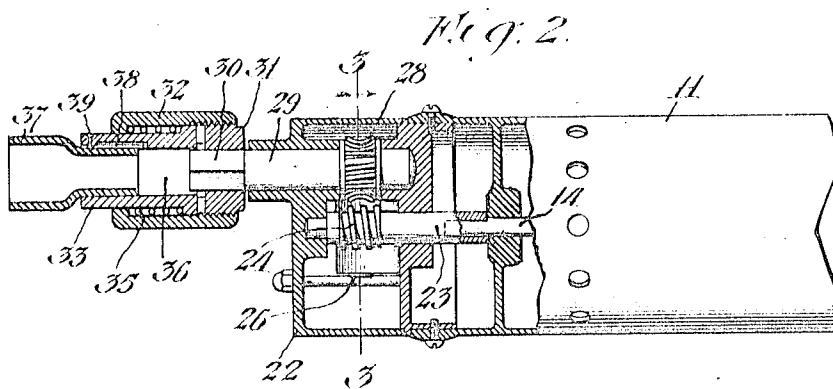


1,298,504.



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UNITED STATES PATENT OFFICE.

HAROLD HOLLINGSHEAD, OF PASADENA, CALIFORNIA.

POWER-DRIVEN SOCKET-WRENCH.

1,298,504.

Specification of Letters Patent.

Patented Mar. 25, 1919.

Application filed February 8, 1918. Serial No. 216,383.

To all whom it may concern:

Be it known that I, HAROLD HOLLINGSHEAD, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented a new and useful Power-Driven Socket-Wrench, of which the following is a specification.

My invention relates to the art of assembling machinery, and more particularly to the art of fastening machine parts together.

This application is an improvement and in part a continuation of my application Serial No. 181,437, filed July 18, 1917.

The principal object of the invention is to provide a power driven wrench by which nuts or bolts can be readily screwed in place and readily removed without danger of injuring the wrench or breaking the bolts or stripping the threads thereon.

A further object of the invention is to provide a power driven socket wrench which is so constructed that a nut or bolt can be driven home, the wrench being provided with a friction clutch which releases whenever the bolt or nut is seated.

A still further object of the invention is to provide a power driven wrench having substantial handles secured to the side by means of which the bolt or nut can be started or finally seated, the mechanism of the wrench being such that the socket is rigidly locked at all times that the driving means is out of commission.

A still further object of my invention is to provide a new and useful combination of gearing.

The invention comprises the novel arrangement and combination of parts as shown in the drawing and described in the following specification in which further objects and advantages will be set forth.

Referring to the drawings, which are for illustrative purposes only,

Figure 1 is a side elevation of my invention.

Fig. 2 is a similar elevation on an enlarged scale, partly in section on a central plane.

Fig. 3 is a section on a plane represented by the line 3—3 of Fig. 2.

Fig. 4 is a sectional elevation of the clutch and

Fig. 5 is a section on a plane indicated by the line 5—5 of Fig. 4.

In the form of my invention illustrated in these drawings, a case 11 is provided with

a spade handle 12 on the extreme rear thereof, this handle being hollow so that a pipe or bar 13 can be inserted therein. Located inside the case 11 is an electric motor which is controlled by a suitable rheostat controlled by a button 15, the motor being driven by suitable conductors 16.

Secured on either side of the case 11 are handles 20 which can be folded back in the position shown in dotted lines at 21 when not in use.

Secured in the front end of the case 11 is a gear housing 22 in which is mounted a primary worm shaft 23 carrying a primary worm 24. This primary worm meshes with a primary worm gear 25 mounted on an intermediate shaft 26 which also carries a secondary worm 27. The secondary worm 27 meshes with a secondary worm gear 28 which is mounted on a socket shaft 29. The end of the socket shaft 29 is square as shown at 30 and projects into and engages with a primary clutch member 31, this member having a spring housing 32 threaded on the exterior thereof inside which a secondary clutch member 33 is free to turn. The members 31 and 33 are provided with serrated teeth 34, these teeth being preferably cut in an axial plane on one side and being cut at an inclination on the other.

Located inside the housing 32 is a spring 35. The member 33 is provided with a square or hexagonal opening 36 into which sockets 37 of various sizes may be slipped. a small spring 38, secured by a rivet 39, serving to retain the socket 37 in place.

The housing 22 may be filled with grease or oil through a suitable opening so that the gears run at all times in oil.

The method of operation of the invention is as follows:

When it is desired, for example, to place a nut 50 on a bolt 51, the nut is started on the bolt by hand and the socket 37 is then slipped over the nut, the wrench being held by the handles 20 as shown in Fig. 1. When it is desired to drive the nut home, one of the hands, preferably the right hand, is released from the handle 20 and grips the spade handle 12. The rheostat button 15 being pushed over by the thumb, the motor is started in a right hand direction so that the socket 37 is rotated in a right hand direction turning the nut 50 on the bolt 51 and forcing it down against its seat. The inclination of the teeth 34 is such that as soon

as the nut reaches its seat these teeth disengage and slip so that the shaft 39 can turn without turning the socket 37. The point at which this slippage takes place is regulated by the tension of the spring 35 which in turn is regulated by the distance the housing 32 is forced onto the primary clutch member 31. Calibration markings 53 may be provided on the secondary clutch member 33 for the purpose of indicating these points.

Whenever it is desired to remove a nut, the motor is started to rotating in the opposite direction, and under ordinary conditions the nut is readily removed. The shape of the teeth 34 is such that there is a direct drive without any tendency to slip when the clutch is rotated left handedly so that when once the nut is started off it can be withdrawn without any tendency for the clutch members to disengage.

Under some conditions nuts are found which it is very hard to start as they are jammed in place, but these nuts when once started can ordinarily be readily removed. The method of starting such nuts is very simple. The wrench is grasped with the two hands as shown in Fig. 1, the motor standing idle. The handles 20 being substantially constructed it is possible for the user to exert a very powerful turning movement on the nut so that it can be readily started by hand. This is rendered possible by the fact that there is no slippage of the clutch in the reverse direction and the motor is connected to the clutch shaft 29 through a double worm gear reduction. These worm gears being of a small angle will not transmit power backward, and with the motor stationary numerous turning movements can be exerted on the shaft 29 without revolving the motor. As soon as the operator has loosened the nut sufficiently he starts the motor and continues the movement rapidly and conveniently by the use of power.

I claim as my invention:—

1. In a power driven wrench a socket; a motor; gearing by which said motor drives said socket, said gearing being so arranged that said socket cannot drive said motor except upon the application of excessive turning movements to said socket; a case in which said gearing and said motor are mounted; and a handle by which said case may be turned manually.

2. A combination as in claim 1 in which said gearing includes a worm driven by said motor; and a worm gear driven by said worm and driving said socket.

3. A combination as in claim 1 in which said gearing includes a primary worm rigidly secured to the shaft of said motor; an intermediate shaft turning in bearings stationary in said case; a primary worm gear meshing with said primary worm and rigidly secured to said intermediate shaft; a secondary worm rigidly fixed to said intermediate shaft; a secondary worm gear meshing with said secondary worm; and means by which said secondary worm gear drives said socket.

4. A combination as in claim 1 which also comprises a clutch placed in said gearing between said motor and said socket, said clutch comprising means for positively driving in one direction and means for slipping at predecided upon torques in the opposite direction.

5. A combination as in claim 2 which also comprises a clutch placed in said gearing between said motor and said socket, said clutch comprising means for positively driving in one direction and means for slipping at predecided upon torques in the opposite direction.

6. A combination as in claim 3 which also comprises a clutch placed in said gearing between said motor and said socket, said clutch comprising means for positively driving in one direction and means for slipping at predecided upon torques in the opposite direction.

7. In a power driven wrench for turning right-handed bolts and nuts, a driving shaft; an electric motor; gearing so arranged that said motor turns said driving shaft in a right handed direction; a socket free to turn on said driving shaft; a head fixed to said driving shaft; and coengaging serrated teeth formed on said head and said socket, said teeth having straight faces which are engaged when said driving shaft rotates in a left-handed direction and inclined faces which are engaged and by means of which said head drives said socket when said driving shaft rotates in a right-handed direction.

8. A combination as in claim 7 which also comprises a spring so placed as to hold said driving teeth in engagement.

9. A combination as in claim 8 which also comprises means for adjusting the force of said spring.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 1st day of February, 1918.

HAROLD HOLLINGSHEAD.