Aug. 25, 1953 W. J. MARKOVICH 2,649,823

RATCHET OPERATED SOCKET WRENCH

Filed Nov. 4, 1950 2 Sheets-Sheet 1

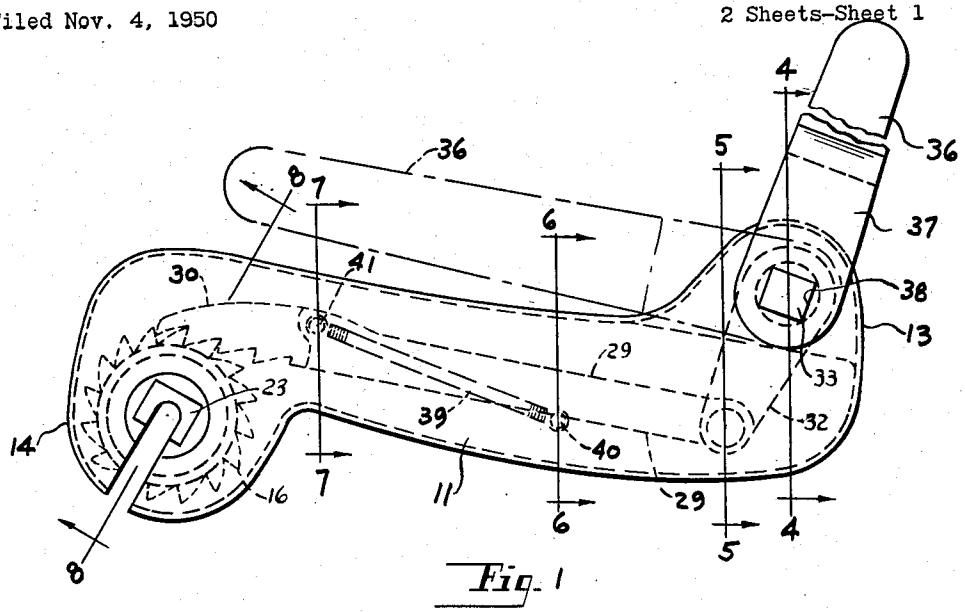

Fig. 1

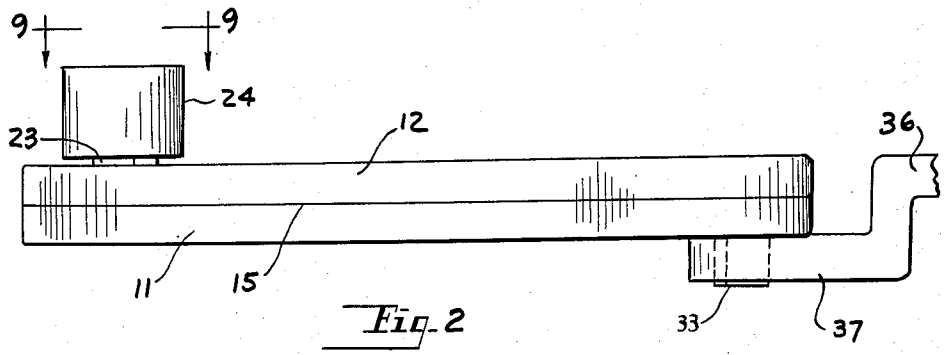

Fig. 2

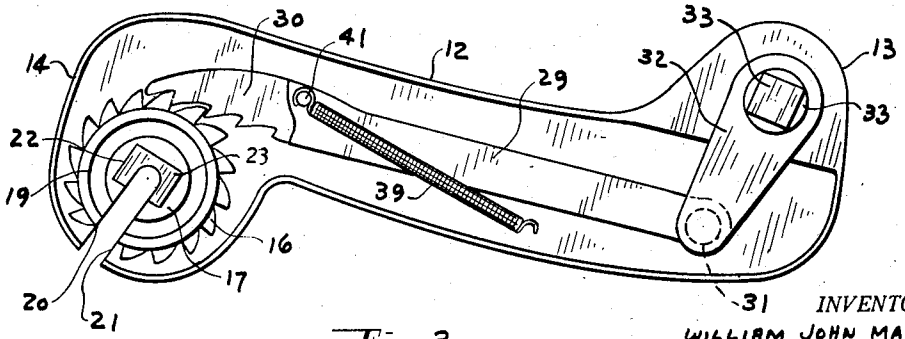

Fig. 3

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RATCHET OPERATED SOCKET WRENCH

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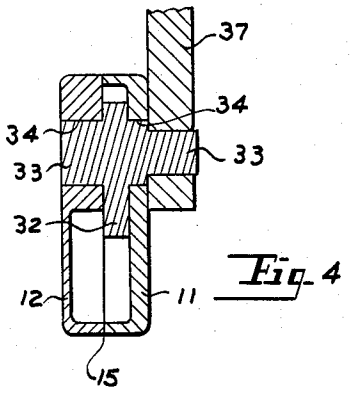

Fig. 4

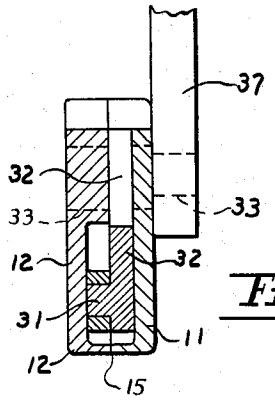

Fig. 5

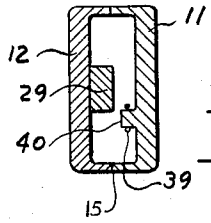

Fig. 6

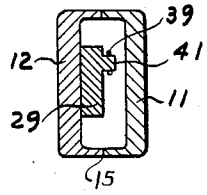

Fig. 7

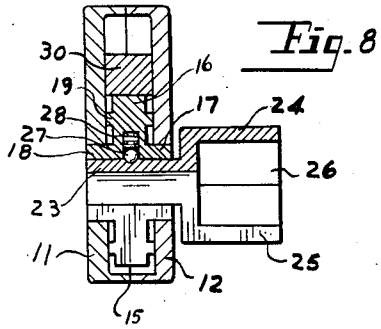

Fig. 8

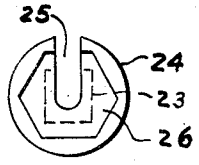

Fig. 9

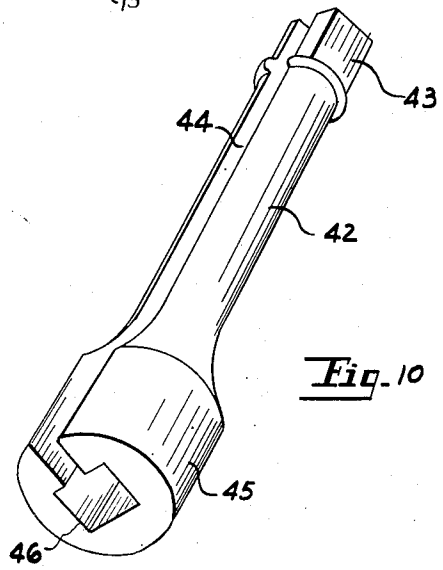

Fig. 10

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2,649,823

RATCHET OPERATED SOCKET WRENCH

William John Markovich, Detroit, Mich.

Application November 4, 1950, Serial No. 194,087

1 Claim. (Cl. 81—61)

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This invention relates to a ratchet operated socket wrench and more particularly to a novel socket wrench construction whereby sockets of various sizes may be employed and rotatably driven for tightening or loosening nuts either by swinging the wrench body or by rotatably actuating a ratchet driving device.

It is the object of the present invention to provide a ratchet operating socket wrench which is particularly adapted for the tightening or loosening of the connecting nuts normally employed in securing a conduit to another member as for instance a gasoline line to a carburetor.

It is a further object of this invention to provide a simplified ratchet operated socket wrench which is adapted for the tightening of hard to get at nuts such as on a vehicle or for the driving of nuts which are normally not accessible to the conventional type of socket wrench.

These and other objects will be seen from the following specification and claim in conjunction with the appended drawings in which—

Fig. 1 is a side elevational view of the ratchet operated socket wrench with the handle partially broken away.

Fig. 2 is a plan view thereof.

Fig. 3 is a side elevational view of said wrench with the cover removed.

Fig. 4 is a section on line 4—4 of Fig. 1.

Fig. 5 is a section on line 5—5 of Fig. 1.

Fig. 6 is a section on line 6—6 of Fig. 1.

Fig. 7 is a section on line 7—7 of Fig. 1.

Fig. 8 is a section on line 8—8 of Fig. 1.

Fig. 9 is a section on line 9—9 of Fig. 2; and

Fig. 10 is a perspective view of a socket extension arm.

It will be understood that the above drawings illustrate merely a preferred embodiment of the invention and that other embodiments are contemplated within the scope of the claim hereafter set out.

Referring to the drawings applicant's ratchet operated socket wrench includes a pair of elongated oppositely arranged hollow housing elements 11 and 12 which are arranged respectively with oppositely formed cooperating extensions 13 and 14 as illustrated in Figs. 1 and 3, said housing elements being suitably secured to each other along the line 15 such as by spot welding, for example.

The ratchet wheel 16 is positioned within the wrench extensions 14 at one end and has a pair of oppositely arranged hubs 17 and 18 rotatably journaled to corresponding transverse openings

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in the side walls of housing elements 11 and 12 as shown in Fig. 8. Said ratchet wheel also has annular raised portions 19 upon its opposite sides for cooperative engagement with the interior surfaces of housing elements 11 and 12 and for centrally spacing said ratchet wheel therebetween.

Transverse rectangularly shaped radial slot 20 is formed within said ratchet wheel and cooperates with a similar rectangularly shaped transverse radial slot 21 formed within the extensions 14 of housing elements 11 and 12. Slot 20 is registerable with housing slot 21 whereby said slots may be transversely positioned over a conduit upon or to which a nut is to be secured.

Ratchet wheel 16 has a transverse slot which is square in cross section as at 22 and is adapted to receive the square shank 23 of a preferably hexagonal nut socket 24, said socket and its shank being also longitudinally slotted at 25 whereby the same may be positioned over a conduit carrying a rotatable nut to be loosened or tightened.

As shown in Fig. 8 the socket 24 is provided with a transversely hexagonal opening 26 however it is contemplated that any type of socket and of any shape may be employed in the present invention. Preferably the socket 24 is removable and interchangeable with other sized sockets and there is provided a ball 27 and a spring 28 within the ratchet 16 to normally urge the said ball outwardly into securing engagement within a corresponding recess in the shank of the socket 24 to prevent accidental dislodgement thereof. It is apparent that the radial internal slot in the ratchet which houses the ball is so constructed at its outer end as to prevent escape of the ball therefrom. However said ball is readily yieldable inwardly against the action of spring 28 whereby the socket 24 may be manually removed from said ratchet.

As shown in Figs. 1 and 3 there is provided a longitudinally reciprocal ratchet operating arm 29 with a head 30 at its outer end including a plurality of longitudinally spaced ratchet teeth which are cooperable with the ratchet teeth of ratchet wheel 16 in the manner illustrated in the drawing.

The opposite end of arm 29 is provided with a transverse opening to receive a laterally projecting stud 31 formed on the lower end of reciprocal pivotal lever 32.

The lever 32 as shown in Figs. 1 and 3 and 4 is provided at its upper end with a pair of oppositely arranged cylindrical shoulders 33 which

project through and are rotatably journaled within the transverse circular slots 34 in the housing elements 11 and 12 in the manner best illustrated in Fig. 4.

It will be noted from Figs. 1 and 3 that one of the shoulders 33 projects outwardly of the housing element 11 and is of slightly reduced diameter or thickness and is square in cross section in order to receive the handle 37 which has a correspondingly shaped square opening 38.

Handle 37 has a laterally offset extension 36 as indicated in Figs. 1 and 2 whereby in the dotted line position of the handle shown in Fig. 1 the same is substantially in alignment with the wrench housing 11—12, to facilitate storing. When the handle is to be used it is removed from the element 33 and repositioned in some other desirable position such as shown, broken away, but in solid lines in Fig. 1. Naturally it is contemplated that in many situations the handle need not be employed and may be removed. In that case the socket wrench will be operated in a conventional manner by grasping the central body portion thereof.

As shown in Figs. 1 and 3 there is provided a coiled spring 39 one end of which is anchored to the projection 40 upon the inner surface of housing element 11, best illustrated in Fig. 6, whereas the opposite end of said spring is anchored to the lateral projection 41 on the ratchet wheel operating arm 29, best illustrated in Fig. 7.

By this construction the forward end 30 of the ratchet wheel operating arm 29 is constantly urged into operative engagement with the teeth of ratchet wheel 16 as shown in Figs. 1 and 3. Furthermore forward longitudinal projection of arm 29 under the pivotal action of lever 32 is against the resiliency of spring 39 so that said arm has a tendency to return to its initial inoperative position sliding rearwardly and freely over the teeth of ratchet 16.

Referring to Fig. 10 there is provided a socket extension arm 42 which has an end portion 43 which is square in cross section and which is adapted to be inserted within the square opening 22 of the ratchet wheel supporting shaft 17—18, there also being a suitable recess formed in the outer surface of the end portion 43 to cooperatively receive a portion of the ball 27 in the same manner as is illustrated in Fig. 8.

Extension 42 is similarly provided with a longitudinal slot 44 throughout its length whereby said extension may transversely fit over the conduit or tube upon which a nut is to be tightened or loosened. The opposite end of extension 42 is slightly enlarged as at 45 and has a central slot 46 which is preferably square in cross section and is adapted to receive a squared shank 23 of the desired socket in the same manner as said shank is received by the ratchet wheel support shown in Fig. 8. This would mean that there would also be a similar spring urged ball arranged upon the interior of opening 46 for cooperative retaining engagement within a recess in the outer surface of the particular socket employed for operation in the same manner as that shown in Fig. 8.

In operation and in the situation where it is not possible to manually operate the handle or housing 11—12 of the socket wrench, then in that case the handle 36—37 is positioned upon the squared end 35 of the lever support 33 in any desired position such as that shown in Fig. 1, for

example. It is apparent from Fig. 1 that movement of the handle 36—37 in a clockwise arc will effect a longitudinal movement to the left of the ratchet operating arm 29 causing its toothed end 30 to operatively bear against and rotate ratchet wheel 16 in a counter-clockwise direction, to either tighten or loosen a nut upon a tubular pipe or conduit depending upon the positioning of the nut to be tightened or loosened. It is apparent that the arm 29 will drive the ratchet 16 in only one direction consequently the socket 24 must be changed and inserted through the ratchet wheel upon the opposite side for the reverse operation of loosening or tightening a particular nut.

It is contemplated that the radial slot 20 must be in registry with the radial slot 21 of the wrench housing and at the same time the longitudinal slot 25 or the longitudinal slot 44 of the socket extension 42 in Fig. 10, must also be in registry with the radial slot 21 in order to mount the socket over the particular nut to be tightened or loosened.

Having described my invention reference should now be had to the claim which follows for determining the scope thereof.

I claim:

In a socket wrench, a hollow elongated body with opposed circular apertures through its walls at its opposite ends, a ratchet within one end of said body and having a socket driving axle journaled through one pair of apertures in the opposite side walls of said body, a manually pivotal lever entirely within the opposite end of said body and having a trunnion at one end journaled through the second pair of apertures in the opposite side walls of said body, a longitudinally reciprocal arm within said body pivotally joined at one end to the other end of said lever, the opposite end of said arm having longitudinally extending teeth in operative driving engagement with said ratchet, a coiled spring joined at one end to said arm adjacent said teeth and with its other end anchored to the interior of said body for maintaining said teeth in engagement with said ratchet, one end of said trunnion extending outwardly beyond the wall of said body, a second lever joined at one end to said trunnion for effecting rotary movements of said first lever, said body adjacent said ratchet having a radial slot to transversely receive a conduit, said ratchet also having a radial slot registerable with said body slot, and a socket removably joined to said axle for rotation therewith, said socket having a longitudinally extending radial slot throughout its length registerable with the aforementioned slots.

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