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OPEN HEAD RATCHET WRENCH

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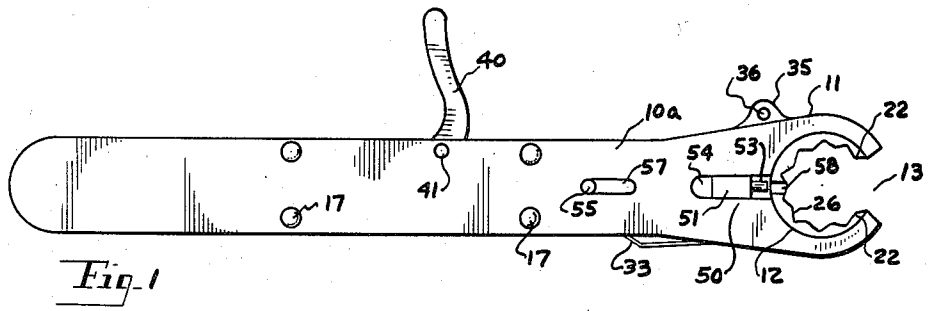


Fig. 1

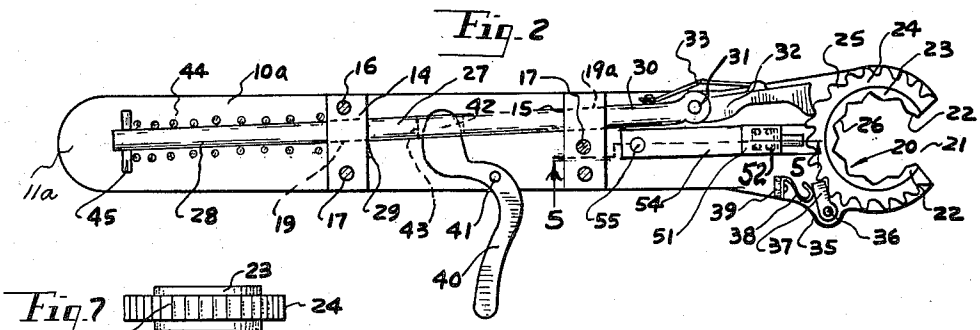


Fig. 2

Fig. 7

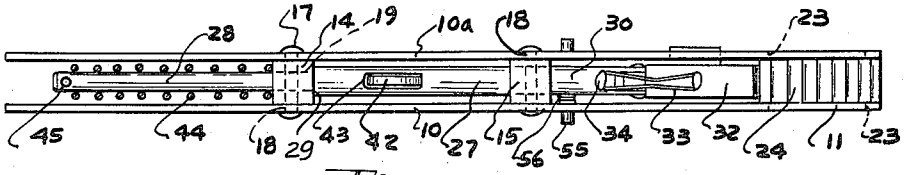


Fig. 3

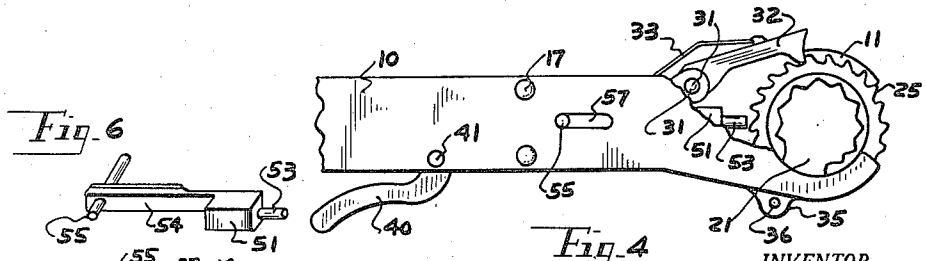


Fig. 4

Fig. 6

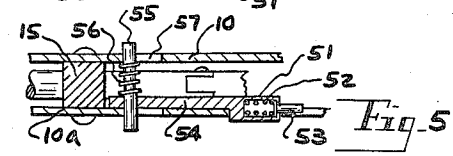


Fig. 5

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OPEN HEAD RATCHET WRENCH

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1 Claim. (Cl. 81—58.1)

My invention pertains to a wrench, including a handle, which at one end is expanded into what may be called a head. Disposed within the head and adapted to be rotated therein, is an annular socket member which is provided with a radial gate or opening for engagement with the object to be actuated by the wrench. The head mentioned above has a similar opening, and the engagement between the head and the annular socket member is such that by rotation of the socket member, the gate within said socket member and the opening within the head may be brought into register or out of register with each other. While this feature alone is not new, my improvement pertains to means whereby the socket member may be rotated remotely by an element located within the handle while the handle itself may be kept in a stationary position. Thus in a case where, for example, a nut upon a pipe has to be turned about its axis, this may be done first by bringing the socket member into axial engagement with the nut, and then by rotating the socket member while the handle may be held in a stationary position.

For other purposes, the socket member may be locked against rotation or it may be set to become operative on the swing of the handle in one direction in a plane at a right angle to the axis of the socket but to remain inoperative on the swing of the handle in the opposite direction.

I shall now describe the wrench with reference to the accompanying drawings in which,

Fig. 1 is a plan view of the wrench;

Fig. 2 is a plan view of the wrench from the opposite side to that revealed in Fig. 1, but with a top plate removed for the purpose of disclosing the operative parts of the wrench;

Fig. 3 is a side view of the wrench at a right angle to that shown in Fig. 1;

Fig. 4 is a fragmentary plan elevational view of the wrench with a part of the top plate broken off, the view disclosing operative elements of the wrench in positions differing from those shown in Fig. 2;

Fig. 5 is a sectional view on line 5—5 of Fig. 2;

Fig. 6 is a perspective view of a member which is a part of the mechanism used in the wrench;

Fig. 7 is a side elevational view of an annular socket member used in the wrench.

Similar numerals refer to similar parts throughout the several views.

The wrench is composed in part of two elongated plates 10 and 10*a* which are disposed in parallel spaced relation to each other. Each of the plates includes at one end which is the front end a head 11 which has a recess 12 defining a part of a circle, and a radial opening or gate 13 leading outwardly from said head. The rear end of each plate is marked 11*a*.

Disposed between the two plates are two spacer bars 14 and 15, respectively. The bars are disposed transversely to the length of the plates, being located intermediate the ends thereof but being spaced from each

other as shown in Figs. 2 and 3. The bars have apertures 16 for application of rivets 17 by means of which the bars are secured to the plates. For this purpose the plates themselves have holes 18. The plates, being connected to each other by means of said bars, form a handle, while one end portion thereof forms an integrally formed head as stated above. Bar 14 contains a slot 19 extending in the direction from the rear end towards the front end of said handle. Bar 15 contains a similar slot 19*a*, the two slots being in register with each other along a line slanting upwardly in the direction of said head of the wrench. The slot 19 is circular in cross section, while slot 19*a* is elliptical, its major axis exceeding the diameter of the slot 19.

Fitting into the respective circular recesses of the two plates 10 and 10*a* is an annular socket member 20. The member is split radially, as shown in Fig. 2, to provide an opening into the interior space thereof. The end portions 22 of the socket member at the opening formed by the split are spaced from each other to correspond to the width of the gate 13 in the head portions of the plates 10 and 10*a*.

The socket member, best shown in Fig. 7, includes a hub 23 and a body portion 24 which is of reduced thickness and which is provided with radial teeth 25. The inner surface of the socket member is angular, being defined by a plurality of faces 26 simulating serrations of low sloped teeth. The diameter of the hub 23 is of a size to fit into the circular recesses 12 of the plates 10 and 10*a*, while the body portion of the socket member 20 fits between the heads 11 of the two plates 10 and 10*a*. When so held between said heads, the socket member may be rotated about its axis, the edges of the recesses of said heads 11 serving as bearings for the hub portions of the socket member.

Located between the plates and passing through the slots 19 and 19*a* in the spacer bars 14 and 15, is a rod 27 which is elliptical in cross section, excepting its rear portion 28, which is circular in cross section. As a result, a shoulder 29 is formed thereon, the shoulder bearing against the bar 14 from the direction of the head of the wrench. The other or front end 30 of the rod, passes through the slot 19*a* in the spacer bar 15. Pivotally connected to the front end 30 by means of a cross pin 31 is a pawl 32, which is adapted to engage the ratchet teeth 25 of the socket member 20. A wire spring 33, anchored at one end to the rod as shown at 34, bears against the pawl and presses it into contact with said teeth 25.

The wrench includes another or a second pawl 37. This is pivotally mounted between laterally extending portions 35 of both plates, at the head portion 11, thereof by means of a cross pin 36. The pawl is pressed into engagement with the teeth 25 by a spring 38. The spring is mounted upon a cross lug 39 which may be soldered to one of the plates. The pawl permits rotation of the socket member in one direction only.

Serving for the operation of the first named pawl 32 is a trigger 40, which midway its length, is pivotally mounted between the two plates 10 and 10*a* by means of a pin 41. The trigger includes what will be called an inner end 42 which fits into a longitudinal slot 43 within the rod 27. Wound about the rear end of the rod 27 is a coiled spring 44, which at one end bears against the spacer bar 14 and at the other end against a cross member 45, which is held within an opening in the end 28 of the rod 27. The spring pushes the rod rearwardly away from said spacer bar 14, and thereby serves to hold the pawl 32 out of engagement with the teeth 25 of the socket member 20.

One of the side plates of the wrench, namely the plate 10*a*, contains a slot 54 which extends from the recess

12 radially away from the gate 13. The slot serves as a guideway for a small box 51 which contains a coiled spring 52. The spring bears against a pin 53, pushing it outwardly. Connected to the box and extending away from the head of the wrench is a shank 50 which at its outer end is provided with a transverse bore disposed at right angle to the planes of the two plates 10 and 10*a*. Located within the bore is a cross member 55. The shank is disposed parallel to and in abutment with the side plate 10*a* as shown in Fig. 5, and is kept in this position by means of a coiled spring 56 which is wound about said cross member 55. The ends of the cross member 55 project outwardly through the slots 57 in the respective plates 10 and 10*a* and serve as a means for manual operation of the shank permitting it to be shifted towards the socket member 20 or away from it. The hub 23 of the socket member 20 has on one side of the body portion 24 of said member 20, a radial slot which is located diametrically opposite to the open portion or gate of said socket member.

The manner in which the wrench may be used is quite obvious. Assuming that the wrench is to be applied over a nut at the junction of two pipes, the open portion of the rotary socket member 20 has to be in register with the gate 13 in the head of the wrench. This is shown in Figs. 1 and 2. It will also be assumed that pin 53 is in its retracted position out of engagement with the radial slot 58 in said socket member 20. If the wrench in this condition is applied to the nut, it may be used in the ordinary manner. The inner faces 26 will come into engagement with the sides of the nut, and the swing of the handle in one direction in the plane at right angle to the axis of the nut will cause the pawl 37 to engage the teeth 25 of the member 20 so that the member 20 and the nut will be rotated together. A swing of the handle in the opposite direction will cause the pawl 37 to slip over the teeth 25, leaving the member 20 and the nut in a stationary position.

This action ordinarily has to be followed until the nut has been fully unscrewed. However, this continuous swinging of the handle is unnecessary in the use of the wrench of the applicant. Once the nut has been initially loosened, the handle of the wrench may be held in a stationary position as the member 20 may be rotated by the use of the trigger 40. Every time the trigger is depressed from its position shown in Fig. 2 to the position shown in Fig. 4, the rod 27 will push the pawl 32 in the direction of the head into engagement with the teeth 25 of the socket member 20. As a result, the socket member 20 will be rotated about its axis. This is shown in Fig. 4 in which the open portion of the member 20 is shown out of register with the gate 13 in the head of the wrench.

In order to remove the wrench from its application to the nut, it is necessary to bring agains the open portion of the member 20 into register with the gate 13. Visual control of the two elements is not always possible. However, no visual control is necessary as the desired result may be obtained by means of the pin 53 which is controlled by means of cross member 55 connected to shank 54. If the shank is pushed forwardly in the direction of the member 20, the pin 53 will come

into contact with the hub 23 of the socket member 20 and will be depressed by said hub inwardly into the box 51 at the end of the shank. It will be kept in said depressed position until, by reason of the rotation of said member 20, the radial slot 58 in the hub 23 will be brought in register with the pin 53. At this stage said pin, actuated by said spring 52, will slide into the slot 58, thus preventing further rotation of said socket member 20. The slot, as shown in the drawing, is diametrically opposite the open portion of said member 20 and opposite the gate 13, permitting the wrench to be removed from the pipe. Once the pin 53 is in engagement with said slot 58, the wrench may be used like any ordinary wrench as the socket member will not rotate in any direction.

It will be understood that some changes may be made in the structure of my wrench without departing from the inventive concept disclosed herein. What I, therefore, wish to claim is as follows:

A ratchet wrench including an oblong handle and an open head at one end thereof, the head having a circular recess and a radial gate opening into said recess, an annular socket member seated in said recess and having a radial opening for register with said gate, the socket member having a body provided with radial teeth along its periphery and a hub projecting axially from each side of said body, the hub being provided with a radial slot opposite the radial opening in said socket member, a spring-biased pawl mounted upon a stationary support for engagement with said teeth to permit rotation of the socket but in one direction, a rod slidingly disposed within the handle lengthwise thereof, a second spring-biased pawl connected pivotally to one end of the rod for a tangential engagement with the teeth of the socket member, spring means acting upon the rod to keep the second pawl in a position out of engagement with said teeth, a trigger connected to the rod remotely from the socket member to shift the rod with the pawl towards the socket member for engagement with the teeth thereof to rotate the socket about its axis, a sliding bar within the handle disposed radially with respect to said socket member, a pin at one end of the bar in radial alinement with the hub of said socket member and adapted to be pushed into the radial slot in said hub, and means connected to the bar and projecting outwardly through openings in the side plates, to move the bar manually towards the hub for engagement of the last named pin with the slot in said hub.

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