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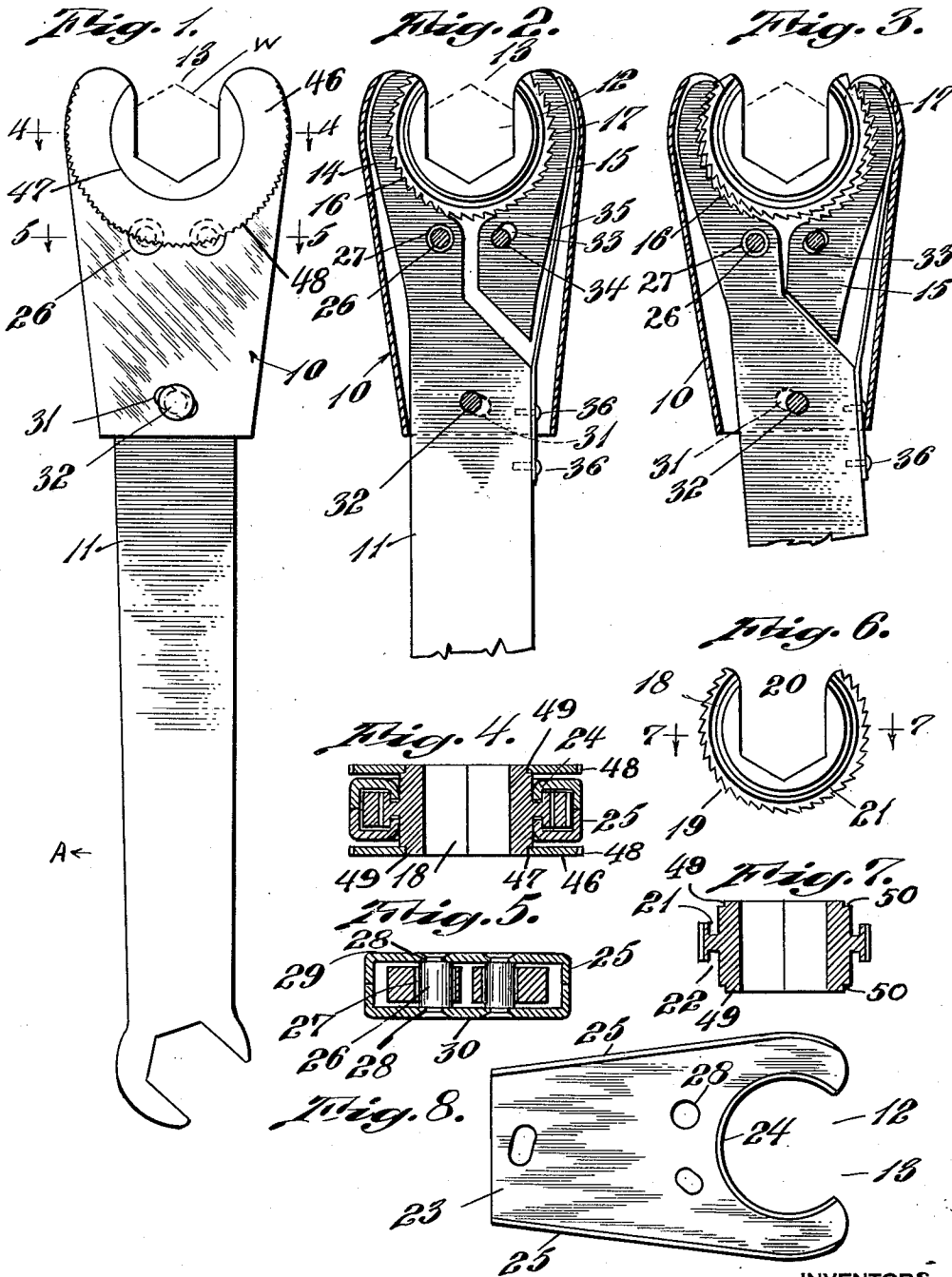
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2,508,604

RATCHET WRENCH

Filed March 31, 1945

2 Sheets-Sheet 1



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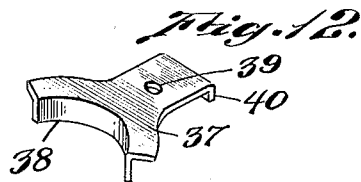
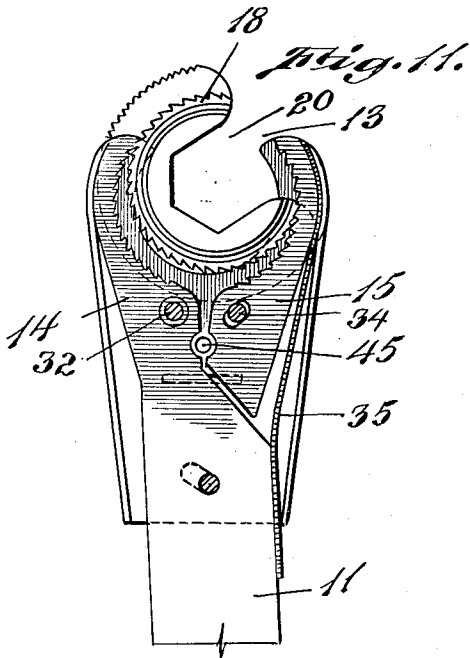
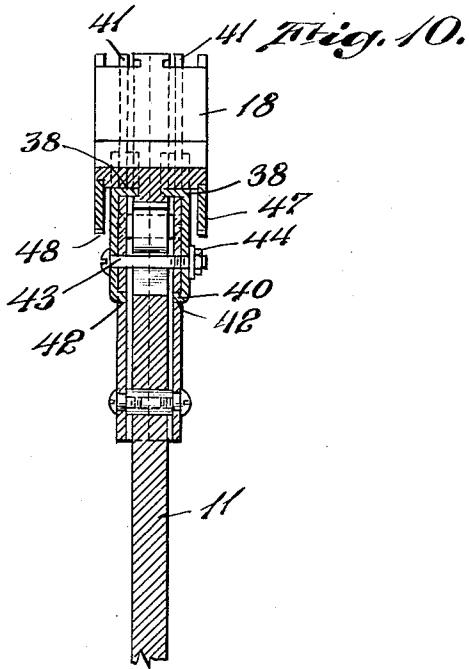
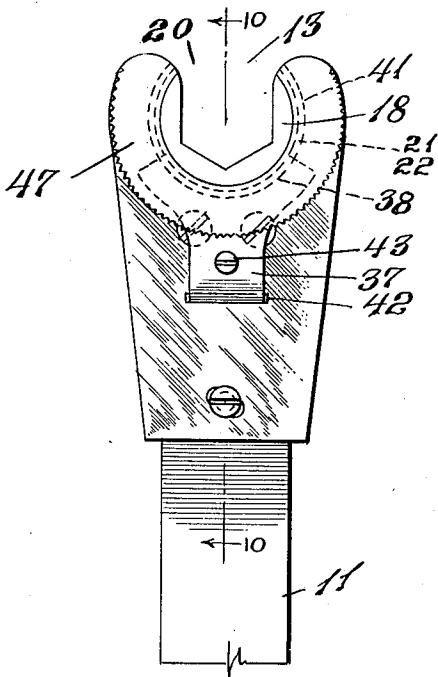
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Fig. 9.



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RATCHET WRENCH

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4 Claims. (Cl. 81—60)

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This invention relates to improvements in ratchet wrenches, particularly wrenches having a work receiving recess adapted to fit over the work from a direction either in line with or transverse of its axis.

Wrenches of this character are usually provided with a ratchet head having a toothed periphery and a work engaging socket opening slotted outwardly through the peripheral edge of the wrench head. In some instances a single pawl having a plurality of teeth thereon is provided for engaging the toothed periphery of the wrench head for the application of a torque thereto and to permit free rotation of the wrench head when moved in the opposite direction. In other instances a plurality of spaced pawls is provided and each has a single tooth for engaging the toothed periphery of the wrench head. At some particular position of the wrench head relative to the body of the wrench, the entrance slot to the work engaging socket will be so positioned as to receive a pawl and render the pawl received ineffective. In such a situation, if the wrench construction includes a plurality of pawls, at least one, thereof, will be out of engagement with the wrench head. If the construction includes a single pawl provided with a toothed surface, then a plurality of teeth equal in combined width to the opening of the slot of the wrench head will be out of contact with the wrench head. Consequently the degree of torque which may be applied at said particular relative position of slot opening can be only that which may be applied through the strength of the then active pawls or teeth of the single pawl. This requires that the wrench be made relatively larger for the application of a given torque than would be necessary in a wrench in which the torque applying element would engage a substantial portion of the ratchet wrench head.

An object of the invention is to provide a wrench construction having a ratchet wrench head provided with a toothed periphery and means for applying a torque thereto which will engage a substantial portion of the toothed periphery thereof at all relative positions of rotation.

Another object of the invention is to provide a ratchet wrench having a work engaging ratchet head capable of being moved into firm engagement with the torque applying means of the wrench.

Another object of the invention is to provide a ratchet wrench having a ratchet wrench head

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capable of being moved in a direction to and from the torque applying means.

Another object of the invention is to provide in a ratchet wrench a mounting for the wrench head which may be moved relative to the torque applying means.

Another object of the invention is to provide in a ratchet wrench a mounting for the wrench in a manner so as to be moved by a relative movement of the handle.

Another object of the invention is to provide in a ratchet wrench having a ratchet wrench head, means for the application of torque to the wrench head in a direction substantially tangent to the periphery of the wrench head.

Another object of the invention is to provide for mounting a torque applying means for movement in a direction substantially tangent to the periphery of the ratchet wrench head.

Another object of the invention is to provide a ratchet wrench having a floating mounting providing a track about which the wrench head will move.

Another object of the invention is to provide a ratchet wrench having an interchangeable ratchet wrench head.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompany drawings:

Fig. 1 is a plan view of a wrench embodying my invention;

Fig. 2 is a plan view of a fragmentary portion of the wrench with a portion of the casing removed so as to illustrate certain details of construction;

Fig. 3 is a view similar to that shown in Fig. 2 but showing a different relation of elements than that shown in Fig. 2;

Fig. 4 is a sectional view taken substantially along lines 4—4 of Fig. 1;

Fig. 5 is a sectional view taken substantially along lines 5—5 of Fig. 1;

Fig. 6 is a plan view of the work engaging element forming part of the wrench;

Fig. 7 is a sectional view taken substantially along lines 7—7 of Fig. 6;

Fig. 8 is a plan view of a plate forming part of the wrench housing;

Fig. 9 is a plan view of a wrench showing a modified construction;

Fig. 10 is a sectional view taken substantially along line 10—10 of Fig. 9;

Fig. 11 is a plan view of the wrench shown in

Fig. 9 with the wrench head retaining elements and a part of the casing removed, illustrating a manner of removing the wrench head from between the torque applying means; and

Fig. 12 is a perspective view of one of the wrench head retaining elements.

Referring to the drawing for a more detailed description of the invention, 10 designates a housing having a handle 11 movably related thereto which handle may be of any desired appropriate size and shape. The housing has a recess 12 at one end providing an entrance opening 13.

A wrench head 18 located in recess 12 is provided with a work engaging slotted opening 20 which opens outwardly through the entrance opening 13 in the housing whereby the wrench may be applied laterally to the work. The wrench head is provided with circular grooves 21 and 22 extending about the opposite edges of the head and concentric to the periphery thereof.

In order to movably mount the head 18 in the housing 10, the edges of the recess 12 of the housing are provided with tracks 24 to enter the grooves 21 and 22 and rotatably mount the head. The housing for reasons of assembly is preferably made of two similar plates 23 best shown in Fig. 8. Each carrying one of the tracks 24 which are circular extending along the edges of the opening 12. These plates are positioned one on either side of the wrench with the outer side flanges 25 of one plate abutting the outer side flanges of the other plate. If desired the plates may be welded along the seam formed at the junction of the side flanges 25 to secure the wrench head to the housing thus formed.

The handle 11 is provided at one end with a jaw 14 and is movably mounted to the housing; a jaw 15 is also movably mounted to the housing for movement relative to the jaw 14. Each jaw is of similar shape and provided with an internally toothed arcuate surface 16 and 17 respectively. The housing 10 is movably secured to the handle 11 by means of a bearing pin 26 which extends loosely through an opening 27 and through openings 28 provided in the walls 29 and 30 of the housing. The ends of the pins are upset against the walls 29 and 30 to secure the same in place.

The housing 10 is also provided with an arcuate slot 31 through which passes a pin 32 that extends between the walls 29 and 30 and is secured thereto by upsetting the ends thereof against the walls. The movable jaw 15 is also provided with a cam slot 33 through which passes a pin 34 extending between and secured to the walls 29 and 30. A leaf spring 35 is fastened at one end to the wrench as by means of screws 36. The free end of the spring is provided with a curved end to engage a curved portion of the jaw 15 at a location adjacent to the outer end thereof so as to bias the jaw towards and into engagement with the wrench head 18.

In the modification shown in Figs. 9 to 11 inclusive, we have shown a construction wherein the wrench head is removably mounted so as to be interchangeable with wrench heads having different sizes of work engaging openings. As shown the tracks which mount the wrench head in the present case comprise plates 37 each having an arcuate track 38, an opening 39 and a lip 40. One of these plates is positioned on each side of the housing with its track 38 extending through opening 41 in the housing and received in the groove 21 or 22 in the wrench head 18. The lips 40 are received in slots 42 and the plates

secured in position by means of a screw bolt 43 and nut 44, the bolt extending through the openings 39 in the plates and openings 45 in the housing. The arc of tracks 38 are such as to be always in engagement with the grooves 21, 22 at all relative positions of the wrench head.

In order to remove the wrench head the nut 44 is loosened sufficiently so as to permit disengagement of the tracks with grooves 21, 22 or the plates may be entirely removed as shown in Fig. 11. The wrench head is then rotated to position the opening 20 therein to a position such as shown in Fig. 11 and in which position the wrench head may be readily pulled from between the jaws 14 and 15.

In operation moving the handle in a clockwise direction as viewed in Figure 2, a relative movement will be had between the housing 10 and the handle 11. The jaw 14 being integral with the handle will be moved into engagement with the wrench head to move the same upon further movement of the handle in the same direction. In moving the handle in the opposite direction so as to obtain a new location of engagement between the jaws and wrench head, as shown in Figure 3, a relative movement between the housing 10 and handle 11 will occur in the opposite direction and move the jaw 14 out of engagement with the wrench head. This will permit a freer relative movement between jaws and wrench head merely against the urge of the spring 35.

In order that opening of the slot 20 may be alined with entrance 13 we have provided a plate 46 having an opening 47 and a knurled edge 48. One of these plates is attached to each side of the wrench head by means of a reduced neck portion 49 thereon which is received within the opening 47 with sufficient friction to normally hold the plates 46 onto the wrench head. The plates are properly spaced on the wrench head by means of shoulders 50 on which the plates rest. The knurled edges provide a surface to be grasped between the thumb and fingers of one hand to rotate and aline the entrance openings so as to permit removal and insertion of the wrench on the work.

We claim:

1. A ratchet wrench comprising a housing having opposite walls and a work entrance opening therein at the outer edge thereof, a handle movably mounted on said housing at a position between said walls, a wrench head having a toothed periphery and a work engaging slot extending inwardly from the periphery thereof and movable relative to said housing to position said slot in register with the entrance opening in said housing, said head having a circular groove therein, a track carried by said housing and engaging in said groove for mounting said wrench head for rotation about said track, said handle having a toothed jaw at an end portion thereof movable into and out of engagement with said wrench head upon relative movement between said housing and handle, a second toothed jaw movably mounted to said housing and movable into engagement with said wrench head and a spring for biasing said second jaw into engagement with said wrench head.

2. A ratchet wrench as set forth in claim 1 wherein said spring is fixed at one end to said handle.

3. A ratchet wrench as set forth in claim 1 wherein said track is detachably mounted to said housing.

4. A ratchet wrench comprising a housing having a work entrance opening therein, a handle

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movably mounted in said housing, a wrench head having a toothed periphery and a work engaging slot extending inwardly from the periphery thereof, said wrench head having a circular groove therein, a track carried by said housing and engaging in said groove for mounting said wrench head for rotation about said track, said handle having a toothed jaw at an end portion thereof movable into and out of engagement with said wrench head upon relative movement between said housing and handle, a second toothed jaw movably mounted to said housing and movable into engagement with said wrench head and spring biased into engagement therewith, and a knurl-edged plate carried by said wrench head for manually moving said wrench head to align the slot therein with the work entrance opening in said housing.

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