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T. O. RUEB

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RATCHET WRENCH

Filed July 13, 1936

Fig. 1.

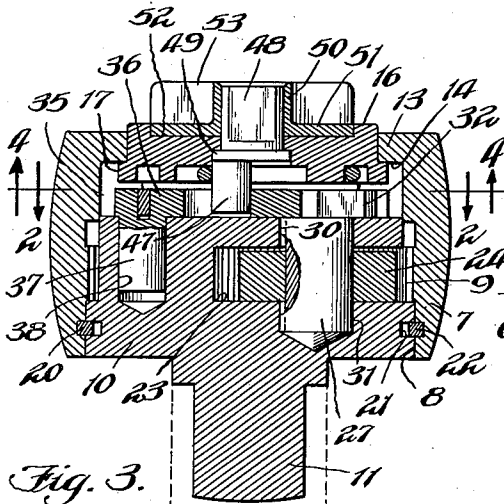
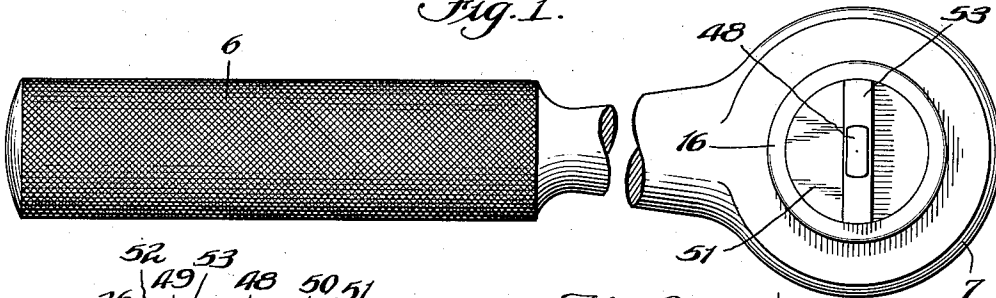


Fig. 3.

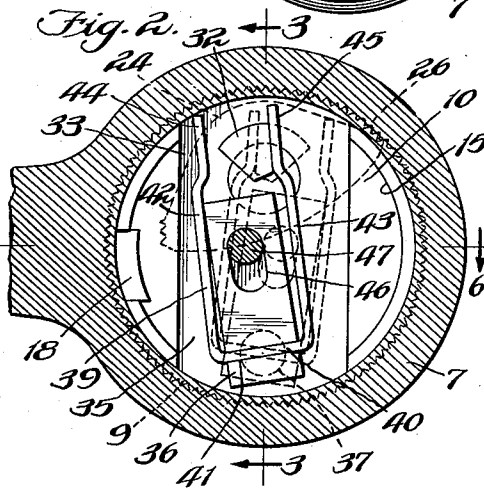


Fig. 2.

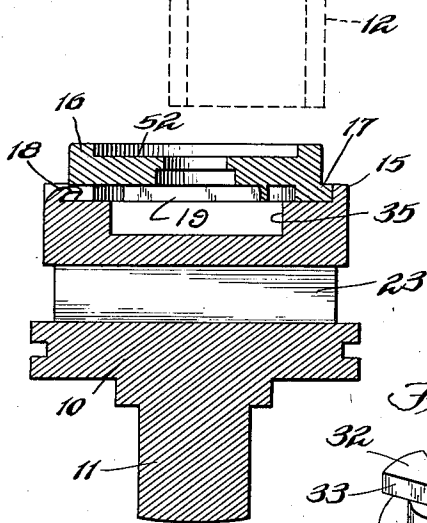


Fig. 4.

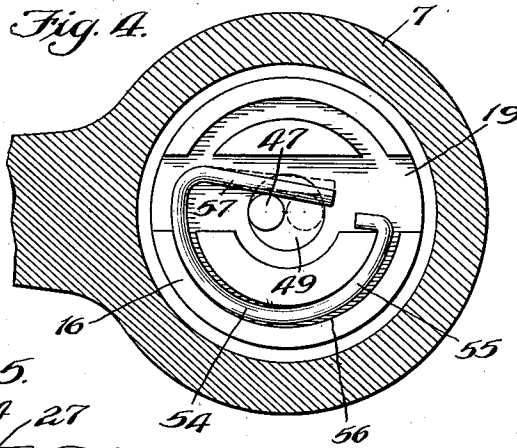
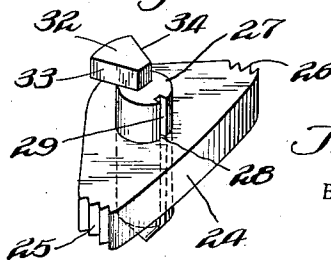


Fig. 5.

Fig. 6.



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RATCHET WRENCH

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Application July 13, 1936, Serial No. 90,272

7 Claims. (Cl. 81-63)

This invention relates to ratchet wrenches having means for reversing the driven member, and manually operable means for quickly and effectively actuating the reversing movement.

The principal object of this invention is to provide a reversible ratchet wrench which may be economically manufactured and which is particularly adaptable for making small sizes.

Other objects of the invention are to provide a ratchet wrench having a double ended pawl for reversing the movement, and simple and efficient means for turning and holding the pawl with either end thereof in resilient engagement with the teeth or actuating surface of the barrel or outer member; and to provide such other advantages and novel features as will appear more fully from the following description.

In the accompanying drawing, Figure 1 is a plan view;

Figure 2 is an enlarged sectional plan view taken on the line 2-2 of Figure 3;

Figure 3 is a sectional view taken on the line 3-3 of Figure 2;

Figure 4 is a sectional view taken on the line 4-4 of Figure 3;

Figure 5 is a perspective detail of the pawl and supporting pin therefor; and

Figure 6 is a sectional detail taken on the line 6-6 of Figure 3 and showing the interlocking of two of the parts.

In the particular form of the invention as illustrated, the handle 6 is provided with a cylinder or barrel 7 which may be formed integrally therewith or welded or attached thereto in any suitable manner. The cylinder or barrel 7 has a longitudinal bore 8 and is provided with an annular series of teeth or corrugations 9 for engagement with the actuating pawl. A turning member or head 10 is rotatably mounted in the barrel 7 and is provided with suitable means for connecting the same with the article to be turned such as a projection 11 of the type commonly used for engagement with sockets as indicated at 12. The barrel or cylinder 7 has an inwardly extending flange 13 at one end which provides an inner shoulder 14 as shown in Figure 3.

The head 10 is shorter than the barrel and has a recess in its inner end which is defined by a peripheral flange 15. A cap or cup 16 extends outwardly through the open end of the barrel 7 and has a flange 17 which engages with the shoulder 14 to hold the operating parts against movement in one direction, this flange also fitting within the flange 15 of the head 10. In order to prevent relative rotative movement between the

cap 16 and the head 10 the head is provided with a tooth or projection 18 which engages with a transverse slot 19 in the cap, as shown particularly in Figure 6. The operating parts are fastened in position in the barrel by means of a removable spring ring 20 which engages with peripheral grooves 21 and 22 in the head and barrel respectively when the parts are in assembled position.

The head 10 has a transverse channel or recess 23 in which is mounted a pawl 24 of approximately triangular shape with ratchet teeth 25 and 26 at the opposite ends or apexes which are adapted to coact with the teeth 9 to provide the ratchet turning movement. The pawl 24 is mounted on a pin 27 and is secured thereto in any suitable manner as by means of a spline or key 28 which fits in a keyway 29 in the pin so that these parts will turn together. The pin 27 engages with holes or bearings 30 and 31 in the head 10 and is free to turn therein, as shown in Figure 3. The pin 27 has a triangular shaped cam projection or sector 32 extending radially from its upper end as shown in Figure 5, which projection may be formed integrally with the pin or secured thereto as desired. The projection has substantially radial converging sides 33 and 34 and serves to rotate the pin and swing the ratchet to its different operating positions. The head 10 has a transverse slot 35 into which the projection 32 extends, the upper end of the pin 27 being flush with the bottom surface of the slot. A rectangular block or plate 36 is pivotally mounted in the slot 35, being provided at one end with a pin 37 which fits in a hole or bearing 38 in the head 10. A substantially U-shaped spring 39 is carried by the block 36, this spring having a transverse portion 40 which fits in a slot 41 in the block and substantially parallel side branches 42 and 43 which extend along and engage with the sides of the block. The branches 42 and 43 have inwardly extending parallel terminal portions 44 and 45 which are opposed to and engage with the respective faces 33 and 34 of the sector 32 for actuating the same as will be seen from Figure 2.

The block 36 has a slot 46 for receiving a crank or eccentric pin 47 which extends inwardly from one end of a pintle member 48 which is mounted in the cap 16 and which has a flange 49 engaging with a recess in the cap for holding it in position. The pintle 48 is flattened at its upper end and engages with and is secured in a boss or projection 50 on a disc 51 which engages with an annular recess 52 in the cap 16 and is adapted to turn freely therein. The disc and boss have thumb pieces 53 for turning the same. The pintle 48

may be held in position by riveting or the like as shown.

The disc 51 and thumb pieces are preferably turned through an angle of approximately one hundred eighty degrees in order to swing the crank or pin 47 to move the block 36 from one ratcheting position to the other. In order to tend to hold the parts in such operative positions and to prevent accidental reversal of the ratcheting movement I provide a spring 54 which has a curved portion 55 that is held in a slot 56 in the lower face of the cap 16 as shown in Figure 4. This spring has a substantially straight portion 57 that moves in the slot 19 and is in constant engagement with the pin 47 and tends to hold the pin and parts associated therewith at either end of the movement of the crank, such movement being limited by the engagement of the teeth of the pawl with the teeth of the cylinder or barrel.

When the pawl is to be adjusted to turn the head in an anti-clockwise direction, by the vibrating movement of the handle 6, with the parts arranged as shown in Figure 2, the thumb piece and disc are turned to actuate the crank or eccentric 47 to swing it to its extreme position in one direction, which causes the block 36 to move the branch 44 of the spring out of engagement with the sector 32 so that the block will be free from the branch 43 or opposite portion of the spring. This leaves the end or engaging portion 45 in contact with the face 34 of the sector 32 and thus tends to hold the sector in adjusted position with the teeth 26 in yielding engagement with the teeth 9 so that the ratchet will operate with the parts in this position in the usual manner. When the head is to be rotated in the opposite direction the disc 51 is turned to its other extreme position which causes the crank pin 47 to swing the block 36 and move the end 45 of the spring away from the sector and cause the end 44 to engage with the opposite face thereof and swing the pawl to its other operative position and to hold the pawl yieldingly in engagement with the teeth as will be readily understood. The parts are held in these different adjusted positions by means of the spring 54 which presses against the pin or crank 47 to hold it in such adjusted positions as above described.

While the drawing is made on an enlarged scale for convenience in illustration, it will of course be apparent that my improved wrench may be made in various sizes and on account of the simplicity of construction is particularly adaptable for small wrenches. Furthermore the construction is such that there is little possibility of any of the parts getting out of order or becoming broken.

While I have shown a preferred form of my improved wrench I do not wish to be limited to the particular construction shown and described except as specified in the following claims, in which I claim:

1. A ratchet wrench having a cylinder with an annular series of teeth therein, a work engaging head rotatively mounted in the cylinder, a double ended pawl mounted in said head and coacting with said cylinder, means for adjusting the pawl to different positions, including an axis for the pawl, a cam secured to the axis, a U-shaped spring pivoted at one end thereof to the head and having its free ends opposed to the cam and adapted to actuate the same, and means for swinging the spring and holding it in adjusted

positions whereby the ends of the pawl will be brought into operative positions.

2. The combination with a ratchet wrench including a barrel and a driving member rotatably mounted therein, of a double ended pawl having its ends adapted to engage at different times with the driving member to reverse the operating movement, a pin on which the pawl is rotatably mounted in said driving member, a sector projecting outwardly from the pin, resilient means engaging with the opposite faces of the sector for swinging the sector and pawl, and means for actuating said resilient means to swing the pawl in opposite directions and to maintain the pawl in operative engagement with its driving member.

3. In a wrench, the combination of a handle, a barrel associated with said handle having a circumferential series of ratchet teeth therein, a revoluble work engaging head journaled in the barrel, a pawl associated with said head for cooperation with said ratchet teeth, a pin supporting said pawl, an eccentric projection on said pin, a block pivoted at one end to the head, a substantially U-shaped spring secured in said block with its free arms extending along the sides of the same and having their extremities oppositely disposed with regard to the projection, and means for actuating said block and holding the same in adjusted position to bring one or the other of said arms into cooperative relation with said projection.

4. In a ratchet wrench, the combination with a head having means for engagement with a nut or the like, and having a transverse opening therein, of a pin extending through said opening, a double ended pawl mounted on said pin, a handle having a cylinder engaging with said head and having internal teeth which are engaged by the pawl, a sector projection on said pin extending radially therefrom, a block pivotally mounted on the head, springs secured to the block and having their free ends opposed to the faces of the sector, a crank having a pin engaging with a slot in said block, a cap coacting with the head and having a bearing, said crank having a pintle engaging with said bearing, and means secured to the pintle for turning the same to cause the crank to swing the block and bring the opposite springs into engagement with the faces of the sector at different times to swing the pawl and to hold the respective ends thereof in operative position with respect to the teeth.

5. In a device as per claim 4, means for holding the crank in adjusted positions comprising a spring secured to the cap and having a branch engaging with the crank pin.

6. In a ratchet wrench, the combination with a handle of a barrel having inwardly projecting teeth, a work engaging head rotatably mounted in the barrel, a pawl mounted in the head and having oppositely disposed engaging portions for engagement with the teeth to turn the head in opposite directions, a pin mounted in the head and secured to the pawl, a cap fixed to said head and extending through one end of the barrel, a crank pintle rotatably secured in the cap, a thumb piece for manually turning the crank, and means actuated by the crank pin for turning the pawl supporting pin and holding the ends of the pawl respectively at different times in engagement with the teeth.

7. In a wrench, the combination with a handle of a barrel having inwardly projecting teeth, a

5 head for engagement with nuts or the like rotatably mounted in the barrel, a pawl mounted in the head and having outwardly disposed engaging portions for engagement with the teeth
10 whereby the head may be turned in opposite directions, a pin mounted in the head and secured to the pawl, a cap fixed to the head and closing one end of the barrel, a substantially triangular projection on said pin, a block pivotally mounted in a slot in said head, a substantially U-shaped spring having its closed end secured in the block and having its free ends positioned

to engage with opposite faces of the triangular projection to turn the pin and pawl carried thereby and to hold the pawl in ratcheting positions, a pintle rotatably mounted in the cap and having an eccentric portion engaging with a slot in the block for swinging the block, a spring detent secured to the cap and tending to hold the eccentric projection in adjusted positions, and a disc secured to the pintle and having thumb pieces for turning the same.

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