Oct. 2, 1923. 1,469,533

H. D. RAHLING

WRENCH

Filed Jan. 22, 1921

Fig. 1.

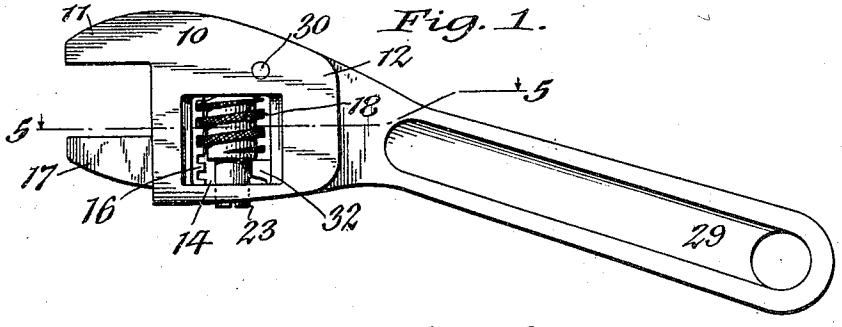


Fig. 2.

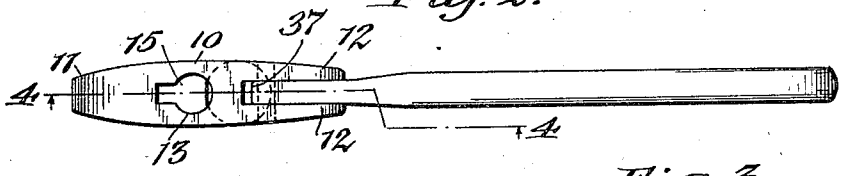


Fig. 3

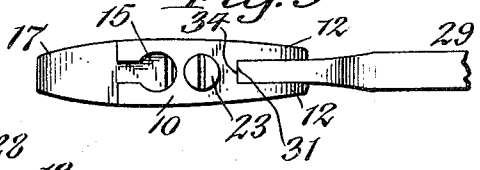
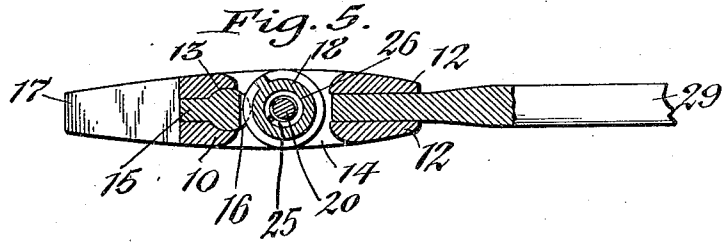


Fig. 4.

Fig. 5.



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Patented Oct. 2, 1923. 1,469,533

UNITED STATES PATENT OFFICE.

HENRY D. RAHLING, OF BUFFALO, NEW YORK, ASSIGNOR TO CYGNET MFG. CO., INC., OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

WRENCH.

Application filed January 22, 1921. Serial No. 439,085.

To all whom it may concern:

Be it known that I, HENRY D. RAHLING, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Wrenches, of which the following is a specification.

This invention relates to a wrench which can be adjusted to suit nuts and bolts or other objects of different sizes and which can also be used as a ratchet wrench so as to avoid the necessity of taking new holds of the object when turning the same.

The principal object of this invention is to so construct the wrench that the jaws are not liable to creep and gradually open when an irregular pressure is applied to the same while turning an object and thus avoid loosening the grip on the same.

Another object of the invention is to improve the means of guiding the adjusting worm or screw in its sliding motion.

A further object is to render the wrench more compact, lighter and stronger.

A still further object is to so organize the wrench that all springs are enclosed within the wrench where they are not liable to become broken or deranged.

In the accompanying drawings: Figure 1 is a side elevation of a wrench embodying my improvements. Figure 2 is a top view of the same. Figure 3 is a fragmentary bottom view of the same. Figure 4 is a fragmentary longitudinal section of the wrench, on an enlarged scale, taken in a plane parallel with the side of the wrench. Figure 5 is a transverse section taken on line 5—5, Fig. 4.

Similar characters of reference indicate corresponding parts throughout the several views.

10 represents the head or body of the wrench which is provided on its front end adjacent to the top thereof with a fixed jaw 11 and on its rear end with two longitudinal side cheeks 12, 12, the head, fixed jaw and cheeks being preferably integral and forged or otherwise produced from a single piece of metal. In its front edge the head in rear of the fixed jaw is provided with a transverse guideway 13 and in the central part of the head the same is provided with an opening 14 extending through the same from one longitudinal side to the other and intersecting the guideway 13 and the slot 31 between the cheeks.

15 represents a movable shank which slides transversely in the guideway and is provided on its rear or inner side with a gear rack or sectional screw thread 16 while the outer end of its front side is provided with a movable jaw 17 which is adapted to approach the fixed jaw or recede therefrom in adapting the wrench to grip nuts, bolts or other articles of different sizes or diameters. Within the opening 14 is arranged an adjusting worm or screw nut 18 the external thread of which meshes with the gear rack of the movable jaw. This worm is journaled at its upper end on the central part 20 of a stationary pivot and guide pin which latter extends across the opening 14 parallel with the sides of the head and has an externally threaded reduced upper end 21 which is secured in an internally threaded opening in the head on the upper side of the opening 14 while the lower end 23 of this pin is enlarged and projects into the lower part of the screw nut and is also seated in an unthreaded opening in the head at the lower side of said opening, as shown in Fig. 4. The screw nut is thus journaled and guided at both of its ends on this pivot and guide pin. The adjusting nut or worm is yieldingly held in its uppermost position with its upper end in engagement with the top of the opening 14 by means of a spiral spring 25 arranged in an enlargement 26 in the bore of the adjusting worm and engaging its upper end with an upper shoulder 28 at the bottom of said enlarged bore, while its lower end engages an annular shoulder 27 formed on the pivot and guide pin between the enlarged lower end and the reduced central part thereof.

29 represents a hand lever which has its front end arranged in the slot between the cheeks and is pivoted so as to swing in a plane parallel with the sides of the head by a pin 30 passing transversely through corresponding openings in the upper front part of the hand lever and the adjacent parts of the cheeks of the head. Adjacent to the lower part of the front end of this hand lever the same is provided with a thrust lug 32 forming an upwardly-facing shoulder which is adapted to engage with the lower end of the adjusting nut or worm and below

this lug the front end of the hand lever is provided with a forwardly facing stop surface 31 which is adapted to engage with a corresponding stop face 34 formed by the adjacent lower part of the slot between said cheeks. The hand lever is yieldingly turned in a direction in which its thrust lug is carried underneath the adjusting screw by means which preferably consist of a spring 35 arranged between the front end of the hand lever and the rear part of the head above the axis of the lever. This spring is preferably seated at its front end in a recess or pocket 36 formed in the upper part of the front end of the slot between the cheeks while its rear end engages with a transverse bearing face 37 formed on the front end of the hand lever above the axis of the same.

When using this wrench the adjusting worm or nut is first turned with the finger until the movable jaw has been shifted into the desired position to permit of fitting the opposing faces of the jaws to the object to be grasped. Upon now turning the hand lever forwardly, in the direction of the arrow shown in Fig. 4, the thrust lug engages with the lower end of the adjusting nut and holds the same firmly against the upper side of the opening 14, whereby the jaws are retained in the relative position to which they have been adjusted and maintain a tight grip on the article which is to be turned, so that in effect the wrench at this time operates as a solid wrench. During the backward stroke of the hand lever the first part of this movement causes the thrust lug to be removed from underneath the adjusting screw or worm, thereby permitting the latter and the movable jaw associated therewith to move downwardly or in a direction in which the movable jaw recedes from the fixed jaw as the two jaws pass over the corners of the bolt head or nut or other enlarged or high surface on the part being turned. After the jaws clear the high surfaces of the object and again come opposite the low surfaces of the same, the worm spring 25 moves the nut and movable jaw upwardly so that the jaws grasp the article and in that way cause the wrench at this time to operate as a ratchet wrench. The instant the movement of the hand lever is again reversed, the thrust lug is moved under the adjusting nut and holds the two jaws against separation.

Heretofore the pivot pin 30 was located a considerable distance from the axis of the adjusting nut or worm which caused the thrust lug to gradually lose its engagement with the lower end of this nut when the hand lever was operated by a hesitating or unsteady pull instead of by a continuous or steady pull and this was liable to cause the jaws to loose their grip on the object while turning the wrench forwardly. In the present construction the pin 30 and the point at which the thrust lug engages the adjusting nut or worm are arranged on a line which is substantially parallel with the axis of the adjusting worm or nut and the direction of movement of the movable jaw toward and from the fixed jaw, as shown in Fig. 4. This relation of the parts has the effect of keeping the thrust lug in engagement with the lower end of the adjusting nut notwithstanding that the forward movement of the hand lever may be unsteady, this being due to the fact that the tendency of the thrust lug to move away from under the adjusting nut is either absent or imperceptible and therefore avoids the liability of the wrench slipping on an object during the forward stroke of the same. This location of the pivot pins 30 is possible by arranging the spring which raises the adjusting nut within the latter and thus provide the necessary space above the adjusting nut to permit the pivot pin 30 to be arranged transversely in line or substantially so, with the thrust lug and secure the advantages above described. Moreover, in this construction the springs are all arranged within the body of the wrench where the same are not likely to be damaged.

During the forward movement of the hand lever, the thrust of the same is transmitted by its lower stop face 31 to the stop face 34 on the head between the cheeks of the same, whereby the tendency to spread the cheeks or injure the same is avoided and a firm and strong contact between the hand lever and head is obtained for insuring positive and reliable action of the wrench.

I claim as my invention:

1. A wrench comprising a head having a fixed jaw, a shank slidable transversely on said head and provided with a gear rack and a movable jaw adapted to co-operate with said fixed jaw, a rotary adjusting worm engaging its thread with said rack, a stationary guide pin which is mounted on said head and on which said worm is capable of sliding and turning, and a spring for yieldingly moving the worm, shank and movable jaw in a direction in which the movable jaw approaches the fixed jaw.

2. A wrench comprising a head having a fixed jaw, a shank slidable transversely on said head and provided with a gear rack and a movable jaw adapted to co-operate with said fixed jaw, a rotary adjusting worm engaging its thread with said rack, a stationary guide pin which is mounted on said head and on which said worm is capable of sliding and turning, a spring for yieldingly moving the worm, shank and movable jaw in a direction in which the movable jaw approaches the fixed jaw, and a hand lever pivoted on said head and having an integral shoulder adapted to engage with said worm

and hold the same against movement in a direction in which the movable jaw recedes from the fixed jaw.

3. A wrench comprising a head having a fixed jaw, a shank slidable transversely on said head and provided with a gear rack and a movable jaw adapted to co-operate with said fixed jaw, a rotary adjusting worm engaging its thread with said rack, a hand lever pivoted on the head and provided on one side of its axis with a shoulder for engaging the worm and holding the same against moving in a direction in which the movable jaw recedes from the fixed jaw, said lever being provided on the opposite side of its axis with a transverse bearing face and said head being provided opposite said bearing face with a recess, and a spring seated at one end in said recess and engaging its other end with said bearing face.

4. A wrench comprising a head having a fixed jaw, and a transverse guideway, a shank slidable in said guideway and provided on its front side with a movable jaw co-operating with said fixed jaw and on its rear side with a transverse gear rack, a transverse guide pin arranged in rear of the shank and secured to said head and provided with an inwardly facing shoulder, a worm capable of sliding and turning on said pin and having an external thread meshing with said rack and an enlarged bore forming an outwardly facing shoulder, and a spring surrounding said pin and engaging its opposite ends with the shoulders on said pin and worm and operating constantly to move the movable jaw toward said fixed jaw.

5. A wrench comprising a head having a fixed jaw and a transverse guideway, a shank slidable in said guideway and provided on its front side with a movable jaw co-operating with said fixed jaw, and on its rear side with a transverse gear rack, a transverse guide pin arranged in rear of the shank and secured to said head and provided with an inwardly facing shoulder, a worm capable of sliding and turning on said pin and having an external thread meshing with said rack and an enlarged bore forming an outwardly facing shoulder, a spring surrounding said pin and engaging its opposite ends with the shoulders on said pin and worm and operating constantly to move the movable jaw toward said fixed jaw, and a hand lever pivoted on said head and having a shoulder adapted to engage with the outer end of said worm.

6. A wrench comprising a head having a fixed jaw and a transverse guideway, a shank slidable in said guideway and provided on its front side with a movable jaw co-operating with said fixed jaw and on its rear side with a transverse gear rack, a transverse guide pin arranged in rear of the shank and secured to said head and provided with an inwardly facing shoulder, a worm capable of sliding and turning on said pin and having an external thread meshing with said rack and an enlarged bore forming an outwardly facing shoulder, a spring surrounding said pin and engaging its opposite ends with the shoulders on said pin and worm and operating constantly to move the movable jaw toward said fixed jaw, a hand lever pivoted on said head and having a shoulder adapted to engage with the outer end of said worm, and a spring for turning said hand lever in the direction for engaging the shoulder thereof with said worm.

7. A wrench comprising a head provided on its front end with a fixed jaw and on its rear end with two longitudinal cheeks which form a longitudinal slot and a stop face on the rear end of said head between said cheeks, a shank slidable transversely on said head and having a gear rack and a movable jaw, a worm engaging said rack and mounted on said head so as to be slidable and rotatable thereon, a spring operating to move the worm in the direction for causing the movable jaw to approach the fixed jaw, and a hand lever arranged between said cheeks and pivoted thereto and having a shoulder adapted to engage said worm, and a stop face adapted to engage said stop face on the head.

8. A wrench comprising a head having a fixed jaw, a shank slidable transversely on said head and having a gear rack and a movable jaw, a worm having a thread engaging said rack and capable of turning about an axis parallel with the direction of movement of said movable jaw and also capable of sliding in this direction, a spring which moves said worm in the direction in which the movable jaw approaches said fixed jaw, a hand lever pivoted on the head and provided on one side of its axis with a thrust lug which is adapted to engage with said worm and also provided outwardly from said lug with a stop face adapted to engage with a corresponding stop face on the rear end of said head and also provided on the opposite side of said axis with a transverse bearing face, and a spring interposed between said bearing face and the adjacent part of said head, said axis of the hand lever and the point of engagement of said lug with the worm being on a line which is substantially parallel with the direction of sliding movement of said worm and movable jaw.

HENRY D. RAHLING.