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Our invention relates to a close-quarter ratchet pipe wrench. It has to do, more particularly, with a pipe wrench or Stillison wrench which is so designed that it can be used in close quarters where the handle can be swung only to a limited extent. However, the wrench is so designed and constructed that it can also be used in the manner of the ordinary pipe wrench.

There have been many designs and constructions of pipe wrenches in the prior art which include a head pivoted to a handle with associated ratchet means for controlling the relative pivoting of the handle and the head. These arrangements provided in the prior art are usually complicated and expensive to produce. They generally comprise many parts which not only increase production difficulties but which also provide parts which will readily wear. Furthermore, these large number of parts and complicated arrangement tend to produce a structure which is not very rugged as compared to the ordinary pipe wrench.

According to the present invention, we provide a pipe wrench which is practically as rugged and sturdy as the ordinary pipe wrench. This is accomplished by keeping the parts insofar as possible identical with the corresponding ordinary pipe wrench parts and adapting the pivot and ratchet mechanism thereto in such a manner that the simple and rugged nature of the pipe wrench is maintained. The resulting structure is such that the wrench of our invention has all the desirable features of the ordinary pipe wrench but, in addition, has a head pivoted to a handle, and associated control ratchet mechanism, so that the wrench can be used in close quarters where it would be impossible to use the ordinary pipe wrench.

In the accompanying drawings, we have illustrated the preferred embodiment of our invention and in these drawings:

FIGURE 1 is a side elevational view of a wrench embodying our invention.

FIGURE 2 is a vertical sectional view taken along line 2--2 of FIGURE 1.

FIGURE 3 is a view, partly in elevation and partly in section, illustrating the pivoting of the head on the handle and the ratchet mechanism for controlling such pivoting.

FIGURE 4 is a diagrammatic view illustrating how the wrench can be used in close quarters and showing the initial position of the head on a pipe to be rotated.

FIGURE 5 is a similar view but showing advanced successive rotative positions of the head as the pipe is turned with our wrench.

With reference to the drawings, we have illustrated our wrench as comprising an elongated handle 10 having a jaw head 11 pivoted thereto by the pivot pin 12. The head 11 will swing about the pivot pin 12 under the control of a ratchet which can be released by suitable means, such as a finger loop 13 at the lower end of the handle 10.

The head 11 is constructed almost exactly with the head of the ordinary pipe wrench. It includes the usual barrel or guide 14 in which the usual jaw-adjusting nut 15 is positioned for rotation. The threaded portion or stem 16 of the L-shaped jaw 17 slidably passes through the guide 14 and is threaded through the nut 15 in the usual manner. The movable jaw 17 is of the usual form and has the serrated jaw surface 18 formed thereon which is provided with the usual serrated jaw surface 20 which projects laterally to provide ribs or shoulders 20a at each side. The jaw surfaces 18 and 20 are disposed parallel with each other and are adjusted relatively by the nut 15 in the usual manner. It will be apparent that the head structure up to this point is of identical structure as compared to the usual pipe wrench head structure.

According to this invention, we provide a ratchet segment 21 between the jaw 19 and the guide 14 and positioned within the angle usually provided between these members. This flat ratchet segment 21 is integrally formed with the guide portion 14 and jaw portion 19. The guide 14 projects laterally of the flat ratchet 21 to provide ribs or shoulders 14a where they come together. Thus, it serves to strengthen these two portions. The ratchet segment 21 has its arcuate outer edge provided with ratchet teeth 22 and the center of curvature of this edge is at the axis of the pivot pin 12.

The handle 10 is of bifurcated form at its upper end and straddles the depending ratchet segment 21, as shown best in FIGURE 2. The laterally spaced handle stems 23 are flat and are disposed close adjacent the flat sides of the ratchet 21. The pin 12 passes through aligning openings in the upper ends of these stems 23 and through a pivot opening in the ratchet portion 21 and its ends may be butted to hold it in position. Thus, the head 11 is pivoted to the handle 10 for swinging movement about the axis of the pin 12. The center of gravity of the head 11 is preferably such that, when the jaws 17 and 19 are expanded relatively, the center of gravity is outwardly beyond the pivot axis 12. This will tend to swing the head 11 from the position shown in FIGURE 1 to a position at right angles to the axis of the handle when the ratchet is released.

The control pawl 25 of the ratchet is mounted at the inner end of the space 26 provided between the stems 23 of the handle. This pawl 25 is slidably disposed in a bore 27 in the handle and is normally pressed outwardly by means of a compression spring 28 at the inner portion of the bore. The pawl 25 is provided with a tooth-engaging end 29 which projects from the bore into engagement with the ratchet teeth 22. The portion 29 may be released from the teeth 22 by a downward pull on the loop 13 which is on the lower end of a wire 30 that has its upper end anchored to the pawl member 25. It will be apparent that because of the shape of the pawl end 29 and the associated ratchet teeth 22, as shown in FIGURE 3, when the ratchet is engaged, swinging of the handle 10 relative to the head 11 about the axis of the pivot 12 is permitted only in the counterclockwise direction, as indicated by the arrow in FIGURE 3. Of course, when the ratchet is released by a pull on the loop 13, relative rotation of the handle and head in either direction is permitted.

The manner in which our wrench is used is illustrated diagrammatically in FIGURES 4 and 5. We have shown a pipe P which it is desired to rotate and which is positioned between obstructions O, which make it impossible to use the ordinary pipe wrench since the space allowed between the obstructions O will merely permit sufficient swinging of the handle of the ordinary pipe wrench to tighten the head on the pipe and not to rotate it. However, it is possible to use the wrench of this invention in this limited space to turn the pipe P. In using our wrench, the ratchet is released and the head 11 is turned 90 degrees from the position shown in FIGURE 1. The ribs 20a at the jaw surface 20 project outwardly from the flat side surfaces of the ratchet 21 to provide means for engaging the associated edges of the stems 23 of the handle and will limit rotation of the head to this position. The head is tightened on the pipe by operating the nut.
15 to clamp it on the pipe in the full line position shown in FIGURE 4. To rotate the pipe, the handle 10 is swung to the right at successive intervals, the ratchet permitting this motion without turning the head 11. However, when swung to the left at successive intervals, the automatically engaged ratchet will permit turning of the head 11 and the gripped pipe P. Thus, the wrench head 11 can be rotated successively through the positions illustrated in FIGURES 4 and 5 to rotate the pipe P even though there is limited space for swinging the handle 10. In each of these figures a comparison of the positions indicated by full lines and dotted lines designated A and B, respectively along with the full and dotted positions of the head and handle of the wrench, will indicate how much the head is advanced in its rotation on each swing of the handle to the left. Necessary oscillations of the handle 10 are permitted, the swinging movement to the right being a handle positioning movement and the swinging movement to the left being the pipe-turning movement. When the head reaches the position shown in FIGURE 1 where the projecting shoulders 14a of the guide 14 engage the associated edges of the handle stems 23, it will be necessary to release the ratchet by pulling on the loop 13 and loosen the head from the pipe so that it can be turned to the original full line position shown in FIGURE 4, after which the turning of the pipe can be continued in the manner described above. Thus, the handle 10 can be actuated to permit automatic functioning of the ratchet until the limit of the relative rotation of the head and handle is reached, at which time the ratchet can be manually released to permit repositioning of the handle on the handle and the turning operation can then be repeated.

It will be apparent that we have provided a ratchet-type pipe wrench which is as rugged as the ordinary pipe wrench. It can be used as an ordinary wrench but the ratchet arrangement provides for use in close quarters where the ordinary wrench cannot be used. Because the ratchet member is formed between the fixed jaw and the guide for the movable jaw, the ruggedness of these portions is actually increased. Furthermore, this location of the ratchet permits the positioning of the handle so that the desired oscillating movement of the handle to operate the ratchet is permitted without changing the basic character of the head of the pipe wrench. The handle is pivoted to the head at an axis which is at the center of the segmental ratchet member and will oscillate between the stop shoulders at the fixed jaw and the stop shoulders at the guide portion for the movable jaw. This arrangement not only provides for an efficient rugged structure but also makes it possible to produce a wrench of this type at a minimum cost since a minimum number of parts are employed in the structure.

According to the provisions of the patent statutes, the principles of this invention have been explained and have been illustrated and described in what is now considered to represent the best embodiment. However, it is to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

Having thus described our invention, what is claimed is:

1. A close-quarter ratchet pipe wrench comprising a handle and a head pivoted together for relative movement, a ratchet between the head and the handle for controlling relative pivotal movement, said head comprising a movable jaw and a guide member carrying the movable jaw for relative movement to a fixed jaw carried by the guide member, said guide member comprising a guide for adjustably receiving the stem of the movable jaw and a fixed jaw at an angle to the axis of the guide so that the movable jaw will move toward and away from said fixed jaw upon movement of the stem in the guide, a jaw-adjusting nut supported in said guide member for receiving and adjusting said stem of the movable jaw when it is positioned in said guide, a segmental toothed ratcheted portion disposed within the included angle between said guide and said fixed jaw on said guide member and formed integral therewith and having ratchet teeth on its outer edge which is arcuate curved, a handle having its inner end overlapping the segmental ratchet portion and being pivoted thereto by a pivot located within the outer curved toothed edge of said ratchet portion and toward the vertex of the angle between said fixed jaw and the axis of said guide, a movable pawl on said handle for engaging the ratchet teeth and yieldingly engaging said teeth, and means connected to said pawl for moving it out of engagement with said teeth.

2. A wrench according to claim 1 in which the overlapping upper end of the handle is bifurcated and straddles the segmental ratchet portion, said pivot for the handle being located within the ratchet portion at the center of curvature of the toothed outer edge of said ratchet portion, and radially extending stop shoulders on said segmental ratchet portion at opposite faces thereof and located at said fixed jaw and said guide to engage the bifurcations of the handle to limit pivotal movement of said handle relative to said guide member.

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