Aug. 7, 1956 A. C. REAVES 2,757,564

BROKEN CIRCLE RATCHET WRENCH

Filed June 13, 1955

FIG. 1

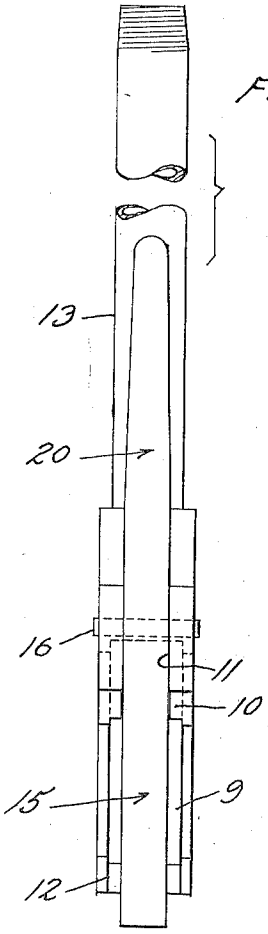
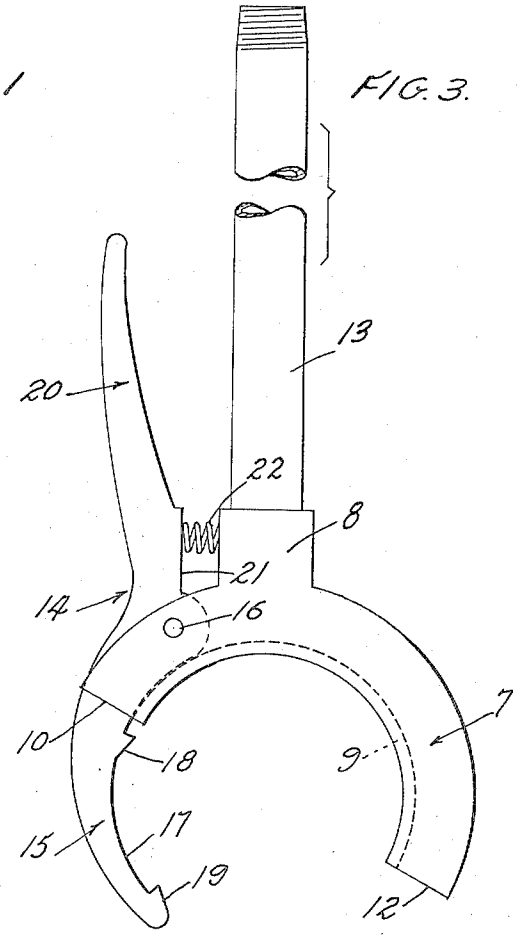


FIG. 3.



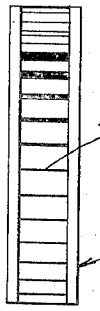
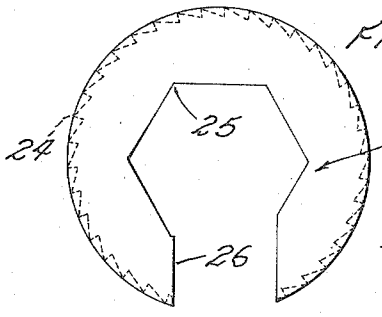


FIG. 2.

FIG. 4.



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BROKEN CIRCLE RATCHET WRENCH

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4 Claims. (Cl. 81—58.2)

This invention relates to a novel ratchet wrench primarily adapted for making pipe union connections, meter connections and the like in relatively inaccessible locations, and has for its primary object to provide a wrench the head of which may be slipped over a pipe and moved therealong into engagement with the wrench lands of a coupling or union after which, by back and forth manipulation of the wrench, the wrench head can be rotated in one direction for tightening the coupling or union.

More particularly, it is an aim of the present invention to provide a novel wrench of the aforedescribed character wherein the rotary mounted wrench head has an opening or gap therein enabling the head to be passed over a pipe and thereafter positioned in engagement with a coupling or union to be tightened or loosened, and which wrench is so constructed that the gap in the rotary head will not prevent complete rotational movement of the wrench head within the wrench.

Another object of the invention is to provide a wrench having novel pawl means functioning additionally as retaining means for retaining the wrench head rotatably mounted in the wrench and which affords an extremely simple and efficient means for removing and replacing the wrench head, so that wrench heads having openings of different sizes and shapes may be readily employed interchangeably for engaging couplings and unions of different sizes and shapes.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is an edge elevational view of the wrench with the rotary head removed therefrom;

Figure 2 is an edge elevational view of the rotary head;

Figure 3 is a side elevational view of the wrench, looking from right to left of Figure 1, and

Figure 4 is a side elevational view of the rotary wrench head.

Referring more specifically to the drawing, the ratchet wrench in its entirety includes a substantially semi-circular holder 7 which is provided with a socket 8 which projects outwardly from the outer convex side thereof. The inner concave side of the holder 7 is recessed from end-to-end thereof, as best seen in Figure 1, to provide a guide groove or channel 9. The outer side of one end 10 of the holder 7 is provided with a recess 11 which opens outwardly of said end 10 and of the convex outer side of the holder 7. The socket 8, as seen in Figure 3, is located nearer the holder end 10 than the other end 12 of said holder. An elongated rigid handle 13, which may be of any desired length, has one end secured in the socket 8.

An elongated lever, designated generally 114, includes an elongated arcuately shaped end portion 15 forming a pawl, an inner end portion of which fits loosely in the recess 11. A pivot pin 16 extends transversely through the holder 7 and loosely through a part of the pawl 15 which is located in the recess 11 for swingably connecting said lever to the holder 7 for swinging movement of

the lever in a plane coinciding with the plane of said lever and holder. The pawl 15 includes a portion of substantial length which extends from the holder end 10 and which has a concavely bowed inner edge 17 which forms substantially a continuation of the arc of the bed of the channel 9, as seen in Figure 3. Said projecting pawl portion is provided with a pair of spaced lugs 18 and 19. The lugs 18 and 19 project from said inner edge 17 and the lug 18 is located beyond but adjacent the holder end 10 while the lug 19 is located adjacent the terminal end of the pawl 15. When the lever 14 is in its normal position, as seen in Figure 3, the gap between the terminal end of the pawl 15 and the holder end 12 constitutes an arc of substantially less than a half circle.

The other end of the lever 14 constitutes a handle 20 which projects from the holder 7 in slightly diverging relation to the wrench handle 13 and which is provided with an inner substantially flat surface 21 which is spaced from and disposed substantially parallel to a part of the socket 8. An expansion coil spring 22 is disposed between said surface 21 and the socket 8 for urging the lever 14 to swing counterclockwise about the pivot 16 to its operative position of Figure 3.

The ratchet wrench also includes a rotary wrench head, designated generally 23 in the form of a relatively thick disk, in the periphery of which is cut a series of ratchet teeth 24, as best seen in Figure 2. The rotary wrench head 23 has a central opening 25 of noncircular shape and a slot 26 extending from a portion of said opening 25 through a portion of the periphery of the rotary wrench head. As illustrated, the opening 25 includes four sides and a part of a fifth side which are adapted to conformably fit four sides and a portion of a fifth side, not shown, of a hexagon shaped coupling or union whereby the coupling or union will be turned with the wrench head 23. The radius of the wrench head 23 corresponds to that of the bed of the channel 9. Accordingly, by displacing the handle 20 toward the handle 13, the exposed end of the pawl 15 will be swung away from guide channel 9 and away from the holder end 12, so that the rotary head 23 can be inserted into the holder 7 and one-half thereof received in the channel 9. The handle 20 is then released permitting the spring 22 to return the lever 14 to its position of Figure 3, so that an additional portion of the toothed periphery 24 will be engaged by the inner edge 17 of the pawl 15, and the lugs 18 and 19 will engage simultaneously against spaced teeth 24. Thus, the spring 22 will function with the pawl 15 to releasably retain the rotary head 23 in the guide channel 9, and said head 23 will be journalled in said channel 9 and against the inner pawl edge 17.

With the head 23 thus mounted in the holder 7 and with the gap 26 thereof located between the holder end 12 and the terminal of the pawl 15, the slot 26 will provide clearance for a pipe, not shown, so that the wrench can be moved to position the pipe in the opening 25, after which the wrench may be moved longitudinally of the pipe to engage the wrench land surfaces of the opening 25 with a union or coupling, now shown, to be turned by the wrench. The handle 13 can then be manually engaged for oscillating the tool from right to left and vice versa, as seen in Figure 3. When the wrench is swung to the right or clockwise as seen in Figure 3 the lugs 18 and 19 by engagement with certain of the teeth 24 will cause the wrench head 23 to turn in unison with the holder 7 and pawl 15 so as to turn the element engaged by the wrench 23. However, when the wrench is swung counterclockwise or to the left as seen in Figure 3, the inclined back edges of the lugs 18 and 19 will ride over the back edges of the teeth 24 so that the parts as shown in Figure 3 may be turned counterclockwise relative to the wrench head 23. This movement is made possible due

to the fact that the spring **22** permits a yielding clockwise rocking movement of the lever **14** about its pivot **16** to enable the lugs **18** and **19** to swing outwardly for passing over the teeth **24**. Thus, said spring functions in conjunction with the lever **14** to enable the wrench to be turned relative to the wrench head in one direction and additionally functions with said lever to retain the wrench head **23** detachably mounted in the holder **7** and in the exposed end of the pawl **15**.

It will be noted that the spacing between the lugs **18** and **19** is greater than the width of the slot or gap **26**. Thus, when either lug is located in the slot **26** the other lug will still be positioned to engage a ratchet tooth so that the wrench head **23** can be turned with the parts as shown in Figure 3. Accordingly, the wrench head **23** may readily rotate a complete revolution within the holder **7** and pawl **15**.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the function or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A ratchet wrench comprising a substantially semicircular holder having a recessed inner edge defining a substantially semicircular guide channel, said holder including a first end and a second end, an elongated handle having one end secured to said holder and extending from a portion of the outer edge thereof and spaced from said holder ends, said holder having an externally recessed portion opening outwardly of a portion of its outer edge and of said first end, a pawl having an inner end loosely disposed in said externally recessed portion, a pivot element pivotally connecting the inner end of the pawl to the holder for swinging movement of the pawl in the plane of the holder, said pawl being longitudinally curved and having an outer end portion forming a curved extension of the first end of said holder and including a concavely bowed inner edge forming substantially a continuation of the arc of the bed portion of said guide channel, in an operative position of the pawl, spring means urging said pawl to swing inwardly relative to the holder and for yieldably maintaining said pawl in an operative position, the distal end of said pawl being spaced substantial distances from the ends of said holder whereby the gap between the distal end of the pawl and the second end of the holder constitutes an arc of substantially less than a semicircle, in an operative position of the pawl, and a substantially disk shaped rotary wrench head having a radius corresponding to the radius of said guide channel and journaled therein, said wrench head being retained

in engagement with the guide channel by engagement of a portion of the periphery thereof with said inner edge of the pawl, said wrench head being provided with a noncircular opening disposed centrally thereof and a series of ratchet teeth formed in the periphery thereof, and said pawl having a lug projecting from a part of the inner edge thereof disposed beyond the first end of the holder for engaging the ratchet teeth whereby said wrench head is constrained to rotate in one direction with the holder and pawl and whereby said holder and pawl may turn in the opposite direction relative to said wrench head, said spring means permitting outward yielding movement of the pawl to allow the lug to ride over the ratchet teeth in said last mentioned direction of movement of the holder and pawl and additionally to provide clearance between the distal end of the pawl and the second holder end for removal of the wrench head from the holder and pawl and for applying the wrench head thereto.

2. A ratchet wrench as in claim 1, said wrench head having a slot opening outwardly of a portion of the periphery thereof and communicating with the central opening, and said pawl having a second lug projecting from the inner edge thereof and disposed beyond said first end of the holder, said lugs being spaced apart a distance greater than the circumferential width of said slot, said lugs being disposed to simultaneously mesh with spaced teeth of said series of ratchet teeth.

3. A ratchet wrench as in claim 2, said pawl constituting an end of a lever, the other lever end forming a handle and extending from a portion of the outer side of the holder, said lever handle being spaced from the first mentioned handle and disposed in outwardly diverging relation thereto and being swingably movable toward the first mentioned handle for swinging the pawl outwardly of the holder to a released position.

4. A ratchet wrench as in claim 3, said spring means being disposed between a portion of the lever handle and a part of said holder.

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