Nov. 2, 1954 H. L. FISH 2,693,123

OPEN END RATCHET WRENCH

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Fig. 1.

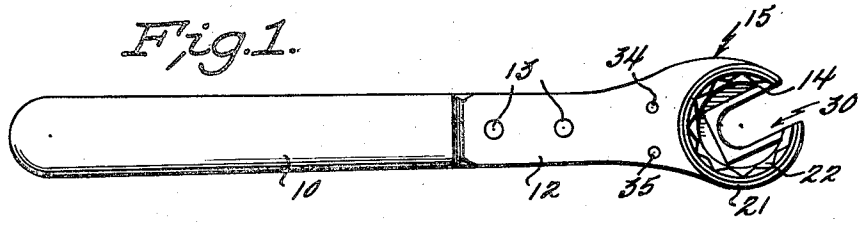


Fig. 2.

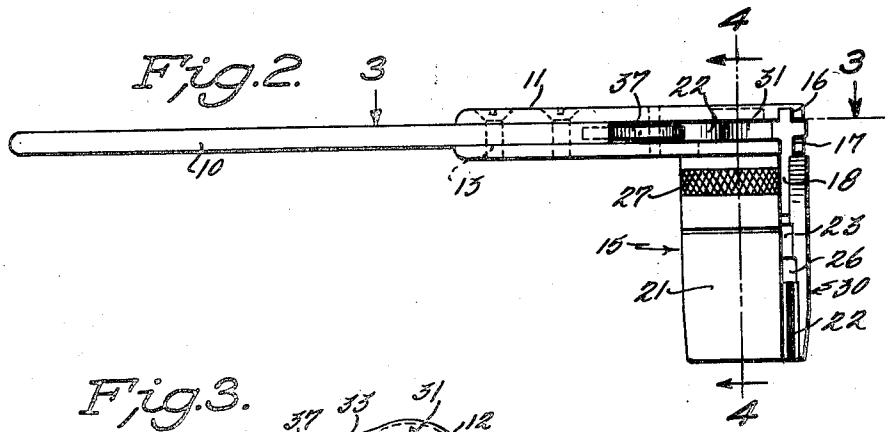


Fig. 3.

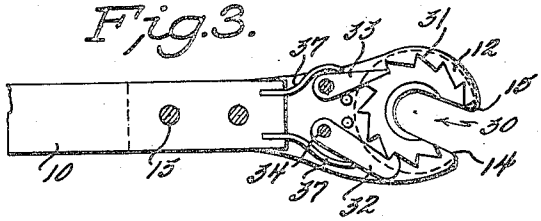


Fig. 4.

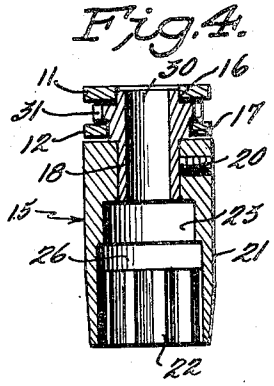


Fig. 5.

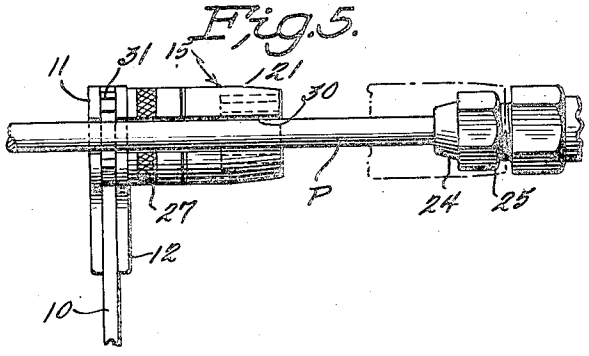
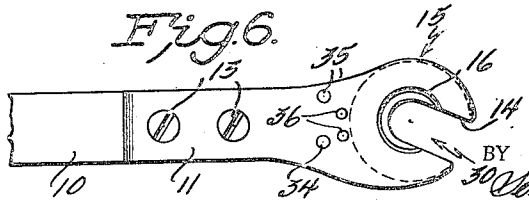


Fig. 6.



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Fig. 7.

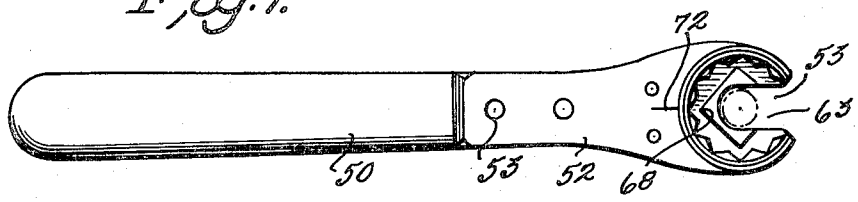


Fig. 8.

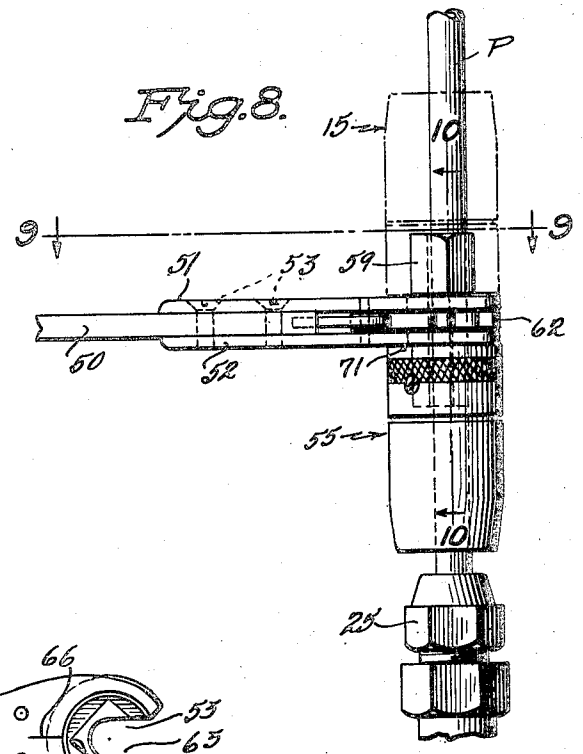


Fig. 10.

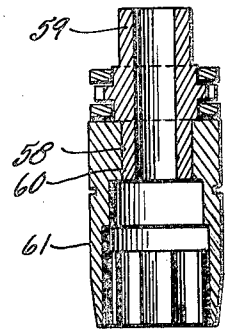
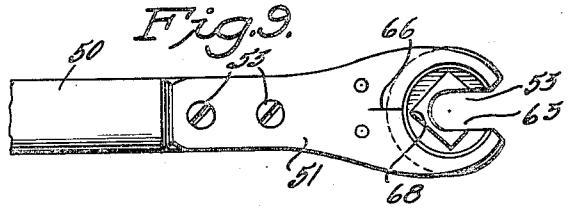


Fig. 9.



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OPEN END RATCHET WRENCH

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Original application April 27, 1945, Serial No. 590,577, now Patent No. 2,578,686, dated December 18, 1951. Divided and this application December 11, 1951, Serial No. 261,104

2 Claims. (Cl. 81—58.2)

This invention relates to wrenches and more particularly to open end ratchet wrenches of the socket type.

This application is a division of my parent application Serial No. 590,577, filed April 27, 1945, now Patent No. 2,578,686, December 18, 1951, entitled Split Ratchet Wrench.

Wrenches of this general type are known in the art and are usually characterized by a number of undesirable features which limit their utility. Among these features are a lack of compactness rendering them impractical in limited working spaces; a lack of reversability, an insufficiently rugged construction making them vulnerable to excessive spreading under heavy loads to which this type of wrench is often subjected; a general cumbersomeness in use rendering them unpopular with mechanics, and an unnecessarily high initial cost which prohibits sales success on the open highly competitive market.

Accordingly the chief object of the present invention is to provide a wrench construction which will obviate the foregoing disadvantages characterizing known structures.

One object of my invention is to provide split socket wrench means which may be used satisfactorily for turning a plurality of B nuts or the like each of a different size or shape from the others.

Another object of my invention is to provide an improved wrench with which B nuts or the like in a continuous pipe system can be quickly and satisfactorily revolved.

Other objects and advantages of my invention will appear as the description proceeds.

In the drawings:

Figure 1 is a side view of a ratchet wrench constructed according to one form my invention may take.

Figure 2 is a view taken at right angles to the plane of the ratch handle of Figure 1.

Figure 3 is a view of structure similar to that shown in Figure 1 being broken away in part to show certain details of construction more clearly as seen on lines 3—3 of Figure 2.

Figure 4 is a longitudinal sectional view of a slotted head element taken along the lines 4—4 of Figure 2.

Figure 5 is a side view of a wrench embodying my invention and illustrates how it may be placed in position on a pipe preparatory for lateral movement into engagement with a B nut.

Figure 6 is a partial side view of the structure of Figure 2 looking in the direction of the arrows on line 3—3.

Figure 7 is a side view of another form of ratchet wrench which embodies my invention.

Figure 8 is a partial side view of the wrench of Figure 7 illustrating it fastened on a pipe system ready to be moved laterally into engagement with a B nut.

Figure 9 is a partial side view of the Figure 7 wrench looking at the opposite side from the view of Figure 7.

Figure 10 is a longitudinal sectional view of the wrench structure of Figure 8 taken along the line 10—10.

Referring to the embodiment of my invention shown in Figure 1, 10 is a metal handle of a shape commonly used in similar wrenches. Fastened securely to each side of the handle 10 is jaw 11 and jaw 12. These jaws may be spaced apart the thickness of the handle or any distance desirable and fastened to the handle by screws 13 or other suitable fastening means. The outer end of each jaw is enlarged and is made with a slot or gap element 14. The inner portion of each slot 14 has the form of

a portion or segment of a circle. The width of the slot opening at the outer extremity of the circular portion is less than the diameter of the circular portion of the gap for an advantage presently to appear. 15 represents a generally a revoluble B nut-engaging unit having two journal elements 16 and 17 which are made to engage with a snug working fit in the circular portions of the slots 14 in the jaws 11 and 12 and are flush with the sides of the jaws. The journal elements 16 and 17 are integrally joined and spaced apart so as to engage with jaws 11 and 12 respectively. Integrally joined to the element 17 is an inner sleeve portion 18 extending downwardly as viewed in Figure 4. Fastened on the sleeve 18 by a screw 20 is a socket 21 which may have the approximate outer form of a cylinder. In the walls of this cylindrical member 21 are internal spline-like teeth 22 constructed for engagement with the B nuts for which the wrench is designed to be used. Between the teeth 22 and the sleeve 18 is provided a space 23 for receiving portions 24 of the B nuts extending beyond the usual nut body 25. A space 26 is provided between the inner ends of the teeth 22 and the space 23 to permit forming of the teeth. The inner end of the member 21 is made with a knurled portion 27 for conveniently rotating the unit 15 by the user's hand when such is desirable. The entire unit 15 functions as a ratchet driven socket.

To enable the unit 15 to be placed in position over a pipe P having a B nut connection with another pipe or part, a slot-like opening 30 is provided through the walls of the bearing elements 16 and 17 and the sleeve 18 and the cylindrical member 21. This opening is slightly wider than the diameter of the pipe P.

To revolve the unit 15 and the B nut 25 in engagement with it in one direction, an advantageous ratchet means may be provided as follows: Ratchet teeth 31 having a thickness to fit snugly between the jaws 11 and 12 are cut in the solid stock between the elements 16 and 17. The outside diameter of these teeth exceeds the diameter of the circular portion of the gaps 14. In the space between the jaws 11 and 12 and between the inner end (right end as viewed in Figure 3) there are mounted two spring pressed pawls 32 and 33 pivoted on strong pins 34 and 35, respectively, which extend between the jaws 11 and 12 and which also help to stiffen the jaws against sidewise motion under strain. The pawl 32 is made in the form of a drive or pull pawl and the pawl 33 is made as a dog or push pawl but both pawls serve as drive pawls. The ends of the pawls are positioned so that when the end of one of the pawls is disposed in the slot 30 the end of the other pawl is in engagement with the teeth 31 at some point and are effective to rotate the wrench unit 15. Pins 36 are positioned for stopping the pawls 32 and 33 in position for assembling the pawls and ratchet teeth. Wire springs 37 may be mounted as shown in Figure 3 to press the pawls into engagement with the teeth. The pins 36 also serve to prevent the springs 37 pressing either pawl down too far into the slot 14 when the latter is revolved past the end of either pawl.

It can be seen from inspection of Figures 1, 4 and 5 that the socket unit 15 is provided with a desirable bearing means which maintains it and its unit engaging teeth 22 in true parallel relation to a pipe P having a B nut 25 to be turned. This parallel relation is secured by constructing the sleeve 18 with an inside diameter for engaging snugly about the pipe with which it is to be used, and to have the sleeve extend from the nut engaging portion of the unit 15 to an integral juncture with the slotted ratchet element 31. Maintaining the teeth 22 in parallel relation to the faces and edges of the nut 25 while the latter is being turned is important since it reduces to an inappreciable amount any tendency for the teeth to become disposed at an angle to the faces and edges of the nut which if it occurred would probably result in the nut being "chewed up" i. e. roughened and marred, and also help make the socket 15 become disengaged from the nut.

In Figures 7, 8 and 9 another form my wrench may take is illustrated, which has certain desirable features presently to appear. On each side of a handle 50 two jaw members 51 and 52 are fastened by screws 53. The enlarged end head portion of the jaws 51 and 52 are sym-

metrical and their axes align with the long axis of the handle instead of being shaped as the jaws shown in Figure 1. Jaws **51** and **52** may have a slot **53** similar in construction and function to the slot **14** hereinabove. A nut engaging socket unit **55** may be driven by ratchet mechanism and this unit **55** and its ratchet mechanism may be the same in construction and function as similar parts **15** etc. of the above described form of my wrench except as is pointed out hereinafter.

The unit **55** is preferably made with sleeve member **58** which has one end portion **59** extending out a short distance from the jaw **51** (see Figures 8 and 10) instead of stopping flush with that jaw as in the construction shown in Figure 1. The end portion **59** and another like end portion **60** preferably have a square or hexagonal cross section in part instead of a round cross section. This square form affords several advantages. A nut engaging socket member **61** of the unit **55** can have a very strong connection with the stock of the ratchet teeth **62**. Also the protruding sleeve portion **59** can be used conveniently to revolve the unit **55** to bring a slot **63'** therein into alignment with the slot **54**. This may be convenient when, for example, the wrench is fastened on a continuous pipe system by these slots being out of alignment due to the use of the wrench for tightening up a B nut connection, and to use the wrench elsewhere it must be removed from engagement with the pipe system by having the slots in alignment. Also the square form of sleeve provides a compact means for turning the unit **55** slightly relative to the handle **50** for bringing teeth **62** in the socket into proper engagement with a B nut or the like while the wrench is being moved laterally into engagement with the B nut with the other hand of the user. Furthermore, by providing a mark **66** on the jaw **51**, this mark will cooperate with the middle edge **68** of the projecting sleeve portion **59** and thus indicate that the slots **54** and **60** are in alignment and the wrench may be removed from engagement with a continuous pipe system. To this same slot aligning indicating end, a line **71** on the member **61** may cooperate with a line **72** on the jaw **52**.

The ratchet wrench in Figure 8 may be moved along the pipe P to the right into engagement with a B nut **25**, or it may be turned over 180° around the long axis of the handle **50**, and with the unit **55** disposed as indicated in dot and dash outline the wrench may be removed to the left for engaging a B nut or the like, not shown. In this position one hand of the user may press the unit **55** against the nut while the fingers of the other hand turn the unit **55** slightly.

When the unit **15** or unit **55** is at the right of its respective handle, as viewed in Figures 2 and 8, a nut is turned, i. e. the wrench is operated by upward movement of the handle. When the units are at the left of their handles the wrench is operated by a downward movement of the handles.

It will be understood that the term continuous pipe system as used in the specification and claims of the present application is intended to mean a line of pipes and other parts associated with fluids which extend between and/or form a continuous conduit between any devices used with fluids, whether liquids or vapors. Furthermore, a pipe system having a stretch of considerable length between a B nut and part or connection or the like and an end unconnected to anything is in effect a substantial continuous pipe system as regards the difficulty of employing a usual ratchet wrench to turn B nuts or the like on the pipe system when such nuts are a long way from the open or unconnected end.

It can be seen that all forms of my wrench are fastened securely on a pipe system by their engagement with the nut and the movement of the slots in the nut-engaging members out of alignment with the slot in the wrench head, the movement of the slots being done first in many cases.

As is well known, the term Parker Fitting is sometimes applied to B nuts which as shown in Figures 5 and 8 are compression coupling members for joining soft metal tubing.

I claim:

1. An open end socket wrench for turning B nuts on a pipe, comprising: a split body including two transversely spaced, parallel plate sections, completely separated by a longitudinally extending recess, concentric circular apertures in respective sections, parallel lengthwise open slots in respective sections, connecting with said apertures, a socket driving member provided with spaced bearing portions coaxially journalled in respective apertures for rotation relative to said body, drive means on said body for rotating the socket driving member, a nut engaging socket member having a detachable non-rotary connection with the socket driving member coaxially therewith, said socket driving member and socket member each having a slot extending the length thereof and one aligned with the other, said last two slots aligning with the first named slot in one rotational position of the driving member, and all of said slots having a width approximately equal to the diameter of said pipe.

2. An open-end socket wrench as defiend in claim 1 wherein said socket driving member is formed with internal wall means defining a cylindrical passage coaxially extending through said member of a diameter substantially equal to the outer diameter of the pipe to which said B nut is mounted whereby, once said slots are aligned, said wrench may be laterally moved onto said pipe and then longitudinally of the same to engage said socket member with said B nut.

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