Feb. 15, 1944. W. G. LA PIERRE 2,341,564

WRENCH

Filed Dec. 9, 1941

Fig. 1

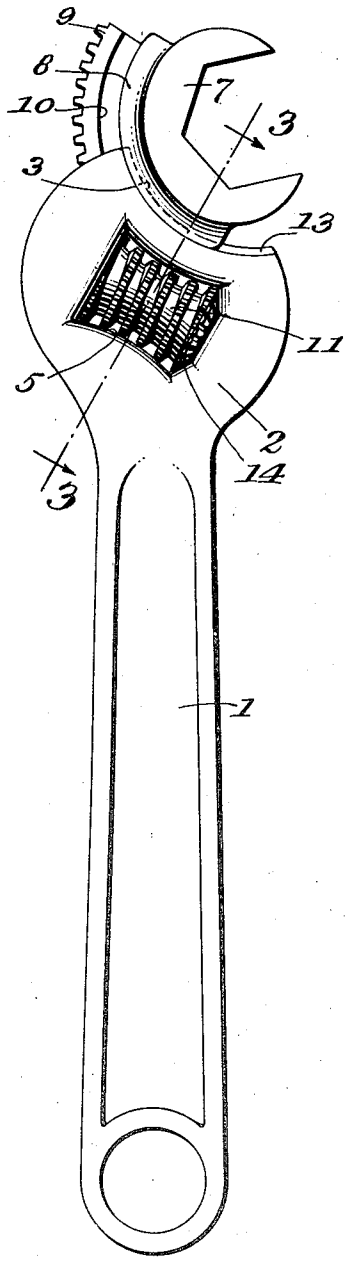


Fig. 2

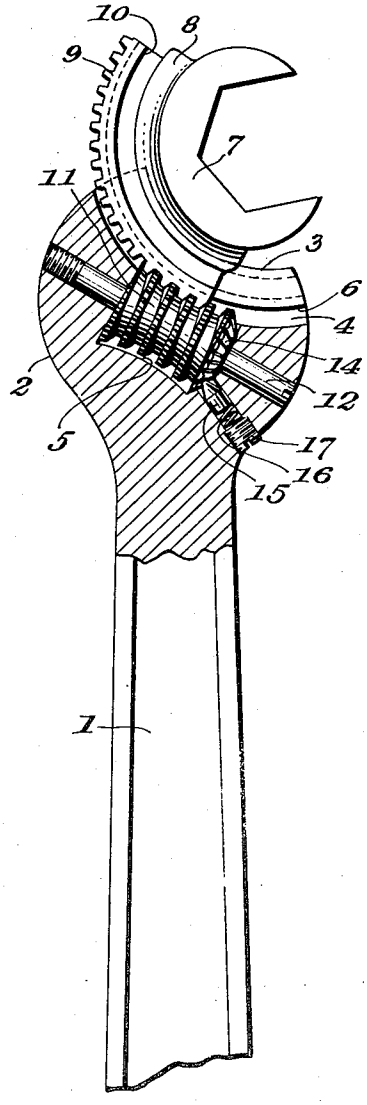
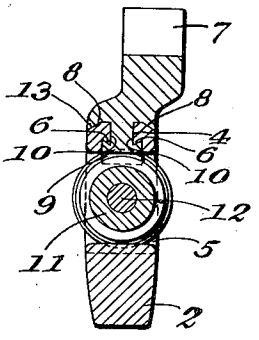


Fig. 3



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UNITED STATES PATENT OFFICE

2,341,564

WRENCH

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1 Claim. (Cl. 81—59)

My present invention relates to a novel wrench of the type in which the angle between the handle and the nut engaging head may be adjusted as desired.

In many instances, conventional wrenches cannot be used in the adjustment of a nut because its location is such that either the head of the wrench cannot be brought into engagement with the nut, or the space is too limited to permit the wrench to be moved sufficiently to bring the nut into a position wherein it may be re-engaged. Such circumstances are frequently encountered, particularly in the automotive, aircraft and marine industries, and present a real problem to the mechanic in assembly, installation or service work.

In accordance with my invention, I provide the nut engaging head with arcuate shoulders on each side of an arcuate rack also formed to provide arcuate shoulders. One end of the handle is formed with an arcuate slot to receive the rack and with arcuate shoulders to define with the head shoulders, bearings to retain the rack in the slot. The surfaces defining the bearings are so shaped that the strains developed by the use of wrenches in accordance with my invention are prevented from spreading the handle laterally of the slot.

I provide a worm to actuate the rack to effect the desired angular relationship between the handle and the head and in accordance with my invention, I employ a detent to hold the worm against accelerated rotation.

I am aware of the fact that adjustable angle wrenches have been proposed. These have been objectionable in that the walls defining the rack receiving slot were inadequate in strength and were not confined against spreading strains and the heads were not readily removed and replaced.

In the accompanying drawing I have shown an illustrative embodiment of my invention from which its novel features and advantages will be readily apparent. In the drawing:

Fig. 1 shows in plan view a wrench in accordance with my invention.

Fig. 2 is a fragmentary sectional view, partly in elevation, showing the construction of the surfaces defining the bearings by which spreading strains are eliminated, and

Fig. 3 is a section along the lines 3—3, of Fig. 1, showing the detent controlled adjusting worm.

At 1 I have shown a wrench handle having an enlarged end portion 2 terminating in arcuate shoulders 3 bordering the mouth of the arcuate slot 4 opening into the aperture 5. Interiorly of the slot 4 I provide second arcuate shoulders 6.

The nut engaging head 7 includes a pair of arcuate shoulders 8 and an arcuate rack portion 9 having arcuate shoulders 10. The head 7 may be of any desired type and heads may be easily changed as required by the bolt that requires adjusting.

The rack portion 9 is shaped to enter the slot 4 to bring its teeth into engagement with the worm 11 mounted in the aperture 5 on the shaft 12. When the head 7 and the handle 1 are thus assembled, the shoulders 3 and 8 define a first bearing and the shoulders 6 and 9 define a second bearing. The shoulders 3 and 8 are downwardly and outwardly inclined as at 13 and the shoulders 6 and 9 are upwardly and outwardly inclined as may be clearly seen in Fig. 2. By this construction, strains developed in use that would normally tend to spread the handle portions laterally of the slot 4 are eliminated.

The worm 11 is preferably concave in order that it and the rack portion 9 may have substantial interengaging surfaces and one end of the worm 11 is formed with serrations 14 engaged by the detent 15 resiliently backed by the spring 16 seated in the cap 17 threaded in the handle 1. The detent holds the worm 11 against accidental rotation ensuring the maintenance of the selected angularity of the wrench.

Wrenches in accordance with my invention are well adapted for use in adjusting nuts that are not readily accessible. The wrench is assembled with the correct head 7 and the worm 11 is rotated to establish the desired angular relation between the head 7 and the handle 1, or such angular adjustments are made after the wrench has been moved as far as possible to permit the nut to be re-engaged.

What I therefore claim and desire to secure by Letters Patent is:

In a wrench, a handle and a nut engaging head, said head including a pair of spaced arcuate bearing shoulders having transversely alined portions and oppositely inclined marginal portions and an arcuate rack portion intermediate said shoulders and including a pair of arcuate bearing shoulders inclined oppositely to the inclined portions of said first named bearing shoulders, the outer ends of the adjacent inclined portions on each side of the head being closer together than the inner ends of the corresponding portions to form restricted channels at each side of the head, and one end of said handle having an arcuate slot to receive said rack portion and to define a pair of walls, said walls being shaped to establish bearing shoulders complemental in shape to said first and second named bearing shoulders, and means carried by the handle to engage said rack portion to hold the said head in adjusted positions.

WILLIAM G. LA PIERRE.