Dec. 14, 1954 G. E. RELKEN 2,696,748

RATCHET WRENCH

Filed Feb. 2, 1954

FIG. 1.

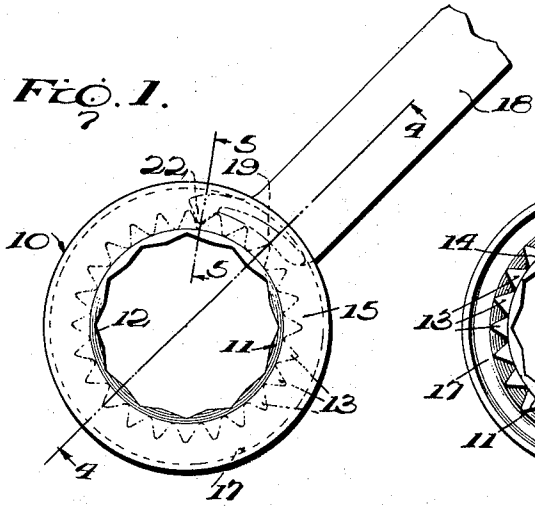


FIG. 2.

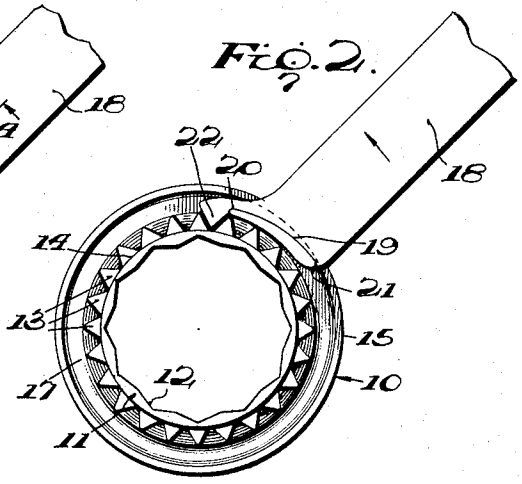


FIG. 3.

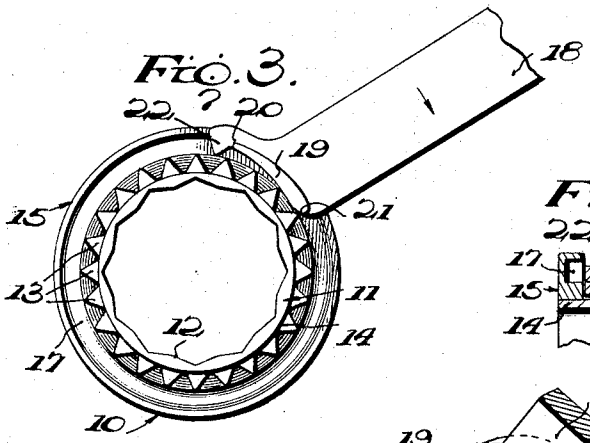
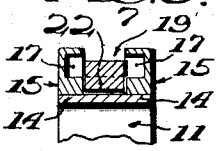


FIG. 5.



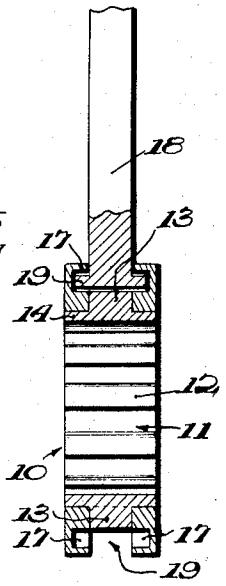
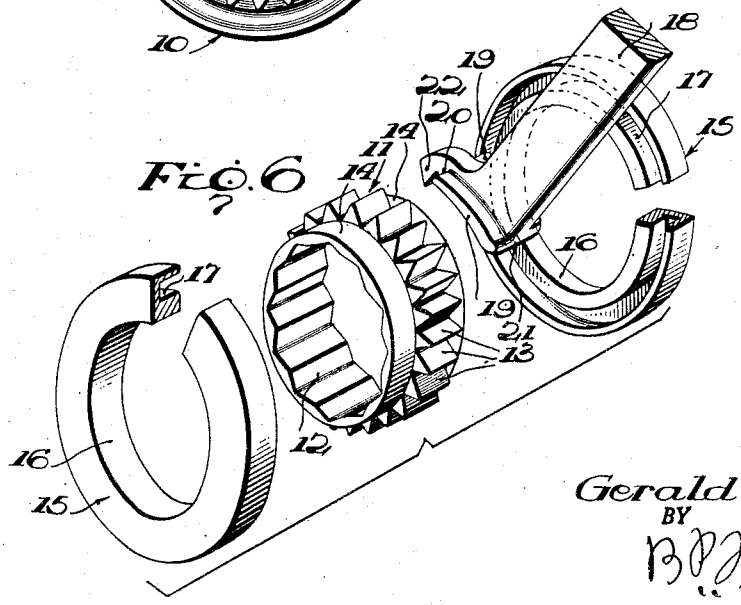


FIG. 4.

FIG. 6.



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RATCHET WRENCH

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2 Claims. (Cl. 81—61)

My invention relates to wrenches, and more particularly to a simplified wrench of the ratchet type.

A primary object of the invention is to provide a ratchet type wrench embodying a minimum number of simplified parts which are sturdy and durable, and assembled in a compact manner.

A further object of the invention is to provide a ratchet wrench having a novel mode of assembly and operation, and embodying no springs, spring pressed balls, pivoted pawls, or the like, the wrench embodying only a single movable part in assembly, directly carried by the operating handle, and adapted to coact with the ratchet teeth in the body portion of the wrench.

A further object is to provide a wrench of the above-mentioned character which is positive and reliable in operation, easy to use, and relatively inexpensive to manufacture.

Still another object is to provide a ratchet type wrench wherein the operated handle is movable circumferentially of the wrench body portion, and the tooth engaging pawl carried by the handle is shiftable into and out of engagement with the ratchet teeth, by a mere rocking action of the handle.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of a wrench embodying my invention, part broken away,

Figure 2 is a further side elevation of the wrench with a side section removed to show the internal structure of the wrench,

Figure 3 is a further side elevation similar to Figure 2, but showing a different operative position of the wrench handle and associated elements,

Figure 4 is a diagonal section taken on line 4—4 of Figure 1,

Figure 5 is a fragmentary radial section taken on line 5—5 of Figure 1, and,

Figure 6 is an exploded perspective view of the wrench, parts broken away, and parts in section.

In the drawings, where for the purpose of illustration is shown a preferred embodiment of my invention, the numeral **10** designates generally a wrench head or body portion. The wrench head **10** comprises a central annular ratchet member **11** having a central axial opening **12** extending therethrough, and ribbed or fluted, as shown, for engagement with the heads of bolts, hexagon nuts, and the like. The ratchet member **11** is provided upon its periphery with a series of circumferentially equidistantly spaced tapered or V-shaped ratchet teeth **13**, integral therewith. Cylindrical sleeve extensions **14** extend equidistantly beyond the opposite sides of the ratchet teeth **13**, as shown, and have their peripheries in alignment with the bottoms of the ratchet teeth. The ratchet member **11** is of unitary integral construction, as shown.

A pair of annular guide rings **15** of identical construction are arranged upon opposite sides of the teeth **13**, and have their bores **16** receiving the cylindrical sleeve extensions **14** therein. The axial widths of the rings **15** are preferably equal to the widths of the sleeve extensions **14**, as best shown in Figure 4. The guide rings **15** are provided in their inner opposed sides with annular grooves **17**, having their innermost circumferential walls in lateral alignment with the tops or outer edges of the teeth **13**. The outer circumferential walls of the grooves **17** are

spaced radially beyond the tops of the teeth **13**, as shown.

A circumferentially movable handle **18** of any desired length is provided, and this handle **18** is adapted to extend radially of the ratchet member **11** and rings **15**, in assembly, projecting through the annular slot or space **17** between the guide rings **15**. The handle **18** is provided at its inner end with generally transverse curved lugs or shoes **19**, formed integral therewith, and projecting equidistantly laterally beyond the opposite sides of the handle **18**. The shoes **19** are elongated circumferentially of the grooves **17**, and disposed within the grooves **17** for circumferential and limited radial movement therein. The curvature of the shoes **19** is such, that they are substantially concentric with the inner and outer annular walls of the grooves **17**, although the shoes may taper slightly toward their leading ends **20**, as shown. The shoes **19** are radially narrower than the grooves **17**, so that they may shift radially inwardly and outwardly when rocked about the rounded heel **21** of the handle **18**. The leading ends **20** of the shoes **19** project somewhat forwardly of the forward side of the handle **18**, as shown, and the widths of the shoes **19** are such that their outer sides are close to the outer sides of the grooves **17** in assembly, Figure 4.

A V-shaped dog or pawl **22** is integrally secured to the leading ends of the shoes **20**, and is preferably of the same width as the handle **18**, as shown. The pawl **22** is of the same width as the ratchet teeth **13**, and adapted to engage between or intermesh with adjacent pairs of the ratchet teeth, in the manner shown in the drawings. The pawl **22** is disposed bodily forwardly of the curved shoes **19** and handle **18**, and projects inwardly radially of the shoes **19**, as shown. The pawl **22** is movable radially and circumferentially within the annular passage **17**, between the rings **15**.

In operation, the work such as a nut or bolt head is received by the ribbed opening **12** of the ratchet member **11**. The pawl **22** or dog is disengaged from the ratchet teeth **13**, by rocking the handle **18** clockwise, Figure 3, about the heel **21**. The heel **21**, and in fact, the shoes **19**, in their entireties ride upon the inner circumferential walls of the annular grooves **17**, upon which walls the above described rocking action takes place. With the pawl **22** thus disengaged from the ratchet teeth **13**, the handle **18** may be adjusted circumferentially of the head **10**, in either direction, to the selected adjusted position, since the shoes **19** are freely slidable within the grooves **17**, and the handle and pawl **22** may move within the passage **17**. In practice, assuming that a nut or the like is being loosened in Figures 2 and 3, the handle **18** will be adjusted circumferentially of the wrench head **10** in the clockwise direction, after each untightening stroke or turn of the handle **18** in the counterclockwise direction.

When the handle **18** is rocked about the heel **21** in the counterclockwise direction, after each circumferential adjustment of the handle, the pawl **22** will reengage between another adjacent pair of ratchet teeth **13**, and when the handle **18** is now swung in the counterclockwise direction, Figure 2, the nut or like work will be turned in the counterclockwise direction. The upper sides of the feet **19** react against the outer circumferential walls of the grooves **17**, when the handle **18** is swung counterclockwise, Figure 2, with the pawl **22** in engagement with the ratchet teeth. The clockwise rocking action of the handle **18** about its heel **21**, Figure 3, is limited by the engagement of the shoes **19** with the outer circumferential walls of the grooves **17**.

Wrenching action in the opposite or clockwise direction, for tightening screw threaded work, and the like, is achieved by merely turning the wrench over, and repeating the above described operations.

It is thus seen, that I have provided a freely adjustable ratchet type wrench, without the use of springs, separate pivoted pawls, or other complex moving parts. In my wrench, the only relatively movable parts in the assembled device are the handle **18** and wrench head **10**. The structure of the wrench is highly compact and the wrench is very easy to operate. It is neat and attractive in appearance and may be made in any desired standard sizes.

In assembling the four separate elements which make up my wrench, I prefer to heat the guide rings **15** to expand the same slightly, and chill the annular ratchet mem-

ber 11. The rings 15 are now slipped onto the sleeve extensions 14, while the shoes 19 of the handle 18 are positioned to enter the grooves 17. When the parts cool, the rings 15 will be tightly secured to the sleeve extensions 14, and the handle 18 will be permanently assembled to the other parts of the wrench. I do not contemplate taking the wrench apart, once it is assembled during manufacturing, but this could be accomplished if necessary.

It is to be understood that the form of the invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or scope of the subjoined claims.

Having thus described my invention, I claim:

1. A wrench comprising, an annular ratchet member having an opening to receive a nut or the like and provided upon its periphery with a set of teeth, rings carried by the ratchet member and disposed upon opposite sides of the set of teeth, the rings being spaced to form an outer annular passage exteriorly of the teeth, one ring having an annular groove upon its inner face, the annular groove having an inner wall arranged near the free ends of the teeth and an outer wall spaced from such free ends, a handle extending into the outer annular passage between the rings, an elongated shoe rigidly secured to the handle and extending circumferentially within said groove, said shoe tapering in one direction, the shoe extending transversely of the handle, the reduced end of the shoe being radially smaller than the radial dimension of the groove, a pawl rigidly secured to the handle and arranged near the reduced end of the shoe, the pawl being spaced circumferentially from the handle, the handle terminating substantially at the shoe.

2. A wrench comprising, an annular ratchet member

having an opening to receive a nut or the like and provided upon its periphery with a set of teeth, rings carried by the ratchet member and disposed upon opposite sides of the set of teeth, the rings being spaced to form an outer annular passage exteriorly of the teeth, said rings being provided with annular grooves upon their inner faces, the annular grooves having their inner walls arranged near the free ends of the teeth and their outer walls spaced from such free ends, a handle extending into the outer annular passage between the rings, elongated shoes arranged upon opposite sides of the handle and secured thereto and extending circumferentially within said grooves, said shoes tapering in one direction, the shoes extending transversely of the handle, the reduced ends of the shoes being radially smaller than the radial dimension of said grooves, a pawl rigidly secured to the handle and arranged near the reduced ends of the shoes, the pawl being spaced circumferentially from the handle, the handle being free from extensions which surround the annular ratchet member.

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