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R. H. GRAY

3,255,647

RATCHET TOOL

Filed Oct. 14, 1963

FIG. 1

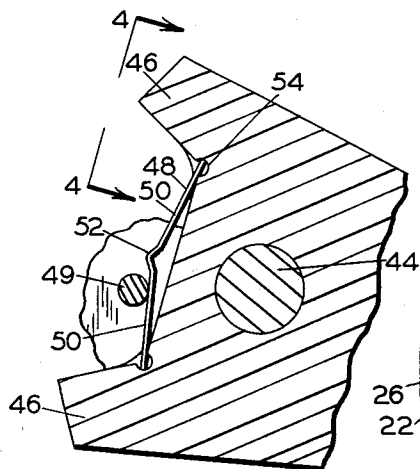
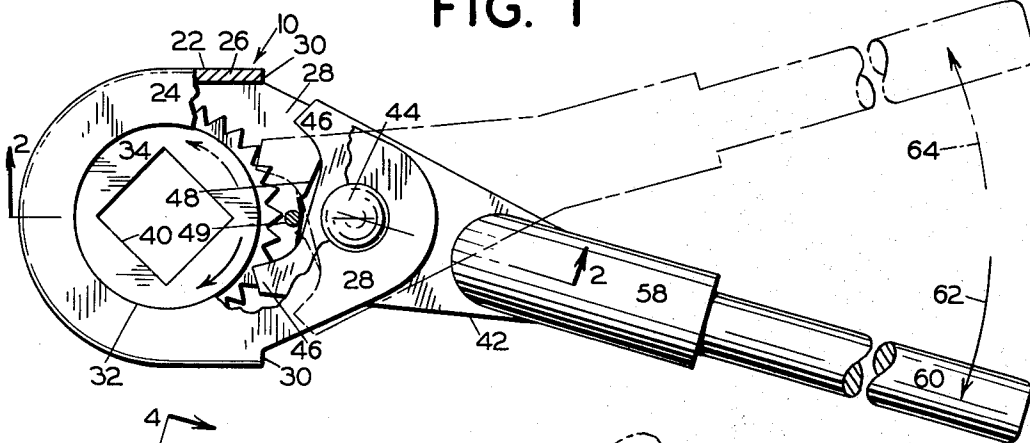


FIG. 3

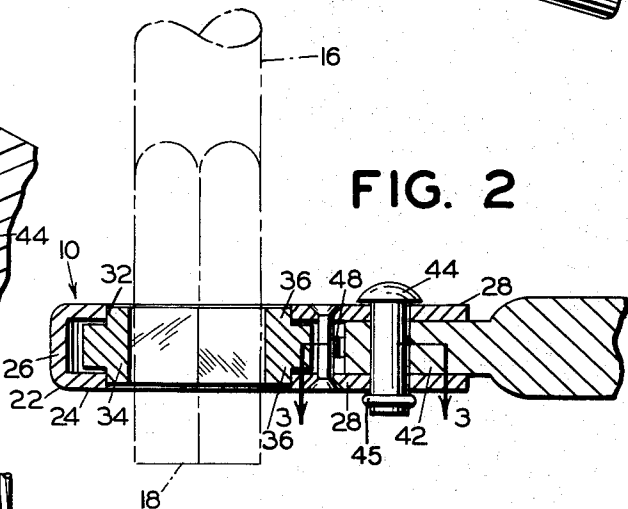


FIG. 2

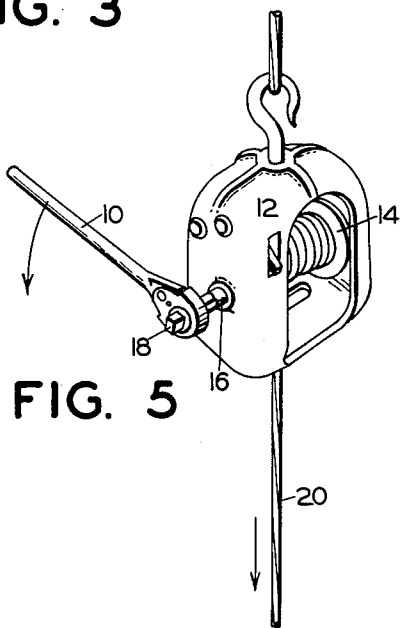


FIG. 5

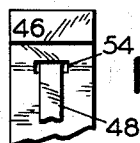


FIG. 4

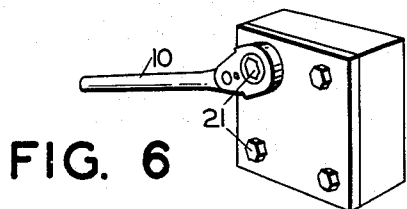


FIG. 6

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3,255,647

RATCHET TOOL

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2 Claims. (Cl. 81-63.1)

This invention relates to new and useful improvements in ratchet tools for applying torque to a member to be rotated.

A primary objective of the present invention is to provide a ratchet tool having a novel association of housing, ratchet wheel, and reverse control means, said combination of elements being arranged to provide for the convenient application of torque to a member to be rotated in the direction desired.

Another object is to provide a ratchet tool operative to apply torque to a winding shaft in the desired direction regardless of the position in which the tool is applied to the shaft and which by visible inspection of the tool it is apparent what direction the tool is set to ratchet.

Still another object is to provide a ratchet tool which is simplified in its construction and operation and economical to manufacture.

Briefly stated, the invention resides in a housing in which is incorporated a rotatable ratchet wheel having a winding shaft receiving aperture extending therethrough. Pivotaly mounted on the housing is an operating handle having at its forward end a pair of symmetrically arranged integral pawls adapted for engagement, one at a time, with the ratchet wheel. The operating handle is used to rotate the ratchet wheel in the desired direction and may be reversed to change the direction of rotation. Control of the operating handle in either forward or reverse directions is accomplished by a spring and latch post therefor whereby to permit rotation of the winding shaft in the desired direction.

The invention will be better understood and additional objects will become apparent from the following specification and claims, considered together with the accompanying drawings, wherein the numerals of reference indicate like parts and wherein:

FIGURE 1 is a side elevational view of the ratchet tool of the present invention, with parts being broken away for clarity, and showing in phantom lines a reversed position thereof;

FIGURE 2 is a sectional view taken on the line 2-2 of FIGURE 1;

FIGURE 3 is an enlarged fragmentary sectional view taken on the line 3-3 of FIGURE 2;

FIGURE 4 is a fragmentary edge view of the inner end of the operating handle and showing particularly means for mounting the ratchet control spring, taken on the line 4-4 of FIGURE 3;

FIGURE 5 is a perspective view in reduced scale showing one application of the present ratchet tool; and

FIGURE 6 is a perspective view in reduced scale showing another application of the present tool.

Referring now in particular to the drawings, the present ratchet tool is designated generally by the numeral 10. This tool is particularly applicable for operating a conventional winch 12 such as shown in FIGURE 5. This type of winch employs a winding drum 14 on a winding shaft 16 projecting from one end of the housing and terminating at its projecting end in a square or other non-circular portion 18. The purpose of the ratchet handle 10 is to apply a torque to the winding shaft 16 for winding a cable 20 on the drum 14, the winch 12 having a ratchet mechanism, not shown, interiorly of its housing arranged to permit winding in one direction only.

The tool may also be used as a conventional ratchet or socket wrench. Such use is exemplified in FIGURE 6

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wherein it is shown in engagement with a nut 21 for installing or removing the same.

Ratchet tool 10 comprises a housing 22 having a pair of side walls 24 interconnected integrally in spaced parallel relation by an edge wall 26.

The side walls 24 have rear extensions 28 projecting beyond end 30 of the edge wall 26. Since the edge wall 26 terminates short of the rear limit of the housing it is apparent that the rearward end of said housing is open.

Housing 22 is provided with round apertures 32 in its side walls 24. Rotatably mounted within the housing is a ratchet wheel 34 provided with round face projections 36 having journaled engagement in apertures 32 of the housing. Thus the housing 22 and ratchet wheel 34 are relatively rotatable.

Ratchet wheel 34 is provided with a square or otherwise non-circular aperture 40 conforming substantially to the shape and size of the non-circular shaft section 18 wherein when the present tool is mounted on the shaft portion 18, the shaft 16 and ratchet wheel have unitary rotation. Of course the aperture 40 may assume a different shape, as apparent in FIGURE 6, to accommodate a desired usage.

Projecting into the rearward opening of the housing is an operating handle 42. This handle is pivotally attached to said housing by a pin 44 extending between the housing extensions 28. This pin is held in place by a retaining ring 45 which facilitates removal of the handle 42 from the housing if necessary. The forward end of operating handle 42 terminates in a pair of pawls 46 symmetrically arranged thereon and adapted for engagement, one at a time, with the ratchet wheel 34. Thus by rotating the operating handle in one direction, one of the pawls 46 engages the teeth of the ratchet wheel to rotate the shaft in one direction and by rotating the operating handle in the other direction, the other pawl will engage the teeth of the ratchet wheel to rotate the shaft in the other direction.

The operation of the pawls on the ratchet wheel in the direction desired, or in other words the ratcheting function of the present tool, is controlled by a reversing or pivot control mechanism comprising a detent spring 48 and a latch post or pin 49. Referring particularly to FIGURES 2 and 3, the spring 48 is a leaf spring having a pair of angularly disposed legs 50 meeting centrally in an auxiliary peak 52 the sides of which are angled relative to the legs 50 to form an over-center latch. The spring 48 is seated in notches or recesses 54 in the operating handle at the base of the pawls 54.

The latch post 49 is mounted between rearward extensions 28 and cooperates with the spring 48 to position the operating handle in one of two ratcheting positions, said spring 48 and post 49 permitting a quick and easy change of ratcheting direction. This change in ratcheting direction is accomplished by a slight rotation of the operating handle relative to the housing, and is accomplished by a rotation sufficient to move the peak 52 to the other side of the post 49. In the construction of the present ratchet tool, the operating handle thus assumes two different angular positions relative to the housing depending upon the direction of ratcheting. The angular disposition of the operating handle relative to the housing in the different positions of ratcheting is sufficiently great that it can be readily determined, merely by looking at the tool, in what direction it will ratchet.

Operating handle 42 has a socket 58 for the removable reception of an extension bar 60 for increasing the leverage of the tool.

In operation of the present ratchet tool, it is moved into engagement with the element to be turned wherein aperture 40 in the ratchet wheel engages a shaft 16, a nut 21, or other element which may be turned by a ratchet movement. The operating handle will be in either one ratchet-

ing position or the other when it is installed, and if it is in the proper position, rotation thereof can be immediately started. If the operating handle, however, is set in the opposite or reverse position than desired it is changed to its other position merely by rotating it relative to the housing sufficient to snap the peak 52 of spring 48 to the other side of post 49. This then permits ratcheting in the desired direction. The two ratcheting positions of the operating handle are shown in full and broken lines in FIGURE 1, and the operative directions of rotation in such positions are shown by full and broken arrows 62 and 64, respectively.

It is thus apparent that the tool may be applied to a shaft with either side facing the shaft. From a visible inspection of the operating handle relative to the housing, to determine the angular disposition of these parts it can be readily determined in which direction the tool is set to ratchet.

The spring 48 in its construction and arrangement with the post 49 is such that it will accomplish efficient ratcheting rotation of the ratchet wheel 34. That is, after rotating the ratchet wheel through a portion of a revolution the spring is arranged such that upon returning the handle for picking up a following tooth on the ratchet wheel the spring will not allow reversal of the handle in such returning movement but causes the housing to rotate with said handle. Thus a force with which the spring 48 requires reversal in ratcheting direction is greater than the force required to rotate the housing relative to the ratchet wheel.

In addition to the features enumerated above it is also apparent that the present device does not utilize an operator-controlled reversing lever but accomplishes a reversing function by a simplified and efficiently functioning arrangement wherein the operating handle is snapped rotatably into a desired position.

It is to be understood that the form of my invention herein 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 my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A ratchet tool comprising a housing, a ratchet wheel rotatably mounted in said housing and having means for engaging an element to be rotated in ratchet drive, an operating handle having forward and rearward ends, means adjacent the forward end of said handle pivotally attaching the latter to said housing, a pair of pawls integral with the forward end of said handle and arranged

for driving engagement one at a time with said ratchet wheel to drive the latter in opposite directions, a detent spring mounted on the forward end of said handle, and a stationary latch post on said housing, said latch post being engageable by said spring and operative with said spring for establishing a pair of over-center positions of said spring, one of said over-center positions of the spring serving to hold said handle for pawl-driving engagement with said ratchet wheel in one direction and the other of said over-center positions of the spring serving to hold said handle for pawl-driving engagement with said ratchet wheel in the other direction.

2. A ratchet tool comprising a housing, a ratchet wheel rotatably mounted in said housing and having means for engaging an element to be rotated in ratchet drive, an operating handle having forward and rearward ends, means adjacent the forward end of said handle pivotally attaching the latter to said housing, a pair of pawls integral with the forward end of said handle in spaced relation and arranged for driving engagement one at a time with said ratchet wheel to drive the latter in opposite directions, a leaf spring mounted on the forward end of said handle between said pawls, a projection on said spring intermediate the ends thereof, and a stationary latch post on said housing, said latch post being engageable by said spring and operative with said projection for establishing a pair of over-center positions of said spring, one of said over-center positions of the spring serving to hold said handle for pawl-driving engagement with said ratchet wheel in one direction and the other of said over-center positions of the spring serving to hold said handle for pawl-driving engagement with said ratchet wheel in the other direction.

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