May 21, 1940. A. P. STONE 2,201,705

RATCHET WRENCH

Filed July 19, 1938

FIG. 1

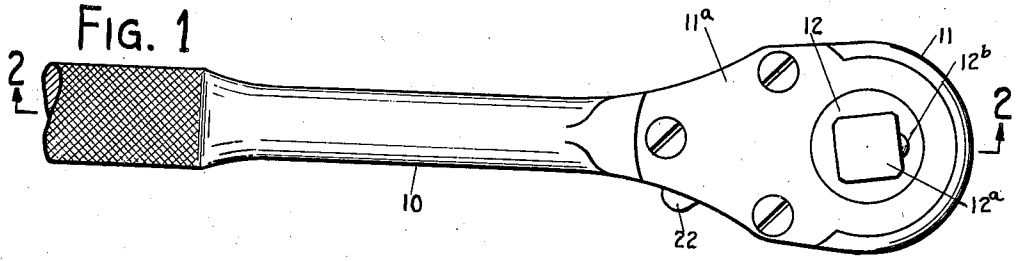


FIG. 2

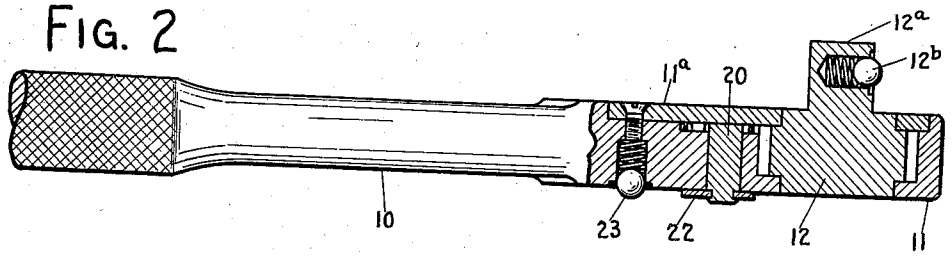


FIG. 3

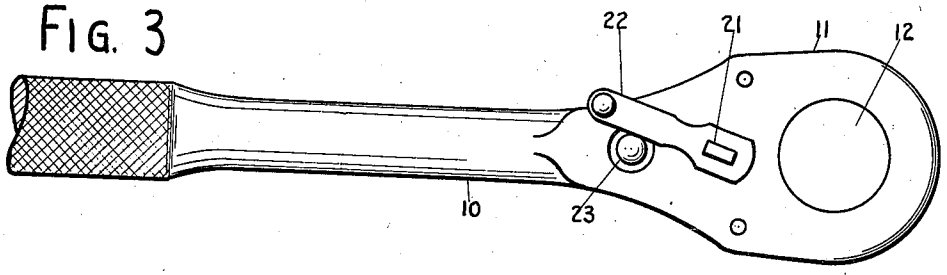
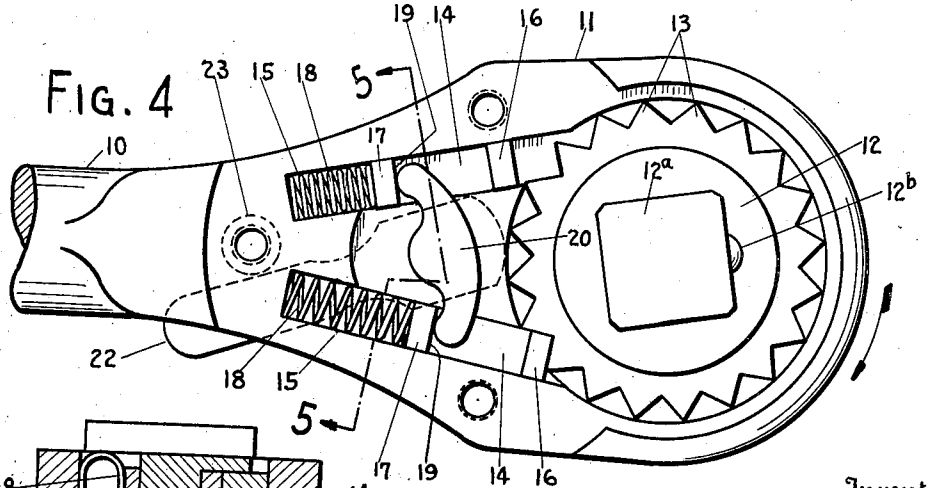


FIG. 4



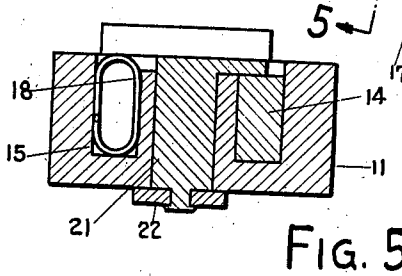


FIG. 5

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RATCHET WRENCH

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Application July 19, 1938, Serial No. 220,016

1 Claim. (Cl. 192—43.2)

This invention relates to ratchet wrenches.

The general purpose of the invention is to provide an improved wrench device of this type with reversible ratchet action.

A further purpose of the invention is to provide an improved wrench of this type in which the wrench can be set for ordinary use without utilizing the ratchet action.

The foregoing and other purposes or objects of the invention are attained in the ratchet wrench illustrated in the accompanying drawing and described below.

Of the accompanying drawing:

Figure 1 is a plan view of the head end of a ratchet wrench device embodying the invention for use with a socket type wrench.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is an inverted plan view of the wrench device.

Figure 4 is an enlarged plan view of the wrench head with cover plate removed.

Figure 5 is a section on line 5—5 of Figure 4.

Referring to the drawing, the wrench device may have any suitable handle 10 on which is a wrench-engaging head 11. Rotatably mounted in the head 11 is the operative element of the ratcheting device which may, as shown, be designed for use with a socket wrench. It will be understood, however, that the wrench device may be formed in any other suitable way with male or female engaging members. The male member of the particular socket wrench operating device shown is indicated at 12a and may be square, as shown, or of other polygonal shape and may have a spring-pressed ball 12b therein of a known type for gripping the side of a socket of the wrench with which it is engaged. The rotatable wrench element 12 is formed with teeth 13, 13 about its periphery, which teeth are preferably triangular shaped, as shown, so that a large number of strong ratchet teeth may be provided in adjoining relation about the rotary ratchet member providing effective ratcheting action when the wrench device is used in closely confined spaces. Arranged to engage with teeth 13 are pawls 14, 14, which are arranged in slots 15, 15 in the wrench-engaging head, preferably directed at such angles diverging outwardly toward the ratchet member 12 that the ends of the pawls 14, which are preferably squared with the sides of the pawls, as indicated at 16, 16 will snugly fit in the triangular spaces between teeth 13 in the rotary member 12, the slots or grooves 15 being open at the ends thereof adjacent the rotary ratcheting element 12, permitting movement of the pawls 14 through said ends into engagement with the teeth 13 of the rotary member as shown in Figure 4. The rear ends of the pawl members 14, as shown at 17, 17, may be engaged with compression spring 18, 18 set in the grooves or slots 15 (see Figure 5). The springs 18 serve normally to urge the pawls 14 into engagement with the teeth 13 of the rotary ratchet member 12.

As shown in Figure 4, the pawls are so set that the ratcheting action is in the direction of the arrow. Means are provided for holding one pawl 14 or the other out of engagement with ratchet wheel or rotary ratchet member 12 in the manner shown whereby a reversible ratcheting action can be secured. For this purpose the pawls 14 are formed with shoulders at 19, 19 with which engages a cam 20 formed or secured on shaft 21 journalled in the head 11 and to which is secured an operating handle 22 at the back of the wrench operating device. One end of cam 20 is designed to engage with one shoulder 19 of one pawl 14 and the other end of cam 20 is designed to engage with the corresponding shoulder 19 of the other pawl 14, as clearly appears in Figure 4. When the handle 22 is set to one side of the center of the device, as shown in Figures 3 and 4, one pawl 14, as shown, is held out of engagement with the ratchet wheel, the other being permitted to engage. The handle 22 is designed to be swung to an opposite angular position away from the center line of the device at which it will be obvious that the cam 20 is designed to depress the other pawl 14 and to permit the first pawl 14 to move into engagement with the ratchet member 12, thereby reversing the ratcheting action.

Arranged centrally of the device is suitable means for holding the handle 22 in an intermediate position in which both pawls 14 are permitted to contact with the ratch teeth 13. To this end the device is provided at 23 with a spring-pressed ball centrally arranged to engage the under side of lever 22 to hold the lever 22 in a central position in which the ratchet mechanism will be locked so that the wrench-engaging element 12 will in effect be in fixed relation with the head permitting use of the wrench in the usual manner of a non-ratcheting wrench.

The pawls 14 and associated parts may be retained in slots 15 by a cover-plate 11a secured on the head as shown. The construction provides a reversible ratcheting wrench adapted for effective use under modern conditions and where the wrench is frequently used in small and confin-

ing places where the ratcheting action is necessarily limited in amplitude. The construction permits the use of a large number of comparatively small but strong teeth which give effective ratcheting action without slippage or breakage. Also the wrench may be effectively locked for use as a non-ratcheting wrench in the usual way. The provision of the outwardly diverging pawls 14 to cooperate with the triangular teeth 13 makes possible the use of a relatively large ratchet wheel with closely spaced strong triangular teeth.

Modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claim. It will be understood the invention may be embodied in a wrench-operating device or handle, as shown, or directly in a wrench structure.

What is claimed is:

A wrench of the character described comprising a wrench-operating head housing therein a rotatable ratchet wheel, said wheel being provided with a plurality of closely spaced triangular teeth, said head having therein slots extending toward said wheel in outwardly diverging direction, the inner ends of said slots being closed and the outer ends thereof opening into the housing for said wheel, pawls slidably fitted into said slots whereby the outer ends thereof may move through the open ends of said slots into engagement with said ratchet wheel, the ends of said pawls being squared to provide triangular portions projecting into said housing to engage the teeth of said ratchet wheel, said slots and said pawls being of polygonal or non-circular cross-section whereby the pawls slide without rotation in said slots, yielding means between the closed ends of said slots and said pawls for normally urging said pawls into engagement with said ratchet wheel and means for controlling engagement of said pawls with said ratchet wheel, said controlling means comprising a single cam rotatably mounted on said head in a position between said slots intermediate the ends thereof and having portions overlying said pawls above said slots, said pawls having shoulders thereon arranged to be engaged by the overlying portions of said cam whereby either pawl may be urged and locked out of engagement with said ratchet wheel or both may be released by the cam for simultaneous engagement of the ratchet wheel, the outer walls of said slots supporting the pawls throughout their entire lengths when subjected to pressure of the ratchet wheel on the projecting triangular portions of the pawls.

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