

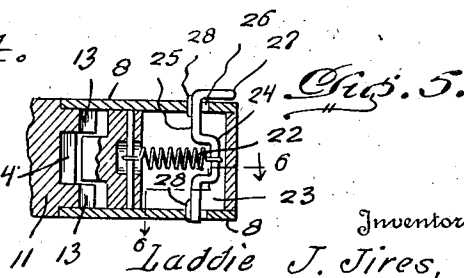
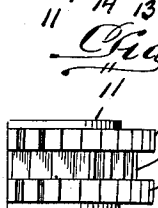
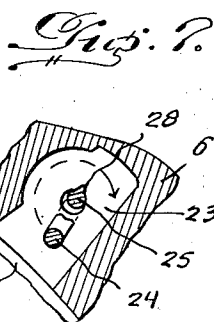
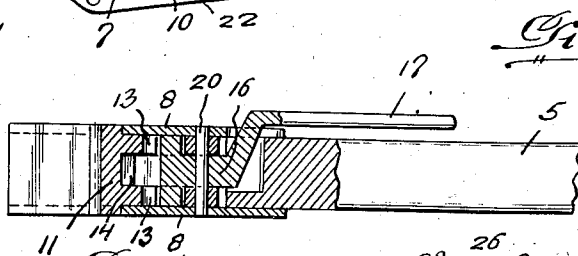
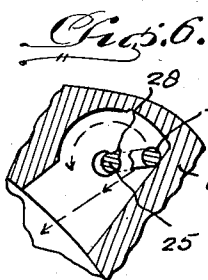
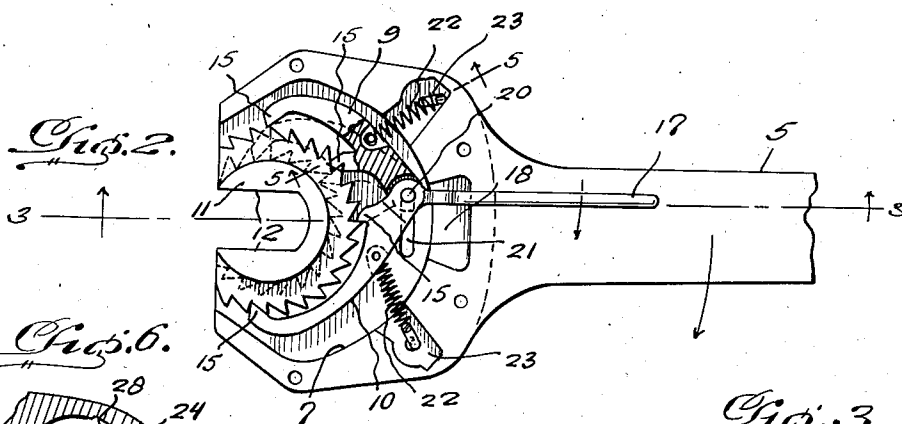
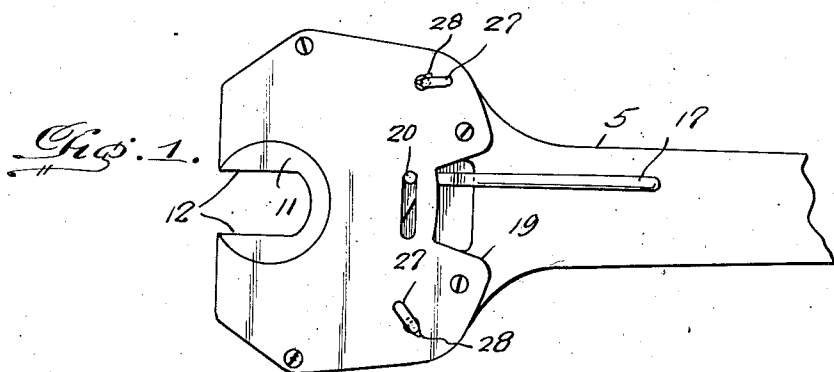
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WRENCH

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WRENCH

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3 Claims. (Cl. 81-62)

This invention relates to an open end wrench of the type including rigid opposed jaws to engage with work and with a firm grip thereon, and has for the primary object the provision of a device of this character which will operate on a ratchet principle to permit the work, such as nuts or bolts located in close places to be easily turned in either direction with a very short throw or movement of the handle and with a minimum amount of effort on the part of the person employing the device.

With these and other objects in view as will become more apparent as the description proceeds, the invention consists in certain novel features of construction, combination and arrangement of parts as will be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawing, in which

Figure 1 is a fragmentary side elevation illustrating a wrench constructed in accordance with my invention.

Figure 2 is a view similar to Figure 1 showing one of the cover plates of the head of the wrench removed.

Figure 3 is a sectional view taken on the line 3-3 of Figure 2.

Figure 4 is a side elevation illustrating the jaw member and the ratchet teeth thereon.

Figure 5 is a detail sectional view taken on the line 5-5 of Figure 2.

Figure 6 is a detail sectional view taken on the line 6-6 of Figure 5.

Figure 7 is a view similar to Figure 6 showing one of the dog spring operating shafts located for placing the spring under pressure or to cause said spring to act with a pressure creating action.

Referring in detail to the drawing, the numeral 5 indicates a handle which may be of any desired length and has integral therewith a head 6 provided with a recess 7 coaxing with cover plates 8 removably secured to opposite faces of the head in forming a chamber for the accommodation of dogs 9 and 10 and a jaw member 11.

The jaw member 11 is in the form of a semi-annular body bifurcated to provide opposed work-engaging faces 12. The semi-annular body has formed on its outer periphery rows of ratchet teeth 13 and 14. The ratchet teeth 13 are reversely arranged to the ratchet teeth 14 and the free ends of the ratchet teeth 14 are arranged inwardly of the free ends of the ratchet teeth 13. Also it is to be noted that the row of ratchet

teeth 14 is arranged between the rows of ratchet teeth 13.

The dog 10 operates in conjunction with the ratchet teeth 13 while the dog 9 operates in conjunction with the ratchet teeth 14. The dogs 9 and 10 are each provided with a pair of teeth engaging portions 15 spaced a maximum distance from each other to assure complete rotation of the jaw member 11 by either of said dogs when the latter are operated. As for instance, when one of the teeth engaging portions 15 of the dog is opposite the bifurcation of the jaw member, the other tooth engaging portion 15 is in position to engage a tooth of the jaw member to assure its continued rotation in a step by step manner by said dog even though the jaw member or its bifurcated portion is located within the chamber of the head.

It will be seen that the cover plates of the head are provided with semi-annular openings to expose the ends of the jaw member and that the rows of ratchet teeth are confined within the chamber or recess of the head beyond the walls of the semi-annular openings of the cover plates so as to rotatably retain the jaw member in the head of the device.

The dog 10 is formed integrally with the offset end 16 of an operating lever 17. The head 6 of the wrench is recessed, as shown at 18, to accommodate the offset end of the operating lever 17 with a portion thereof located in the chamber of the head along with the dog 10. One of cover plates 8 has a cutout portion 19 to permit pivotal movement of the operating lever 17, the hand grip portion of which overlies one side of the handle 5.

The offset end of the lever 17 is apertured to receive a pivot pin 20 which operates in slots 21 provided in the cover plates 8 so that said dog 10 and lever may have a limited sliding movement as well as a pivotal movement. The attaching end of the dog 9 is bifurcated and apertured to receive the pivot pin 20. The bifurcation of the dog 9 straddles the dog 10 where the latter forms on the offset end of the lever 17.

Coil springs 22 are connected to the dogs 9 and 10 and extend into recesses 23 formed in the head 6 and are connected to cranks 24 of operating shafts 25.

The cover plates 8 are provided with openings 26 to receive the operating shafts 25 and each has one end bent to form a finger piece 27 lying exteriorly of the head of the wrench or over one of the cover plates. The openings 26 which receive the operating shafts 25 have walls thereof

notched to receive lugs or projections 28 on the operating shafts for releasably securing the operating shafts against rotation or until such time that the operating shafts have their positions shifted in the openings to move the lugs 28 out of the notches.

The purpose of the cranks on the operating shafts 25 is to place the springs 22 either under tension or under pressure. When the springs are under pressure, they act to engage the dogs with the ratchet teeth and when under tension act to swing the dogs out of engagement with the ratchet teeth. To vary the action of the springs 22, the person using the wrench rotates the operating shafts 25 by the finger pieces 27. It is to be understood that when the dog 9 is in engagement with its ratchet teeth for rotating the jaw member in one direction by a swinging movement of the handle 5 the ratchet dog 10 is disengaged from its ratchet teeth and vice versa when the jaw member is to be rotated in a reverse direction, that is, the dog 10 engages its ratchet teeth while the dog 9 is disengaged from its ratchet teeth.

When the jaw member is being rotated by either of the dogs the pivot pin 20 engages one end of the slots 21. Either dog may be caused to operate the jaw member during a swinging movement of the lever 5 or by swinging the hand lever 17 backward and forward. The hand lever 17 is used principally when it is desired to turn a nut on a bolt which is not fully threaded home on the bolt and does not require a great deal of force to bring about the turning of the nut on the bolt. The nut can be rotated on the bolt very rapidly through the use of the hand lever 17. However, when the nut begins to turn hard on the bolt the lever 5 is then swung in the arc of a circle giving the operator a great deal more leverage on the nut.

It is to be understood that either the dogs 9 or 10 can be operated by the hand lever 17 when desired. This also applies to the handle 5.

From the foregoing description, taken in connection with the accompanying drawing, it will be seen that a very efficient, durable and compact end wrench has been provided wherein the jaw member thereof can be rotated relative to the head of the wrench in either direction by a backward and forward swinging movement of the handle of the wrench or through the swinging movement of the hand lever. Further, it will be seen that an end wrench of this kind including a ratchet mechanism of the character described and shown will permit work such as bolts and nuts to be conveniently turned within very limited spaces and with a minimum amount of effort on the part of the operator.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention as claimed.

Having thus described my invention, what I claim is:

1. In an end wrench, a handle, a head on said handle, an end type jaw journaled in said head, groups of ratchet teeth on said member and one group of ratchet teeth being reversely arranged to the other group of ratchet teeth, a dog carried by the head to coact with one group of ratchet teeth, a second dog carried by the head to coact with the other group of ratchet teeth, means mounting the dogs for pivotal movement in the head, coil springs connected to the dogs, shafts journaled in said head and including finger pieces and cranks with the crank of one shaft connected to one spring and the crank of the other shaft connected to the other spring whereby the rotation of said shafts may either tension the springs or place said springs under pressure to cause the dogs to be correspondingly disengaged or engaged with the ratchet teeth.

2. In an end wrench, a handle, a head on said handle, an end type jaw member journaled in said head, groups of ratchet teeth on said member and one group of ratchet teeth being reversely arranged to the other group of ratchet teeth, a dog carried by the head to coact with one group of ratchet teeth, a second dog carried by the head to coact with the other group of ratchet teeth, means mounting the dogs for pivotal movement in the head, coil springs connected to the dogs, shafts journaled in said head and including finger pieces and cranks with the crank of one shaft connected to one spring and the crank of the other shaft connected to the other spring whereby the rotation of said shafts may either tension the springs or place said springs under pressure to cause the dogs to be correspondingly disengaged or engaged with the ratchet teeth, said head having notches, and projections formed on the shafts to enter said notches to releasably secure the shafts against rotation when the cranks of the shafts are positioned to place the springs under pressure.

3. In an end wrench, a handle, a head on said handle, an end type jaw member journaled in said head, groups of ratchet teeth on said member and one group of ratchet teeth being reversely arranged to the other group of ratchet teeth, a dog carried by the head to coact with one group of ratchet teeth, a second dog carried by the head to coact with the other group of teeth, manually operated means carried by the head and connected to the dogs to engage and disengage either of said dogs with the ratchet teeth, a hand lever extending into the head and having one of the dogs formed thereon and the other dog pivoted thereto, means for pivotally and slidably connecting the hand lever to the head whereby said dogs may be operated by the movement of the handle or by movement of the hand lever.

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