Feb. 14, 1933. J. R. JOHNSON 1,897,614

WRENCH

Filed June 13, 1930

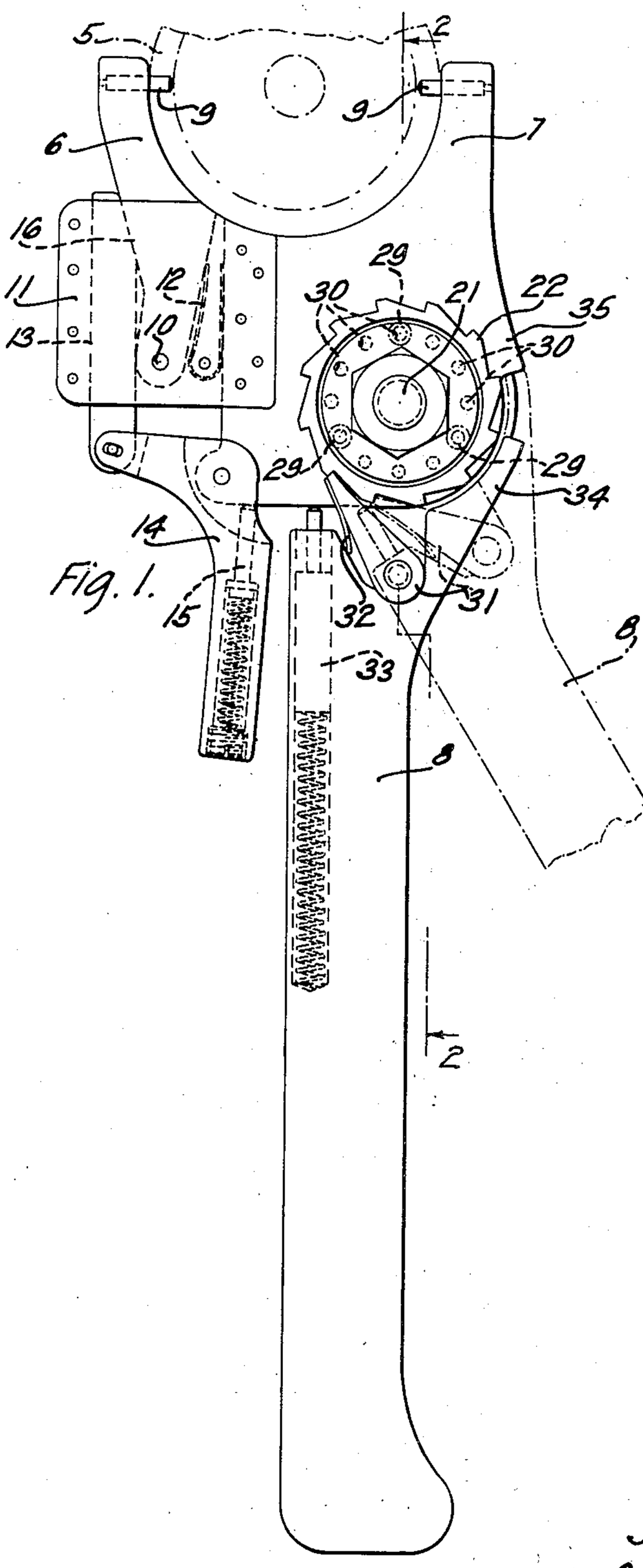

Fig. 1.

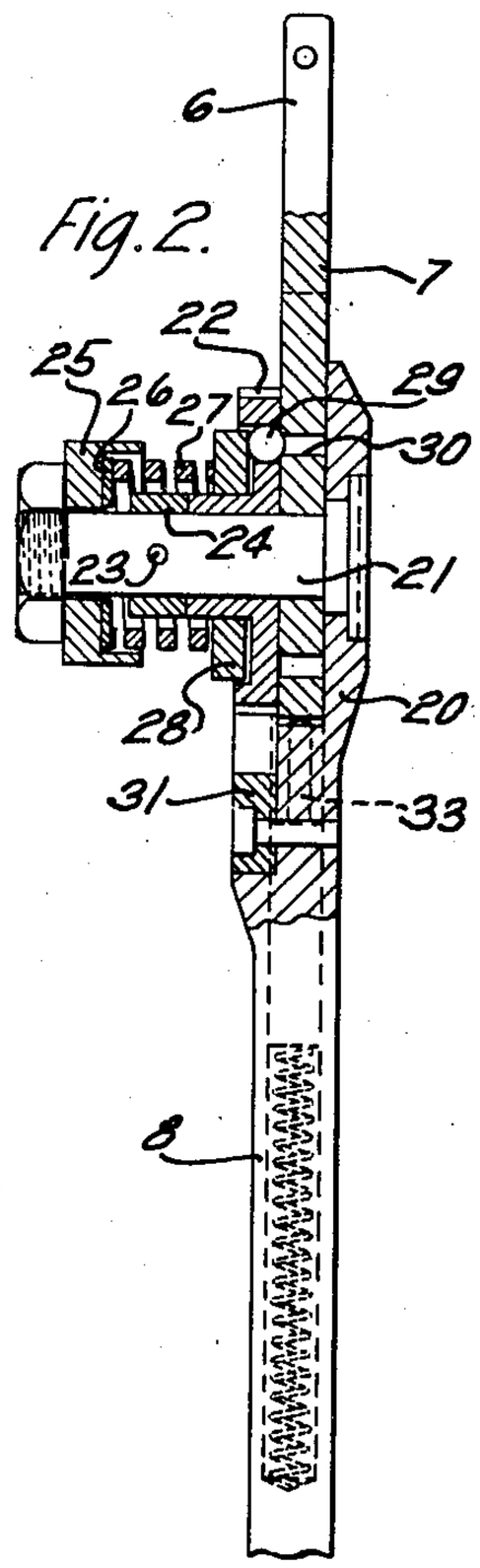

Fig. 2.

Inventor
J. R. Johnson
By H. B. Whitfield. Att'y.

Patented Feb. 14, 1933 1,897,614

UNITED STATES PATENT OFFICE

JOEL R. JOHNSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

WRENCH

Application filed June 13, 1930. Serial No. 460,831.

This invention relates to wrenches, and more particularly to wrenches of the type which automatically yield or release when a predetermined torque is applied thereto.

An object of this invention is to devise a simple and efficient releasable wrench which may be quickly engaged with or disengaged from the part to be rotated.

In accordance with the object, one embodiment of the invention comprises a wrench having a pivoted jaw movable into operative and inoperative positions relative to a stationary jaw, a hand lever being provided to control the position of the pivoted jaw with respect to the stationary jaw. The wrench handle is yieldably connected to the stationary jaw so that when the wrench has rotated the part to a predetermined tightness the handle yields with respect to the stationary jaw. A spring actuated plunger is provided in the handle for returning it to its original position.

A clear understanding of the invention will be had from the following description of one specific embodiment thereof when taken in connection with the accompanying drawing, wherein

Fig. 1 is an elevational view of the wrench, and

Fig. 2 is a sectional view thereof taken on line 2—2 of Fig. 1.

Referring now to the drawing in which like reference numerals designate similar parts in the two figures, there is disclosed a threaded part 5 to be rotated or tightened, in this instance a telephone receiver cover. The devised wrench for tightening part 5 includes a pair of jaws 6 and 7 and a handle 8. Pins 9—9 are mounted in the ends of the jaws 6 and 7 for insertion into diametric apertures in the part 5. The jaw 6 is pivotally supported at 10 in a housing 11 which is secured to the jaw 7, and a U-shaped spring 12 secured to the housing presses the jaw 6 outwardly while a slider 13 mounted in the housing limits such outward movement. The free end of slider 13 is provided with a cam surface 16 designed to cooperate with the outer surface of jaw 6. A lever 14 is linked to the slider by a pin-and-slot connection, and is pivoted to the jaw 7. The lever 14 carries a spring actuated plunger 15 which bears against the jaw 7 and tends to rotate the lever 14 in the clockwise direction to force the slider 13 against the jaw 6 to cause the pins 9—9 to enter the apertures in the part. When the operator's hand compresses the lever 14 and the handle 8, the jaw 6 is moved outwardly by means of the spring 12.

The handle 8 and jaw 7 are connected by means of a releasable pawl and ratchet mechanism, which will now be described. The upper end of the handle 8 is provided with an integral offset portion 20 (Fig. 2) in which is positioned a countersunk bolt 21 which extends through an aperture in the jaw 7 and has a ratchet wheel 22 rotatably mounted thereon and held in place by means of a collar 24 which is secured to the bolt by means of a pin 23, one face of the ratchet wheel resting against the surface of the jaw 7. A cap 25 with a washer 26 is pressed by the nut of the bolt 21 against a coiled spring 27 which bears against a washer 28 surrounding the hub of the ratchet wheel 22. The ratchet wheel 22 has balls 29—29 mounted in apertures thereof which engage the edges of registering apertures 30 arranged in circular formation in the jaw 7, the balls being held in the apertures by the pressure of the spring 27 against the washer 28 which contacts with these balls. The teeth of the ratchet wheel 22 are designed to be engaged by a pawl 31 pivoted to the handle 8 and having a spring 32 secured to one side thereof and bearing on the handle 8 for urging the pawl toward the ratchet wheel. A spring pressed plunger 33 is provided in the handle 8 and presses against the lower edge of the jaw 7 so that normally the handle 8 is swung to the right of the position shown in Fig. 1, causing a shoulder 34 of the handle to abut against a shoulder 35 of the jaw 7.

In the operation of the above described wrench the operator compresses the lever 14 and handle 8 with his hand to move the slider 13 downwardly and release the jaw 6 so that the two jaws may be brought into operative relation to the part 5. He then releases the lever 14 to allow the slider 13 to move

upwardly under the influence of the plunger 15, the cam surface 16 forcing the jaw 6 inwardly, and the pins 9—9 and the two jaws engage the part 5. In the original position the handle 8 is in the dotted position shown in Fig. 1, with shoulder 34 of the handle abutting against shoulder 35 of the jaw 7. The operator now gives a clockwise turn to the handle 8 to tighten the part and the entire wrench rotates as a unit about the axis of the part 5 because the pawl 31 is in engagement with a tooth of the ratchet wheel 22 and the ratchet wheel remains stationary with respect to the jaw 7. When the part 5 has been tightened a predetermined amount, however, the ratchet wheel 22, pawl 31, and handle 8 rotate about the bolt 21 due to the fact that the spring 27 yields and allows the balls 29—29 to be forced out of the corresponding apertures 30—30 of the jaw 7, and the balls then engage the next set of apertures 30—30. In other words, at this stage of the operation the handle 8, pawl 31, and ratchet wheel 22 rotate with respect to the jaw 7 in a clockwise direction until the balls 29—29 carried by the ratchet wheel engage the next set of apertures 30—30 in the jaw 7, and the handle 8 then assumes the position shown in Fig. 1, whereby the operator knows that the part 5 has been tightened the required amount. He then releases the handle 8 to allow the plunger 33 thereof to rotate the handle back to its original position wherein the shoulder 34 of the handle engages the shoulder 35 of the jaw 7. The pawl 31 then engages the next tooth of the ratchet wheel ready for the next turning operation. The operator also depresses on the lever 14 against the force of the spring pressed plunger 15 to move the slider 13 downwardly to allow the spring 12 to move the jaw 6 outwardly, thereby disengaging the wrench from the part, and the wrench is then ready for tightening the next part.

The pressure exerted by the spring 21 upon balls 29, and hence the torque at which the wrench releases, may be adjusted by means of the nut on bolt 21 in accordance with the degree of tightness desired in the setting of part 5.

It is believed to be apparent from the foregoing description of the wrench that it may be readily brought into and out of engagement with the part and that it automatically yields or releases when the applied torque exceeds a predetermined amount. It will of course be understood that the invention is not to be limited to the specific embodiment herein disclosed but may be modified considerably to adapt it to operate on other objects to be rotated, and is to be limited only by the scope of the appended claims.

What is claimed is:

1. In a wrench, means for gripping a part to be tightened, a releasable member connected thereto comprising a ratchet wheel containing balls engaging recesses in the gripping means, resilient means for holding the balls in the recesses, and a handle connected to the releasable member and having a pawl for engaging the ratchet wheel.

2. In a tool, an element for operatively engaging an article to be rotated, an operating handle, and an overload clutch interconnecting the element and the handle, said clutch including a toothed member yieldably engaging the element, and a pawl pivotally carried by the handle for actuating the toothed member.

3. In a wrench, means for gripping a part to be rotated, a handle pivoted thereto, and an overload clutch operatively connecting the handle with the gripping means, said clutch including a ratchet member, clutch members carried thereby, means for causing the clutch members to yieldably engage the gripping means, and means pivotally carried by the handle for operatively engaging the ratchet member.

4. In a wrench, means for gripping a part to be rotated, a handle pivoted thereto, and an overload clutch arranged coaxial with the pivotal axis of the handle for operatively connecting the latter with the gripping means, said clutch including an axial support mounted in the handle, a ratchet wheel rotatable on the support, clutch members carried by the ratchet wheel, means including a resilient member surrounding the support for causing the clutch members to yieldably engage the gripping means, and a pawl carried by the handle for operatively engaging the ratchet wheel.

5. In a wrench, means for gripping a part to be rotated, a handle pivoted thereto, and an overload clutch interconnecting the handle with the gripping means, said clutch including a ratchet member, rolling clutch members mounted in apertures in the ratchet member, adjustable means operatively connected to the clutch members for causing the same to yieldably engage the gripping means with a predetermined force, and means carried by the handle for operatively engaging the ratchet member.

In witness whereof, I hereunto subscribe my name this 27th day of May A. D., 1930.

JOEL R. JOHNSON.