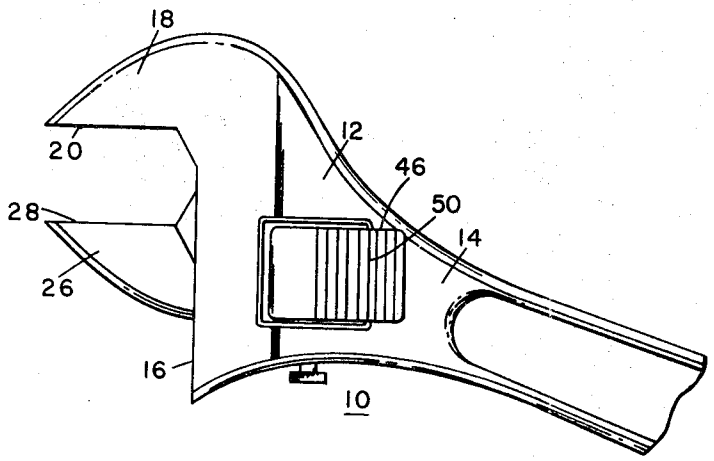
Oct. 27, 1970 E. T. RIZA 3,535,959

ADJUSTABLE WRENCH

Filed April 26, 1968

FIG. 1



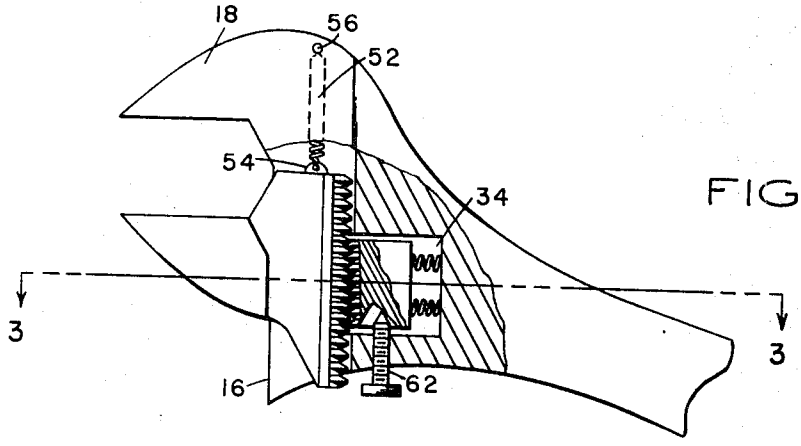
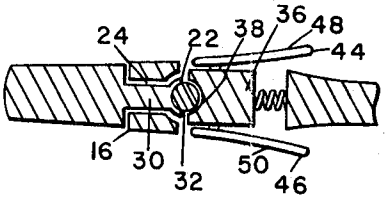




FIG. 2

FIG. 3



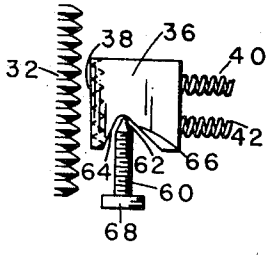




FIG. 4

INVENTOR

EUGENE T. RIZA

*Clegg, Harwood & Francis*

ATTORNEY

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# ADJUSTABLE WRENCH

Eugene T. Riza, 1006 Oak St., Dallas, Tex. 75204

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U.S. Cl. 81—52.4 7 Claims


## ABSTRACT OF THE DISCLOSURE

An automatically adjustable wrench is disclosed including a slidable lower jaw spring biased towards a fixed upper jaw. A serrated latch member, biased into engagement with meshing serrations on a part of the lower jaw structure, retains the lower jaw at desired positions relative to the upper jaw. A torque adjustment is provided on the body of the wrench for adjustably varying the engagement or meshing of the latch member and lower jaw to allow the latch member to disengage the lower jaw, permitting it to slip downwardly, away from the upper jaw, when a predetermined amount of torque or tension is placed upon the wrench.


This invention relates to automatically adjustable wrenches. More particularly, the invention relates to wrenches having a fixed jaw and a movable jaw, the movable jaw being slidable toward and away from the fixed jaw, and latch means being provided for securing the lower jaw at various positions relative to the upper jaw.

The present invention provides an improved lower jaw structure which, in combination with a latch member and means for adjusting the engagement of the latch member and lower jaw structure, provides a wrench that is quickly and effortlessly adjustable, that can be caused to ratchet about a nut or bolt head, and that can be adjusted to release at a predetermined tension or torque setting.

The many features and advantages of the wrench of the present invention will become readily apparent to those persons skilled in the art upon reference to the following detailed description of a preferred embodiment of the invention, taken in conjunction with the claims, and appended drawings, wherein:

FIG. 1 is a side elevational view of the wrench with the handle portion broken away;

FIG. 2 is a side elevational view, partly in section and partially broken away of the wrench shown in FIG. 1;

FIG. 3 is a section taken along line 3—3 of FIG. 1, and

FIG. 4 is a detail view of the serrated portion of the lower jaw structure, the latch member and torque adjustment member.

Referring now to FIG. 1 of the drawing, a wrench in accordance with the present invention is shown denoted generally by the reference numeral **10**. The wrench **10** includes a body **12** having a handle portion **14** at one end, and terminating at the other end in a front face **16**, and an upper jaw **18**. The upper jaw **18** is fixed and includes a gripping face **20**, which is substantially normal to the front face **16**.

As best seen in FIGS. 2 and 3, the body **12** also includes a vertical slideway **22** extending through the height thereof. A slot **24** communicates the slideway **22** with the front face of the body **12**, and a lower jaw structure **26**, including a gripping face **28**, is slideably positioned in the body **12** adjacent the upper jaw **18**. The lower jaw structure **26** also includes a web portion **30** which is slideably fitted through the slot **24** and terminates in a latch bar **32** adapted for sliding up and down in the slideway **22**. The latch bar **32** is preferably semi-circular in cross-section and includes a plurality of spaced grooves or serrations formed around its width, normal to its length.



The body **12** further includes a transverse opening **34** disposed behind the front face **16** and communicating with the slideway **22**. A latch member **36** is fitted in the opening **34** for lateral movement toward and away from the slideway **22**. The front face **38** of the latch member **36** is formed in the shape of a half-nut or concave semi-circle and also includes a plurality of spaced grooves or serrations for mating or meshing with the latch bar **32** positioned in the slideway **22**. Springs **40** and **42**, positioned behind the latch member **36** between it and the back of the opening **34**, serve to bias latch member **36** into engagement with the latch bar **32**. Grips **44** and **46** are positioned on either side of the latch member **36**, and are attached thereto, suitably, by welding or brazing, to hold the latch member in place. The grips further serve as a means for grasping the latch member to pull it back and out of engagement with the latch bar and lower jaw structure **16**. For this reason, the grips **44** and **46** suitably include raised ridged portions **48** and **50** to aid in grasping by a person operating the wrench.

Because it is desireable that the lower jaw structure **16** move upwardly towards the fixed jaw **18** when the latch member **36** is disengaged from the jaw structure to automatically fit to a nut or bolt, a spring **52** is connected to the top **54** of the lower jaw structure at one end, and to the top part of the slideway **22** at the other end by means of a pin **56** held in the body **12**. Thus, when the jaws are expanded and the latch member **36** disengaged from the latch bar **32**, the lower jaw structure **16** will move upwardly as viewed in the drawings, toward the upper jaw **18**.

As shown in FIG. 4, the serrations **38** on the half-nut shaped latch member **36** and those on the latch bar **32**, are angulated with respect to lines normal to the face of the members. This angulation serves to translate a downward force on the lower jaw structure **16**, and thus the latch bar **32**, into a backward or disengaging force on the latch member **36**. Thus, when the latch member **36** is meshed with the latch bar **32**, a certain predetermined downward force on the lower jaw **16**, depending upon the strength of the springs **40** and **42**, will cause the latch member **36** to move backward or to the right as viewed therein, releasing the lower jaw structure **16** allowing it to open or move downwardly. It will be further understood that by rotating the latch block **36** slightly counterclockwise, as viewed in FIG. 4, so that the lower serrations on the block are not as fully meshed with the serrations on the latch bar **32** as those at the top, the downward force on the lower jaw structure **16** required to move the latch block **36** backward out of engagement with the latch bar **32** is lessened. It will also be seen that by further counterclockwise rotation of the block **36**, and by moving it slightly to the right, as viewed in FIG. 4, whereby only the top serrations of the block **36** and bar **32** are meshed, and those serrations are only partially meshed, this force is lessened even further. By varying in this manner the engagement or meshing of the latch member **36** with the latch bar **32**, the wrench is adjustable to the amount of torque it will withstand before the latch member **36** is caused to move backward by the downward force on the lower jaw **16**, allowing the jaws to separate and the wrench to release the nut or bolt to which it is applied.

To accomplish this adjustment of the amount of engagement of the two members, and to allow the latch block **36** to be able to rotate slightly and to move backward, it is necessary that the opening **34** be slightly wider and somewhat longer than latch member **36**. Additionally, an adjustment member **60** is provided which is threadably fitted in a similarly threaded opening **62** through the body of the wrench **12** communicating with the opening **34**. The upper end **62** of member **60** is pointed or rounded, and it is adapted to engage a canted surface of a notch **64** in

the bottom of the member **36** such that upward movement of the member **60** against the surface **66** of the notch **64** causes the latch member **34** to rotate slightly counter-clockwise and to move slightly backward or to the right as viewed in FIG. 4. The other end of the member **60** is suitably knurled to provide a gripping surface whereby the member **60** can be easily rotated for movement relative to the opening **62**.

To operate the wrench the gripping surfaces **44** and **46** are pulled back by the operator, most easily with the thumb and forefinger, to disengage the latch member **36** from the lower jaw **16**. The lower jaw is then grasped in the other hand and pulled downward to the fully extended position and the grips **44** and **46** released to re-engage the latch member **36** with the lower jaw structure **16**. The wrench is then applied to a nut or bolt and the grips **44** and **46** again pulled backwards, whereupon the spring **52** causes the lower jaw **16** to close up around the object, automatically adjusting to the right size opening. The grips **44** and **46** are then released and the wrench is ready for use. In this regard, it is preferable to have the serrations on the latch bar and latch member **36** be at $\frac{1}{16}$ or $\frac{1}{32}$ of an inch intervals whereby the wrench will be readily adaptable to all U.S. and metric size nuts and bolts. These small intervals are made possible by the longer grip length of the serrations due to the fact that the latch bar **22** is of semi-circular configuration, and the latch member **36** is in the shape of a half-nut, giving a much longer grip length of the serration than would be possible were the members straight across their face.

Another advantage of the wrench is that it can be caused to ratchet by pulling back on the grips **44** and **46** at the end of each stroke of the wrench, allowing the lower jaw **16** to be free to expand, rotating the wrench around the object to a desired starting position, and again releasing the grips to firmly latch the jaw **16**.

To adjust the torque setting of the wrench or the downward force required on the lower jaw structure **16** to cause the latch member **36** to release, allowing the lower jaw structure **16** to move downwardly to open the wrench, the adjustment member **60** is rotated either clockwise or counter-clockwise. Assuming right hand threads, clockwise rotation of the adjustment member **60** causes the member to move up against the notched surface **66** of the latch member **36**, slightly rotating the member **36** counter-clockwise and causing it to move to the right as viewed in FIG. 4 away from the latch bar **32**. This movement then causes some of the lower serrations to be unmeshed or disengaged, and those which are engaged are engaged less fully. Thus, the torque setting of the wrench is adjustable from strongest available to a setting of very little resistance to opening. This adjustment is particularly useful for such purposes as preventing breaking small bolts or stripping threads on the smaller nuts and bolts.

While this invention has been described with reference to a particular embodiment thereof, it is understood, of course, that it is not be construed in a limiting sense. Many modifications and improvements of the disclosed embodiment, as well as other embodiments, will become readily apparent to those persons skilled in the art from the foregoing detailed description thereof. It is therefore intended that the invention be limited only as defined in the appended claims.

I claim:

**1.** An automatically adjustable, variable torque, wrench comprising:

(a) a body member terminating at one end in a fixed upper jaw including a jaw face, and defining a handle over most of the rest of its length;



(b) said body member defining a slideway substantially normal to the face of said upper jaw, and a slot communicating said slideway to the one end of said body member;

(c) a lower jaw structure positioned for sliding movement within said body member and including a web portion slideable in said slot, and a serrated portion slideable in said slideway;

(d) said lower jaw structure including a face substantially parallel to said face of said upper jaw;

(e) a spring member, attached at one end to said body member and at the other end to said lower jaw structure, for biasing said lower jaw structure towards said fixed upper jaw;

(f) an opening through said body member communicating with said slideway;

(g) a latch member, positioned in said opening, said latch member being serrated along one side thereof, for meshing with said lower jaw structure;

(h) means biasing said latch member into engagement with said serrated portion of said lower jaw structure, and

(i) an adjustment member, variably engageable with said latch member for limiting the meshing of said latch member with said serrated portion of said lower jaw structure.

**2.** A wrench as defined in claim **1**, wherein said body member further includes a second threaded opening communicating with said first mentioned opening, and wherein said adjustment member comprises an elongated threaded member threadably engaging said second threaded opened and having one end adapted for abutting said latch member and said serrated portion of said lower jaw structure.

**3.** A wrench as defined in claim **1** wherein said latch member fits loosely within said opening and includes an angulated notch having a canted surface, said body member including a second opening communicating said first mentioned opening with a lower side of said body member and aligned with said canted surface, said adjustment member being positioned in said second opening for abutting at one end thereof said canted surface of said latch member.

**4.** A wrench as defined in claim **3**, wherein said second opening is threaded and wherein said adjustment member comprises an elongated threaded member, threadably fitted in said second opening.

**5.** A wrench as defined in claim **1** wherein said serrated portion of said lower jaw structure includes a semi-circular cross-section and wherein said serrated side of said latch member is concave for mating with said serrated portion of said lower jaw structure.

**6.** A wrench as defined in claim **1** wherein the serrations included on said lower jaw structure and said latch member are spaced in one sixteenth inch intervals.

**7.** Apparatus as defined in claim **1** also including grip means on both sides of said latch member for grasping by a person operating the wrench.


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JAMES L. JONES, JR., Primary Examiner