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2,731,866

READILY REPOSITIONABLE SLIDABLE JAW WRENCH

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Fig. 1

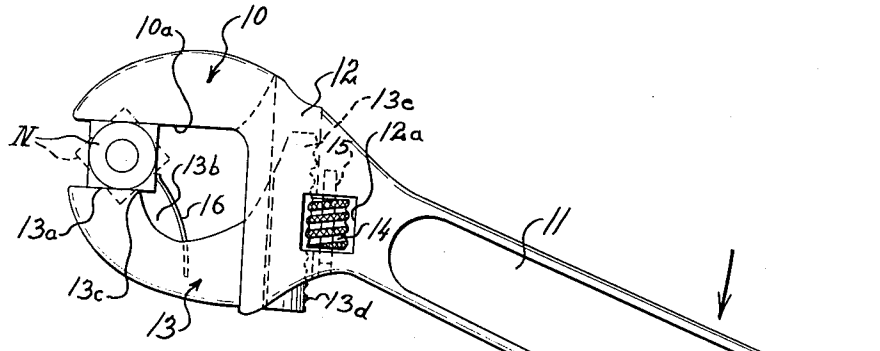


Fig. 2

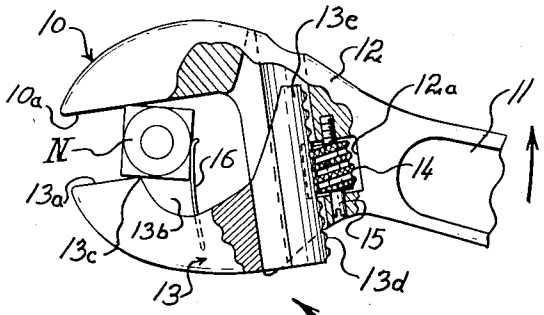


Fig. 3

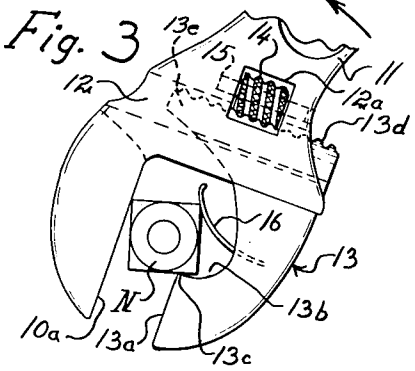


Fig. 4

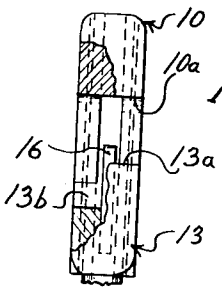
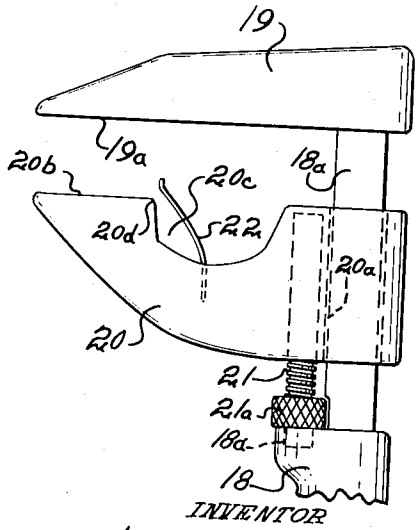


Fig. 5



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READILY REPOSITIONABLE SLIDABLE JAW WRENCH

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4 Claims. (Cl. 81—53)

This invention relates to quick-action wrenches for turning nuts, fittings or other elements having pairs of diametrically arranged flatted surfaces for gripping.

It is an object of my present invention to provide an improved construction adapted for use in most types of adjustable wrenches wherein a nut or analogous element may be quickly turned for tightening or loosening through reciprocating swinging movement of the wrench handle in much the manner of application of torque to a ratchet wrench.

A further object is the provision of an improved, simple wrench construction whereby torque may be swingably applied to turn the nut or other article in conventional manner and thereafter, without bodily removing the wrench from the nut, the wrench handle may be swung with a slight longitudinal thrust action in the opposite direction to bring the gripping surfaces into a new torque-applying position. With my improved structure, a simple and rugged wrench may be produced at low cost, which will enable an operator to by fast, reciprocating swinging actions, tighten or loosen a nut or other object to be turned.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a side elevation showing my invention applied to a type of Crescent wrench after an initial torque has been applied to the nut, the original position of the nut being shown in dotted lines;

Fig. 2 is a side elevation with some portions being broken away and others shown in section of the same wrench in its relation to the nut at the inception of the return swinging movement;

Fig. 3 is a side elevation of the same wrench showing its relation to the nut near the completion of the return swing of the handle and just prior to the engagement of the jaw-gripping surfaces to provide a new torque-applying position;

Fig. 4 is a front elevation of the jaws of the wrench with some portions broken away; and

Fig. 5 is a side elevation showing my invention applied to a monkey wrench.

In Fig. 1, a Crescent wrench for the most part of conventional type, is shown having the usual stationary jaw **10** provided with as shown, a substantially straight inner edge **10***a*, the outermost portion of which constitutes a gripping surface. The stationary jaw **10** is integrally formed with or rigidly connected to an elongated handle **11** which is angled usually at an obtuse angle relative to the gripping surface **10***a*. The head portion of the wrench designated by the numeral **12** is as shown of sufficient thickness to accommodate the toothed edge **13***d* and head **13***e* of an adjustable jaw **13**. The toothed edge **13***d* is in the form of a rack formed to accommodate and engage a short helical or screw gear **14** which is rotatively

mounted in the head portion of the wrench upon a stub shaft **15**. The head portion **12** is recessed as at **12***a* to accommodate the screw gear and at least one of the side faces of head portion **12** is cut away as shown in Fig. 1 to expose the knurled spiral edge of the gear to facilitate hand or finger application of torque thereto to facilitate adjustment of the jaw **13**. All of the parts described to this point are of conventional construction in Crescent wrenches and consequently, no more detailed description is thought necessary.

The adjustable jaw **13** of the wrench is provided at its inner edge with a relatively short gripping surface **13***a* extending from the outer extremity of the jaw inwardly and being opposed to the gripping surface **10***a* at the inner edge of the stationary jaw. Immediately contiguous to the gripping surface **13***a* of the movable jaw, the inner edge of the jaw is formed to define a deep recess **13***b* of curved shape in longitudinal configuration and of a dimension to accommodate at least the marginal portion of a nut or flat surfaced fitting or the like whether of squared, hexagonal or octagonal shape. The recess **13***b* is if a depth and also length to accommodate nuts or the like having dimensions of maximum size for accommodation in the full open adjustment of the jaws.

Anchored in the recessed portion of jaw **13** is an upwardly or inwardly and forwardly extending leaf spring **16** having a high resiliency and made from a steel or other metal of a nature which will withstand hard wear and a great deal of flexing. One end of this spring may be embedded or otherwise anchored in the metal material of the jaw **13** fitting into an aperture or cut formed in the metal. The metal may be swedged or otherwise treated to securely anchor the attachment end of spring **16** therein as shown in Figs. 1 to 3. Spring **16** preferably, at its outer extremity is curved or rounded to facilitate sliding thereof upon the exterior surface of a nut or other member to be turned. This spring normally extends slightly beyond the position shown in Fig. 1 with its free end disposed somewhat above the surface of gripping edge **13***a* and somewhat rearwardly of the rear end of said gripping surface.

The novel operation and cooperative functioning of the essential elements of my improved wrench is illustrated in successive-step manner in Figs. 1 to 3. In Fig. 1, the original position of a nut end is illustrated in dotted lines having been turned from this position as shown, through approximately 45° to the full line position of Fig. 1 where the wrench is firmly engaged upon opposite flatted edges of the square nut. In the application of torque, the nut is firmly engaged between the gripping edge **10***a* of the stationary jaw and the relatively short opposing gripping edge **13***a* of the adjustable jaw, as shown in Fig. 1. Fig. 2 illustrates the changed relation of gripping surfaces and nut which occurs at the beginning of the return or upward swinging movement of the handle. The operator, as he swings the handle upwardly from the position shown in Fig. 1, almost instinctively applies a forward thrust in such swinging movement which moves the opposing jaws of the wrench a slight distance forwardly from the position shown in Fig. 1, the tension of the leaf spring **16** cushioning and resisting this thrust movement and preventing sudden disengagement of the nut. In the positional relationship of Fig. 2, it will be noted that the free and outer end of spring **16** is engaging a substantial portion of one edge of the nut up to approximately the center thereof and that the lower edge of the nut provides a fulcrum from the inner shoulder or corner designated as **13***c* of the adjustable jaw. Such relative fulcruming is made possible by the provision of the curved concave recess **13***b* in the adjustable jaw.

Further upward swinging of the handle **11** of the wrench

with the slight forward and longitudinal thrust component exerted thereon brings the wrench into the relationship with the nut illustrated in Fig. 3. Here it will be seen that a corner and marginal portion of the nut is now fully accommodated in the recess **13***b* while the outer end of spring **16** is engaging against one of the corners of the nut at the same time the adjacent lower corner of the nut is disposed within the recess just inwardly of the shoulder **13***c*. Slight additional upward swinging of the wrench from the position shown in Fig. 3 through guiding pressure supplied by spring **16** causes the gripping surfaces **10***a* and **13***a* to be aligned with two of the flatted surfaces of the nut and the wrench naturally assumes its new torque-applying position with the nut then positioned squarely against and between the gripping surfaces **10***a* and **13***a*.

From the foregoing description, in connection with the drawings, it will be seen that the successive stages of the operation are almost automatically brought about by the upward or counterclockwise swinging of the wrench from the position shown in Fig. 1. It is natural in swinging the wrench to impart slight forward longitudinal thrust in the swinging movement so that actually in operation my wrench may be swingably reciprocated upon a nut without exercise of care as to precise engagement of the nut or piece turned, to produce in such reciprocations, a step by step turning of the piece either for tightening or loosening purposes.

When a nut is to be loosened (assuming the thread to be a right hand thread) the wrench is reversed or turned upside down from the position shown in the drawings and disposed with the gripping surface **13***a* engaging the top flatted surface of the nut.

In Fig. 5 my invention is illustrated as applied to a conventional type of monkey wrench, the lower portion of the handle being broken away. The monkey wrench has an elongated handle **18** provided with the longitudinally extending, diminished square post **18***a* projecting therefrom upon the outer end of which is rigidly affixed the upper stationary jaw **19**. This jaw as shown has a straight inner edge **19***a* which at its forward portion constitutes a gripping surface. The lower jaw **20** is slidably but non-rotatively mounted upon post **18***a* having a squared bore **20***a* which slidably engages said post. Adjustment of jaw **20** is effected in conventional manner by a screw **21** which has threaded engagement with a tapped socket extending longitudinally of the handle and formed in the head portion of jaw **20**. Screw **21** at its lower extremity is journaled in a bearing **18***a* provided by handle **18** and adjacent said lower extremity a knurled collar **21***a* is affixed to facilitate turning of the adjustment screw.

The adjustment jaw **20** at its inner or upper longitudinal edge is provided with a relatively short gripping surface **20***b* extending from the outer extremity of the jaw inwardly for a short distance and opposed in substantially parallel relationship to the gripping surface **19***a* of the fixed jaw. Immediately thereafter at the interior edge of jaw **20** a relatively deep, curved recess **20***c* is formed of similar shape to the recess **13***b* in the form of the invention first described, said recess defining a corner, shoulder or fulcrum **20***d* at the rear end of the gripping surface. A leaf spring **22** of high resiliency and substantially identical in all respects with the spring **16** of the Crescent wrench first described, is anhcored at its lower end in the intermediate portion of jaw **20** where the recess **20***c* is formed having its free outer end curved slightly and disposed normally somewhat above and somewhat rearwardly of the shoulder **20***d*.

The function and operation of the cooperating parts of the wrench shown in Fig. 5 is precisely similar to the function of the corresponding or similar parts of the wrench shown in Figs. 1 to 3.

From the foregoing description, it will be seen that I have provided a simple, highly efficient, quick-action wrench adapted to apply torque to and turn a nut or similar element in quick, successive stages and through reciprocating swinging of the handle in the manner of a ratchet wrench. My structure adds exceedingly little expense to the cost of conventional adjustable wrenches now in use; provides a more rugged and durable structure than ratchet wrenches in use and is adapted to accommodate nuts or fittings of various types and varying in diametrical dimensions within range of adjustment of conventional wrenches now in use.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention.

What I claim is:

1. A quick-action wrench comprising a stationary jaw and an adjustable jaw, said jaws having rigid opposing gripping surfaces at the inner edges thereof, a handle connected with said jaws for applying torque to a nut or other object to be turned, one of said jaws having formed along its inner edge, contiguous to and inwardly of its said gripping surface, an open recessed portion adapted to accommodate at least the marginal portion of a nut or other object to be turned and a single, resilient, yieldable element anchored in said recessed portion of said last mentioned jaw and extending inwardly therefrom in the direction of said opposed jaw and adapted to engage the rear portion of a nut and to yieldingly resist displacement of the wrench in a direction to accommodate a portion of the nut in said recess whereby a nut may be turned through an arc by swinging of said handle and then with the reverse swinging movement of said handle and simultaneous slight outward longitudinal thrust thereof in opposition to said resilient element, the wrench may be swung relative to said nut with said recess accommodating a portion of said nut and brought into a new torque-applying position with said gripping surfaces then operatively engaging said nut.

2. The structure set forth in claim 1 wherein said resilient, yieldable element comprises a leaf spring anchored in said recessed portion of one of said jaws and normally extending generally towards the gripping surface of the opposite jaw in a position behind and above the gripping surface of the jaw wherein it is anchored.

3. A quick action wrench comprising a stationary jaw provided with a gripping surface at its inner edge, a handle structure rigidly connected with said stationary jaw, an adjustable jaw non-rotatively connected with said handle structure and having at its inner edge, a relatively short gripping surface opposed to the gripping surface of said stationary jaw and having contiguous to and inwardly of said gripping surface a deeply recessed, open portion adapted to accommodate at least the marginal portion of a nut or other object to be turned and a resilient element anchored in the recessed portion of said adjustable jaw and extending inwardly therefrom in the direction of said opposed jaw and having a free end disposed normally in a position above and inwardly of the gripping surface of said adjustable jaw and adapted to engage the rear portion of a nut and to yieldingly resist displacement of the wrench to accommodate a portion of the nut in said recess whereby with said recessed portion, said cooperative gripping surfaces may be engaged with opposite sides of a nut, the nut turned through an arc by swinging of said handle and then with a reverse swinging movement of said handle and simultaneous outward longitudal thrust thereof in opposition to the resistance of said resilient element, the wrench may be swung relative to said nut with said recess accommodating a portion of said nut and brought into a new torque-applying position with said gripping surfaces then engaging two different opposite edges of said nut.

4. The structure set forth in claim 3 wherein said recess defines with the inner end of the gripping surface of said adjustable jaw, a shoulder operating as a fulcrum between a flatted surface of a nut or the like and said

adjustable jaw when the wrench is swung backwardly for engagement in a new torque-applying position.

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