WRENCH HAVING PIVOTABLE AND RELATIVELY ADJUSTABLE JAWS

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My invention relates to wrenches especially of the adjustable type, the instant disclosure being an improvement over my invention disclosed in Patent No. 2,708,384.

An important object of my invention is to provide a ratcheting type of wrench which can be used to grip polygonal objects such as nuts, which may be utilized for tightening and loosening pipe connections, which has mating jaws pivotally mounted and fulcrumed in diagonal relationship so as to effectuate a gripping action when turned in one direction and a ratcheting action when turned in a contra direction, and which has an enlarged hub or boss portion providing a bearing for means for adjusting one of the jaws to vary the size of the work-receiving gap.

A further object of my invention is to provide releasable locking means which will permit the wrench to remain open in order to straddle a nut or polygonal formation on a union which may be mounted in a system of piping as distinguished from readily accessible nuts to which the wrench could be axially applied.

A still further object of my invention is to provide a pair of mating jaws in a wrench of the afore-mentioned character which are urged into closed position by means of one spring overpowering another spring; the springs not functioning in the event the wrench is set to open position.

A still further object of my invention is to provide spring-actuated ball-locking means operating in concert with detent or promontory means provided on one of the jaw supports.

A still further object of my invention is to provide a wrench of the afore-mentioned character which is convenient and simple to operate, practical in its construction and of such simple elemental construction as to warrant economical manufacture thereof in quantity production.

Other objects and ancillary advantages inherent in my invention will become apparent from an examination of the accompanying drawings, wherein like symbols are used to designate like parts, and in which;

Fig. 1 is a front view of my invention shown in closed or normal position.

Fig. 2 is a top view of Fig. 1.

Fig. 3 is an enlarged fragmentary front view of the operative portion of the wrench showing in full lines and dotted lines the position of the jaw elements for gripping and ratcheting respectively.

Fig. 4 is a vertical transverse section looking in the direction of line 4—4 on Fig. 3.

Fig. 5 is a fragmentary front view on the same scale as Fig. 3, parts being broken away and shown in section, and shows the wrench jaws retained in open position preparatory to straddling a nut or polygonal formation of a union which may be not accessible endwise.

Fig. 6 is a fragmentary front view corresponding to Fig. 5, but showing the wrench jaws closed on a hexagonal nut.

Fig. 7 corresponds to Fig. 6 but shows a slight modification of my invention in that the jaw elements are serrated similar to a "Stillson" type of wrench so as to afford a good gripping relationship with a pipe or a similarly shaped pipe accessory or fitting.

Referring to the various views my invention is generally designated 8, and includes a handle 9 of suitable length and provided with an enlarged hub portion 10 which is integral with a further enlarged bearing portion 11. The bearing portion 11 is slotted at 12 in order to furnish an operating seat for a knurled and threaded nut 13.

The nut 13 is operated whenever it is desired to vary the size of the work-receiving gap formed by inner and outer jaws 15 and 20 of the wrench.

The hub portion 10 has a tongue portion 14 thereon which is cut away as indicated at 18 in order to furnish ample clearance for the inner jaw 15, and which provides an anchoring section for a pivot pin 17 on which bifurcated legs of the jaw 15 are pivotally secured, rear edges 16 of the legs of the jaw 15 being arcually cut away so that they will clear the hub portion 10 during operation of the wrench.

On a front edge of the tongue portion 14 is mounted a flat spring 33 anchored in place by a screw 34 or any other suitable means may be employed for biasing the jaw 15 to open position. The jaw 15 is provided with a V gripping portion 19, the mating outer jaw 20 being provided with a like V gripping portion 21 so that the two V portions 19 and 21 will operate in concert to grip a nut 29 as shown in Figs. 1, 3 and 6.

The outer jaw 20 has an elongated shank 22 terminating in a bifurcated section 36 which straddles a tongue portion 40 of a threaded support 31 and which pivots on a pin 23 that extends through the tongue portion 40. The threaded support 31 is provided with flat opposite sides 32 and is slidable in a broached out guideway 30 in the bearing portion 11, the flat sides 32 preventing rotation of the threaded support 31. Thus when the nut 13 is rotated in one direction it will advance the jaw 20 to increase the gap between the V portions 19 and 21 (see Fig. 6), and when operated in a contra direction it will reduce the gap (see Figs. 1 and 3).

The outer jaw 20 is biased to closed position by a leaf spring 25 having a hump portion 26 so as to afford sufficient flexibility and prevent the spring from breaking in use, the spring 25 being secured to the tongue extension 40 by means of a screw 27. A shallow groove 24 is provided in the arcuate outer edge of the jaw 20 and a lip 28 operates therein so as to maintain the spring 25 in proper alignment during swinging movement of the jaw 20.

The wrench jaws 15 and 20, respectively, are provided with confronting straight sides 47 and 46 which make straight-line contact when the jaws assume their work-gripping positions, and are also provided with confronting straight ledges 48 and 49 which in concert with the edges 46 and 47 tend to interlock the jaws when the jaws are adjusted to their minimum gap and are being used to tighten or loosen a nut.

The biasing force of the jaw-closing spring 25 is strong enough to overpower the jaw-opening spring 33 whenever the jaws approach their fully closed positions, whereby the springs 25 and 33 permit the wrench jaw ratcheted about a polygonal object so as to either tighten or loosen the same as situations require.

When it is desired to either apply the wrench to, or remove the wrench from, a polygonal formation or a nut which happens to be part of a union or coupling used as a pipe fitting, so that the wrench cannot be applied or removed endwise, then the jaws may be opened to the
positions indicated in Fig. 5 and the jaw 20 adjusted so as to provide whatever size gap is required. The wrench jaws will then remain in such open positions, the spring 33, maintaining the jaw 15 in its open position, whereas the jaw 20 has a bore 37 which contains a spring 38 and a ball 39, the spring-actuated ball entering a recess in a promontory 41 on the tongue portion 40 when the jaw 20 reaches its outermost position, the jaw-closing spring 25 being inadequate to overcome the locking action of the spring-seat ball 39. The bifurcated section 36 straddles the tongue portion 40 and is maintained in pivoted relationship by the pivot 23. The axes of the pivots 17 and 23 are laterally spaced from a longitudinal axis of the handle and are mutually offset along said axis, the amount of offset being inversely proportional to the gap between the jaws.

Thus if the wrench is applied to a nut 29 while the jaws are maintained open as shown in Fig. 5, they may be snapped into their closed positions (see Figs. 1, 3 and 6) for either a tightening or loosening operation on the nut 29, the type of operation depending on the direction in which the jaws face, as the wrench is applied to the nut. It should be noted that the edge 18 of the tongue portion 24 and a wall 35 between the bifurcations of the jaw 15 cooperate to limit opening movement of the jaw 15 when the spring 33 urges the same to open position. The wrench is operated to loosen or tighten a threaded object by turning the wrench alternately in the directions indicated by arrows 50.

The wrench jaws 15 and 20 may have serrated V portions 44 and 43 as illustrated in Fig. 7 so as to permit the wrench to be utilized on a pipe element 45 or on similarly shaped pipe fittings during the assembly or dismantling thereof.

Although the drawings and the above specification disclose the best modes in which I have contemplated embodying my invention, I desire to be in no way limited to the details of such disclosure, for in the further practical application of my invention many changes in the form and construction thereof may be made as circumstances require or experience suggests without departing from the function of the invention as expounded within the scope of the appended claims.

Having thus described and revealed my invention, what I claim as new and desire to secure by Letters Patent is:

1. An adjustable wrench adapted to grip varied shapes of units when rotated in one direction and further adapted to slip on said units when rotated in a contra direction, comprising a handle provided with a bearing portion and a tongue portion, a thread support provided with flat means and fitted to operate slidably in said bearing portion, a tongue portion of said threaded support, a transverse slot in said bearing portion, nut means mounted on said threaded support and confined in said transverse slot, a pair of complementary jaws each articulately secured to one of said tongue portions by pivot means, said pivot means being disposed on axes laterally spaced from a longitudinal axis of said handle and being offset along said axis, primary spring means secured to one of said tongue portions and pressing against one of said complementary jaws, and secondary spring means secured to the other of said tongue portions and pressing against the other of said complementary jaws.

2. An adjustable wrench adapted to grip varied shapes of units when rotated in one direction and further adapted to slip on said units when rotated in a contra direction, comprising a handle provided with a bearing portion and a tongue portion, a thread support provided with flat means and fitted to operate slidably in said bearing portion, a tongue portion on said threaded support, a transverse slot in said bearing portion, nut means mounted on said threaded support and confined in said transverse slot, a pair of complementary jaws each articulately secured to one of said tongue portions by pivot means, said pivot means being disposed on axes laterally spaced from a longitudinal axis of said handle and being offset along said axis, primary spring means secured to one of said tongue portions and pressing against one of said complementary jaws, secondary spring means secured to the other of said tongue portions and pressing against the other of said complementary jaws, and interlockable edges on both said complementary jaws, said edges making contact for interlock only when said jaws are adjusted to their minimum gap by said nut means and said wrench is swung to effectively grip and rotate one of said units.

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