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SPANNER WRENCHES FOR THREADED SPANNER NUTS

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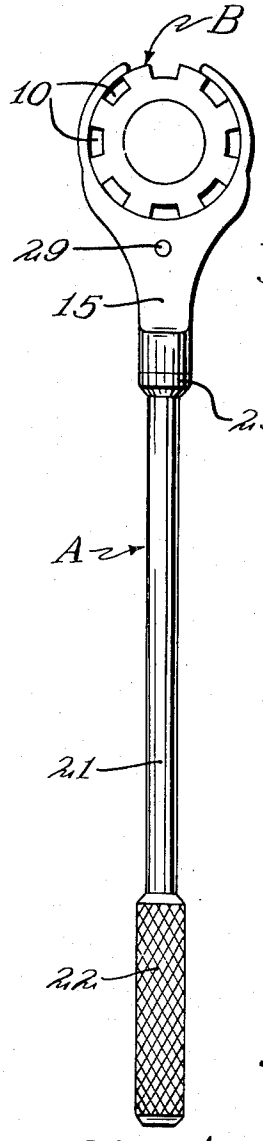


Fig. 1

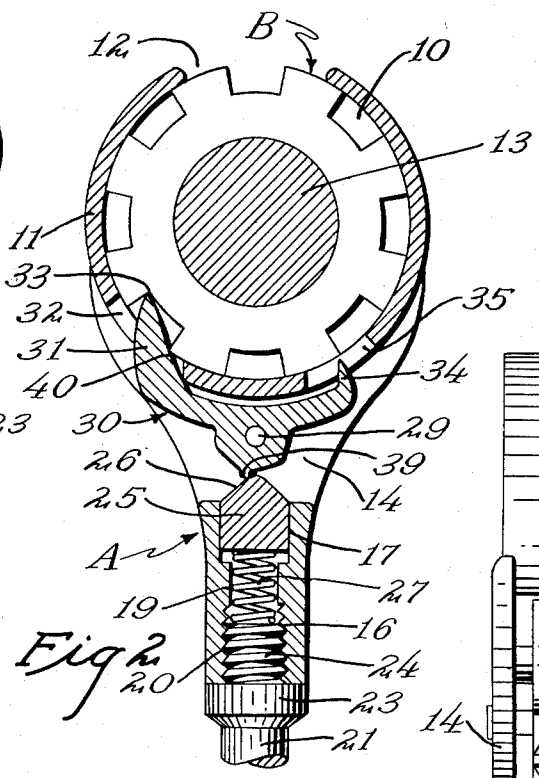


Fig. 2

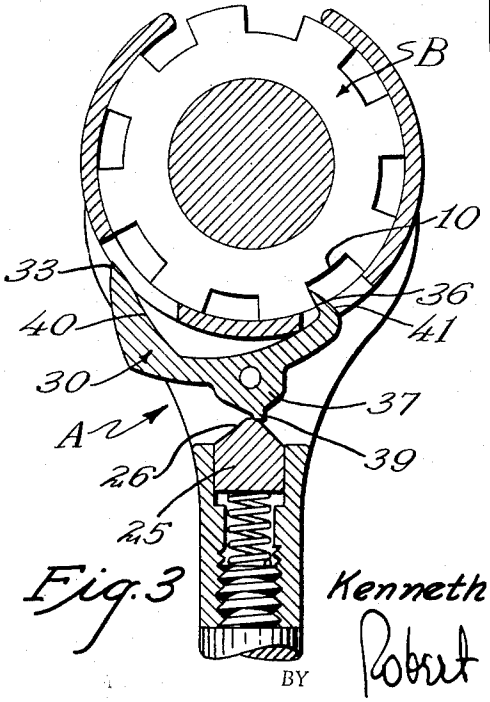


Fig. 3

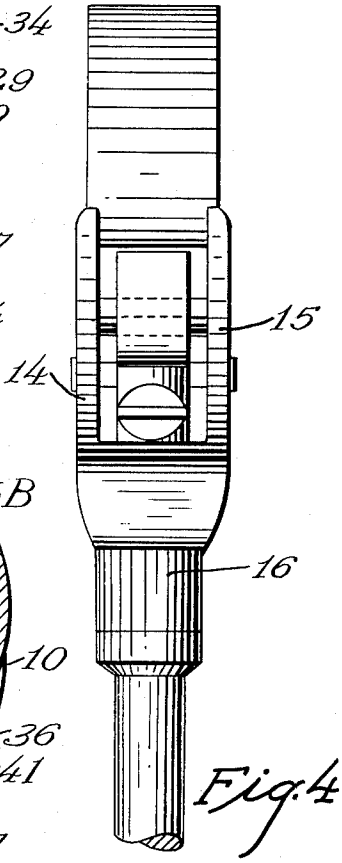


Fig. 4

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SPANNER WRENCHES FOR THREADED SPANNER NUTS

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6 Claims. (Cl. 81—63)

This invention relates to an improvement in wrenches and deals particularly with a type of ratchet wrench suitable for use with spanner nuts.

Spanner nuts are often used in locations where nuts requiring a usual type of wrench can not be employed. The tools used in tightening spanner nuts must accordingly ordinarily be operable to tighten or loosen the nut with an extremely limited angular motion. Various types of wrenches have been previously produced for this general purpose. However, most of these previously employed wrenches either are complicated to construct, or bulky in construction, or require reversal of the wrench to operate. It is the object of the present invention to avoid these difficulties.

A feature of the present invention resides in the provision of a spanner wrench which includes a split ring shaped shell designed to encircle somewhat more than one-half the circumference of the nut. This shell holds the wrench assembled with the nut and prevents the wrench from being disengaged from the nut by a radial movement. The split in the shell is of proper width to accommodate the shaft or bolt on which the nut is threaded so that the wrench may be removed and replaced without difficulty.

A feature of the present invention resides in the provision of a wrench having a ratchet dog or pawl having nut engaging portions at each end thereof. The dog or pawl is pivoted intermediate its ends and the nut engaging portions are so spaced as to cause one end to engage in a nut recess when the other end is being withdrawn. In other words, the disengagement of one end of the dog or pawl causes engagement of the opposite end with the nut.

A feature of the present invention resides in the provision of a spanner nut wrench having a double ended pawl, the ends of which alternately engage the grooves or recesses in the outer surface of the spanner nut. The spacing between the ends of the pawl are such that the angular oscillation of the wrench handle necessary to rotate the nut an angular distance equal to that between the peripheral nut grooves is only substantially half of the angular distance of rotation which would be necessary with a ratchet wrench employing a single ended pawl.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a plan view of the wrench engaged upon a spanner nut.

Figure 2 is a sectional view through the wrench showing the pawl in one extreme position.

Figure 3 is a view similar to Figure 2 showing the pawl at its other extreme position.

Figure 4 is a side elevational view of the wrench.

The spanner wrench is indicated in general by the letter A and is used in conjunction with a nut illustrated in general by the letter B. The nut B is of the type

ordinarily known as a spanner nut and includes angularly spaced axially extending grooves **10** about its periphery. The nut may be rotated by any tool engageable in a notch. In many instances such nuts are tightened by means of blades inserted in a groove and moved longitudinally by striking the blade end with a hammer or similar tool.

The wrench includes a ring shaped shell **11** having a slot or groove **12** extending therethrough. The slot **12** is of sufficient width so that the shell may be inserted or removed over the periphery of the threaded shaft **13** or bolt upon which the nut is mounted. Obviously the spanner nut may include an externally threaded hub if preferred for insertion into an internally threaded hole.

The shell **11** is connected by two spaced gusset plates **14** and **15** to a socket portion **16**. This socket portion **16** is arranged with its axis extending radially from the center of the ring **11**. The socket **16** includes a large diameter bore **17** which is connected to a smaller diameter bore **19**. The end of the bore **19** is threaded as indicated at **20**. The large diameter bore **17** is at the end of the socket nearest the shell **11** while the threaded end is directed outwardly.

A handle **21** is provided with a handle grip portion **22** which is at its outer end and a flange **23** near its other end. A threaded shank **24** projects beyond the flange **23** and is proportioned to be threaded into the threaded end **20** of the wrench socket portion **16**. The handle **21** may thus be disengaged from the wrench if desired but may normally be connected thereto.

A plunger **25** having a wedge shaped end **26** is slidably supported in the socket end **17**. If preferred the plunger **25** and its socket portion may be keyed to prevent relative axial rotation. Alternatively the plunger **25** may have a conically shaped end in place of the wedge shaped construction illustrated. A spring **27** is interposed between the plunger **25** and the threaded end **24** of the handle **21** to urge the plunger **25** toward the center of the shell **11**.

A pivot **29** extends between the gusset plates **14** and **15** and is supported thereby. This pivot **29** pivotally supports a dog or ratchet pawl **30**. This pawl **30** is provided with a spanner nut engaging end at both extremities thereof. One end **31** extends through an aperture **32** in the shell **11** and is provided with a pointed extremity **33** designed to engage at the juncture of the base of a nut groove **10** and a radial wall thereof. In other words, the pointed or wedge shaped extremity **33** of the pawl end **31** is engageable in a groove of the spanner nut B to permit rotation of the nut upon rotation of the wrench handle about the center of the shaft **13** in a clockwise direction as viewed in the drawings.

The other end of the pawl **30** is provided with a hook shaped projection **34** which is designed to extend through a shell aperture **35** and engage in a groove **10** of the nut B. This projection **34** engages against a groove of the wrench in such a way as to cause clockwise rotation of the nut when the wrench handle **10** is moved in a clockwise direction. A surface **36** of the hook shaped end **34** engages against a wall of the groove **10** acting to pull the nut in a rotative direction.

The ratchet dog **30** is provided with an enlarged bearing portion **37** which terminates in a laterally extending rib or ridge **39**. This ridge **39** is designed to engage on one side or the other of the wedge shaped extremity **26** of the plunger **25**. In other words, the plunger **25** is designed to hold the ratchet dog **30** in either of two extreme rotative positions, one of which is indicated in Figure 2 and the other of which is pictured in Figure 3.

The pawl end **31** is provided with an inner cam surface **40** which engages against a portion of the nut B at the edge of the groove **10** opposite the side thereof engaged

by the wedge shaped extremity **33**. In other words, as the handle **21** of the wrench is rotated in a counter-clockwise direction from the position viewed in Figure 2, the cam surface **40** engages the outer nut surface in such a way as to swing the pawl in a counterclockwise direction as viewed in the drawings. This cam surface **40** thus pivots the wedge shaped extremity **33** out of engagement with the groove **10** of the nut B and swings the hook shaped extremity **34** into another such groove. The cam surface **40** acts to pivot the ratchet until the rib **39** passes the center of the plunger **25** whereupon the plunger swings the ratchet dog into the position shown in Figure 3 and resists pivotal movement in the opposite direction.

With the ratchet dog in the position shown in Figure 3 the wrench may again be rotated in a clockwise direction to move the nut B. Movement of the nut is effected by engagement of the hook end **36** of the pawl with an edge of a nut groove **10**. When the wrench handle reaches the limit of its movement the handle is again rotated in a counter-clockwise direction.

Counter-clockwise movement of the wrench moves a rounded cam surface **41** on the pawl extremity **36** against the trailing edge of the spanner nut groove. The cam surface is such as to swing the pawl or ratchet **30** in a clockwise direction. This movement swings the hook shaped pawl end **36** out of the notch it has engaged and swings the pawl extremity **33** into another notch or groove **10**. Thus the pawl automatically engages the nut grooves alternately, first with one end and then with the other.

In the event the handle **21** may be swung through an arc greater than half the angular distance between two of the grooves **10**, a similar action is provided. Upon movement of the wrench handle in a counter-clockwise direction, first one end of the pawl and then the other is engaged in a suitable nut groove until the rotative movement of the wrench handle is stopped. As soon as the wrench handle is swung in the opposite direction one end or the other of the ratchet is at the time engaged in a groove and will rotate the nut.

The spanner wrench is reversible and can be turned over 180 degrees to rotate the nut in a reverse direction. The wrench is designed to fit a spanner nut of a particular size and having a predetermined groove spacing. Obviously the wrench can be constructed to accommodate a nut of any size and the jaws of the wrench can be proportioned to fit a nut of any size.

In accordance with the patent statutes, I have described the principles of construction and operation of my wrench, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A spanner wrench for use in combination with a grooved spanner nut threaded onto a shaft including a non-rotatable shell designed to encircle more than half the circumference of the nut, said shell being slotted to accommodate the nut shaft, a double ended ratchet dog pivotally supported adjacent to said shell, a ratchet point at each end of said dog, both said points being shaped to rotate the nut in the same direction, said ratchet points being alternately engageable with the nut.

2. A spanner wrench for use in combination with a recessed spanner nut threaded onto a bolt including a non-rotatable shell designed to extend around more than half the circumference of the nut, said shell being slotted

to accommodate the nut shaft, a ratchet dog pivotally supported adjacent said shell, a projection at each end of said ratchet dog designed to engage a groove in a spanner nut, said dog being pivotal between two extreme positions, one of said projections being engageable with a groove in the spanner nut to exert a pushing force thereagainst when said dog is in one extreme position, and the other of said points being engageable in a groove of the spanner nut to exert a pulling force thereagainst in the other extreme position of said dog.

3. A spanner wrench for use in conjunction with a spanner nut threaded onto a shaft and having a grooved surface, the wrench including a non-rotatable shell designed to extend more than half the circumference of the nut, said shell being slotted to accommodate the nut shaft, a ratchet dog pivotally supported adjacent to said shell, a projection at each end of said ratchet dog designed to engage in a groove of a nut encircled by said shell, one of said projections extending diagonally of a groove in the nut when in engagement therewith to exert a pushing pressure against the nut to rotate the same in one direction, the other of said projections being substantially hook shaped and engageable in a groove of the nut to exert a pulling force against the nut to rotate the same in said one direction.

4. A spanner wrench including a shell designed to extend more than half the circumference of a spanner nut, a ratchet dog pivotally supported adjacent said shell, a projection at each end of said ratchet dog designed to engage a groove in the spanner nut, said dog being pivotal between two extreme positions, one of said projections being engageable with a groove in a manner to exert a pushing force thereagainst when the dog is in one extreme position, and the other of said points being engageable in a groove of the spanner nut to exert a pulling force thereagainst in the other extreme position of said dog, and cam means forming a part of each projection and designed to pivot said dog toward its other extreme position upon rotation of the wrench in the opposite direction.

5. The combination of claim 3, and cam means on one of the projections for releasing said projection from a nut groove upon a pivotal movement of the wrench in the opposite rotative direction, and to simultaneously engage the other projection in another groove.

6. A spanner wrench for use in combination with a recessed spanner nut threaded onto an in accessible shaft, comprising a handle, a non-rotatable open split ring shaped shell having the opening on the outermost end in the plane of said handle and designed to freely accommodate said shaft and to slidably encircle somewhat more than half the circumference of the recesses in a spanner nut, and a ratchet dog pivotally mounted at the end of said handle adjacent said shell for engaging the relative recesses in a spanner nut when the spanner wrench is turned over and fitted thereto for a tightening or loosening operation.

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