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PIVOTED-JAW WRENCH HAVING A JAW-CLOSING SPRING ANCHORED IN A HOLLOW PIVOT

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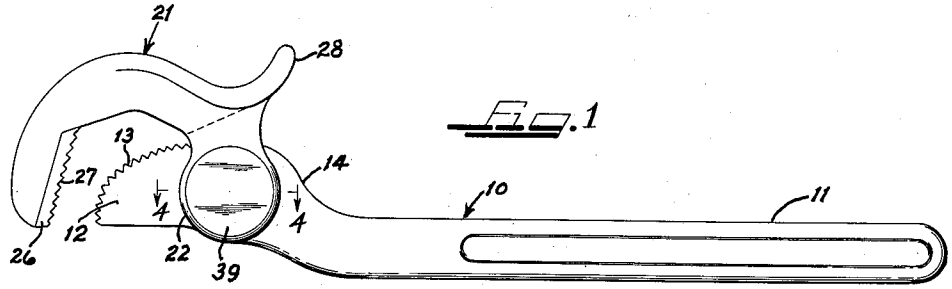


Fig. 1

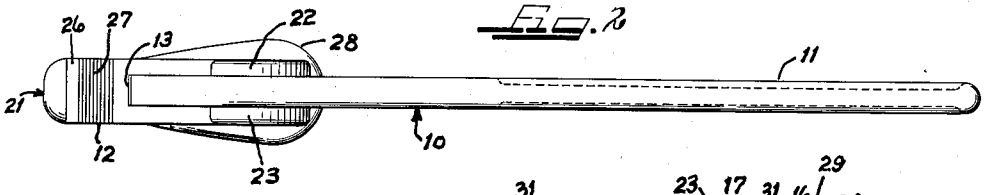


Fig. 2

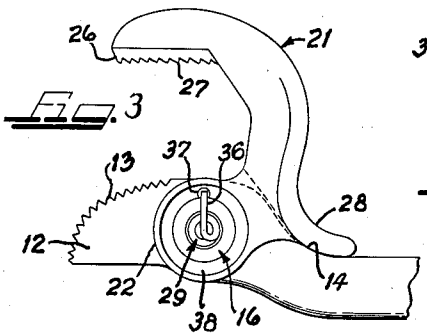


Fig. 3

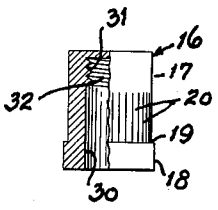


Fig. 10

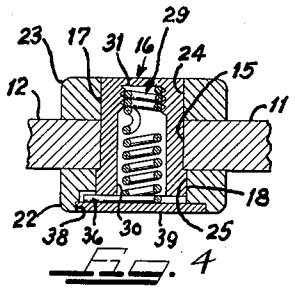


Fig. 4

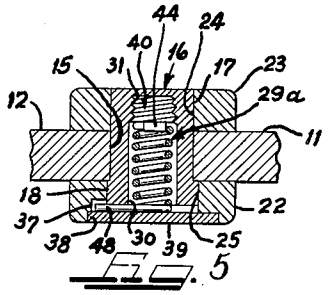


Fig. 5

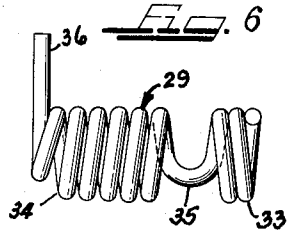


Fig. 6

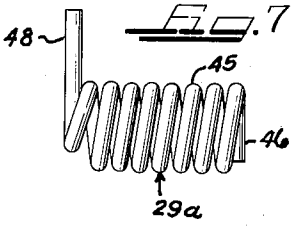


Fig. 7

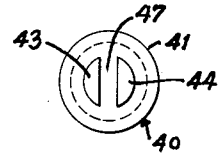


Fig. 9

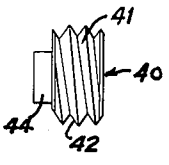


Fig. 8

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PIVOTED-JAW WRENCH HAVING A JAW-CLOSING SPRING ANCHORED IN A HOLLOW PIVOT

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8 Claims. (Cl. 81—99)

This invention relates to pivoted-jaw wrenches of the type which ratchet on the work and more particularly to spring and pivot means therefor whereby the jaws are self-adjusting, although these features may be employed with equal advantage for other purposes.

An important object of this invention, then, is the provision of an improved type pivot and jaw-actuating spring mechanism for a ratchet wrench.

Another object of the invention is the provision of an improved spring-anchoring pivot means for a ratchet-type wrench having a pivoted jaw.

A further object of the invention is the provision of a spring-anchoring pivot on which a movably mounted and operatively connected jaw structure is self-adjusting to the work to be turned.

A still further object of the invention is the provision in a ratchet type wrench of a hollow pivot for enclosing spring means operatively connecting the pivot and a movable jaw.

Yet another and still further object of the invention is the provision, in a pivoted-jaw wrench, of a hollow pivot enclosing and anchoring a jaw-closing spring.

Other objects and advantages of the invention will become more apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of a wrench embodying features of the present invention;

Figure 2 is a bottom view of the wrench shown in Figure 1 and illustrates the front or open-jaw side thereof;

Figure 3 is a fragmentary side elevation of the jaw structure in open position and with a cover being removed to better show the self-closing spring assembly;

Figure 4 is an enlarged fragmentary horizontal sectional view taken substantially along the line 4—4 of Figure 1;

Figure 5 is a view, similar to Figure 4, but showing a modified form of pivot-and-spring assembly;

Figure 6 is an enlarged plan view of the pivot spring shown in cross section in Figure 4, but rotated 90° clockwise from its position therein;

Figure 7 is an enlarged plan view of the pivot spring shown in cross section in Figure 5, but rotated 90° clockwise from its position therein;

Figure 8 is an enlarged plan view of a pivot insert, but rotated 90° clockwise from its position therein;

Figure 9 is a left end view of the insert shown in Figure 8; and

Figure 10 is a plan view having parts broken away and shown in section, of the cup-shaped pivot pin shown in cross section in Figures 4 and 5.

As shown in Figures 1 and 2, the wrench **10** comprises an elongated handle **11** terminating at one end in a fixed or stationary jaw **12**. The jaw has an arcuate and convex shaped gripping surface with transverse serrations or teeth **13**. These teeth may be provided as an integral part of the wrench in which event the handle is formed from an alloy steel or other hard, tough metal

to provide maximum wear. However, the teeth may be formed on a detachable member secured to the handle by interengaging wedge cleats, by screws, or by any one of several other means, all of which is well known in the art.

It will be noted that the longitudinal axis of the handle **11** is forwardly offset relative to the stationary jaw and connected thereto by a curved portion **14** for a purpose to be described later.

As best shown in Figures 4 and 5, the stationary jaw **12** has an opening **15** therethrough for receiving a pivot member **16**. The pivot member, illustrated in Figure 10, has a straight cylindrical shank **17** with an enlarged end portion **18** providing an abutment shoulder **19**. Serrations or teeth **20, 20** are formed in the shank adjacent the abutment shoulder. The shank is sized for press fit through the opening **15** with the shoulder **19** seated against the side of the jaw **12** and the serrations holding the pivot member against rotation.

A movable jaw member **21** terminates at one end in furcated pivot mounts **22** and **23** spaced to straddle the stationary jaw. The mounts **23** and **22**, respectively, have aligned apertures **24** and **25** therethrough for receiving the ends of the pivot member **16**. The spacing of the mounts is such as to permit free relative rotation of the movable jaw on the stationary jaw but without any lateral play.

The body of the movable jaw generally is S-shaped in side view. At its forward end is a gripping portion **26**, preferably of straight line configuration arranged in angular or tilted relation to the vertical axis of the stationary jaw when the parts are as shown in Figure 1. The gripping surface is formed by transverse serrations or teeth **27**. As in the case of the teeth of the stationary jaw, the teeth **27** may be formed integrally on the movable jaw or on a detachable member.

At the other or opposite end of the movable jaw body is provided a thumb trigger **28**. The trigger has a concave upper surface to accommodate the thumb of a user for quickly opening the movable jaw relative to the fixed or stationary jaw for receiving therebetween a work piece to be turned. When the movable jaw is rotated on the pivot **17** to the position of maximum opening (Figure 3), the convex under side of the thumb trigger seats against the curved surface **14** connecting the stationary jaw and handle.

In order that the movable jaw **21** be self-adjusting toward the stationary jaw **12** to accommodate a work piece and effectively grip it, a coiled wire spring **29** is confined within an internal recess **30** in the pivot member. An extension recess **31**, of smaller diameter than the recess **30**, is provided with threads **32** for securing one end **33** of the spring. As best shown in Figures 4 and 6, the spring **29** has several coils of wire at the end **33** wound in a right-hand direction. The coils are sized to thread into the extension recess and lock in the pivot member. At the other end **34** of the spring there is provided a plurality of coils wound in a left-hand direction. The left and right-hand coils are joined by a loop **35**. The coils **34** terminate in a diametrically extending anchor **36** which extends into a slot **37** provided in an edge of the aperture **25** of the movable jaw boss **22**. The spring described is provided with right-hand-wound coils in order to threadably engage within the threaded recess at the bottom of the pivot member. This arrangement affects a locking of the parts. In Figure 6, the spring is illustrated as having two such coils. It is to be understood, however, that this number may be varied depending on the depth of the recess **31** and the number of threads therein. The forward or working end **34** of the spring is provided with a plurality of left-hand-wound coils whereby to effect a winding of that portion of the

spring when the movable jaw is rotated to an opened position. An unwinding of the spring will, therefore, effect pressure in a jaw-closing direction.

As seen in Figure 4, the pivot mount **22** has an annular recess **38** provided in the face thereof. A flat cover plate **39** is shaped to be spun or pressed into the annular recess to serve as a seal for the interior of the pivot member and to confine the coiled spring therein. It is preferred that the closed end of the pivot member lie flush with the outer face of the movable jaw pivot mount **21** and that the annular recess **38** accommodate the cover plate flush with the outer face of the pivot mount **22**.

With the arrangement of parts as described above, the spring **29** will normally urge the movable jaw **21** toward the stationary jaw **12** from any limits defined by the abutment of the trigger **28** and curved handle surface **14** (Figure 3) and by contact of the jaws one with the other. The user can open the movable jaw by exerting thumb pressure on the trigger **28** to rotate the jaw in a clockwise direction relative to the stationary jaw to any desired distance within the above defined limits. In this relative jaw movement, the pivot mounts **21** and **22** rotate on the pivot member **16** against pressure exerted by the coiled spring **29** urging the movable jaw to a closed position.

In the modified embodiment illustrated in Figures 7, 8 and 9, the structural features previously described are embodied therein except for changes in the construction of a coiled wire spring **29***a* and the provision of an insert **40** for the extension recess **31** of the pivot member **16**. The insert **40** has a body **41** of approximately the same length as the depth of the extension recess **31** and is provided with exterior threads **42** for threaded engagement therein. At one end of the body **41** is formed forwardly extending spaced fingers **43** and **44** of generally partially circular configuration.

The spring **29***a* has all of its coils **45** wound in a left-hand direction with the inside diameter thereof effecting a snug embracing of the spaced fingers **43** and **44**. The embracing end of the spring terminates in a diametrically extending anchor **46** which engages in a slot **47** between the fingers **43** and **44**. At the other end of the spring is a diametrically extending anchor **48** shaped similarly to and for the same purpose as the anchor **36** of the spring **29**.

Operation of the spring **29***a* and associated parts is the same as previously described. As the end **46** is anchored in the pivot member, a clockwise rotation of the movable jaw **21** winds the spring thereby effecting the application of an unwinding pressure on the jaw to return it to a position closing it either against an inserted work piece or the stationary jaw.

While I have shown certain preferred embodiments of my invention and described them more or less precisely as to details, it is to be understood that the invention is not to be limited thereby, as changes may be made in the arrangement and proportion of parts, and equivalents may be substituted, without departing from the function and scope of the invention.

I claim as my invention:

1. In a hand tool having a fixed jaw and a movable jaw with furcated pivot mounts straddling said fixed jaw, the improvements comprising a hollow pivot member, said fixed jaw and pivot mounts having aligned openings for receiving said pivot member, a coiled spring adapted to seat within said pivot member, and means anchoring one end of said spring in the pivot member, the other end of said spring being anchored to one of the pivot mounts for normally urging said movable jaw toward said fixed jaw.

2. In a hand tool having a fixed jaw and a movable jaw with furcated pivot mounts straddling said fixed jaw, the improvements comprising a hollow pivot member, said fixed jaw and pivot mounts having aligned openings for receiving said pivot member, a coiled spring adapted to seat within said pivot member, and threaded means anchoring one end of said spring in the pivot member, the other end of said spring being anchored to one of the pivot mounts for normally urging said movable jaw toward said fixed jaw.

3. In a hand tool having a fixed jaw and a movable jaw with furcated pivot mounts straddling said fixed jaw and said jaws having aligned openings at the straddled area, the improvements comprising a recessed pivot member press-fitted in the opening of the fixed jaw and extending on both sides thereof for rotatably mounting the furcated mounts of the movable jaw, a coiled spring adapted to seat in the recess of said pivot member, and threaded means in the recess of said pivot member for anchoring the coiled spring therein, the other end of said spring being anchored to one of the pivot mounts for normally urging said movable jaw toward said fixed jaw.

4. In a hand tool having a fixed jaw and a movable jaw with furcated pivot mounts straddling said fixed jaw and said jaws having aligned openings at the straddled area, the improvements comprising a recessed pivot member with a serrated peripheral portion located substantially intermediately of the ends thereof, the pivot member being arranged for press-fit at the serrated portion in the opening of the fixed jaw with the ends thereof rotatably mounting the furcated mounts, the bottom of the recessed portion of the pivot member being threaded, and a coiled spring having one end arranged for threaded engagement in said bottom of the recess to anchor the spring to said pivot member and its other end anchored to one of the pivot mounts for normally urging said movable jaw toward said fixed jaw.

5. In a hand tool having a fixed jaw and a movable jaw with furcated pivot mounts straddling said fixed jaw and said jaws having aligned openings at the straddled area, the improvements comprising an axially recessed pivot member in press-fit engagement in the opening of the fixed jaw and extending beyond both sides thereof to provide pivots for rotatably mounting the straddling furcated mounts, threads in a bottom portion of the axial recess of the pivot member, and a coiled spring having coils at one end arranged for threaded engagement in the threads of the bottom portion of the pivot-member recess to anchor the spring therein, the coils at the other end of said spring being wound in a direction opposite the winding of the coils at said one end and terminating in an anchor to one of the pivot mounts for normally urging said movable jaw toward said fixed jaw.

6. In a hand tool having a fixed jaw and a movable jaw with furcated pivot mounts straddling said fixed jaw and said jaws having aligned openings at the straddled area, the improvements comprising an axially recessed pivot member in press-fit engagement in the opening of the fixed jaw and extending beyond both sides thereof to provide pivots for rotatably mounting the straddling furcated mounts, threads in a bottom portion of the axial recess of the pivot member, and a coiled spring having the coils at one end wound in a left hand direction and the coils at the other end wound in a right hand direction with a connecting loop therebetween, the right hand coils being threaded into the threads of the bottom portion of the recess in the pivot member to anchor the spring therein, the left hand coils terminating in an anchor to one of the pivot mounts for normally urging said movable jaw toward said fixed jaw.

7. In a hand tool having a fixed jaw and a movable jaw with furcated pivot mounts straddling said fixed jaw and said jaws having aligned openings at the straddled area, the improvements comprising an axially recessed pivot member in press-fit engagement in the opening of the fixed jaw and extending beyond both sides thereof to provide pivots for rotatably mounting the straddling furcated mounts, threads in a bottom portion of the axial recess of the pivot member, a threaded insert member

screwed into the threaded bottom portion of the axial recess of the pivot member, and a coiled spring having one end anchored in said insert member and its other end anchored in one of the pivot mounts for normally urging said movabale jaw toward said fixed jaw.

8. In a hand tool having a fixed jaw and a movable jaw with furcated pivot mounts straddling said fixed jaw and said jaws having aligned openings at the straddled area, the improvements comprising an axially recessed pivot member in press-fit engagement in the opening of the fixed jaw and extending beyond both sides thereof to provide pivots for rotatably mounting the straddling furcated mounts, threads in a bottom portion of the axial recess of the pivot member, an insert member having a threaded body screwed into the threaded

portion of the axial recess of the pivot member and a slotted end projecting therefrom, and a coiled spring having the ends thereof turned diametrically across the spring, one end seated in the slotted projecting end of the insert to anchor the spring to the pivot member and the other end anchored in one of the pivot mounts for normally urging said movable jaw toward said fixed jaw.

References Cited in the file of this patent

UNITED STATES PATENTS

295,204	Schramm et al	Mar. 18, 1884
1,486,981	Magnan	Mar. 18, 1924
2,211,507	Lilleberg	Aug. 13, 1940
2,645,145	Larson	July 14, 1953