June 22, 1954 H. BUSCHMAN 2,681,583

TOGGLE-ACTUATED, PIVOTED JAW WRENCH

Filed Aug. 21, 1952

2 Sheets-Sheet 1

Fig. 1.

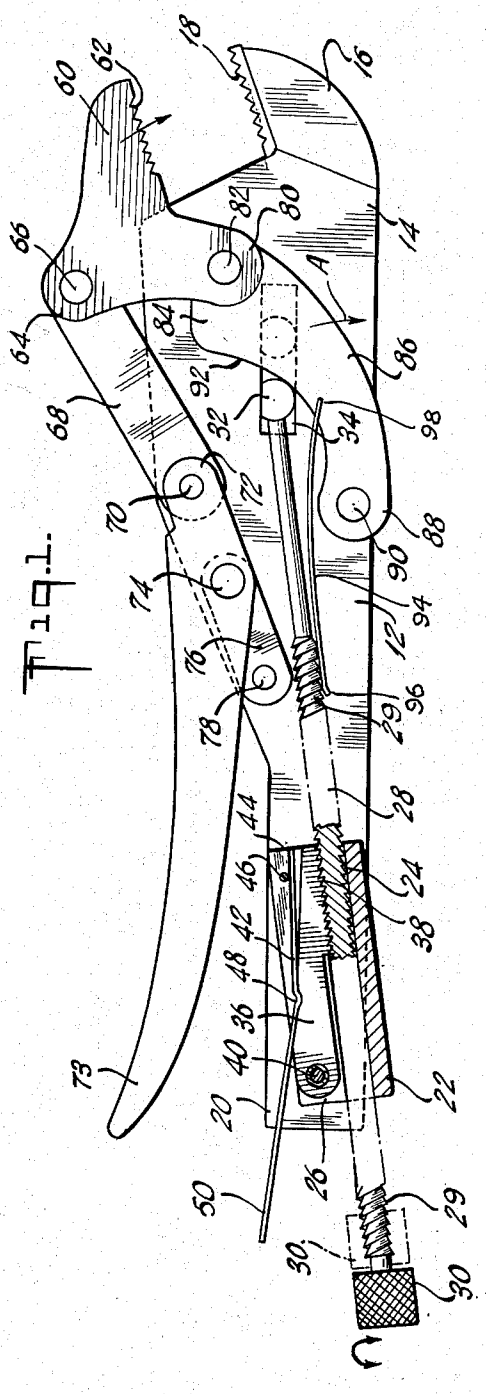



Fig. 3.

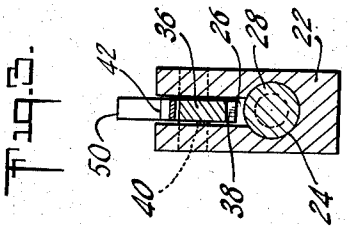
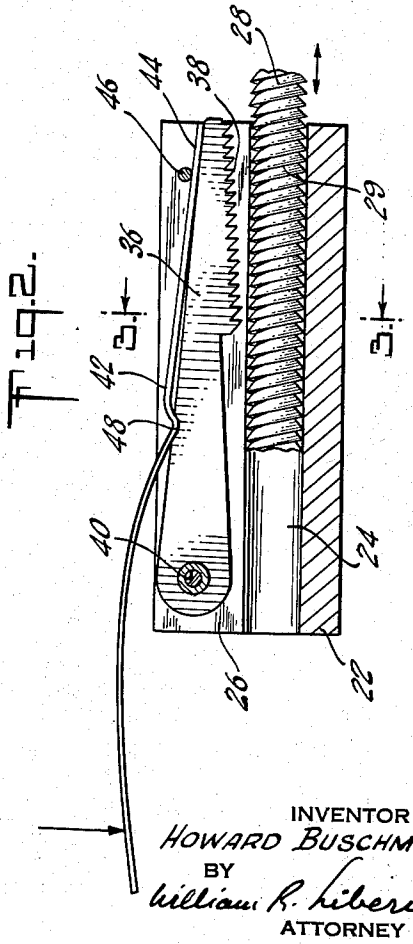



Fig. 2.




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Fig. 4.

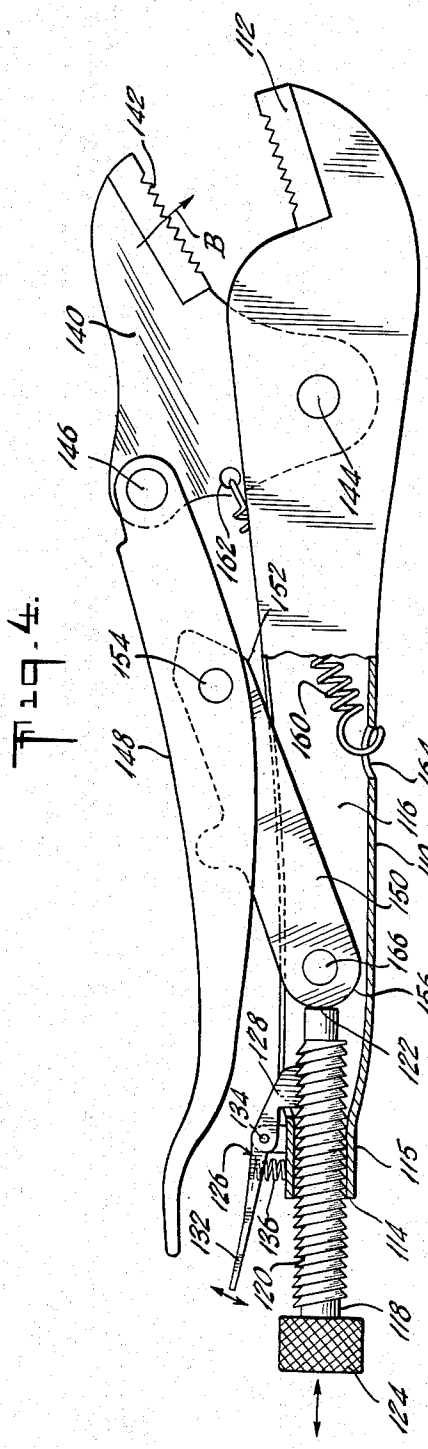



Fig. 6.

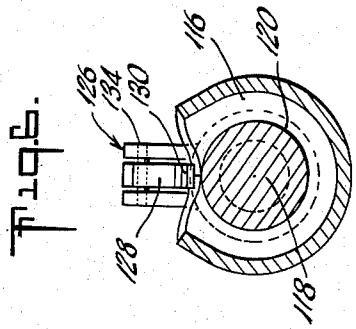
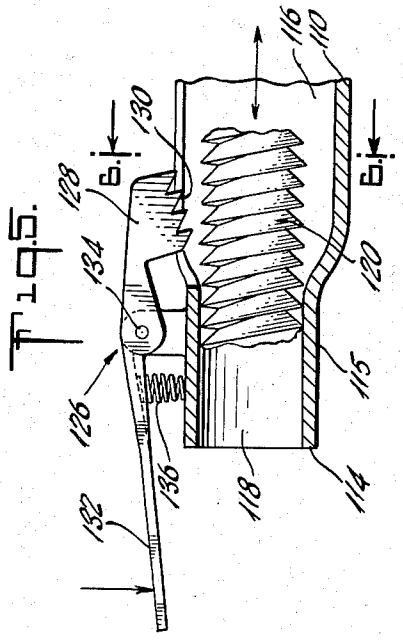



Fig. 5.




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# UNITED STATES PATENT OFFICE

2,681,583

## TOGGLE-ACTUATED, PIVOTED JAW WRENCH

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5 Claims. (Cl. 81—84)

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The present invention relates generally to wrenches, and in particular to wrenches having adjustable jaws. Wrenches of the general type to which this invention relates are adapted to be used on nuts, bolts, pipes and the like. It is slow and time-consuming work to change the spacing between the jaws of adjustable wrenches. The change is usually accomplished either by the rotation of a threaded shaft to which the movable jaws is secured either directly or by a pivot, or by rotation of an internally threaded collar disposed operatively about a threaded rod to an end of which the movable jaw is connected. These methods and means of adjustment are necessarily slow, awkward and time-consuming, depending on the speed of rotation of the threaded shaft or threaded collar, and valuable time is lost in adjusting the wrenches from one size to another.

The main object of the present invention, therefore, is the provision of improved means to vary the spacing between wrench jaws.

Another object of the present invention is the provision of an improved wrench provided with adjustable jaws, the spacing between which may be adjusted linearly and by straight line movement of a suitable control member, rather than by rotation of a shaft or collar.

Other and further objects of the present invention will in part be obvious and in part specifically pointed out in the following description of several illustrative embodiments thereof.

In the drawings annexed hereto and forming a part hereof,

Figure 1 is a part side elevation part longitudinal section through one form of device constructed according to and embodying the present invention;

Figure 2 is an enlarged part side elevation and part longitudinal section of the heel end of the fixed handle component of the device of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a side elevation, partly broken away to show interior details, partly in section of a modified form of wrench incorporating the control mechanism of the present invention;

Figure 5 is an enlarged part side elevation and part longitudinal section of the heel end of the fixed handle component of Figure 4; and

Figure 6 is a section on the line 6—6 of Figure 5.

Referring to the modification of the invention illustrated in Figures 1 to 3, the wrench involved

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comprises a pair of spaced-apart side frame plates 12, 12. A fixed head 16 is disposed between the head ends 14 of frame plate 12, said head 16 having a scored or ribbed inner face 18. Between the spaced-apart heel ends 20 of the frame is disposed a lengthwise-extending spacer block 22, which is longitudinally apertured as indicated at 24. The upper portion of block 22 is centrally channeled lengthwise thereof as indicated at 26, channel 26 being narrower than aperture 24 but in communication therewith. An elongated, control rod 28 is provided with rearwardly angled threads 29 thereabout, said rod 28 being of such diameter as to permit easy passage through and along block aperture 24. The rear of rod 28 is provided with an enlarged manually operable knurled head 30, the front of the rod terminating in a cross-head 32, the ends of which extend into and are trapped within elongated lengthwise extending slots 34 in each of frame sides 12.

A detent 36 is pivotally secured within block channel 26, said detent 36 having a forward reaching jaw with forwardly angled serrations 38 across the underside thereof, of such spacing as to interfit and interlock with the threads 29 about shaft 28. The rear end of detent 36 is pivoted between the sides of block 22 by pin 40 passing therethrough, the detent jaw being normally urged downwardly and into locking engagement with rod 28 by means of a leaf spring 42. The front end 44 of spring 42 is trapped beneath a cross-pin 46 set into block 22 and across channel 26 at its forward upper end. A medial portion of spring 42 is secured atop detent 36 as at 48, with the free end 50 of spring 42 extending rearwardly and beyond the heel ends 20 comprising the fixed handle. As spring end 50 is depressed, detent jaw 36 will be raised free of the rod threads 29.

A generally triangularly shaped, movable jaw 60 is provided and disposed between the frame plates 12, 12 opposite fixed jaw 16, said triangular jaw 60 having a scored or corrugated side or face 62 opposing face 18 of jaw 16. The upper end 64 of the base of triangular jaw 60 is pivoted by pin 66 to a link 68, the other end of which is pivoted by pin 70 to the forward end 72 of a movable handle 73. Handle 73 is likewise pivotally secured by pin 74 up from the forward end thereof to one end of a short link 76, the other end of said link 76 being pivotally secured to and between frame sides 12 by pin 78. The lower end 80 of the base of jaw 60 is pivotally secured by pin 82 to the upper end 84 of an arcuate link

member 86. The other end 88 of said arcuate link 86 is pivotally secured between plates 12, 12 by pin 90. When fitted together in the relationship illustrated in Figure 1, the cross-head 32 of control rod 28 bears against the rear curved edge 92 of link 86. It is to be noted that the upper end of rod 28 is rotatably fixed in cross-head 32. A flat, elongated, pre-set arched leaf spring 94 is provided, with one end thereof fixed between plates 12, 12, as at 96, and the other end thereof seated in a notch 98 in arcuate link 86, normally to bias link 86 upwardly to swing movable jaw 60 towards open position with respect to jaw 16, said spring 94 being further tensioned on downward movement of link 86 so as to swing link 86 upwardly on release of pressure of cross-head 32 against the rear edge 92 of link 86.

As illustrated in Figure 1, jaw faces 18, 62 are shown in spread-apart position. When it is desired to bring them closer together, for work on a nut, bolt or the like of smaller diameter, jaw 60 need only be manually swung toward fixed jaw 16 until the desired spacing is achieved. Thereupon, control rod is grasped at the headed knurled end 30 thereof and pushed inwardly and lengthwise of the device until cross-head 32 is butted against the rear edge 92 of link 86. The angulation of rod teeth 29 is such that the rod will override notches 38 in detent 36, permitting free movement of the rod upwardly even when the detent is engaged with the control rod. When handle 73 is then pressed towards heel ends 20, the heads 60, 16 will be locked in the desired position, particularly since the engagement of detent teeth 38 against threads 29 will resist any rearward or retrograde movement of rod 28. It will be obvious that the position of cross-head 32 in slots 34 will determine the maximum distance between jaw faces 18, 62.

In the embodiment of the present invention illustrated in Figures 4 to 6 inclusive, the fixed component comprises a generally U-shaped frame member 110 having a fixed jaw 112 mounted between the sides at the forward end thereof, the sides at rear end 114 thereof being turned into annular shape providing a lengthwise circular extending hollow sleeve 115 opening into the channel 116 between the frame sides. A control rod 118 is provided, threaded as indicated at 120 along its length, terminating at its forward end flat face 122, and at its rear end in an enlarged knurled head 124. A pivoted detent 126 is provided and secured atop sleeve 115, having a forward reaching head 128 provided with forwardly angled teeth 130 at its underside extending over the rear of channel 116 and interfitting with the rearwardly angled threads 120 on rod 118. A manually controllable lever 132 extends rearwardly from the pivot point 134 of detent 126 and a coil spring 136 is trapped between sleeve 115 and the underside of lever 132, this spring 136 serving normally to raise lever 132 and depress head 128 into toothed engagement with rod 118.

A generally triangular movable jaw 140 is provided, having a transversely extending toothed face 142 opposing fixed jaw 112 on the upper portion of one side of the triangle. The base at one side thereof is disposed within frame channel 116 and pivotally secured therebetween by pin 144; the other end of the base, extending upwardly out of frame 116 is pivotally secured by pin 146 to the forward end of handle 148. A straight, elongated link 150 is provided, with one end 152 thereof pivoted to handle 148 by transverse pin 154, the body of link 150 depending into channel 116 with its other end 156 resting therewithin in alignment with rod 118.

A coil spring 160 is provided, with one end thereof engaging the base of jaw 140 as at 162, and the other end engaged in an opening 164 in frame 110. Spring 160 is fitted as described under extension, functioning normally to pivot jaw 142 away from jaw 112. The operation of this modification of my invention is generally similar to that of the first modification hereinabove described.

When it is desired to reduce the distance between jaws 112, 142, they are merely and manually urged towards each other into the desired spacing against the biasing of spring 160. This will pivot head 140 downwardly in the direction of the arrow B and draw link 150 forwardly, whereupon control rod is pushed into channel 116 until the end face 122 thereof bears against the free end 156 of link 150, at which point the desired spacing between jaws 112, 142 is fixed. If desired, rod 118 may simply be pushed forwardly against link 150 and the tension of spring 160 until the desired jaw spacing is achieved. The angulation of rod threads 120 is such as to permit same to ride over and past detent teeth 130. Retrograde movement of rod 118 in a straight line is prevented by the interlocking engagement of detent teeth 130 with threads 120. A cross-pin 166 through link end 156 serves to trap link 150 within channel 116.

As will be obvious, when it is desired to enlarge the spacings between jaws 112, 142 (Figure 4) and between jaws 18, 62 (Figure 1) detents 126 and 36 respectively are disengaged from the control rods, thus permitting their retraction in a straight line. The contraction of spring 160 will pivot jaw 140 away from jaw 112 and urge link 150 rearwardly until it butts against rod end 122. It is possible in both modifications of my device to rotate the control rods 28, 118 clockwisely or counter-clockwisely for fine adjustments of the jaws, or even for full adjustment over the permissible scale, exactly as done with conventional devices, but with the devices of my invention, the slow, tedious and time-consuming rotary adjustment may be avoided and adjustment made positively, quickly and easily by straight line reciprocating manipulation of the control rods. The detents are normally engaged to lock the control rods, but they may be disengaged when retrograde movement is desired to enlarge the spacing, and they may be shifted forwardly—despite engagement by the detents— when it is desired to lessen the distance between the jaws.

My devices are simple to construct and operate and may readily be incorporated in conventional devices at small cost.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. A wrench comprising an elongated body portion having a pair of opposing jaws at one end thereof, an adjustably positioned fulcrum rotatably engaging one of said jaws which jaw is relatively movable towards and away from the other of said jaws, a lengthwise extending hollow bearing sleeve mounted at the other end of the body, an elongated threaded rod disposed within said sleeve and engaging and movable with said fulcrum, said rod being reciprocably shiftable lengthwise of the body selectively by screw thread rotation and by straight line movement to control the position of said fulcrum and said movable jaw with respect to the fixed jaw, a toothed

detent within the sleeve at said other end of the body normally engaging the threaded rod to limit same against straight line movement rearwardly of the body, the rod being shiftable forwardly by straight line movement and by screw thread rotation and rearwardly only by reverse screw thread rotation thereof during said engagement.

2. A wrench comprising an elongated body portion having a pair of opposing jaws at one end thereof, an adjustably positioned fulcrum rotatably engaging one of said jaws which jaw is relatively movable towards and away from the other of said jaws, a lengthwise extending hollow bearing sleeve pivotally mounted at the other end of the body, an elongated threaded rod disposed within said sleeve and engaging and movable with said fulcrum, said rod being reciprocably shiftable lengthwise of the body selectively by screw thread rotation and by straight line movement to control the position of said fulcrum and said movable jaw with respect to the fixed jaw, a toothed detent within the sleeve at said other end of the body and spring means thereon to urge the detent into engagement with the threaded rod to limit the same against straight line movement rearwardly of the body, the rod being shiftable forwardly by straight line movement and by screw thread rotation and rearwardly only by reverse screw thread rotation thereof during said engagement.

3. A wrench as in claim 2, wherein the teeth on the detent are forwardly angled, and the



threaded rod engaged with the detent is shiftable forwardly against the spring urging of the toothed detent against the rod threads, with the latter overriding the detent teeth.

4. A wrench as in claim 2, wherein the sleeve is longitudinally slitted and the detent is pivotally disposed within the slit with the toothed portion thereof directed against the rod extending through the sleeve.

5. A wrench as in claim 4, wherein the tension of the spring on the sleeve normally urging the detent into engagement with the rod is relaxable to disengage the detent from the rod, whereupon the rod is straight line reciprocably shiftable lengthwise of the body.


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