

Nov. 15, 1966

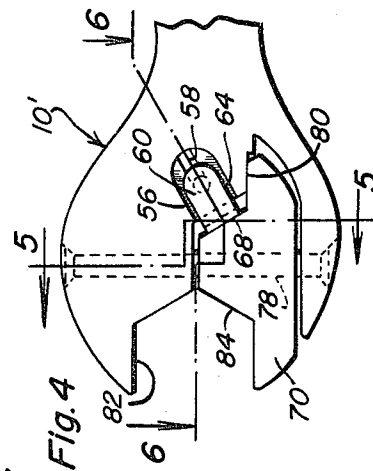
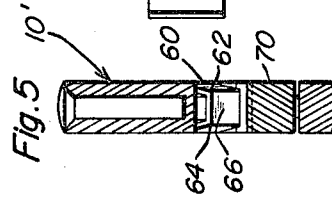
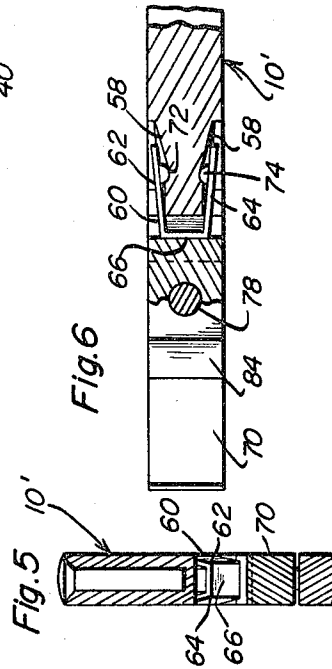
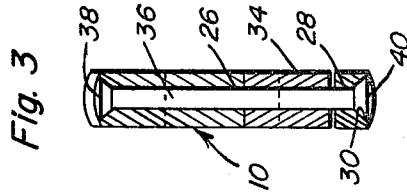
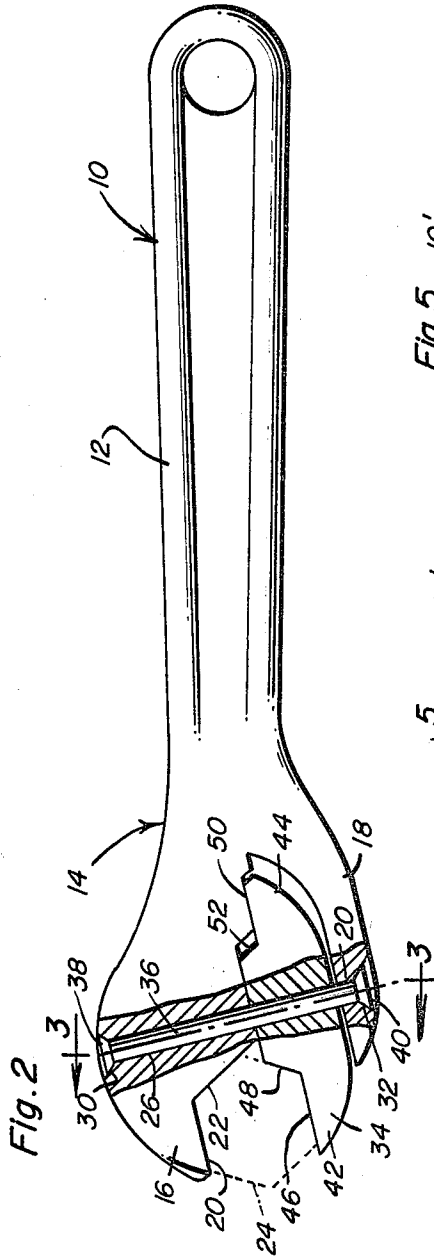
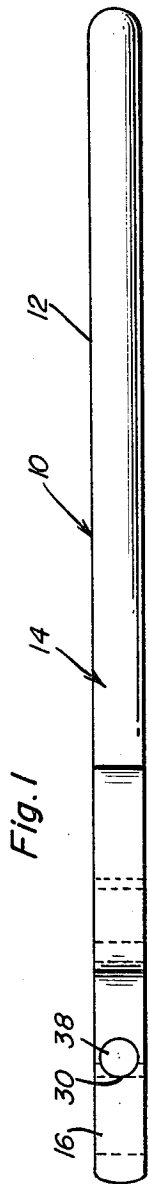
W. A. DAVIS

3,285,105

END WRENCH WITH ROTATABLE JAW INSERT

Filed March 4, 1965

2 Sheets-Sheet 1



Wilbur A. Davis
INVENTOR.

BY *Wm. A. O'Brien*
and *Harvey R. Jacobson*
Attorneys

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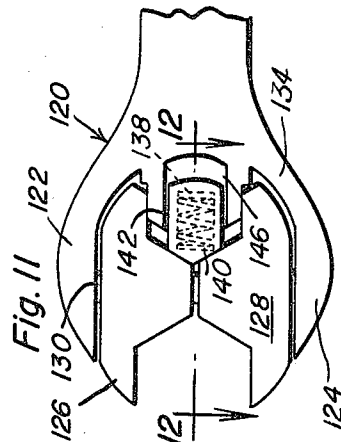
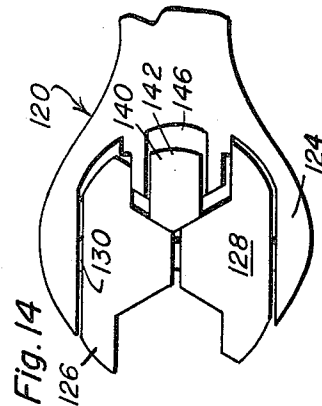
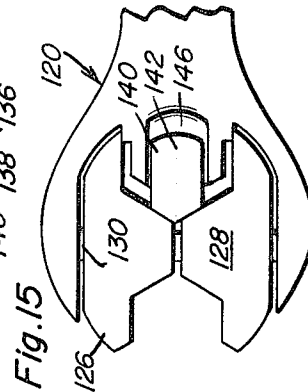
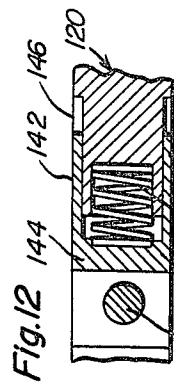
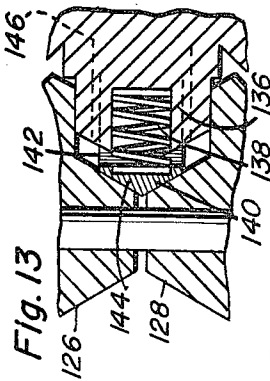
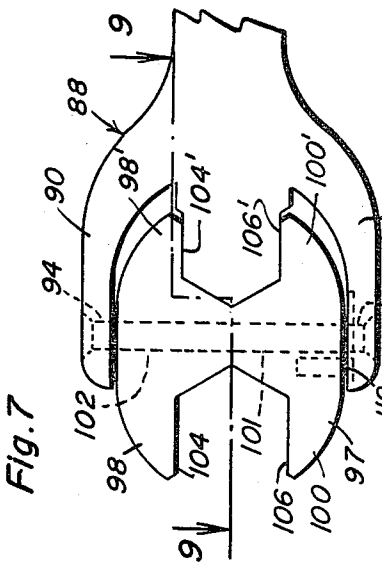
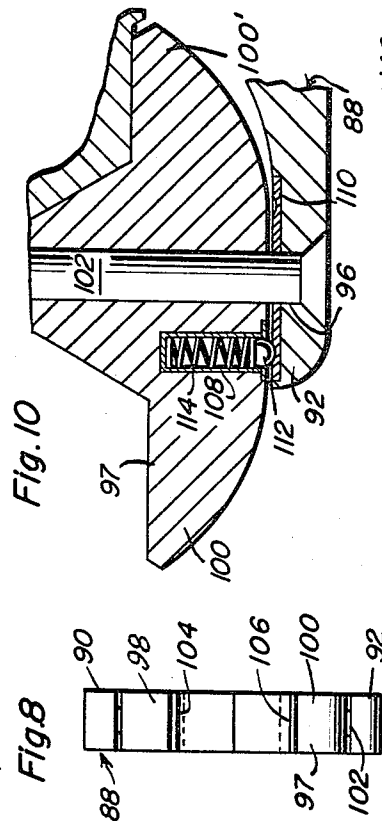
W. A. DAVIS

3,285,105

END WRENCH WITH ROTATABLE JAW INSERT

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2 Sheets-Sheet 2



Wilbur A. Davis
INVENTOR.

BY *Oliver A. O'Brien*
and *Harvey B. Jackson*
Attorneys

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3,285,105

END WRENCH WITH ROTATABLE JAW INSERT

Wilbur A. Davis, R.R. 1, Mahomet, Ill.

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11 Claims. (Cl. 81—178)

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This invention relates to a novel and useful end wrench and more specifically to an end wrench having opposing jaw surfaces for gripping a nut or bolt head therebetween.

At least one of the jaw surfaces of the end wrench is carried by a jaw member supported from the body of the wrench for rotation about an axis extending between the opposing jaw surfaces and the rotatable jaw member includes a second jaw surface disposed substantially diametrically opposite the first-mentioned jaw surface thereof and which may, upon rotation of the rotatable jaw member, be alternately positioned in juxtaposed relation with the jaw surface of the other jaw member.

In this manner, the jaw faces carried by the rotatable jaw member will be positioned in different spacial relationship relative to the gripping surface of the opposing jaw member as the jaw surfaces of the rotatable jaw member are alternated in position in and out of juxtaposed relation relative to the gripping surface of the opposing jaw member.

In addition, the end wrench of the instant invention may have each of its jaw members rotatably supported from the body portion of the wrench. In this instance it is to be understood that the diametrically opposite gripping surface on each rotatable jaw member are disposed in planes spaced longitudinally of and disposed normal to the axis of rotation of that jaw member.

The main object of this invention is to provide an open end wrench including means whereby at least one of the jaw members thereof may be shifted laterally of the line extending between the two jaw members of the wrench in the manner to bring an alternate gripping surface into juxtaposed spaced relation with the gripping surface of the opposing jaw, which alternate gripping face will be spaced a different distance from the opposing gripping face.

A further object of this invention, in accordance with the immediately preceding object, is to provide an end wrench of conventional over-all configuration and which includes structural features that do not prevent the end wrench from having a relatively small width thereby enabling the end wrench to be utilized in close quarters.

Another object of this invention is to provide an end wrench in accordance with the preceding objects including novel means for retaining the rotatable jaw members thereof in adjusted rotated positions.

A final object of this invention to be specifically enumerated herein is to provide an end wrench in accordance with the preceding objects and which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of the end wrench of the instant invention;

FIGURE 2 is a top plan view of the embodiment illustrated in FIGURE 1 and shown with portions thereof broken away and in horizontal section;

FIGURE 3 is a vertical transverse sectional view taken substantially upon a plane indicated by section line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary top plan view similar to FIGURE 2 but of a modified form of the end wrench;

FIGURE 5 is a vertical transverse sectional view taken substantially upon a plane indicated by section line 5—5 of FIGURE 4;

FIGURE 6 is a longitudinal vertical sectional view taken substantially upon the plane indicated by the section line 6—6 of FIGURE 4;

FIGURE 7 is a fragmentary top plan view of a further modified form of the invention;

FIGURE 8 is an end elevational view of the end wrench illustrated in FIGURE 7 as seen from the left side of FIGURE 7;

FIGURE 9 is a fragmentary longitudinal vertical sectional view taken substantially upon the plane indicated by the section line 9—9 of FIGURE 7;

FIGURE 10 is an enlarged fragmentary horizontal sectional view taken substantially upon the plane indicated by the section line 10—10 of FIGURE 9;

FIGURE 11 is a fragmentary top plan view of yet another modified form of end wrench which is substantially identical to the end wrench illustrated in FIGURE 7 but which includes different means for retaining the rotatable jaw members thereof in adjusted rotated positions;

FIGURE 12 is a fragmentary enlarged longitudinal vertical sectional view taken substantially upon a plane indicated by the section line 12—12 of FIGURE 11;

FIGURE 13 is an enlarged fragmentary horizontal sectional view of the embodiment illustrated in FIGURE 11 and showing the manner in which the rotatable jaw members are retained in adjusted rotated positions; and

FIGURES 14 and 15 are fragmentary top plan views of the embodiment illustrated in FIGURE 11 but with the rotatable jaw members thereof in different adjusted rotated positions.

Referring now more specifically to the drawings, the numeral 10 generally designates the end wrench of the instant invention. The end wrench 10 includes an elongated handle portion 12 having an enlarged head assembly generally referred to by the reference numeral 14 on one end thereof.

The head assembly 14 is somewhat conventional in design in that it includes two opposing jaw members 16 and 18. The jaw member 16 includes the usual nut gripping surfaces 20 and 22 for gripping adjacent sides of the nut 24. In addition, aligned bores 26 and 28 are formed through the jaw members 16 and 18 and the remote ends of the bores 26 and 28 are flared as at 30 and 32.

A rotatable jaw element 34 is pivotally supported from the jaw member 18 by means of a pivot pin 36 secured through the bores 26 and 28 and including enlarged head portions 38 and 40 seated in the flared end portions 30 and 32. The jaw element 34 is elongated and narrow and includes opposite end jaw sections 42 and 44, the former including complementary gripping faces or surfaces 46 and 48 and the latter including gripping surfaces or faces 50 and 52.

The gripping surfaces 48 and 52 are inclined similarly relative to the longitudinal axis of the pivot fastener or bolt 36 and the faces 46 and 50 are disposed in parallel planes which generally parallel the gripping surface 20 and are spaced different distances from the latter.

From FIGURE 2 of the drawings it may be seen that the surfaces 20 and 46 are spaced $\frac{7}{8}$ of an inch apart when the jaw element 34 is positioned as illustrated. However, when the jaw element 34 is rotated 180° from the position illustrated in FIGURE 2 of the drawings, the surfaces 50 and 52 will be disposed at the outer end of the jaw member 18 and the surfaces 20 and 50 will be spaced apart $\frac{3}{4}$ of one inch.

From FIGURES 1 and 3 of the drawings it may be seen

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that the head assembly 14 is relatively narrow and substantially the same thickness of a conventional open end wrench including rigid jaw members.

With attention now invited to FIGURES 4-6 of the drawings, there will be seen a modified form of open end wrench generally referred to by the reference numeral 10' and which is very similar in construction to the head assembly 14 except in that opposite sides of the head portion are relieved as at 56 with the relieved portions including inclined grooves 58. A locking member constructed of spring metal and designated by the reference numeral 60 is generally U-shaped in configuration including a pair of inclined legs 62 and 64 interconnected by means of an integral bight portion 66 and is disposed between the gripping surface 68 of the jaw element 70 and the opposing surface of the head assembly 14 with the projections 72 and 74 of the legs 62 and 64 disposed in the grooves 58.

When the locking member 60 is disposed as illustrated in FIGURE 4 of the drawings, its bight portion 66 abuts against the gripping surface 68 and prevents the jaw elements 70 from being rotated about the pivot fastener 78 of the head assembly 10'. However, the locking member 60 may be slid to the right as viewed in FIGURES 4 and 6 in the drawings to withdraw the bight portion 66 from engagement with the gripping surface 68 and a sufficient distance from the axis of rotation of the jaw element 70 to enable the latter to be rotated 180° in order to position the gripping surface 80 in juxtaposed position with the gripping surface 82. This, of course, will also position the gripping surface 84 in juxtaposed position relative to the bight portion 66 for engagement by the latter upon movement of the locking member 60 back to the left in order to retain the jaw element 70 in its adjusted rotated position.

With attention now invited to FIGURE 7 of the drawings there will be seen a still further modified form of open end wrench generally referred to by the reference numeral 88 and which is similar in construction to the end wrench 10 except in that it includes two abbreviated rigid jaw members 90 and 92 provided with aligned bores 94 and 96 and between which a double pivoted jaw 97 is rotatably supported. The double jaw 97 includes two pairs of jaw elements 98 and 100 and 98' and 100' and is provided with a bore 101 which rotatably receives the pivot fastener 102. The jaw elements 98 and 100 of the double jaw 97 define opposing gripping surfaces 104 and 106 which are spaced a predetermined distance apart and the jaw elements 98' and 100' define opposing jaw surfaces 104' and 106' which are spaced apart a distance slightly less than the distance between the jaw surfaces 104 and 106. In addition, the double jaw 97 has a blind bore 108 formed therein and the abbreviated jaw 92 includes a groove 110 which extends generally diametrically of the bore 96. A ball detent 112 is disposed in the outer end of the blind bore 108 and a compression spring 114 seated in the blind bore 108 bears against the detent 112 and urges the latter toward a seated position in the corresponding end of the groove 110.

From FIGURE 9 of the drawings it may be seen that the ball detent 112 is alternately seated in the opposite end portions 110 as the double jaw 97 is pivoted 180°.

With attention now invited to FIGURES 11-15 in the drawings it will be seen another modified form of end wrench generally referred to by the reference numeral 120 and which also includes a pair of abbreviated jaw members 122 and 124 similar to the jaw members 90 and 92 and between which a pair of jaw elements 126 and 128 are rotatably supported by means of a pivot fastener 130. The jaw members 126 and 128 each comprise approximately one-half of the double jaw 97 and are independently rotatable relative to the remainder of the end wrench 120. In addition, the body portion 134 of the end wrench 120 includes a blind bore 136 which opens toward the pivot fastener 130 and which has

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a compression spring 138 seatingly disposed therein. A detent member 140 is carried by the outer end of the compression spring 138 and is engageable with the opposing portions of the jaw members 126 and 128 to retain these jaw members in adjusted rotated positions.

Inasmuch as the jaw members 126 and 128 are independently rotatable relative to the body portion 134, the end wrench 120 may have its jaw members 126 and 128 positioned so as to adapt the wrench 120 to be utilized in connection with four different size nuts and/or bolts.

The follower 140 includes a pair of arms or legs 142 which are similar to the arms or legs 62 and 64 and which are interconnected at one pair of ends by means of a bight portion 144 defining the abutment portion of the follower and which are received in relieved portions 146 formed in opposite sides of the body portion 134 and similar to the relieved portions 58.

The head assembly 14 is slightly rotated in position on the handle portion 12 and this specific orientation of the head assembly 14 enables the wrench 10 to be held in a person's hand in a more comfortable manner. Further, the amount the jaw members 16 and 18 project from opposite sides of the wrench 10 is reduced by slightly inclining the pivot pin 36 relative to a line disposed normal to the longitudinal center line of the handle portion 12.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An end wrench with a rotatable jaw insert, said wrench including a body portion and a first jaw member in predetermined position relative to said body portion and defining a first jaw surface, a second jaw member defining a second jaw surface opposing said first jaw surface, said second jaw member being pivotally supported from said body portion for rotation about an axis disposed generally normal to a plane containing said first jaw surface and including means defining a third jaw surface, said second jaw being selectively rotatable between two positions alternately positioning said second and third jaw surfaces in operative positions opposing said first jaw surface, said second and third jaw surfaces being disposed in generally parallel planes passing through said axis at points spaced longitudinally therealong, said first jaw member being also pivotally supported from said body portion for rotation about an axis disposed generally normal to said plane and including means defining a fourth jaw surface selectively interchangeable in approximate operative position with said first jaw surface upon rotation of said first jaw member relative to said body portion, said first and fourth jaw surfaces being disposed in generally parallel planes passing through said axis at points spaced longitudinally therealong.

2. An end wrench with a rotatable jaw insert, said wrench including a body portion and a first jaw member in predetermined position relative to said body portion and defining a first jaw surface, a second jaw member defining a second jaw surface opposing said first jaw surface, said second jaw member being pivotally supported from said body portion for rotation about an axis disposed generally normal to a plane containing said first jaw surface and including means defining a third jaw surface, said second jaw being selectively rotatable between two positions alternately positioning said second and third jaw surfaces in operative positions opposing said first jaw surface, said second and third jaw surfaces being disposed in generally parallel planes passing through said axis at points spaced longitudinally therealong, said first and second jaw members being pivotally supported

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body portion for rotation about the axis disposed generally normal to said plane and including means defining a fourth jaw surface selectively interchangeable in approximate operative position with said first jaw surface upon rotation of said first jaw member relative to said body portion, said first and fourth jaw surfaces being disposed in generally parallel planes passing through said axis at points spaced longitudinally therealong, said body portion including first and second opposing extensions on one end thereof, said axis extending between said extensions.

10. The combination of claim 9 wherein said first and second jaw members are mounted for simultaneous pivotal movement relative to said body portion.

11. An end wrench with a rotatable jaw insert, said wrench including a body portion and a first jaw member in predetermined position relative to said body portion and defining a first jaw surface, a second jaw member defining a second jaw surface opposing said first jaw surface, said second jaw member being pivotally supported from said body portion for rotation about an axis disposed generally normal to a plane containing said first jaw surface and including means defining a third jaw surface, said second jaw being selectively rotatable between two positions alternately positioning said second and third jaw surfaces in operative positions opposing said first jaw surface, said second and third jaw surfaces being disposed in generally parallel planes passing through said axis at points spaced longitudinally therealong, said first jaw member being also pivotally supported from

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said body portion for rotation about the axis disposed generally normal to said plane and including means defining a fourth jaw surface selectively interchangeable in approximate operative position with said first jaw surface upon rotation of said first jaw member relative to said body portion, said first and fourth jaw surfaces being disposed in generally parallel planes passing through said axis at points spaced longitudinally therealong, said body portion including first and second opposing extensions on one end thereof, said axis extending between said extensions, said first and second jaw members being mounted for individual pivotal movement relative to said body portion.

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WILLIAM FELDMAN, *Primary Examiner*.

MILTON S. MEHR, *Examiner*.