Feb. 4, 1969 W. A. DAVIS 3,425,302

END WRENCH WITH SELECTIVELY USABLE JAW FACE SHIM MEANS

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Fig. 1

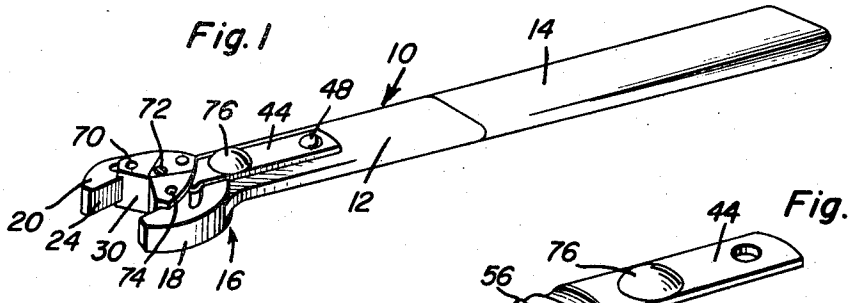


Fig. 6

Fig. 2

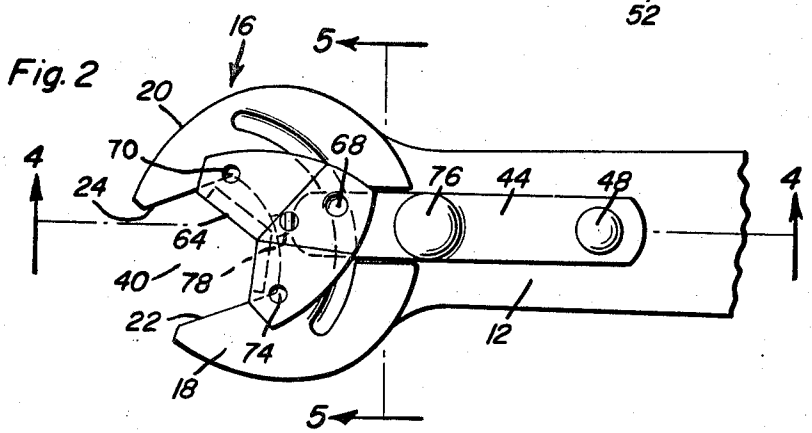


Fig. 3

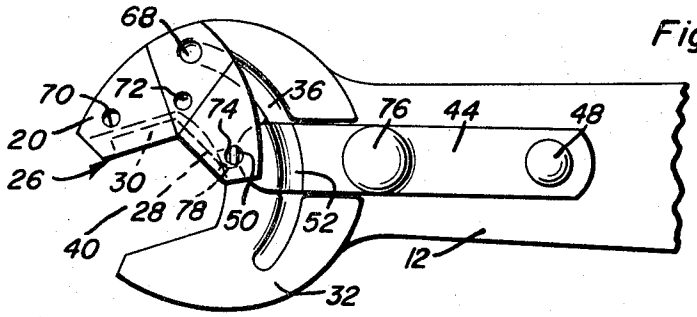
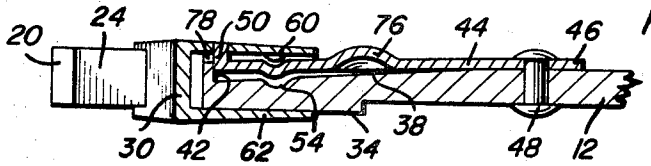


Fig. 4



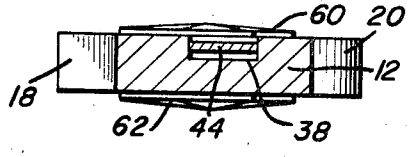


Fig. 5

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END WRENCH WITH SELECTIVELY USABLE JAW FACE SHIM MEANS

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Int. Cl. B25b *13/24, 13/38*

ABSTRACT OF THE DISCLOSURE

A shim structure adapted for use on an end wrench including a pair of opposing jaw members provided with opposing jaw faces and including spaced apart detached corresponding end portions, the shim structure including a pair of shim portions with one of the shim portions being positionable between the jaw faces and adjacent one of the latter to reduce the effective spacing between the faces and the other shim portion being alternately positionable between the jaw faces adjacent the other of the faces to further reduce the effective spacing between the jaw faces.

The end wrench construction of the instant invention is provided with a shim structure including a pair of shim portions thereof selectively positionable between the opposing jaw faces of the end wrench. In addition, the shim structure is constructed in a manner whereby both of the shim portions thereof may be disposed in an out-of-the-way position leaving the area between the jaw faces of the wrench unrestricted and thus not reducing the spacing between the jaw faces. Therefore, the shim structure of the instant invention may be utilized to effectively reduce the width of the jaw opening of an end wrench. By providing the shim structure with a pair of shim portions which may alternately be positioned between the opposing jaw faces of the corresponding end wrench, the shim assembly may be utilized to convert an open end wrench which will accept three different size nuts or bolts heads.

The main object of this invention is to provide an end wrench including means by which it may be readily altered to accept nuts and bolt heads of different sizes.

Another object of this invention is to provide an end wrench constructed in a manner so that it may accept nuts and bolt heads of three different sizes.

A still further object of this invention is to provide an end wrench in accordance with the preceding objects and including structural features thereof that may be readily incorporated into the manufacture of conventional end wrench and which may also be added by way of modifications to existing end wrenches with a minimum amount of machining.

A final object of this invention to be specifically enumerated herein is to provide an end wrench in accordance with the preceding objects 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 perspective view of the end wrench of the instant invention;

FIGURE 2 is an enlarged fragmentary plan view of the left end portion of the end wrench of FIGURE 1;

FIGURE 3 is a fragmentary plan view similar to that

of FIGURE 2 but with the shim assembly of the wrench positioned in an alternate position;

FIGURE 4 is a sectional view taken substantially upon the plane indicated by the section line 4—4 of FIGURE 2;

FIGURE 5 is a transverse sectional view taken substantially upon the plane indicated by the section line 5—5 of FIGURE 2; and

FIGURE 6 is a perspective view of the spring-type locking detent of the end wrench which is operable to maintain the shim assembly of the wrench in adjusted position.

The numeral **10** generally designates an end wrench constructed in accordance with the present invention. The wrench **10** includes an elongated body **12** having an elongated handle extension **14** on one end and provided with a wrench head generally referred to by the reference numeral **16** on the other end.

The wrench head **16** includes opposite side confronting jaw members **18** and **20** which generally parallel each other and project outwardly from the side of the head **16** remote from the handle extension **14** and the jaw members **18** and **20** include generally parallel and confronting jaw faces **22** and **24**, respectively, between which a nut or bolt head is adapted to be snugly received whereby the elongated body of the wrench **12** including the handle extension **14** may be utilized to apply torsional forces to the nut or bolt head.

The wrench head **16** is quite similar to the head portion of a wrench commonly known as a crescent wrench. The jaw members **18** and **20** are of course stationary and therefore the distance between the generally parallel jaw faces **22** and **24** is set. For this reason, the wrench head **16** may be utilized to grip only one size of nut or bolt head. However, the instant invention includes the provision of a shim assembly generally referred to by the reference numeral **26** and which includes two different thickness shim portions **28** and **30** which may be selectively shifted into superposed relation with the jaw faces **22** and **24** to vary the effective distance between the jaw members **18** and **20**.

The wrench head **16** includes an upper surface **32** and a lower surface **34** and the upper surface **32** has a semicircular upwardly opening groove **36** formed therein. Also, the upper surface of the jaw member **18** in the adjacent end of the body **12** has a groove **38** formed therein. The groove **38** gradually decreases in depth toward the end thereof adjacent the handle extension **14** and increases in depth toward the throat area **40** defined between the jaw members **18** and **20** and terminates at an upstanding wall portion **42** spaced but slightly from the inner end of the throat area **40**.

A positioning spring arm **44** has one end **46** secured to the body **12** by means of a fastener **48** and the other end of the spring arm **44** extends forwardly in the groove **38** and terminates in an upwardly directed forward terminal end portion **50** disposed closely adjacent the wall portion **42**.

As can best be seen in FIGURE 6 of the drawings the spring arm **44** incldes a crimped portion **52** defining a continuation for the groove **36** and which is receivable in the portion of the groove **38** in which a transverse groove **54** is formed. Further, the terminal end portion **50** includes opposite side upper beveled corners **56** forming a reduced upper end on the terminal end portion **50**.

The shim assembly **26** includes a pair of vertically spaced apart upper and lower plates **60** and **62** notched in a similar fashion at their forward ends as at **64** and rigidly interconnected by means of the upstanding wall-like shim portions **28** and **30**. The upper wall or plate **60** includes a downwardly depressed detent portion **68**

which is slidingly received in the groove **36** and also in the groove defined by the crimped portion **52** and the upper wall or plate **60** further includes three apertures **70**, **72** and **74** in which the reduced upper end of the terminal end portion **50** is receivable.

When the shim assembly **26** is positioned as illustrated in FIGURE 2 of the drawings, the shim portions **28** and **30** are not disposed in overlying relation to either of the jaw surfaces **22** and **24** and therefore the effective spacing between the jaw members **18** and **20** is not reduced and a full size nut or bolt head may be engaged between the jaw faces **22** and **24**.

When the shim assembly **26** is positioned as illustrated in FIGURE 2 of the drawings, the depressed portion **68** is disposed in the crimped portion **52** and the upper reduced end of the terminal end portion **50** is received in the aperture **72** and thus the shim assembly **26** is maintained in stationary position.

When the effective distance between the jaw members **18** and **20** is to be reduced so as to adapt the wrench to be utilized in effectively gripping a smaller nut or bolt head, the forward end of the spring arm **44** is depressed by pushing downward on the upwardly offset thumb grip **76** disposed slightly rearwardly of the crimped portion **52** in order to downwardly withdraw the terminal end portion **50** from the aperture **72**. Then, the shim assembly **26** is swung to the position thereof illustrated in FIGURE 3 of the drawings bringing the aperture **74** into registry with the terminal end portion **50** and sliding the depressed portion **68** in the end of the groove **36** formed in the jaw member **20**.

By so shifting the shim assembly **26**, the shim portion **30** is disposed between the jaw faces **22** and **24** in position closely overlying the jaw face **24** and thereby reducing the effective spacing between the jaw members **18** and **20** to thus allow the wrench **10** to be engaged with a smaller nut or bolt head. However, if a nut head or bolt of a size between the sizes which may be gripped by the wrench **10** when the shim assembly **26** is positioned as illustrated in FIGURES 2 and 3 of the drawings is to be turned, the shim assembly **26** may be shifted from the position overlying the jaw member **20** illustrated in FIGURE 3 of the drawings to a position overlying the jaw member **18** and with the slightly thinner shim portion **28** closely overlying the jaw face **22**.

It is deemed readily apparent that the shim assembly **26** may be readily removed from the wrench head **16** by first centering the shim assembly **26** in the position thereof illustrated in FIGURE 2 of the drawings and then downwardly depressing the forward end of the spring arm **44** whereupon the shim assembly **26** may be disengaged from the wrench head **16** by forwardly displacing the shim assembly **26** and slipping the downwardly depressed portion **68** through the semi-circular notch **78** formed in the upper extremity of the wall portion **42**.

Further, it is to be noted that the shim portions **28** and **30** are slightly spaced from the jaw faces **22** and **24** when overlying the latter. Also, the shim assembly **26** could be made so as to be more readily removable and so as to be forwardly displaceable from the wrench head **16** from positions overlying the jaw member **20**, such as that illustrated in FIGURE 3 of the drawings, and overlying the jaw member **18**. If it was desired to so construct the shim assembly **26**, the depressed portion **68** and the apertures **70**, **72** and **74** could be eliminated and the groove **36** and the spring arm **44** could also be eliminated. However, each jaw member **18** and **20** could be provided with an upstanding bore in a position corresponding with the opposite ends of the groove **36** and the upper and lower plates **60** and **62** could be provided with registered apertures in lieu of the depressed portion **68** which could be registered with the bores formed in the jaw members **18** and **20** so that a locking pin could be displaced downwardly through the upper and lower plates **60** and **62** and the corresponding jaw member to releasably lock the shim assembly **26** in the desired position. However, if such construction was to be utilized, the shim assembly **26** would be readily removable and thus more likely to be lost, especially if the wrench **10** was ever to be used without the shim assembly **26**.

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. In combination, a body including a pair of opposing jaw faces between which opposite sides of a nut or bolt head are adapted to be gripped, a single integral shim structure including a pair of shim portions of different thickness and supported from said body for shifting between two positions in a single plane extending between and disposed generally normal to said faces with one of said shim portions being disposed between said faces adjacent one of the latter to reduce the effective spacing between said faces when said shim structure is in one of said two positions and the other of said shim portions being disposed between said faces adjacent the other of said faces to further reduce the effective spacing between said faces when said shim structure is in the other of said two positions.

2. The combination of claim **1** wherein said body comprises an elongated wrench body and said jaw faces are disposed on one end of said wrench body.

3. The combination of claim **2** wherein said jaw faces define an open end wrench head on said one end of said body.

4. The combination of claim **1** wherein said shim structure is also supported from said body for shifting in said plane to a third position thereon in which neither of said shim portions is disposed between said faces in a manner reducing the effective spacing therebetween.

5. The combination of claim **4** wherein said third position is disposed intermediate the first mentioned two positions.

6. The combination of claim **5** wherein said body comprises an elongated wrench body and said jaw faces are disposed on one end of said wrench body.

7. The combination of claim **6** wherein said jaw faces define an open end wrench head on said one end of said body.

8. The combination of claim **1** wherein said body comprises an elongated wrench body and said jaw faces are disposed on one end of said wrench body, said jaw faces being carried by jaw members fixed on and defining an open end wrench head on said one end of said wrench body.

9. In combination with an open-end wrench of the type including a pair of spaced apart elongated jaw members interconnected at one pair of corresponding ends and including generally parallel opposing jaw faces, a shim structure supported from said wrench and including a pair of shim wall portions disposed in relatively angulated position to form a notch having an included angle of approximately 120 degrees, said shim structure being alternately positionable in a first position with one of said shim wall portions overlying one of said faces and the other shim wall portion extending generally toward the plane containing the other of said faces and a second position with the other of said shim wall portions overlying the other of said faces and said one shim wall portion extending toward the plane containing said one face.

10. The combination of claim **9** wherein said shim structure is also supported from said wrench for shifting to a third position with said shim wall portions extending between said one pair of corresponding ends of said jaw members and with a line bisecting said included angle

generally paralleling said jaw faces and extending outwardly between the other pair of corresponding ends of said jaw members.

11. In combination with an open-end wrench of the type including a jaw portion consisting of a pair of spaced apart elongated jaw members interconnected at one pair of corresponding ends, defining a throat area therebetween and including generally parallel opposing jaw faces, said jaw portion including upper and lower surfaces disposed on opposite sides of and facing away from a horizontal plane extending between said jaw faces and in which said jaw members extend, a single shim structure including upper and lower plate portions overlying and underlying said upper and lower surfaces, respectively, and a plate-like shim portion extending through said throat area and interconnecting corresponding marginal edge portions of said plate portions, said plate portions and said surfaces coacting to guidingly support said shim structure for shifting in said plane relative to said jaw portion between a first position with said shim portion disposed at one side of said throat area and overlying one of said jaw faces and thereby reducing the effective dimension of said throat area extending between said faces and a second position with said shim portion disposed at the inner extremity of said throat area and out of registry with said jaw faces.

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