

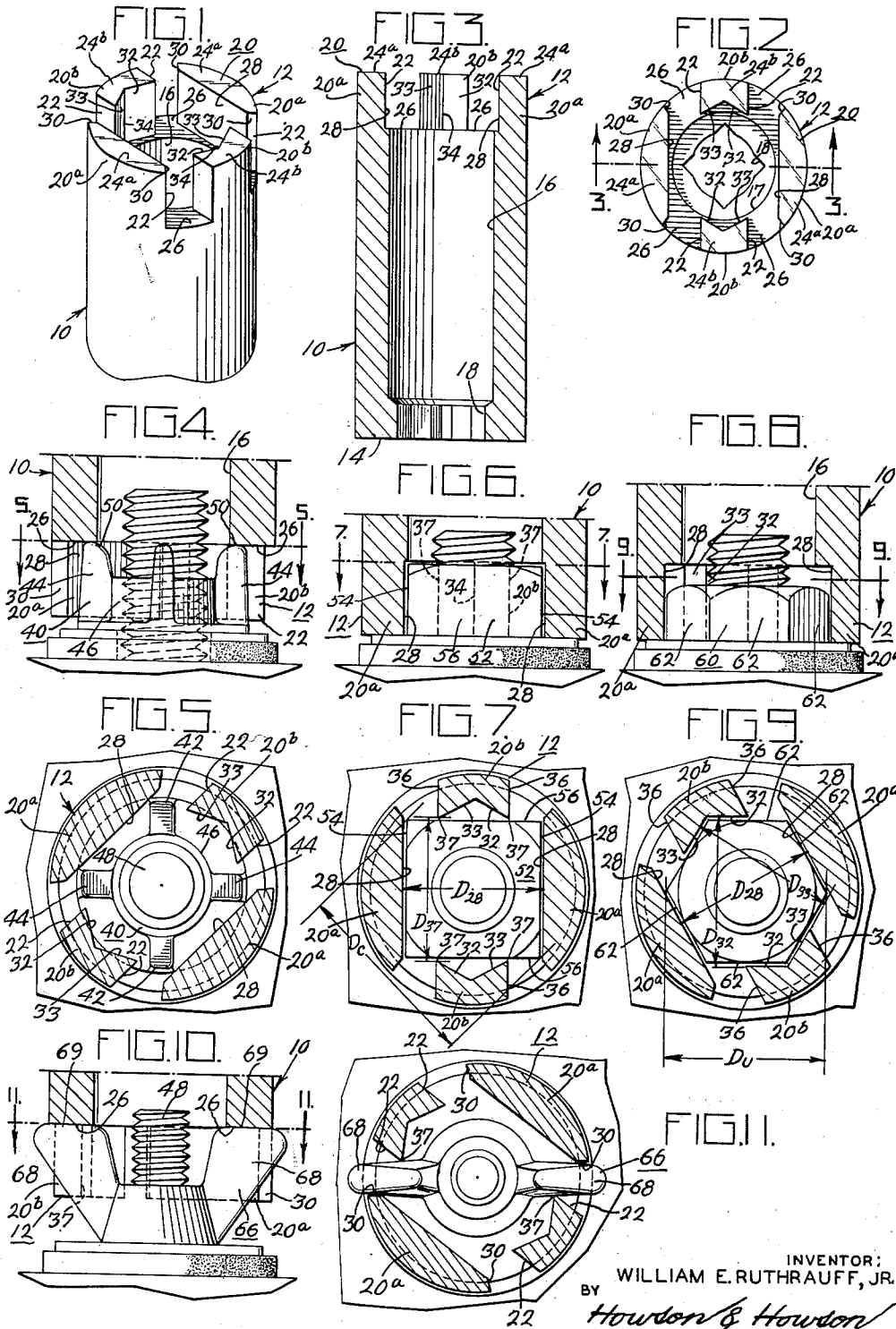
Jan. 8, 1963

W. E. RUTHRAUFF, JR

3,071,995

TOOL FOR FASTENERS

Filed Oct. 7, 1960



INVENTOR;
WILLIAM E. RUTHRAUFF, JR.
BY
Howdon & Howdon
ATTYS.

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TOOL FOR FASTENERS

William E. Rudhrauff, Jr., 350 MacDade Ave.,
Collingdale, Pa.

Filed Oct. 7, 1960, Ser. No. 61,278

6 Claims. (Cl. 81-90)

This invention relates broadly to a tool for turning fasteners, and is more particularly directed to a tool having a single working end or tip which may be used interchangeably to turn square and hexagonal nuts as well as single and double wing-nuts.

The tool is especially useful for installing bathroom fixtures such as cabinets, toilets, and the like, which may require various fasteners of the types mentioned above to secure the fixtures in place. Installation of the fixtures is greatly expedited when using the tool of the present invention for the reason that the workman need only employ a single tool for the various types of fasteners used. This eliminates manipulation of separate tools for each type fastener or adjustment of a single tool to accommodate a variety of fasteners, and therefore results in a considerable time saving to the workman. Additionally, since only a single tool is required by the workman, the cost of tool investment is reduced considerably.

With the foregoing in mind, an object of the present invention is to provide a tool having a single working end or tip operable to engage and turn square and hexagonal nuts as well as single and double wing-nut fasteners.

Another object of the present invention is to provide a tool of the above type which is economical to manufacture and is extremely effective in use.

A still further object of the present invention is to provide a new and useful tool for turning fasteners which is capable of doing the work of several tools, since it may be used selectively to turn standard square and hexagonal nut type fasteners as well as single and double wing-nut type fasteners, and therefore minimizes tool handling and tool investment costs.

These and other objects of the present invention and the various details of the construction and operation thereof are hereinafter more fully set forth with reference to the accompanying drawings, in which:

FIG. 1 is a fragmentary perspective view of a tool showing a working tip made in accordance with the present invention;

FIG. 2 is an end view thereof;

FIG. 3 is a sectional view of the tool taken on line 3-3 of FIG. 2;

FIG. 4 is an enlarged fragmentary sectional view of the working end of the tool in working engagement with a double wing-nut;

FIG. 5 is a sectional view taken on line 5-5 of FIG. 4;

FIG. 6 is an enlarged fragmentary sectional view similar to FIG. 4, showing the working end of the tool applied to a standard square nut;

FIG. 7 is a sectional view taken on line 7-7 of FIG. 6;

FIG. 8 is an enlarged fragmentary sectional view of the working end of the tool engaging a standard hexagonal nut;

FIG. 9 is a sectional view taken on line 9-9 of FIG. 8;

FIG. 10 is a fragmentary view similar to FIGS. 4, 6 and 8, showing the tool applied to a double wing-nut, and

FIG. 11 is a sectional view taken on line 11-11 of FIG. 10.

In the illustrated embodiment of the tool of the present invention shown in FIGS. 1-3 of the drawings, the tool comprises broadly a body portion 10 having a working end or tip 12 and a driver or handle-engaging end 14. In the present instance the body portion 10 is generally cylindrical, having a central bore 16 extending longitudinal-

ly thereof, and the handle-engaging end 14 of the tool is provided with a generally square opening 18 to accommodate a driver (not shown) of generally square cross-section for turning the tool.

In accordance with the present invention, the working tip 12 of the tool is constructed so that it may be selectively positioned in working engagement with standard square and hexagonal nuts, as well as single and double wing-type nuts to turn the same. The working tip of the tool is designed to firmly embrace or grip fasteners of the above-mentioned type so that they may be turned by rotation of the tool about its central axis. To this end the working tip 12 is comprised of a plurality of terminal wall portions 20 which project lengthwise in a generally circular array from the body portion 10 and, as illustrated, are formed as an integral part thereof. In the present instance, two pairs of terminal wall portions 20^a and 20^b are provided, with the terminal wall portions of each pair being diametrically opposed. The terminal wall portions 20^a are disposed between the terminal wall portions 20^b and are circumferentially spaced therefrom to provide longitudinally extending slotted openings 22 between the adjacent terminal wall portions. The circumferential extent of the terminal wall portions 20^a is greater than that of the terminal wall portions 20^b. For example, each of the terminal wall portions 20^a occupies about 90° of the circle described by the terminal wall portions, whereas each of the terminal wall portions 20^b occupies 45° of the circle. The slotted openings 22 extend from the axial end faces 24^a, 24^b of the terminal wall portions 20^a, 20^b, respectively, toward the body portion 10 of the tool, and terminate in circumferentially-extending recessed seats 26 between the terminal wall portions.

The terminal wall portions 20^a and 20^b are provided with working surfaces facing generally inwardly toward the central axis of the tool adapted to embrace a nut fastener and cause it to be turned when the tool is rotated. In the present instance, the terminal wall portions 20^a have continuous planar, confronting working surfaces 28, 28 which, as shown in FIG. 3, are co-extensive and substantially parallel to each other and to a plane through the central axis of the tool. The outer side extremities of the working surfaces 28, 28 are bevelled outwardly from the central axis of the tool, as shown in FIG. 2, to provide offset segmental working surfaces 30, 30.

Each of the terminal wall portions 20^b is provided with angularly disposed working surfaces 32, 33 which may be of equal size and shape and which, as illustrated in FIG. 2, are diverging surfaces facing inwardly toward the central axis of the tool. In the present instance the working surfaces 32, 33 intersect at an angle of 120° along lines of intersection 34, 34 which lie in the common plane passing through the central axis of the tool parallel to the surfaces 28, 28. The planar working surfaces 28, 28 are at an angle of 120° to each of the adjacent working surfaces of the terminal wall portion 20^b. The corresponding working surfaces 32 of the terminal wall portions 20^b are diagonally opposed and parallel to each other and to a plane through the central axis of the tool. The working surfaces 32 are spaced apart a distance D₃₂, approximately equal to the distance D₂₈ between the planar working surfaces 28, 28 (see FIG. 9). The corresponding working surfaces 33 are likewise diagonally opposed and parallel to each other and to the plane through the central axis of the tool. The working surfaces 33 are spaced apart a distance D₃₃, approximately equal to the distances D₂₈ and D₃₂. Each terminal wall portion 20^b has generally parallel side walls 36, 36 which are substantially parallel to the working surfaces 28, 28. The side walls 36 of the opposed terminal wall portions 20^b are aligned, and their inner side edges 37 are spaced apart a distance D₃₇ which is approximately

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equal to the distance D_{28} between the parallel working surfaces 28, 28 (see FIG. 7).

The tool of the present invention is shown in FIGS. 4-11 applied to various types of nut fasteners. In FIGS. 4 and 5, for example, the working tip 12 of the tool engages a double wing-nut fastener 40 having transversely arranged pairs of wings 42, 44 extending from an internally threaded body 46 which turns on a stud 48. When the nut 40 is nested in the working tip 12 of the tool as illustrated, the wings 42, 44 face generally in the direction of the slotted openings 22, and the upper tips 50 of the wings engage the recessed seats 26. When the tool is rotated, for example in a clockwise direction with respect to FIG. 5, to seat the nut, the working surfaces 28, 28 engage the side edges of the wings 42 so that the nut is turned with the tool, and when the tool is rotated in the opposite direction, the working surfaces 28, 28 engage the side edges of the wings 44 to cause the nut to turn with the tool.

In FIGS. 6 and 7 the tool is shown in working engagement with a standard square nut 52. The nut is nested snugly within the working tip 12 of the tool with the opposed parallel flats or side faces 54 and 56 thereof facing, respectively, the working surfaces 28, 28 of the terminal wall portions 20^a and the side edges 37 of the terminal wall portions 20^b. As illustrated, the distances D_{28} and D_{37} are slightly greater than the distance across the flats of the nut and less than the distance D_c across the diametrically opposed corners of the nut to closely confine the nut within the terminal wall portions of the tool. With this arrangement it is apparent that as the tool is rotated the nut is likewise turned.

In FIGS. 8 and 9 the tool is shown in working engagement with a standard hexagonal nut 60 which fits snugly within the confines of the terminal wall portions 20^a, 20^b. The distances D_{28} , D_{32} and D_{33} between the working surfaces 28, 32 and 33, respectively, are, as described above, substantially equal, and are slightly greater than the width across the parallel opposed flats or side faces 62 of the nut, so that the working tip 12 of the tool may be readily positioned over the nut with a working surface of the tool confronting each of the flats 62 thereof and closely spaced therefrom. The distance D_w across the diametrically opposed corners of the nut is greater than the distances D_{28} , D_{32} and D_{33} . With the nut confined in this manner, the nut is readily turned by rotating the tool.

The tool of the present invention may be used to turn a single wing-nut fastener 66 having aligned wing portions 68. As shown in FIG. 11, each wing portion 68 of the nut is received in the slotted opening 22 between the segmental working surface 30 of the terminal wall portion 20^a and the inner side edge 37 of the terminal wall portion 20^b. When the working tip is seated on the nut, as shown in FIG. 10, the upper tips 69 of the wings engage the recessed seats 26. With the wings wedged in the openings 22, as described, the nut is caused to turn with the tool.

While the tool of the present invention has been illustrated as being of a particular configuration, it is to be understood that modifications thereof are possible without departing from the invention. For example, the body portion of the tool may be of non-cylindrical form, and if desired the driver or handle for turning the tool may be formed as an integral part of the tool.

Accordingly it is apparent that the present invention provides a new and useful tool for turning fasteners, which has a single working end that may be selectively applied to standard square and hexagonal nut-type fasteners as well as single and double wing-nut type fasteners to turn the same.

While a particular embodiment of the present invention has been illustrated and described herein, it is not intended to limit the invention to such a disclosure, and

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changes and modifications may be made therein within the scope of the following claims.

I claim:

1. A tool for turning fasteners comprising a body portion and at least two pairs of terminal wall portions projecting in a generally circular array from said body portion with the wall portions of each pair being diametrically opposed, one of said pairs of the terminal wall portions having confronting opposed continuous planar working surfaces, each terminal wall portion of the other of said pairs having angularly-disposed working surfaces diverging inwardly toward the central axis of the tool, each planar working surface of said one pair occupying approximately 90° of the circle defined by the pairs of terminal wall portions and being of a length approximately equal to the shortest distance between the working surfaces of said other pair of terminal wall portions and the angularly disposed working surfaces of each of said other pair occupying approximately 45° of said circle whereby slotted openings are formed between adjacent wall portions in said circular array.

2. A tool for turning fasteners comprising a body portion and at least two pairs of terminal wall portions projecting in a generally circular array from said body portion with the wall portions of each pair being diametrically opposed, the terminal wall portions of one of said pairs having confronting opposed continuous planar working surfaces which are approximately parallel to each other and to a plane through the central axis of the tool and are of a length approximately equal to the shortest distance between the working surfaces of said other pair terminal wall portions, the terminal wall portions of the other of said pairs being co-extensive and each having a pair of angularly-disposed working surfaces diverging inwardly toward the central axis of the tool, said angularly disposed working surfaces intersecting at an angle of 120° in said plane through the central axis of the tool.

3. A tool according to claim 2 wherein corresponding surfaces of said pairs of angularly-disposed working surfaces are diagonally opposed and are parallel to each other and to the central axis of the tool, and wherein the planar working surfaces are at an angle of 120° to each of the adjacent working surfaces of said angularly-disposed surfaces.

4. A tool according to claim 3 wherein the distance between said planar working surfaces is approximately equal to the distance between said diagonally-opposed working surfaces whereby the tool may accommodate a hexagonal nut.

5. A tool for turning nut fasteners comprising a generally cylindrical body portion, means defining a central bore through said body portion extending longitudinally thereof, and a working tip at one end of said body portion operable to engage a nut fastener, said working tip having at least two pairs of terminal wall portions projecting axially from the cylindrical body portion with the wall portions of each pair being diametrically opposed, the terminal wall portions of one of said pairs having confronting continuous planar working surfaces which are approximately parallel to each other and to a plane through the central axis of the body portion and are of a length approximately equal to the shortest distance between the working surfaces of said other pair of terminal wall portions, each of the terminal wall portions of the other of said pairs having angularly-disposed working surfaces diverging inwardly toward said central axis of the body portion.

6. A tool according to claim 5 wherein adjacent wall portions of said working tip are spaced apart circumferentially to define therebetween longitudinally extending slotted openings whereby the tool may accommodate a wing-nut.

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