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[54] **HANDY MAN'S WRENCH**

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[52] **U.S. Cl.** ..... **81/121 R,** 81/177 N

[51] **Int. Cl.** **B25b 13/06**

[58] **Field of Search** ..... 81/121 R, 121 A, 81/121 B, 125.1, 119, 177 R, 177 E, 177 M, 177 N, 177 G, 180 R, 180 B, 90 R, 90 B; 7/1 G

[56] **References Cited**

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[57] **ABSTRACT**

A handy man's wrench comprising noncircular wrench inserts with socket openings stored in the wrench handle under a pivoting cover and interchangeable to matingly shaped end positions thereon. The desired size socket opening in a wrench insert is placed in the end position of the wrench handle for engaging and turning a standard hexagonal nut with levered force applied to and transmitted through the handle.

10 Claims, 8 Drawing Figures

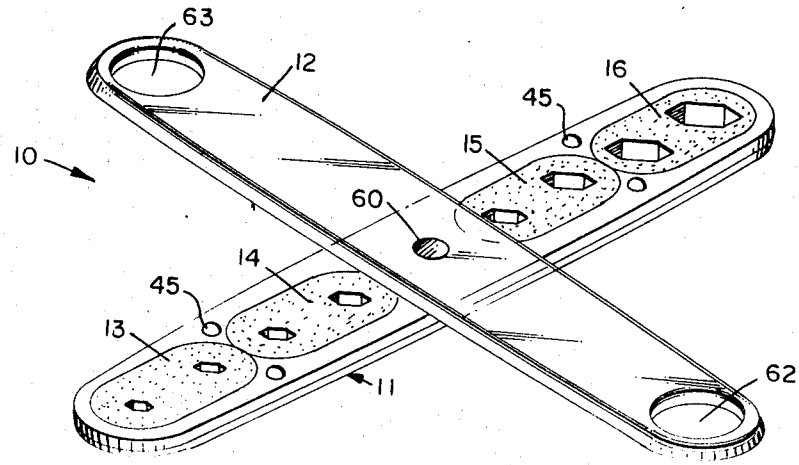


FIG. 1

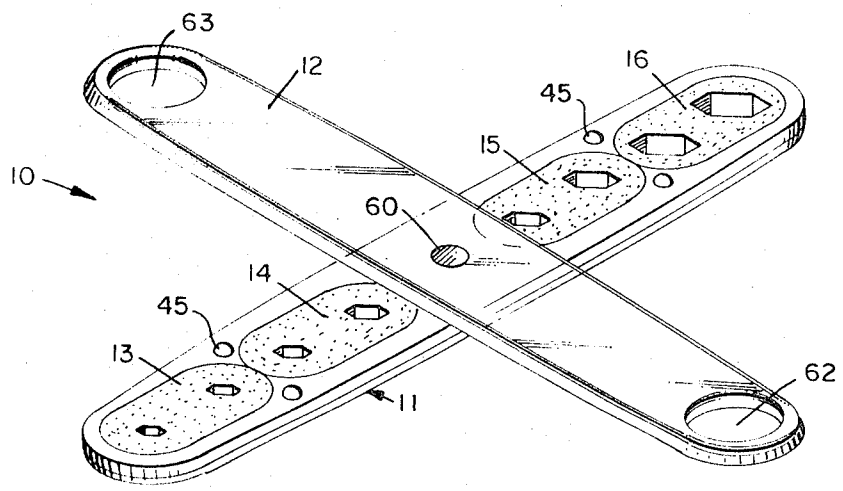
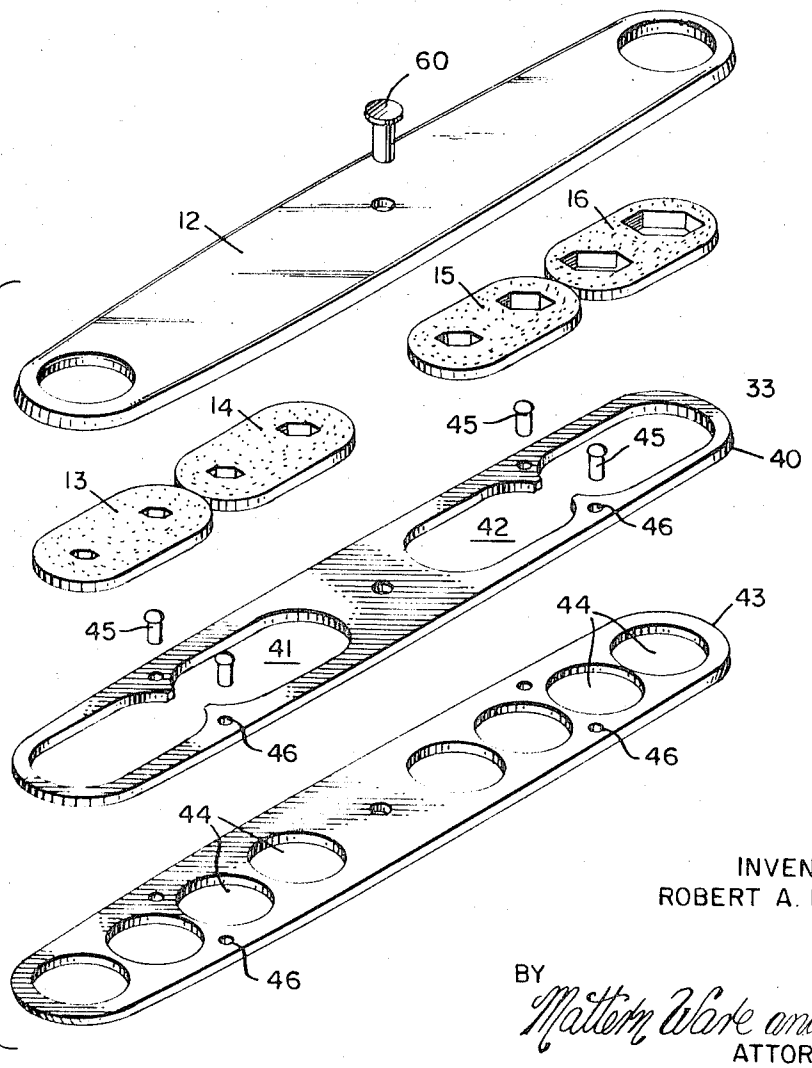


FIG. 2



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FIG. 3

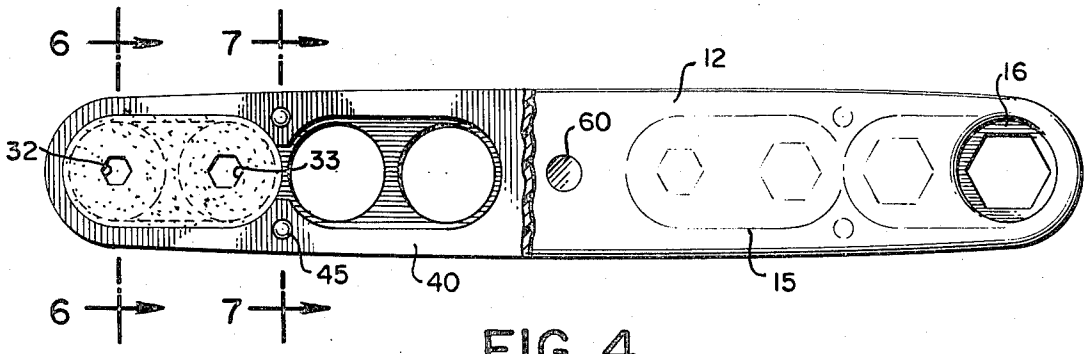


FIG. 4

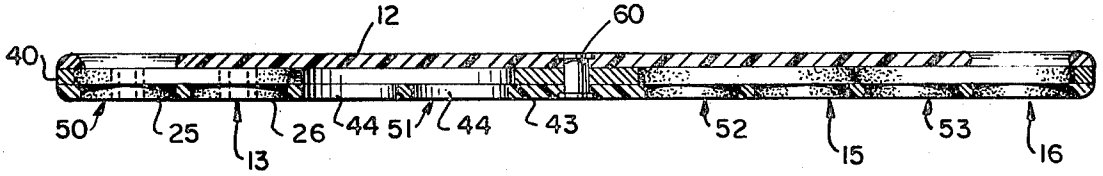


FIG. 5

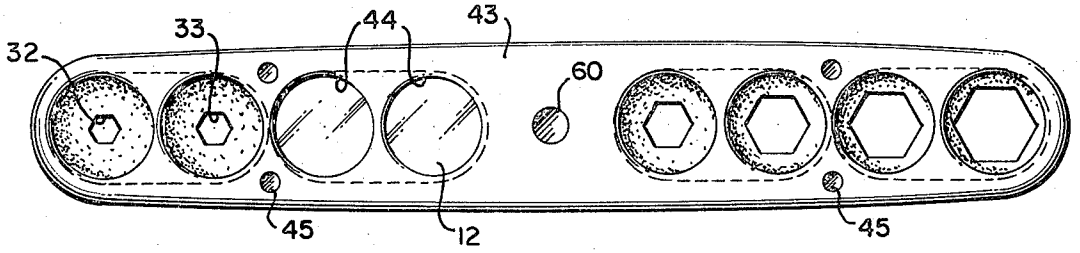


FIG. 6

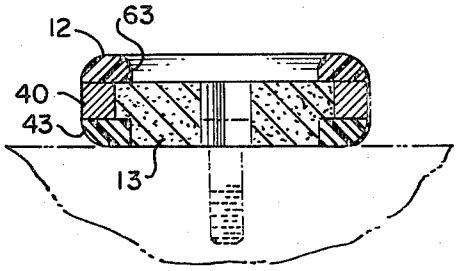


FIG. 7

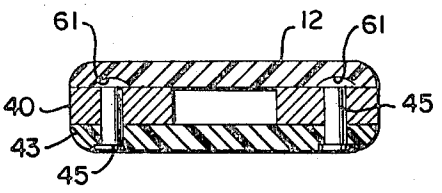
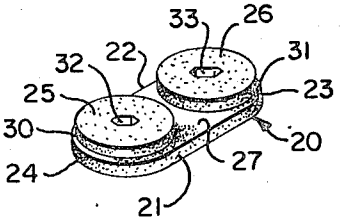


FIG. 8



HANDY MAN'S WRENCH

SUMMARY OF THE INVENTION

This invention relates to a handy man's wrench, and more particularly it relates to a handy man's wrench comprising a plurality of various sized socket openings in noncircular socket inserts stored in the wrench handle and movable to the end positions thereon for engaging and turning a standard hexagonal nut.

It is impractical for the handy man to purchase a complete set of wrenches for an occasional odd job. A quality set of forged steel wrenches in a variety of common sizes represents a relatively large financial investment. An inexpensive set of wrenches is often also cheaply constructed, having a poor fitting relation with the nut and slipping when even moderate force is applied.

In addition, a set of several wrenches is messy to store. They often are scattered throughout one or more drawers, and are easily mislaid. It is also inconvenient to carry a set of several wrenches in one's pocket.

A second type of prior art wrenches are the so-called socket wrenches. A set of socket wrenches comprises generally a single handle with a square end portion insertable in a plurality of socket members, each of which has a socket opening corresponding to various sizes of nuts. Again, a set of this type of wrenches is quite expensive, bulky to store, and easily misplaced or lost. They are not particularly portable or compact, and usually are packaged in a relatively large and heavy box unsuitable for carrying in one's pocket.

A first type of single wrench capable of accommodating a variety of nut sizes in an adjustable wrench. These wrenches generally comprise an L shaped member forming the handle portion and the first of two nut-engaging jaws. The second nut engaging jaw protrudes from a sleeve adjustably positioned on the handle by means of a thumb wheel screw. Wrenches of this type are useful primarily in turning relatively large nuts; however, they are prone to become unadjusted while being used, generally do not adjust well to small nuts, and further are too bulky to work within confined spaces.

A second type of single wrench adaptable to more than one nut size comprises a flat elongated piece of steel with wrench openings in the ends thereof. Additional nut sizes are accommodated by closed hexagonal openings distributed along the handle portion of the wrench. Wrenches of this type are often used on outboard motors and bicycles. The hexagonal openings along the wrench handle are useful only for turning nuts and bolts located with ample lateral clearance to accommodate the wrench.

The "dogie" wrench represents still another type of single wrench designed to accommodate more than one size of nut. This wrench resembles a small barbell with hexagonal socket openings arrayed about the rounded end portions. This wrench is also incapable of being used on nuts or bolts in confined areas, although it is easily carried and relatively inexpensive.

The wrench of this invention overcomes the disadvantages of prior art wrenches by providing a single handle storing a plurality of noncircular inserts in matingly shaped receptacles under a pivoted cover. Each insert has one or more socket openings corresponding to the size and shape of common nuts and bolt heads. The inserts are interchangeable to positions at the end

of the handle, thereby positioning the socket openings with adequate clearance for engaging and turning bolts and nuts in relatively confined areas. In addition, maximum wrench leverage is achieved on the socket opening currently in use at the end position on the handle. The wrench is self contained in a single compact unit easily stored and carried. The wrench embodies efficient use of a minimum number of parts and is inexpensive to manufacture.

OBJECTS OF THE INVENTION

An object of the invention is to provide an improved handy man's wrench.

A second object of the invention is to provide a single-handled wrench incorporating inserts with socket openings adapting the wrench to accommodate various nut sizes.

Another object of the inventions is to provide a single-handled wrench with a plurality of inserts stored in the handle thereof.

A still further object of the invention is to provide a wrench having inserts with socket openings stored in the handle and interchangeable to end positions therein for maximum clearance and leverage for using the wrench.

Yet another object of the invention is to provide a handy man's wrench of the above type which is easily portable, and inexpensive to manufacture.

Other and more specific objects will be apparent from the features, elements, combinations, and operating procedures disclosed in the following detailed description and shown in the drawings.

THE DRAWINGS

FIG. 1 is a perspective view of a wrench according to the invention with the cover portion of the wrench handle pivoted to an open position;

FIG. 2 is an exploded perspective view of the wrench of FIG. 1;

FIG. 3 is a top plan view of the wrench of FIG. 1 with the cover in the closed position and partially cut away;

FIG. 4 is a longitudinal sectional view of the wrench of FIG. 1 with the cover in the closed position;

FIG. 5 is a bottom plan view of the wrench;

FIG. 6 is a cross sectional view of the wrench taken along the line 6—6 of FIG. 3;

FIG. 7 is a cross sectional view of the wrench taken along the line 7—7 of FIG. 3; and

FIG. 8 is a perspective view showing the under side of an insert with two socket openings isolated from the handle of the wrench according to the invention.

DETAILED DESCRIPTION

Referring now to FIG. 1, there is shown a handy man's wrench **10** comprising a handle **11**, a pivotably mounted cover **12**, and four handle inserts **13, 14, 15,** and **16,** each of which has two hexagonal socket openings.

Wrench insert **13** is shown isolated from the remainder of the wrench assembly in FIG. **8.** It comprises an elongated base **20** having parallel side surfaces **21** and **22,** and rounded end surfaces **23** and **24.** Two circular portions **25** and **26** are raised from the under side of the elongated base **20.** A flat surface area **27** of the elongated base **20** remains between the two raised circular portions **25** and **26.** This flat surface area extends around the raised circular portions **25** and **26,** forming

shouldered areas generally indicated at **30** and **31**. Centered in the raised circular portions and extending through the base **20** are two hexagonal socket openings **32** and **33**. The socket opening **32** has a dimension of one-eighth of an inch between its facing sidewalls, and is therefore adapted to receive a standard ⅛ inch hexagonal nut or bolt head. The hexagonal socket opening **33** accommodates a 3/16 inch hexagonal nut. The socket openings in the remaining wrench inserts **14, 15,** and **16** accommodate respectively, a ¼ inch nut, a 5/16 inch nut, a ⅜ inch nut, a 7/16 inch nut, a ½ inch nut, and a 9/16 inch nut. The socket openings may also be made in a square or slot configuration if the anticipated use of the wrench is on square nuts or bolt heads. The wrench inserts are preferably precision molded of fused powdered steel for strength and durability.

The wrench inserts are interchangeably position in a three layer handle **11**. Referring now to FIG. **2**, a middle layer **40** is preferably fabricated of metal, such as aluminum or steel, to provide the strength for the handle. Two portions are cut away to form openings **41** and **42**. These openings have a generally "figure 8" shape with each loop of the 8 shaped correspondingly to the base portion **20** of the wrench inserts **13–16**. As can be seen in FIG. **1**, the curved end portions of wrench inserts **13** and **14** touch when they are positioned in opening **41**. If greater strength is desired in the handle, the opening **41** can be divided into two openings each receiving one wrench insert and divided by an additional strengthening cross member. Some sacrifice in the compactness of the wrench results from this stronger alternative construction, and the additional strength is not necessary in using the wrench for normal household odd jobs.

Referring still to FIG. **2**, a bottom layer **43** of the handle **11** has the same general outside shape as the middle layer **40**. Eight circular openings **44** are formed in the bottom layer **43**. These openings have a slightly larger diameter than the diameter of the raised circular portions **25** and **26** of the wrench inserts **13–16**. The bottom layer **43** is preferably fabricated of high impact resistant styrene.

The metal center handle layer **40** and the plastic bottom handle layer **43** are fastened together with their outside edges aligned by four round head rivets **45**. The rivets are installed through aligned openings **46** in the two handle layers, and have their round heads protruding above the center layer as can be seen in FIG. **7**. The lower portions of the rivets, expanded to provide a retaining flange, are preferably recessed in the lower handle layer **43** as shown in FIG. **7**, providing a smooth bottom surface for the wrench handle.

The FIG. **8** shaped openings **41** and **42** in the center handle layer **40** combine with the openings **44** in the bottom handle layer **43** to form four receptacles **50** through **53** for receiving the wrench inserts **13** through **16**. Referring now to FIGS. **3** and **4**, receptacle **50** is shown with wrench insert **13** therein, and receptacle **51** is shown with the wrench insert removed. The elongated base portion **20** of the wrench insert **13** is surrounded by one loop of the FIG. **8** shaped opening **41** in the center handle layer **40**. The two raised circular portions **25** and **26** of the wrench insert extend downward into the circular openings **44** in the bottom handle layer **43**. The flat surface **27** and the shouldered surfaces **30** and **31** of the wrench insert rest against the portions of the bottom handle layer **43** surrounding the openings **44** therein, thereby restraining the wrench inserts in the receptacle.

A cover **12** comprises the upper handle layer. The cover is pivotally mounted on the handle by means of a rivet **60** passing through all three handle layers. The head and mushroomed ends of the rivet **60** are recessed to provide a smooth top and bottom surface for the wrench handle. The cover **12** is restrained in its closed position by means of dimpled depressions **61** in the bottom surface thereof cooperating with the raised rounded heads of rivets **45** as shown in FIG. **7**. The cover **12** is preferably slightly arched to resiliently bias the ends thereof downward toward the middle handle layer, and increase the effectiveness of the cooperation of the rivet and the dimpled depression.

The cover **12** is provided with two openings **62** and **63** near the ends thereof, said openings providing clearance above the socket openings positioned nearest the ends of the wrench. It is preferably also fabricated of high impact styrene, which has sufficient resiliency to bias the ends of the cover downward as described above.

OPERATION OF THE WRENCH

The user of the wrench first positions the desired socket opening at one end of the wrench handle comprising the three handle layers **12, 40,** and **43**. This is accomplished by pivoting the cover **12** to the open position shown in FIG. **1**, and manipulating the interchangeable wrench inserts **13–16** to position the desired size socket opening at one end of the wrench handle. The wrench inserts are easily removed from the handle by pushing them upward, access to the wrench inserts being gained through the openings **44** in the bottom handle layer **43**. After selecting and placing the desired socket opening at one of the end positions of the wrench handle, the cover is pivoted to its closed position and held there as described above.

The user then engages the nut to be turned in the socket opening. If the nut is on a bolt, the threaded shaft of the bolt may protrude upwardly through the socket opening and the openings **62** or **63** in the wrench cover **12** as shown in FIG. **6**. The nut is then turned by rotating the wrench handle about an axis concentric with the longitudinal axis of the bolt. Because of its elongated shape, the wrench insert incorporating the socket opening cannot rotate within the wrench handle, and a torquing force is generated on the nut by rotating the wrench. handle.

Alternative shapes of wrench inserts may be provided. Any wrench insert with a noncircular shape received in a mating noncircular receptacle in a wrench handle will be restrained from turning within that receptical, thereby transmitting force applied to the wrench handle into torquing force on a nut. The elongated wrench insert with two socket openings disclosed herein is preferable because either socket opening can be positioned nearest to the wrench end, thereby minimizing the distance between the socket opening and the wrench end.

If the wrench is to be used on hexagonal bolt heads, or on nuts threaded onto bolts wherein the threaded shaft of the bolt does not protrude above the nut in its tightened position, a socket opening in a wrench insert may be engaged on the bolt head or nut without moving the socket opening to the end position of the wrench handle. Use of the wrench in this manner sacrifices

some torquing force and clearance capability, however, such use may be convenient in some situations.

The wrench described above is inexpensively manufactured from a minimum of efficiently used parts. It is highly compact, and easy to store or carry. The wrench inserts are stored within the wrench handle, and therefore not easily lost or misplaced.

Since the foregoing description and drawings are merely illustrative, the scope of the invention has been broadly stated herein and it should be liberally interpreted to secure the benefit of all equivalents to which the invention is fairly entitled.

What is claimed is:

1. A handy man's wrench accommodating a plurality of different nuts comprising:

A. a wrench handle having two or more substantially similar elongated receptacles formed therein; and

B. two or more elongated wrench inserts having substantially similar outside shapes interchangeably matingly receivable in the elongated receptacles formed in said wrench handle, thereby restraining said wrench inserts from rotational movement therein, each of said wrench inserts having at least one opening formed therein for receiving and engaging a nut.

2. A handy man's wrench as defined in claim **1**, further comprising a cover pivotally mounted on said wrench handle and movable between an open position wherein the cover does not restrict access to the elongated receptacles and a closed position wherein the cover restrains said wrench inserts from removal from the elongated receptacles in said wrench handle.

3. A handy man's wrench as defined in claim **1**, wherein said wrench handle has four substantially similar elongated receptacles formed therein interchangeably matingly receiving four substantially similar elongated wrench inserts, each of said wrench inserts having at least one opening formed therein for receiving and engaging a nut, each of the openings accommodating a different nut.

4. A handy man's wrench as defined in claim **1**, wherein each of said wrench inserts have two openings formed therein for receiving and engaging a nut, each of said openings receiving and engaging a different nut.

5. A handy man's wrench as defined in claim **3**, wherein each of said substantially similar wrench inserts has an elongated base with two round portions raised therefrom, and each of said openings formed therein passing through the elongated base and one round raised portion.

6. A handy man's wrench as defined in claim **1**, wherein one of said two or more substantially similar elongated receptacles formed in said wrench handle is located at either end thereof.

7. A handy man's wrench as defined in claim **3**, wherein at least two of the four receptacles are partially joined.

8. A handy man's wrench as defined in claim **2**, wherein said wrench handle comprises a central layer fabricated of metal, a lower layer fabricated of plastic, said central layer and lower layer laminated together, and said cover is fabricated of plastic and pivotally mounted above said central layer.

9. A handy man's wrench as defined in claim **8**, wherein said central and lower layers are laminated together by round head rivets, and said pivotally mounted cover has recesses formed therein engagingly receiving said round head rivets to hold said cover in its closed position.

10. A handy man's wrench as defined in claim **2**, wherein said pivotally mounted cover has two openings formed therein, larger than the opening formed in said wrench insert and disposed above the openings in said wrench insert when the cover is in its closed position.

* * * * *