May 13, 1952 B. WIESEN 2,596,882

AUTOMATICALLY ADJUSTABLE WRENCH

Filed Sept. 9, 1950 2 SHEETS—SHEET 1

Fig. 1

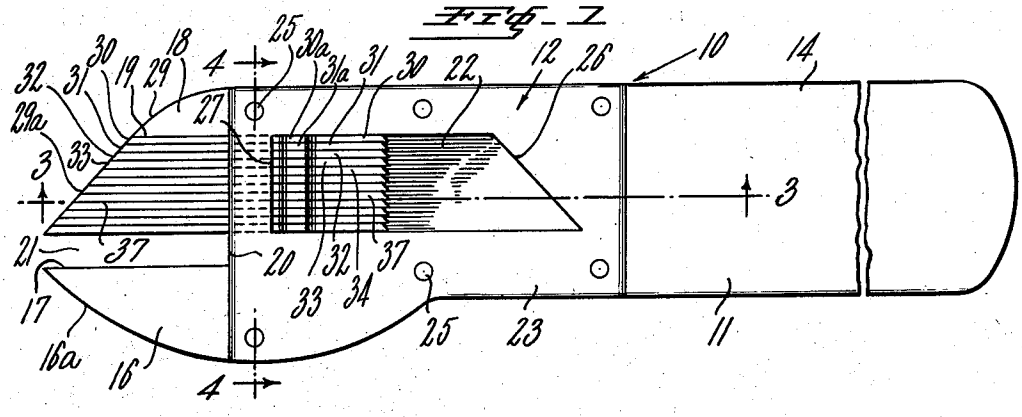


Fig. 2

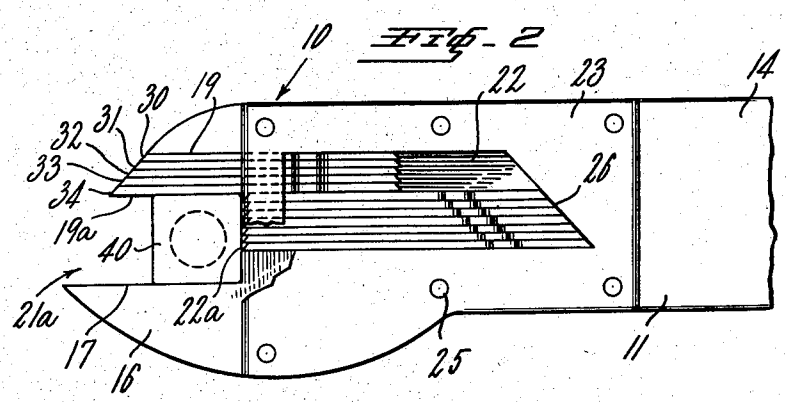


Fig. 3

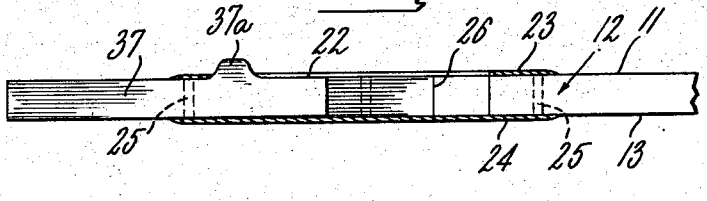


Fig. 4

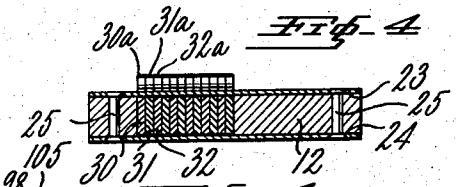
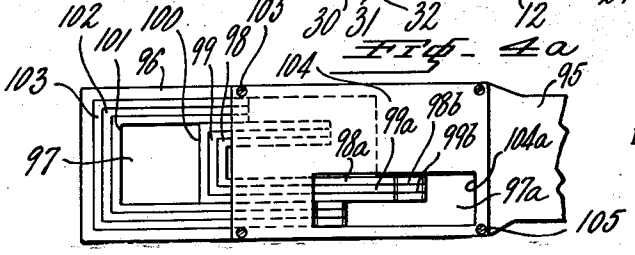


Fig. 4a



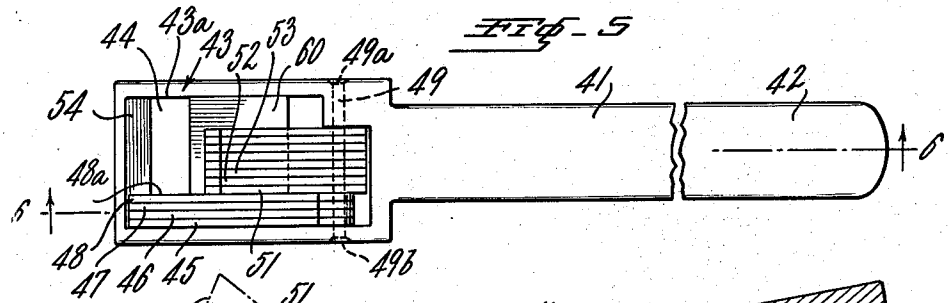
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Fig. 5



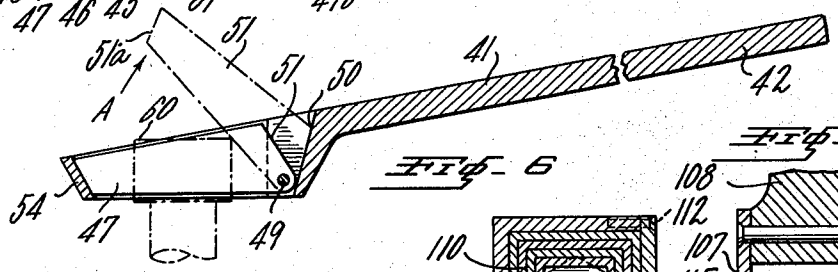


Fig. 6

Fig. 10

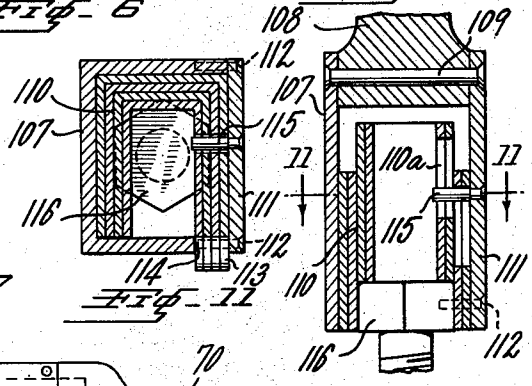
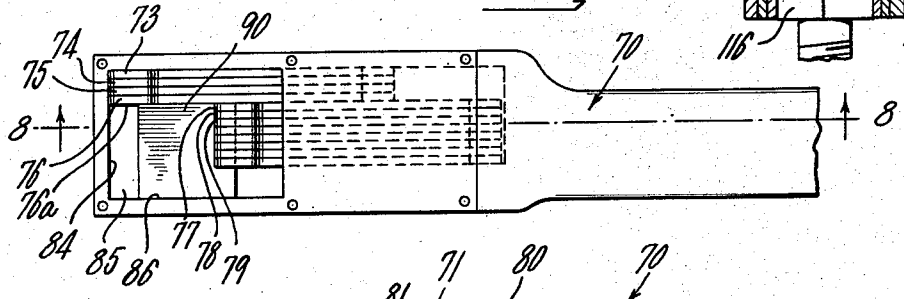


Fig. 7

Fig. 11



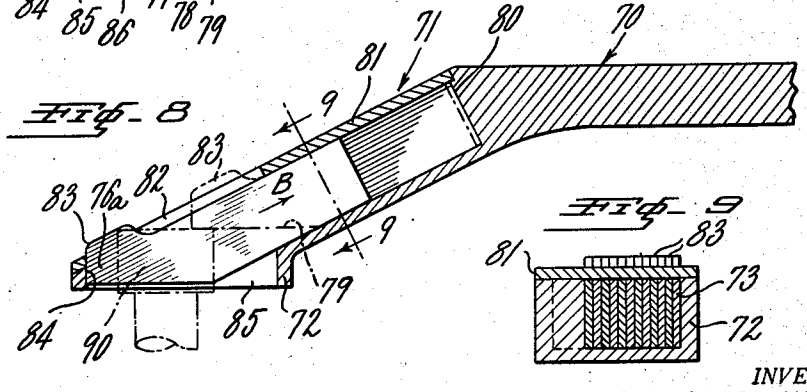


Fig. 9

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AUTOMATICALLY ADJUSTABLE WRENCH

Bernard Wiesen, Bronx, N. Y.

Application September 9, 1950, Serial No. 183,934

4 Claims. (Cl. 81—185)

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This invention relates to tool or spanner structures and more particularly to novel wrench constructions.

It is one of the objects of the invention to provide means affording an inexpensive, universal and quick-acting wrench structure employable in connection with various dimensions or sizes of screw bolt heads, nuts, nut locks, and so forth.

It is another object of the present invention to provide means facilitating in a very practical and simple manner automatic adjustment of the wrench structure to the size of the bolt head or the like to which said wrench structure is to be applied.

Yet another object of the invention is to provide means ensuring great efficiency of the wrench structure and permitting rapid individual fitting thereof in accordance with a predetermined range of dimensions of bolt heads and so forth from, say, $\frac{1}{8}$ of an inch to one inch.

Still another object of the present invention is to provide means materially reducing the cost of manufacture and storing of wrench structures, and enhancing their saleable and other commercial possibilities.

A further object of the present invention is the provision of means contributing to a sturdy and compact wrench structure which is capable of achieving an efficient hold on and of accommodating various shapes (square or hexagonal) of screw or like heads.

It is still a further object of this invention to provide means offering the possibility of applying the wrench to a screw or bolt head with or without any preadjustment of the distance between the jaws of the wrench in accordance with the particular shape or dimension of said head.

With the above and other objects in view, the invention will be hereinafter more fully described and the combination and arrangement of parts will be shown in the accompanying drawings and pointed out in the claims which form part of the specification.

In the drawings:

Fig. 1 is a top plan view of a wrench device embodying the invention.

Fig. 2 is a fragmentary view similar to that of Fig. 1 with a bolt head in applied position;

Fig. 3 is a sectional view taken along lines 3—3 of Fig. 1;

Fig. 4 is a sectional view taken along lines 4—4 of Fig. 1;

Fig. 4*a* is a fragmentary top plan view of one modified form of the invention;

Fig. 5 is a top plan view of a wrench device

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in modified form and made according to the invention;

Fig. 6 is a sectional view taken along lines 6—6 of Fig. 5;

Fig. 7 is a top plan view of a further modified device according to the invention;

Fig. 8 is a sectional view taken along lines 8—8 of Fig. 7;

Fig. 9 is a sectional view taken along lines 9—9 of Fig. 8;

Fig. 10 is a sectional view of a still further modified form of the invention; and

Fig. 11 is a transverse sectional view taken on line 11—11 of Fig. 10.

Referring now more particularly to the drawings, there is disclosed in Figs. 1 to 4, inclusive, a wrench device 10 made in accordance with the invention and provided with an elongated body portion 12 having a top surface 11 and a bottom surface 13. The body portion 12 terminates in a handle 14. At the forward end of wrench 10 there project two fixed jaws 16 and 18 which are spaced from each other and have opposed linear surfaces 17 and 19, respectively, facing each other. Jaw 16 preferably projects further outwardly than jaw 18 for a purpose later to be described. Between the opposed surfaces 17 and 19 and rear surface 20 there is defined an opening or slot 21. Body portion 12 further includes an opening 22 which is in communication with slot 21.

On the top and bottom surfaces 11, 13 of body 12 there are arranged two cover plates 23 and 24 which are fixed to the body 12 by means of rivets 25. Cover plate 23 includes the opening 22 which through opening 22*a* is in direct communication with slot 21. Within opening 22 there are movably arranged a plurality of slat or shim-like elements 30, 31, 32, 33, etc., each of which being provided with a nose or projection 30*a*, 31*a*, etc., whereby these elements may be slid from the rear edge or end wall 26 of opening 22 for abutment against the front edge or wall 27 of the aforesaid opening 22. As can be seen in Fig. 1, all the elements 31, 32, 33, etc. have been moved into their foremost positions whereby the finger pieces or projections 30*a*, 31*a*, 32*a*, etc. abut against the front wall 27. The aforesaid shim-like elements 31, 32, 33, etc. are substantially alignedly arranged so as to form a continuous line of transition to extend from the outer boundary edge 29 of jaw 18, as can be seen from Fig. 1. Thus, the shim-like elements in their most forward position constitute an inclined edge 29*a* with respect to linear surfaces 17 and 19.

If it is now desired to fit the wrench device 10 on a bolt head 40, for instance, as seen in Fig. 2, it will be immediately visualized that all shim elements extending beyond shim element 34 will be moved or pushed to retracted position in which they abut against rear wall 26 of opening 22.

Shim elements 30 to 34, inclusive, form a composite or unitary wall whereby the innermost surface 19a thereof faces the surface 17 of jaw 16, thereby defining a jaw opening 21a which is reduced in size as compared with opening or slot 21 (when all the shim elements are retracted and abut against rear wall 26).

It will be noted from Fig. 1 that jaw 16 has an inclined edge 16a which along with the inclined edge 29a of the shim-like elements forms pointed gripping jaws which permit easy access to confined spaces.

Preferably, the wrench according to the invention, can be utilized with bolt heads varying from $\frac{1}{16}$ of an inch to one inch in diameter. However, it is to be understood that it is within the scope of this invention to vary the range of diameters of bolt heads that may be accommodated in this wrench device. Shim elements 30, 31, etc. may be made from hardened steel and the jaws 16, 18 may also be hardened. It is well understood that any suitable material may be selected for the parts of which the device 10 consists.

Figs. 5 and 6 show another form of the wrench device according to the invention. One end of body portion 41 terminates in a handle 42 and the other end in a box-like portion 43 having a large opening 44, as seen in Fig. 5.

Bolt head 60 fits in opening 44 of the wrench device, thereby causing all shim elements which extend beyond shim element 48 to be pivoted about a pivot pin 49 in a direction indicated by arrow A in Fig. 6 and shown in dot-dash lines. The pivotal movement about pin 49 which is riveted at 49a, 49b takes place automatically by the abutment action of the bolt head 40 against the shim elements when said head moves into opening 44. The wall 50 of body portion 41 serves as a stop to prevent further clockwise movement of the shim-like elements 51, 52, 53, etc. when the bevelled end surfaces of these elements come in contact with wall 50. The shim-like elements move, in this instance, by gravity, back to normal position when the bolt head is removed from the wrench.

As seen in Fig. 5, a plurality of shim-like elements 45, 46, 47, 48, 51, 52, 53, etc. are journalled on pivot pin 49 which extends across box-shaped portion 43 and terminates in riveted ends 49a, 49b. The forward wall 54 of box-shaped portion 43 is downwardly and inwardly inclined and the forward end of the shim-like elements, say, (as exemplified in Fig. 6) the forward end 51a of shim element 51 is accordingly shaped to contact the inclined forward wall 54. Portion 43 has further the inner lead edge 43a against which the bolt head 60 abuts which, when inserted in the opening 44 of wrench portion 43 will automatically lift shim elements 51, 52, 53, etc. whereby the bolt head 60 extends between the lead edge 43a and the inner face 48a of shim elements 45, 46 and 48 which, in this instance, become effective as a unitary element.

As can be seen from Fig. 6, shim element 51 is swung according to arrow A to its inoperative or upper position where the shims 51, 52, 53, etc. overlie head 60 without becoming obstructive or

in any way participating in the operation of the wrench device.

Figs. 7 and 8 show a wrench device 70 in a further modified form. The device 70 has a downwardly directed head piece 71 while the handle of wrench device 70 is omitted on the drawing for clarity's sake. Head piece 71 terminates in an open ended portion 72 into which the slidable shim elements 73, 74, 75, 76 are slid, as can be seen from Figs. 7 and 8, whereas the shim-like elements 77, 78, 79, etc. are shown in their retracted position in which they may abut against or are positioned adjacent the rear wall 80 of the hollow wrench head 71. It will be further seen from Fig. 8 that the cover plate 81 of the head piece 71 is provided with a slot 82 into which extend finger pieces or projections 83 of the slidable shim elements. Fig. 7 shows shim element 77 in its retracted position, whereas shim element 76 is shown in abutting relation with the forward edge 84 defining opening 85 of the head piece 71.

If, as seen in Figs. 7 and 8, head 90 of a screw bolt is inserted within opening 85 of the head piece 71, head 90 of the screw bolt will abut against the lead edge 86 and will automatically displace shims 77, 78, 79 etc. whereas the opposite face of screw bolt head 90 abuts against the inner surface 76a of shim element 76 which, together with shim elements 73, 74, 75 forms a unitary element defining the extent or dimension of the screw bolt head 90 when inserted in opening 85.

It will be further visualized that the sliding shim elements may be readily retracted by means of the finger operated projections 83, as seen in Fig. 7, whereby, for instance, shim elements 77, 78, 79, etc. are moved in the direction of arrow B (Fig. 8).

In Fig. 4a, 95 represents the handle carrying a box-like portion 96 providing an opening 97 into which the head of a bolt or a nut can be extended. The opening 97 has a rearwardly extending part 97a to receive the operating ends of a plurality of U-shaped gauge elements 98, 99, 100, 101, 102 and 103 nested together and adjustable within the opening 97 and relative thereto and relative to each other. Each of the U-shaped gauge elements have long operating legs 98a, 99a, etc. which can be adjusted into the rearwardly extending part 97a of the opening 97 and which respectively have upwardly extending finger projections 98b, 99b etc. that extend out of the top of the opening to be accessible for engagement with the finger to effect the adjustment of the respective elements. A top cover plate 104 is secured to the handle by screws 105 in the respective corners thereof. This plate has an opening 104a through which the finger projections of the gauge elements may extend. The gauge elements are limited in their movement by the ends of the opening of the plate 104. The elements are slid in and out depending upon the size of the square nut or head to be gripped. The square opening provided between two of the elements may also receive a hexagonal nut and the wrench can thus effectively be used on either square or hexagonal nuts or head portions.

In Figs. 10 and 11, there is shown a still further form of the invention where the features thereof are incorporated in a socket type of wrench. In this form, a channel member 107 is secured to a handle 108 by long rivets 109, only one being shown. Upon the assembly of the wrench, a plurality of nested gauge elements 110

are assembled in the member 107 and a cover plate 111 is secured by the same rivets 109 to the handle 108 and by small screws 112 to the sides of the channel flanges. The gauge elements are in the form of channel elements and have finger projections extending from one flange thereof, as indicated at 113, through a slot 114 in the flange of the member 107. Each of the elements 110 has an elongated slot 110*a* into which extends a stop pin 115 projected inwardly from the cover plate 111. The stop pin 115 prevents the outward displacement of the elements from the lower end of the member 107. Upon placing the wrench over a bolt head 116, the inner elements 110 will be lifted depending upon the size of the head as to the number of such elements that will be lifted. This lifting of the elements is accordingly effected automatically and without the need of any manual adjustment of the elements. The inner faces which are angled relative to each other provide the faces with which to engage the side faces of the head of the bolt or nut.

It should now be apparent that there has been provided a socket wrench construction which is operable upon a plurality of different size bolt heads or nuts wherein the single wrench is easily adjusted to these different sizes and according to certain of the forms this adjustment is effected automatically and without need for the manual manipulation of the elements.

The form of the invention, as shown in Figs. 1 and 4*a*, 7 and 8, permit the manual adjustment of the gauge or shim-like elements, while in Figs. 5 and 10, the adjustment of the elements is effected automatically as the wrench construction is applied to the bolt head or nut.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

I claim:

1. A wrench construction comprising a body including a depending head, said head being provided with a downwardly directed bolt-receiving opening and having at least one wall defining a stationary bolt-engaging jaw, said body being provided with a guideway upwardly-inclined at an angle with respect to said bolt-receiving opening and communicating with the latter, a stack

of shim-like elements juxtaposed within said guideway and movably supported therein, each of said shim-like elements including a jaw-forming portion and being urged downwardly in said guideway under the force of gravity to a position wherein said jaw-forming portions are disposed within said bolt-receiving opening in spaced opposed relation with respect to said stationary jaw, one or more of said shim-like elements being upwardly movable relative to the remaining shim-like elements and relative to said stationary jaw in response to the insertion of a selected bolt within said bolt-receiving aperture whereby the size of the latter is adjustable in accordance with the size of said selected bolt.

2. A wrench according to claim 1 wherein another wall of said bolt-receiving opening forms an abutment for limiting the downward movement of said shim-like elements under the force of gravity.

3. A wrench according to claim 1, including means carried by each of said shim-like elements actuable exteriorly of said body for separately effecting the upward movement of said shim-like elements.

4. A wrench according to claim 1, including means carried by each of said shim-like elements actuable exteriorly of said body for separately effecting the upward movement of said shim-like elements.

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