

Feb. 21, 1956

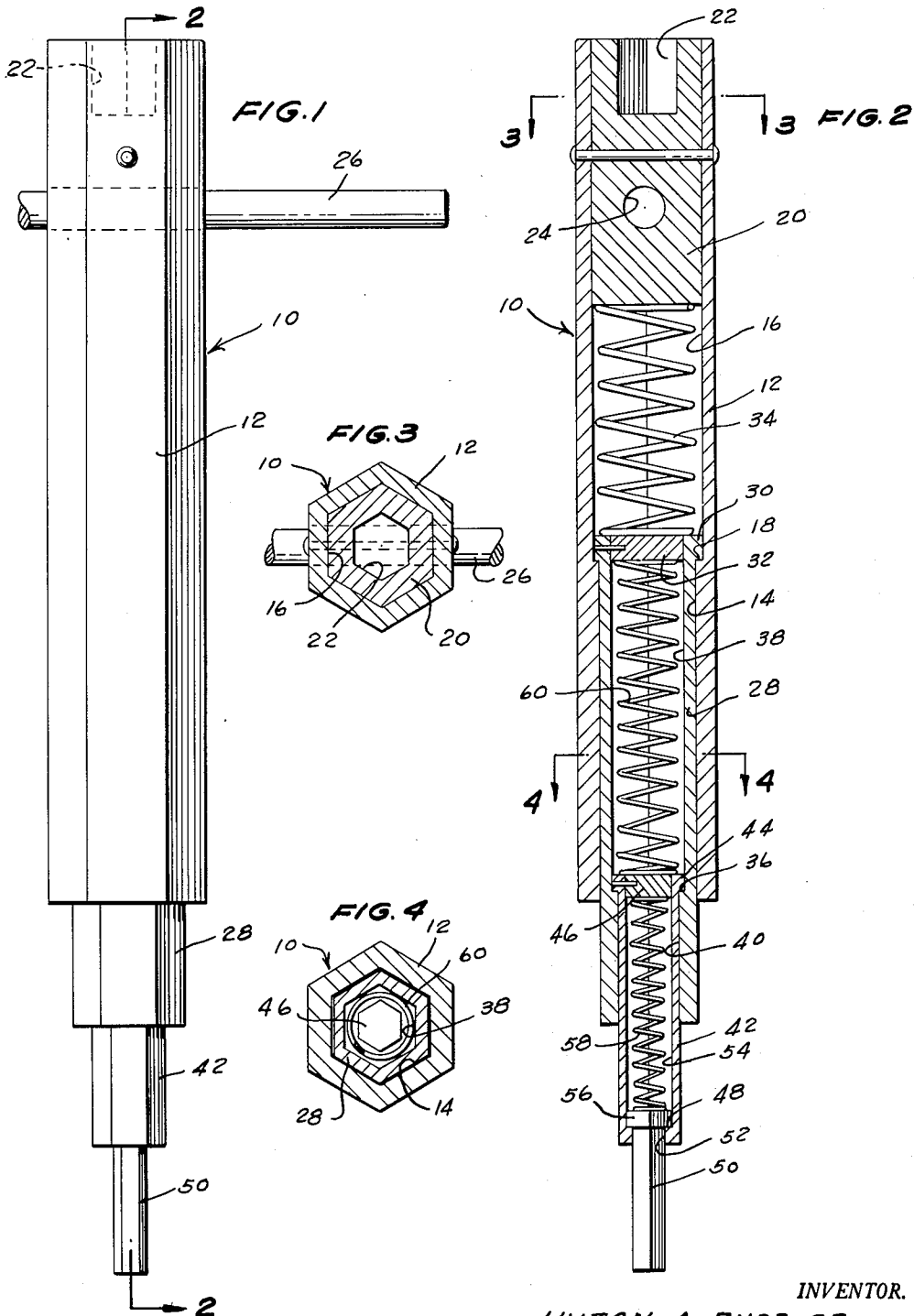
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MULTIPLE WRENCH WITH TELESCOPING SECTIONS

Filed Sept. 1, 1954

2 Sheets-Sheet 1



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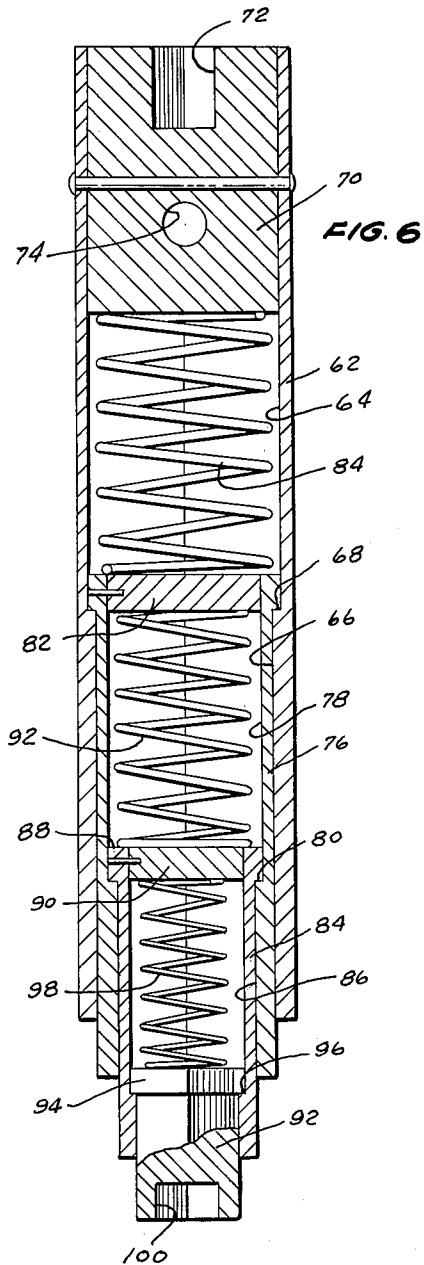
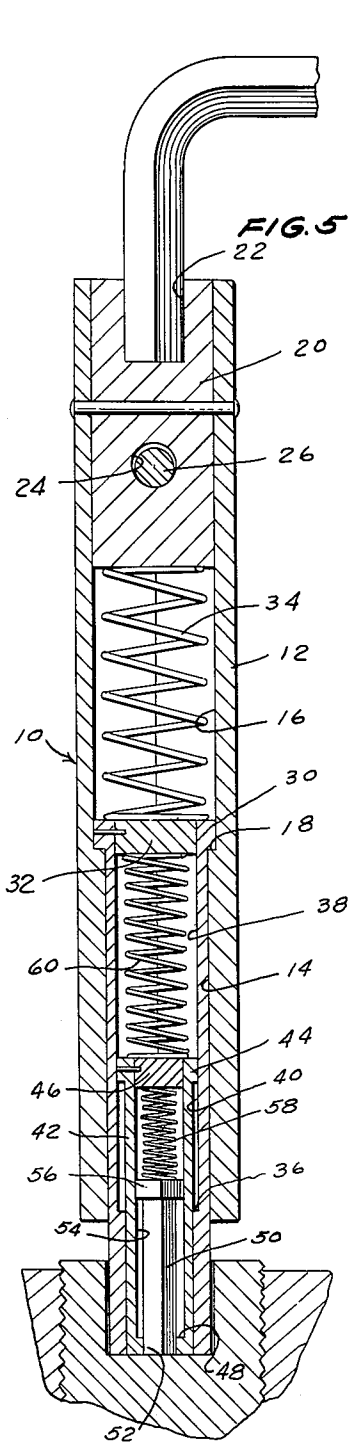
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MULTIPLE WRENCH WITH TELESCOPING SECTIONS

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Application September 1, 1954, Serial No. 453,494

2 Claims. (Cl. 81—71)

This invention relates to a multiple wrench and has for its primary object a single instrument capable of entering the sockets in the heads of screws and turning said screws either to loosen or tighten them.

Another object is to enable a single instrument to fit the sockets in the heads of screws of different sizes.

The above and other objects may be attained by employing this invention which embodies among its features a tubular shell having an external contour which conforms to the internal contour of the socket in the head of a screw, a shoulder carried by the shell and extending inwardly therefrom intermediate the ends thereof to define a stop, a tubular plunger having an external contour which conforms to the internal contour of the socket in the head of a second and smaller screw and the internal contour of the tubular shell, said plunger being mounted in the tubular shell to rotate therewith and to move longitudinally through one end thereof, a flange carried by the plunger and extending outwardly therefrom adjacent the end thereof within the tubular shell for engaging the shoulder and arresting outward movement of the plunger, a plug closing the end of the tubular shell remote from that through which the plunger moves, said plug having a turning tool receiving socket extending thereinto through the end thereof remote from the shoulder, and a compression coiled spring within the tubular shell and bearing on the plug and on the flange for yieldingly projecting the plunger through the end of the tubular shell remote from the plug.

Other features include a cross handle extending through the tubular shell and the plug therein for rotating the screw driver.

In the drawings:

Figure 1 is a side view in elevation of a multiple wrench embodying the features of this invention.

Figure 2 is a longitudinal section view taken substantially on the line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is a horizontal sectional view taken substantially on the line 4—4 of Figure 2;

Figure 5 is a view similar to Figure 2, showing the multiple wrench in use with the bit telescoped into the next adjacent tubular plunger, and the intermediate tubular plunger entered into the socket in the head of a screw; and

Figure 6 is an enlarged longitudinal sectional view showing the device constructed as a multiple wrench.

Referring to the drawings in detail, this improved multiple tool designated generally 10 comprises an outer shell 12 of hexagonal cross section and having a longitudinally extending hexagonal bore 14 extending through one end thereof and a conventional circular bore of larger cross section 16 opening through the opposite end of the shell 12 to define intermediate the ends of the shell a stop shoulder 18. Secured in the tubular shell 12 adjacent the end thereof through which the bore 16 extends is a plug 20 having a wrench receiving socket 22 opening through the end thereof remote from the shoulder 18, and extending transversely through an opening 24 which extends

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through the shell 12 and plug 20 is a cross handle 26 by means of which the instrument may be rotated about its longitudinal axis.

Mounted for longitudinal sliding movement through the end of the shell 12 remote from the plug 20 is a tubular plunger 28 carrying adjacent its end adjacent the plug 20 an outstanding annular flange 30 which rides in the bore 16 and defines a stop which engages the shoulder 18 to limit outward movement of the tubular plunger 28 through the end of the shell 12 remote from the plug 20. An end closure 32 closes the end of the tubular plunger 28 adjacent the flange 30, and seated on the tubular plunger 28 and bearing on the plug 20 is a compression coil spring 34 which yieldingly urges the tubular plunger outwardly through the end of the tubular shell 12 remote from the plug 20. The external contour of the tubular plunger 28 conforms to the shape of the socket in the head of a screw of smaller size than the socket in the head of a screw in which the end of the tubular shell 12 is entered for turning said screw, and the external contour of the tubular plunger 28 and the internal contour of the tubular shell 12 between the shoulder 18 and the end thereof remote from the plug 20 coincide so as to assure positive rotary motion between the shell and tubular plunger while permitting relative longitudinal movement therebetween.

The tubular shell 12 is provided intermediate its ends with an inwardly extending shoulder 36 defining an upper circular bore 38 and a lower hexagonal bore 40 of smaller cross section than the upper bore 38. A second tubular plunger 42 having an external hexagonal contour conforming to the cross sectional shape of the bore 40 is mounted in the tubular plunger 28 to move longitudinally through one end thereof, and carried by the tubular plunger 42 and extending outwardly therefrom adjacent the end thereof within the tubular plunger 28 is an annular flange 44 which is adapted to engage the shoulder 36 to limit outward movement of the tubular plunger 42 relative to the tubular plunger 28. Closing the end of the tubular plunger 42 adjacent the flange 44 is a plug 46 and carried by and extending inwardly from the tubular plunger 42 adjacent the end thereof remote from the plug 46 is a stop shoulder 48. A tool bit 50 having an external contour conforming to the internal contour 52 of the opening which extends through the shoulder 48 is mounted to project through the opening 52 and carried by the end of the tool bit 50 which is disposed within the bore 54 within the tubular plunger 42 is a head or outwardly extending flange 56 which engages the shoulder 48 to arrest outward movement of the tool bit 50. It is to be understood that the cross section of the tool bit 50 conforms in contour to the cross section of the opening 52 so as to establish driving connection between the tubular plunger 42 and the tool bit 50. A compression coil spring 58 is disposed within the bore 54 and bears at one end on the plug 46 and at its opposite end on the tool bit 50 to yieldingly urge said tool bit outwardly through the opening 52 in the tubular plunger 42.

A compression coil spring 60 is contained within the tubular plunger 28 and bears at opposite ends on the plugs 32 and 46, respectively, to yieldingly urge the tubular plunger 42 longitudinally outwardly through the bore 40.

In the modified form of the invention, illustrated in Figure 6, a tubular shell 62 is provided with a circular bore 64 which opens through one end thereof and a hexagonal bore 66 which opens through the opposite end thereof. The junction of the bores 64 and 66 define an inwardly extending shoulder 68 and the portion of the tubular shell 62 between the shoulder 68 and the end of the shell remote from the bore 64 defines a socket for engagement with a nut of relatively large diameter. A

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plug 70 closes the end of the bore 64 remote from the shoulder 68 and is provided with a tool socket 72 and a transversely extending passage 74 which extends through the tubular shell 62 to receive a cross handle (not shown). Mounted for longitudinal sliding movement through the end of the tubular body 66 remote from the plug 70 is a second tubular body 76 having an internal cross section of substantially hexagonal form to enable the device to be used as a socket for turning a nut. Said body 76 is provided adjacent the end thereof having the hexagonal cross section with a bore 78 which defines with the hexagonal portion of the plunger 76 a shoulder 80 intermediate the ends of the member 76. A plug 82 closes the end of the bore 78 remote from the shoulder 80, and seated on said plug and extending upwardly therefrom for engagement with the plug 70 is a compression coil spring 84 by means of which the socket member 76 is yieldingly projected through the end of the shell 62 remote from the plug 70. A second tubular plunger or socket member 84 extends through the hexagonal portion 86 of the socket member 76 and carries adjacent its inner end an outstanding annular flange 88 which is adapted to engage the shoulder 80 to limit outward movement of the socket member 84. The external contours of the socket members 76 and 84 conform to the internal contours of the bores 66 and 86 so as to establish turning movement between the socket members one with the other while permitting relative longitudinal movement of said socket members. A plug 90 closes the end of the socket member 84 adjacent the flange 88, and seated on said plug and extending upwardly within the bore 78 of the socket member 76 is a compression coil spring 92 which bears on the underside of the plug 82 to yieldingly urge the socket member 84 outwardly through the socket member 76. A solid socket member 92 provided with an outstanding annular flange 94 which is adapted to engage a stop shoulder 96 formed intermediate the ends of the socket member 84 is mounted for sliding movement through the end of the socket member 84 remote from the plug 90, and contained within the socket member 84 and bearing on the underside of the plug 90 and on the upper end of the socket member 92 is a compression coil spring 98. The socket member 92 is provided with a hexagonal socket 100 which opens through the end thereof remote from the flange 94 to receive the head of a bolt, or a nut of relatively small size. Obviously, as the device of Figure 6 is advanced toward a nut of a size larger than the socket 100, it will be received in the hexagonal portion of the socket member 84, while the socket member 92 telescopes into the socket member 84 against the effort of the spring 98. Obviously, as larger nuts are encountered, the socket members 84 and 76 may be telescoped into the next adjacent tubular members until the bolt head or nut is accommodated.

Obviously, the same telescopic operation is encountered by the structure of Figures 1 through 5, inclusive, as socket headed screws of different sizes are encountered by the instrument.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

What is claimed is:

1. A multiple implement for use with screws of the type having axial tool receiving sockets opening through the heads thereof, said implement comprising a tubular shell having a polygonal external contour which conforms to the internal contour of the socket in the head of a screw, an internal shoulder formed in the shell and extending inwardly therefrom intermediate the ends thereof to define a stop, a tubular plunger having a polygonal external contour which conforms to the internal contour of the socket in the head of a second and smaller screw and also the internal contour of the tubular shell, said

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plunger being mounted in the tubular shell to rotate therewith and move longitudinally through one end thereof, a flange carried by the plunger and extending outwardly therefrom adjacent the end thereof and within the tubular shell for engaging the shoulder and arresting outward movement of the plunger, a plug closing the end of the tubular shell remote from that through which the plunger moves, said plug having a turning tool receiving socket extending thereinto through the end thereof remote from the shoulder, a compression coiled spring within the tubular shell and bearing on the plug and on the flange for yieldingly projecting the plunger through the end of the tubular shell remote from the plug, a plug closing the end of the tubular plunger adjacent the flange, an internal shoulder formed in the tubular plunger and projecting inwardly therefrom intermediate the ends thereof, a bit mounted in the tubular plunger to rotate therewith and to move longitudinally through the end thereof remote from the plug, an annular flange carried by the bit and extending outwardly therefrom and within the tubular plunger for engaging the shoulder in said plunger and limiting outward movement of the bit relative to the plunger, said bit having a polygonal external contour adapted to fit into the socket in the head of a still smaller screw, and a compression coiled spring within the tubular plunger for yieldingly holding said bit projected through the end of the tubular plunger remote from the plug.

2. A multiple implement for use with screws of the type having tool engaging heads, said implement comprising a tubular shell having a polygonal internal contour which conforms to the external contour of the head of a screw, an internal shoulder formed in the shell and extending inwardly therefrom intermediate the ends thereof to define a stop, a tubular plunger having a polygonal internal contour which conforms to the external contour of the head of a second and also smaller screw and having a polygonal external contour which conforms to the internal contour of the tubular shell, said plunger being mounted in the tubular shell to rotate therewith and to move longitudinally through one end thereof, a flange carried by the plunger and extending outwardly therefrom adjacent the end thereof and within the tubular shell for engaging the shoulder and arresting outward movement of the plunger, a plug closing the end of the tubular shell remote from that through which the plunger moves, said plunger having a turning tool receiving socket extending thereinto through the end thereof remote from the shoulder, a compression coiled spring within the tubular shell and bearing on the plug and on the flange for yieldingly projecting the plunger through the end of the tubular shell remote from the plug, a plug closing the end of the tubular plunger adjacent the flange, an internal shoulder formed in the tubular plunger and projecting inwardly therefrom intermediate the ends thereof, a socket mounted in the tubular plunger to rotate therewith and to move longitudinally through the end thereof remote from the plug, an annular flange carried by the socket and extending outwardly therefrom and within the tubular plunger for engaging the shoulder in said plunger and limiting outward movement of the socket relative to the plunger, said socket having a polygonal internal contour adapted to fit the head of a still smaller screw, and a compression coiled spring within the tubular plunger and bearing on the socket and on the plug in the tubular plunger for yieldingly holding said socket projected through the end of the tubular plunger remote from the plug.

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