

Feb. 24, 1953

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STUD BOLT WRENCH

2,629,277

Filed Oct. 4, 1949

2 SHEETS—SHEET 1

FIG. 1.

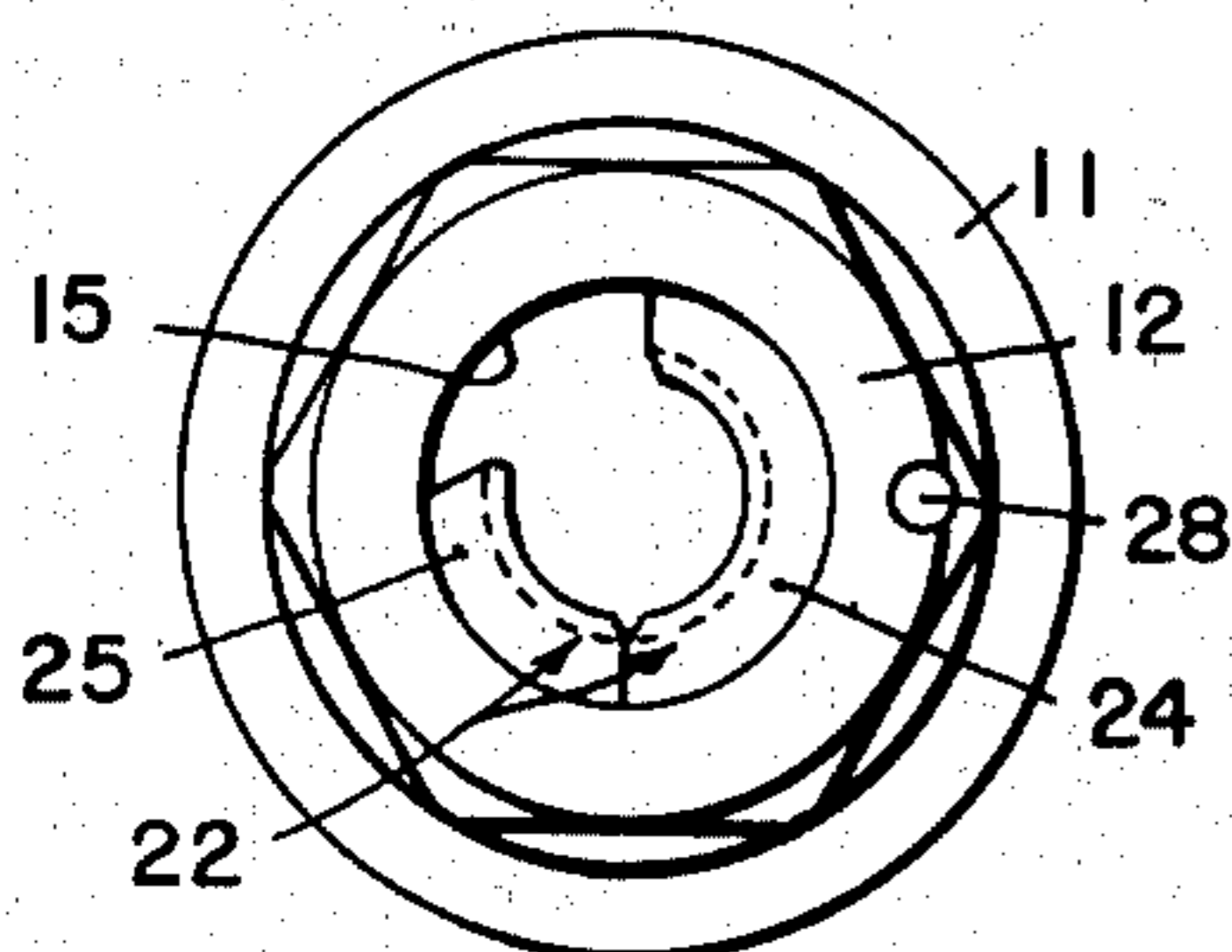


FIG. 2.

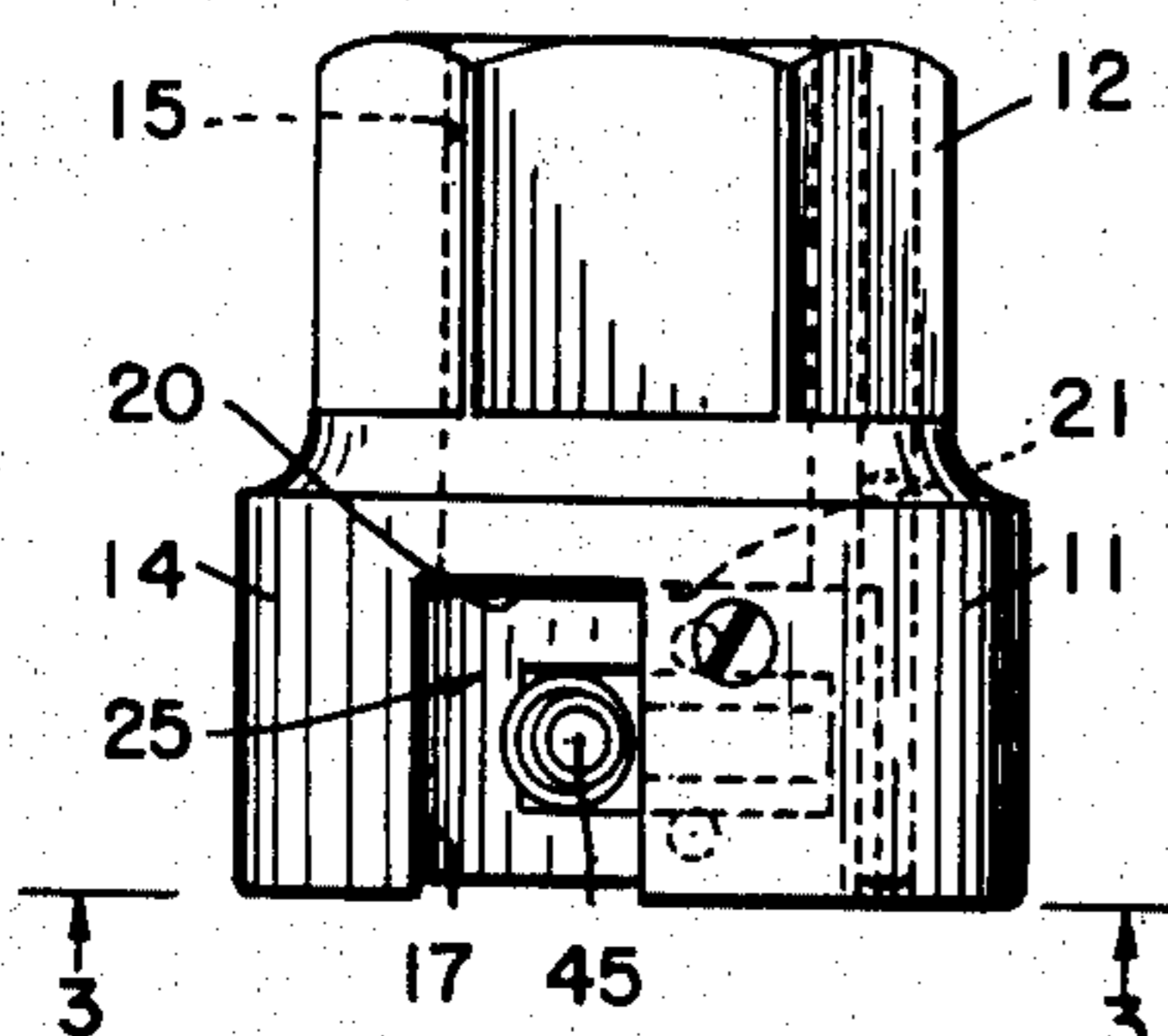


FIG. 3.

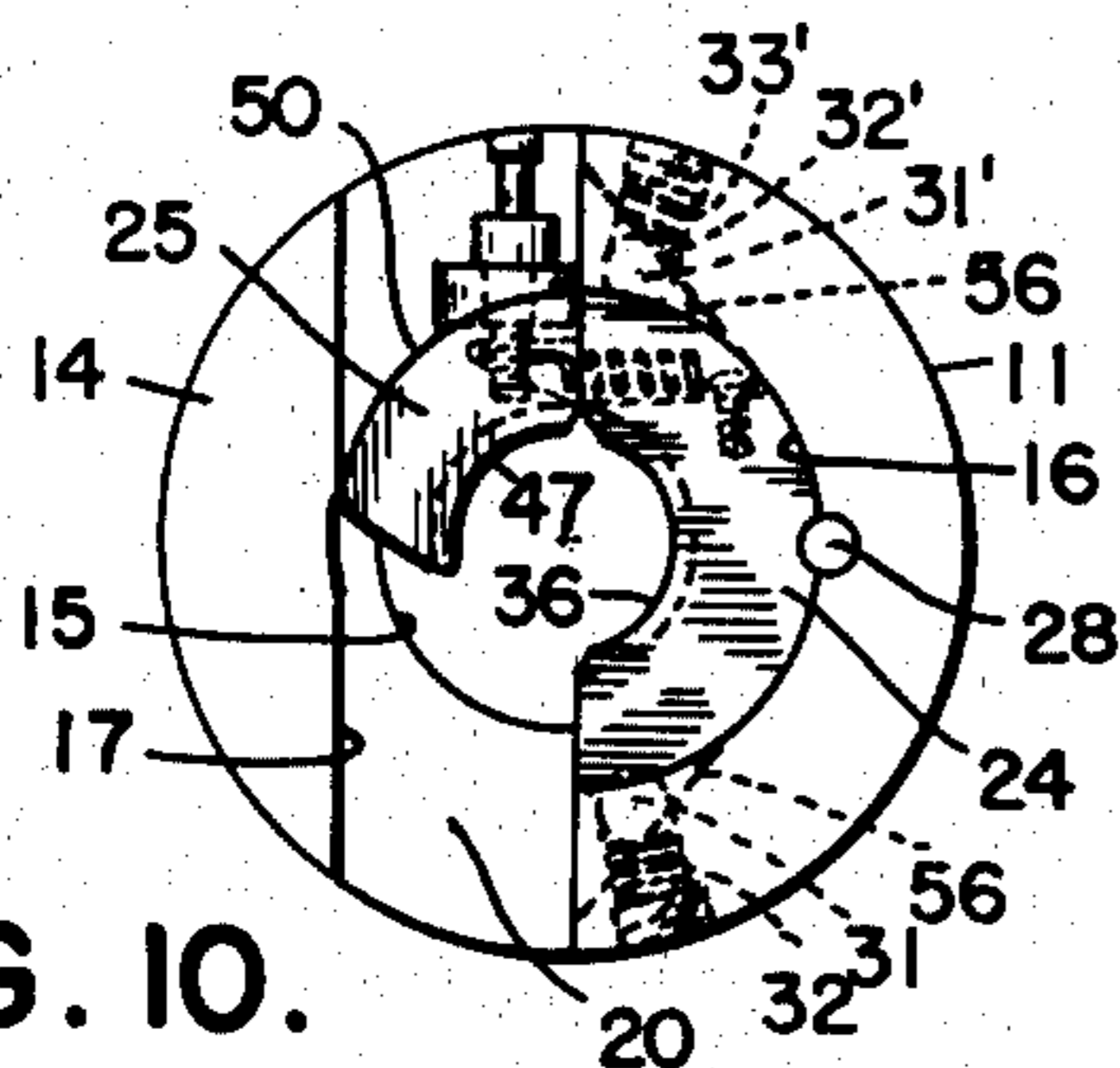


FIG. 10.

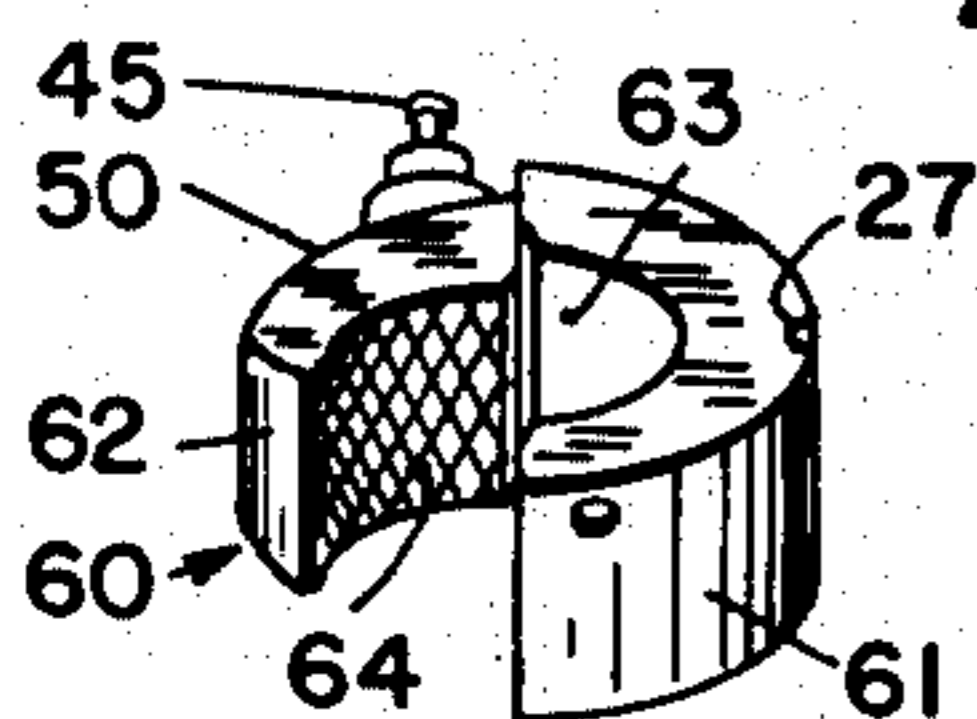


FIG. 9.

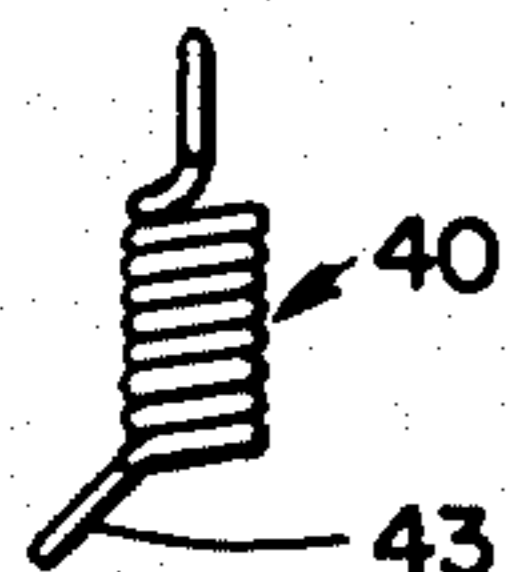


FIG. 8.

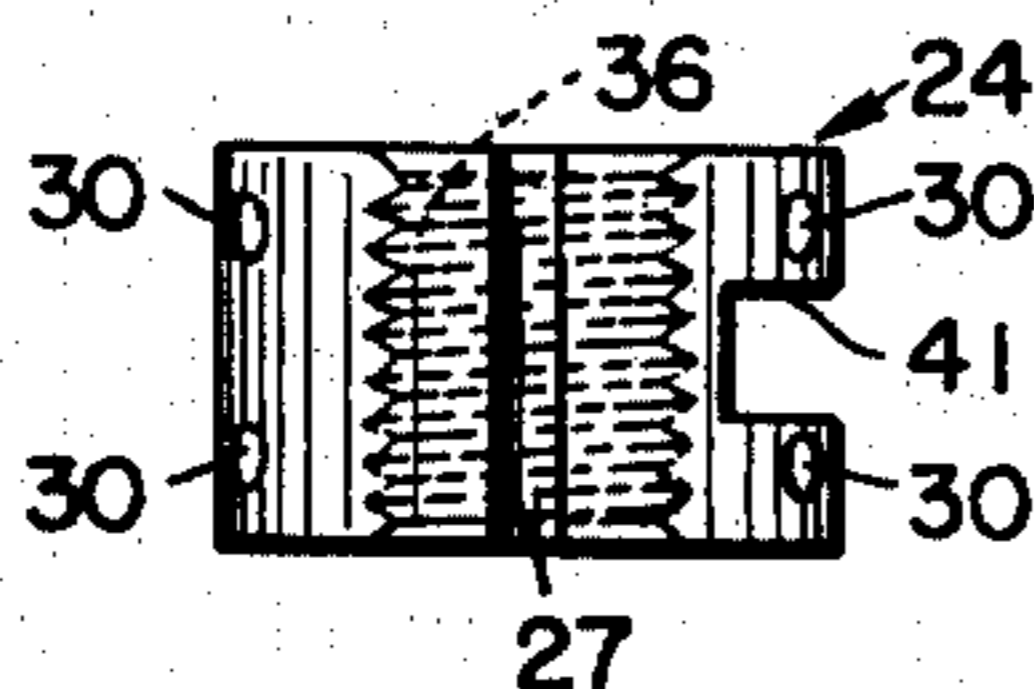


FIG. 4.

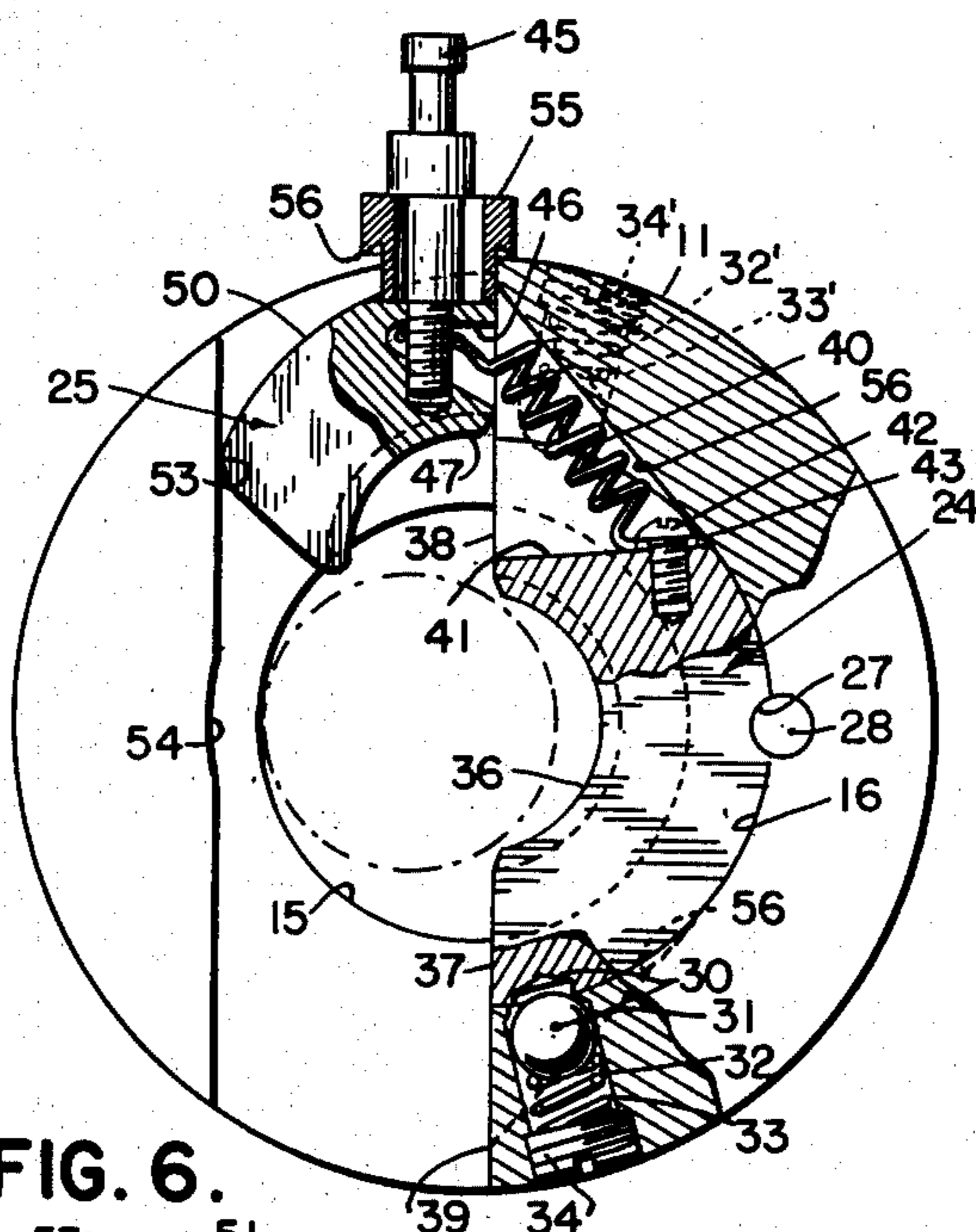


FIG. 6.

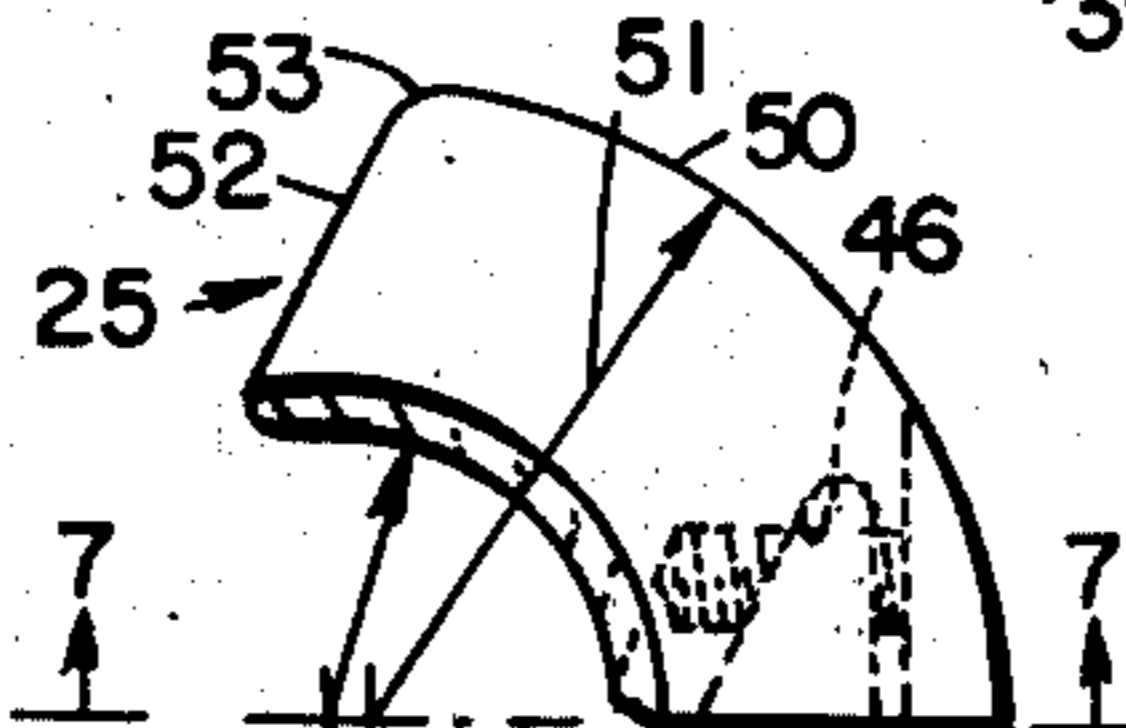


FIG. 7.

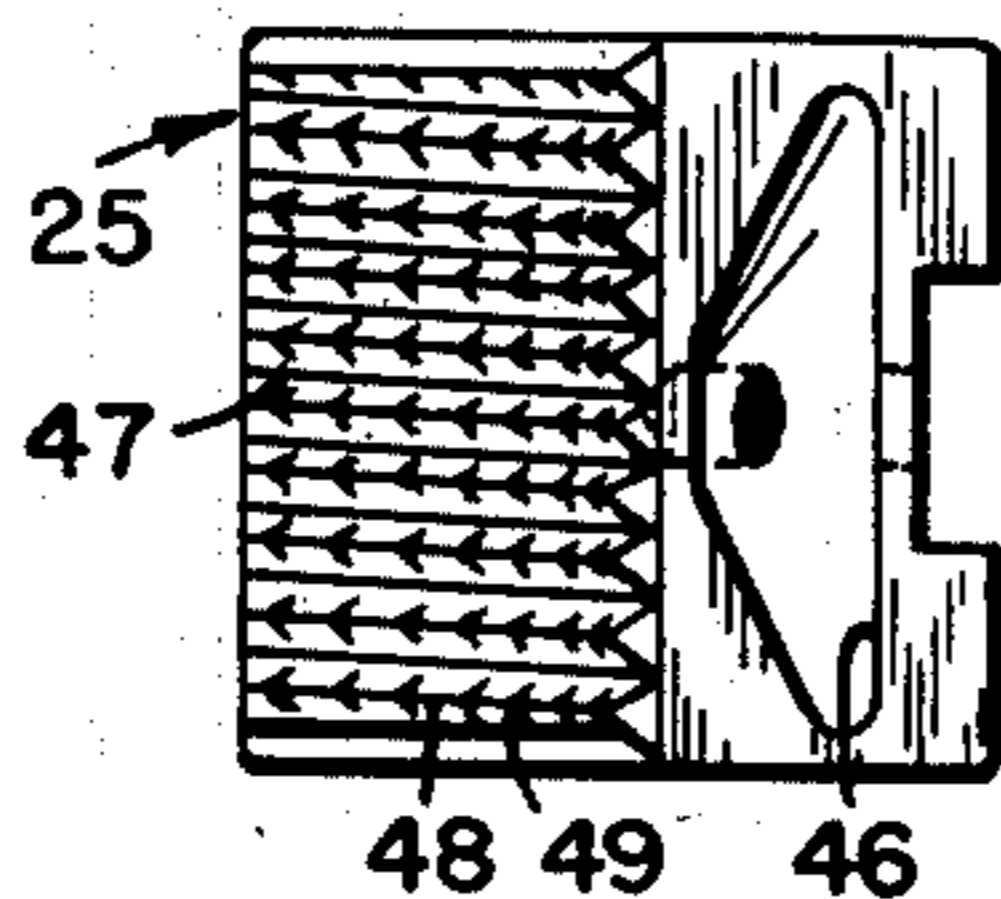
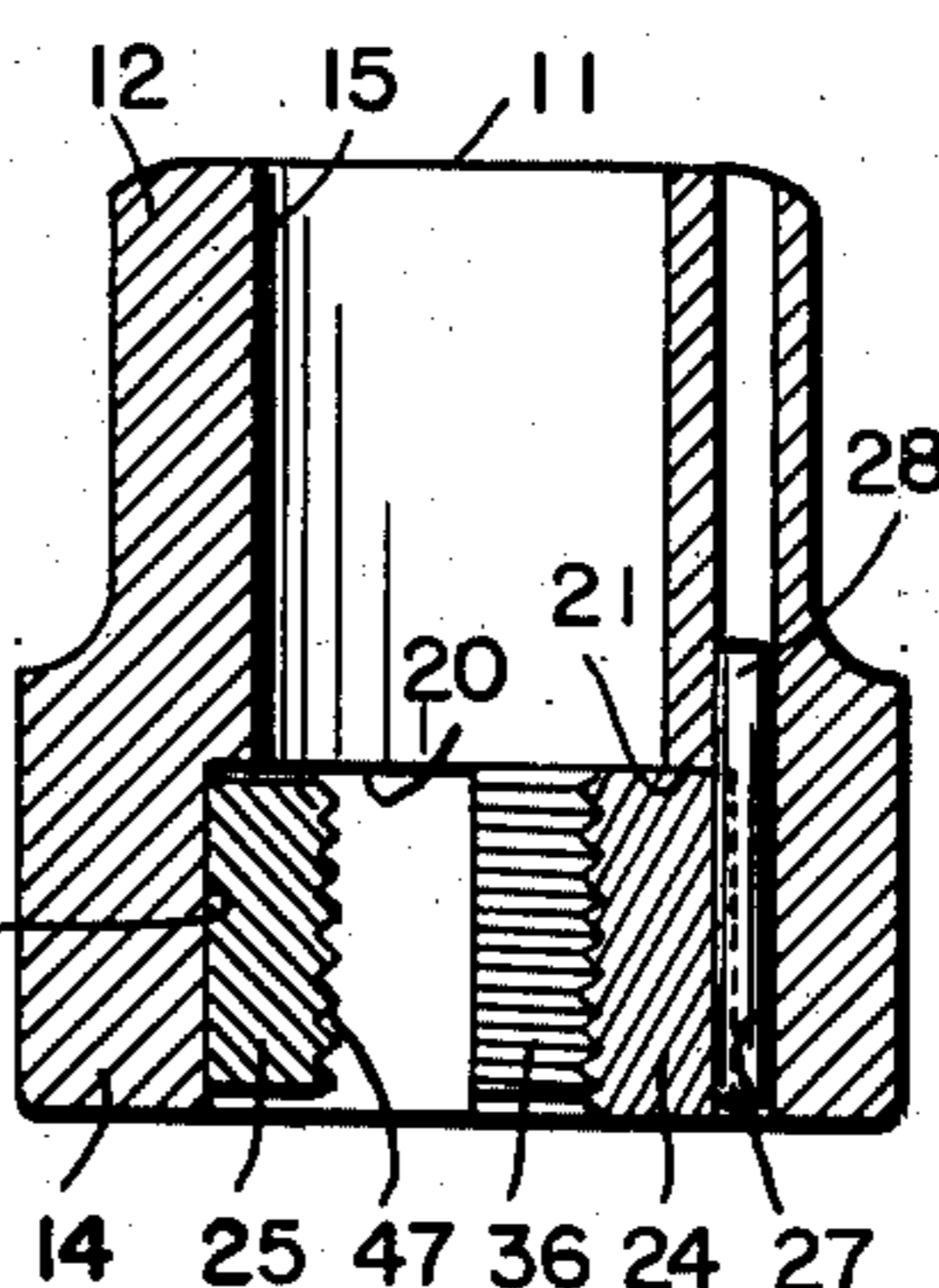


FIG. 5.



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FIG. 11.

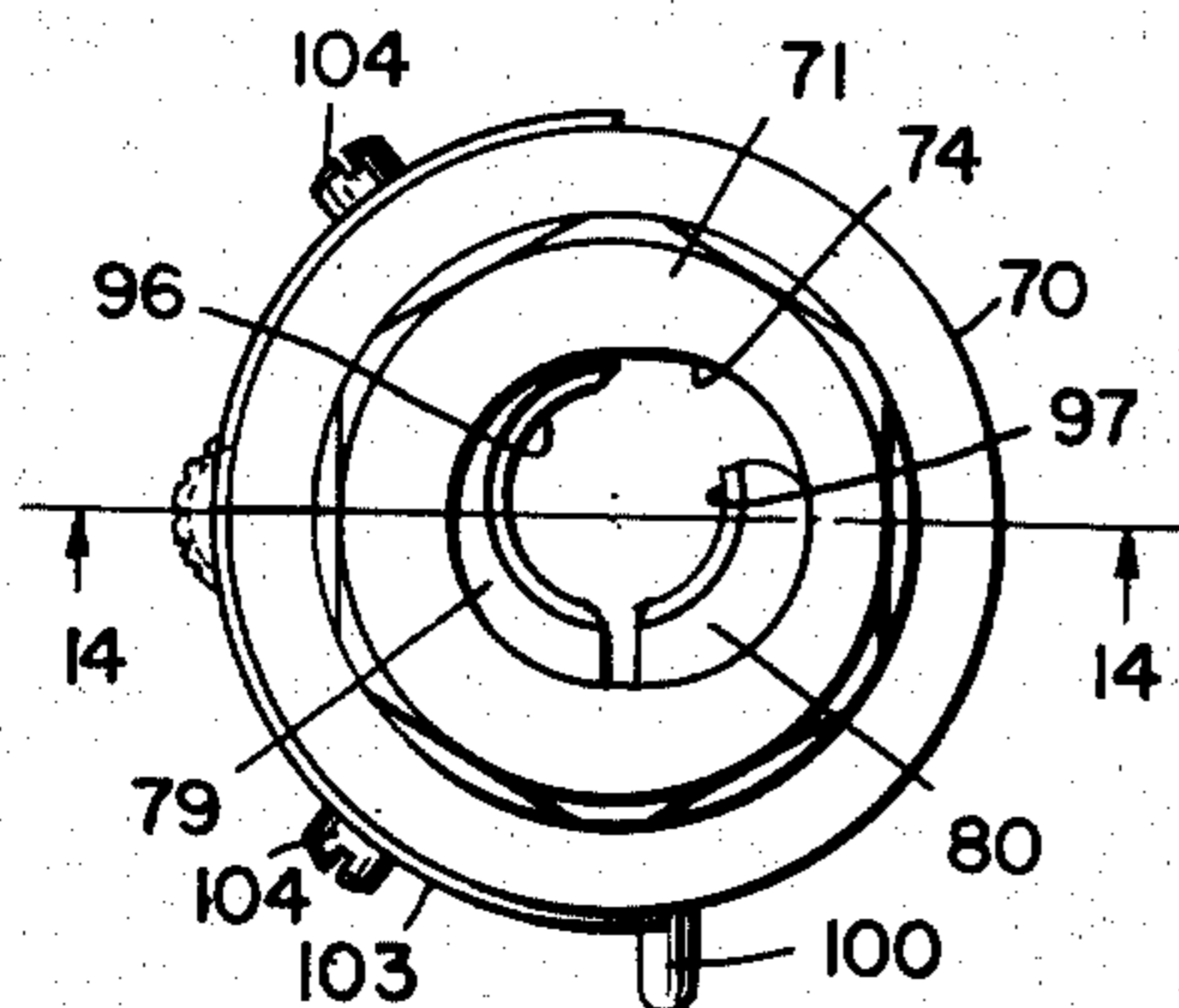


FIG. 12.

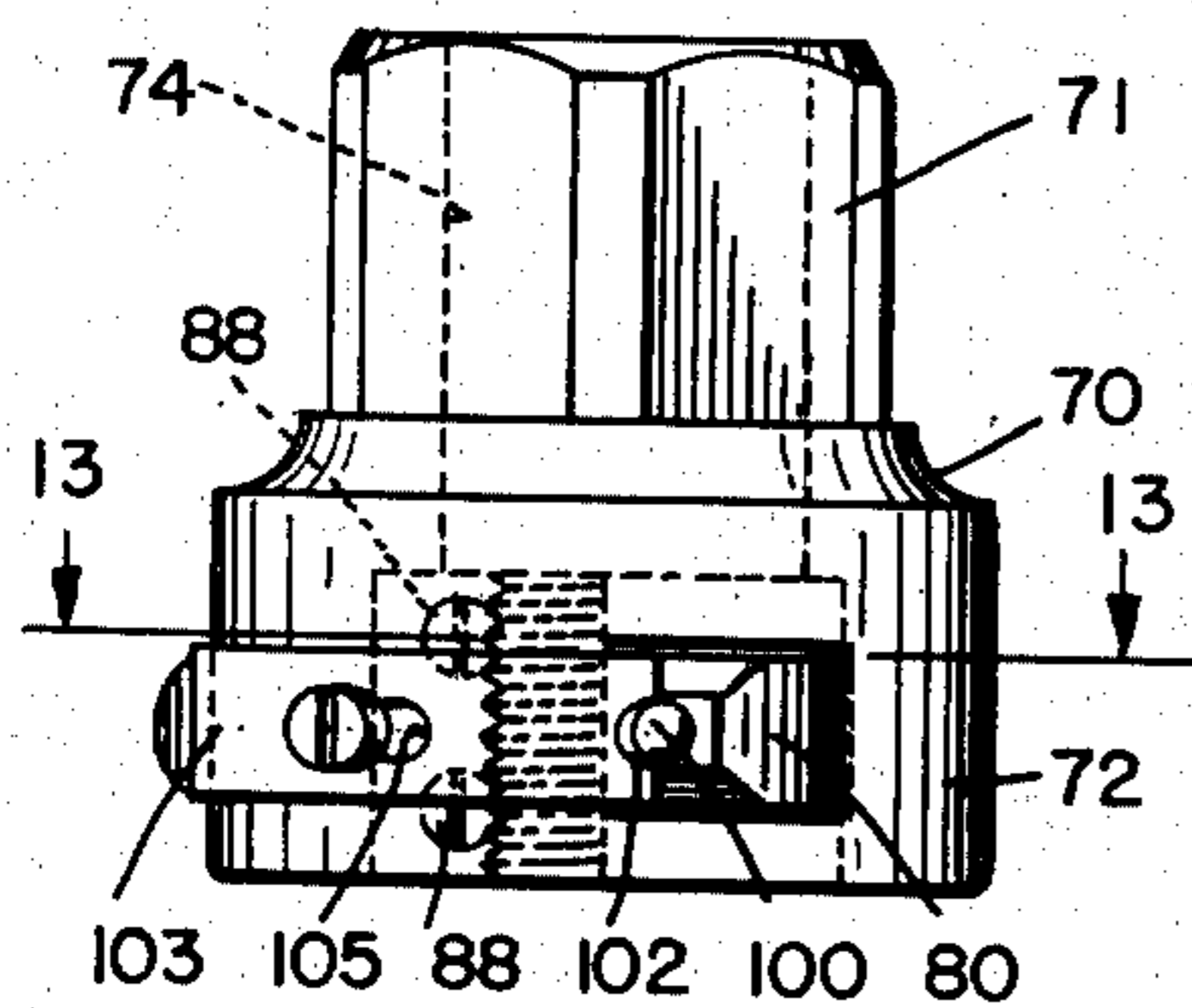


FIG. 13.

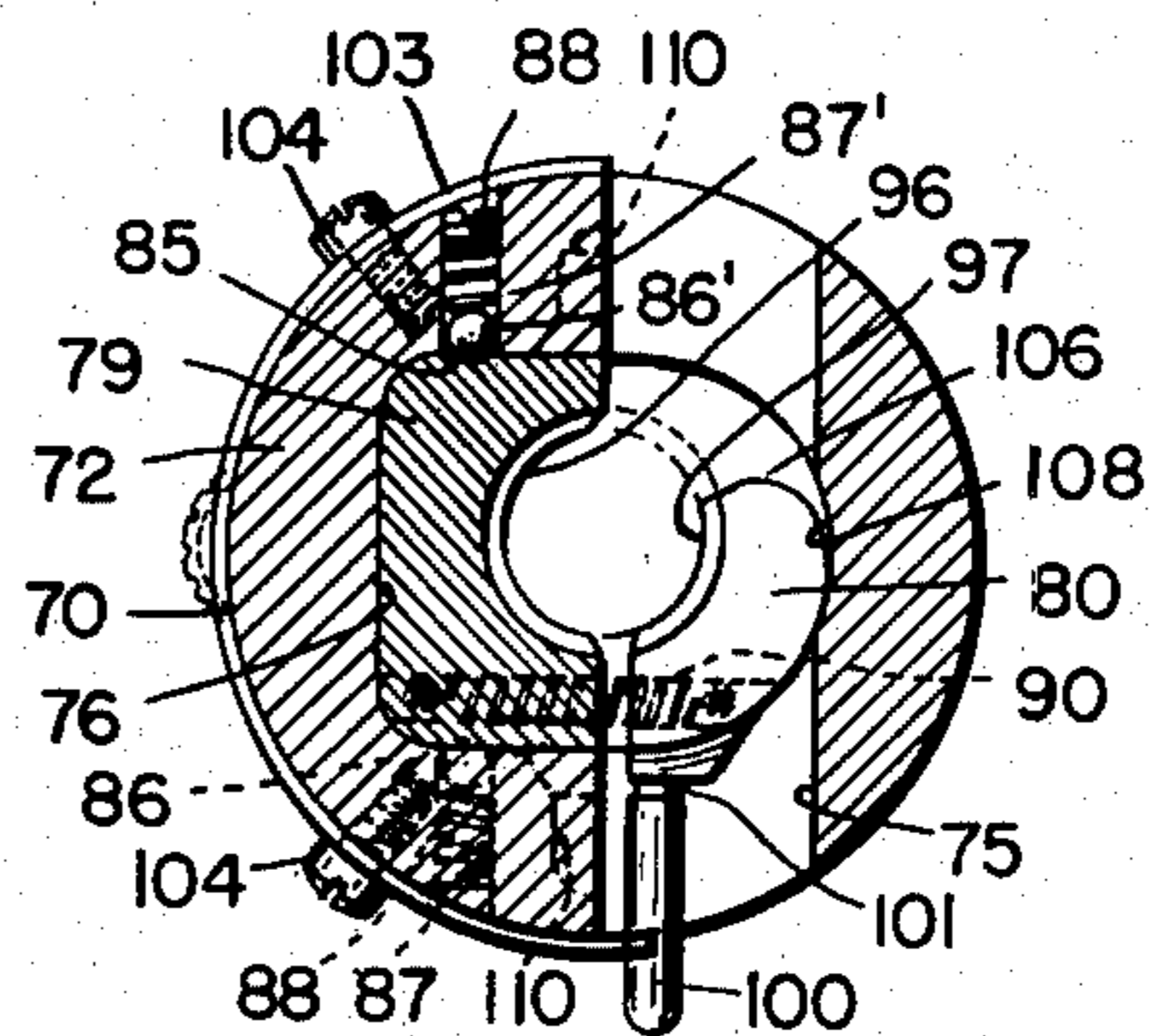


FIG. 14.

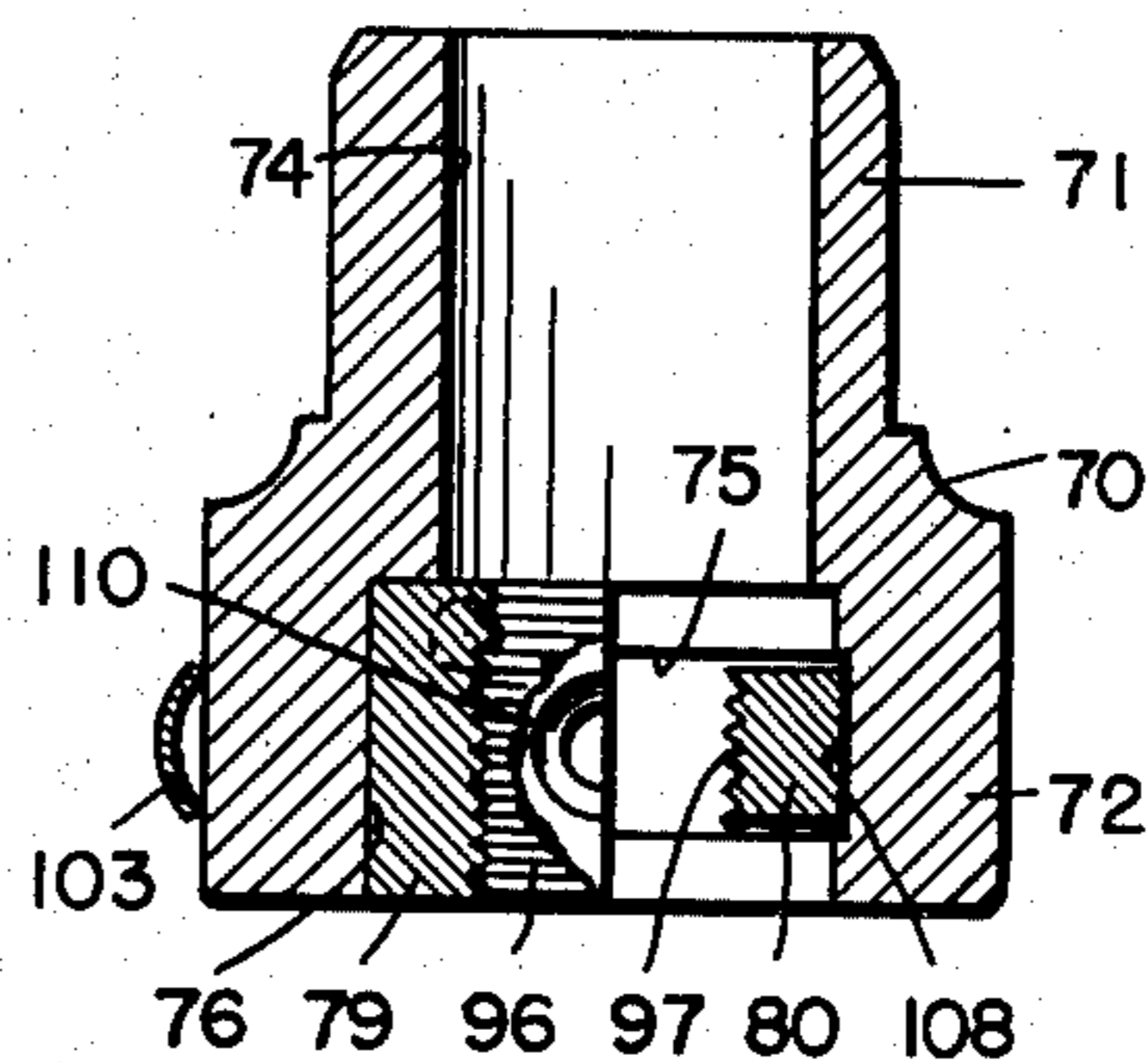


FIG. 15.

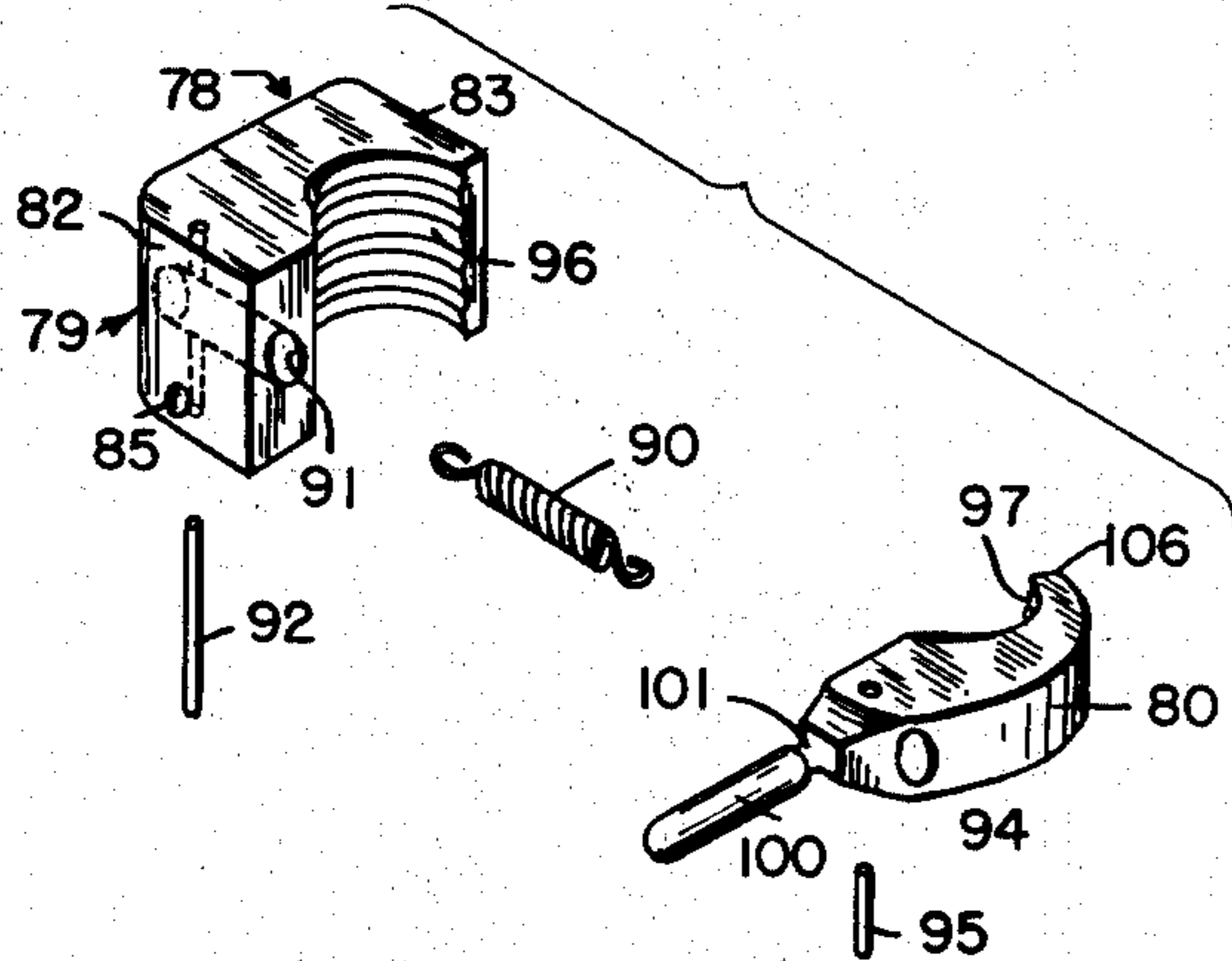
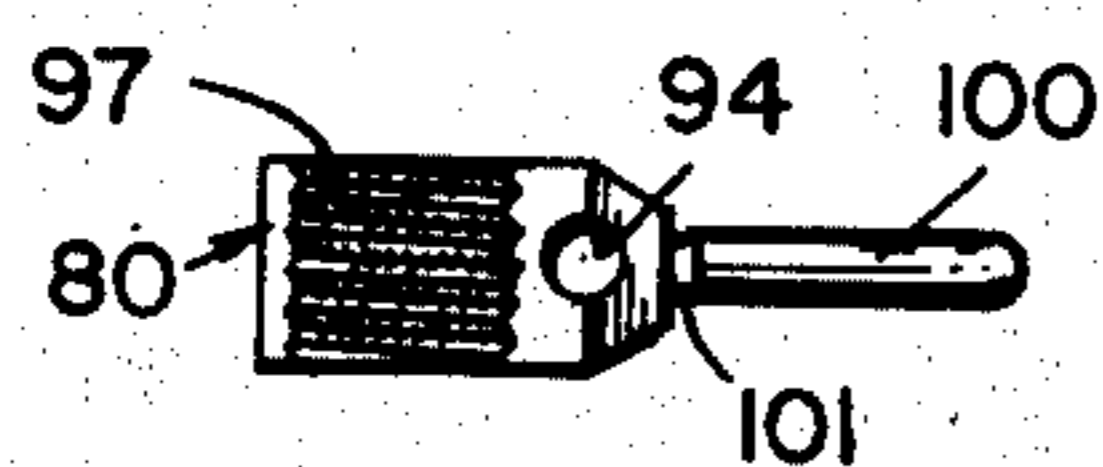


FIG. 16.



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UNITED STATES PATENT OFFICE

2,629,277

STUD BOLT WRENCH

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Application October 4, 1949, Serial No. 119,447

1 Claim. (Cl. 81—53)

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This invention has to do generally with wrenches used for inserting and removing stud bolts.

The tool disclosed herein is an improvement upon those shown in my copending applications for patent, namely application Serial No. 673,911 for Tool for Inserting and Removing Stud Bolts filed June 3, 1946, now Patent Number 2,571,968 of October 16, 1951 and application Serial No. 707,273 for Universal Stud Puller and Driver filed November 1, 1946, now Patent Number 2,560,012 of July 10, 1951.

An object of the invention is to provide a novel, relatively compact, rugged wrench tool for use in inserting and removing stud bolts and the like which is easy to use and efficient in operation. A further object is to provide such a tool which can be used as a wrench on pipe, pipe fittings and other objects.

Another object is to provide a stud bolt wrench which does not mar the threads of the bolt when it is used directly upon the threaded portion of the bolt.

A further object is to provide a stud bolt wrench in which the bolt-gripping elements can be retracted out of the way of the bolt to permit the wrench being readily slipped over or removed from the bolt.

Another object is to provide a device of the type indicated having a body adapted to selectively receive any one of a plurality of different-sized sets of bolt-gripping jaws.

Still another object of the invention is to provide an improved type of jaw construction.

These and other objects will be apparent from the drawing and the following description thereof.

Referring to the drawings:

Fig. 1 is a plan view of a tool embodying the invention;

Fig. 2 is an elevational view of the tool of Fig. 1;

Fig. 3 is an inverted plan view as on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged inverted plan view similar to Fig. 3 but showing the parts in a different position;

Fig. 5 is a central sectional elevational view of the tool;

Fig. 6 is a plan view of a movable jaw;

Fig. 7 is an elevational view on line 7—7 of Fig. 6;

Fig. 8 is an elevational view of the stationary jaw element on a smaller scale than Fig. 6;

Fig. 9 is an elevational view of a spring utilized in the device;

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Fig. 10 is a perspective view of a jaw set for use in gripping the smooth part of a bolt;

Fig. 11 is a plan view of a wrench embodying another form of the invention;

Fig. 12 is an elevational view of the tool of Fig. 11;

Fig. 13 is a sectional view on line 13—13 of Fig. 12;

Fig. 14 is a sectional view on line 14—14 of Fig. 11;

Fig. 15 is an exploded view of parts of a jaw set; and

Fig. 16 is an elevational view of a movable jaw.

More particularly describing the invention, numeral 11 generally indicates the body of a tool embodying the invention. This body includes an upper portion 12 which is shown as hexagonal in shape so that it can be received in a socket or other wrench. The body of the tool may be made in other external shapes if desired. The lower or base portion 14 of the body is somewhat larger in cross section than the upper portion and is shown as circular in cross section.

The body is provided with an axial bore 15 which is of a diameter sufficient to receive the largest size bolt for which the wrench is designed. A counterbore 16 is provided in the base portion 14 of the body this is preferably, although not necessarily, slightly eccentric to the axial bore 15. The body is also provided with a transverse slot 17 which is open on the underside or base end of the body. This slot intersects both the bore 15 and the counterbore 16 and terminates in the flat surface 20 which is in the same plane as the end face 21 between the counterbore and the main bore.

The body 11 accommodates what will be termed a jaw set 22. Various sizes of jaw sets may be provided for the purpose of gripping bolts of different diameters. Each jaw set comprises a stationary jaw 24 and a movable jaw 25 connected together in a manner to be described. The outer surface of the stationary jaw is curved correspondingly to the curvature of the counterbore 16 and is adapted to fit in the counterbore as shown in the drawing. The jaw is also provided with a longitudinal groove 27 which receives a dowel 28, mounted in the body 11 and projecting partially into the counterbored area. The dowel serves to prevent rotation of the stationary jaw relative to the body.

For the purpose of releasably retaining the stationary jaw 24 in the body the exterior surface of the jaw 24 is provided with two pairs of recesses 30 for receiving balls 31 and 31' mounted

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in bores 32, 32' in the body of the tool and yieldingly urged inwardly by springs 33, 33'. Screws 34 and 34' retain the springs.

The inner surface of the stationary jaw is provided with a threaded arcuate concave surface 36 which corresponds to a particular size of bolt. The ends 37 and 38 terminate in the plane of the inner wall 39 of slot 17.

Associated with the stationary jaw and flexibly attached thereto is the movable jaw 25. This jaw is received in the slot 17 of the body and attached to the jaw 24 by a tension spring 40. One end of the tension spring is mounted in a slot 41 of the stationary jaw and secured thereto by a screw 42. The end 43 of the spring is preferably originally formed at about a 45-degree angle to the axis of the spring so that when it is secured in position as shown in Fig. 4 the spring will have a tendency to urge the movable jaw to the position it is shown in Fig. 3. The other end of the spring is secured by a threaded latch pin 45 mounted in the jaw 25, the jaw being provided with a recess 46 for receiving the spring.

The inner surface 47 of the movable jaw 25 is curved correspondingly to the inner surface 36 of the stationary jaw although it is of less length. This surface is provided with screw threads 48 which are preferably roughened as by serrations 49. The outer surface 50 of the movable jaw is struck on an arc, the center of which is offset toward the latch pin end of the jaw as shown in Fig. 6 where 51 indicates the radius, thereby providing a member which increases in thickness from the inner end 52 to the outer end.

Preferably also the movable jaw is provided with a rounded corner 53 where it engages the wall of the slot 17 and in this connection the slot may have a shallow depression 54 therein for receiving the rounded corner part of the jaw as the jaw moves inwardly, the jaw 25 being slidable in the slot 17. The depression 54 may be formed as a continuation of the curve of the counterbore.

The latch pin 45 on the movable jaw is fitted with a sleeve 55 which is loosely mounted on the latch pin and is provided with a sharp undercut shoulder 56 for the purpose of permitting the entire movable jaw member 25 to be pulled out to a retracted position such as shown in Fig. 4 where the sleeve 55 can be positioned to engage the outer surface of the body at the edge of slot 17 and releasably retain the jaw retracted.

In the operation of the device it will be apparent that with the parts in the position in which they are shown in Fig. 4 that the wrench may be readily slipped over a bolt and the movable jaw member subsequently released to spring inwardly into loose engagement with the bolt. It is assumed that the user will choose the proper size of jaw set for the particular bolt to be turned. When the movable jaw is released, it moves to the position of Fig. 3 where it loosely engages the threads on the stud bolt (not shown). It will be obvious that, if the body 11 is turned in a clockwise direction as viewed in Fig. 3, movable jaw 25 will wedge itself between the wall of the slot 17 and the bolt thereby firmly gripping the bolt in conjunction with the stationary jaw 24.

It will also be apparent that by reversing the jaw set the device may be used for turning a bolt in the opposite direction. In this connection it will be seen that the interior of the body

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11 is provided with two shallow slots 56 for accommodating the spring 40 when the movable jaw is retracted.

In Fig. 10 I show another type or form of jaw set which is used for gripping the smooth or unthreaded part of a bolt. Referring to this figure, the jaw set, generally indicated by numeral 60, comprises the stationary jaw member 61 and movable jaw member 62. These members are substantially similar to the members 24 and 25 previously described except that the inner bore 63 of the stationary jaw is smooth and the inner surface 64 of the movable jaw is roughened such as by knurling as shown. With this construction some rotation of the bolt relative to the stationary bore is permitted during the initial camming or gripping action of the movable jaw member, thereby enabling the movable jaw to move into firm gripping engagement with the bolt.

Referring to Figs. 11-16 where there is shown a modified form of the invention, numeral 70 indicates the body of a wrench tool which may have its upper end 71 of hexagonal or other convenient shape so that it may be gripped by a wrench or the like. The lower part 72 of the body is preferably circular. A bore 74 is provided in the body and this extends longitudinally therethrough. At the base or lower end portion 72 of the body the bore is intersected by an opening 75 of rectangular cross section which is positioned radially outward of the axis of the bore. Opposite the opening the body is provided with a recess 76 having three sides which are substantially rectangularly disposed.

The opening 75 and recess 76 accommodate what will be termed a jaw set 78 which includes a stationary jaw 79 and a movable jaw 80. The outer sides of the stationary jaw 79 correspond to the sides of the recess 76 and the jaw fits snugly in the recess. Preferably a means is provided for releasably retaining the stationary jaw 79 in the body and in the form of the invention shown, the ends 82 and 83 of the stationary jaw are shown as each being provided with a pair of semi-circular recesses indicated by 85. These are adapted to receive balls 86 and 86' which are urged inwardly by springs 87, 87', the springs being retained by screws 88. It will be apparent that with this construction the stationary jaw may be releasably mounted in the recess 76 as shown or inverted.

A movable jaw 80 is connected to the stationary jaw by a tension spring 90, one end of which is received in a bore 91 of the stationary jaw and held by a pin 92. The other end of the spring is received in a bore 94 in the movable jaw and is retained by pin 95.

The stationary and movable jaws are each provided with arcuate opposed bolt-gripping faces, indicated, respectively, by 96 and 97. Where the jaw set is for use in gripping the threaded part of a bolt the surfaces 96 and 97 are threaded correspondingly to the bolt to be gripped and the threads on the surface 97 of the movable jaw roughened as by serrations (not shown) similar to those previously described as being on the movable jaw shown in Figs. 1-10.

The movable jaw is positioned in the opening 75 and is provided with a handle 100 so that it may be retracted or pulled out from the position in which it is shown in Fig. 13 to be out of the way of a bolt when the wrench is slipped over the bolt. For releasably holding the movable jaw retracted the handle is provided with

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a groove 101 which is adapted to be engaged by the notched end 102 of a band 103 on the exterior of the jaw. The band is mounted for limited movement around the body by screws 104 which pass through slots 105 in the band.

The movable jaw 80 is formed so that it increases in width from the nose or inner end 106 outwardly so that the same will wedge between the wall of the slot 75 and a bolt between the jaws when the body is turned in a clockwise direction as viewed in Fig. 13. To increase the bearing area between the wall of the slot and the movable jaw the slot may have a shallow recess 108 formed therein.

While the operation of this device in the gripping of a stud bolt or the like is the same as for the form of the invention previously described, it will be apparent that a little more manipulation is required to insert and remove the jaw set. However, the flexibility of the spring 90 connecting the movable jaw and stationary jaw is such that the movable jaw may be moved sufficiently that the jaw set as a whole may be removed. Niches 110 are provided to accommodate the spring when the movable jaw is retracted.

Although the invention has been particularly shown and described, it is contemplated that various changes and modifications can be made without departing from the scope thereof as defined in the claim.

I claim:

A stud bolt wrench comprising, a body having a bore therethrough, said body having a recess at one end to one side of said bore, said body

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having an opening therethrough intersecting said bore and opposite said recess, a jaw set mounted in said recess and opening, said set comprising a stationary jaw mounted in said recess and a movable jaw mounted opposite thereto in said opening at normally adjacent ends, said jaws being connected by a tension spring, said jaws having opposed semi-circular bolt-gripping surfaces, said movable jaw being constructed and arranged to cooperate with the wrench body to be cammed into gripping engagement with the bolt in conjunction with said stationary jaw, said movable jaw being movable in said opening outwardly of said bore to a retracted position, and latch means on said movable jaw for engagement with said body to releasably hold said movable jaw in retracted position.

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