Oct. 31, 1950 M. A. BARKER ET AL 2,527,517

AUTOMATIC ADJUSTABLE TORQUE WRENCH

Filed Sept. 11, 1947

Fig. 1.

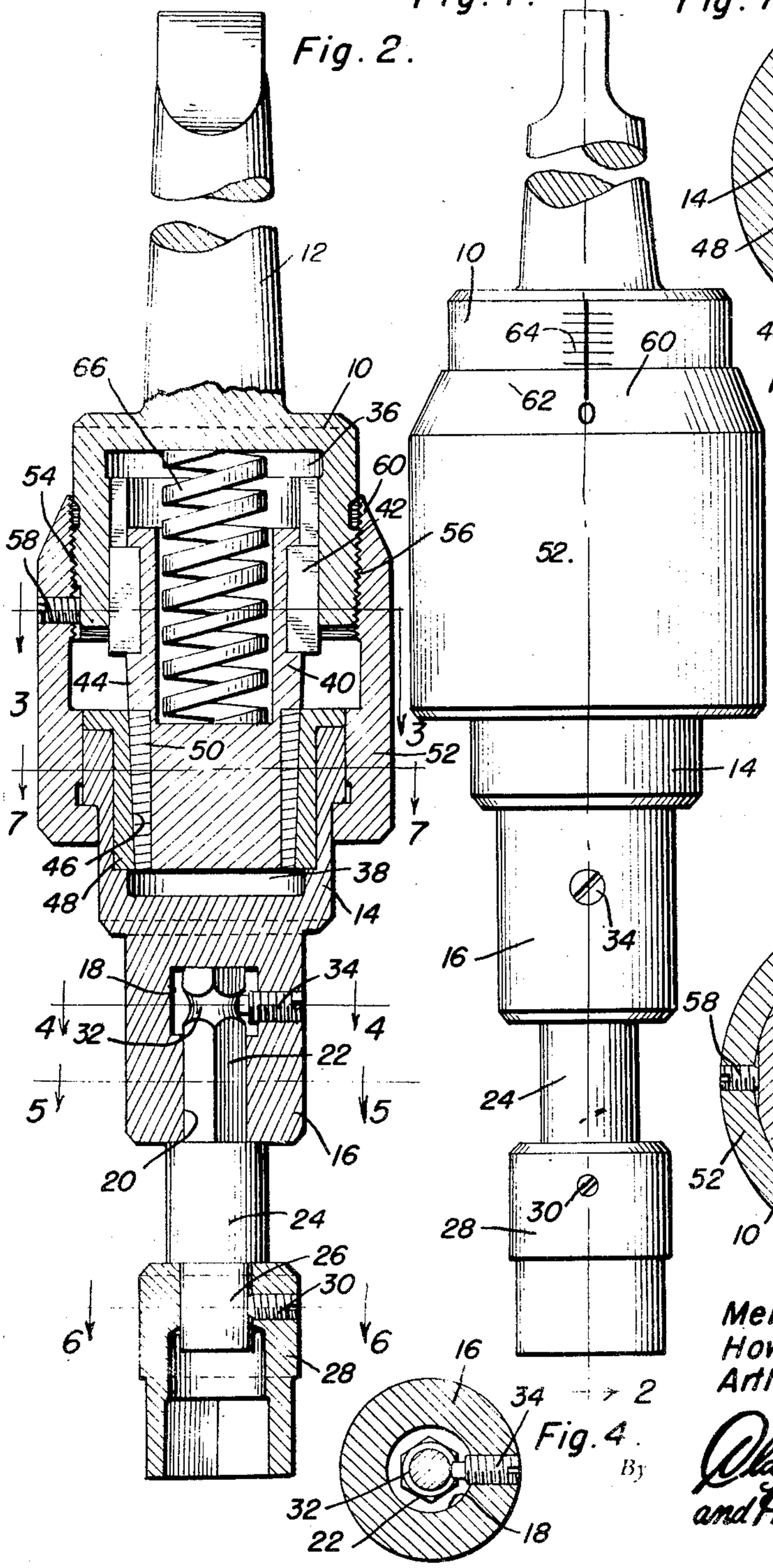


Fig. 2.

Fig. 7.

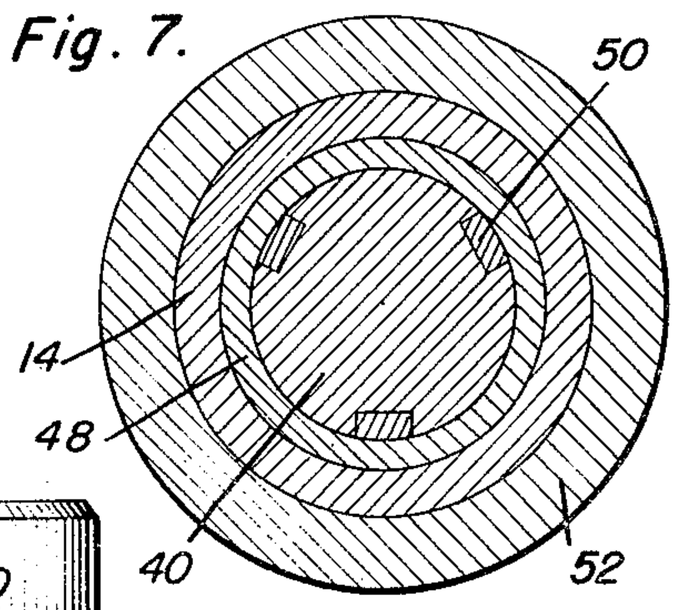


Fig. 5.

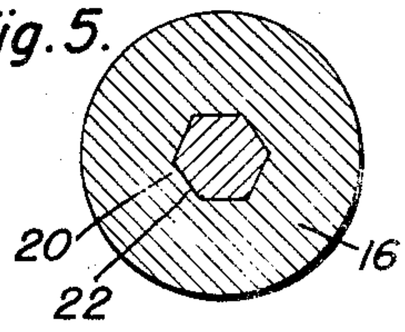


Fig. 6.

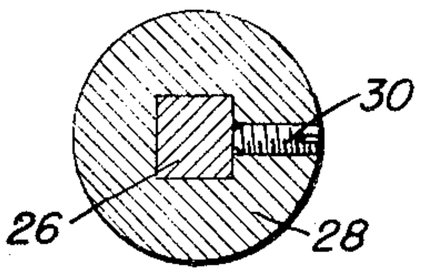
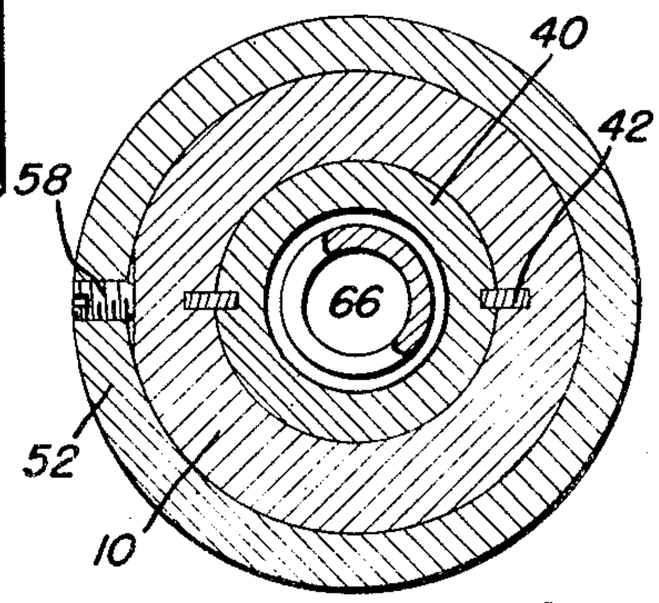


Fig. 3.



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AUTOMATIC ADJUSTABLE TORQUE WRENCH

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5 Claims. (Cl. 64—30)

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This invention relates to novel and useful improvements in an automatic adjustable torque wrench and more specifically relates to an improved construction and means for selectively adjusting the torque at which a clutch embodied in the wrench releases, to thereby regulate with exactness the force in inch pounds applied to a nut or bolt.

The principal object of this invention is to provide a novel and improved adjustable clutch mechanism embodied in a torque wrench which shall be extremely compact, efficient in operation, of simplified construction and which may be readily adjusted to apply any predetermined torque or force to a nut or bolt.

A further object of the invention is to provide a mechanism according to the preceding objects which may be equally embodied in a wrench operable manually or from a source of power.

Yet another important purpose of the invention is to provide a tool of the character set forth above wherein there is provided an improved means for adjusting the spring tension upon the clutch member to occasion slipping in the clutch at a predetermined torque, together with a combined coupling means and torque indicating adjustment means.

These, together with various ancillary objects of the invention which will later become apparent as the following description proceeds, are attained by this device, a preferred embodiment of which has been illustrated by way of example only in the accompanying drawings, wherein:

Figure 1 is an elevational view showing the improved wrench embodying the invention;

Figure 2 is a vertical longitudinal sectional view taken substantially upon the plane of the section line 2—2 of Figure 1 and showing the interior construction of the device; and,

Figures 3–7 are horizontal sectional detail views taken substantially upon the plane indicated by the section lines 3—3, 4—4, 5—5, 6—6 and 7—7 of Figure 2.

Referring now more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, the improved wrench is shown as comprising an upper body 10 having a tapering operating shank 12, and a lower body 14 having a reduced, bored shank portion 16 at the lower end thereof. The shank 16 is provided with an enlarged internal annular chamber 18, from which extends a polygonal shaped axial bore 20 which may be hexagonal as shown. Slidably and not rotatably received in the bore 20 is the reduced, correspondingly shaped inner extremity 22 of a shank 24 whose outermost extremity 26 is of square cross section for detachably receiving a wrench socket 28 secured thereto and by a set screw 30 or any other suitable detachable securing means. As will readily be understood, it is contemplated that a plurality of different size wrench sockets 28 may be selectively positioned upon the extremity 26. The polygonal shaped inner extremity 22 of the shank 24, is provided with an annular groove 32 by means of which the shank is retained in the bore of the shank 16, by means of a laterally positioned inwardly extending set screw 34 whose inner extremity engages the groove 32.

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The bodies 10 and 14 are provided with complementary and adjacent chambers 36 and 38 respectively within which are respectively secured a male clutch member 40 slidably but not rotatably received in the chamber 36 as by cooperating key 42, this clutch member having a lower conical tapering clutch surface 44, which as shown in Figure 7 is provided with longitudinally extending imbedded wear inserts 50.

Within the chamber 38 of the lower body member 14, is rigidly secured a removable female clutch insert 48 having a conical shaped clutch surface 46 frictionally engaging the similarly shaped conical clutch surface 44 with its friction inserts 50.

The conicities of the cooperating male and female clutch elements are such that as the members are forced towards each other, their frictional engagement increases, whereby a greater torque may be transmitted from one to the other by relative rotation of the shanks 12 and 16.

A coupling gland 52 engages an annular shoulder upon the lower body 14 and is provided at its outer extremity with an internally threaded portion 54 embracing and threadingly engaging corresponding threads 56 on the lower outer extremity of the body portion 10. As will readily be seen, by screwing the coupling gland upon the body 10, the two clutch bodies will be drawn forth together, and they may be locked in desired adjusted position by means of a set screw 58 depending through the coupling gland 52 and engaging an area of the lower circumference of the body 10.

As shown in Figures 1 and 2, the upper extremity of the coupling gland 52 is conically tapered as at 60 and is provided with suitable indicia 62 registerable with corresponding indicia 64 carried upon the adjacent surface of the upper body member 10, to thereby indicate

the relative portional capacity of the clutch members in inch pounds or other suitable torque calibrated indicia.

As shown in Figure 2, a coil spring **66** is received within the chamber **36** of the upper body member **10**, and abuts against the bottom of said chamber and extends into and engages the bottom of a recess extending axially into the male clutch member **40**, to thereby urge the latter downwardly and outwardly from the upper body member **10** and into the female clutch member **48** of the lower body member **14**. Obviously, by adjusting the coupling gland **52** the lower body member and the female clutch member may be urged upwardly against the clutch surface of the downwardly extending male clutch member against the opposition of spring **66**, and the above mentioned indicia **62** and **63** may be so calibrated as to indicate when any desired tension has been applied against the spring **66** and any desired torque may be carried by the cooperating clutch members.

From the foregoing, it is believed that the manner of operating and constructing the device will be readily understood. In operation, the shank **12** may be received in any suitable power operating means whereby the wrench may be operated automatically from the power source, or a manual operating means may be applied thereto as desired. Any suitable size of socket **28** may be secured to the shank **24** extending from the lower end of the wrench, for adapting the latter to any particular work desired. When the wrench has been applied, and the combined coupling gland **52** and torque adjusting means has been satisfactorily manipulated, and locked in its adjusted position by means of the set screw **58**, the rotation of the shank **12** is transmitted through the keys **42** to the male clutch member **40** rotating the latter and by means of the frictional engagement between the cooperating surfaces **44** and **46**, causing rotation of the female clutch member **48** and subsequently of the tool socket **28**. This rotation continues until the resistance of the nut or bolt engaged by the socket **28** is sufficient to reach the desired torque for which the tool is set, whereupon the friction between the surfaces **44** and **46** is overcome and further rotation of the handle or shank **12** is insufficient to cause rotation of the socket **28**.

Obviously the parts may be so calibrated that it will be possible to set the device for maintaining any desired torque transmission by the clutch to the socket **28**.

Since numerous modifications will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not intended to limit the invention to the exact construction shown and described, but all suitable modifications and equivalents may be resorted to falling within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. In a torque wrench, a pair of relatively rotatable bodies having complementary and adjacent chambers, cooperating male and female clutch members disposed in said chambers, spring means disposed in one of the chambers for urging said male clutch member into engagement with the female clutch member and means for rotatably securing said bodies together and for regulating said spring means adjustably embracing each of said bodies and concentrically disposed about the chambers thereof to provide a predetermined and adjustable torque release for said clutch members.

2. The combination of claim 1 wherein one of said clutch members is non-rotatably but axially adjustably secured in its chamber.

3. The combination of claim 1 wherein one of said clutch members is rigidly secured in its chamber.

4. In a torque wrench, a driving member having a tapered shank terminating in an enlarged chamber, a driven member having a tool receiving shank and a chamber disposed complementary and adjacent to said chamber of the driving member, cooperating male and female clutch members disposed in said chambers, said male clutch member being non-rotatably but axially adjustably disposed within the driving member chamber, resilient means disposed in the chamber of the driving member and bearing against the male clutch for urging the same into engagement with the female clutch, and means embracing both of said bodies and concentrically disposed about the chambers for rotatably securing the bodies together and for regulating said resilient means to provide an adjustable torque release for said clutch members.

5. In a torque wrench, a driving body and a driven body, said bodies having complementary and adjacent chambers, a fixed female clutch member disposed in one of said chambers, a non-rotatably and axially adjustable male clutch member disposed in the other of said chambers and adapted for cooperation with the female clutch member, resilient means disposed in one of said chambers and bearing against the male clutch member for urging the same into driving engagement with the female clutch member, a member embracing both of said bodies and having screw-threaded engagement of one of said bodies for rotatably securing said bodies together and regulating the resilient means.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
923,043	Gulick	May 25, 1909
1,002,310	Procunier	Sept. 5, 1911
1,669,862	Christianson et al.	May 15, 1928
2,268,869	Given	Jan. 6, 1942