

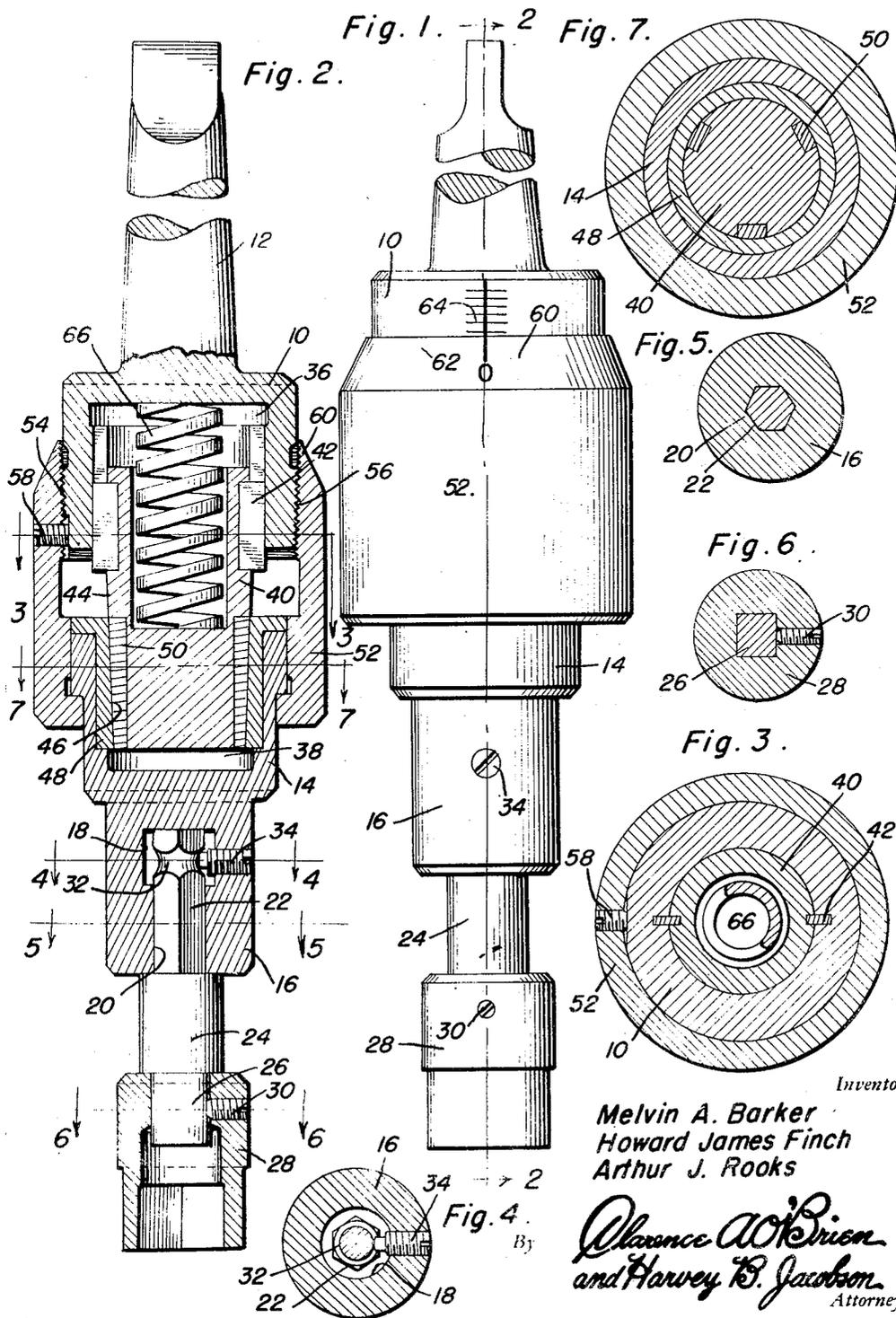
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AUTOMATIC ADJUSTABLE TORQUE WRENCH

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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 im-
provements in an automatic adjustable torque
wrench and more specifically relates to an im-
proved 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 pro-
vide a novel and improved adjustable clutch
mechanism embodied in a torque wrench which
shall be extremely compact, efficient in opera-
tion, 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 op-
erable manually or from a source of power.

Yet another important purpose of the inven-
tion 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 com-
bined coupling means and torque indicating ad-
justment means.

These, together with various ancillary objects
of the invention which will later become apparent
as the following description proceeds, are at-
tained 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 im-
proved 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 accom-
panying drawings; wherein like numerals desig-
nate 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 poly-
gonal shaped axial bore 20 which may be hexag-
onal as shown. Slidably and not rotatably re-
ceived in the bore 20 is the reduced, correspond-

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ingly 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 extrem-
ity 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 re-
tained 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.

The bodies 10 and 14 are provided with com-
plementary and adjacent chambers 36 and 38
respectively within which are respectively secured
a male clutch member 40 slidably but not rota-
tably received in the chamber 36 as by cooperat-
ing 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 mem-
ber 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 fric-
tion inserts 50.

The conicities of the cooperating male and
female clutch elements are such that as the mem-
bers are forced towards each other, their fric-
tional 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 shoul-
der 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 ex-
tremity 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 de-
sired 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 ex-
tremity of the coupling gland 52 is conically
tapered as at 60 and is provided with suitable
indicia 62 registerable with corresponding in-
dicia 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 53, 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 ro-

tatable 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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