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(54) **Tool having an angularly adjustable driving head**

(57) A tool includes a handle (10) having a cavity (17) to slidably receive a latch (40), and a driving head (30) having a shank (32) rotatably secured to the handle (10). The shank (32) includes a number of depressions (37) arranged in the cavity (17) of the handle (10). The latch (40) includes a stem (41) having a reduced outer diameter and includes an actuator (45) to selectively engaged into either of the depressions (37) of the shank (32). A spring (47) may bias the actuator (45) to engage into either of the depressions (37) of the shank (32), and to adjustably secure the driving head (30) relative to the handle (10) at selected angular positions.

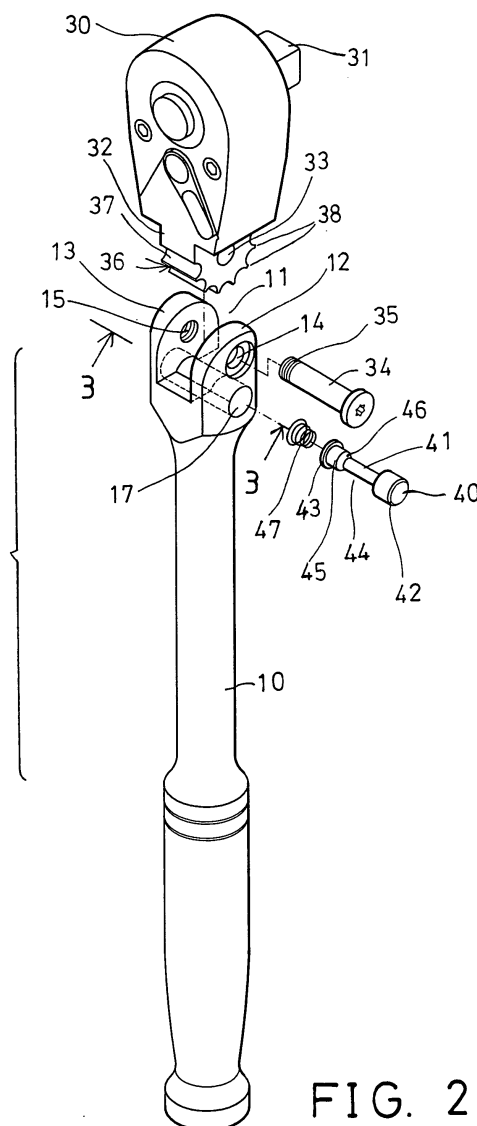


FIG. 2

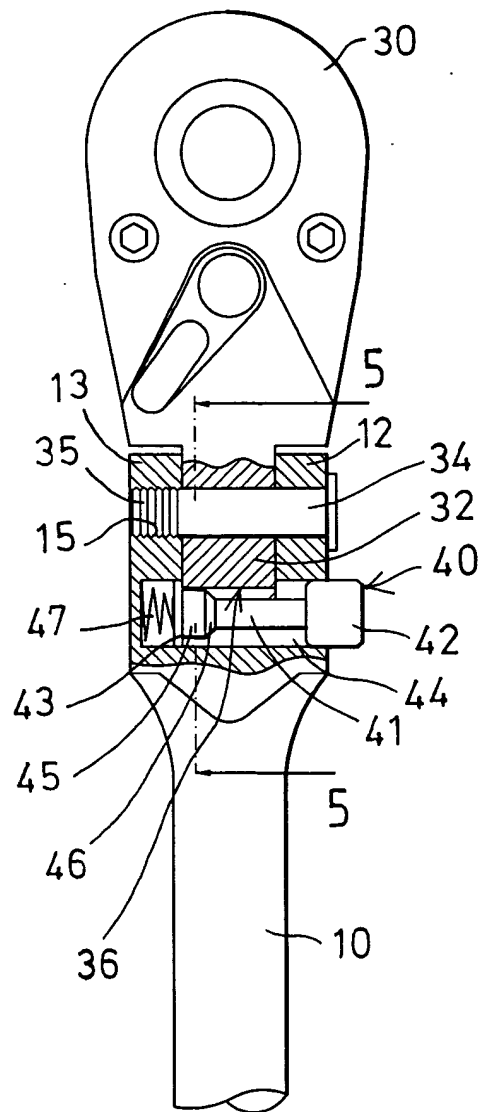


FIG. 4

Description

[0001] The invention relates to a tool having a rotatable driving head.

[0002] Typical tools include a rotatable driving head adjustably secured to the handle with a ball or a pawl or gears which may not solidly secure the head to the handle.

[0003] The invention is to provide a tool having a rotatable driving head adjustably secured to the handle with a simplified lock device.

[0004] FIG. 1 is a perspective view of a rotatable driving head for a tool;

[0005] FIG. 2 is a partial exploded view of the tool;

[0006] FIGS. 3, 4, 5, 6, 7 are partial cross sectional views;

[0007] FIG. 8 is a perspective view of the other tool; and

[0008] FIGS. 9, 10 are partial cross sectional views.

[0009] Referring to FIGS. 1-5, a tool comprises a handle 10 including a space 11 formed in one end by two flaps 12, 13. One of the flaps 12 has an orifice 14 and the other flap 13 has a screw hole 15.

[0010] A rotatable driving head 30 includes a driving member 31 for driving fasteners or the like, and a shank 32 received in the space 11 of the handle 10 and having an aperture 33 for aligning with the orifice 14 and the screw hole 15 of the flaps 12, 13. The driving head 30 may also include an engaging hole 39 (FIG. 8) for driving fasteners or the like.

[0011] A shaft 34 is engaged through the orifice 14 of the flap 12 and the aperture 33 of the shank 32 or of the driving head 30, and includes a threaded segment 35 for threading with the screw hole 15 of the flap 13, to pivotally secure the driving head 30 to the handle 10. The shank 32 of the driving head 30 includes a number of curved depressions 37 formed in the outer peripheral portion 36 by a number of teeth 38, and parallel to the shaft 34, but perpendicular to the driving member 31 of the driving head 30.

[0012] The handle 10 includes a lateral cavity 17, preferably parallel to the shaft 34 or the orifice 14 and the screw hole 15 of the flaps 12, 13, and partially communicating with the space 11 of the handle 10 (FIG. 3). The outer peripheral portion 36 of the shank 32 is extended into the cavity 17 of the handle 10 (FIGS. 4-7).

[0013] A latch 40 includes a stem 41 formed between an outer button 42 and an inner disc 43, and having an outer diameter smaller than that of the outer button 42 and the inner disc 43 of the latch 40, to form an annular peripheral recess 44 between the latch 40 and the handle 10 when the latch 40 is received in the cavity 17 of the handle 10 (FIGS. 2, 4, and 6).

[0014] The outer button 42 and the inner disc 43 of the latch 40 preferably include an outer diameter equals to the inner diameter of the cavity 17 of the handle 10, to allow the latch 40 to be smoothly slid and/or rotated relative to the handle 10, but for preventing latch 40 from

being vibrated or shacken relative to the handle 10. The outer diameter of the stem 41 is arranged to prevent the stem 41 from being engaged with the teeth 38 or the outer peripheral portion 36 of the shank 32 (FIGS. 6, 7).

[0015] The latch 40 includes an actuator 45 formed on one end of the stem 41, close to the disc 43, and having an outer diameter smaller than that of the outer button 42 and the inner disc 43 of the latch 40, but greater than that of the stem 41, to allow the actuator 45 to be engaged into either of the curved depressions 37 that are formed in the outer peripheral portion 36 of the shank 32.

[0016] A spring 47 is received in the cavity 17 of the handle 10, and engaged with the latch 40, for biasing the button 42 of the latch 40 to partially extended out of the cavity 17 of the handle 10, and for biasing the actuator 45 to selectively engage into either of the curved depressions 37 of the shank 32 (FIGS. 4, 5), and thus to adjustably secure the driving head 30 to any selected angular position relative to the handle 10.

[0017] The actuator 45 of the latch 40 preferably includes an outer diameter or curvature corresponding to that of the curved depressions 37 of the shank 32, for allowing the actuator 45 of the latch 40 to be snugly received in the curved depressions 37 of the shank 32 (FIGS. 4, 5), and thus to greatly increase the driving torque applied to the driving head 30 by the handle 10.

[0018] As also shown in FIG. 4, the outer peripheral portion 36 of the shank 32 is extended into the cavity 17 of the handle 10, and the inner disc 43 of the latch 40 is snugly received in the cavity 17 of the handle 10, such that the disc 43 of the latch 40 will be engaged with the outer peripheral portion 36 of the shank 32, and such that the latch 40 prevented from being disengaged from the handle 10. The actuator 45 of the latch 40 preferably includes an inclined or curved side portion 46 for easily engaging into either of the curved depressions 37 of the shank 32, and to be engaged with the teeth 38 of the shank 32.

[0019] When it is required to rotate or adjust the driving head 30 relative to the handle 10, it is only required to depress the latch 40 into the cavity 17 of the handle 10 (FIGS. 6 and 7), and to disengage the actuator 45 from the curved depressions 37 and the teeth 38 of the shank 32. The actuator 45 may be biased by the spring 47, to engage into the other curved depressions 37 of the shank 32, and to be engaged with the teeth 38 of the shank 32, to adjustably lock the driving head 30 to the handle 10 at selected angular position.

[0020] The latch 40 includes a greatly simplified configuration having the integral actuator 45, and may thus be easily assembled into the cavity 17 of the handle 10 before the shank 32 is engaged into the space 11 and the cavity 17 of the handle 10.

[0021] Referring next to FIGS. 9 and 10, alternatively, the handle 10 may include a shank 18 rotatably engaged into a space formed between two flaps 321 of the driving head 30, and the driving head 30 includes a cavity 301

to slidably receive the spring 47 and the latch 40. The latch 40 includes an integral actuator 45 for engaging with either of the curved depressions 19 of the shank 18 of the handle 10, in order to adjustably lock the driving head 30 to the handle 10 at selected angular positions. 5

Claims

1. A tool comprising a handle (10), a driving head (30) 10 including a shank (32) rotatably secured to the handle (10) with a shaft (34), and the shank (32) including an outer peripheral portion (36) having a plurality of depressions (37) formed between teeth (38), **characterized in that:** 15

the handle (10) includes a cavity (17), a latch (40) is slidably received in the cavity (17) of the handle (10) and includes a stem (41) having an outer peripheral recess (44) and to receive the teeth (38) of the shank (32), the latch (40) includes an actuator (45) to engage into either of the depressions (37) of the shank (32), and means (47) for biasing the actuator (45) to engage into either of the depressions (37) of the shank (32). 20 25

2. A tool as claimed in claim 1, wherein the latch (40) includes a first end having a disc (43) and a second end having a button (42), and the disc (43) and the button (42) include an outer diameter equals to an inner diameter of the cavity (17) of the handle (10). 30
3. A tool as claimed in claim 1, wherein the actuator (45) of the latch (40) includes an inclined side portion (46). 35
4. A tool as claimed in claim 1, wherein the handle (10) includes a space (11) formed between a first flap (12) and a second flap (13) and communicating with the cavity (17) of the handle (10) to receive the teeth (38) of the shank (32). 40
5. A tool as claimed in claim 4, wherein the first flap (12) has an orifice (14) to receive the shaft (34), and the second flap (13) has a screw hole (15), the shaft (34) includes a threaded segment (35) to thread with the screw hole (15) of the second flap (13). 45

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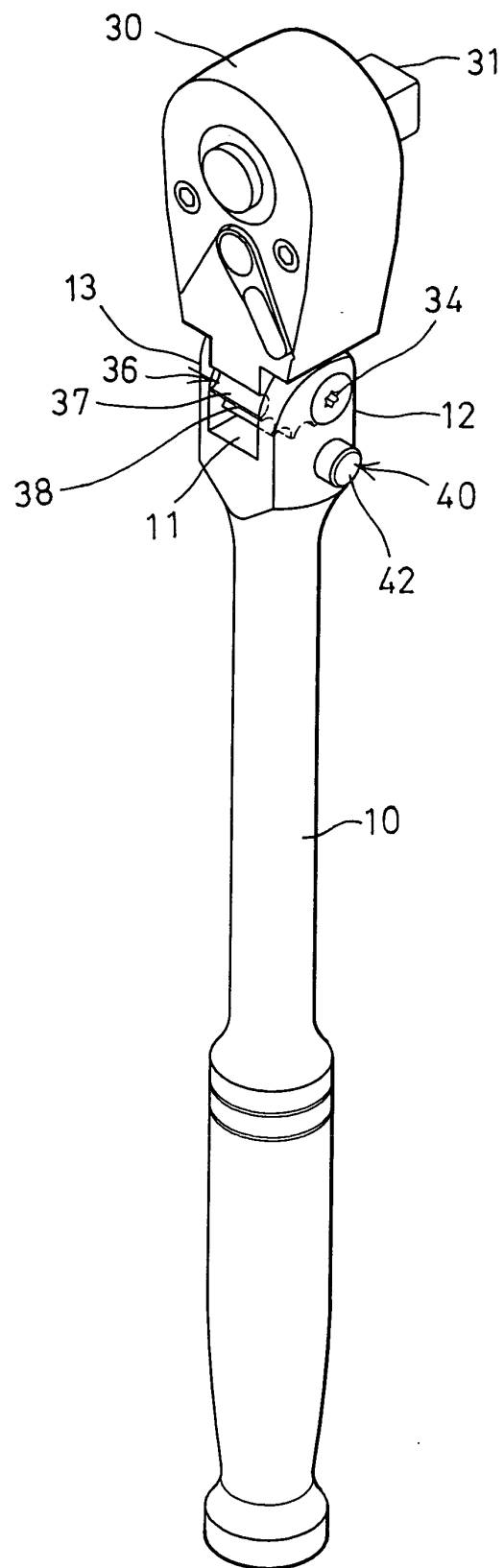
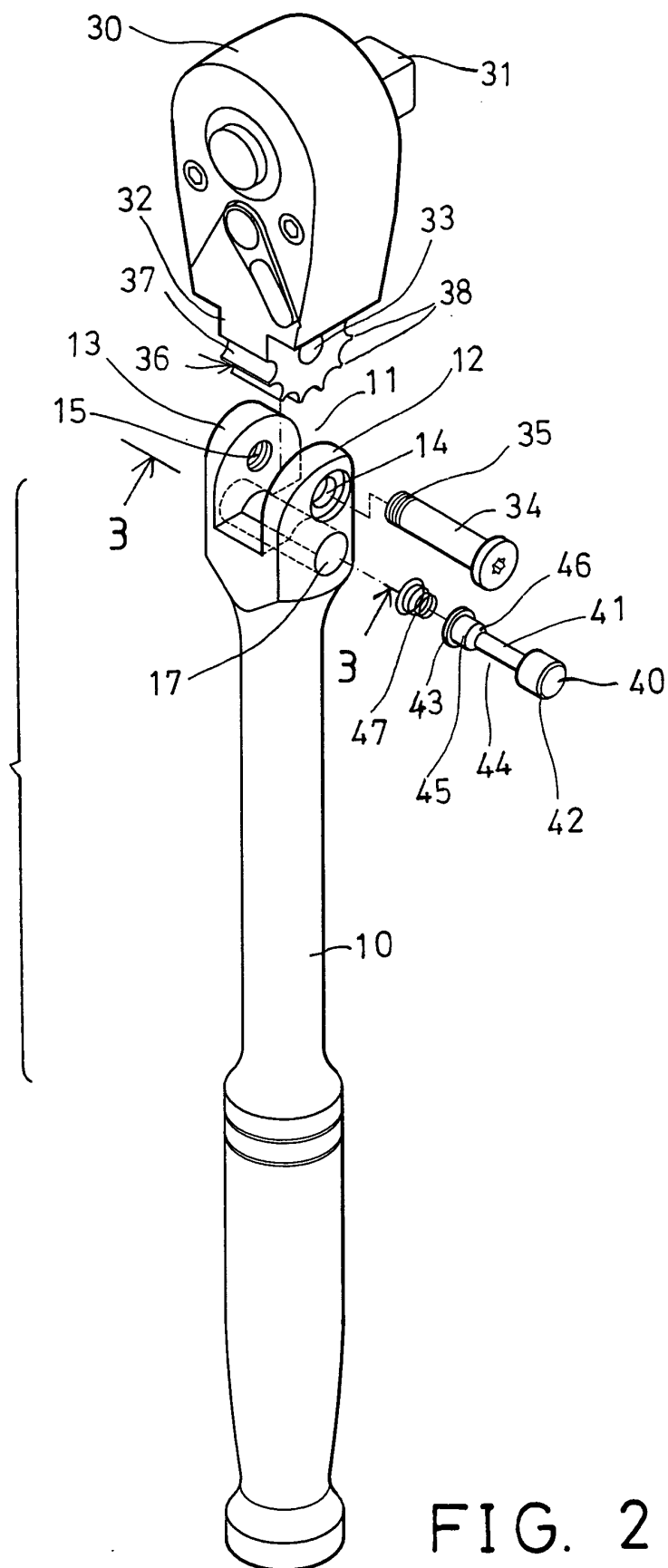


FIG. 1



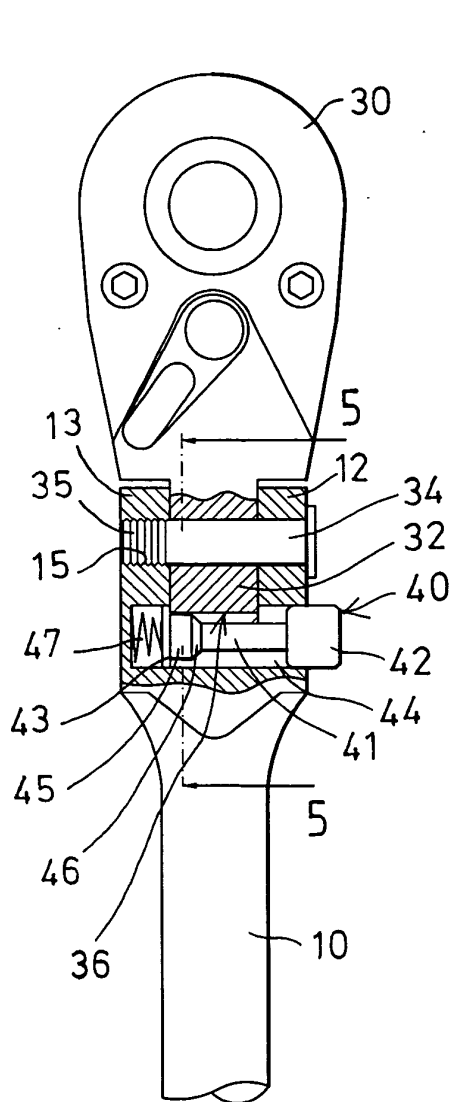


FIG. 4

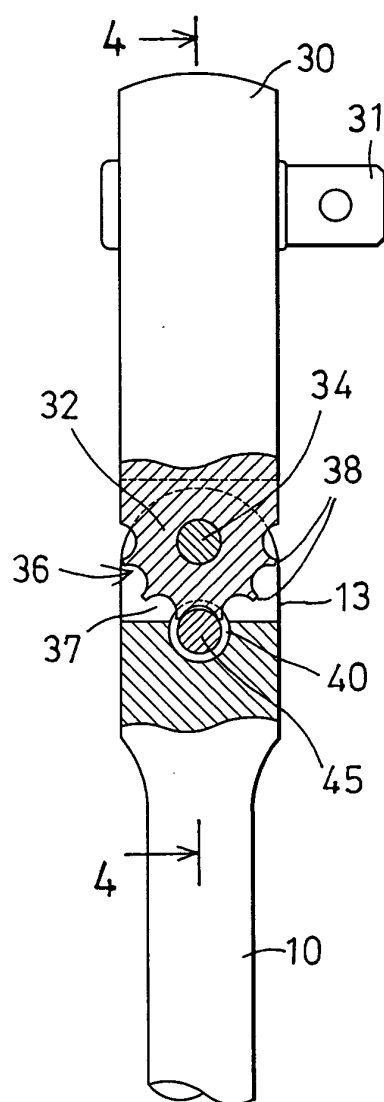


FIG. 5

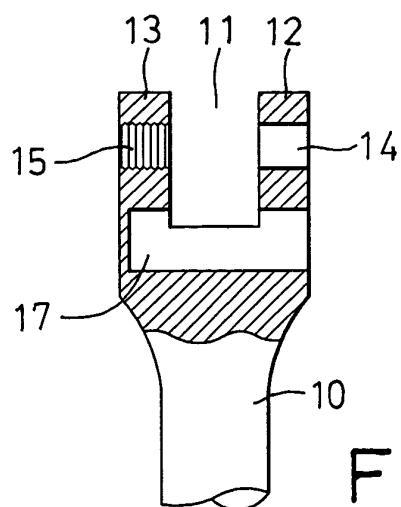


FIG. 3

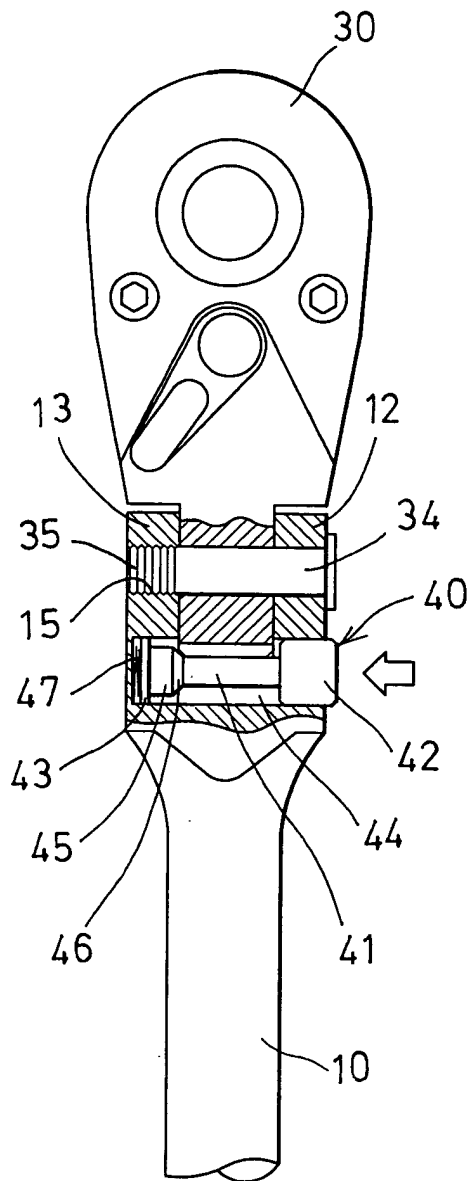


FIG. 6

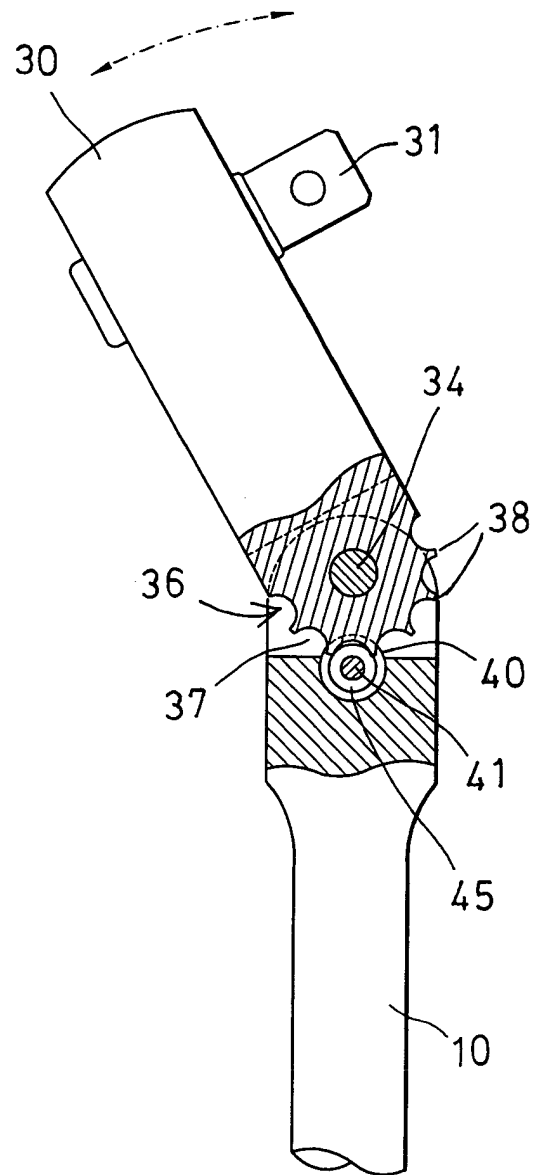


FIG. 7

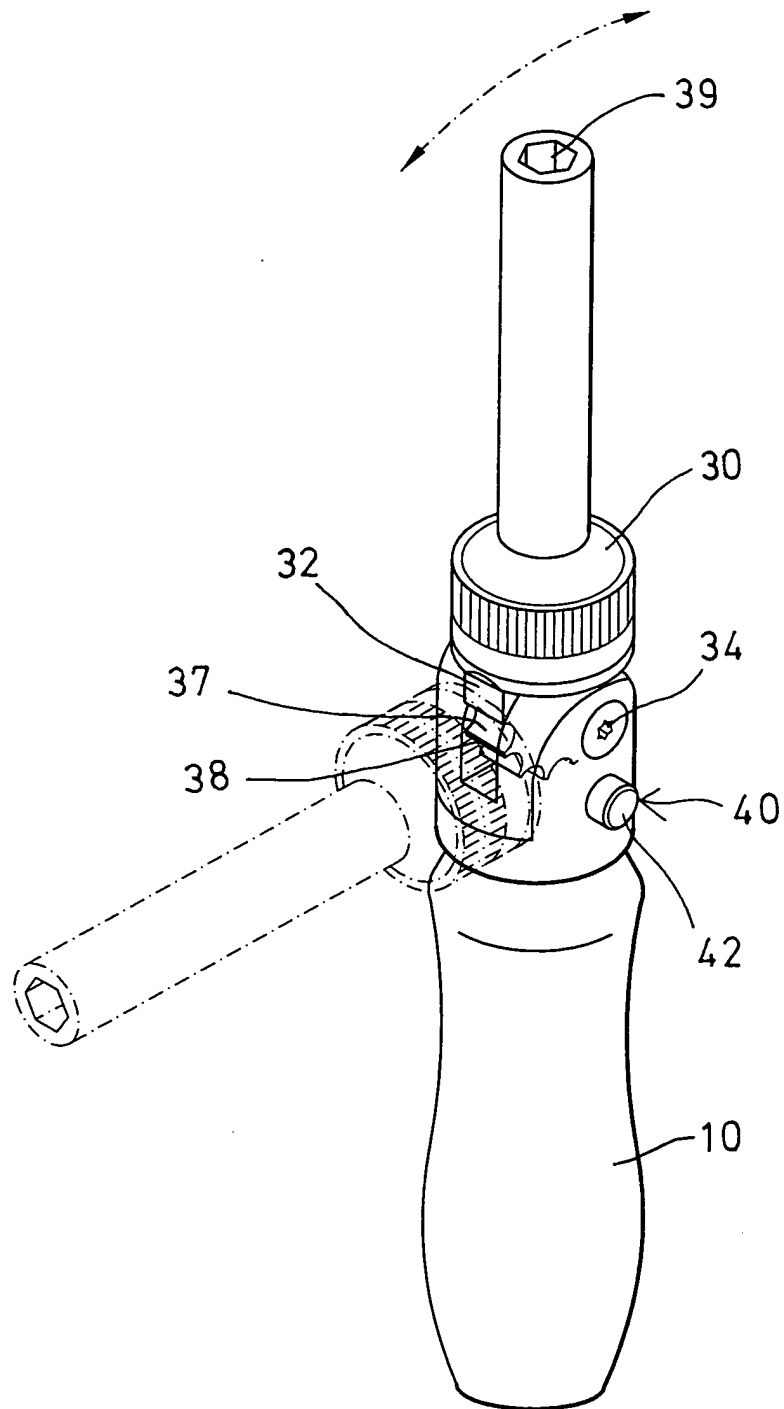


FIG. 8

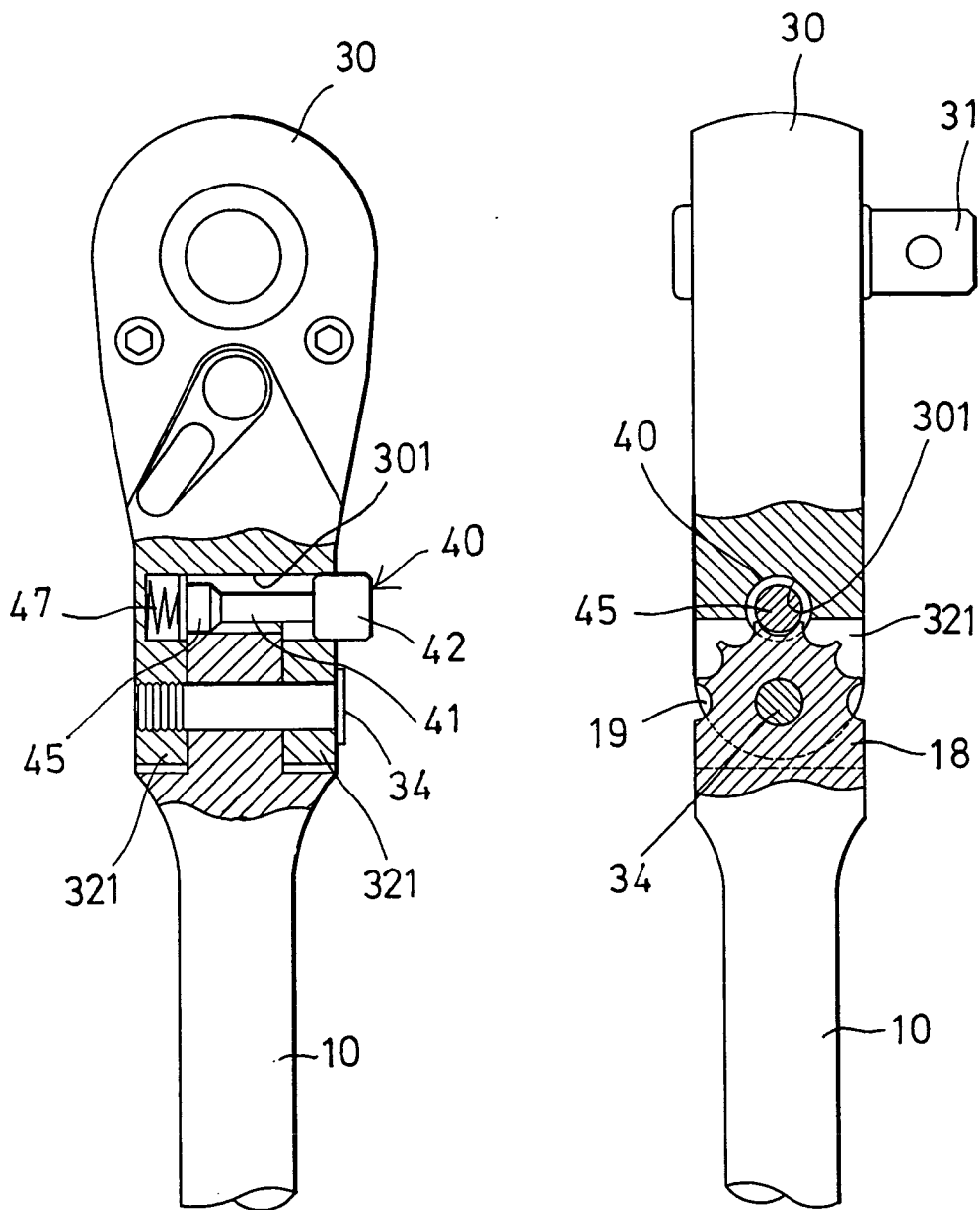


FIG. 9

FIG. 10



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 02 9714

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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 14 May 2004	Examiner Kühn, T
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 03 02 9714

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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