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(54) **A ratchet lever for actuating a car jack in combination with an extension handle**

Ratschenhebel zum Betätigen eines Wagenhebers mit einem Hebelarm

Levier à cliquet pour actionner un cric de véhicule avec un bras de levier

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Description

[0001] The present invention relates to a combination of an actuating lever for a car lifting jack and an extension according to the preamble of claim 1 (see, for example, BE-A-480 390).

[0002] At present there are known ratchet spanners used for tightening bolts and nuts. Ratchet spanners generally have an elongate portion serving as a handle and an enlarged head portion comprising a toothed wheel co-operating with a ratchet which allows the wheel to rotate in one direction of rotation, whilst it impedes rotation in the opposite direction. The toothed wheel has a central opening of polygonal shape in which there is to be inserted the bolt to screw or unscrew. As the toothed wheel must further be secured in rotatable manner to the spanner housing, on the opposite sides of the wheel there must be formed guiding means of circular shape, such as reliefs or grooves co-operating with corresponding apertures or reliefs formed in the spanner housing.

[0003] In order to apply a final tightening torque, ratchet spanners have to be able to withstand considerably high torques. Consequently, the mechanisms (toothed wheel and ratchet) are made out of turned steel, and therefore involve high manufacturing costs owing to the turning processing of the mechanism elements.

[0004] Both documents GB-1.208.036 and GB-897.042 disclose an actuating lever for a car jack having a rotating element driving the lifting movement of the car; the lever comprises a ratchet mechanism with a toothed wheel with a central polygonal opening for insertion of said rotating jack element and the ratchet mechanism is contained within a housing constituted by two half-shells made of plastic or thin plate.

[0005] No handle, however, is applied to both the above actuating levers, so for the operator is not easy to apply the considerably high torque required and the operator must use a different tool to unscrew the bolts of the vehicle wheels.

[0006] It is object of the present invention to provide a combination of an actuating lever and an extension handle of low cost, adapted to be applied to a car jack to lift a car quickly and safely through the conventional quick and repetitive movement by which ratchet spanners are used. Particularly, it is a significant object of the present invention to provide a ratchet lever that does not require costly housings and metal mechanisms obtained by turning as those exploited by conventional ratchet spanners.

[0007] These and other objects are achieved by a ratchet lever as defined in appended claim 1. Advantageous embodiments of the invention are defined in the dependent claims.

[0008] These and other objects, advantages and features of the present invention will become readily apparent to those skilled in the art from a study of the following description of a few exemplary preferred embodiments when read in conjunction with the attached drawings and appended claims.

FIG. 1 is a perspective view, to an enlarged scale, of a ratchet lever according to the present invention, in which there are visible the inner parts;

FIG. 2 is a perspective view of the lever of FIG. 1 once assembled;

FIG. 3 is a perspective view of a toothed wheel being part of the ratchet mechanism;

FIG. 4 shows the elements forming the toothed wheel of FIG. 3;

FIGS. 5, 7 and 9 are perspective views, to an enlarged scale, of a few alternative embodiments of the toothed wheel utilised in the lever of the present invention;

FIGS. 6, 8 and 10 are cross sectional views as seen according to lines C-C, B-B, and A-A, respectively, of FIGS. 5, 7 and 9;

FIGS. 11 and 12 are two side views showing a particular embodiment of the lever according to this invention in two different operational positions;

[0009] Referring initially to Figure 1, numerals 1 and 2 designate two complementary half-shells made of plastic or thin plate and constituting the outer body or housing of a lever. One of the two half-shells, designated at 1, is for containing the inner parts of the lever, whilst the other half-shell, designated at 2, acts as a cover. The outer body of the lever forms an enlarged head portion 10 containing the gears and an elongated portion 11, preferably of tubular shape, for hand gripping or for insertion of a handle, as described herein after.

[0010] Within the head portion 10 of half-shell 1 there is fitted a toothed wheel 5 engaging a ratchet 3 with a returning spring 4. The ratchet 3 allows the wheel to move in the direction indicated by arrow A and hinders its movement in the opposite direction of rotation.

[0011] As shown in FIGS. 3 and 4, the toothed wheel 5 forms a central opening 6 of polygonal or rectangular shape for insertion of a rotatable element (not shown) such as a worm screw that drives the lifting operation of a car jack. Fitted to the opposite sides of the wheel are disc elements 7 and 8 having central openings 6 equal to those formed in the wheel 5. Disc elements 7 and 8 are integral with the wheel 5 and project from the sides of the wheel to be rotatably inserted in circular bores 9 formed in the head portion 10 of half-shells 1 and 2 (FIGS. 1 and 2).

[0012] According to the present invention, the mechanisms of the ratchet lever are made of steel or any other suitable metal material. In any case, the choice of the material employed will fall on a pressed material possessing mechanical

characteristics such as to undergo little deformation when subjected to normal operation stresses, which are particularly more intense in the zones of apertures 6 and on the peripheral teeth of the wheel 5.

[0013] Referring to FIGS. 5 and 6, according to a first embodiment of this invention, the toothed wheel 5 and opposite disc elements 7, 8 are distinct bodies formed by separate pressing operations. Only in a second time, the two disc elements are welded to the opposite sides of the toothed wheel 5 along respective indentations 20 and 21. In this embodiment, the toothed wheel can be made of a first material, and the disc elements of a different material.

[0014] In another embodiment, not shown, the toothed wheel can be pressed in a single piece incorporating the disc elements.

[0015] Referring to FIGS. 7 and 8 in accordance with a further embodiment of this invention, the toothed wheel 5 is made by pressing two specular and complementary elements 5a and 5b, welded by indentations 20 along the facing sides. In this variant, the two opposite sides of the two elements 5a, 5b each have an annular relief 12 around the polygonal opening 6 in which there is engaged the rotatable element of the car jack to be rotated. The annular relief 12 carries out the same function as the disc elements discussed with reference to FIGS. 5 and 6 and is adapted to engage the bores 9 of the half-shells 1 and 2 constituting the lever housing.

[0016] In FIGS. 9 and 10 there is shown a still further variant, according to which the toothed wheel 5 is once again made by welding two specular, complementary elements 5a, 5b, but forming a central circular relief 13 at the centre of which there is formed the polygonal opening 6. Also in this case, the functions of the previously discussed disc elements are carried out by elements incorporated in the toothed wheel. The central reliefs 13 insert in rotatable and guided manner in bores 9 of the lever housing.

[0017] Still according to the present invention, advantageously also the ratchet 3 may be made out of pressed metal.

[0018] Referring to FIGS. 11 and 12, in the opening of the tubular elongated portion 11 of the housing there can be releasably inserted a handle 14 prolonging the lever arm. The handle may be of the kind which the vehicle is already equipped with, and so having an end head 15 with a hexagonal seat 16 for unscrewing the vehicle wheel bolts. In the embodiment illustrated in FIGS. 11 and 12, the handle 14 advantageously forms a throw 17 near its end portion and is rotatably inserted in the housing tubular portion 11 to alternately reach a horizontal position (FIG. 11) for quick movement and an upright, rotated position (FIG. 12) for the car lifting movement.

[0019] It will be appreciated that the manufacturing of the gears constituting the ratchet mechanisms by pressing of metal allows for considerable savings with respect to conventional turning of steel. The ratchet lever of the present invention, unlike ratchet spanners, is not made for applying high tightening torques, but only for transmitting a rotary movement under to a substantially constant torque in lifting a car. A plastic material could also suffice to withstand the stresses to which the ratchet mechanism is subjected to when lifting a car.

Claims

1. The combination of an actuating lever for a car jack and an extension handle, in which the actuating lever has a rotating element driving the lifting movement of the car and comprising a ratchet mechanism with a toothed wheel (5) with a central polygonal opening (6) for insertion of said rotating jack element; at least the toothed wheel being made of a pressed metal material and the ratchet mechanism being contained within a housing constituted by two half-shells (1, 2) made of plastic or thin plate; the lever housing forming a tubular portion (11) suitable for allowing insertion therein of a first end of said extension handle (14), **characterised in that** the extension handle (14) has the second end provided of an head (15) with a hexagonal seat (16) suitable for unscrewing the bolts of a vehicle wheel; said handle (14) further forming a throw (17) proximate to said end head (15), and being rotatably inserted in the tubular portion (11) of the lever housing to alternately reach a horizontal position for quick movement and a rotated, upright position for the car lifting movement.
2. The combination of claim 1 further **characterised in that** said handle (14) is that which a vehicle is normally equipped with for screwing and unscrewing the wheel bolts.
3. The combination of claim 1, further **characterised in that** the toothed wheel (5) and the opposite disc elements (7, 8) are distinct bodies of metallic material joined by welding (10, 11).
4. The combination of claim 1, further **characterised in that** said toothed wheel (5) is pressed in a single piece incorporating said disc elements (7, 8).
5. The combination of claim 1, further **characterised in that** the toothed wheel is made by pressing two specular and complementary elements (5a, 5b) welded by an indentation (20) along the facing sides, each element (5a, 5b) having an annular relief (12) of a diameter corresponding to that of said bores (9).

Patentansprüche

1. Kombination aus einem Betätigungshebel für einen Wagenheber und einem Hebelarm, wobei der Betätigungshebel ein Drehelement aufweist, welches die Hebebewegung des Kraftfahrzeugs antreibt und einen Ratschenmechanismus mit einem Zahnrad (5) mit einer mittigen polygonalen Öffnung (6) zum Einführen des Wagenheber-Drehelements umfasst; wobei zumindest das Zahnrad aus einem Pressmetallmaterial hergestellt ist und der Ratschenmechanismus innerhalb eines Gehäuses aufgenommen ist, welches durch zwei Halbschalen (1, 2) gebildet wird, welche aus Kunststoff oder Feinblech hergestellt sind; wobei das Hebelgehäuse einen rohrförmigen Abschnitt (11) bildet, welcher sich dazu eignet, das Einführen eines ersten Endes des Hebelarms (14) in diesen Abschnitt zu ermöglichen, **dadurch gekennzeichnet, dass** das zweite Ende des Hebelarms (14) mit einem Kopf (15) mit einem hexagonalen Sitz (16) versehen ist, welcher sich dazu eignet, die Bolzen eines Fahrzeuggrades aufzuschrauben; wobei der Arm (14) ferner eine Kröpfung (17) in der Nähe des Endkopfes (15) bildet und drehbar in den rohrförmigen Abschnitt (11) des Hebelgehäuses eingeführt wird, um abwechselnd eine horizontale Position für rasches Bewegen und eine gedrehte, aufrechte Position für die Wagenhebebewegung zu erreichen.
2. Kombination nach Anspruch 1, ferner **dadurch gekennzeichnet, dass** der Arm (14) jener ist, mit welchem ein Kraftfahrzeug für gewöhnlich für das Fest- und Aufschrauben der Radbolzen ausgestattet ist.
3. Kombination nach Anspruch 1, ferner **dadurch gekennzeichnet, dass** das Zahnrad (5) und die entgegen gesetzten Scheibenelemente (7, 8) getrennte Körper aus metallischem Material sind, welche durch Schweißen (10, 11) zusammengefügt werden.
4. Kombination nach Anspruch 1, ferner **dadurch gekennzeichnet, dass** das Zahnrad (5) als ein einziges Stück gepresst wird, in welches die Scheibenelemente (7, 8) integriert sind.
5. Kombination nach Anspruch 1, ferner **dadurch gekennzeichnet, dass** das Zahnrad durch Pressen von zwei spiegelnden und komplementären Elementen (5a, 5b), welche über eine Vertiefung (20) entlang der einander zugewandten Seiten verschweißt sind, hergestellt wird, wobei jedes Element (5a, 5b) ein ringförmiges Relief (12) mit einem Durchmesser, welcher jenem der Bohrungen (9) entspricht, aufweist.

Revendications

1. Combinaison d'un levier d'actionnement destiné à un cric de voiture et d'une poignée d'extension, dans laquelle le levier d'actionnement comporte un élément rotatif entraînant le mouvement de levage de la voiture, et comprenant un mécanisme à cliquet comprenant une roue dentée (5) présentant une ouverture centrale polygonale (6) destinée à l'insertion dudit élément de cric rotatif, au moins la roue dentée étant faite d'un matériau de métal pressé et le mécanisme à cliquet étant contenu à l'intérieur d'un logement constitué par deux demi-coquilles (1, 2) faites d'une matière plastique ou d'une plaque mince, le logement du levier formant une partie tubulaire (11) convenant pour permettre l'insertion dans celle-ci d'une première extrémité de la poignée d'extension (14), **caractérisée en ce que** la seconde extrémité de la poignée d'extension (14) est munie d'une tête (15) qui comprend un logement hexagonal (16) convenant pour dévisser les boulons d'une roue de véhicule, ladite poignée (14) formant en outre un coude (17) près de ladite tête de l'extrémité (15), et étant insérée avec possibilité de rotation dans la partie tubulaire (11) du logement du levier afin d'atteindre alternativement une position horizontale en vue d'un mouvement rapide, ou une position verticale tournée en vue du mouvement de levage de la voiture.
2. Combinaison selon la revendication 1, **caractérisée en outre en ce que** ladite poignée (14) est celle dont un véhicule est normalement équipé en vue de visser et de dévisser les boulons des roues.
3. Combinaison selon la revendication 1, **caractérisée en outre en ce que** la roue dentée (5) et les éléments de disques opposés (7, 8) sont des corps distincts de matériau métallique réunis par soudage (10, 11).
4. Combinaison selon la revendication 1, **caractérisée en outre en ce que** ladite roue dentée (5) est pressée en une seule pièce en incorporant lesdits éléments de disques (7, 8).
5. Combinaison selon la revendication 1, **caractérisée en outre en ce que** la roue dentée est réalisée par pressage de deux éléments spéculaires et complémentaires (5a, 5b) soudés par une empreinte (20) prévue le long des faces en regard, chaque élément (5a, 5b) comportant un relief annulaire (12) dont le diamètre correspond à celui

desdits alésages (9).

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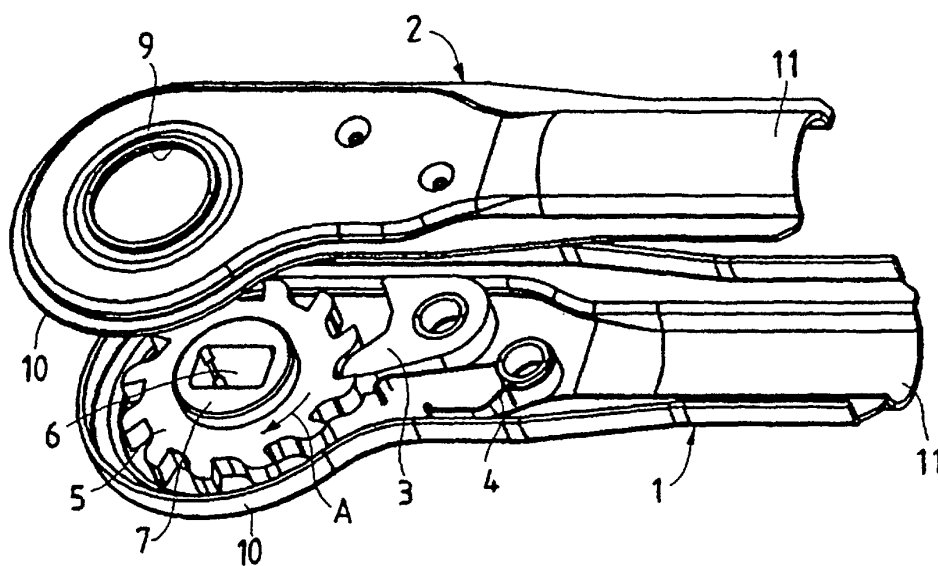


Fig.1

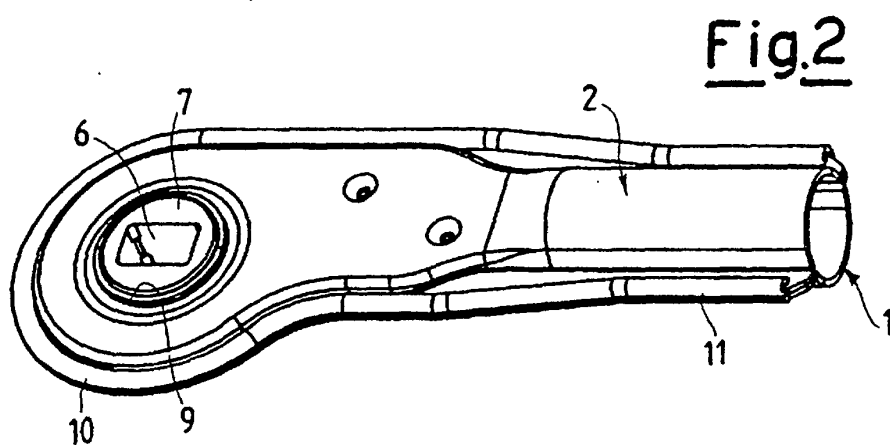


Fig.2

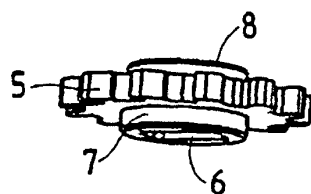


Fig.3

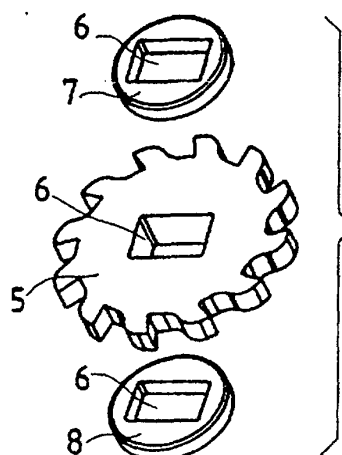


Fig.4

Fig.5

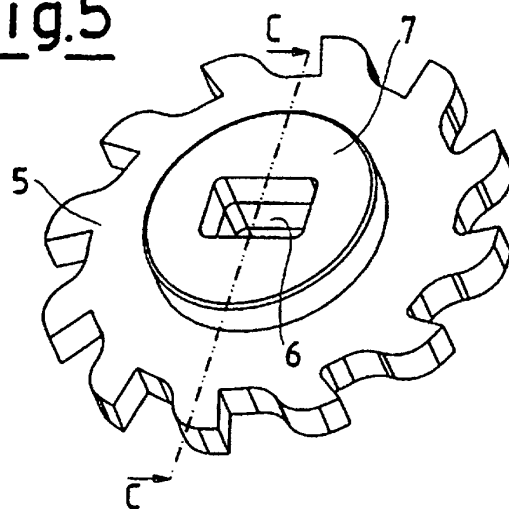


Fig.6

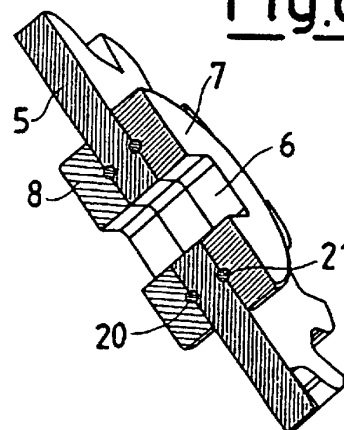


Fig.7

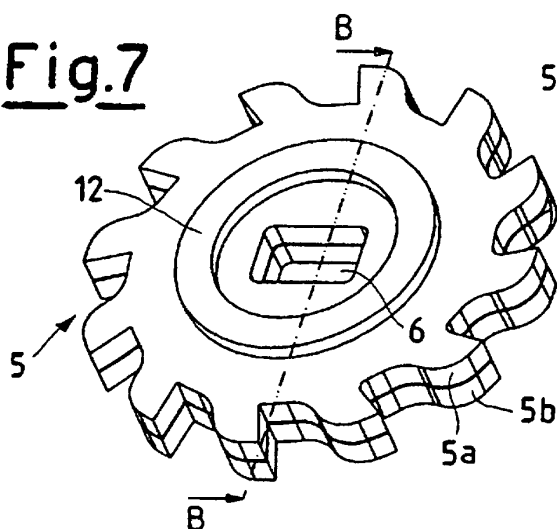


Fig.8

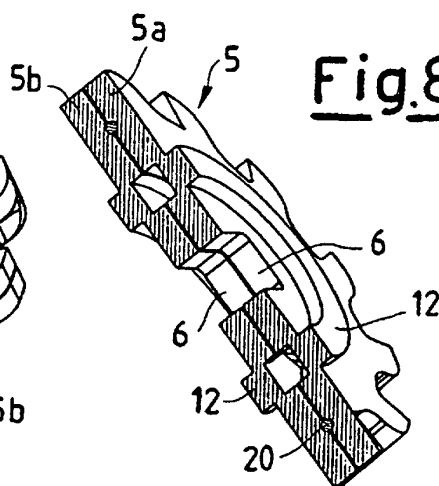


Fig.9

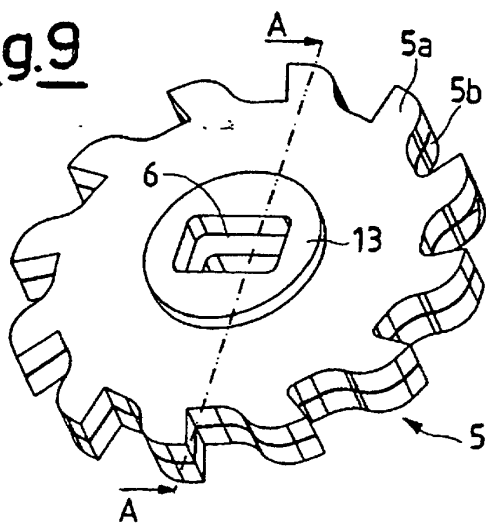


Fig.10

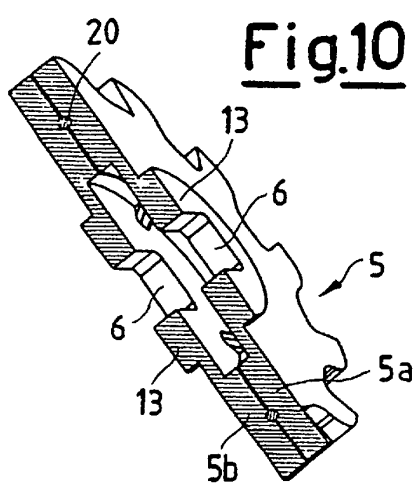


Fig.11

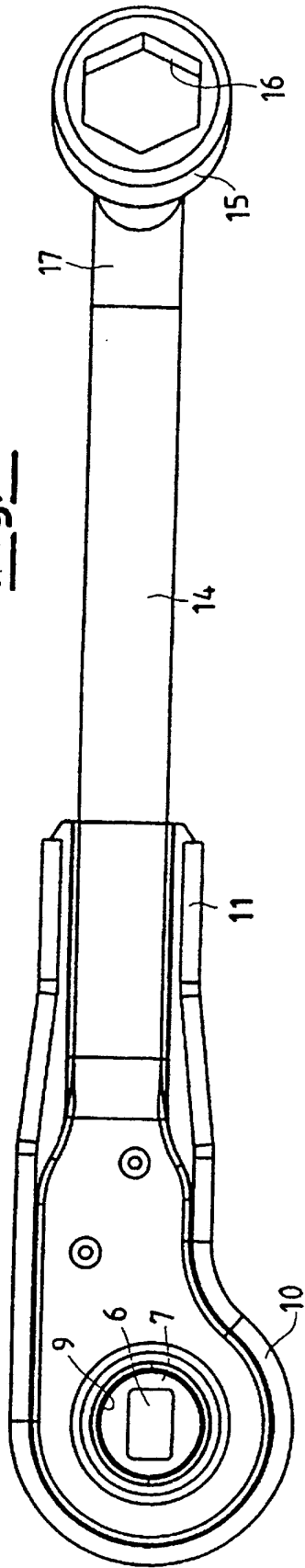


Fig.12

