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(54) Tool for actuating and positioning of steering knuckles in motor vehicles

(57) A device for actuating and positioning lower oscillating arms in motor vehicles, which comprises a tube (1) able to house within it a spring (2) engaged to a chain (3) which at its end has a hook (4) for fastening the device under the vehicle. Fastened to an end of the tube (1), two mutually opposite flanges sustain in the upper part a support (5), which serves as a fulcrum for a lever (8), fastened to the flanges (6) through a pivot (7). To an end of the lever (8) are fastened two rings (14 and 15) whereto is engaged the chain (13) by means of a clamp (20); on the other side of the lever there are two half-rings (14 and 15) which allow the engagement of a chain (13). A rod (23) having variable length, constituted by a sleeve (10) and by two tie rods with forks (17 and 18), is hinged on one side to the lower end of the lever (8), on the other side to a flange (11) fastened to the tube (1).

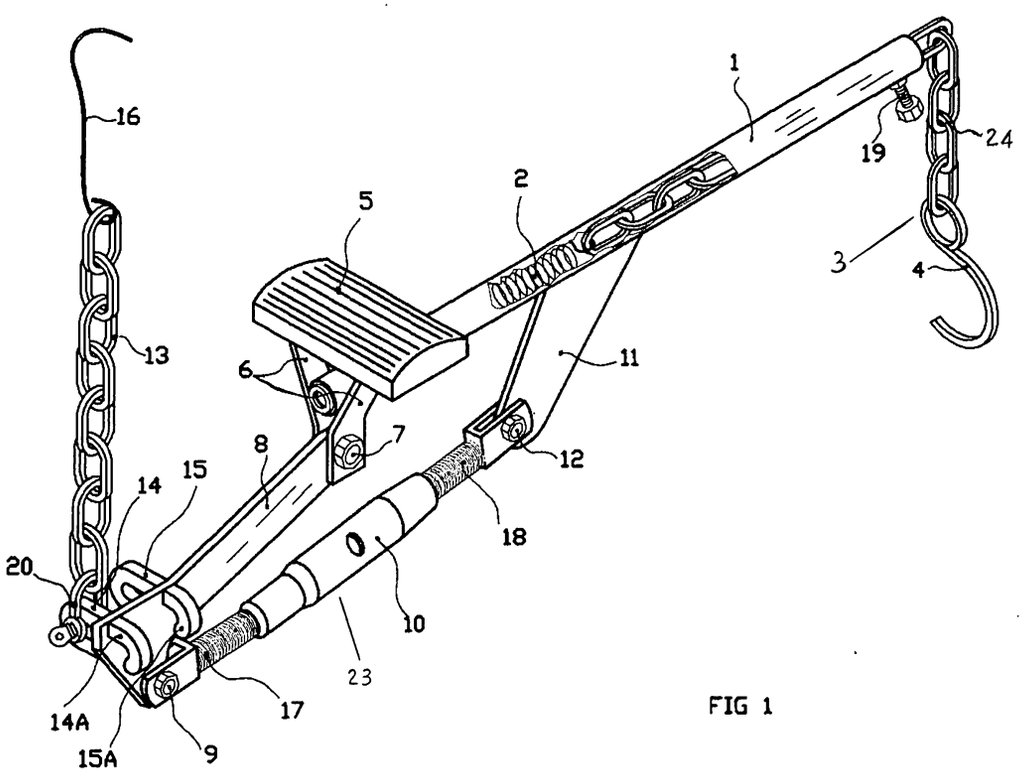


FIG 1

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Description

[0001] The present invention relates to a device for actuating and positioning lower oscillating arms in motor vehicles.

[0002] As is well known, for the various repairs of a motor car (such as replacing bearings, cowlings, homokinetic joints, axles, heads, shock absorbers, etc.), it is necessary to detach the articulated head of the lower oscillating arm of the wheel upright and tilt the arm downwards to allow appropriate maintenance operations. Currently, the above operations require considerable efforts by the mechanical operator, since the heads, due to their particular shape, are not easy to extract from their housing, especially because of rust and due to their position which makes it extremely difficult to use specific extracting tools and, not least, due to the torsion bars which, built ever stronger, thrust in the opposite sense relative to the motion which the operator needs to make; therefore, the mechanic is forced to ask for the qualified intervention of another operator who will assist him/her using a crowbar or a particular strong pipe. The first operator inserts the crowbar between the body of the motor vehicle and the oscillating arm and with all the weight of his/her body leverages until creating a downward pressure on the oscillating arm.

[0003] Oftentimes, the operation described above is not sufficient to detach the head, so a second mechanic needs to intervene and, using a bar or a hammer, tries to facilitate the exit of the head. Once the lower head is detached, the upright is constrained by the upper shock absorber and also by the steering box, making all necessary repairs, such as replacing the homo-kinetic joint cowling , very difficult.<0}

[0004] An additional drawback is provided by the torsion bar which, connected to the oscillating arm, tends to push so far upwards as to bring the oscillating arm to impact heavily against the wheel upright, which is particularly delicate, especially in some of its components like the homo-kinetic joint cowling, the ABS sensor, the brake pipes, etc.<0} Therefore, considerable damage can be caused to the vehicle and in any case the operator has to work in very little space, in an inconvenient and potentially dangerous way. Moreover, the other mechanic, bearing down on the crowbar, must remain in that forced position to maintain the oscillating arm inclined downwards until the colleague has finished operating.

[0005] Another drawback derives from the fact that said pipes or crowbars must be particularly strong and heavy to withstand the efforts whereto they are subjected. Consequently, said tools are inconvenient to use and to position correctly on the oscillating arm because there is always the risk of forcing or damaging other parts of the vehicle such as axles, gearbox, bushings, trapeze bar, etc.

[0006] An additional problem linked with the use of the crowbar derives from the correct height which the car set down on the bridge must have. The most correct for the mechanical acting on the oscillating arm is often not suitable for the operator who in the meantime is leveraging with the crowbar.

[0007] In the long run, mechanical operators who are forced to work in such uncomfortable and tiresome positions start to have physical problems and are forced to slow their work pace, with negative consequences for their health and for their work efficiency.

[0008] An object of the present invention is to solve the problems of the prior art, overcoming the above described difficulties and to make available a device able to actuate and position lower oscillating arms in motor cars, able to be operated by a single operator without difficulties or hazards for the operator him/herself.

[0009] A further object of the present invention is to allow said device to be particularly strong and at the same time small sized, thus facilitating its fastening to the car. Moreover, the device of the present invention has very low construction costs and needs no maintenance; consequently, it becomes an easily affordable tool even for small workshops.

[0010] Another object of the present invention therefore is to provide a universal device, i.e. able to be adapted, simply and without modifications, to any model of motor vehicle or light commercial vehicle, both with front wheel drive and rear wheel drive.

[0011] Said objects are fully achieved by the device of the present invention, which is characterised by the content of the appended claims and in particular in that it comprises in combination:

- a rod-like body, for example a tube;
- a first connecting means, for example a chain connected to a spring, fastened to an end of the rod-like body and able to fasten said rod-like body to the motor vehicle;
- a lever, hinged on the rod-like body;
- a second connecting means, for example a chain, able to connect the lever to the oscillating arm;
- a rod of variable length by means of a mechanism able to provide a suitable reduction ratio, for example constituted by a sleeve in combination with tie rods, which is hinged at one side on the lever, at the other on the rod-like body, so that the lever and the rod-like body form an angle of less than 180 degree downwards.

[0012] This and other features shall become more readily apparent from the following description of a preferred embodiment, illustrated purely by way of non limiting example in the accompanying drawing tables, in which:

Figure 1 shows a perspective view of the device of the present invention;

- Figure 2 is a perspective view of the device inserted in a generic car, in the position of use.

[0013] With reference to Figure 1, the number 1 designates a tube or rod-like body, able to house within it a spring 2 connected to a chain 3 which, in turn, ends with a hook 4. The chain 3 constitutes a first connecting means.

[0014] The reference 6 designates a pair of mutually opposite flanges, fastened to the end of the pipe 1, which sustain in the upper part a support 5, and in the lower part are hinged, through the pivot 7, on a lever 8, at whose ends are located to half-rings 14 and 15, distanced from each other, necessary to fasten a second chain 13, constituting a second connecting means. The reference number 9 designates a second pivot, which connects the lever 8 to a tie rod 17, which is inserted in a sleeve 10 (or jack). Moreover, a flange 11, integral with the tube 1, is connected by pivot 12 to the tie rod 18, which in turn is inserted in the sleeve 10. The reference number 23 designates a rod of variable length by means of a mechanism able to provide an appropriate reduction ratio, in the specific case the sleeve 10 with the tie rods 17 and 18.

[0015] In addition to what is described above, in the subject device the tube 1, within which the chain 3 is housed, has a screw pivot 19 for locking the translatory motion of the chain 3.

[0016] With reference to Figure 2, the number 21 designates an oscillating arm, whilst the number 22 designates a wheel upright. In the present embodiment, the device of Fig. 1 further comprises sealing means for the lower oscillating arm, constituted by a chain 13 able to wind around the arm itself and then to engage the lever 8 by means of the half-rings 14 and 15. The chain 13 is fastened at one end with a clamp 20 whilst for the other end are provided two open hooks 14A and 15A for locking the chain according to the operator's needs. The reference number 16 designates a generic grip element for the chain 13.

[0017] Moreover, the chain locking half-rings 14 and 15, constituting fastening means, are distanced from each other to allow the operator, based on the length of the oscillating arm, to decide whether to use the ring-hook 14 or 15.

[0018] In the illustrated embodiment, the chain 3 with the hook 4 has the task of securing the tool after the chain 13 is fastened to the oscillating arm; the hook 4, connected to the chain 3, engages any point of the motor vehicle, such as the oscillating arm of the opposite side.

[0019] Once the position for the hook 4 is found, the chain 3 is locked by means of the screw pivot 19, constituting a fastening means. Subsequently, one starts to act on the sleeve 10 until the support 5, which serves as a fulcrum and can be coated with rubber to avoid damaging the car, is positioned in proximity to the points sustaining the oscillating arm on the engine cross member of the vehicle. Acting with more force on the sleeve 10, it is possible to detach and lower the lower oscillating arm 21 from the upright 22 and thus allow the exit of the head, positioning the oscillating arm in the most convenient position to perform the necessary repairs. To reattach the lower oscillating arm to the wheel upright, it is sufficient to act on the sleeve 10 again until the insertion of the head.

[0020] Therefore, the present invention originally achieves all proposed objects. The device is able to adapt itself to any model of motor cars and light industrial vehicles and it can be installed by a single worker in very short times. It also allows a single operator not only rapidly to detach the oscillating arm and to position it in the best desired manner, but also easily to reposition the arm, thereby saving time and fatigue.

[0021] In addition to the above, it should be observed that the device according to the present invention has very small dimensions and weight, so it has reduced bulk, and it allows to operator ample room to manoeuvre.

Claims

1. A device for actuating and positioning lower oscillating arms in motor vehicles,
   characterised in that it comprises in combination:
   - a rod-like body;
   - a first connecting means, fastened to an end of the rod-like body and able to fasten said rod-like body to the motor vehicle;
   - a lever, hinged on the rod-like body;
   - a second connecting means, able to connect the lever to the oscillating arm;
   - a rod of variable length by means of a mechanism able to provide a suitable reduction ratio, which is hinged at one side on the lever, at the other on the rod-like body, so that the lever and the rod-like body form an angle of less than 180 degree downwards.

2. A device as claimed in claim 1, wherein the rod-like body is constituted by a tube, within which can be housed the connecting means.

3. A device as claimed in claim 2, wherein the rod-like body comprises an elastic part and a flexible part.

4. A device as claimed in claim 3, wherein the flexible part of the rod-like body is constituted by a chain.

5. A device as claimed in claim 4, wherein the rod-like body comprises a fastening means able to lock the chain.

6. A device as claimed in claim 1, comprising a support that is rigidly fastened to the upper part of the rod-like body, substantially in correspondence with the point in which the rod-like body is hinged on the lever.

7. A device as claimed in claim 1, wherein the second connecting means is substantially flexible and has two ends, able to be fastened to the lever by means of fastening means, positioned on the lever, in such a way as to surround the arm.

8. A device as claimed in claim 7, comprising a plurality of fastening means, in such a way as to allow to adjust the position of the connecting means.

9. A device as claimed in claim 1, wherein the rod comprises a sleeve, a first tie rod, inserted in the sleeve at one end and hinged to the lever at the other end and a second tie rod, also inserted in the sleeve at one side and hinged in a point integral with the rod-like body at the other side.

10. A device as claimed in claim 9, wherein the sleeve is operated by means of a hydraulic or pneumatic actuator, to vary the length of the rod in automatic fashion.

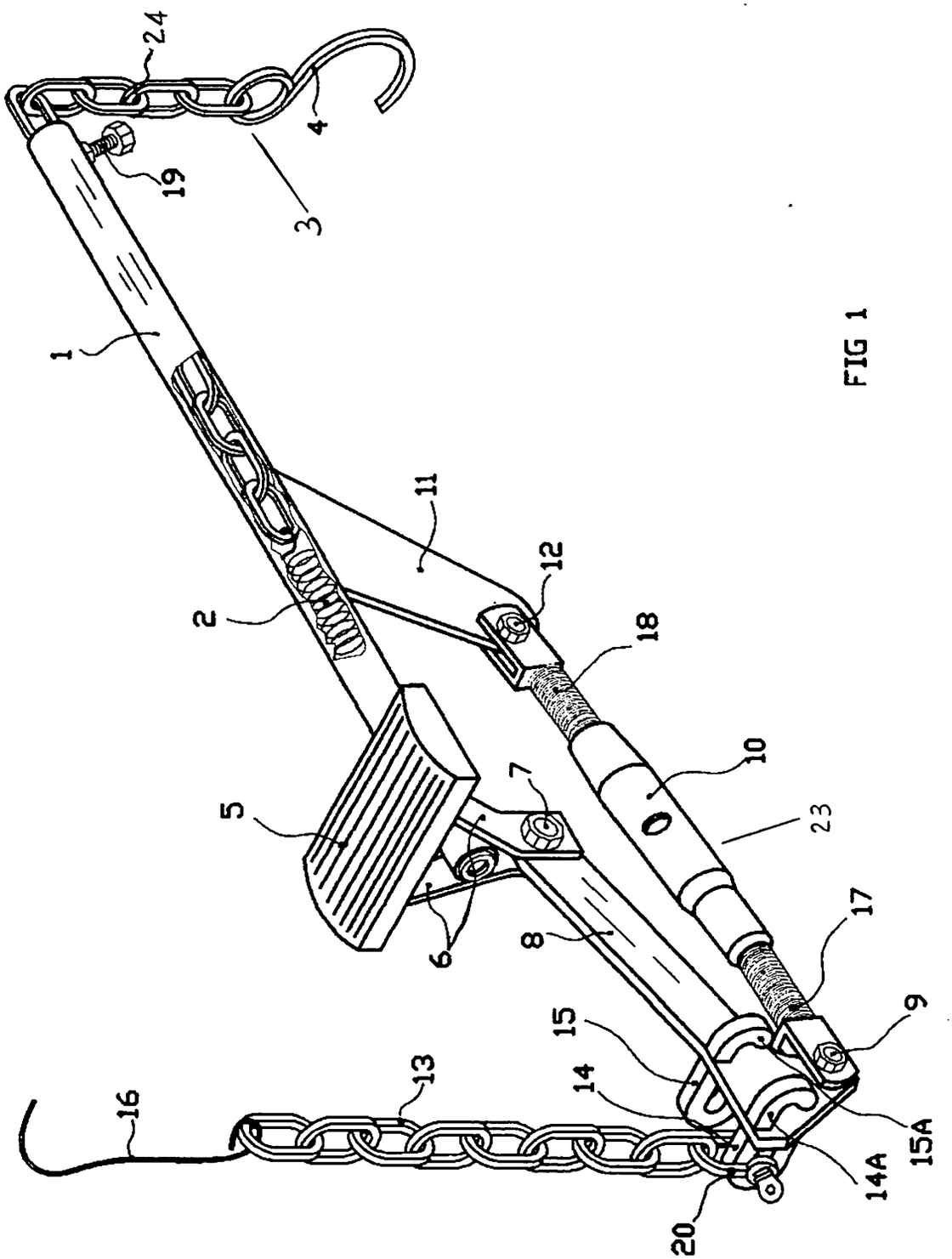


FIG 1

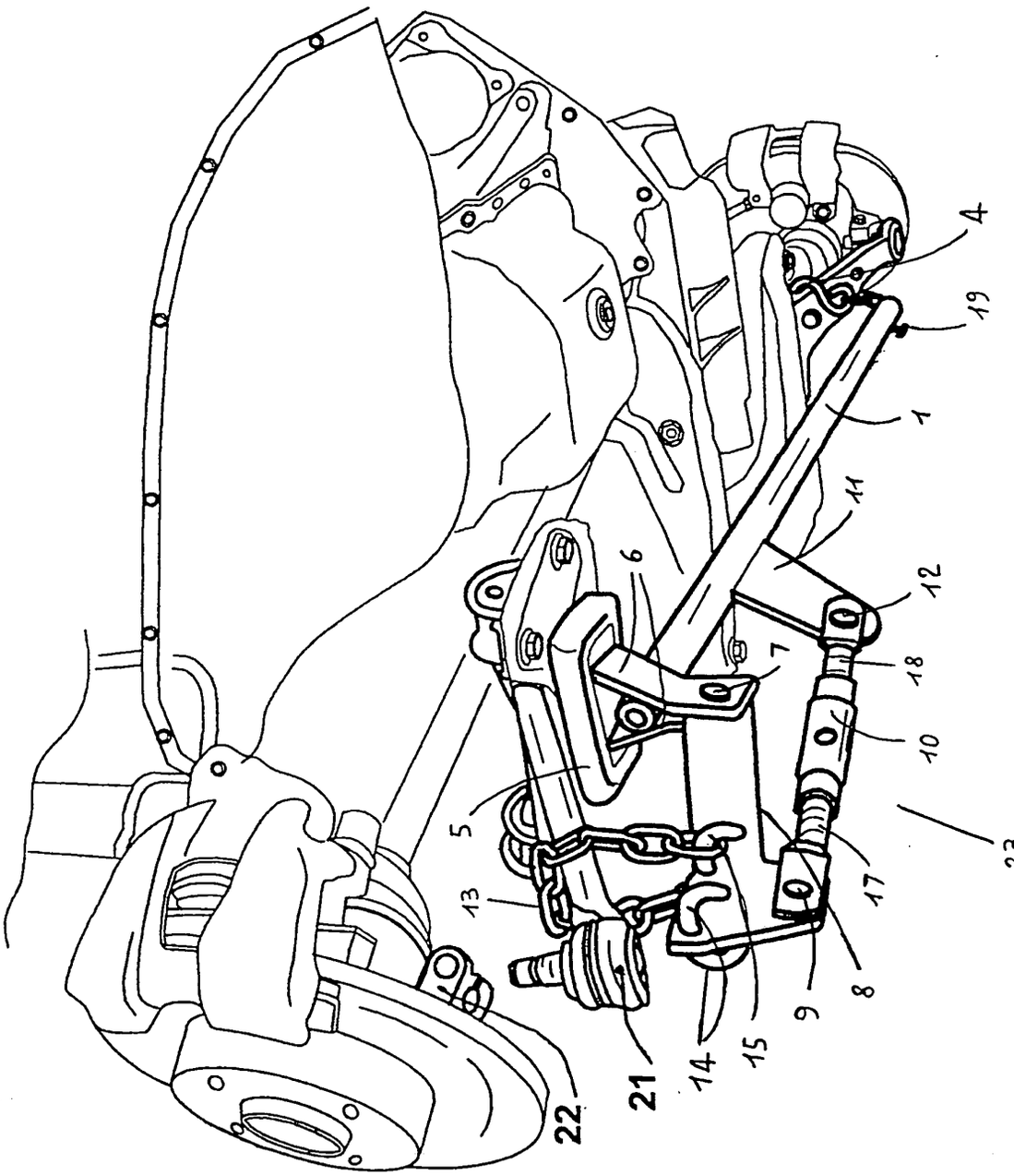


FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 04 01 0093

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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A	DE 90 12 800 U (PASCHKE WERNER) 20 December 1990 (1990-12-20) * the whole document *	1	
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A	US 6 085 419 A (POITRAS LEO) 11 July 2000 (2000-07-11) * figures 2-4 *	1,7,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B25B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 September 2004	Kühn, T

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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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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