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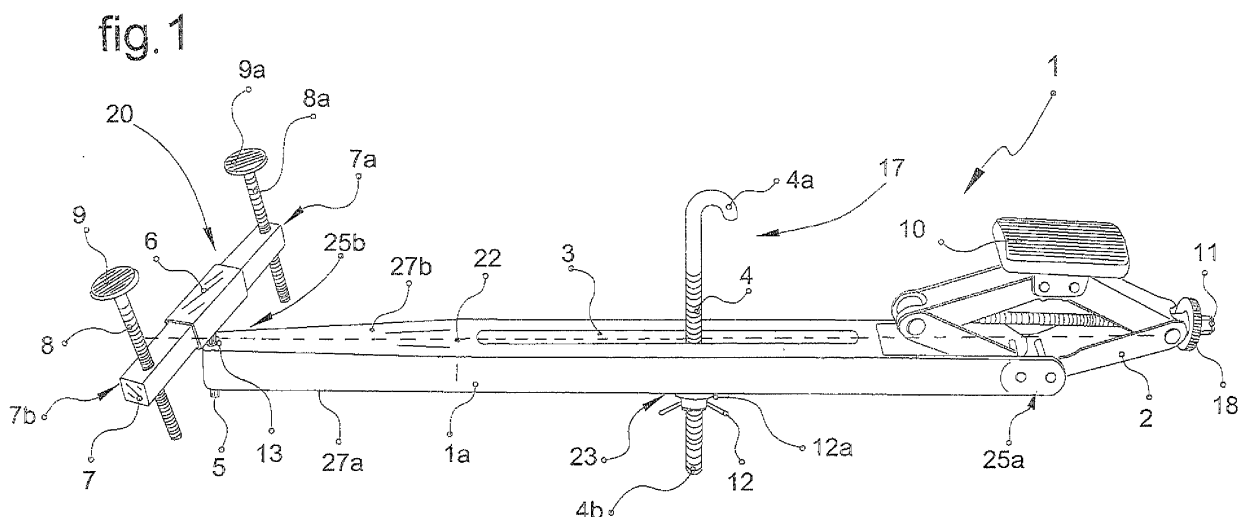
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(54) **Device and method for supporting a vehicle component**

(57) Device (1) for supporting a component (16) of a vehicle (21), comprising:
a load-bearing structure (1) provided with an opening (3) elongated in a predetermined direction (22);
a pantograph lift (2) connected to said load-bearing structure (1a) and able to be positioned under said component (16) to support it;
a first pin (4) able to be hitched to the vehicle (21) and

passing through said opening (3) in such a way that, with the device (1) in an installation configuration, said first pin (4) is free to slide inside the opening (3) and, with the device (1) in an operative configuration, said first pin (4) is fastened within the opening (3) by a nut (12a);
a stabiliser assembly (20) pivotally hinged on the load-bearing structure (1a) to provide stability to the device (1) in the operative configuration.



Description

[0001] The present invention relates to a device and a method for supporting a vehicle component. In particular, the device is used in supporting parts of the engine assembly or of the transmission, during maintenance or repair operations on a motor vehicle.

[0002] For example, replacement of the timing belt or of other auxiliary components needs to be performed periodically (approximately every 100,000 km) and requires the intervention of specialised operators, able to operate in narrow positions between the engine side and the bodywork of the vehicle.

[0003] In order to access the engine assembly, the operator has to detach its support, which is screwed on the side of the engine and fastened on the bodywork. During this step, the operator has to support the engine manually and set the oil sump on a lift (e.g. a lift truck). In this way, the engine assembly remains fastened only to the sides of the transmission and it can be actuated by means of the lift, providing the operator with the space needed to work.

[0004] However, the solution described above is impractical and uncomfortable for the operator. Since the engine is supported by the lift, the auto lift on which the vehicle is positioned cannot be raised. Therefore, the operator is forced to kneel. Moreover, the increasing complexity of the components of the engine assembly is progressively reducing the space available for maintenance, making the operator's intervention nearly impossible.

[0005] Some automotive manufacturers produce devices for supporting the engine assembly that are differentiated on the basis of individual motor vehicle models. Said devices are used to support the engine in such a way as to be able to raise the motor vehicle in the most comfortable position for working.

[0006] The main disadvantage of said devices is linked to the fact that each individual motor vehicle model requires a personalised support. For example, the anchoring flanges are different to be able to adapt to the lower beds and require long time to be fastened.

[0007] Another disadvantage of said devices resides in the difficulty of use due to the adoption of a screw pin to raise or lower the engine. If the vehicle is positioned close to the ground, the operator is forced to lie down in order to operate said pin.

[0008] In this context, the technical task at the basis of the present invention is to propose a device for supporting a vehicle component, in particular for the engine, which overcomes the aforementioned drawbacks of the prior art.

[0009] In particular, an object of the present invention is to propose a universal support device usable with any vehicle model.

[0010] An additional object of the present invention is to make available a device that is structurally simple and practical to use.

[0011] Another object of the present invention is to

present a stabilised and safe support device.

[0012] Another object of the present invention is to make available a support device that is light and compact.

[0013] The technical task and the objects specified above are substantially achieved by the support device and method, comprising the technical characteristics exposed in one or more of the appended claims.

[0014] Additional characteristics and advantages of the present invention shall become more readily apparent from the indicative, and hence non limiting, description of a preferred embodiment of a device and a method for supporting a vehicle, as illustrated in the accompanying drawings in which:

- figure 1 shows a perspective view of a support device for a vehicle component, according to the present invention;
- figure 1A shows a perspective view of a detail of the device of figure 1, fastened under a vehicle;
- figure 2 shows a perspective view of the device of figure 1, in an operative configuration.

[0015] With reference to the figures, the number 1 indicates a support device for a component 16 of a vehicle 21 only partially shown. In particular, the device 1 is applicable to the engine assembly of a motor vehicle during maintenance or repair operations.

[0016] The device 1 comprises a load-bearing structure 1a. Preferably, the load-bearing structure 1a is a crossmember extending along a predetermined direction 22.

[0017] Originally, the load-bearing structure 1a is provided with an opening 3. Preferably, said opening 3 is elongated in the predetermined direction 22. In particular, the opening 3 is obtained in such a way as to traverse the load-bearing structure 1a from a lower surface 27a to an upper surface 27b. Preferably, the opening 3 is obtained at the centre of the load-bearing structure 1a and its length is between 35% and 65% of the length of the load-bearing structure 1a. More preferably, the length of the opening 3 is equal to about half the length of the load-bearing structure 1a.

[0018] The device 1 can be anchored to the vehicle 21 by anchoring means 17. Originally, the anchoring means 17 comprise a first pin 4 that can be fastened to the vehicle 21 and a locking element 23. Advantageously, the first pin 4 passes through the opening 3. In particular, when the device 1 is in an installation configuration, the first pin 4 is free to slide inside the opening 3 along the predetermined direction 22. When the device 1 is in an operative configuration, the first pin 4 is fastened inside the opening 3 by means of the locking element 23.

[0019] Advantageously, the first pin 4 presents a first curved end 4a hitchable to the vehicle 21. Preferably, said first curved end 4a is directly hitchable to the vehicle 21.

[0020] In an alternative embodiment (not shown), the first pin 4 is connected to a stretched belt that can be

hitched to the vehicle 21. In that case, the belt presents a ring in which the first curved end 4a of the first pin 4 is inserted and a hook that can be hitched to the vehicle 21. Preferably, said belt is made of steel or fabric and its maximum length is approximately 50 cm.

[0021] In the embodiment described and illustrated herein, the locking element 23 is constituted by a nut 12a which can be screwed to a second threaded end 4b of the first pin 4 by a manual handle 12. In another embodiment (not shown), the first pin 4 presents at least one slot and the locking element 23 is constituted by a slit pin insertable into said slot.

[0022] At a first end 25a of the load-bearing structure 1a is connected a lift 2 which can be positioned under the component 16 to support it. In particular, the lift 2 is provided with a support 10 for the component 16.

[0023] Preferably, the lift 2 is of the pantograph type. Moreover, the pantograph lift 2 is provided with a screw 11 and with an adjustment knob 18 to lock its extension in the desired position.

[0024] In a further embodiment (not shown), the lift 2 is a pneumatic telescopic cylinder. In alternative, the lift 2 is electrical or hydraulic and can be operated manually or automatically.

[0025] Originally, at a second end 25b of the load-bearing structure 1a there is a stabiliser assembly 20.

[0026] Advantageously, said stabiliser assembly 20 is pivotally hinged on the load-bearing structure 1a in order to provide stability to the device 1 in the operative configuration.

[0027] Preferably, the stabiliser assembly 20 comprises a second pin 5 rotating within a hole 13 drilled at the second end 25b of the load-bearing structure 1a. In particular, the hole 13 is drilled in such a way as to traverse the load-bearing structure 1a from the lower surface 27a to the upper surface 27b. In this way, the second pin 5 is substantially parallel to the first pin 4.

[0028] The stabiliser assembly 20 further comprises a sleeve 6 integral with the second pin 5 and a bar 7 slidable inside the sleeve 6. In particular, at opposite ends of the bar 7 are screwed two props 8 and 8a able to be positioned under the vehicle 21. Said props 8 and 8a are substantially parallel to the first pin 4 and to the second pin 5. For example, a first prop 8a, provided with a first support foot 9a, is at a first end 7a of the bar 7. A second prop 8, provided with a second support foot 9, is at a second end 7b of the bar 7. Preferably, the sleeve 6 and the bar 7 have rectangular or square or, in any case, non-circular cross section to prevent the bar 7 from rotating within the sleeve 6.

[0029] The operation of the device for supporting a vehicle component, according to the present invention, is described hereafter.

[0030] The device 1 is positioned under the vehicle 21. The first pin 4 is fastened to the vehicle 21 hitching the first curved end 4a to the cross member 15 of the engine or, in general, to the lower bodywork of the vehicle 21. In particular, the first curved end 4a is directly inserted

into a hole 14 (or in a recess) of the cross member 15 of the engine. In case the device 1 is fastened to the vehicle 21 in a position of the bodywork not easily accessible, that means far from the component 16, the first curved end 4a is inserted into the ring of the stretched belt and the hook of the stretched belt is hitched to the vehicle 21.

[0031] The second threaded end 4b is inserted into the opening 3 from the upper surface 27b to the lower surface 27a of the load-bearing structure 1a. The first pin 4 is made to slide inside the opening 3 along the predetermined direction 22 until the lift 2 is located under the component 16 (e.g. the oil sump).

[0032] The first pin 4 is fastened inside the opening 3 by screwing the nut 12a to the second threaded end 4b by means of the manual handle 12. The nut 12a is screwed until it adheres to the lower surface 27a of the load-bearing structure 1a.

[0033] In the embodiment described and illustrated herein, the pantograph lift 2 is extended and locked in the desired position, in which the support 10 is placed in contact with the component 16 to support it, acting on the knob 18 for adjusting the screw 11.

[0034] Rotating the bar 7 around the second pin 5 and making it slide inside the sleeve 6, it is possible to position the supporting feed 9 and 9a in contact with the lower bodywork of the vehicle 21 according to the preferred stability requirements. In particular, the props 8 and 8a are adjustable in height by screwing them in the ends 7a and 7b of the bar 7.

[0035] From the above description, the characteristics of the support device for a vehicle component, according to the present invention, are clear, as are its advantages.

[0036] In particular, the device is structurally simple because, for anchoring to the vehicle, it uses the first pin (in case equipped with the stretched belt) inserted into the opening and fastened thereto. The device is therefore light, compact and easy to operate even by a single operator.

[0037] Moreover, the device described herein is universal, i.e. it can be employed in any vehicle model. Indeed, adaptation to the particular lower bed of the vehicle is assured first of all by the elongated opening, which allows the first pin to slide until appropriately positioning the lift under the component.

[0038] Moreover, the first curved end of the pin allows the device to be anchored in any area of the lower bodywork of the vehicle or to tie rods of the vehicle itself (in case by means of the stretched belt), avoiding the use of personalised flanges as takes place in currently known device.

[0039] Additionally, the device is stabilised thanks to the use of the stabiliser assembly, pivotally hinged on the load-bearing structure. This enables to eliminate roll and to make the device stable and safe in operative configuration. Moreover, the stabiliser assembly is adaptable to any vehicle model because the support feet can be appropriately positioned under the vehicle bed making the second pin rotate and making the bar slide inside the

sleeve. The particular conformation of the stabiliser assembly allows to achieve excellent stability of the device even in the presence of highly irregular and wavy vehicle beds (e.g. with passages of exhaust, fuel or brake pipes).
[0040] The device also enables the operator to work comfortably (even when the vehicle is positioned near the ground) because the lift can be operated acting on the adjustment knob by means of a wrench with extension.

Claims

1. Device (1) for supporting a component (16) of a vehicle (21) comprising:

a load-bearing structure (1a);
 a lift (2) connected to said load-bearing structure (1a) and able to be positioned under said component (16) to support it;
 means (17) for anchoring the device (1) to the vehicle (21),

characterised in that the load-bearing structure (1a) is provided with an opening (3), said anchoring means (17) comprising a first pin (4) passing through said opening (3) and able to be connected to the vehicle (21) and a locking element (23) that, in an operative configuration of the device (1), fastens the first pin (4) inside the opening (3).

2. Device (1) as claimed in claim 1, wherein said first pin (4) presents a first curved end (4a) hitchable to the vehicle (21).
3. Device (1) as claimed in claim 1, wherein said first pin (4) is connected to a stretched belt hitchable to the vehicle (21).
4. Device (1) as claimed in any of the previous claims, wherein the opening (3) is elongated in a predetermined direction (22) in such a way that, in a configuration of installation of the device (1), said first pin (4) is free to slide inside the opening (3) along said predetermined direction (22).
5. Device (1) as claimed in any of the previous claims, wherein said first pin (4) presents a second threaded end (4b), said locking element (23) being constituted by a nut (12a) which can be screwed to said second end (4b).
6. Device (1) as claimed in claims 1 to 4, wherein said first pin (4) presents at least one slot, said locking element (23) being constituted by a slit pin which can be inserted into said at least one slot.
7. Device (1) as claimed in any of the previous claims,

wherein the lift (2) is of the pantograph type.

8. Device (1) as claimed in any of the previous claims, further comprising a stabiliser assembly (20) pivotally hinged on the load-bearing structure (1a) to provide stability to the device (1) in the operative configuration.

9. Device (1) as claimed in claim 8, wherein said stabiliser assembly (20) comprises a second pin (5) rotating within a hole (13) of the load-bearing structure (1a), a sleeve (6) integral with the second pin (5) and a bar (7) slidable within said sleeve (6).

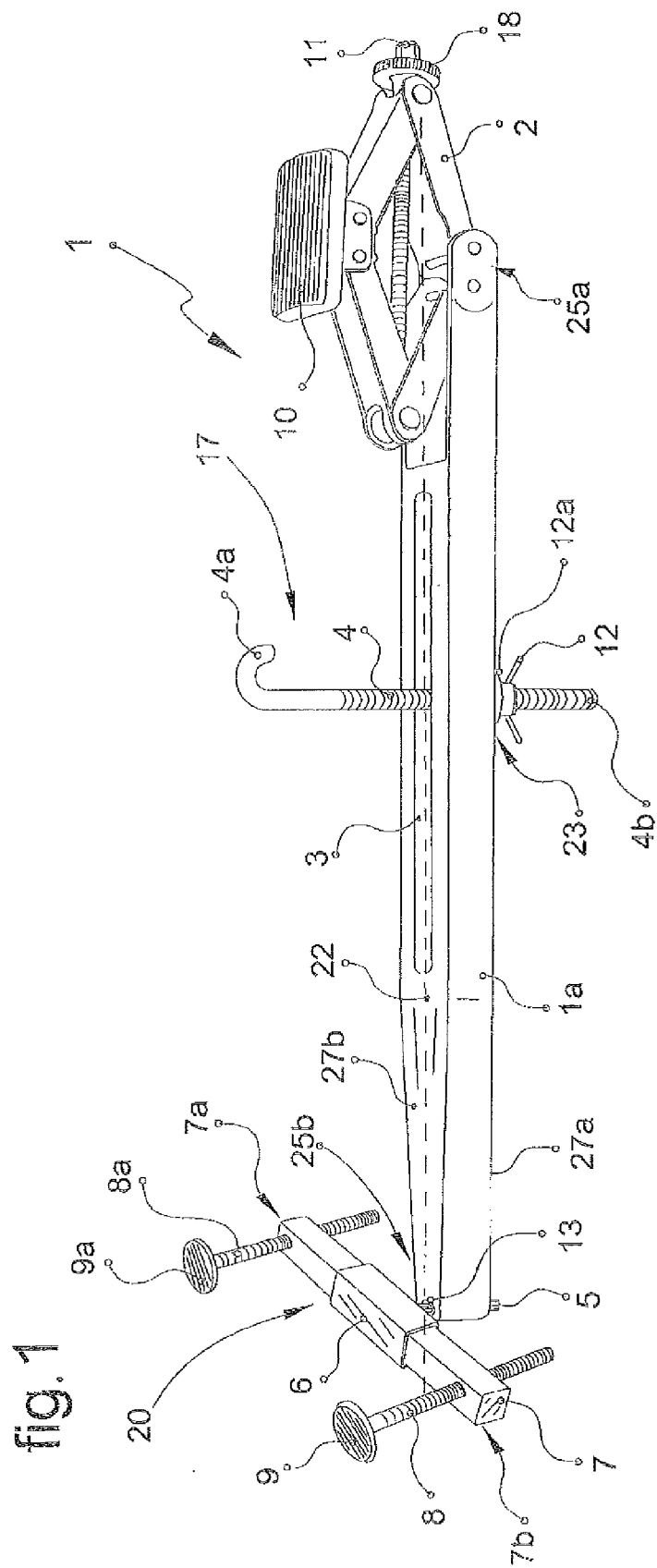
10. Device (1) as claimed in claim 9, wherein the stabiliser assembly (20) further comprises two props (8, 8a) screwed at opposite ends (7a, 7b) of said bar (7) and able to be positioned under the vehicle (21).

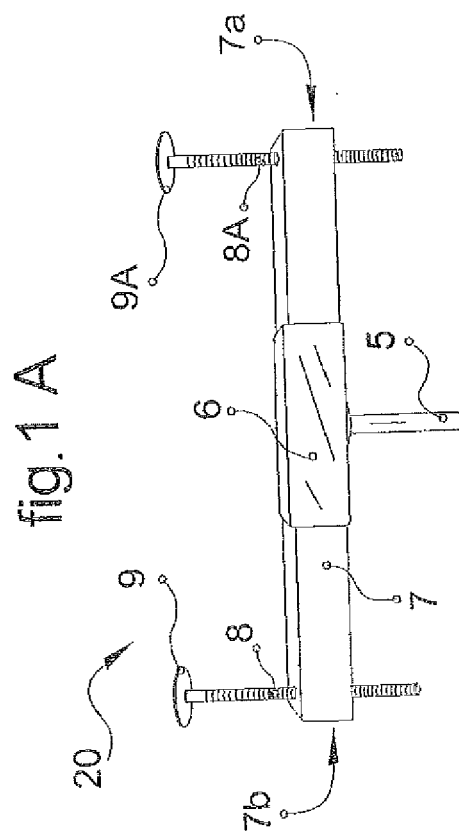
11. Method for supporting a component (16) of a vehicle (21), comprising the steps of:

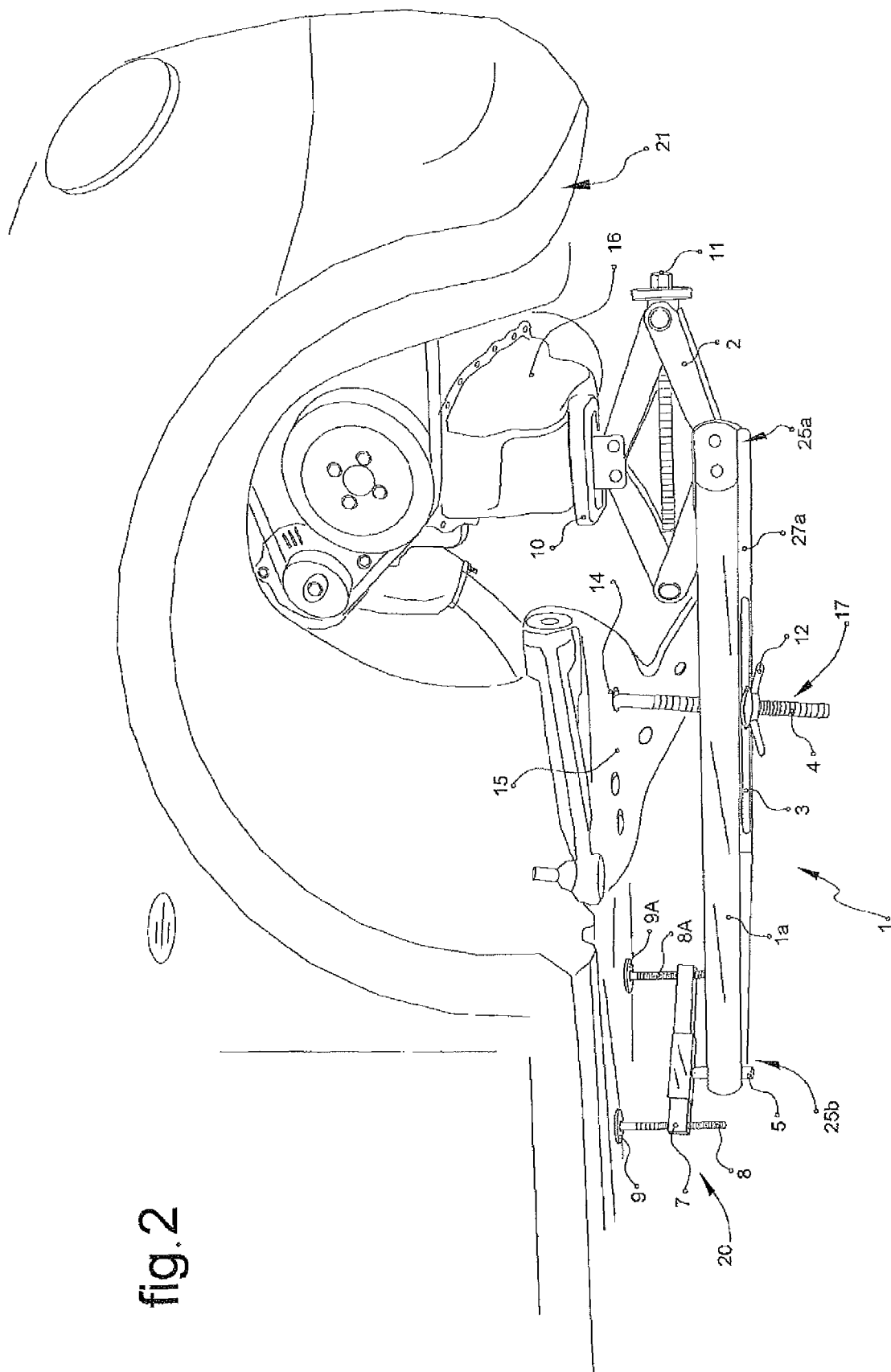
place a supporting device (1) under the vehicle (21);
 anchoring the device (1) to the vehicle (21);
 positioning a lift (2) of the device (1) under said component (16);
 operating said lift (2) in such a way as to support said component (16),

characterised in that the anchoring step takes place fastening a first pin (4) to the vehicle (21), inserting said first pin (4) into an opening (3) obtained within a load-bearing structure (1a) of the device (1) and fastening the first pin (4) within said opening (3) by means of a locking element (23).

12. Method as claimed in claim 11, further comprising the step of stabilising the device (1) in an operative configuration by means of a stabiliser assembly (20) pivotally engaged on said load-bearing structure (1a).









EUROPEAN SEARCH REPORT

Application Number
EP 08 17 2036

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 17 April 2009	Examiner Faymann, L
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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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