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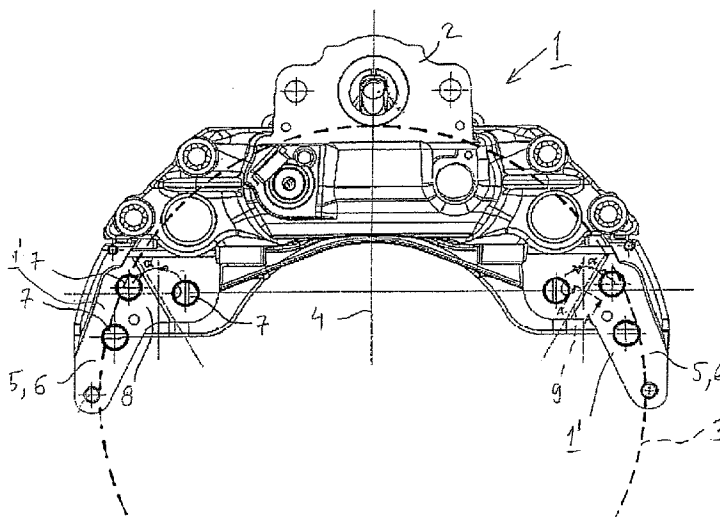
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(54) Title: METHOD AND DEVICE FOR MOUNTING CALLIPERS AND VEHICLE



(57) Abstract: A method for fitting and fastening a brake yoke (1) for a brake disc on a shaft of a vehicle wheel, which brake yoke comprises two supporting arms (1') on opposite sides of a centreline (4) running substantially radially in relation to the disc brake's brake disc (3), each of which supporting arms has a fastening portion (5) serving as an interface (6) against the shaft and comprising holes (7) for fastening bolts. The method is particularly distinguished by the steps of - positively locking the brake yoke (1) to the shaft by a heel element (8) of the respective supporting arm (1') by fitting the heel elements in ramp configurations formed on the shaft for positioning the brake yoke substantially in a fastening position in which the brake yoke is held in both circumferential and radial directions in relation to said brake disc (3), and - preferably transferring braking torque from the brake yoke to the shaft via inter alia the heel elements. The invention also relates to a device for mounting a brake yoke and further relates to a vehicle.

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METHOD AND DEVICE FOR MOUNTING CALLIPERS AND VEHICLE

BACKGROUND

5 Technical field

The present invention relates to a method according to the introductory part of the attached claim 1.

10 The invention relates further to a device according to the introductory part of the attached claim 10.

The invention also relates to a vehicle according to the attached claim 18.

15 STATE OF THE ART

Brake yokes for disc brakes are normally adapted to being fitted on the shaft of the wheel which is to be braked by the respective disc brake arrangement.

20 The brake yoke comprises two supporting arms which extend on opposite sides of a centreline substantially coinciding with a centreline of the brake disc against which the brake yoke is adapted to acting via brake linings, each supporting arm having a fastening portion intended to be fastened to the shaft of the respective wheel by bolts running through holes in the fastening portion.

25

A structure of this kind involves obvious disadvantages, at least as regards disc brakes for heavy vehicles such as trucks.

30 Thus, during servicing of the brake yoke and during assembly at production stage, the fitting together of holes and bolts for permanent assembly is time-consuming and hazardous, inter alia because of the relatively heavy weight of the brake yoke.

Moreover, at least on the occasion of large braking forces, the brake yoke is subject to a large twisting moment which is absorbed by the bolts, which are thus subject to large shearing and fatigue stresses.

5 OBJECT OF THE INVENTION

The object of the present invention is to provide a solution to the problems described above.

10 SUMMARY OF THE INVENTION

The object as above is achieved by a method, a device and a vehicle with features according to claims 1, 10 and 18.

15 Further advantages are afforded by features according to the respective dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

20 The present invention will be better understood against the background of the following detailed description read in combination with the attached drawings, in which the same reference notations refer in principle to the same parts and in which

- Fig. 1 depicts schematically a brake yoke according to a first embodiment of a device
25 according to the invention as seen in its axial direction, looking at the side which is intended to face towards and be attached to the shaft of the respective wheel,

- Fig. 2 depicts schematically part of a section A-A according to Fig. 1,

30 - Fig. 3 depicts schematically the fastening portion of a supporting arm with another embodiment of a heel element according to the invention, which heel element is arranged in a substantially L-shaped configuration,

- Fig. 4 depicts schematically in a section B-B an alternative version of a heel element configuration for axial positive locking by shape,

5 - Fig. 5 depicts a brake yoke according to a second embodiment of a device according to the invention as seen in Fig. 1,

- Fig. 6 depicts in a perspective view a lining carrier of the brake yoke according to Fig. 5 and

10 - Fig. 7 depicts the lining carrier according to Fig. 6 as seen from the left in Fig. 6.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

In Fig. 1, ref. 1 denotes a brake yoke for a disc brake for an undepicted vehicle wheel, which brake yoke is adapted to being fastened to the undepicted shaft of the wheel and to supporting a brake cylinder relative to a bracket 2 and two undepicted mutually opposite brake blocks with brake linings adapted to perform, by means of the brake cylinder, a braking action against opposite sides of a brake disc 3, represented by a broken line.

20

The brake yoke comprises two supporting arms 1' on opposite sides of a centreline 4 which runs substantially radially in relation to the brake disc, which supporting arms are preferably of a somewhat curved configuration, preferably substantially following the curvature of the brake disc's circumference.

25

Each supporting arm has a fastening portion 5 serving as an interface 6 relative to the shaft and comprising holes 7 to accommodate undepicted fastening bolts for fastening the brake yoke to the shaft in a fastening position.

30 According to the invention, the brake yoke is adapted to being positively locked by shape relative to the shaft in both the circumferential and the radial direction of the disc brake's brake disc by a heel element 8 of the respective fastening portion for

positioning the brake yoke substantially in said fastening position. As depicted in Fig. 1, the heel elements 8 are preferably arranged in a mutual wedge configuration narrowing substantially towards the undepicted centre of the shaft, the heel elements being adapted to being fitted in ramp configurations formed on the shaft, e.g. groove configurations, for said positioning of the brake yoke substantially in said fastening position. The angle α of each heel element to the centreline is, for example, about 30-45°.

According to preferred embodiments, the brake yoke is adapted to also being positively locked by shape in the axial direction of the brake yoke, e.g. preferably by negative relief 9 of a dovetail type between the heel elements and the shaft's groove configuration, as schematically depicted in Figs. 1 and 2, which relief forms an angle β with the main plane of extent of the fastening portion. The angle β is for example 45°.

According to another version (see Fig. 3), each heel element 8 is arranged in a substantially L-shaped configuration 8' and the heel elements of the respective fastening portions are arranged mutually opposite, with one side 8'' of said L-shaped configuration running substantially parallel with said centreline and the other side 8''' running substantially perpendicular thereto as a stop element, the heel elements being adapted to being fitted in ramp configurations formed on the shaft for positive locking of the brake yoke in both circumferential and radial directions, and the shaft's ramp configurations preferably comprising corresponding L-shaped configurations. The preferred configuration in this respect, when the brake yoke is as depicted in Fig. 1, has each heel element in the form of upward and downward L shapes and the foot (the side 8''') adapted to constituting a stop element and pointing away from said centreline 4 so that the brake yoke can be suspended in the stop elements. Other versions are also conceivable.

In this embodiment it is also preferred that the brake yoke is adapted to being also positively locked by shape in the axial direction of the brake yoke, e.g. preferably by negative relief as above, with at least one side of each L-configured heel element, e.g.

the side substantially parallel with the centreline, arranged for positive locking in the axial direction.

An undepicted version of an asymmetrical kind which is also conceivable has the heel elements shaped differently, e.g. one as an L-configured heel element and one of the kind depicted in Fig. 1 and forming in this case an acute angle α to the centreline. Embodiments of this kind are also preferably arranged for positive locking of the brake yoke also in the axial direction, as previously described.

10 In the second embodiment depicted in Figs. 5-7 and in many other preferred embodiments of a brake yoke according to the invention, ref. 12 denotes a lining carrier adapted to being part of the brake yoke 1 and inter alia comprising said supporting arms 1'.

15 According to this embodiment, the side of the brake yoke which is intended to face towards said shaft supports, via the lining carrier, two heel elements 13 which are preferably cast as integral parts of the lining carrier and have at the respective fastening portions a protruding portion 15 pointing away from the respective supporting arm's free end 14, the respective heel elements each having a ramp portion
20 16 sloping at an acute angle to said centreline, with the two heel elements 13, like the heel elements 8 according to Fig. 1, arranged in a mutual wedge configuration narrowing substantially towards the centre of the shaft, as illustrated in Figs. 5 and 6, said shaft comprising ramp configurations with a corresponding ramp portion 17 for each heel element, as schematically depicted in Fig. 5, for cooperation with the heel
25 element for assembly positioning of the brake yoke and also for possible absorption of braking torque.

According to a preferred version, as in previously described embodiments, each ramp configuration with ramp portion 17 is combined with a fastening portion 18 for
30 cooperation with fastening bolts.

In this embodiment likewise, the brake yoke may be adapted to being also positively locked in the axial direction of the brake yoke, e.g. preferably by negative relief as above, with the ramp portions 16 arranged, as for example illustrated in Fig. 7, for positive locking in the axial direction.

5

For positive locking in the axial direction, versions other than those of a dovetail type are also conceivable, e.g. the version according to Fig. 4 with a recess 10 forming a stop flange 11 arranged against axial movement, with a flange which fits in the recess forming part of the shaft's groove configuration, or vice versa. With a ramp
10 configuration with a substantial abutment surface of the ramp portion of the heel elements according to Figs. 5-7, axial positive locking may perhaps even be achieved entirely by friction.

The method and the function of the device according to the invention are probably
15 substantially and sufficiently indicated above.

Heel elements formed on or close to the brake yoke's supporting arms' fastening portions and corresponding ramp configurations of the shaft on which the brake yoke is to be fastened, serve to position the brake yoke in a fastening position in which the
20 heel elements and the ramp configurations are so arranged that the brake yoke can easily be suspended on the shaft and thus be held in both the circumferential and radial directions relative to the disc brake's brake disc and in a fastening position so that fastening bolts can be inserted in holes in the fastening portions. The brake yoke may also be positioned and positively locked in the axial direction by special shaping of the
25 heel elements, e.g. by negative relief of a dovetail type.

The invention makes it easy to fit the brake yoke by simple positioning on the shaft and caters for torque absorption by said heel elements and said ramp configurations during braking irrespective of whether the vehicle is travelling forwards or reversing.
30 Particular production advantages are afforded by casting the heel elements integrally with the lining carrier.

The invention is described above in relation to preferred embodiments and embodiment examples.

Further embodiments and minor additions and modifications are of course conceivable
5 without departing from the fundamental concept of the invention.

The invention is therefore not to be regarded as limited to the embodiments indicated above but may be varied within its scope indicated by the attached claims.

CLAIMS

1. A method for fitting and fastening a brake yoke for a brake disc on a shaft of a vehicle wheel, which brake yoke comprises two supporting arms on opposite sides of a centreline running substantially radially in relation to the disc brake's brake disc, each of which supporting arms has a fastening portion serving as an interface against the shaft and comprising holes for fastening bolts, **characterised** by the steps of
- 5
- positively locking the brake yoke (1) to the shaft by a heel element (8, 13) of the respective supporting arm (1') by fitting the heel elements in ramp configurations formed on the shaft for positioning the brake yoke substantially in a fastening position in which the brake yoke is held in both circumferential and radial directions in relation to said brake disc (3),
 - 10
 - arranging the heel elements mutually in a wedge configuration narrowing substantially towards the centre of the shaft, and
 - 15
 - preferably transferring braking torque from the brake yoke to the shaft via inter alia the heel elements.
 - 20
2. A method according to claim 1, in which a heel element (8) is arranged on the respective fastening portion (5).
3. A method according to claim 1, in which a heel element (13) is arranged close to the respective fastening portion at the portion (15) of the latter which points away from the free end (14) of the fastening portion supporting the bearer arm.
- 25
4. A method according to claim 3, in which the heel elements (13) are cast integrally with the brake yoke's lining carrier (12).
- 30
5. A method according to any one of claims 1-4, in which said ramp configurations comprise groove configurations.

6. A method according to any one of claims 1-5, in which the brake yoke is also positively locked in the axial direction of the brake yoke by the heel elements and the shaft's ramp configurations, preferably by negative relief (9) of a dovetail type
5 between heel elements and the shaft's ramp configurations.
7. A device for mounting a brake yoke for a brake disc on a shaft of a vehicle wheel, which brake yoke comprises two supporting arms on opposite sides of a centreline running substantially radially in relation to the disc brake's brake disc, each of which
10 supporting arms has a fastening portion serving as an interface against the shaft and comprising holes for fastening bolts, **characterised** in that the brake yoke (1) is adapted to being positively locked to the shaft by a heel element (8) of the respective supporting arm (1'), the heel elements are adapted to being fitted in ramp
15 configurations formed on the shaft for positioning the brake yoke substantially in a fastening position in which the brake yoke is adapted to being held in both circumferential and radial directions in relation to said brake disc (3), the heel elements are arranged mutually in a wedge configuration narrowing substantially towards the centre of the shaft, and the heel elements are preferably adapted to transferring braking torque from the brake yoke to the shaft.
20
8. A device according to claim 7, in which a heel element is arranged on each fastening portion (5).
9. A device according to claim 7, in which a heel element (13) is arranged close to
25 each fastening portion at the latter's portion (15) which points away from the free end (14) of the supporting arm bearing the fastening portion.
10. A device according to claim 9, in which the heel elements (13) are cast integrally with the brake yoke's lining carrier (12).
30
11. A device according to any one of claims 7-10, in which the brake yoke is adapted to also being positively locked in the axial direction of the brake yoke by the heel

elements and the shaft's ramp configurations, preferably by negative relief (9) of a dovetail type between heel elements and the shaft's ramp configurations.

12. A vehicle, **characterised** in that it comprises at least one brake yoke (1) with a
5 device according to any one of claims 7-11.

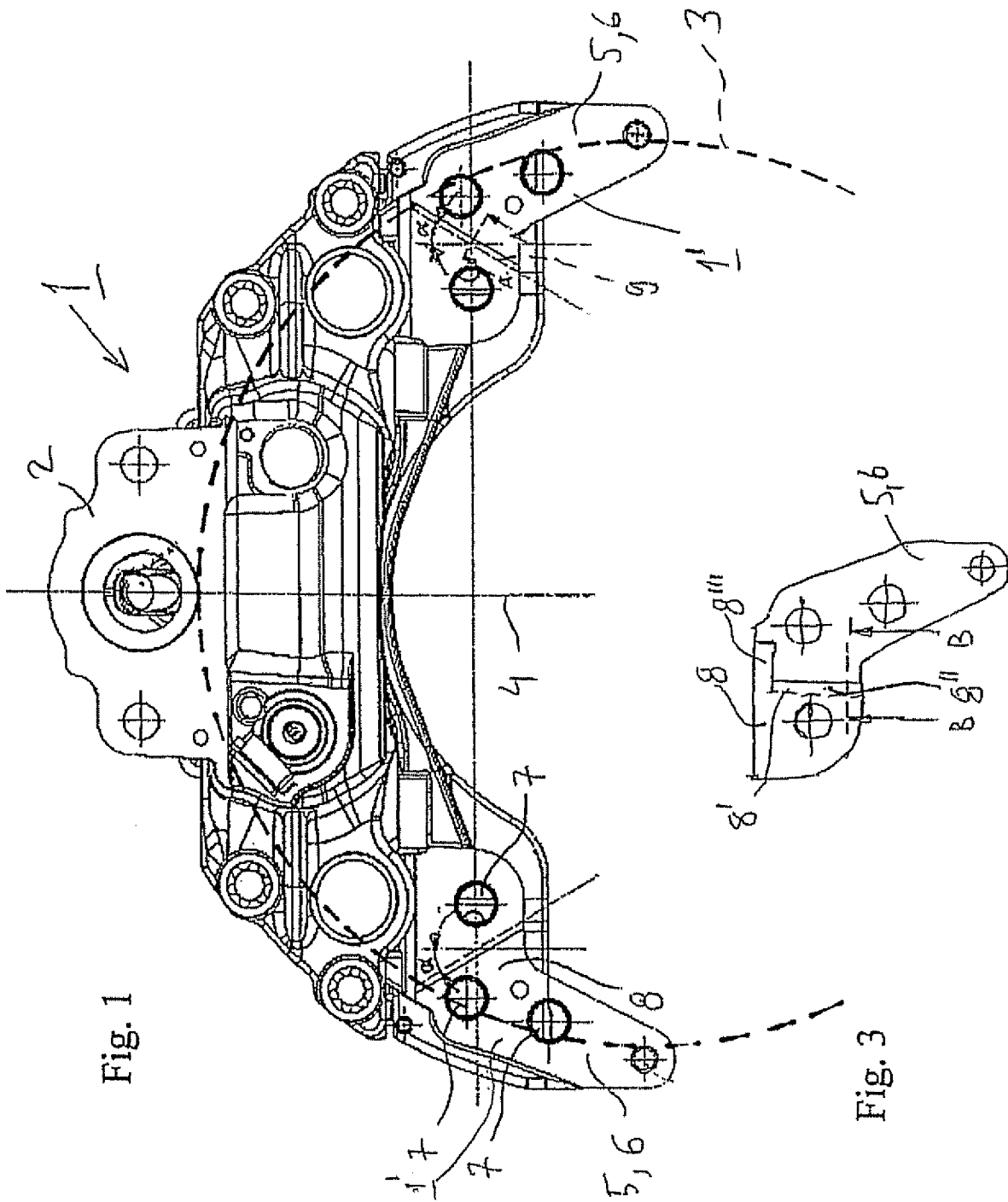


Fig. 1

Fig. 2

Fig. 3

Fig. 4

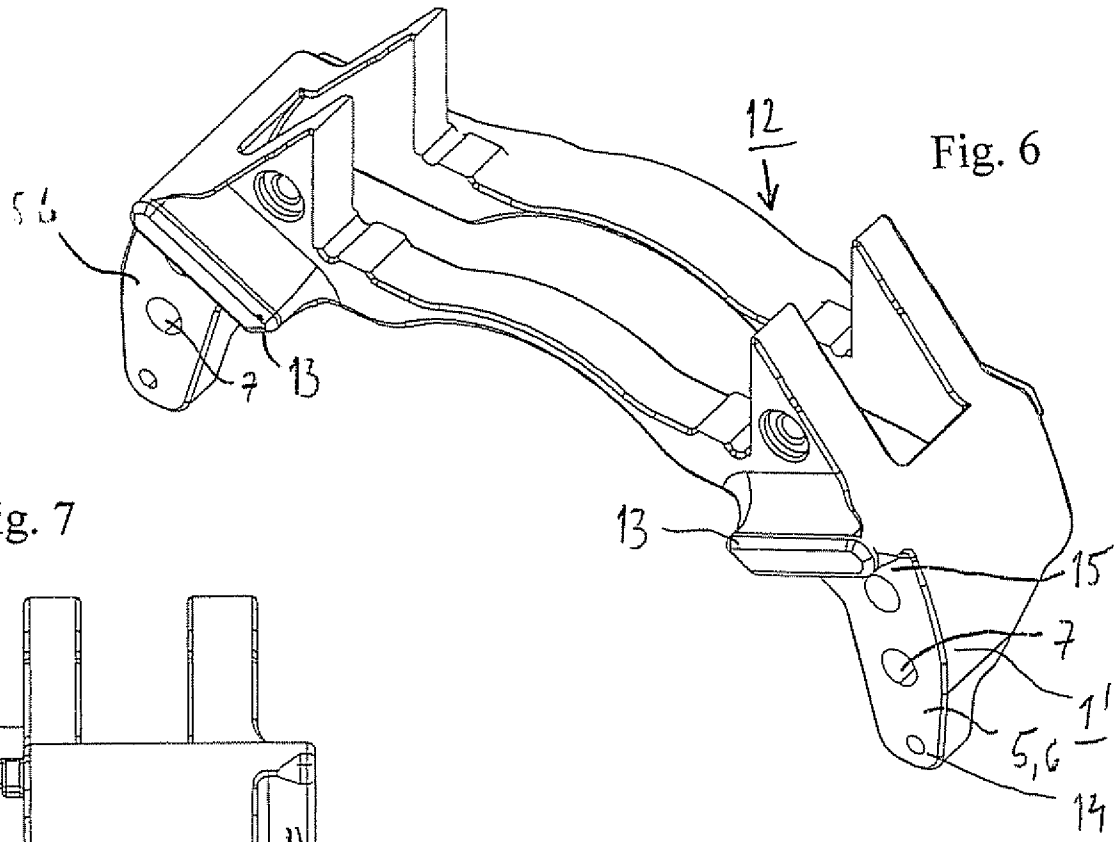


Fig. 7

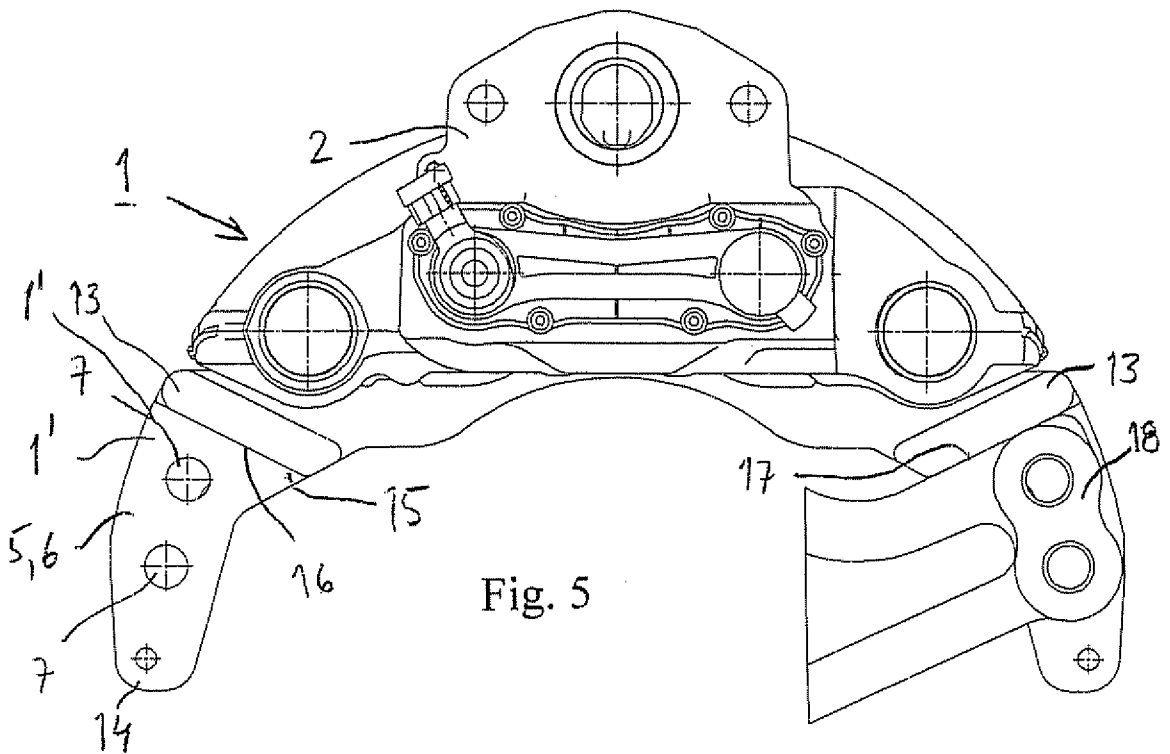
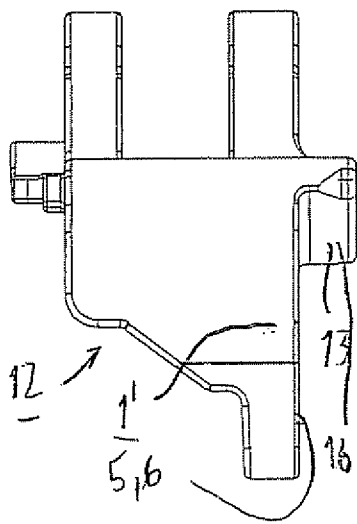


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE2007/050987

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: F16D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1703163 A2 (HITACHI, LTD. ET AL), 20 Sept 2006 (20.09.2006), figures 1,3, abstract, paragraphs (0020) - (0027), (0030) --	
A	US 6408991 B1 (R. HERFFURTH ET AL), 25 June 2002 (25.06.2002) --	
A	WO 2005064189 A1 (HALDEX BRAKE PRODUCTS AB), 14 July 2005 (14.07.2005) --	
A	US 5188202 A (H. TERASHIMA), 23 February 1993 (23.02.1993) -- -----	

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Cited literature, if any, will be enclosed in paper form.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

26/01/2008

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