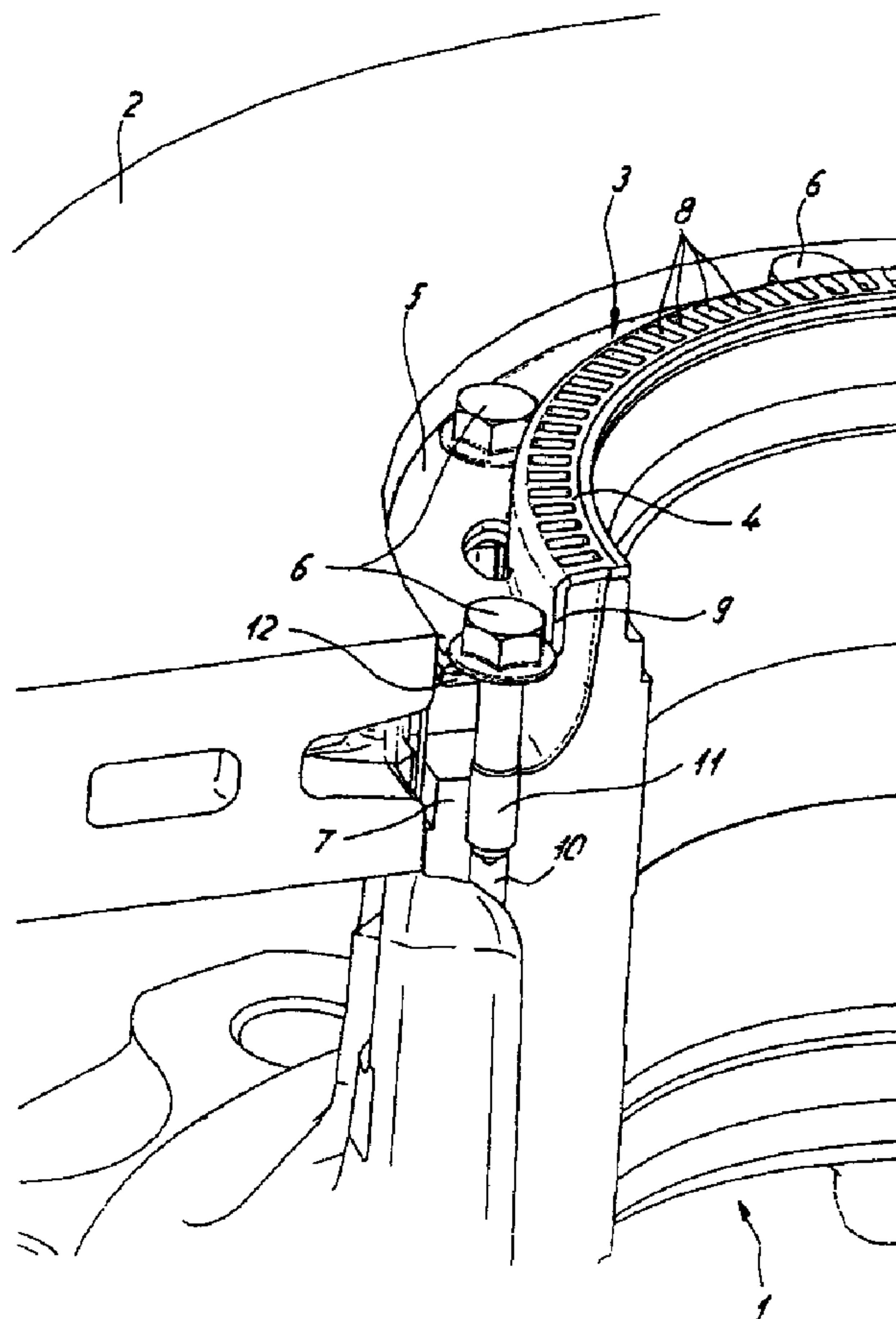




(86) Date de dépôt PCT/PCT Filing Date: 2005/07/13
(87) Date publication PCT/PCT Publication Date: 2006/01/26
(85) Entrée phase nationale/National Entry: 2007/01/11
(86) N° demande PCT/PCT Application No.: EP 2005/007599
(87) N° publication PCT/PCT Publication No.: 2006/008044
(30) Priorité/Priority: 2004/07/16 (DE10 2004 034 361.6)

(51) Cl.Int./Int.Cl. *F16D 65/12* (2006.01),
B60T 8/32 (2006.01), *F16D 66/00* (2006.01),
G01P 3/44 (2006.01)
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(54) Titre : ROTOR POUVANT ETRE RACCORDE A UN MOYEU DE ROUE D'UN VEHICULE AUTOMOBILE
(54) Title: POLE WHEEL WHICH CAN BE CONNECTED TO A WHEEL HUB OF A MOTOR VEHICLE



(57) **Abrégé/Abstract:**

The invention relates to a pole wheel which can be connected to a wheel hub of a motor vehicle. Said pole wheel comprises an annular-shaped wheel ring (4) which extends in a radial manner, which forms an outer edge and which comprises a plurality of



(57) **Abrégé(suite)/Abstract(continued):**

openings (8) which are arranged at equal angle distances in relation to each other. Said wheel pole is embodied in such a manner that a dimensionally stable stop (5) is formed directly or indirectly on the wheel ring (4), said stop being arranged on the brake disk (2) for fixing in an axial manner a brake disk (2) which is connected to the wheel hub (1)

ABSTRACT

The invention relates to a pole wheel which can be connected to a wheel hub of a motor vehicle. Said pole wheel comprises an annular-shaped wheel ring which extends in a radial manner, which forms an outer edge and which comprises a plurality of openings which are arranged at equal angle distances in relation to each other. Said wheel pole is embodied in such a manner that a dimensionally stable stop is formed directly or indirectly on the wheel ring, said stop being arranged on the brake disk for fixing in an axial manner a brake disk which is connected to the wheel hub.

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Pole wheel which can be connected to a wheel hub of a motor vehicle

5 The present invention relates to a pole wheel which can be connected to a wheel hub of a motor vehicle, according to the preamble of claim 1.

10 Pole wheels of this type are used as functional parts of anti-lock braking systems (ABS) in motor vehicles, where they are usually fastened to the associated wheel hub of the motor vehicle in the attachment region of a disk brake.

15 In this case, said disk brake has a brake disk which is connected to the wheel hub and with which brake shoes make contact in order to brake the motor vehicle, the braking operation being performed by the friction linings of the brake shoes which bear against the brake disk.

20 In addition to the brake disk, the pole wheel, which is moreover operatively connected to a sensor, is fastened to the wheel hub in a rotationally fixed manner in this case. A pole wheel of this type is known, for example, from DE 102 05 046 A1 and DE 101 45 947 C1.

25

In order to transmit the braking torque to the wheel hub, the brake disk is also fastened to the wheel hub in a rotationally fixed manner, to which end, for example, external tooth systems of the wheel hub correspond to
30 internal tooth systems of the brake disk in an interlocking manner.

In order to provide the required axial fixing of the brake disk, WO 97/48 919 A1 discloses providing a stop ring which
35 firstly is firmly screwed to the wheel hub and secondly bears against the brake disk, as a result of which the wheel hub is at least largely fixed in the axial direction, with slight

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axial deflection occurring merely on account of the material-dependent elasticity of the stop ring.

5 In order to also prevent axial movement in one direction, DE 103 57 374 A1, which was published after the priority date of the present application, discloses a stop which is fixed in this respect and against which the brake disk bears.

10 In any case, separate components, in the second-mentioned case separate components formed by the pole wheel, are required firstly for axially securing or restricting the movement of the brake disk on one side in any case and for operation of said ABS.

15 This naturally leads to relatively high production and installation costs which all stand in the way of optimization of the brake system.

20 The present invention is therefore based on the object of further developing a pole wheel of this generic type such that its range of use is improved and the disk brake can be produced in a more cost-effective manner overall.

25 This object is achieved by a pole wheel which has the features of claim 1.

30 On account of this structural configuration, the use of a separate axial securing means of the brake disk can be dispensed with in one direction.

35 Instead, this function is also taken over by the correspondingly modified pole wheel. On account of this, as it were, multifunction of the pole wheel, considerable advantages are produced, primarily in production and installation of the disk brake, since the collar of the pole wheel and the connected stop are preferably integrally formed, with the stop expediently being in the form of a

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radially extending, circumferential collar which extends parallel to the collar, but in the opposite direction.

5 In this case, the collar and the stop may be connected by a circumferential web which is at right angles to the latter or is inclined, with the result that a substantially Z-shaped cross section is produced.

10 In principle, it is feasible to produce the pole wheel as a stamped sheet-metal part, which results in particularly low-cost manufacture.

15 In order to provide the stop with sufficient dimensional stability, said stop may, according to one advantageous development of the invention, be provided with beads or embossed ribs. It is also feasible to flange the stop or to angle the stop at the free edge region in the same direction as the web, with the result that an approximate U-shape which is formed by the angled portion, the stop and the web is
20 produced.

Measures such as this for increasing the dimensional stability of the stop are required because the collar with the apertures distributed over its circumference is, for
25 manufacturing reasons, formed from a relatively thin metal sheet, usually with a thickness of 2mm. A sufficiently exact tooth system, which is formed by the apertures, can be produced only with thin metal sheets of this type.

30 According to one further advantageous embodiment of the invention, the entire pole wheel is screwed to the wheel hub. To this end, screws are provided axially in relation to the wheel hub, which screws are distributed over the circumference, preferably at an identical angular distance,
35 are passed through the stop, and are screwed into the abovementioned hub teeth of the wheel hub which correspond to a tooth system of the brake disk in order to transmit torque.

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The connection of the pole wheel, that is to say of the collar and of the stop, to the wheel hub provides the advantage over the known stop structures that the connecting means are positioned outside the brake disk which is intensely heated during a braking operation, with the result that the risk of the screws becoming loose on account of being excessively heated is effectively prevented.

Further advantageous embodiments of the invention are identified in the subclaims.

Exemplary embodiments of the invention are described below with reference to the attached drawings, in which

figure 1 shows a partially sectioned perspective view of a pole wheel according to the invention which is fitted to a wheel hub,

figure 2 shows a detail of figure 1, likewise in a sectioned perspective illustration,

figure 3 shows a further, mounted exemplary embodiment of the invention in cross section, and

figures 4 and 5 each show sectioned perspective views of further exemplary embodiments of a pole wheel according to the invention.

Figure 1 shows a pole wheel 3 for a disk brake of a vehicle, which pole wheel is connected to the end of a wheel hub 1 of a motor vehicle. A brake disk 2 is fastened to the wheel hub 1 in a rotationally fixed manner in the associated free end region, for which reason teeth 7 are provided over the circumference of the wheel hub 1, which teeth correspond to an internal tooth system 13 (figure 3), which is matched to said teeth, of the brake disk 2, with the result that braking

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torques can be transmitted from the brake disk 2 to the wheel hub 1.

5 The pole wheel 3 has a circumferential, radially oriented annular collar 4 which is provided with a large number of apertures 8 which are arranged at identical angular distances from one another.

10 A circumferential web 9 which runs in the direction of the brake disk 2 is integrally formed at an angle to the collar 4 which bears against the free end face of the wheel hub 1, and said web is adjoined, again at an angle, by a stop 5 in the form of a circumferential flange which bears against the brake disk 2 and forms an axial fixing means for said brake
15 disk on one side.

The web 9 may be formed at a right angle or such that it tapers in relation to the collar 4, whereas the stop 5 and collar 4 run parallel or at an angle, but in opposite
20 directions, in the radial direction.

In order to fasten the pole wheel 3 and therefore the collar 4 and also the stop 5, through-bores 14 are made in the stop 5, preferably at identical angular distances, and screws 6
25 whose respective threaded shank 11 is screwed into a threaded hole 10 in a tooth 7 of the wheel hub 1 are passed through said through-bores.

The connections of the stop 5 and of the entire pole wheel 3, which connections are located outside the axially fixed or
30 displaceable brake disk 2, prevent the screws 6 being subjected to heat, as could otherwise occur on account of the frictional heat of the brake disk 2 which is produced during braking.

35

Figures 2 and 3 show that the stop 5 is flanged in order to form a doubled-over section 12 in order to increase the

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dimensional stability, with the result that the deformation forces which are produced can be absorbed without problems.

Another respective option for increasing the dimensional stability, that is to say for increasing the resistance moment of the stop 5, is shown in figures 4 and 5. Here, the exemplary embodiment according to figure 4 has an angled edge 15 in the circumferential region which is opposite the collar 4, which angled edge extends parallel to and in the same direction as the web 9, with the result that a U-shaped cross section is produced.

Finally, figure 5 shows beads 16 which are distributed over the circumference, preferably uniformly, in order to reinforce the stop 5, said beads being introduced by embossing and rising on that face of the stop 5 which faces the collar 4 while the opposite face respectively forms a recess.

In this case, the beads 16 are formed in accordance with the radius of curvature and assume an elongate shape.

A through-hole 14 is in each case expediently arranged between two beads 16, with the distance between the individual beads 16 being kept so large that the head of the screw which is then inserted can rest on the stop 5 without problems and/or a tool, for example in the form of a wrench, can be readily used.

It is also entirely possible to use other reinforcing forms, such as ribs or the like, in place of the shown angled edge 15 or beads 16.

List of reference symbols

- | | | |
|----|-----|----------------------|
| | 1. | Wheel hub |
| 5 | 2. | Brake disk |
| | 3. | Pole wheel |
| | 4. | Collar |
| | 5. | Stop |
| | 6. | Screw |
| 10 | 7. | Tooth |
| | 8. | Aperture |
| | 9. | Web |
| | 10. | Threaded hole |
| | 11. | Threaded shank |
| 15 | 12. | Doubled-over section |
| | 13. | Tooth system |
| | 14. | Through-bore |
| | 15. | Edge |
| | 16. | Bead |

Patent claims

1. A pole wheel which can be connected to a wheel hub of a
5 motor vehicle, having an annular collar (4) which extends in
the radial direction, forms an outer edge, and is provided
with a large number of apertures (8) which are arranged at an
identical angular distance from one another, characterized in
that a dimensionally stable stop (5) is integrally formed
10 directly or indirectly on the collar (4) and rests on the
brake disk (2) in order to axially fix a brake disk (2) which
is connected to the wheel hub (1).

2. The pole wheel as claimed in claim 1, characterized in
15 that the stop (5) is in the form of a circumferential flange
which runs parallel or at an angle, and in the opposite
direction, to the collar (4).

3. The pole wheel as claimed in claim 1 or 2, characterized
20 in that the stop (5) and the collar (4) are connected by an
approximately axially oriented web (9) which is angled in
relation to the latter.

4. The pole wheel as claimed in claim 3, characterized in
25 that the web (9) runs at a right angle or obliquely to the
stop (5) and to the collar (4).

5. The pole wheel as claimed in claim 3 or 4, characterized
in that the collar (4), the stop (5) and the web (9) are
30 integrally formed as a stamped part.

6. The pole wheel as claimed in one of the preceding
claims, characterized in that through-holes (14) are provided
in the stop (5) in order to allow the passage of screws (6)
35 with which the pole wheel (3) can be fastened to the wheel
hub (1).

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7. The pole wheel as claimed in claim 6, characterized in that the screws (6) can be screwed into threaded holes (10) of external teeth (7) of the wheel hub (1), it being possible for said external teeth to be made to correspond to an
5 internal tooth system (13) of the brake disk (2).

8. The pole wheel as claimed in either of claims 6 and 7, characterized in that the through-holes (14) are at an identical angular distance from one another.
10

9. The pole wheel as claimed in one of the preceding claims, characterized in that the stop (5) has reinforcing elements in order to increase the flexural rigidity.

15 10. The pole wheel as claimed in claim 9, characterized in that, in order to reinforce the stop (5), the outer edge region of said stop is formed to produce an angled edge (15) which extends approximately parallel to and in the same direction as the web (9).

20 11. The pole wheel as claimed in claim 9, characterized in that the stop (5) is provided with beads (16) or ribs.

12. The pole wheel as claimed in claim 1, characterized in
25 that the beads (16) are embossed.

13. The pole wheel as claimed in either of claims 11 and 12, characterized in that a through-hole (14) is in each case arranged between two beads (16).
30

14. The pole wheel as claimed in claim 9, characterized in that the stop (5) has a doubled-over section (12) which is formed by flanging.

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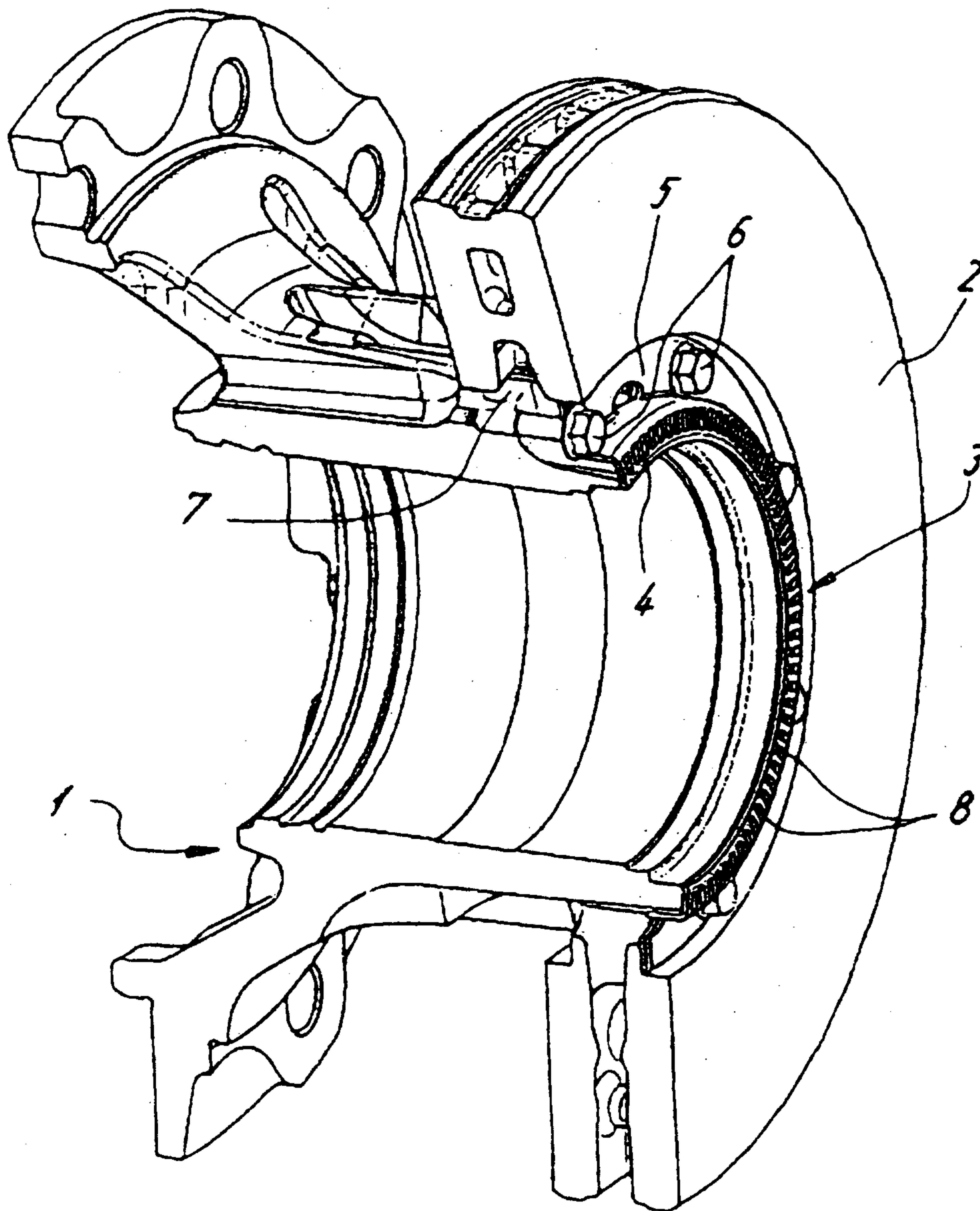
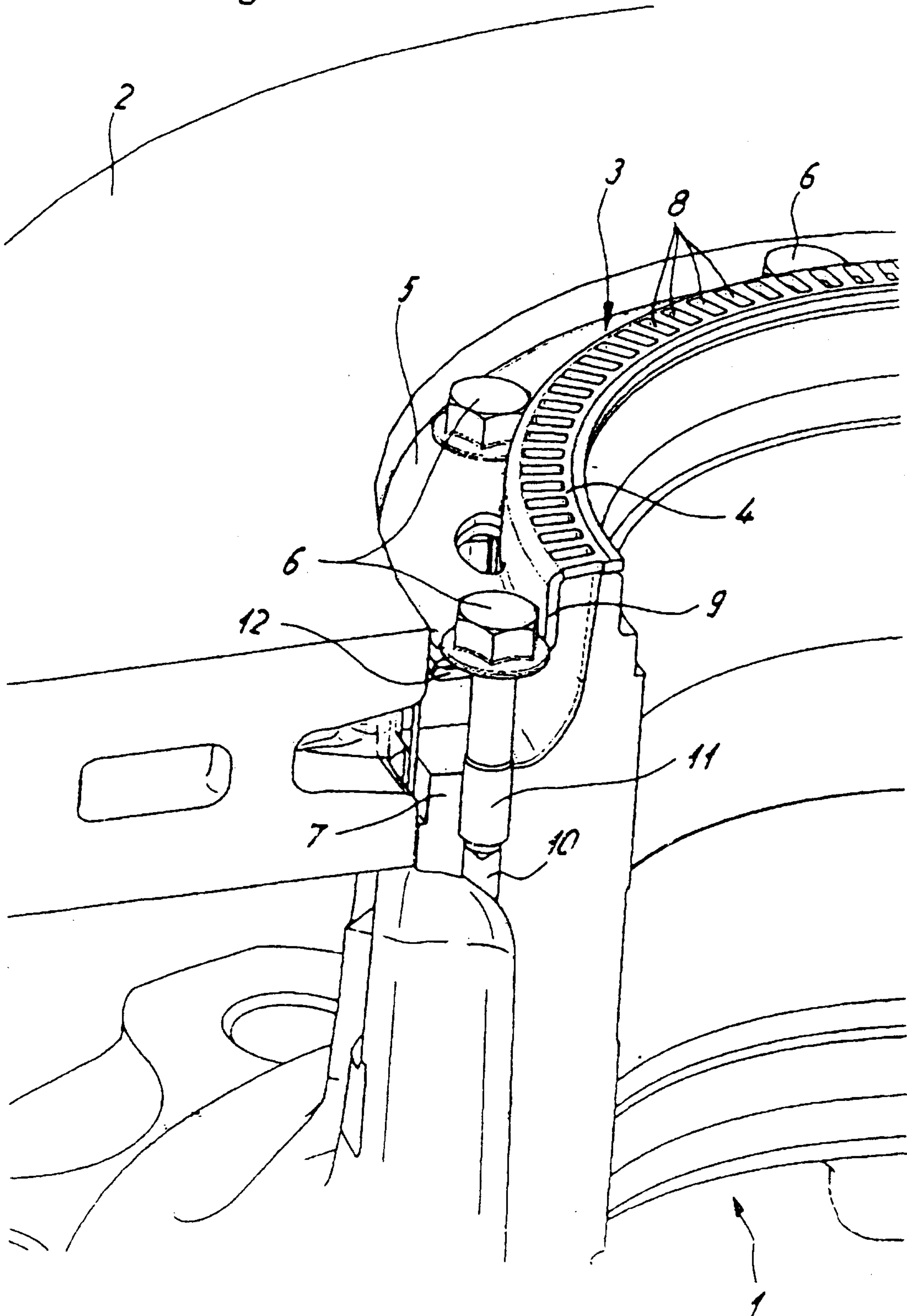


Fig. 1

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Fig. 2



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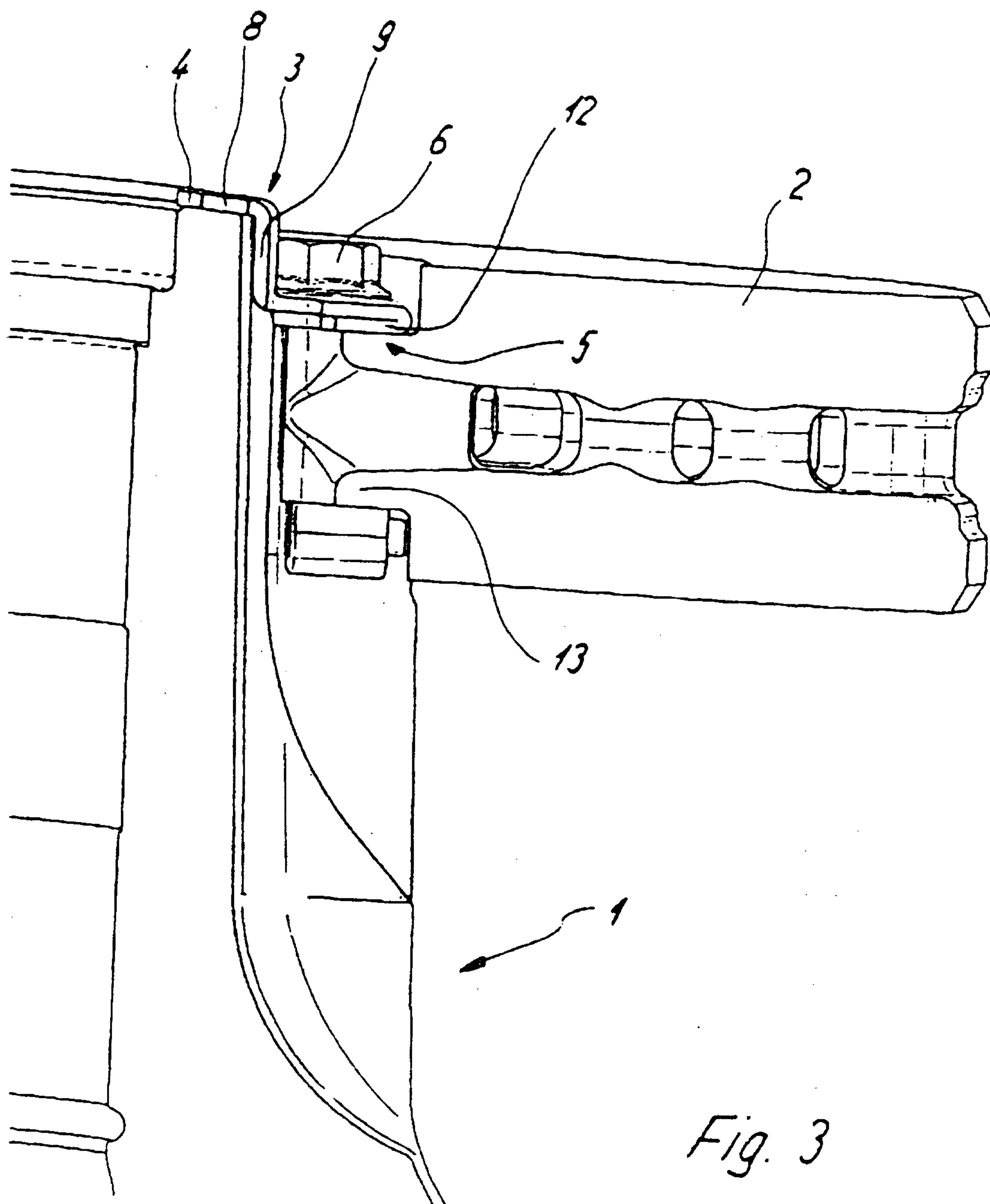


Fig. 3

