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(54) Titre : ROULEAU DE GALETAGE
(54) Title: HARD-ROLLING ROLLER

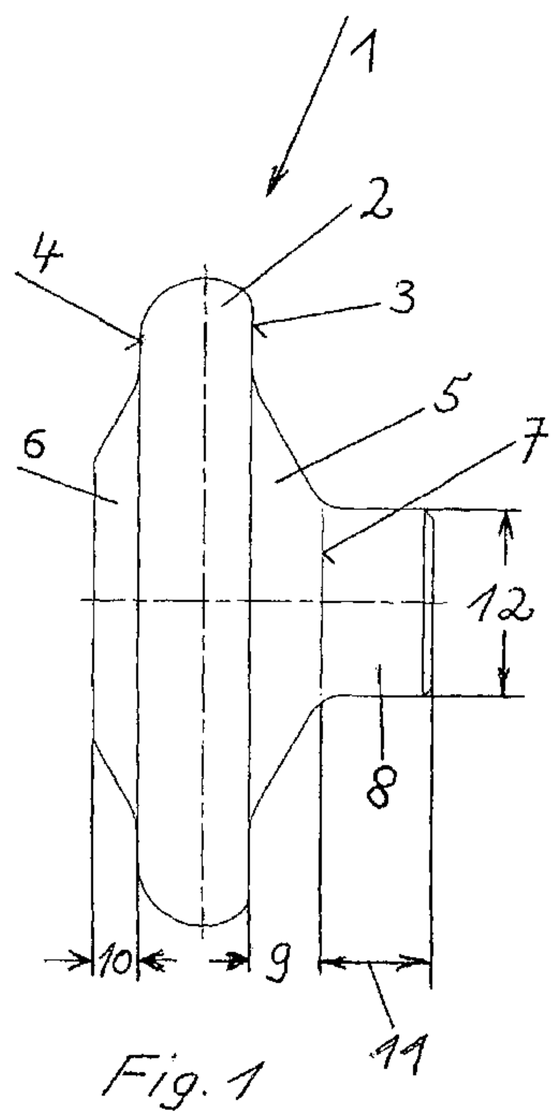

Fig. 1

(57) Abrégé/Abstract:
The invention relates to a hard-rolling roller for a hard-rolling tool having a toroidal main body for hard rolling radii or recesses which bound the bearing journals on crankshafts on both sides, and two at least approximately frustoconical central bodies which rise up on the two sides of the main body. The problem addressed by the invention is that of configuring such a hard-rolling roller such that it is always mounted in the prescribed, that is to say correct installation position in the hard-rolling tool. This problem is solved in that a cylindrical body (8, 8') rises up on the upper end face (7) from one of the two central bodies (5, 6).

ABSTRACT

The invention relates to a hard-rolling roller (1, 1') for a deep rolling tool (19) having a torus-shaped base body (2) for deep rolling of radiuses or recesses (14, 15) which limit the bearing trunnion (13) on crankshafts on both sides, and two at least approximately truncated cone-shaped central bodies (5, 6), rising on both sides (3, 4) of the body (2). A cylindrical body (8) rises on the upper end surface (7) of one of the two central bodies (5).

Hard-rolling roller

The invention relates to a hard-rolling roller for a deep rolling tool with a torus-shaped base body for deep rolling of radiuses or recesses which limit the bearing trunnions on crankshafts on both sides and two cone-shaped central bodies which are at least approximately truncated that rise on both sides of the base body.

Hard-rolling rollers generally have the shape of a low truncated cone. The base area of these truncated cones is very rounded at the edges, sometimes with different radiuses, which results in a nearly torus-shaped body. Hard-rolling rollers of the designated type are known, for example, from DE 102 30 526 A1, see Fig. 2. But hard-rolling rollers of the designated type are also shown in WO 2005/023488 A1, see Fig.10 to Fig.12. The hard-rolling rollers mentioned are used interchangeably in the deep rolling tools and are loosely and rotatably guided in the cages. A cage of the designated type is known, for example, from DE 100 42 425 B4. When using the above-mentioned hard-rolling rollers in the deep rolling tools, it may happen that the hard-rolling rollers are clamped in an inverted position between the cages. The consequences are premature wear of the cage and the hard-rolling rollers and an incorrectly machined crankshaft.

Hence the resulting task for the present invention is to design a hard-rolling roller in such a way that it is always mounted in the prescribed, i.e. correct, mounting position in the deep rolling tool.

According to the invention, this task is solved by the fact that a cylindrical body rises on the upper end surface of one of the two central bodies.

From US 6,393,885 B1, hard-rolling rollers having different shapes are known in addition to the hard-rolling rollers of the type mentioned (see Fig. 3, Fig. 5a and Fig. 5b). Such hard-rolling rollers have a torus-shaped base body for deep rolling of radiuses or recesses which limit the bearing trunnions on the crankshafts on both sides, and two at least approximately truncated cone-shaped central bodies which rise on both sides of the base body, see Fig. 6 to Fig. 11. However, the known hard-rolling rollers are not intended to prevent improper installation. The design rather results from the fact that a broadened support surface at the guide roller has been

created for the torus-shaped base body which has to do most of the work at deep rolling. In this way, the deep rolling force no longer acts directly on the base body on the hard-rolling roller, but on the at least approximately truncated cone-shaped central bodies rising on either side of the base body; see Fig. 6.

The invention is described in detail below using a design example. The following views, each in enlarged scale, show:

- Fig. 1 Side view of a hard-rolling roller
- Fig. 2 Front view of the hard-rolling roller from Fig. 1
- Fig. 3 Different installation positions of the hard-rolling roller from Fig. 1

Hard-rolling roller 1 has a torus-shaped base body 2 for deep rolling of radiuses or recesses 14, 15 which limit the bearing trunnions 13 at the crankshafts (not shown) on both sides. The truncated cone-shaped central bodies 5 and 6 rise on both sides 3 and 4 of the base body 2. A cylindrical body 8 rises on the upper end surface 7 of the one central body 5. For example, the two central bodies 5 and 6 have differing heights 9 and 10. These height differences, however, are not absolutely necessary, so that the two heights 9 and 10 can also be the same. It is so that the height of central body 6 which does not support cylindrical body 8 can also be zero.

The cylindrical body 8, in turn, has a height 11 which is at least as high as the height 9 of the central body 5. However, it is preferable if the height 11 of the cylindrical body 8 is larger than the height 9 of the central body 5 which supports the cylindrical body 8. The diameter 12 of the cylindrical body 8 corresponds to the upper end surface 7 of the central body 5. Also to be noted is that the entire hard-rolling roller 1 is integrally designed with its base body 2, the central bodies 5, 6 and the cylindrical body 8. The hard-rolling roller 1 is made of a high-strength material.

Fig. 3 shows the differing installation positions of hard-rolling roller 1. First, any bearing trunnion 13 of a crankshaft is shown. The bearing trunnion 13 is limited on both sides by recesses 14 and 15, followed by the crank webs 16 and 17.

In the left half of Fig. 3, a hard-rolling roller 1 is shown in the correctly mounted position. On the right half of Fig. 3, a hard-rolling roller 1' is shown in an incorrectly

mounted position. In the correct mounted position of the hard-rolling roller 1, the cylindrical body 8 has enough space between the two adjacent cages 18. When looking at the mounted position corresponding to the right half of Fig. 3, one can see that the cylindrical body 8' of an incorrectly mounted hard-rolling roller 1' would protrude into the crank web 16. The insertion of a deep rolling tool 19 between crank webs 16 and 17 would therefore not be possible from the outset. For the sake of completeness, it should be mentioned that the base bodies 2 and 2' of the two hard-rolling rollers 1 and 1' are supported with within the deep rolling tool 19 on a guide roller 20, as is generally known.

List of reference numbers

1, 1'	Hard-rolling roller
2	Base body
3	Side
4	Side
5	Central body
6	Central body
7	Upper end surface
8, 8'	Cylindrical body
9	Height
10	Height
11	Height
12	Diameter
13	Bearing trunnion
14	Recess
15	Recess
16	Crank web
17	Crank web
18	Cage
19	Deep rolling tools
20	Guide roller

CLAIMS

1. Hard-rolling roller (1, 1') for a deep rolling tool (19) with a torus-shaped base body (2, 2') for deep rolling of radiuses or recesses (14, 15) which limit the bearing trunnion (13) on crankshafts on both sides and two at least approximately truncated cone-shaped central bodies (5, 6) rising on the two sides of (3, 4) of the base body (2, 2'), characterized in that a cylindrical body (8, 8') rises on the upper end surface (7) of one of the two central bodies (5, 6).

2. Hard-rolling roller according to claim 1, characterized in that the two central bodies (5, 6) have different heights (9, 10).

3. Hard-rolling roller according to claim 2, characterized in that the height (10) of the central body (6) is zero.

4. Hard-rolling roller according to claim 2, characterized in that the cylindrical body (8) does on the upper end surface (7) of the central body (5) having the larger height (9).

5. Hard-rolling roller according to claim 3, characterized in that the cylindrical body (8, 8') has the same diameter (12) as the upper connection face (7) of the corresponding central body (5).

6. Hard-rolling roller according to claim 3, characterized in that the cylindrical body (8, 8') has at least the same height (11) as the corresponding central body (5).

7. Hard-rolling roller according to claim 1, characterized in that the dimensions of the height (11) and the diameter (12) of the cylindrical body (8, 8') are set so that the deep rolling tool (19) collides with a crank web (16, 17) of the crankshaft in the case of incorrect mounting of a hard-rolling roller (1, 1').

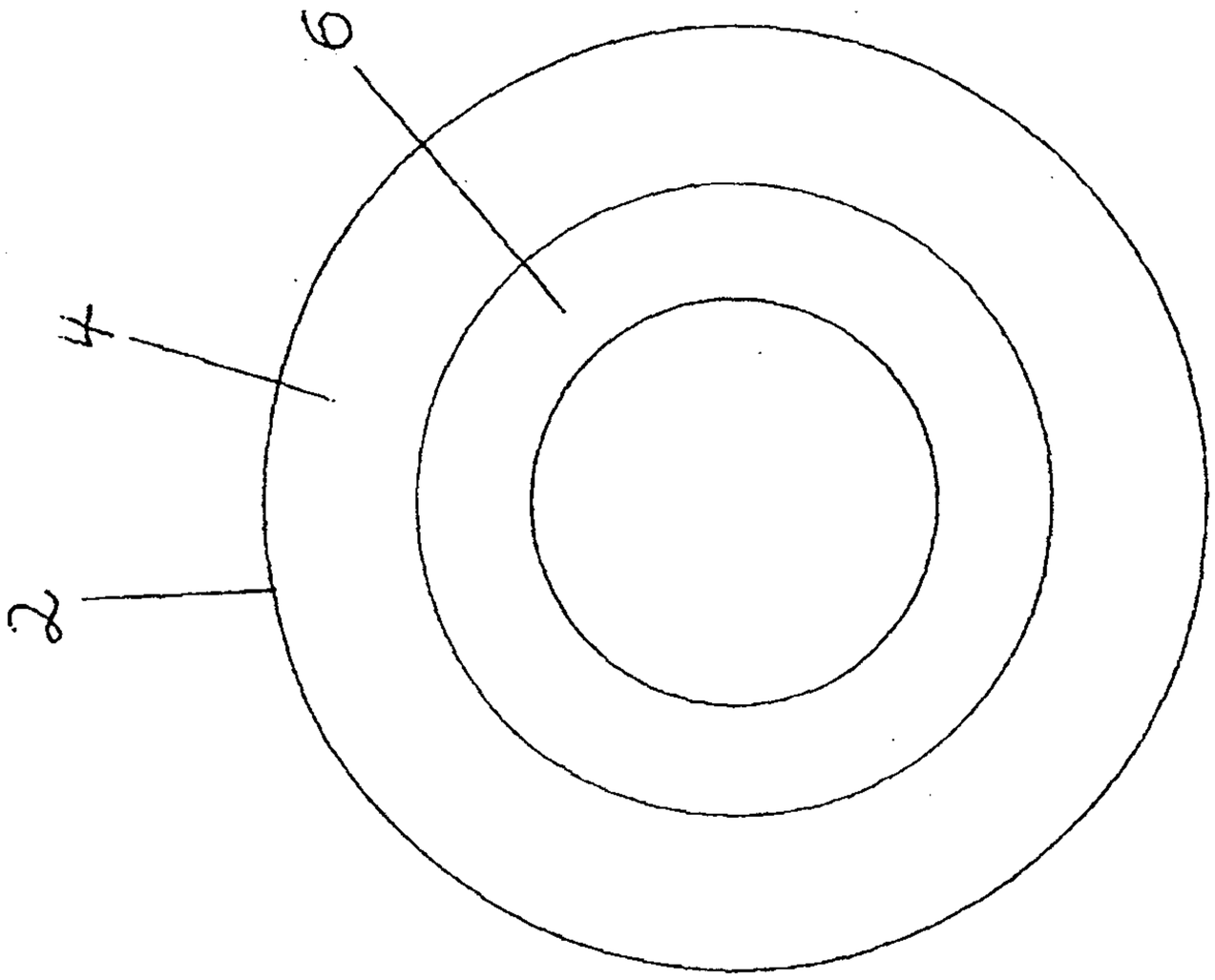

Fig. 2

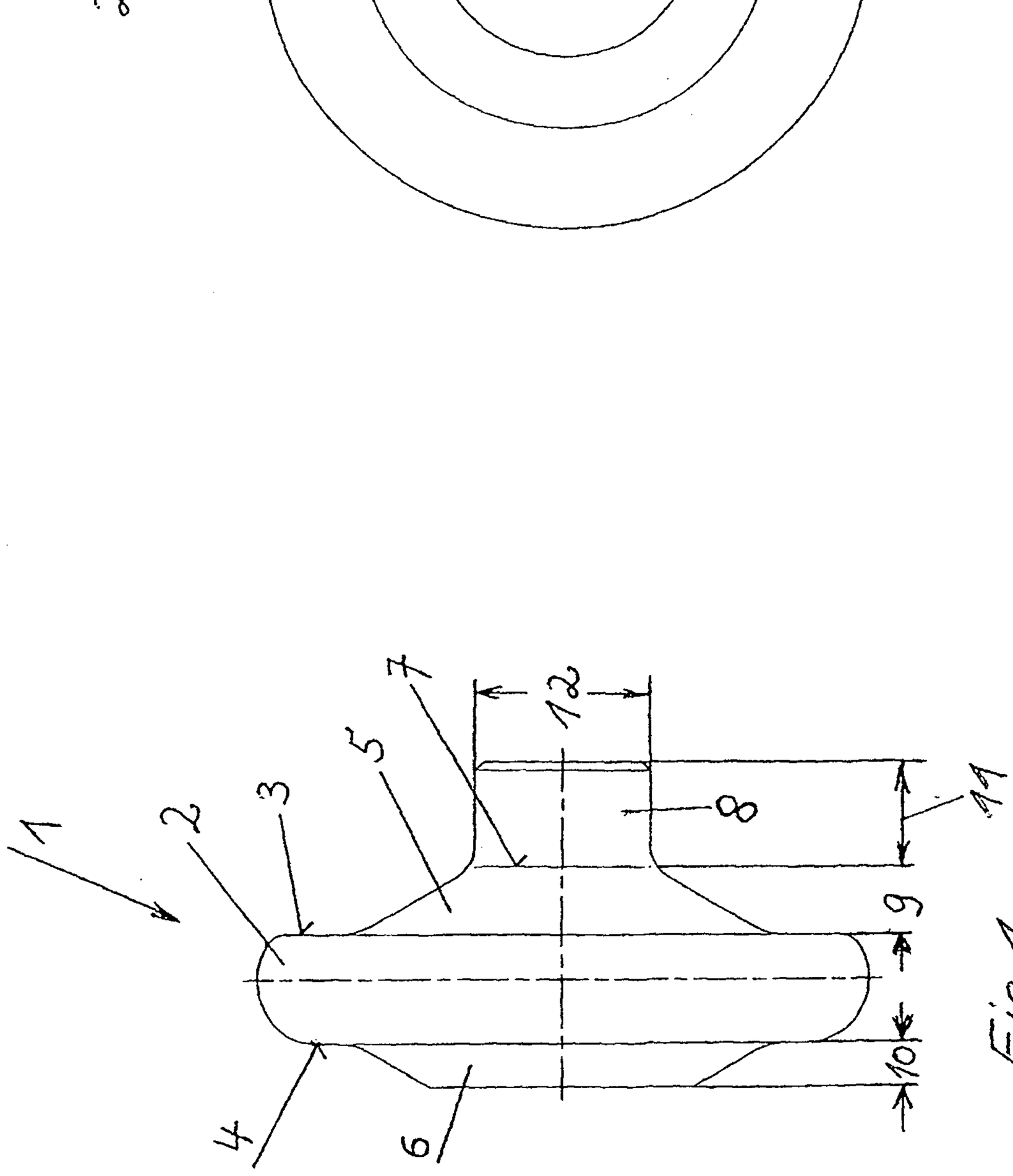

Fig. 1

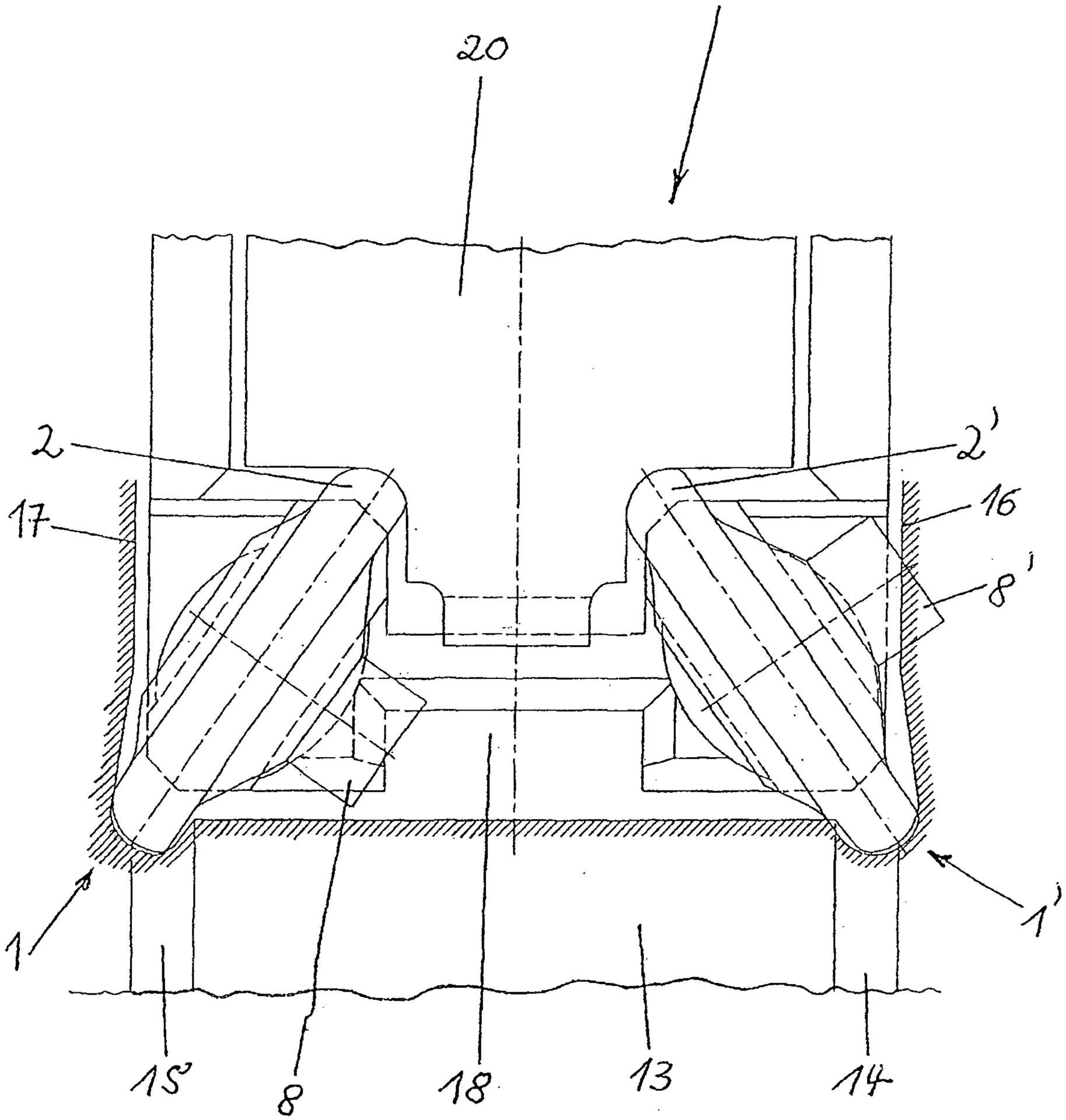

Fig. 3

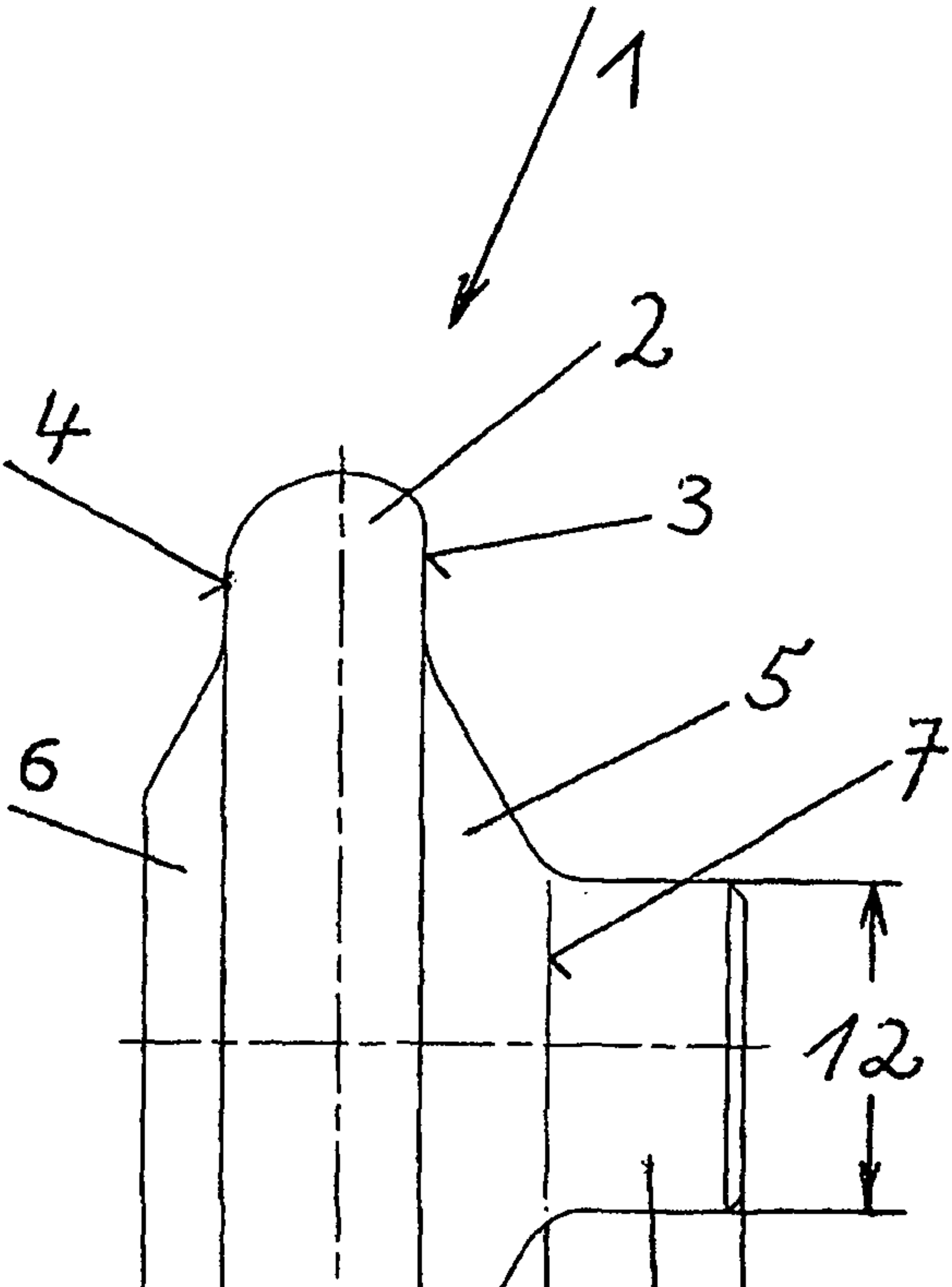

Fig. 1