

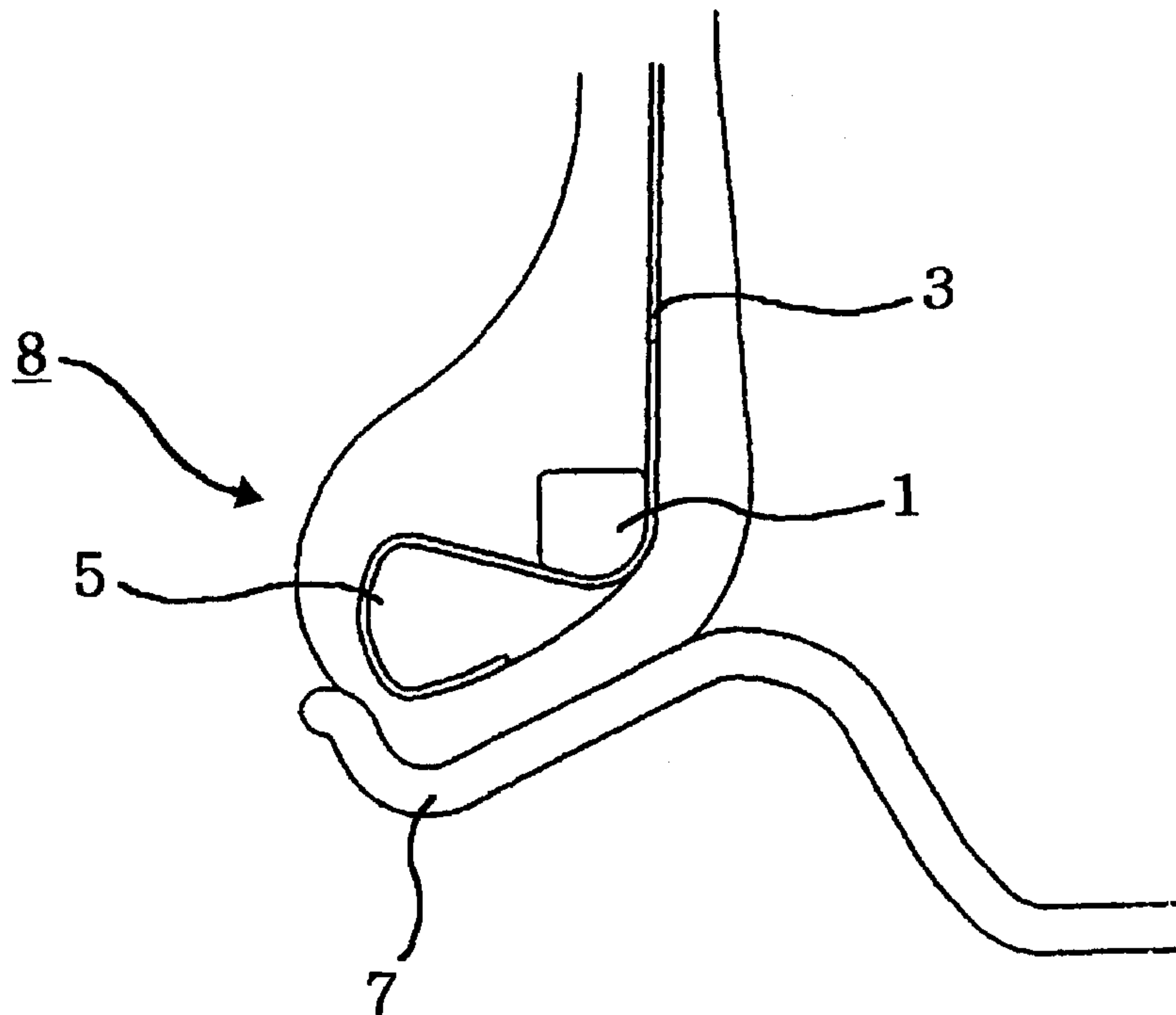


(86) Date de dépôt PCT/PCT Filing Date: 2001/08/31
(87) Date publication PCT/PCT Publication Date: 2002/10/03
(85) Entrée phase nationale/National Entry: 2003/09/19
(86) N° demande PCT/PCT Application No.: KR 2001/001483
(87) N° publication PCT/PCT Publication No.: 2002/076767
(30) Priorité/Priority: 2001/03/20 (2001/14259) KR

(51) Cl.Int.⁷/Int.Cl.⁷ B60C 9/02
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(54) Titre : PNEUMATIQUE

(54) Title: PNEUMATIC TIRE WITH REINFORCED BEAD PART



(57) Abrégé/Abstract:

The present invention relates to a pneumatic tire with rubber lump applied to the bead portion, and more particularly, to a pneumatic tire wherein bead portion is reinforced by applying rubber lump on the side surface of lower portion of bead with carcass ply, optionally together with flipper which provides reinforcement, spirally wound through upper, side and lower portion of said rubber lump to the arbitrary point of upper portion of said bead so that by minimizing the movement of bead by means of said carcass ply or flipper, bead portion of tire is not easily broken away from the rim when air is evacuated from a tire which is installed on a special rim that does not have flange or while driving with tire of low air pressure.



ABSTRACT

The present invention relates to a pneumatic tire with rubber lump applied to the bead part, and more particularly, to a pneumatic tire wherein bead part is reinforced by applying
5 rubber lump on the side surface of lower portion of bead with carcass ply, optionally together with flipper which provides reinforcement, spirally wound through upper, side and lower portion of said rubber lump to the arbitrary point of upper portion of said bead so that by minimizing the movement of bead by means of said carcass ply or flipper, bead portion of tire is not easily broken away from the rim when air is evacuated from a tire which is installed on
10 a special rim that does not have flange or while driving with tire of low air pressure.

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PNEUMATIC TIRE WITH REINFORCED BEAD PART**Technical field**

The present invention relates to a pneumatic tire with a rubber lump applied to the bead
5 part, and more particularly, to a pneumatic tire wherein bead part is reinforced by using a
rubber lump, and carcass ply or a reinforcing structure which encloses the rubber lump, to
minimize the movement of the bead so that the bead portion is not easily released from the
rim of the tire, especially the tire installed on the rim without flange, while driving under low
air pressure of tire.

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Background art

In conventional pneumatic tires, a wedge is installed at the side of the bead so that the
bead portion of the tire is not released from the rim when the tire is deflated or at low air
pressure. As one example of prior art, US Pat. No. 5,971,047 is illustrated in Fig. 1. As
15 shown in the figure, the upper part of carcass ply 3 winds a wedge 2 and is turned up, and
then spherical bead 1 is installed wound on the carcass ply. This art requires many
manufacturing steps and has many problems as described below.

First, the process of installing bead and wedge is very complicated, and there is a
possibility that the bead is released from the rim due to the movement of the spherical bead
20 applied when the tire is deflated. Moreover, since the hardness of the wedge 2 used is low,
about 95 or lower, the wedge 2 can be deformed partially on the portion suppressed by the
bead 1, and cannot perform desired role.

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Summary of the invention

The object of the present invention is to improve the bead portion of the pneumatic tire installed on the rim the toe of which is larger than the heel in diameter while not changing the function of the tire, and to provide a pneumatic tire which can prevent the bead portion from releasing from the rim when the tire is deflated so that car accidents can be prevented.

Brief description of drawings

Fig. 1 is a sectional view of the bead portion of a conventional tire,

Fig. 2 is a sectional view of the bead portion of a tire according to one embodiment of the present invention,

Fig. 3 is a sectional view according to another embodiment of the present invention, which inserts reinforcing structure in the bead portion, and

Fig. 4 a sectional view illustrating various embodiments of the present invention, in which two sheets of carcass ply are installed winding in various forms.

Explanation of marks in the figures

- | | |
|---|----------------|
| 1: bead, | 2: wedge |
| 3, 3a, 3a', 3b, 3b', 3c, 3c', 3d and 3d': carcass ply | |
| 4: flipper | 5: rubber lump |
| 6: flange | 7: bead sheet |
| 8: bead portion | |

Best mode for carrying out the invention

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To achieve the object as stated above, a rubber lump is installed at the side surface of a bead, and a carcass ply winds the rubber lump in the same direction or in various shape, so that the rubber lump and the carcass ply wound thereto prevent the bead portion from being released from the bead sheet of the rim when the tire is deflated.

5 The constitution of the pneumatic tire having reinforced bead part of the present invention will be described in detail with reference to the accompanying drawings.

Fig. 2 is a cross-sectional view of a tire according to one embodiment of the present invention, wherein a wedge-shaped rubber lump 5 having shore hardness of 95 ~ 100 is installed at the bottom of the bead in square shape in order to decrease movement of the bead
10 1 in the bead portion 8 mounted to the bead sheet 7 of the rim, and a carcass ply 3 winds from the upper end to the lower end of the bead, and then from the upper surface to the side surface and to the bottom surface of said rubber lump 5. It is much more effective for the carcass ply 3 to wind in above order than it winds in the order of bottom surface, the side surface and upper surface.

15 Now the process of manufacturing the bead part 8 in which the carcass ply 3 winds the rubber lump 5 will be described.

The carcass ply can be manufactured easily in the following manner: the rubber lump 5 winds at an arbitrary point of the molding drum, and one sheet of carcass ply 3 winds thereto, and the rubber lump 5 is turned down at both ends of the carcass ply 3 to wind the bead.

20 Accordingly, when the tire is deflated under-inflated while driving, the carcass ply 3 is pulled toward the side of the tire, and this force makes the carcass ply 3 push the bead 1 against the rubber lump 5. Then the rubber lump 5 is pushed to the rim and the bead 1 does not push rubber lump 5 any more. Therefore, the bead part 8 is not easily released from the rim because the bead part 8 is prevented from being released from the bead sheet 7.

Fig. 3 represents the pneumatic tire in which a flipper 4 is applied as a reinforcing structure. By using the reinforcing structure, the problem of prior art tire that the bead part of tire is moved to the wall area and released from the bead sheet 7 when the tire is deflated or is under-inflated while driving can be overcome. As illustrated in Fig. 3, the flipper 4 overlaps
5 the carcass ply 3 under the rubber lump 5, and expands along the side surface and upper surface of the rubber lump 5, and passes under the bead 1, and finally reaches above the bead 1 so that the bead 1 and the carcass ply 3 are not be deviated from the bead sheet 7 area.

The figures (a), (b), (c) and (d) of FIG. 4 are cross-sectional views of the bead part of tire illustrating other embodiments of the present invention, wherein two sheets of carcass ply
10 wind in various form in each bead part.

While one sheet of carcass ply is applied in the bead part of FIG. 2 and FIG. 3 respectively, two sheets of carcass ply are applied in the embodiments of Fig. 4; (a) two carcass plies 3a, 3a' wind to upper and lower part of the rubber lump 5, (b) two carcass plies 3b, 3b' wind to upper and lower part of the rubber lump 5 and meet and overlap at the side of
15 the rubber lump, (c) two carcass plies 3c, 3c' wind the rubber lump 5 overlapping on the upper surface of the rubber lump 5, one carcass ply winding to the middle of the side surface of the rubber lump 5 and the other carcass ply overlapping said carcass ply and winding side surface of the rubber lump 5 completely, (d) two carcass plies 3d, 3d' wind the rubber lump 5, one carcass ply winding via lower surface of the rubber lump 5 to the middle of the side
20 surface of the rubber lump 5 and the other carcass ply overlapping said carcass ply and winding the rubber lump 5 completely.

Industrial applicability

By using the pneumatic tire with reinforced bead part of the present invention in a tire
25 without flange, the bead part is not easily released from the rim when the tire is deflated or

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under-inflated while driving, and the function of the tire is not affected. Therefore, the car accidents caused by released bead part can be prevented.

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CLAIMS

What is claimed is:

- 5 1. A pneumatic tire with reinforced bead part, wherein a rubber lump 5 is installed at the side of lower portion of the bead 1 in the bead part 8, and a carcass ply 3 winds said rubber lump 5 in the order of one upper side of said bead 1, lower portion of the bead, upper surface, side surface and lower surface of said rubber lump 5.
- 10 2. A pneumatic tire with reinforced bead part, wherein a carcass ply 3 winds to the lower portion of the rubber lump 5, and a flipper 4, overlapping with said carcass ply 3 on said lower portion of the rubber lump 5, winds in the order of side surface and upper surface of the rubber lump, the lower end portion of the bead 1, and upper end portion of the bead 1.
- 15 3. A pneumatic tire with reinforced bead part, wherein two sheets of carcass ply wind around the rubber lump 5, one carcass ply winding the upper portion of the rubber lump 5, and the other carcass ply winding the lower portion of the rubber lump 5, and two carcass plies meet at the side of the rubber lump 5 and overlap.
- 20 4. A pneumatic tire with reinforced bead part, wherein two sheets of carcass ply wind around the rubber lump 5 overlapping on the upper surface of the rubber lump 5, one carcass ply winding to the middle of the side surface of the rubber lump 5 and the other carcass ply overlapping said carcass ply and winding side surface of the rubber lump 5 completely.

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5. A pneumatic tire having reinforced bead part, wherein two sheets of carcass ply wind around the rubber lump 5, one carcass ply winding via lower surface of the rubber lump 5 to the middle of the side surface of the rubber lump 5 and the other carcass ply overlapping said carcass ply and winding the rubber lump 5 completely.

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6. A pneumatic tire having reinforced bead part of one of claims 1 through 5, wherein the shore hardness of the rubber lump 5 is between 95 and 100.

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FIG. 1

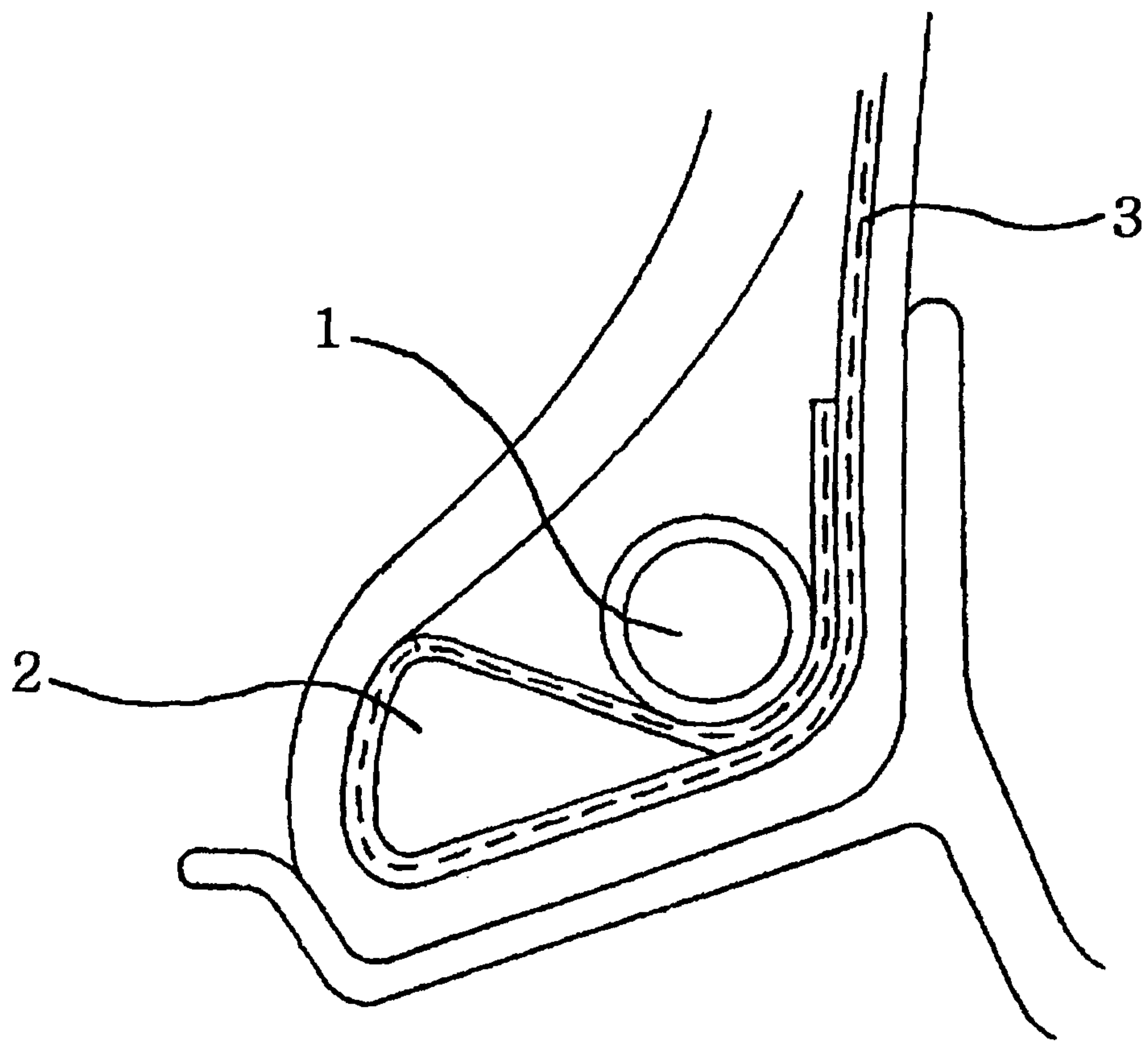


FIG. 2

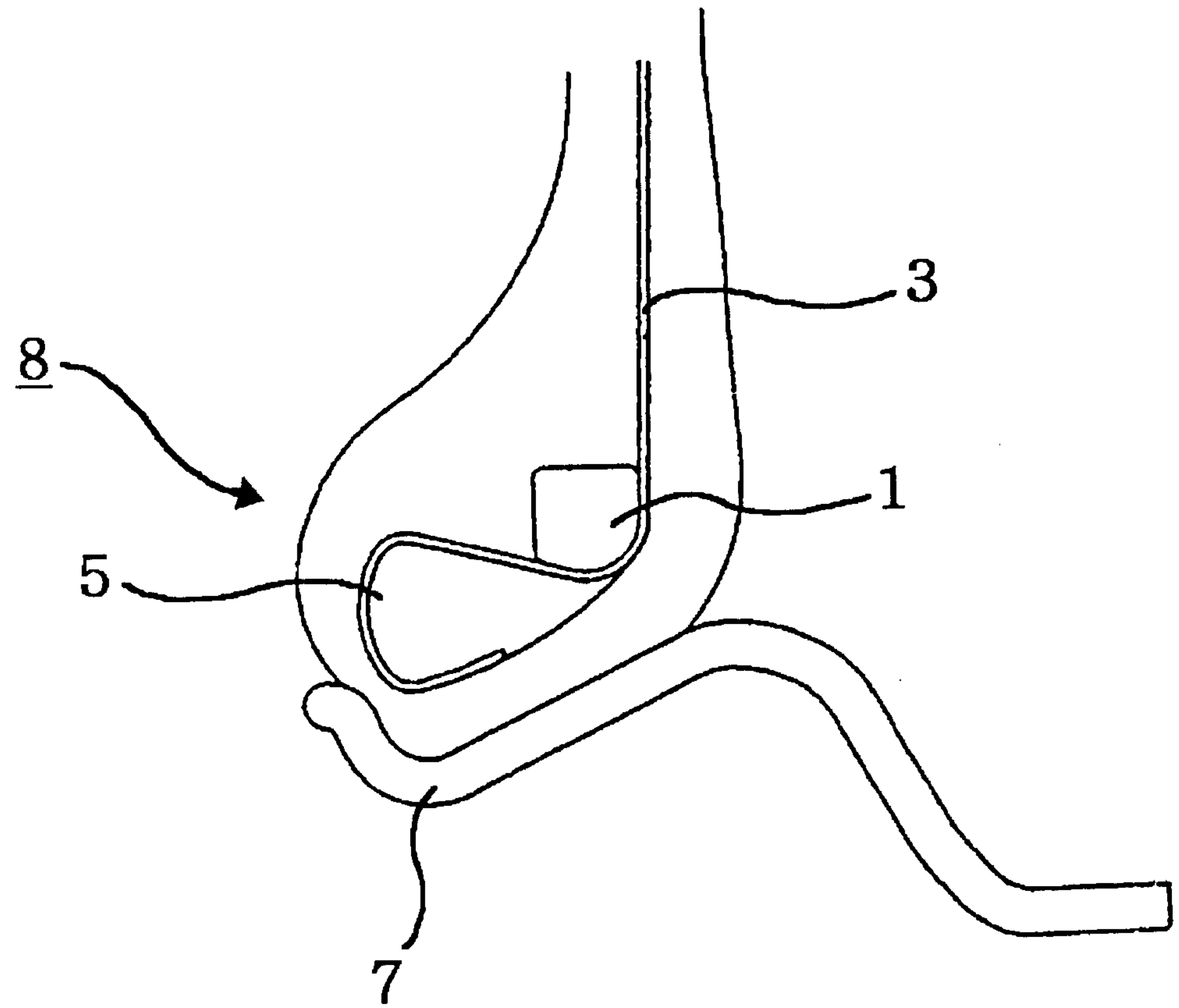


FIG. 3

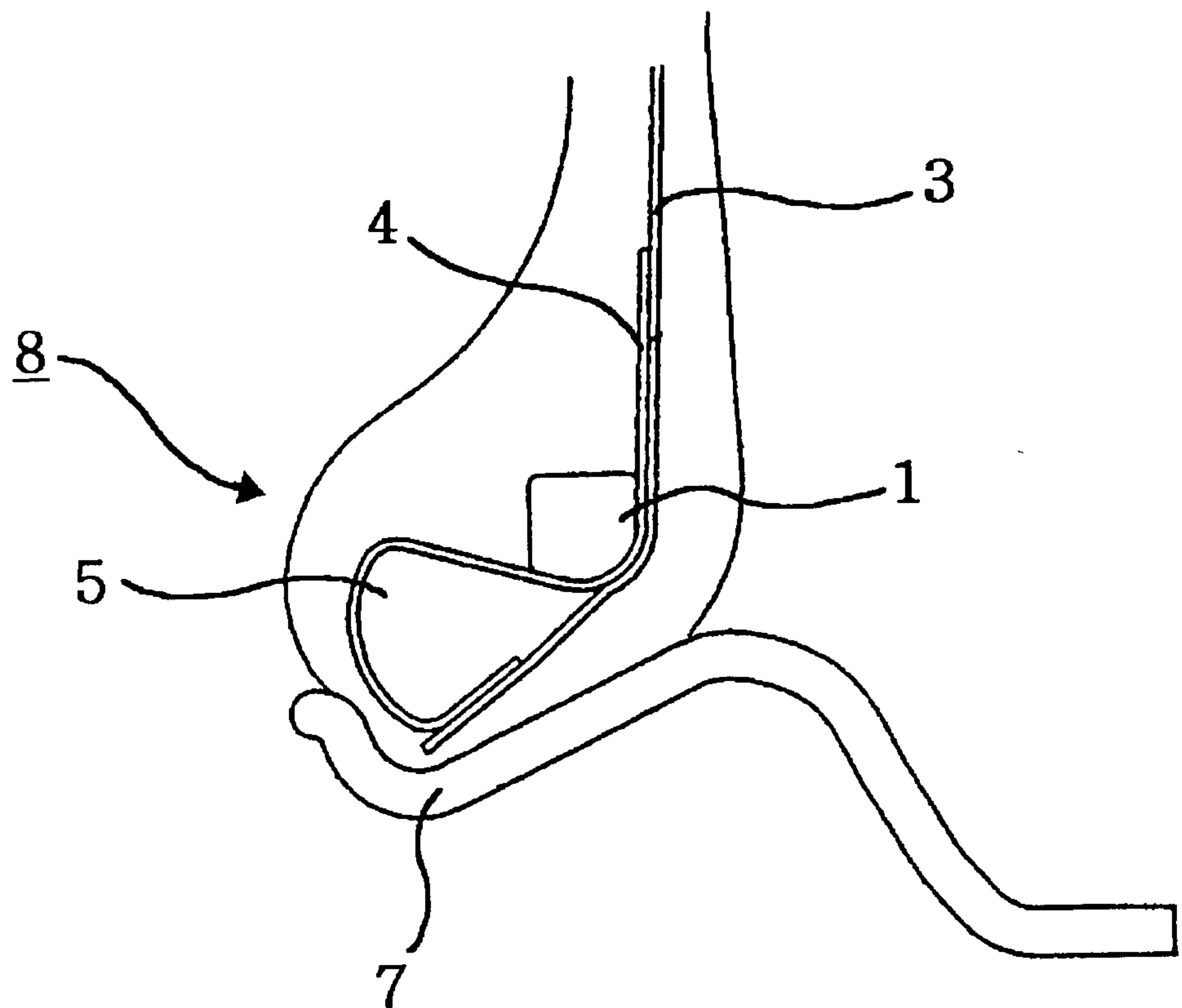
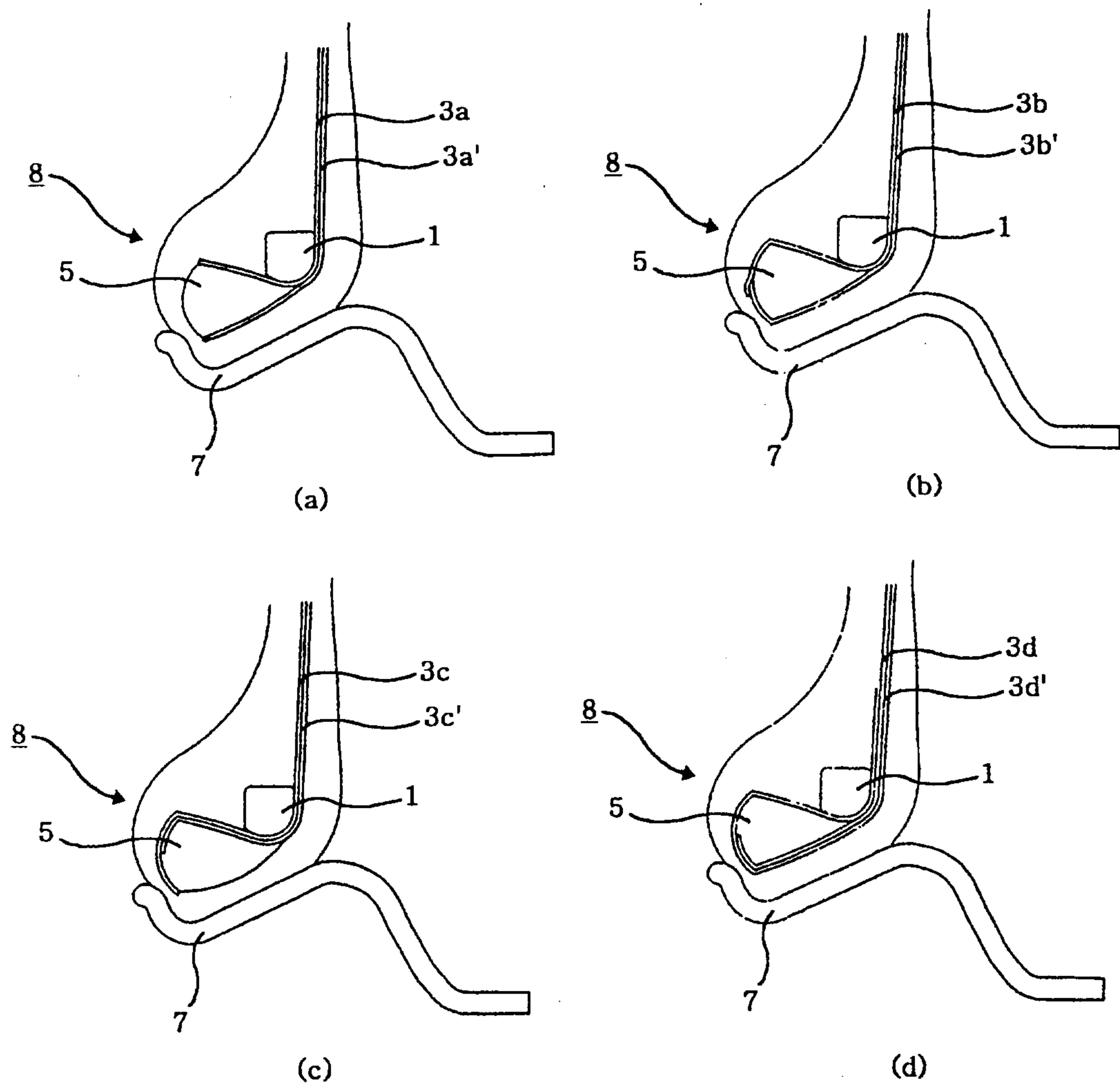


FIG. 4

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