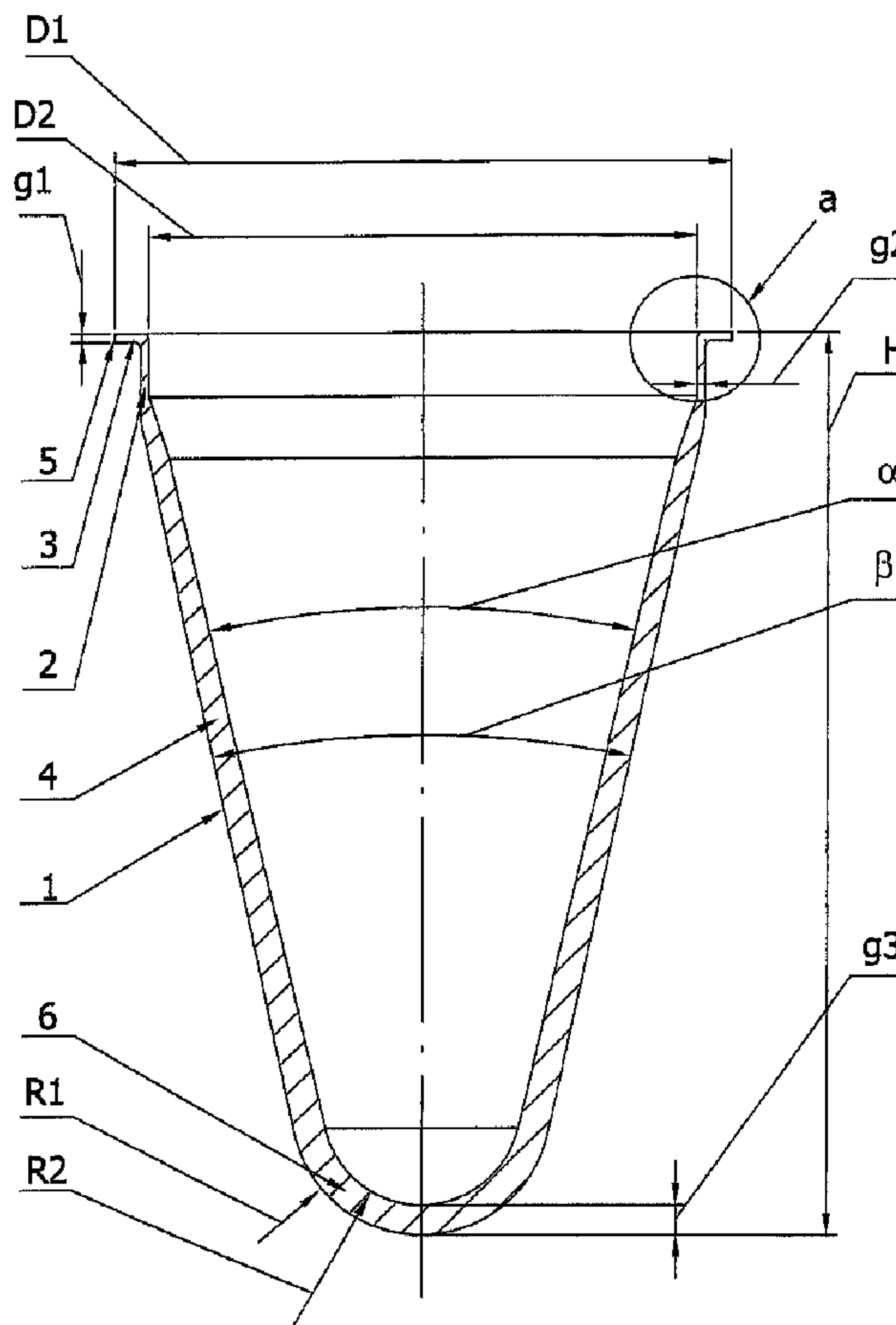




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 (72) Inventeurs/Inventors:
MILKOWSKI, BOGUMIL, PL;
LEWANDOWSKI, DARIUSZ, PL;
TOBOROWICZA, ANDRZEJ, PL
 (73) Propriétaire/Owner:
INVENTO SPOLKA Z O.O., PL
 (74) Agent: GOWLING LAFLEUR HENDERSON LLP

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 (54) Title: A PREFORM OF A PLASTIC CONTAINER PARTICULARLY FOR PACKAGING FOODSTUFFS



(57) Abrégé/Abstract:

This invention relates to the preform to produce a plastic container for packaging foodstuffs, and especially to blow mould thin-walled containers which can be hermetically closed with a metal lid by double seaming. The preform (1) includes a body (4) and a



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

convex hemispherical bottom (6). The body (4) has a conical shape that flares towards a cylindrical neck (2) surrounded by a flange (3) that terminates in a thickened rim (5). Preferably, the angle (α) at which the internal body surface (4) flares towards the cylindrical neck is greater than the angle (β) at which the external body surface (4) opens upwards, and the thickness (g2) of the cylindrical neck (2) is less than the thickness (g3) of the bottom (6).

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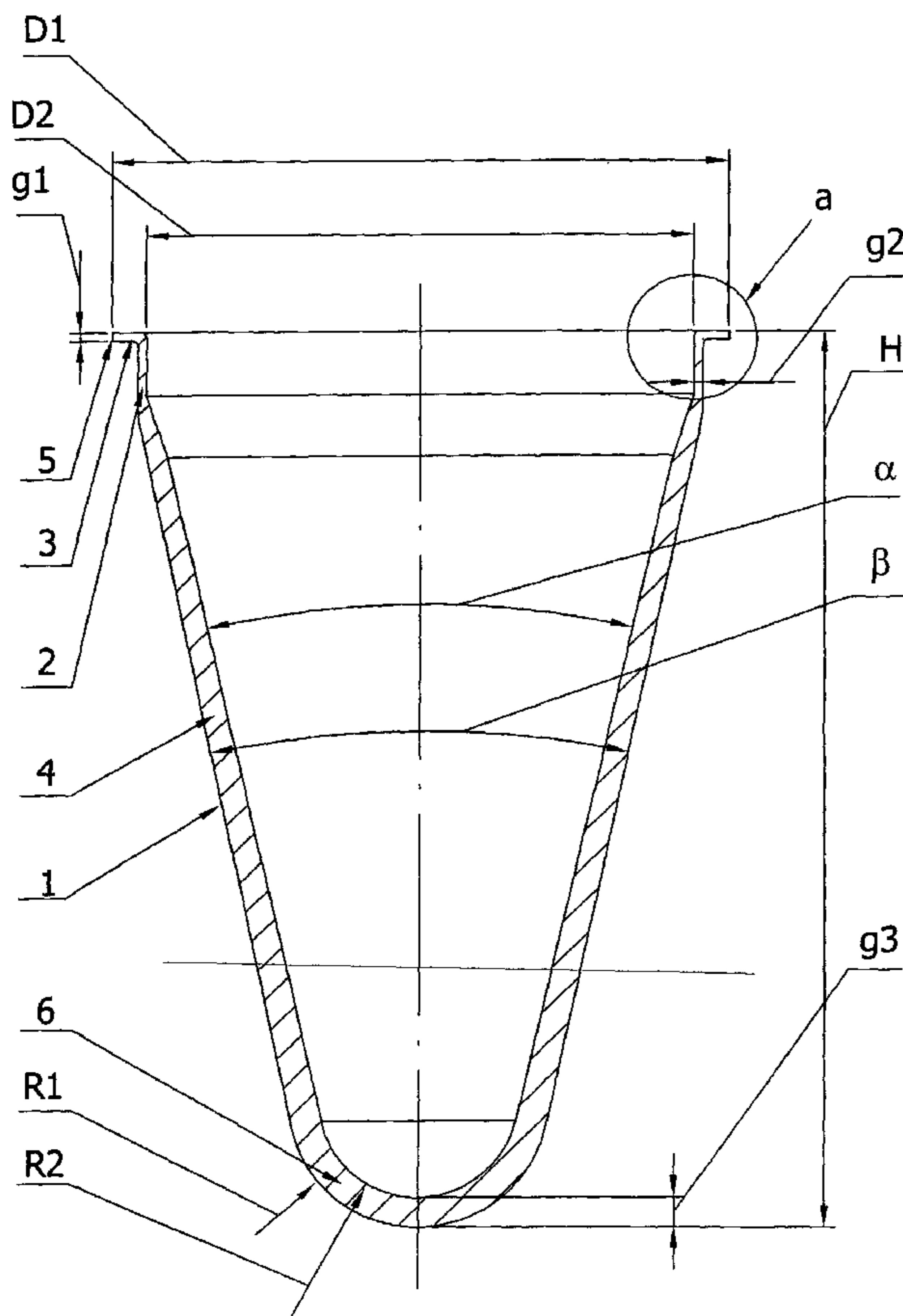
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- (71) Applicant (for all designated States except US): **IN-
VENTO SPOLKA Z O.O.** [PL/PL]; Ul. Wilcza 50/52
lok. 706, PL-00679 Warszawa (PL).
- (72) Inventors; and
(75) Inventors/Applicants (for US only): **MILKOWSKI,
Bogumil** [PL/PL]; Ul. Wojskiego 28, PL-80-119
Gdansk (PL). **LEWANDOWSKI, Dariusz** [PL/PL];
Ul. Korotynskiego 24/85, PL-02-123 Warszawa (PL).
TOBOROWICZA, Andrzej [PL/PL]; Ul. Hoza 42/49 m.
17, PL-00-681 Warszawa (PL).
- (74) Common Representative: **LEWANDOWSKI, Dariusz;**
Ul. Korotynskiego 24/85, PL-02-123 Warszawa (PL).
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[Continued on next page]

(54) Title: A PREFORM OF A PLASTIC CONTAINER PARTICULARLY FOR PACKAGING FOODSTUFFS



(57) Abstract: This invention relates to the preform to produce a plastic container for packaging foodstuffs, and especially to blow mould thin-walled containers which can be hermetically closed with a metal lid by double seaming. The preform (1) includes a body (4) and a convex hemispherical bottom (6). The body (4) has a conical shape that flares towards a cylindrical neck (2) surrounded by a flange (3) that terminates in a thickened rim (5). Preferably, the angle (α) at which the internal body surface (4) flares towards the cylindrical neck is greater than the angle (β) at which the external body surface (4) opens upwards, and the thickness (g_2) of the cylindrical neck (2) is less than the thickness (g_3) of the bottom (6).

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Declarations under Rule 4.17:

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

DESCRIPTION AMENDED UNDER ART. 34**A preform of a plastic container particularly for packaging foodstuffs****The field of the invention**

This invention relates to the preform of a plastic container particularly for packaging foodstuffs. This preform is formed using the conventional injection moulding machinery and utilised to form plastic containers, such as cans, for packaging foodstuffs, and especially to blow mould thin-walled containers which can be hermetically closed with a metal lid secured to the container by seaming the lid flange on filling machines, without deforming the flange or the cylindrical neck under it.

The state of art

The Polish patent application no. P 336 680 A1 relates to a plastic preform designed for forming thin-walled containers. The preform has a threaded neck and a cylindrical body terminated with a convex hemispherical bottom. The body diameter of this preform is 0.5 to 0.85, and the body wall thickness is 0.08 to 0.18, of the neck diameter.

It has been known for some time how to form thin-walled containers terminated with a flange by blow moulding the conventional preform and then severing the top portion of the container including a threaded neck. In this way immense amounts of scrap are produced, which the result that the whole process is highly uneconomical. Furthermore, this method leaves much uncertainty about the reliability of the closure, including its tightness and resistance to pressures inside the container. The edge of the container flange may become nicked by cutting operations and its thickness may vary along the circumference, which is normal as the flange is blow moulded as a part of the side wall of a larger container.

In order for the closure of the plastic container to be tight under pressure, it would be best if the container was formed by a stretch blow moulding process from the injection moulded preform. Patent EP 0482652B1 describes a cylindrical preform with a flat bottom, wherein the bottom is much thinner than the preform walls that gradually slightly part. Due to the fact that the flow of material is hindered, it is impossible to achieve the flange thickness that is below 0.3 mm. The preform flange is smooth and does not have a thickened rim.

Patent WO-A 83/01766 presents a preform, which is generally cylindrical in shape and slightly tapers in the downward direction; its walls and bottom have the same thickness. The flange is smooth and does not have a thickened rim. It has been noted in the document that it is impossible for one to achieve a good degree of material orientation in the flange of such preform; hence, its strength is insufficient for good quality connection between the metal lid and the container.

The document US 4 751 035 A presents a multi-layer preform where the transition between the

conical and cylindrical parts takes the form of a step down, while the flange is relatively thick (0.6 mm). The above-mentioned multi-layer preform solves the problem of multi-layer injection, while it fails to achieve the required optimal flange parameters. It is evident that neither the neck nor the flange are affected by the blow moulding process and that they should emulate the neck and flange shape of a metal can as closely as practicable, in order to enable closing using a typical metal lid. This problem was solved by the invention presented herein, which allows one to obtain a thin, elastic and strong flange by the injection of the moulding of the preform, that is suitable for double seaming of a metal lid using typical closing machines. The route along which the plastic material flows during the injection moulding of the preform performs a decisive impact on the mechanical properties of the flange. A thickened rim on the preform flange also plays an important role. Not only does it improve the hermetic connection between the metal lid and the flange but it also prevents the thin flange from slipping out of the lock.

The summary of the invention

A preform of a plastic container designed particularly for packaging foodstuffs comprising a conically-shaped container body with a convex hemispherical bottom, which flares towards a cylindrical neck, characterised by the single-layer body in which the external diameter of the cone as measured at the point of connection with the cylindrical part is equal to the external diameter of the cylindrical part, where the cylindrical part ends with a flange terminated in a thickened rim). The opening angle of the internal conical surface of the body is greater than the opening angle of the external conical surface of the body; hence, the bottom is the thickest part of the container body and the cylindrical neck is significantly thinner than the bottom. The inflow of the material to the neck space and then to the flange is easy. This is due to the fact that the bottom at the injection point is relatively thick, the walls are appropriately inclined and their thickness tapers in a favourable manner. The material flow velocity in the mould is relatively high during the forming process with the result that the time taken by the material to reach the preform peripheries, including the flange, is short and a decline in temperature of the flowing material is much lower, which allows for appropriate filling and orientation and ensures a far better flange strength. In this way, it is possible for the flange thickness to be less than 0.25 mm, which is required for good quality seaming of the metal lid. The flange has a good degree of material orientation, is elastic and strong. The best seaming quality is achieved when there is a gradual change in thickness between the cylindrical neck and the flange and the transition between these two elements is arched. Preferably, the ratio of the flange thickness to the cylindrical neck thickness should be approximately 0.8.

Furthermore, in order to ensure that the container metal lid fits precisely into the flange rim, it is desirable that the angle between the flange and the cylindrical neck is $180^\circ - \gamma$, where γ lies within a range of 60° to 90° , and most preferably equals 78° .

In order for the seaming operation to ensure a good quality connection between the pressure container and the metal lid, the flange should terminate in a thickened annular rim showing on one or both sides of the flange ending. The height of the annular thickened rim should vary from 1.1 to 2.0 of the flange thickness.

The brief description of the drawings

The present invention has been described in greater detail below in its advantageous examples of embodiments with reference to the enclosed drawings. Fig. 1 presents an axial sectional view of the preform. Fig. 2 presents an enlarged picture of the preform flange with a double-sided annular thickened rim. Fig. 3 presents an enlarged picture of the preform flange with a one-sided annular thickened rim on top of the flange. Fig. 4 presents an enlarged picture of the preform flange with a one-sided annular thickened flange rim underneath the flange. Fig. 5 presents an enlarged picture of the preform flange with rectangular flange ending.

The most efficient version

As shown in Fig. 1, the preform 1 of a plastic container particularly for packaging foodstuffs, includes a body 4 with a convex hemispherical bottom 6. The body 4 has a conical shape that opens upwards and ends with a cylindrical neck 2 surrounded by a radially outwardly extended flange 3 terminated in a thickened rim 5. The thickness of the body 4 decreases gradually starting from the bottom 6; therefore, the thickness g_2 of the cylindrical neck 2 as measured at any point along the cylindrical wall is significantly less than the thickness g_3 of the bottom 6. The flange thickness g_1 as measured at a distance of approximately 5 mm from the flange end (preferably app. 0.20 mm) is less than 0.25 mm.

Fig. 2 shows an enlarged rim 5 of the flange 3 of the preform 1 which is deviated from the cylindrical neck at an angle of $180^\circ - \gamma$, where γ lies within a range of 60° to 90° . The flange 3 terminates in an annular thickened rim 5a on both its sides. The height h of the thickened rim 5a varies from 1.1 to 2.0 of the flange thickness g_1 .

Fig. 3 shows an enlarged rim 5 of the flange 3 of the preform 1 which is deviated from the cylindrical neck at an angle of $180^\circ - \gamma$, where γ lies within a range of 60° to 90° . The flange 3 terminates in a one-sided annular thickened rim 5b on the top of it. The height h of the thickened rim 5b varies from 1.1 to 2.0 of the flange thickness g_1 .

Fig. 4 shows an enlarged rim 5 of the flange 3 of the preform 1 which is deviated from the cylindrical neck at an angle of $180^\circ - \gamma$, where γ lies within a range of 60° to 90° . The flange 3

terminates in a one-sided annular thickened rim 5c underneath it. The height h of the thickened rim 5c varies from 1.1 to 2.0 of the flange thickness g1.

Fig. 5 shows an enlarged rim 5 of the flange 3 of the preform 1 which is deviated from the cylindrical neck at an angle of $180^\circ - \gamma$, where γ lies within a range of 60° to 90° . The flange 3 terminates in a rectangular rim 5d whose height h is generally equal to the flange thickness g1. The preform 1 in the described embodiment has typical external dimensions D1 (max. diameter and H (height) is made of polyethylene terephthalate (PET), a thermoplastic material specifically designed for packaging foodstuffs. When using the subject preform to blow mould a thin-walled container, the diameters D1 and D2 of the cylindrical neck 2 and the flange 3 do not change. A relatively small flange thickness allows for a better fit of the metal lid at the first stage of the double seaming process. The thickening of the flange rim ensures a good closure of the container body at the second stage of the double seaming process and also prevents the thin flange from slipping out of the lock..

WHAT IS CLAIMED IS:

1. A preform of a plastic container particularly designed for packaging foodstuffs comprising a container body (4) with a convex hemispherical bottom (6), which has a conical shape that opens upwards and ends with a cylindrical neck (2) surrounded by a flange (3) terminated in a rim (5), characterised in that the thickness (g1) of the flange (3) surrounding the cylindrical neck (2) is less than 0.3 mm.
2. A preform as claimed in Claim 1, characterised in that the thickness (g1) of the flange (3) is less than or equal to the thickness (g2) of the cylindrical neck (2).
3. A preform as claimed in Claim 1 or 2, characterised in that the rim (5) of the flange (3) has a annular thickening (5a) on top and underneath it, or ring-like one-sided thickening (5b) on top of it, or ring-like one-sided thickening (5c) underneath it, whose height (h) varies from 1.1 to 2.0 of the thickness (g1) of the flange (3).

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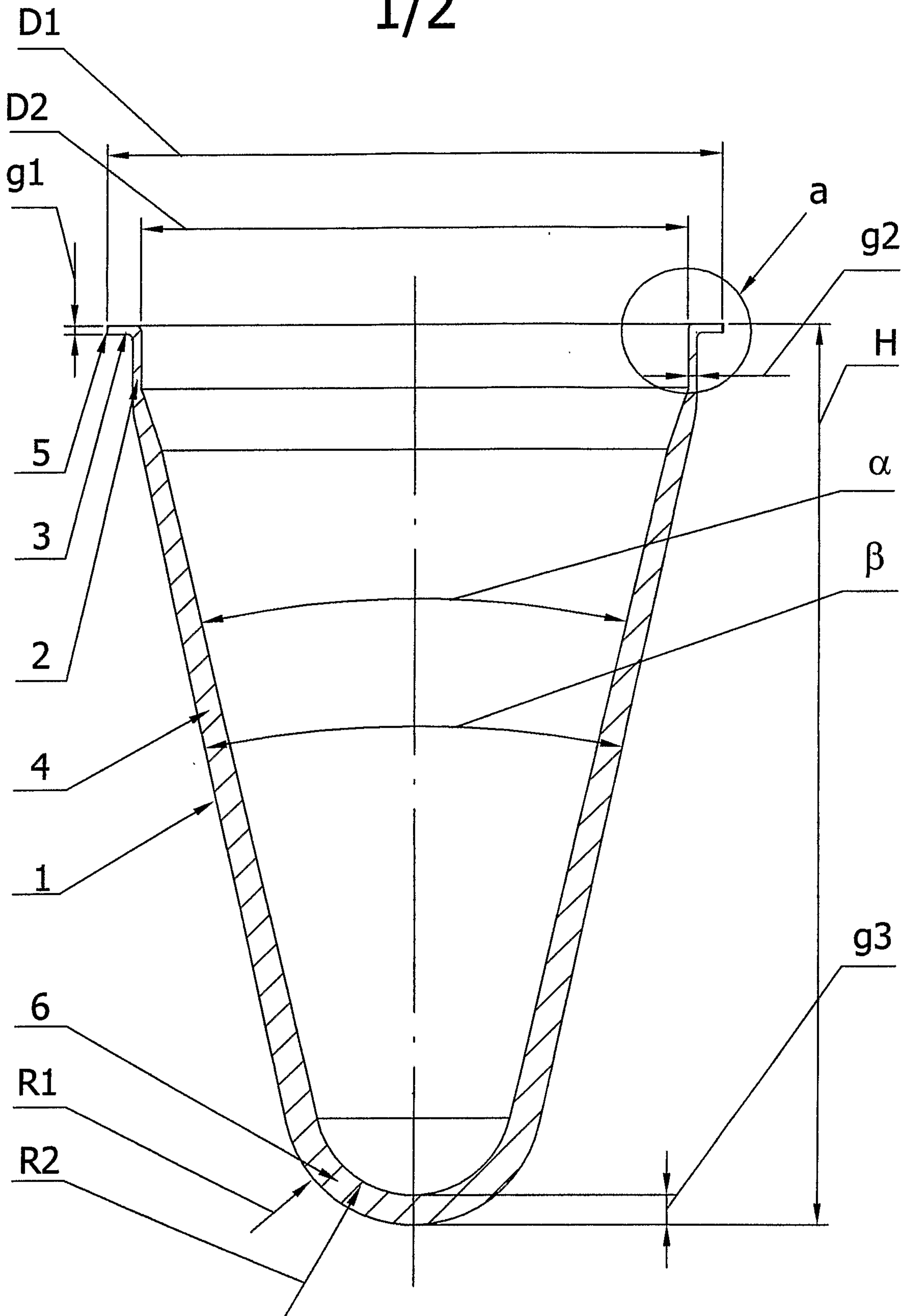


FIG. 1

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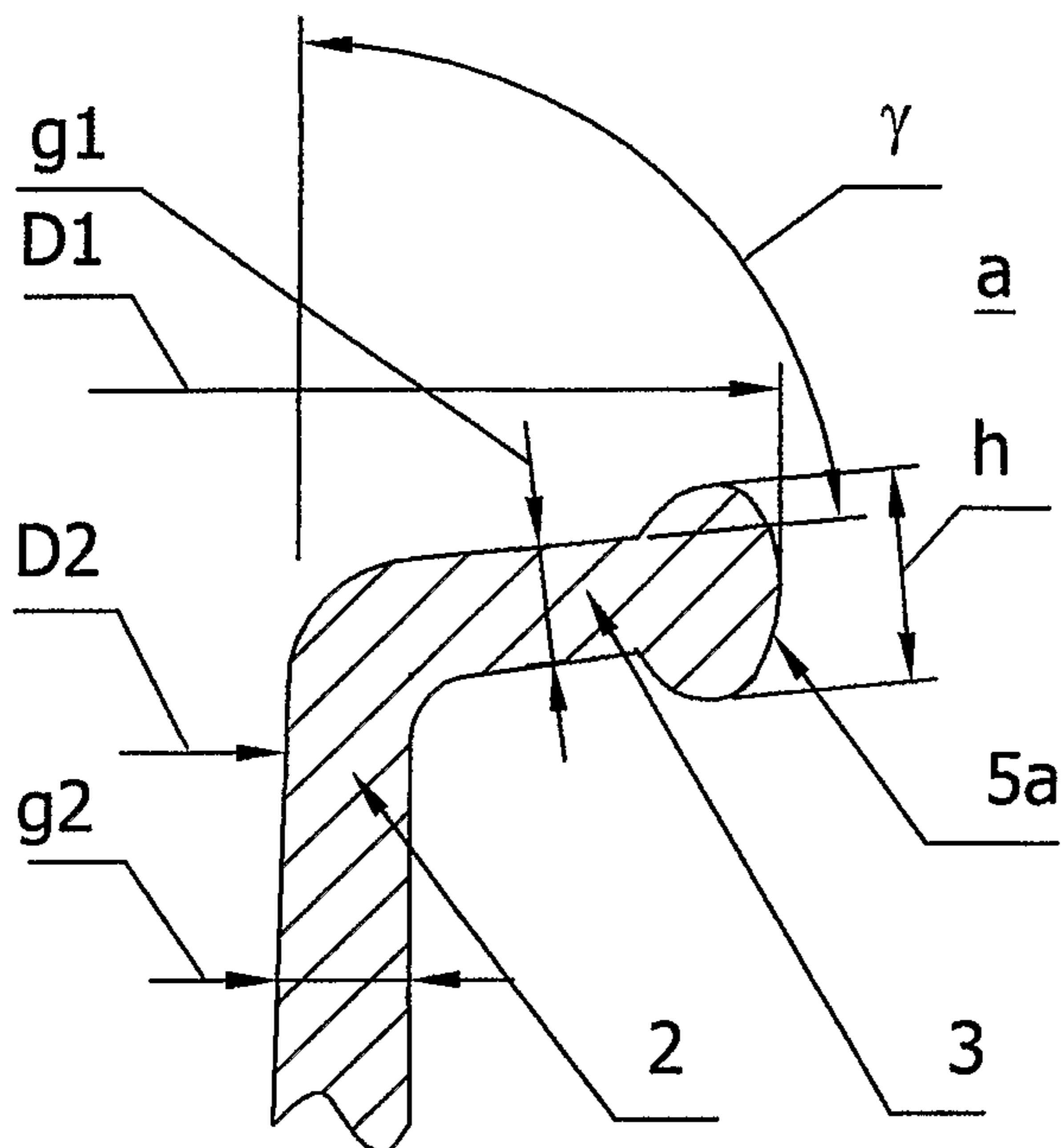


FIG. 2

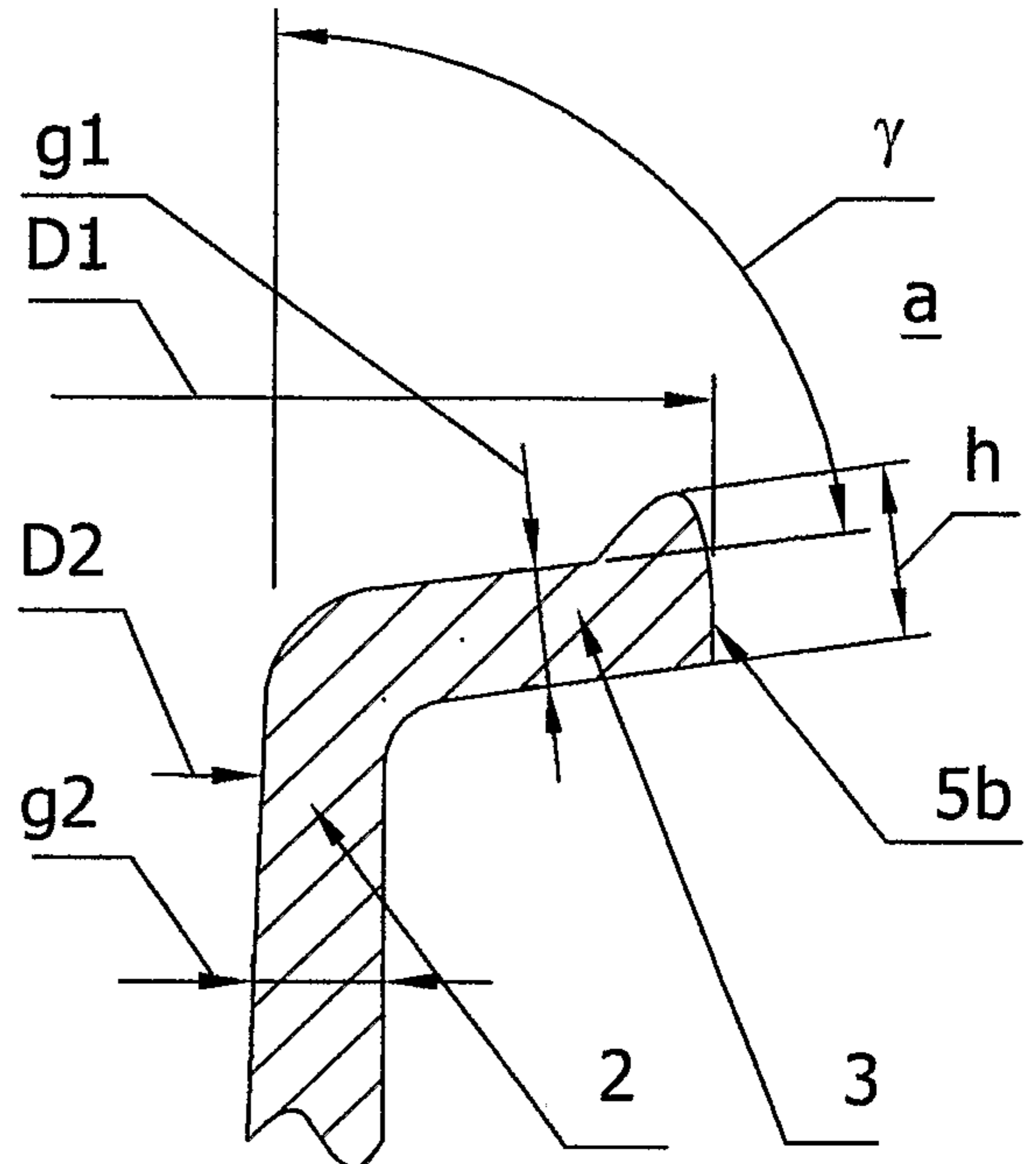


FIG. 3

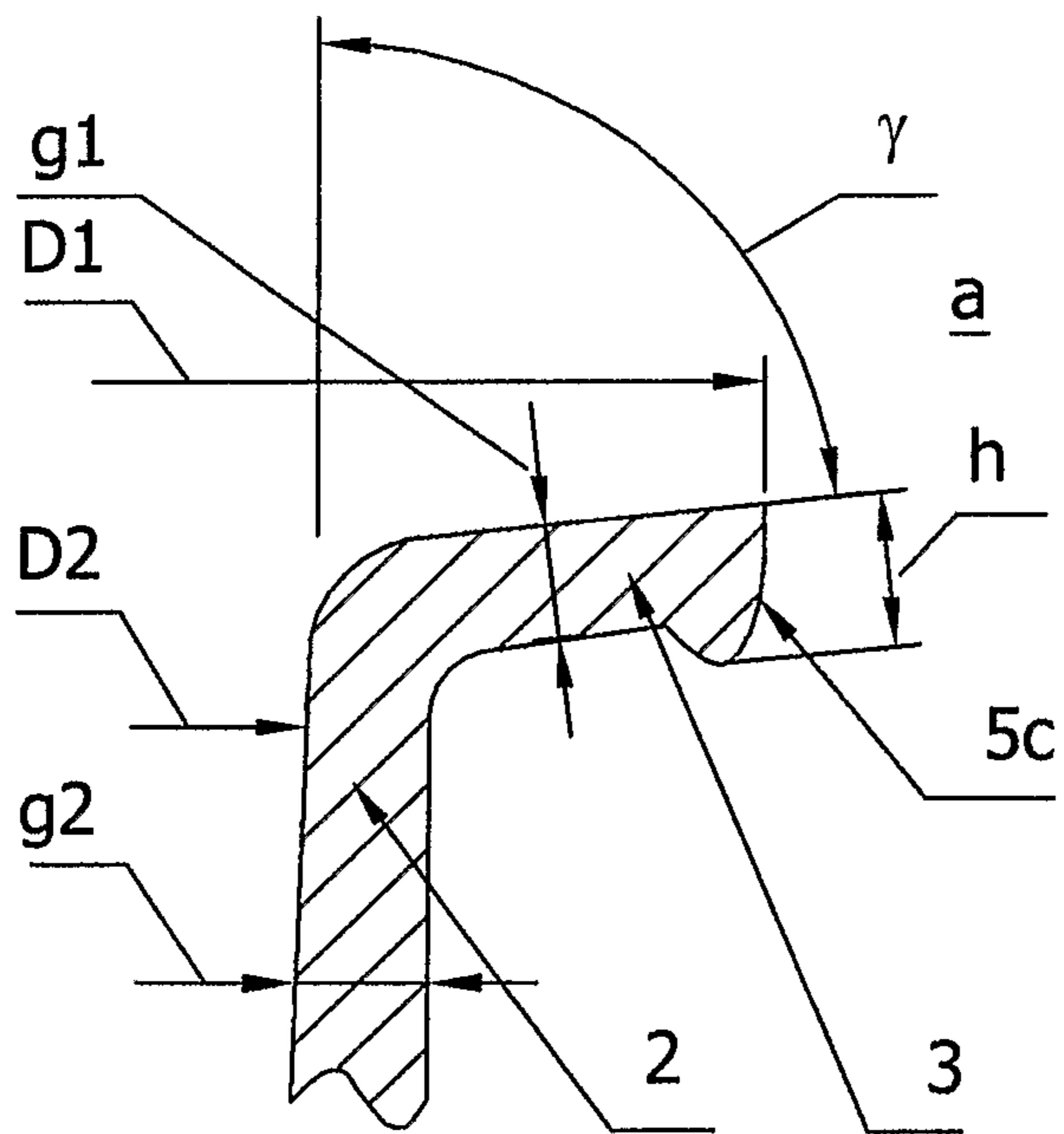


FIG. 4

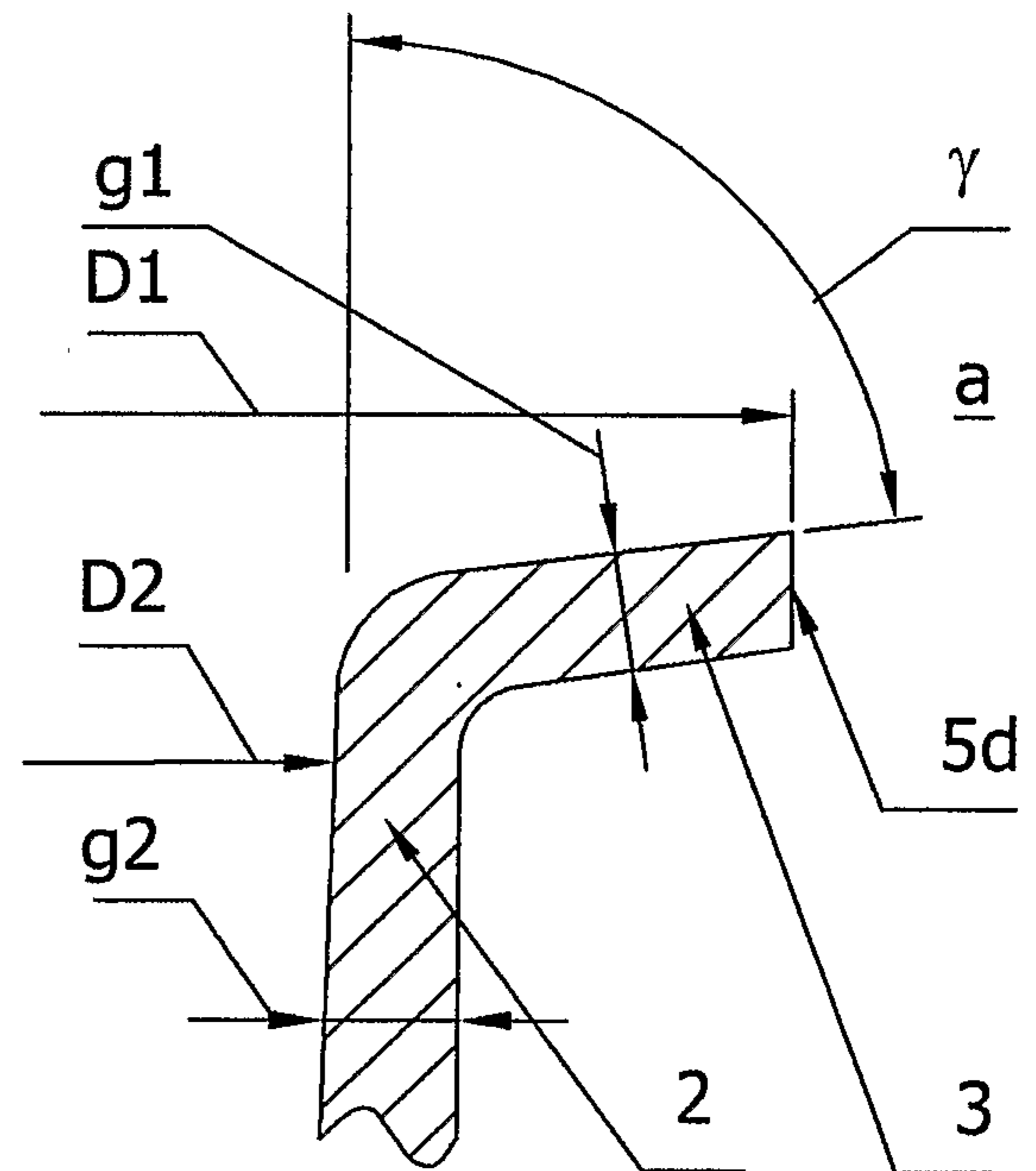


FIG. 5

