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(54) **Crash-helmet for motorcyclists**

Sturzhelm für Motorradfahrer

Casque de protection pour motocyclistes

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(56) References cited:
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US-A- 4 689 836

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Description

[0001] The present invention relates to a crash-helmet for motorcyclists.

[0002] More particularly it relates to a crash-helmet comprising a shell, a visor and a mouth-guard. The visor is pivotally mounted on the shell and is able to rotate between a lowered (closed) position and a raised (open) position. The mouth-guard is also pivotally mounted on the shell and is able to rotate between a lowered (closed) position and a raised (swung-back) position.

[0003] In some helmets the mouth-guard and the visor have a common axis of rotation and travel along circular trajectories having either the same radius or different radii. In the first case, the movement of the visor depends on that of the mouth-guard and therefore it is not possible to lower the visor while keeping the mouth-guard raised. In the second case, the movements of the mouth-guard and the visor are independent, but between mouth-guard and visor there remains a slit which requires the use of seals. With the passing of time, these seals deteriorate, resulting in the infiltration of air and water.

[0004] These problems are solved by a crash-helmet which has been recently proposed and in which mouth-guard and visor rotate about respective pins which are mounted on the shell, suitably spaced from one another, and travel along different circular trajectories. In one embodiment of this helmet, the circular trajectories of the visor and the mouth-guard intersect in such a way that, when the visor and the mouth-guard are lowered at the same time, the bottom edge of the visor and the top edge of the mouth-guard fit together. This helmet has the double advantage of allowing independent raising of the visor and the mouth-guard and enabling them to fit together in the lowered position as disclosed in European Patent No. 0 953 300 which was filed in the name of the same Applicant.

[0005] It has now been found that this helmet may be further improved.

[0006] Therefore, the present invention relates to a crash-helmet for motorcyclists, comprising a shell, a visor and a mouth-guard, said visor and said mouth-guard being rotatably supported on said shell so as to rotate about respective rotational pins having axes which are suitably spaced apart, said visor and mouth-guard travelling along circular trajectories which intersect so as to superimpose a bottom edge of said visor and a top edge of said mouth-guard in a position where both are simultaneously lowered, characterized in that said visor is provided with first engagement means and said mouth-guard is provided with second engagement means, said first and second engagement means being designed to co-operate, over a predetermined circumference arc of said circular trajectories, so that said mouth-guard causes partial raising of said visor when said mouth-guard is lowered.

[0007] Preferably, said first engagement means are formed by at least. one relief integral with said visor and said second engagement means are formed by at least one projection integral with said mouth-guard.

[0008] Advantageously, said relief is positioned on said visor so as to be situated at a predetermined distance from said axis of said rotation pin of said mouth-guard along said predetermined circumference arc, said predetermined distance being approximately equal to the distance at which the furthest portion of said projection is situated from the axis of said pin for rotation of said mouth-guard such that said portion of said projection is in contact with said relief along said circumference arc.

[0009] According to a preferred embodiment, said relief on said visor has a curved shape.

[0010] According to another embodiment, said relief on said visor has a substantially rectilinear shape.

[0011] According to an embodiment, said projection on said mouth-guard has an oblong shape.

[0012] According to another embodiment, said projection on said mouth-guard has a circular shape.

[0013] Preferably, said mouth-guard has a top edge on which a bottom edge of said visor rests.

[0014] Advantageously, said mouth-guard also has an edge substantially perpendicular to said top edge and designed to improve the seal in the zone where said visor and said mouth-guard are joined together.

[0015] When the helmet according to the invention is worn by a motorcyclist with the visor lowered and the mouth-guard raised, in order to lower the mouth-guard it is sufficient for the motorcyclist to rotate it downwards. In fact, the mouth-guard, during the lowering operation, causes partial raising of the visor, by means of the co-operation of the first and second engagement means, thus preventing the visor from interfering with the mouth-guard and hindering complete lowering thereof. In other words, with the helmet according to the invention, when the visor is lowered, lowering of the mouth-guard is so simple, rapid and safe that it can also be performed by the rider using only one hand while the motorcycle is moving.

[0016] Characteristic features and advantages of the invention will now be described with reference to embodiments shown by way of a nonlimiting example in the accompanying drawings, in which:

- Fig. 1 is a left-hand side view, in the condition when worn, of a crash-helmet with a visor and a mouth-guard according to the invention;
- Figs. 2-8 show different positions assumed by the visor and the mouth-guard of the helmet of Fig. 1;
- Fig. 9 is a view, on a smaller scale, of the helmet of Fig. 1, in which circular trajectories of the visor and the mouth-guard are shown;
- Fig. 10 is a partial cross-sectional view taken along the plane X-X of Fig. 1;
- Fig. 11 is a partial cross-sectional view taken along the plane XI-XI of Fig. 10;

- Fig. 12 shows a variation of engagement means of the helmet of Figs. 1-11.

[0017] Figs. 1-9 show a left-hand side view, in the condition when worn, of a crash-helmet 1 for motorcyclists. The right-hand side view of the helmet 1 is a mirror-image. The helmet 1 comprises a jet-type (or "open-face") shell 2, a visor 3 and a mouth-guard 4. The shell 2 is provided with an internal padding, not shown.

[0018] The visor 3 is rotatably supported on the shell 2 by means of two opposite rotational pins 5 which are located respectively on the left-hand side and on the right-hand side of the shell 2. Fig. 9 shows, in broken lines, the circular trajectory 8 of a point 17 situated on a bottom edge 7 of the visor 3. The circular trajectory 8 has its centre on the axis of the rotational pin 5 and has, for example, a radius of about 182 mm. The visor 3 has, integral with it, two reliefs 6 which have a curved shape and are located respectively on its left-hand and right-hand outer sides (Fig. 10) and the function of which will be illustrated further below.

[0019] The mouth-guard 4 is rotatably supported on the shell 2 by means of two opposite rotational pins 10 which are located respectively on the left-hand side and on the right-hand side of the shell 2. Fig. 9 shows, in the form of a dot-dash line, the circular trajectory 15 of a point 14 situated on a top edge 13 of the mouth-guard 4. The circular trajectory 15 is concentric with the axis of the pin 10 and has, for example, a radius of about 168 mm. The circular trajectory 8 of the point 17 of the visor and the trajectory 15 of the point 14 of the mouth-guard intersect at two points A and B, which are spaced at an angle of about 53° (Fig. 9).

[0020] The axis of the pin 5 of the visor 3 is located at a predetermined distance from the axis of the pin 10 of the mouth-guard 4. For example, the distance between the centers of the two pins 10 and 5 is about 16 mm.

[0021] The bottom edge 7 of the visor 3 rests on the top edge 13 of the mouth-guard 4 when visor and mouth-guard are completely lowered in the closed position (defined by the points C and D of the trajectories 8 and 15 in Fig. 9). A stop means designed to retain firmly, also during ride at high speed, the mouth-guard 4 in the completely lowered position is not shown. In the completely lowered position, the profiles of the visor 3 and the mouth-guard 4 are substantially flush. The mouth-guard 4 also has an edge 25 which is substantially perpendicular to the edge 13 and which serves to improve the seal in the zone where visor and mouth-guard are joined together.

[0022] The mouth-guard 4 has, integral with it, two projections 11 which are oblong-shaped and located respectively on its left-hand and right-hand inner sides (Fig. 10) and the function of which will be illustrated further below. Each projection 11 extends radially with respect to the rotational pin 10. Its portion closest to the axis of the pin 10 is indicated by 27, while its portion furthest away from the axis of the pin 10 is indicated by 12. For example, the point of the portion 12 which is furthest away from the axis of the pin 10 is situated at a maximum distance of about 13 mm.

[0023] Each curved relief 6 is positioned on the visor 3 so that its edge 26 is situated at a predetermined distance from the axis of the pin 10 along a predetermined circumference arc of the circular trajectories 8 and 15. The value of this predetermined distance is chosen so that the portion 12 of the oblong projection 11 comes into contact with the edge 26 of the curved relief 6 along said circumference arc, as will be illustrated further below. In particular, this predetermined distance is approximately equal to the distance at which the furthest point of the portion 12 of the projection 11 is situated with respect to the axis of the pin 10. For example, said predetermined distance is about 13 mm.

[0024] A disc 20 provided with a curved slot 21 concentric with the pin 5 is fastened to the shell 2 (Figs. 10 and 11). A stud 22 integral with the visor 3 engages with the curved slot 21. The slot 21 has two end sides 23 and 24 which act as a stop for rotation of the visor 3 between a completely lowered, closed, position (Fig. 1) and a completely raised, open, position (Fig. 6). The arc of rotation of the visor 3 subtends an angle of about 50°.

[0025] In the helmet 1, the visor 3 and the mouth-guard 4 may assume both the completely lowered, closed, position (Figs. 1 and 9) and may be raised independently of one another, causing them to rotate in a clockwise direction about the respective pin 5 or 10. When the mouth-guard 4 is raised, initially, over a small circumference arc, which subtends an angle of about 17°, it draws with it the visor 3 and raises it slightly until its edge 13 is separated from the edge 7 of the visor (Fig. 2 and point A of Fig. 9). Then the mouth-guard 4 continues its raising movement, moving outside the visor 3 (Figs. 3 and 4), and continues to rotate in a clockwise direction over an angle of about 240° until it reaches the completely open position (Fig. 5). The mouth-guard 4 is kept in the completely raised position, where it is swung back, by the edge 13 which rests on the shell 2 and acts as a stop.

[0026] The mouth-guard 4 rotates independently of the visor 3 also during the first part of its raising movement (Figs. 3 and 4) because the portion 12 of each projection 11 remains slightly spaced from the relief 6 on the visor or rather from an edge 26 of the relief 6 directed towards the pin 10. In fact, in these conditions, the edge 26 of each relief 6 is located at a distance from the axis of the pin 10 of the mouth-guard which is slightly greater than the abovementioned predetermined distance (about 13 mm) at which the portion 12 of the projection 11 comes into contact with the edge 26 of the relief 6.

[0027] In turn, the visor 3 is able to rotate independently of the mouth-guard 4. It may be raised so as to be completely open, by causing it to rotate through an angle of about 50° about the pin 5 up to the upper stop (Fig. 6) or may be lowered completely (Fig. 7), while the mouth-guard 4 remains completely raised.

[0028] When the visor 3 is completely lowered and the motorcyclist wishes to bring the mouth-guard 4 into the completely lowered position, he/she rotates the mouth-guard 4 in an anti-clockwise direction until its point 14 moves towards the point B of intersection between the circular trajectories 8 and 15 (Fig. 9). In this condition, the edge 26 of the relief 6 of the visor is situated at the abovementioned predetermined distance (about 13 mm) from the axis of the pin 10 and the portion 12 of the projection 11 of the mouth-guard comes into contact with it (Fig. 7). At this point, while the mouth-guard 4 continues to rotate in an anti-clockwise direction, travelling along a circumference arc which is astride of the point B (Fig. 9) and subtends an angle of about 25°, the portion 12 of its projection 11, rotating in turn in an anti-clockwise direction, exerts a thrust on the relief 6. This thrust causes a small rotation, in the clockwise direction, of the visor 3 about its pin 5 and a partial raising of the visor (Fig. 8). Then, the mouth-guard 4, continuing to rotate in an anti-clockwise direction, reaches the position where it is completely lowered (point C in Fig. 9). At this point, the visor 3 may also be brought into the completely lowered position (point D in Fig. 9).

[0029] Fig. 12 shows a variation of the helmet 1, in which a relief 36 with a substantially rectilinear shape is integral with the visor 3 and a projection 111 with a circular shape is integral with the mouth-guard 4. The projection 111 has a portion 112 which is located at a predetermined maximum distance from the axis of the pin 10. The relief 36 and the projection 111 operate in a manner similar to the relief 6 and to the projection 11 described further above. In particular, the portion 112 of the projection 111 comes into contact with an edge 46 of the relief 36, when the distance between the edge 36 and the axis of the pin 10 becomes practically equal to the distance between the portion 112 and the axis of the pin 10. And this occurs along the abovementioned circumference arc which is located on either side of the point B (Fig. 9).

[0030] The shell 2 and the mouth-guard 4 are made, for example, of polycarbonate or a composite material and the visor 3 is made of polycarbonate. Preferably, said material is also subjected to an anti-scratch treatment.

Claims

1. Crash-helmet (1) for motorcyclists, comprising a shell (2), a visor (3) and a mouth-guard (4), said visor (3) and said mouth-guard (4) being rotatably supported on said shell (2) so as to rotate about respective rotational pins (5, 10) having axes which are suitably spaced apart, said visor (3) and mouth-guard (4) travelling along circular trajectories (8, 15) which intersect (A,B) for superimposing a bottom edge (7) of said visor (3) and a top edge (13) of said mouth-guard (4) in a position where both are simultaneously lowered, **characterized in that** said visor (3) is provided with first engagement means (6; 36) and said mouth-guard (4) is provided with second engagement means (11; 111), said first and second engagement means (6; 36, 11; 111) being designed to co-operate, over a predetermined circumference arc of said circular trajectories (8, 15), so that said mouth-guard (4) causes partial raising of said visor (3) when said mouth-guard (4) is lowered.

2. Crash-helmet (1) according to Claim 1, **characterized in that** said first engagement means (6; 36) are formed by at least one relief (6; 36) integral with said visor (3) and said second engagement means (11; 111) are formed by at least one projection (11; 111) integral with said mouth-guard (4).

3. Crash-helmet (1) according to Claim 2, **characterized in that** said relief (6; 36) is positioned on said visor (3) so as to be at a predetermined distance from said axis of said rotation pin (10) of said mouth-guard (4) along said predetermined circumference arc, said predetermined distance being approximately equal to the distance at which the furthest portion (12; 112) of said projection (11; 111) is located from the axis of said pin (10) for rotation of said mouth-guard (4) such that said portion (12; 112) of said projection (11; 111) is in contact with said relief (6; 36) along said circumference arc.

4. Crash-helmet (1) according to Claim 2, **characterized in that** said relief (6) on said visor (3) has a curved shape.

5. Crash-helmet (1) according to Claim 2, **characterized in that** said relief (36) on said visor (3) has a substantially rectilinear shape.

6. Crash-helmet (1) according to Claims 2 and 4, **characterized in that** said projection (11) on said mouth-guard (4) has an oblong shape.

7. Crash-helmet (1) according to Claims 2 and 5, **characterized in that** said projection (111) on said mouth-guard (4) has a circular shape.

8. Crash-helmet (1) according to Claim 1, **characterized in that** said mouth-guard (4) has a top edge (13) on which a bottom edge (7) of said visor (3) rests.

9. Crash-helmet (1) according to Claim 8, **characterized in that** said mouth-guard (4) also has an edge (25) substantially perpendicular to said top edge (13) and designed to improve the seal in the zone where said visor (3) and said mouth-guard (4) are joined together.

Patentansprüche

1. Sturzhelm (1) für Motorradfahrer, mit einer Schale (2), einem Visier (3) und einem Mundschutz (4), wobei das Visier (3) und der Mundschutz (4) drehbar an der Schale (2) derart gelagert sind, um um jeweilige Drehstifte (5, 10) drehbar gelagert zu sein, die Achsen besitzen, welche geeignet voneinander beabstandet sind, wobei das Visier (3) und der Mundschutz (4) sich entlang kreisförmiger Trajektorien (8, 15) bewegen, die einander schneiden (A, B), um einen unteren Rand (7) des Visiers (3) und einen oberen Rand (13) des Mundschutzes (4) in einer Position übereinander zu legen, in welcher beide simultan abgesenkt sind, **dadurch gekennzeichnet, dass** das Visier (3) mit einer ersten Eingriffseinrichtung (6; 36) ausgestattet und der Mundschutz (4) mit einer zweiten Eingriffseinrichtung (11; 111) ausgestattet ist, wobei die erste und die zweiten Eingriffseinrichtung (6; 36, 11; 111) dazu ausgelegt sind, über einen vorbestimmten Umfangsbogen der kreisförmigen Trajektorien (8, 15) derart zusammenzuwirken, dass der Mundschutz (4) ein teilweises Anheben des Visiers (3) verursacht, wenn der Mundschutz (4) abgesenkt ist.

2. Sturzhelm (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die erste Eingriffseinrichtung (6; 36) durch mindestens eine mit dem Visier (3) integrale Vertiefung (6; 36) gebildet und die zweite Eingriffseinrichtung (11; 111) durch mindestens eine mit dem Mundschutz (4) integralen Vorsprung (11; 111) gebildet ist.

3. Sturzhelm (1) nach Anspruch 2, **dadurch gekennzeichnet, dass** die Vertiefung (6; 36) an dem Visier (3) derart positioniert ist, um in einem vorbestimmten Abstand von der Achse des Drehstifts (10) des Mundschutzes (4) entlang des vorbestimmten Umfangsbogens zu sein, wobei der vorbestimmte Abstand näherungsweise gleich dem Abstand ist, in welchem die entfernteste Position (12; 112) des Vorsprungs (11; 111) von der Achse des Stifts (10) zur Rotation des Mundschutzes (4) gelegen ist, sodass der Abschnitt (12; 112) des Vorsprungs (11; 111) in Kontakt mit der Vertiefung (6; 36) entlang des Umfangsbogens ist.

4. Sturzhelm (1) nach Anspruch 2, **dadurch gekennzeichnet, dass** die Vertiefung (6) an dem Visier (3) eine gekrümmte Form besitzt.

5. Sturzhelm (1) nach Anspruch 2, **dadurch gekennzeichnet, dass** die Vertiefung (36) an dem Visier (3) eine im Wesentlichen geradlinige Form besitzt.

6. Sturzhelm (1) nach Ansprüchen 2 und 4, **dadurch gekennzeichnet, dass** der Vorsprung (11) an dem Mundschutz (4) eine längliche Form besitzt.

7. Sturzhelm (1) nach Ansprüchen 2 und 5, **dadurch gekennzeichnet, dass** der Vorsprung (111) an dem Mundschutz (4) eine kreisförmige Form besitzt.

8. Sturzhelm (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** der Mundschutz (4) einen oberen Rand (13) besitzt, auf welchem ein unterer Rand (7) des Visiers (3) ruht.

9. Sturzhelm (1) nach Anspruch 8, **dadurch gekennzeichnet, dass** der Mundschutz (4) ebenso einen Rand (25) besitzt, der im Wesentlichen senkrecht zu dem oberen Rand (13) ist, und dazu ausgelegt ist, die Abdichtung in der Zone zu verbessern, in welcher das Visier (3) und der Mundschutz (4) miteinander verbunden sind.

Revendications

1. Casque antichoc (1) pour motocyclistes, comprenant une coque (2), une visière (3) et un protège bouche (4), ladite visière (3) et ledit protège bouche (4) étant supportés en rotation sur ladite coque (2) afin d'être entraînés en rotation autour des broches de rotation respectives (5, 10) ayant des axes qui sont espacés de manière appropriée de ladite visière (3) et dudit protège bouche (4) s'étendant le long de trajectoires circulaires (8, 15) qui se coupent (A, B) pour superposer un bord de fond (7) de ladite visière (3) et un bord de dessus (13) dudit protège bouche (4) dans une position dans laquelle les deux sont simultanément baissés,

   caractérisé en ce que ladite visière (3) est prévue avec des premiers moyens de mise en prise (6 ; 36) et ledit protège bouche (4) est prévu avec des seconds moyens de mise en prise (11 ; 111), lesdits premier et second moyens de mise en prise (6 ; 36, 11 ; 111) étant conçus pour coopérer, sur un arc de circonférence prédéterminé desdites trajectoires circulaires (8, 15) de sorte que ledit protège bouche (4) provoque la montée partielle de ladite visière (3) lorsque ledit protège bouche (4) est baissé.

2. Casque antichoc (1) selon la revendication 1, **caractérisé en ce que** lesdits premiers moyens de mise en prise (6 ; 36) sont formés avec au moins un relief (6 ; 36) intégral avec ladite visière (3) et lesdits seconds moyens de mise en prise (11 ; 111) sont formés au moins avec une projection (11 ; 111) intégrale avec ledit protège bouche (4).

3. Casque antichoc (1) selon la revendication 2, **caractérisé en ce que** ledit relief (6 ; 36) est position-

né sur ladite visière (3) afin d'être à une distance prédéterminée dudit axe de ladite broche de rotation (10) dudit protège bouche (4) le long dudit arc de circonférence prédéterminé, ladite distance prédéterminée étant approximativement égale à la distance à laquelle la partie la plus éloignée (12 ; 112) de ladite projection (11 ; 111) est située à distance de l'axe de ladite broche (10) pour la rotation dudit protège bouche (4) de sorte que ladite partie (12 ; 112) de ladite projection (11 ; 111) est en contact avec ledit relief (6 ; 36) le long dudit arc de circonférence.

4. Casque antichoc (1) selon la revendication 2, **caractérisé en ce que** ledit relief (6) situé sur ladite visière (3) a une forme courbe.

5. Casque antichoc (1) selon la revendication 2, **caractérisé en ce que** ledit relief (36) situé sur ladite visière (3) a une forme sensiblement rectiligne.

6. Casque antichoc (1) selon les revendications 2 et 4, **caractérisé en ce que** ladite projection (11) située sur ledit protège bouche (4) a une forme oblong.

7. Casque antichoc (1) selon les revendications 2 et 5, **caractérisé en ce que** ladite projection (111) située sur ledit protège bouche (4) a une forme circulaire.

8. Casque antichoc (1) selon la revendication 1, **caractérisé en ce que** ledit protège bouche (4) a un bord de dessus (13) sur lequel s'appuie un bord de fond (7) de ladite visière (3).

9. Casque antichoc (1) selon la revendication 8, **caractérisé en ce que** ledit protège bouche (4) possède également un bord (25) sensiblement perpendiculaire audit bord de dessus (13) et conçu pour améliorer le joint d'étanchéité dans la zone dans laquelle ladite visière (3) et ledit protège bouche (4) se rejoignent.

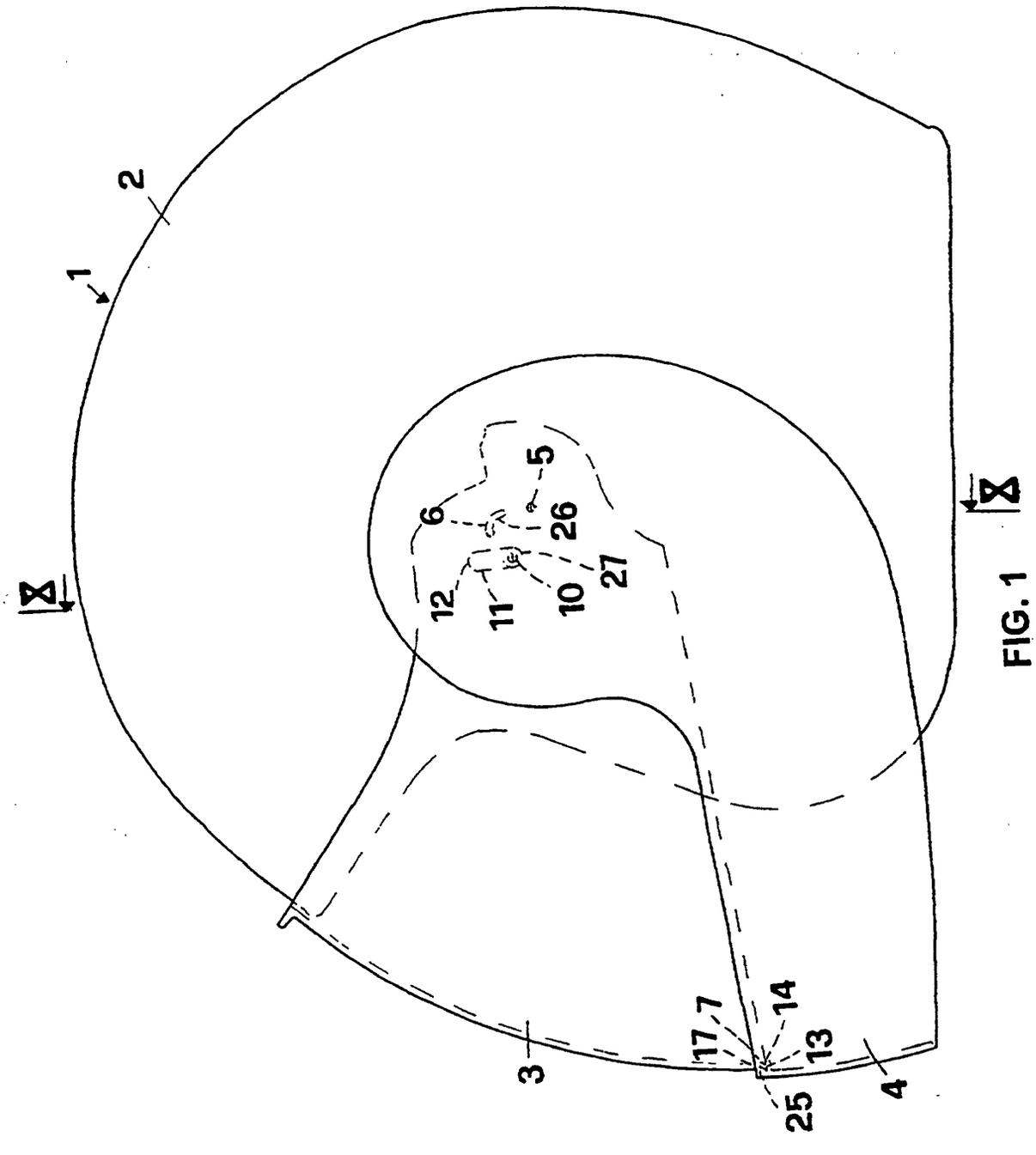


FIG. 1

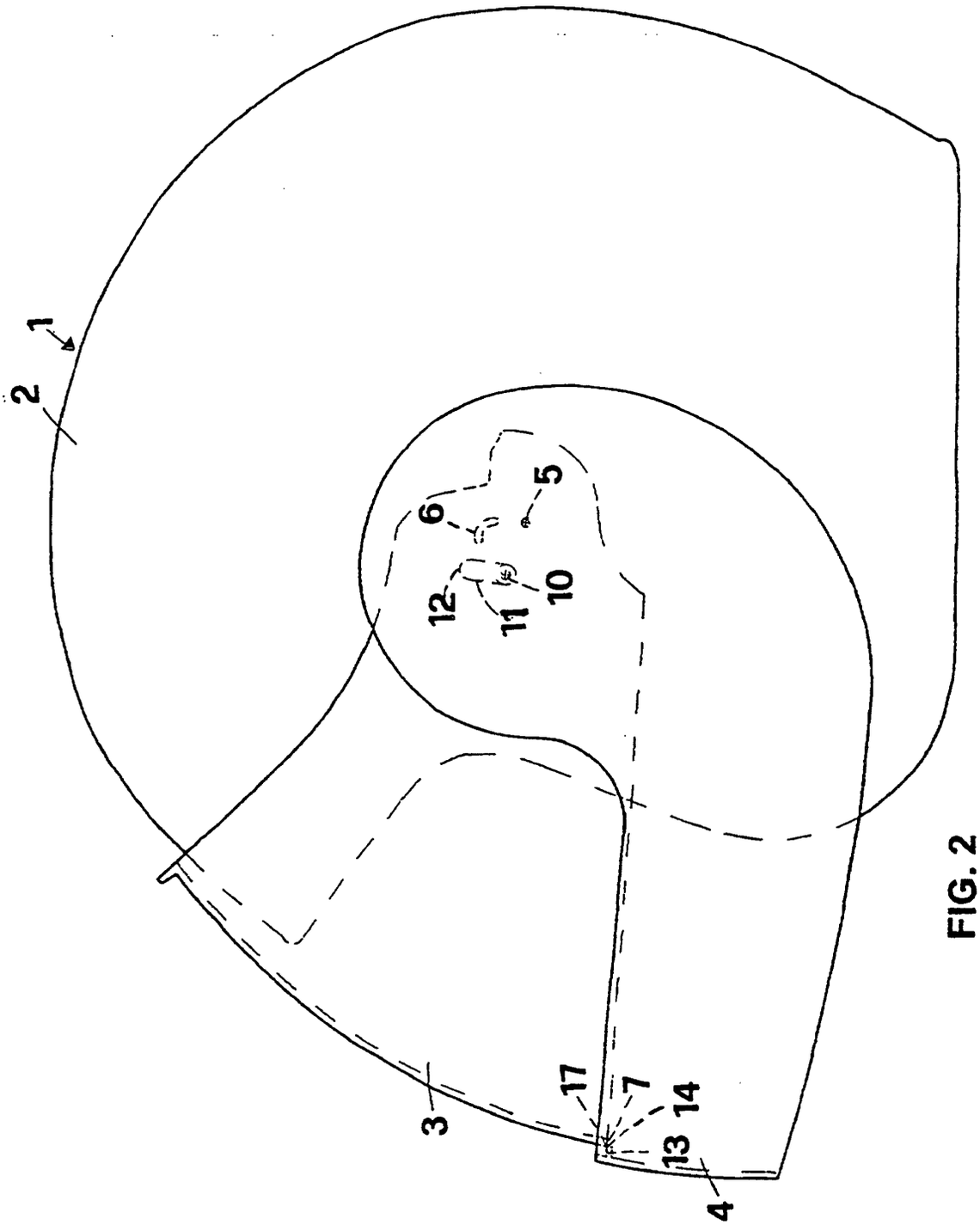


FIG. 2

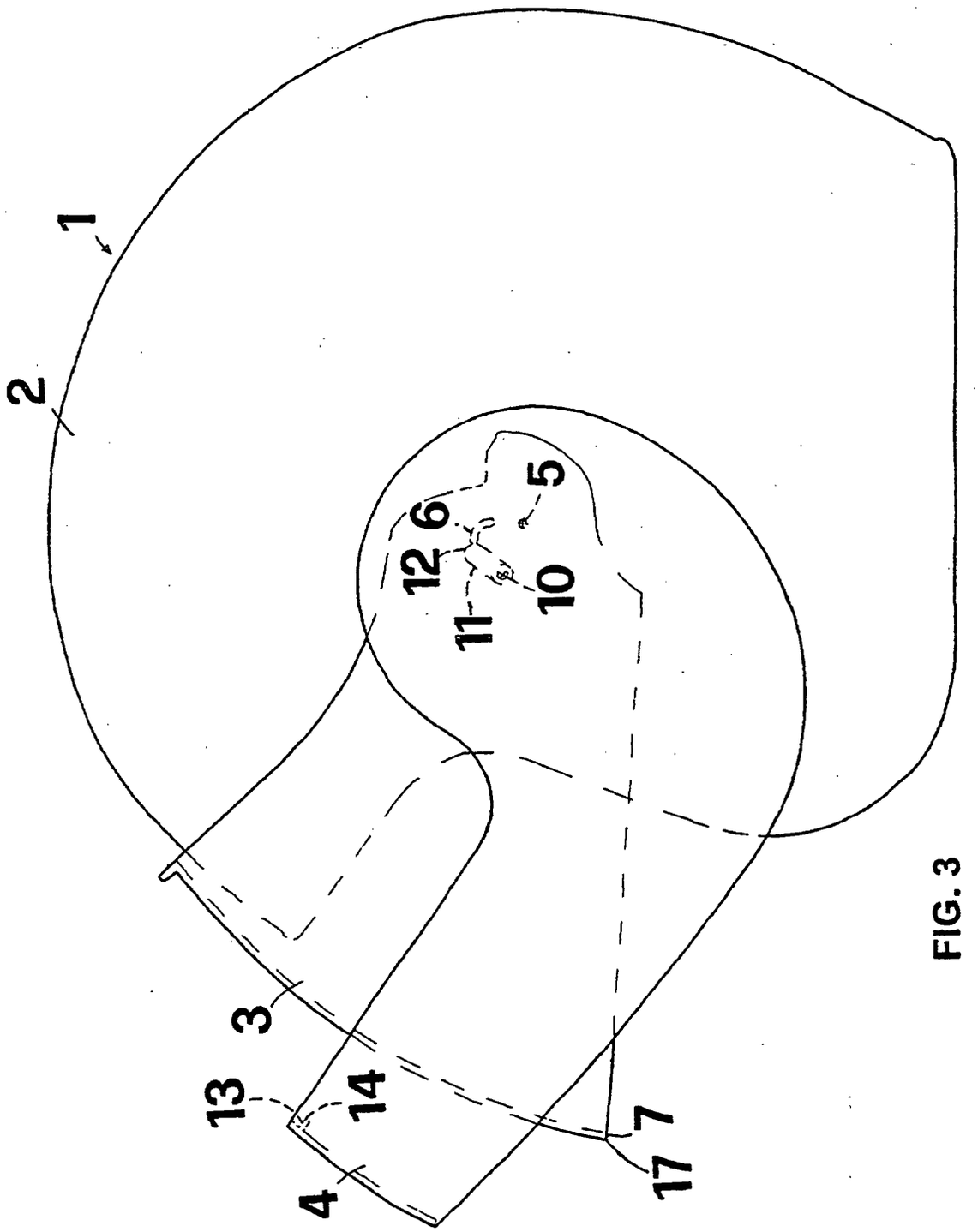


FIG. 3

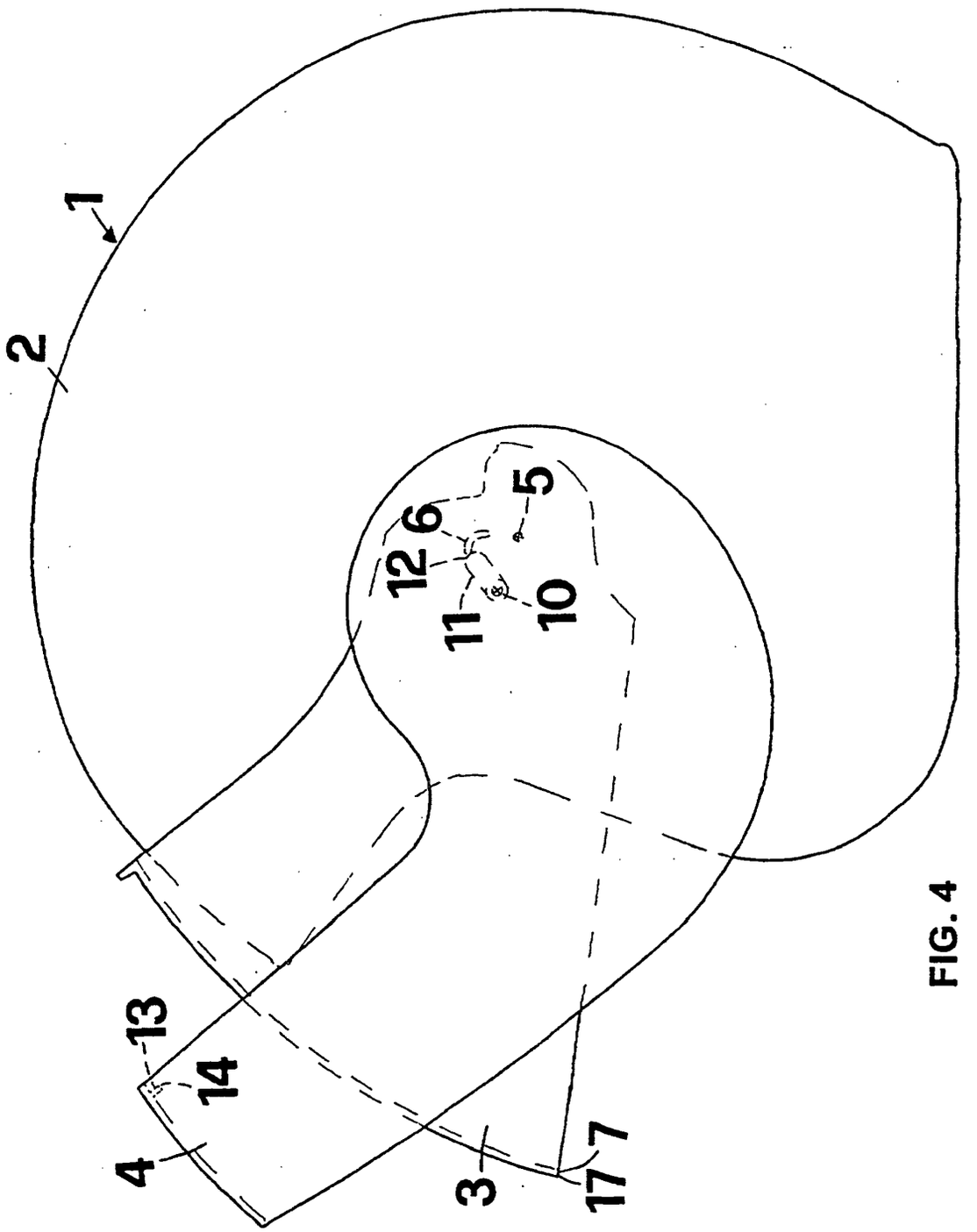


FIG. 4

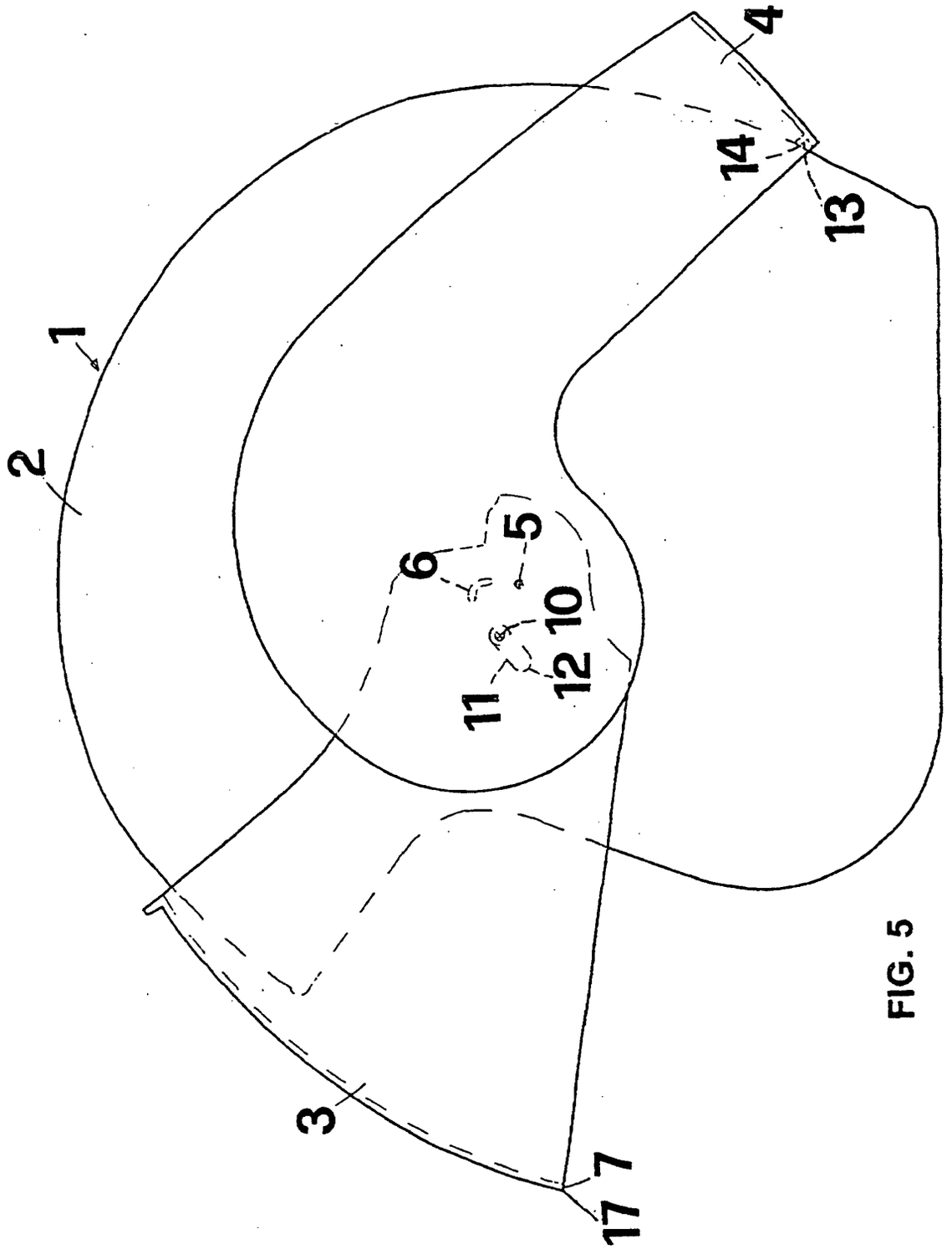


FIG. 5

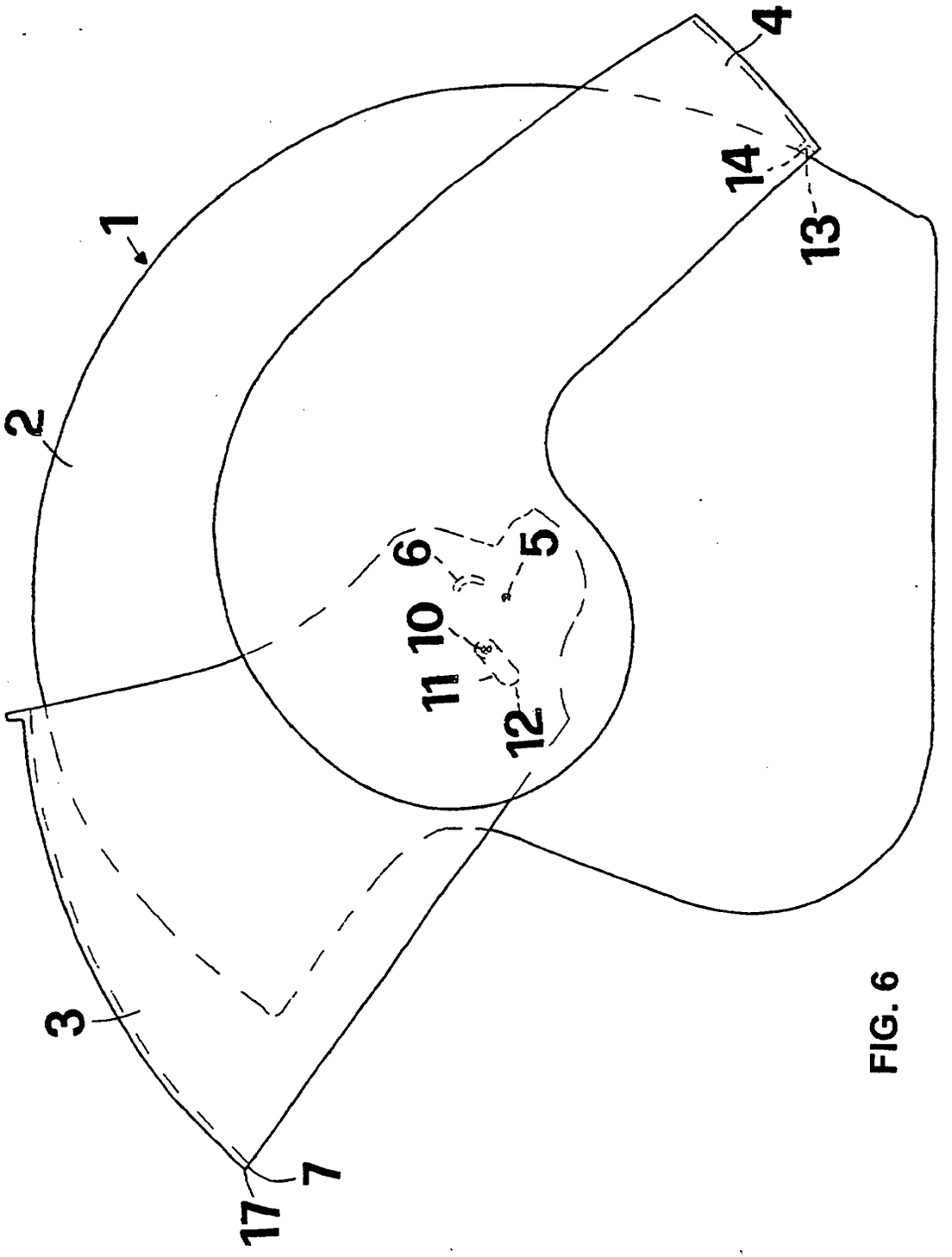


FIG. 6

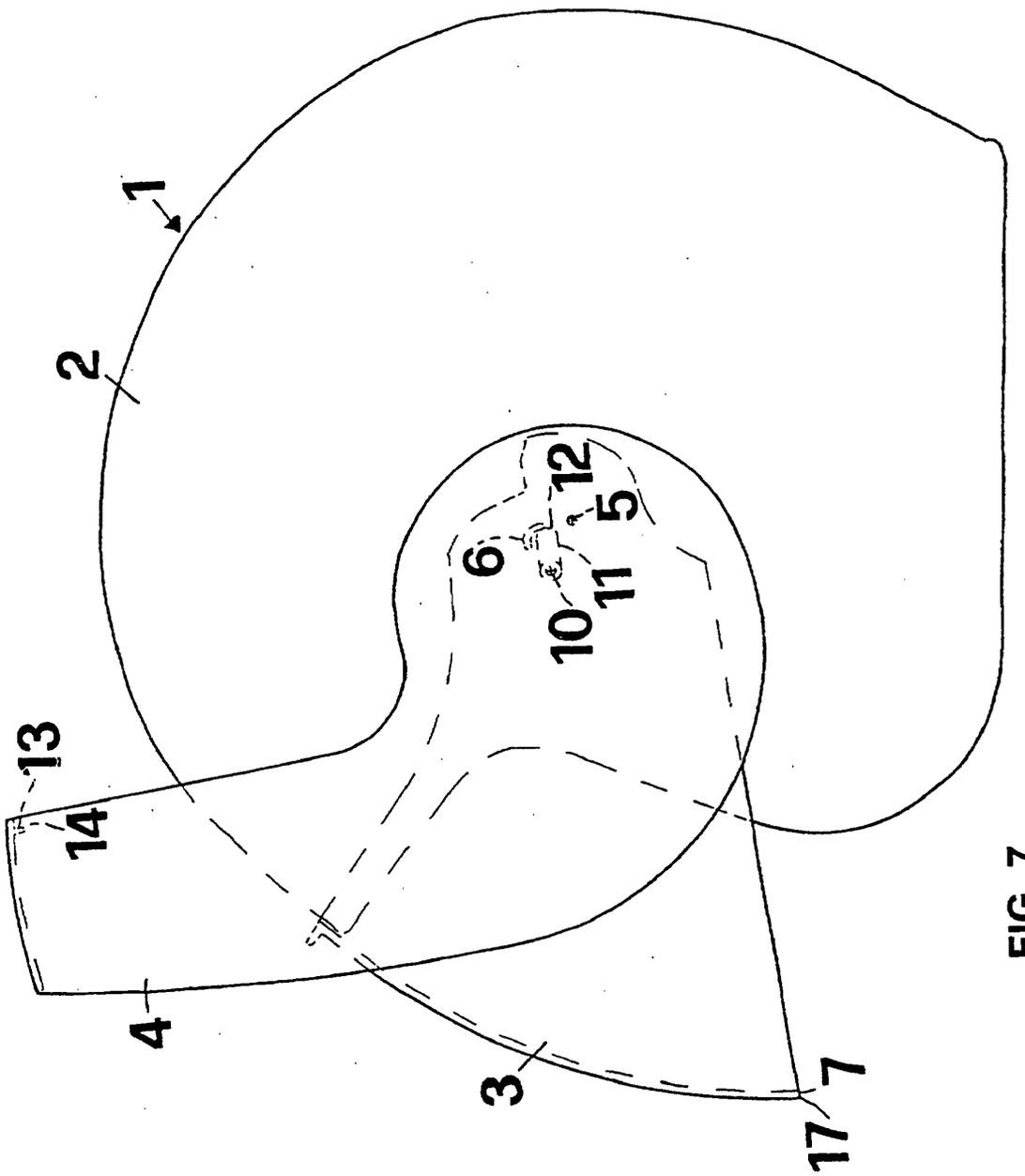


FIG. 7

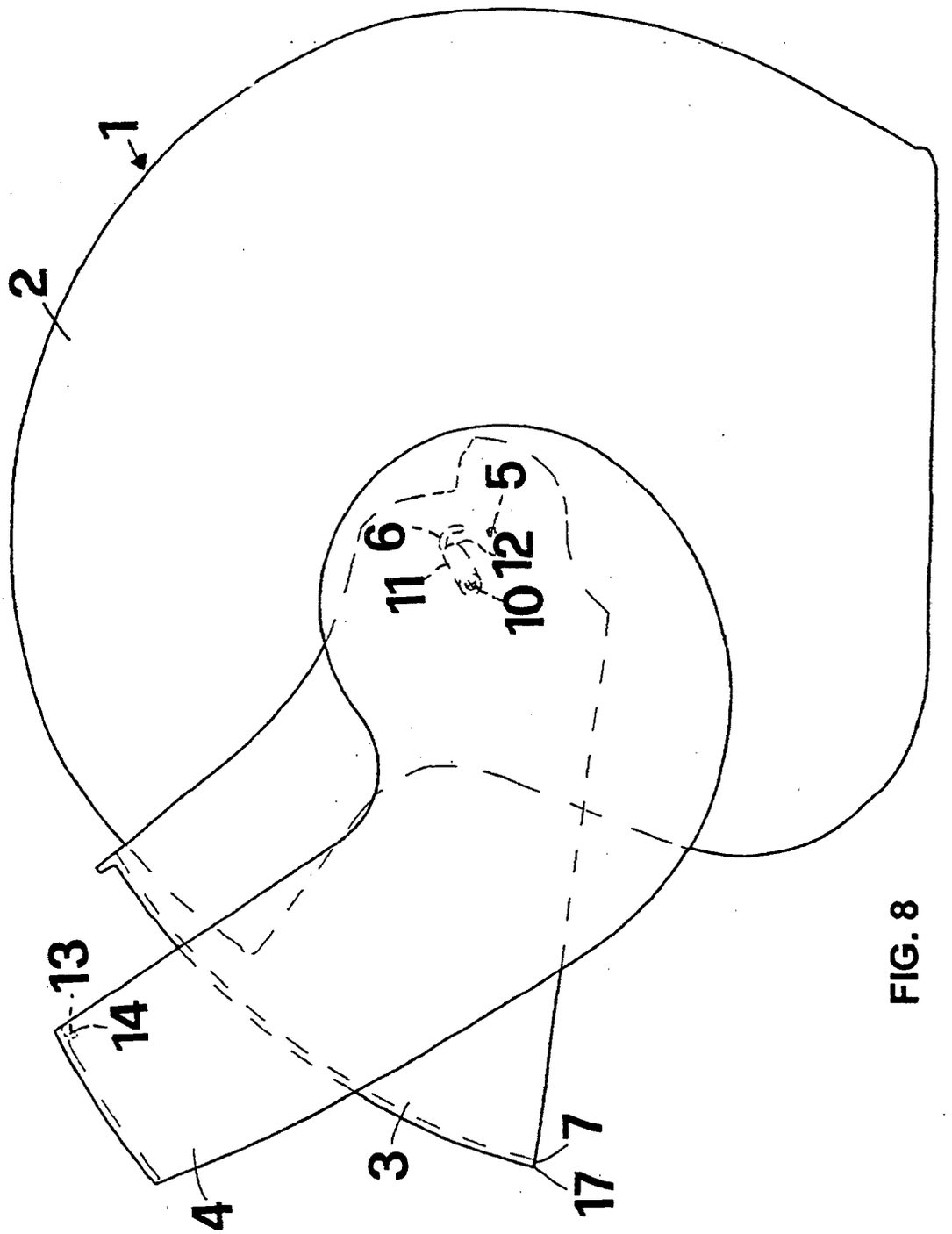


FIG. 8

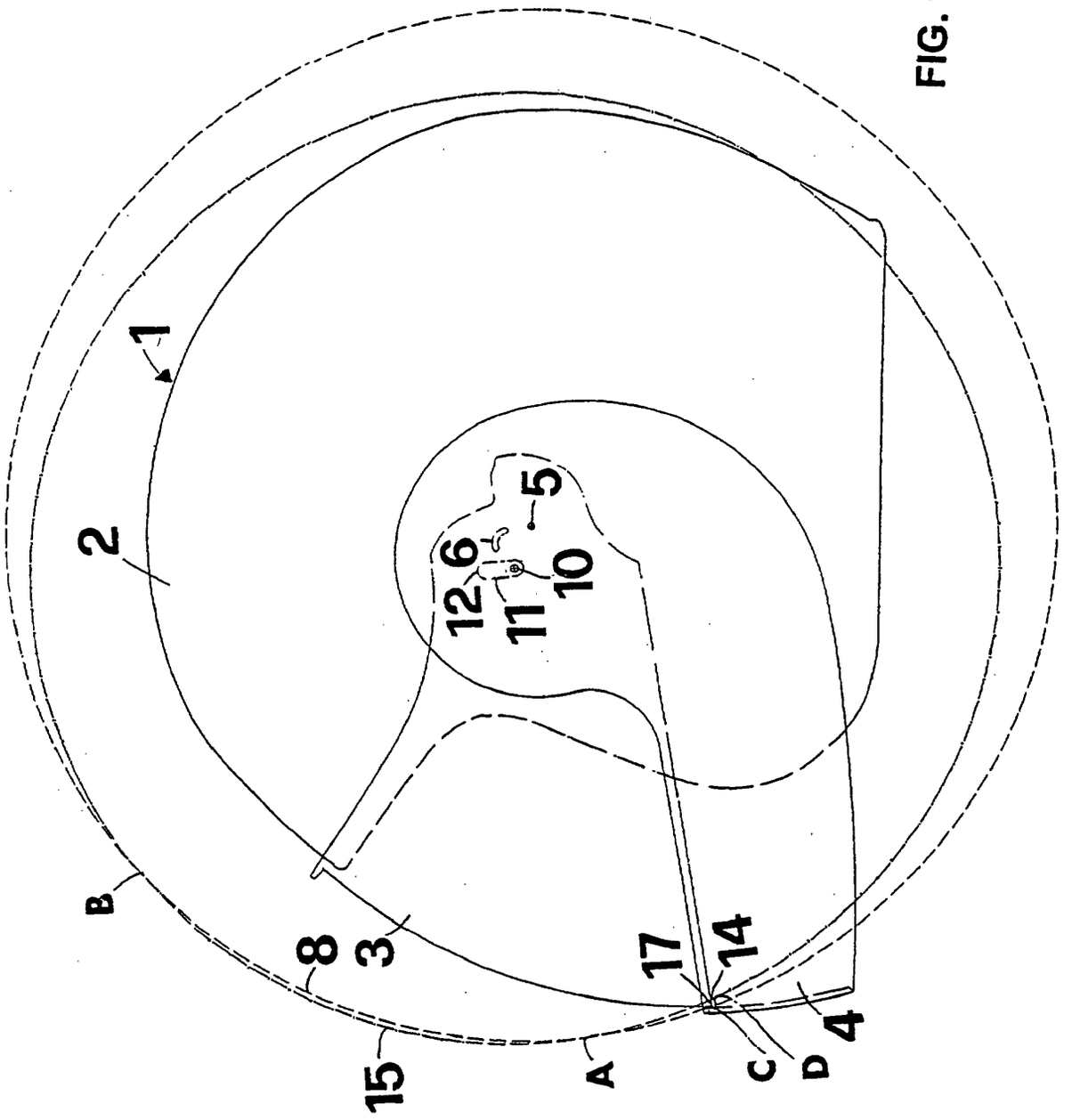


FIG. 9

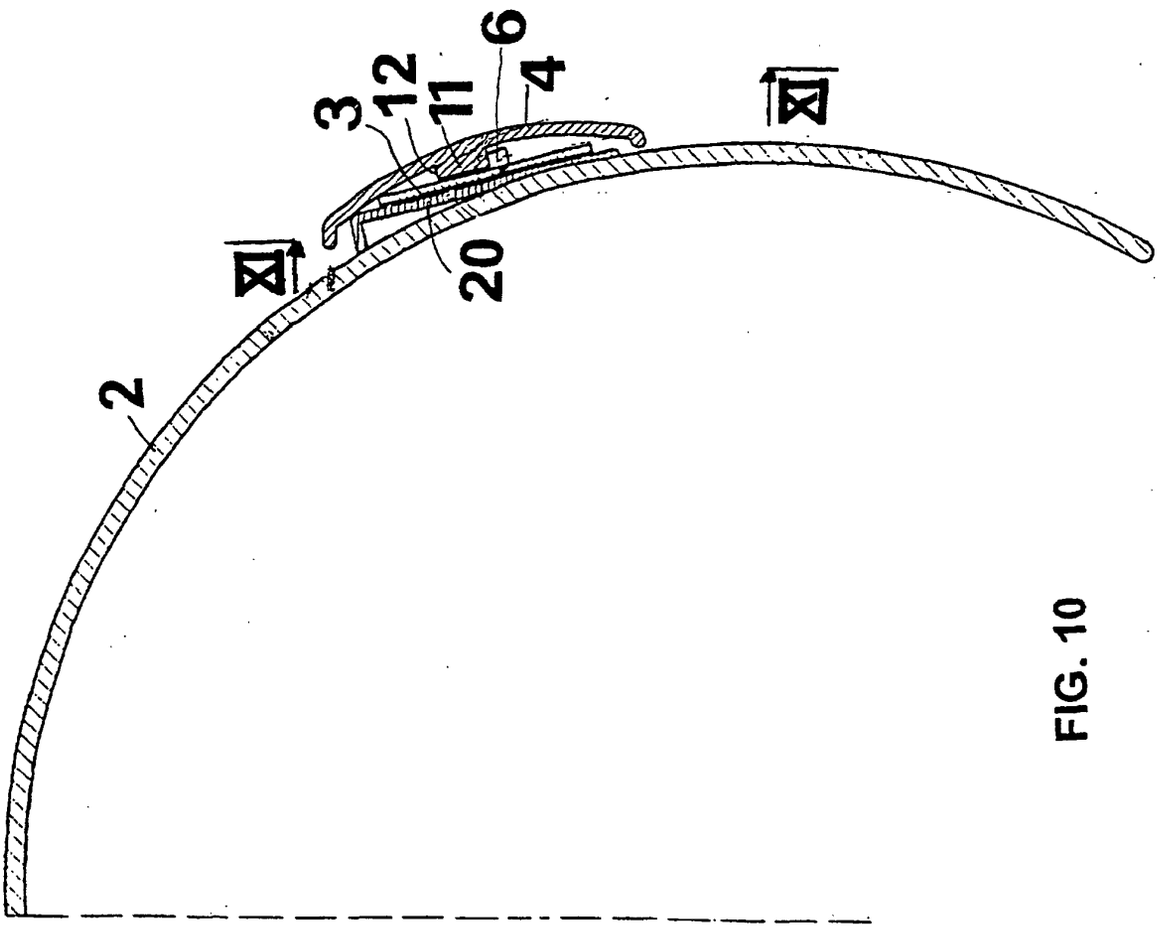


FIG. 10

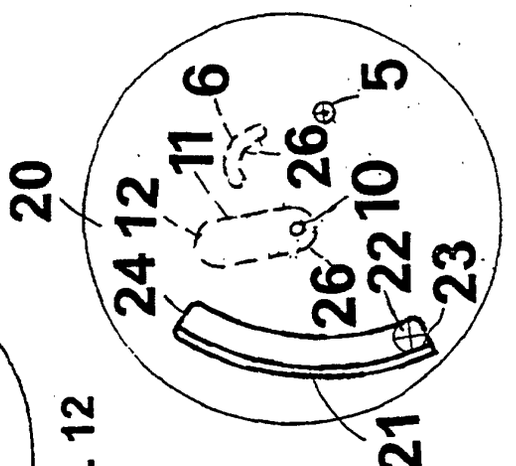


FIG. 11

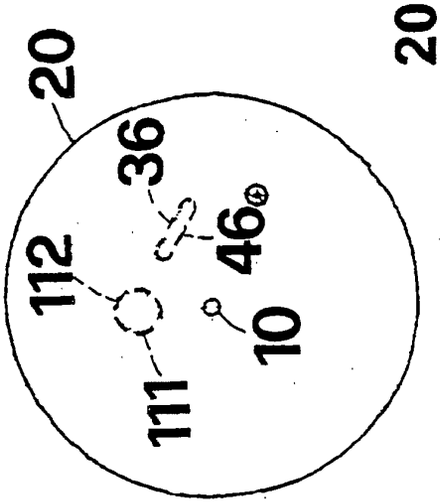


FIG. 12