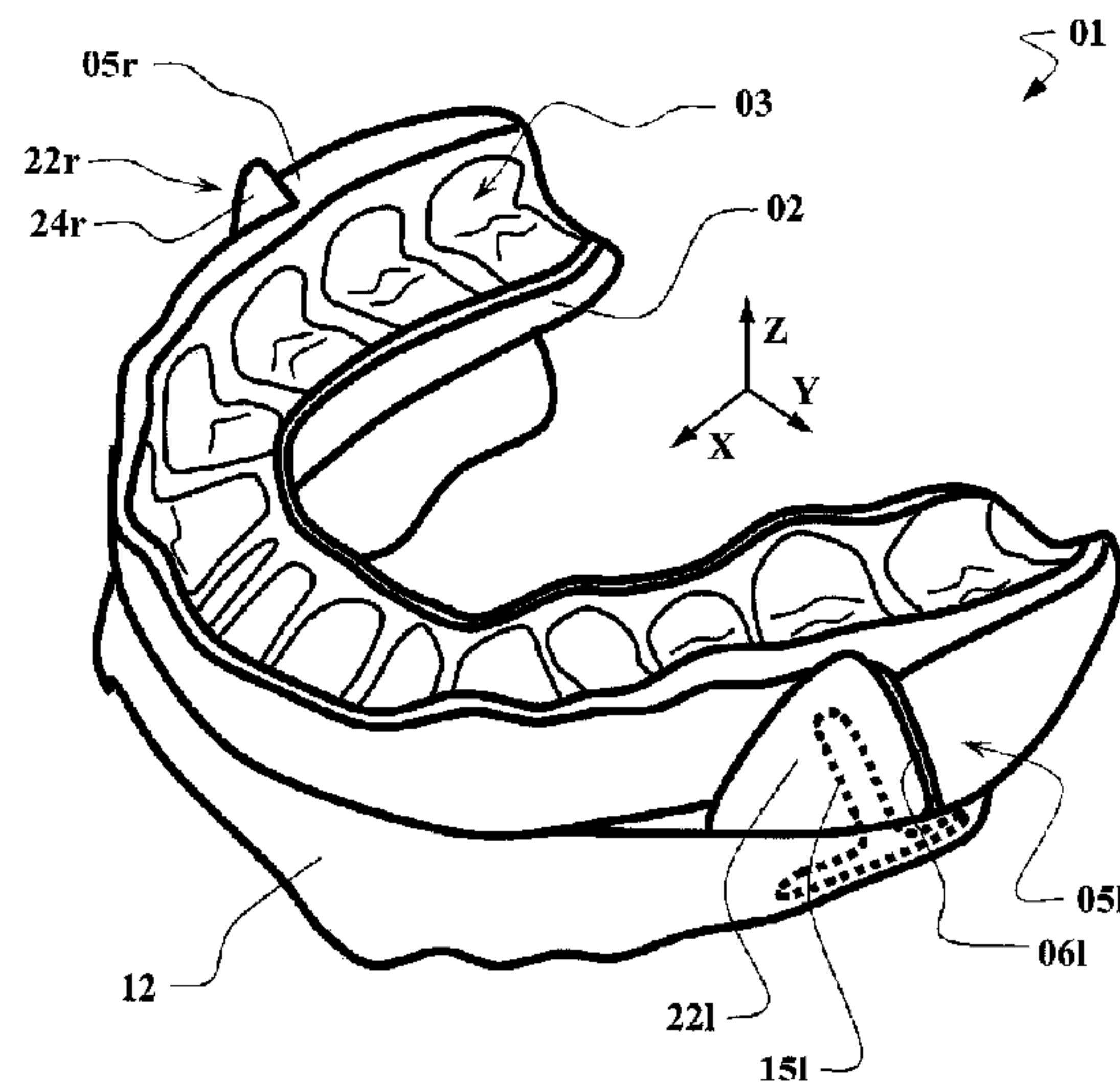




(86) Date de dépôt PCT/PCT Filing Date: 2012/03/26
(87) Date publication PCT/PCT Publication Date: 2013/10/03
(45) Date de délivrance/Issue Date: 2018/08/07
(85) Entrée phase nationale/National Entry: 2014/09/10
(86) N° demande PCT/PCT Application No.: DE 2012/000314
(87) N° publication PCT/PCT Publication No.: 2013/143511

(51) Cl.Int./Int.Cl. *A61F 5/56* (2006.01)
(72) Inventeur/Inventor:
HOFMANN, KONRAD, DE
(73) Propriétaire/Owner:
HOFMANN, KONRAD, DE
(74) Agent: GOWLING WLG (CANADA) LLP

(54) Titre : SYSTEME DE GOUTTIERE OCCLUSALE
(54) Title: OCCLUSAL SPLINT ARRANGEMENT



(57) **Abrégé/Abstract:**

The invention relates to an occlusion splint arrangement (01), in particular for sleep apnoea therapy, with a maxillary miniplast splint (02), which can be arranged on the maxillary row of teeth, and with a mandibular miniplast splint (12), which can be arranged on the mandibular row of teeth, wherein the maxillary miniplast splint (02) can be brought to bear against the mandibular miniplast splint (12), said arrangement comprising at least one maxillary positioning means (05) and at least one mandibular positioning means (22), wherein the setting of the miniplast splints (02, 12) relative to each other in the longitudinal direction (X) and/or in the transverse direction (Y) can be defined by form-fit engagement between the maxillary and the mandibular positioning means (05, 22), wherein the maxillary and/or mandibular miniplast splint (02, 12) has at least one mounting means (15), wherein at least two different positioning means (22a, 22b, 22c) can be secured exchangeably as replacements on the same mounting means (15), as a result of which at least two different relative settings can be defined between the miniplast splints (02, 12).

Abstract

The invention relates to an occlusal splint arrangement (01), in particular for sleep apnea therapy, comprising a maxillary miniplast splint (02) that can be arranged on the maxillary row of teeth and a
5 mandibular miniplast splint (12) that can be arranged on the mandibular row of teeth, wherein the maxillary miniplast splint (02) can be brought to bear against the mandibular miniplast splint (12), said arrangement comprising at least one maxillary positioning means (05) and at least one
10 mandibular positioning means (22), wherein the relative position of the miniplast splints (02, 12) toward each other can be defined in the longitudinal direction (X) and/or in the transverse direction (Y) by a form fit between the maxillary and the mandibular positioning means (05, 22), wherein the maxillary and/or mandibular miniplast splint (02, 12) comprises at least one mounting means (15), wherein at least two
15 different positioning means (22a, 22b, 22c) can be secured as mutual replacements on the same mounting means (15), whereby at least two different relative positions can be defined between the miniplast splints (02, 12).

20 (Fig. 1)

5

10

'Occlusal splint arrangement'

15 The invention relates to an occlusal splint arrangement, in particular for sleep apnea therapy, comprising a maxillary and a mandibular miniplast splint.

In particular for sleep apnea therapy, various embodiments of occlusal splint arrangements are known from the state of the art. They basically
20 aim at influencing the position of the upper jaw relative to the lower jaw so that the lower jaw, the tongue muscle and the soft palate are restricted to an appropriate degree from sinking backwards so as to keep the airways open.

An embodiment that is particularly suited for this purpose is disclosed in
25 document DE 103 41 260 A1. The embodiment comprises a maxillary miniplast splint and a mandibular miniplast splint which can each be plugged onto the corresponding rows of teeth. Moreover, said miniplast splints have opposing contact surfaces so that they can be brought to bear against each other. To realize the required relative position of the
30 miniplast splints toward each other, one miniplast splint comprises an adjusting device including a locking pin and the other miniplast splint

has a complementary locking guide. The position of the mandibular miniplast splint relative to the maxillary miniplast splint is defined in that the locking pin engages into the locking guide.

Further, the afore-mentioned document has an adjusting device as well as
5 alternative embodiments. By means of said adjusting device, the individual position of the mandibular miniplast splint relative to the maxillary miniplast splint can be influenced. In the cited case, this is achieved in that the position of the locking pin in the adjusting device can be adjusted by means of an adjusting screw.

10 Although a reliable positioning between the maxillary and the mandibular miniplast splint for therapy of the sleep apnea syndrome is made possible by known embodiments from the state of the art, the latter per se each still have various disadvantages. On the one hand, they relate to the unnecessarily complex structure and the associated high
15 production costs. Further, the susceptibility to the deposition of dirt is especially disadvantageous in spots that are hard to clean, thus being problematic from a hygienic point of view and requiring a corresponding chemical cleaning after each use.

US 2011/0155144 A1 describes an occlusal splint arrangement in which
20 the mandibular and the maxillary miniplast splint are connected to each other in an articulated manner via two articulated levers and cannot be separated from each other. Adjustment to the upper and lower jaw takes place by means of a thermoplastic filler material.

US 6 516 805 B1 describes an occlusal splint arrangement in which the
25 mandibular and the maxillary miniplast splint can be fixed in relation to each other by means of a downwardly extending fixing protrusion. The fixing protrusion is exchangeably mounted in a guiding groove and is locked with a fixing screw.

US 2005/0028826 A1 describes an occlusal splint arrangement in which the mandibular and the maxillary miniplast splint are provided with removably attached positioning means for positioning the miniplast splints relative to each other. To attach the positioning means,
5 attachment plates are used that are embedded into the plastic of the miniplast splints and to each of which two circular attachment wires are attached. After the attachment plates have been embedded into the plastic of the miniplast splints, the attachment wires protrude sideways from the miniplast splint, and the positioning means are plugged onto the
10 attachment wires from the side. The problem therein is that the attachment of the positioning means to the miniplast splints is not sufficiently secure. Moreover, if a positioning means is pushed off the attachment wires by unconscious jaw movements during sleep, for example, there is the danger that loose positioning means may be
15 swallowed or inhaled, which poses an immense health risk.

Hence, it is the object of the present invention to provide an occlusal splint arrangement by means of which a completely secure positioning becomes possible between the mandibular and the maxillary miniplast splint and at the same time the complexity can be reduced as compared
20 to known embodiments.

In one aspect it is provided an occlusal splint arrangement for sleep apnea therapy, the occlusal splint arrangement comprising: a maxillary miniplast splint arrangeable on a maxillary row of teeth; and a mandibular miniplast splint arrangeable on a mandibular row of teeth,
25 wherein the maxillary miniplast splint can be brought to bear against the mandibular miniplast splint, and wherein the miniplast splints include even contact surfaces that substantially oppose each other in an occlusal plane having at least one maxillary positioning guide and at least one mandibular positioning guide, wherein the relative position of the
30 miniplast splints toward each other is definable in a longitudinal direction and/or in a transverse direction by a form fit between the

maxillary and the mandibular positioning guides, and wherein each
minioplast splint includes one positioning guide arranged on one side in a
molar area and another positioning guide on another side in the molar
area, and wherein the maxillary and/or mandibular minioplast splint
5 includes at least one centering pin, wherein at least two different
positioning guides on the same minioplast splint are alternatively
securable to the centering pin of the same minioplast splint, whereby at
least two different relative positions are definable between the minioplast
splints, and wherein the alternatively securable positioning guides are
10 exchangeable, each exchangeable positioning guide having a centering
recess that is complementary to the centering pin for mounting to the
minioplast splint, and each exchangeable positioning guide being
attachable by placing the centering recess on the centering pin, and the
centering pin simultaneously allowing a centering of the exchangeable
15 positioning guide and an attachment of the exchangeable positioning
guide, and the exchangeable positioning guide being formed in the shape
of a fin, a bottom side of the fin coming to bear on the contact surface of
the associated minioplast splint and a portion of a lateral flank of the fin
forming the guiding surface and a portion of a front edge of the fin
20 forming the positioning surface, wherein the centering pin is anchored
by being cast into the minioplast splint and protrudes beyond the contact
surface.

The occlusal splint arrangement serves in particular for sleep apnea
therapy. Although the present embodiment of an occlusal splint
25 arrangement is primarily intended to be used for therapy of the sleep
apnea syndrome, it is also possible to employ the embodiment according
to the invention for another kind of occlusal splint arrangement. In this
context, the occlusal splint arrangement can just as well be intended for

use in the treatment of malpositions of the teeth or as a bite splint for preventing teeth grinding at night or the like.

The generic occlusal splint arrangement comprises a maxillary miniplast splint that can be arranged on the maxillary row of teeth and a
5 mandibular miniplast splint that can be arranged on the mandibular row of teeth. In correspondence to the intended use, the maxillary miniplast splint can be brought to bear against the mandibular miniplast splint. For positioning of the miniplast splints relative to each other, the maxillary miniplast splint comprises at least one maxillary positioning means and
10 the mandibular miniplast splint comprises at least one mandibular positioning means. In this context, the type, design and arrangement of the positioning means on the miniplast splints are initially immaterial. At least, the positioning of the miniplast splints relative to each other requires a form fit between the maxillary and mandibular positioning
15 means, whereby the relative position of the miniplast splints toward each other can be defined in a longitudinal direction and/or in a transverse direction.

In this regard, it is also initially immaterial whether the form fit is established outside of the mouth prior to the placement on the rows of
20 teeth by joining the miniplast splints, for example, or whether the form fit only occurs once the miniplast splints sitting on the rows of teeth are brought into contact with each other by the mouth being closed. At least, a corresponding form fit between the positioning means is accomplished at the latest in that the miniplast splints bear against each other when the
25 teeth are being closed so that the relative position of the miniplast splints toward each other is defined. Said relative position can include the longitudinal direction, i.e. a forward and backward extension from the patient's perspective, or alternatively or simultaneously a relative positioning in a transverse direction. In this regard, it further is initially
30 immaterial for the embodiment according to the invention whether a slight play is provided therein.

With regard to the mentioned directions, it is to be explained that, from the patient's perspective, the longitudinal direction extends along a line from the back to the front, while the vertical direction is located approximately perpendicular to the occlusal plane and the transverse direction further lies correspondingly vertical to the vertical direction and vertical to the longitudinal direction, i.e. it extends from the left to the right (and vice versa) from the patient's point of view.

According to the invention the required object is attained in that the maxillary and/or mandibular miniplast splint comprises at least one mounting means. In contrast to known embodiments from the state of the art, however, the positioning means is now designed such that it can be secured to the mounting means present on the miniplast splint. To allow for different relative positions between the mandibular and the maxillary miniplast splint, it is further provided according to the invention that the positioning means secured to the mounting means can be replaced by another positioning means that deviates geometrically. This means that each positioning means that is intended for being secured to the mounting means can effect an individual relative position of the miniplast splints toward each other.

In correspondence to the possibility of exchanging the positioning means secured to the mounting means, the unavoidable result is that likewise only a single positioning means can be present, which is exchangeable in principle, but no second, different positioning means is available to replace it.

The basic idea of the present invention is that an adaptation to the relative adjustment no longer takes place by means of a complex adjusting device, but rather that only the positioning means is secured in a simple manner to a mounting means and is quickly replaced when required. Thus, the complexity can be reduced to a minimum and an especially easy cleaning is made possible. In this regard, it is in particular no longer necessary to chemically clean the miniplast splints

after each use. Instead, it is sufficient in many cases to simply rinse the miniplast splints and to only occasionally subject them to a chemical cleaning.

It is further advantageous in this embodiment that the corresponding
5 positioning means can be provided once the attending physician or dentist has determined the required relative position. Thus, in case a change of the relative position becomes necessary, the needed positioning means can simply be sent by mail from the physician to the patient. A faulty adjustment cannot take place and the patient can secure
10 the required positioning means to the mounting means on his/her own. In contrast, the state of the art requires an adjustment by the attending physician or dentist so that a change of the relative position by the patient without a visit to the respective physician or dentist is practically impossible. If the adjustment is performed by the respective patient
15 anyways, it is accompanied by a significant risk of faulty adjustment.

According to the invention, the miniplast splints are designed with opposing contact surfaces. This leads to a corresponding bearing of the miniplast splints against each other at the contact surfaces when the teeth are closed. For this purpose, said contact surfaces are preferably
20 arranged in the occlusal plane and here they are advantageously designed to be even, i.e. planar.

For realizing the form fit between the maxillary and mandibular positioning means so as to produce a defined relative position of the two miniplast splints toward each other in a transverse direction, the
25 maxillary positioning means, in a particularly advantageous manner, comprises a maxillary guiding surface that extends substantially in the longitudinal direction and approximately in the vertical direction.

Analogously, the mandibular positioning means likewise comprises a mandibular guiding surface that extends substantially in the longitudinal
30 direction and approximately in the vertical direction. In this context, it is particularly advantageous if the guiding surfaces are designed to be

complementary to each other. In this way, the form fit between the guiding surfaces and thus between the positioning means can be realized when the teeth are closed. By means of the corresponding orientation of the guiding surfaces, which are basically vertical and approximately
5 parallel to a central plane, the relative position can be advantageously defined in the transverse direction.

In a further particularly advantageous embodiment, the maxillary positioning means comprises a maxillary positioning surface that extends substantially in the longitudinal direction and predominantly in the
10 vertical direction. Analogously, the mandibular positioning means comprises a mandibular positioning surface that extends substantially in the transverse direction and predominantly in the vertical direction. Likewise, it is particularly advantageous to design the positioning surfaces to be complementary to each other. By means of the form fit of
15 the positioning surfaces, the relative position of the miniplast splints toward each other can consequently be defined in a longitudinal direction.

Thus, it is particularly advantageous to design the positioning means with both guiding surfaces and positioning surfaces. Thus, the relative
20 position of the miniplast splints can be defined in the longitudinal direction and in the transverse direction.

In this regard, it can also be provided that the miniplast splints come into contact, the positioning means forming a form fit, before the miniplast splints are placed, wherein it is advantageously provided that,
25 first, the miniplast splints are each placed on the corresponding rows of teeth and the form fit occurs only when the teeth are being closed. In this context, it is initially immaterial whether the form fit and thus the relative position occur upon a beginning closing of the teeth or just finally once the miniplast splints bear completely against each other.

With regard to a pleasant wearing comfort of the miniplast splints and to ensuring the required relative position, it is further particularly advantageous if the guiding surfaces are inclined to the outside, deviating from the vertical direction, at an angle of between 1° and 10°.

5 In case of the miniplast splints not corresponding exactly centrically on top of each other in the transverse direction, this inclination of the guiding surfaces ensures that an unhindered closing can still take place upon closing of the teeth and that the guiding surfaces can slide on each other until the teeth are completely closed with a corresponding relative

10 displacement of the miniplast splints into the desired position in the transverse direction.

Likewise, it is particularly advantageous if the positioning surfaces are inclined forward, deviating from the vertical direction, at an angle of between 10° and 40°. Corresponding to the potentially larger deviation

15 of the miniplast splints toward each other in the longitudinal direction when the teeth are open, the corresponding inclination of the positioning surfaces also leads to an advantageous guiding of the miniplast splints toward each other when the teeth are being closed. The direction in which the guiding surface and the positioning surface is to be inclined,

20 deviating from the vertical direction, is obvious to the person skilled in the art when considering the closing possibility of the miniplast splints starting from the open teeth.

According to the invention, the positioning means are intended to be arranged on the respective miniplast splint at the left and right side in

25 the molar area. This means that at least two positioning means per miniplast splint have to be present. This is particularly advantageous with regard to the fact that the structural space required for the positioning means or the space needed in the respective molar area can be taken up without unduly impairing the patient wearing them. In this

30 context, it further is particularly advantageous if the positioning means are located at the outer side of the row of teeth. This means that the

positioning means are located in the area of the cheek between the teeth and the cheek.

In this context, it further is especially advantageous for the use in particular in sleep apnea therapy if the mandibular positioning means is
5 arranged outside and in front of the maxillary positioning means. In the case of the advantageous guiding surfaces this means that the maxillary guiding surface is arranged between the rows of teeth and the mandibular positioning means, which is consequently arranged between the cheek and the maxillary positioning means.

10 The guiding of the mandibular miniplast splint and of the mandibular row of teeth when closing the teeth with a movement relatively forward in relation to the maxillary row of teeth leads to an advantageous arrangement of the mandibular positioning surface in front of the maxillary positioning surface. Thus, likewise, the mandibular miniplast
15 splint can be pulled forward along the positioning surface by closing the teeth if the positioning surfaces are advantageously inclined.

A particularly comfortable way of wearing and also an advantageous embodiment in the sense of a particularly inexpensive solution and of an advantageous cleaning is ensured if the positioning means are arranged
20 above the occlusal plane and in relation to the respective miniplast splint above the contact surface, respectively. This means that the maxillary miniplast splint is arranged with the maxillary positioning means entirely above the contact surface and above the occlusal plane. In contrast, the mandibular miniplast splint is designed such that its
25 mandibular positioning means is arranged above the occlusal plane and above the contact surfaces and thus at the level of the maxillary miniplast splint.

A particularly cost-effective implementation and at the same time easy cleaning is ensured if in the occlusal splint arrangement either the
30 maxillary or the mandibular miniplast splint comprises the positioning

means integrally. In the case of two present positioning means per
minioplast splint this means that the two associated positioning means are
assigned to the respective minioplast splint as an integral component. In
this way, production costs can be lowered and, in particular because of
5 the integral structure, no unnecessary joints and cracks can form, which
minimizes the deposition of dirt. Further, it is advantageous to choose an
integrated structure because it can advantageously influence the stability
of the positioning means on the respective minioplast splint.

Further, it is particularly advantageous if the minioplast splint is
10 correspondingly produced from a single material as a single component.
However, this does not apply to embodiments that comprise reinforcing
elements, for example, which are embedded in the minioplast splint, such
as wire bows, or in which the tooth receptacle for positioning the
minioplast splint on the respective row of teeth is formed by a different
15 material than the actual carrier of the minioplast splint, which should
integrally comprise at least the positioning means.

With regard to the positioning means present according to the invention,
which are exchangeable and can replace each other, it is particularly
advantageous if they have positioning surfaces that are arranged
20 differently toward each other viewed in the longitudinal direction
relative to the mounting means. This means that the variation of the
relative position of the minioplast splints toward each other can be
realized in that the respective positioning means have corresponding
individual distances from the positioning surface to the mounting means.
25 In consequence, switching the positioning means causes a change of the
positioning surfaces and thus a variation of the relative position in the
longitudinal direction.

For the implementation of the mounting means it is intended according
to the invention to use a centering pin that is cast into the minioplast
30 splint. In doing so, the centering pin can simultaneously cause a
centering of the positioning means and make available a fastening for the

positioning means. Correspondingly, the exchangeable positioning means has a centering recess that is complementary to the centering pin for mounting to the miniplast splint. For example, the centering pin can be a blanked sheet metal part, which can be anchored in the miniplast splint
5 by casting, for example.

Corresponding to the design of the positioning means with a centering recess, the positioning surfaces are designed with different distances to the centering recess so as to realize different relative positions of the miniplast splints toward each other.

10 Taking into account an inclined positioning surface, and in particular in the case of a slightly inclined guiding surface and of the wearing performance in the mouth to be taken into account, it is intended according to the invention that the exchangeable positioning means is designed in the shape of a fin. In this case, the latter can come to bear
15 with a bottom side against the contact surface of the associated miniplast splint, wherein at least a portion of a lateral flank forms the guiding surface and at least a portion of a front edge produces the positioning surface.

Taking into account the expected structural size of the miniplast splints
20 and the available space usable without impairing comfort, it is particularly advantageous if the exchangeable positioning means has a height of between 5 mm and 30 mm above the contact surface, in particular of between 12 mm and 18 mm. In this context, the exchangeable positioning means can protrude slightly beyond the
25 respectively other miniplast splint. In this way, a reliable guiding and a reliable form fit between the maxillary and the mandibular positioning means are ensured.

The shaping of the guiding surface is initially immaterial as long as a corresponding form fit when closing the teeth and an association of the
30 miniplast splints on top of each other is possible. In this regard, the

guiding surface can be curved or plane. Taking into account the regular shaping of miniplast splints and the arrangement of the positioning means on the miniplast splints and taking into account a slight inclination deviating from the vertical direction, the guiding surfaces are
5 to be designed preferably mainly even or with a very slight curvature.

The design of the positioning surfaces is also initially immaterial as long as a corresponding form fit between the positioning surfaces is possible when closing the teeth. The positioning surfaces can be designed to be curved or also plane. In a curved embodiment of the positioning
10 surfaces, if the relative position of the miniplast splints in the longitudinal direction does not exactly coincide, a closing movement of the teeth will generally lead to an initially forward-rushing and finally slower forward motion of the positioning means correspondingly lying in front together with the associated miniplast splint. However, the more
15 complex shaping is disadvantageous for realizing complementary shapes between the mandibular and maxillary positioning surfaces, in particular when taking into account the exchangeability of the positioning means. In consequence, a plane design is particularly suited in this case.

In the following figures, an advantageous embodiment of an occlusal
20 splint arrangement according to the invention and possible variations for the exchangeable positioning means will be outlined.

In the figures:

- Fig. 1 shows an exemplary embodiment of an occlusal splint arrangement according to the invention in a perspective
25 view;
- Fig. 2 the maxillary miniplast splint for the design of Fig. 1;
- Fig. 3 the mandibular miniplast splint for the design of Fig. 1;
- Fig. 4 the occlusal splint arrangement of Fig. 1 in a lateral view;

- Fig. 5 the maxillary miniplast splint of Fig. 4;
- Fig. 6 the exchangeable positioning means for Fig. 4;
- Fig. 7 the mandibular miniplast splint for Fig. 4;
- Fig. 8 a cut through the occlusal splint arrangement;
- 5 Fig. 9 different positioning means for different relative positions;
- Fig. 10 alternative embodiments of the positioning surface.

In **Figure 1**, an exemplary occlusal splint arrangement is outlined. The structure with the maxillary miniplast splint 02 and with the mandibular miniplast splint 12 on the lower side is visible. The maxillary miniplast splint 02 comprises a corresponding teeth receptacle 03 for arrangement
 10 on the maxillary row of teeth. Analogously, the mandibular miniplast splint 12 correspondingly comprises a teeth receptacle 13 (lying covered below) for arrangement of the mandibular miniplast splint 12 on the mandibular row of teeth. Each of the miniplast splints 02, 12 comprises a
 15 positioning means 05 and 22, respectively, on both sides in the molar area. It is already recognizable that the maxillary positioning means 05r on the right side and 05l on the left side form an integral component of the maxillary miniplast splint 02. The mandibular positioning means 22, on the other hand, is designed as an exchangeable positioning means 22r
 20 for the right side and 22l for the left side. In each case, it is mounted on a mounting means in the form of a centering pin 15r and 15l, respectively.

Each of the positioning means 05, 22 has guiding surfaces 07, 24. They serve to center and guide the miniplast splints 02, 12 relative to each
 25 other in the transverse direction (Y). The positioning in the longitudinal direction (X) is realized by means of the opposing positioning surfaces 06 and 23.

In **Figure 2**, the maxillary miniplast splint 02 is outlined once more in this regard. Again, the arrangement of the teeth receptacle 03 for placement of the maxillary miniplast splint 02 on the patient's maxillary row of teeth is visible. Further, the positioning means 05r and 05l in the molar area are visible, each with a guiding surface 07 and a positioning surface 06. The contact surface 04 is located on the bottom side (lying covered), which in this case has an even shape and is intended to bear against the respective other miniplast splint 12.

Figure 3 outlines the mandibular miniplast splint 12 of Fig. 1, in which the teeth receptacle 13 is positioned at the bottom (covered)(as in Fig. 1). The illustrated top side forms the contact surface 14, which is also formed even and is intended to abut against the maxillary contact surface 04 of the maxillary miniplast splint 02.

The relative position between the miniplast splints 02, 12 is realized in this case by means of exchangeable positioning means 22r, 22l, each of which has a guiding surface 24, which is complementary to the maxillary positioning means 05, and a corresponding complementary positioning surface 23. Further, the outlined manner of attachment of the positioning means 22 on the mandibular miniplast splint 12 is visible, which takes place by means of centering pins 15l, 15r that are anchored in the base body of the miniplast splint. In this case, the exchangeable positioning means 22 appears in the manner of a fin, in which the surface facing toward the center forms the guiding surface 24 and the front edge of the fin lying toward the rear forms the positioning surface 23.

In **Figure 4**, again, the occlusal splint arrangement 01 of Fig. 1 is outlined in the lateral view. The arrangement of the contact surfaces 04 of the maxillary miniplast splint 02 opposite of the contact surface 14 of the mandibular miniplast splint 12 is visible, said contact surfaces 04 substantially lying in the occlusal plane 09 when the teeth are closed. Here, it can further be seen that the maxillary positioning means 05 of the maxillary miniplast splint 02 is located entirely above the contact

surface 04, whereas the mandibular positioning means 22 is arranged above the corresponding contact surface 14 on the mandibular miniplast splint 12. Further, the design of the positioning surfaces 06, 23 is visible, which are designed basically even, but inclined forward with respect to the vertical direction (Z). Further (comp. Fig. 1), it is to be taken into account that the mandibular positioning means 22 is located outside and in front of the maxillary positioning means 05. In this manner, it is ensured for effective sleep apnea therapy that the mandibular miniplast splint 12 and thus the lower jaw is pulled forward when the teeth are closed.

In **Figure 5**, additionally to Fig. 4, the maxillary miniplast splint 02 is outlined again in the lateral view, with the positioning surface 06 oriented in the transverse direction (Y) and in the vertical direction (Z) and the guiding surface 07 of the maxillary positioning means 05 oriented in the longitudinal direction (X) and in the vertical direction (Z).

In addition to Fig. 4, **Figure 6** outlines the exchangeable positioning means 22 in the manner of a fin with a centering recess 25 for placement of the positioning means 22 on a correspondingly associated centering pin 15. Herein, a lateral surface of the fin as the positioning means 22 forms the guiding surface 24, a front edge of the fin forming the positioning surface 23 of the positioning means 22. Also visible is the distance 26 between the positioning surface 23 and the centering recess 25, which 26 is crucial for determining the relative position of the two miniplast splints 02, 12 toward each other.

In addition to Fig. 4, **Figure 7** shows the mandibular miniplast splint 12, but without its associated positioning means 22. The mounting means is visible as a centering pin 15, which protrudes beyond the contact surface 14 and is embedded with an anchor 16 in the miniplast splint 12.

Additionally, **Figure 8** outlines a cut through the occlusal splint arrangement 01, wherein the latter is outlined in an exploded illustration on the left side and in a position one on top of the other on the right side. Again, the arrangement of the maxillary miniplast splint 02 with the maxillary teeth receptacle 03 and, on the opposite side, the mandibular miniplast splint 12 with the corresponding teeth receptacle 13 is visible. Each of said miniplast splints 02, 12 has corresponding contact surfaces 04, 14, respectively, which come to bear against each other in the occlusal plane 09 when the teeth are closed. The relative guiding in the transverse direction (Y) is ensured by means of the guiding surfaces 07 in contact with the guiding surfaces 24. Said guiding surfaces 07, 24 are inclined to the outside with regard to the vertical direction (Z) by an angle of inclination 19. Thus, it is ensured that the guiding surfaces 07, 24 find each other when the teeth are being closed, without the mandibular positioning means 22 colliding with the contact surface 04 of the maxillary miniplast splint 02.

Further, the manner of attachment of the exchangeable positioning means 22 to the mandibular miniplast splint 12 by placing the centering recess 25 on the centering pin 15 is visible.

Figure sequence 9 now outlines the possibility of relative arrangement between the maxillary miniplast splint 02 and the mandibular miniplast splint 12, which is substantial to the invention. Herein, the relevant distance 26 between the positioning surface 23 and the centering recess 25 is varied in each case, with a small distance 26a in Fig. 9a, a medium distance 26b in Fig. 9b and a larger distance 26c in Fig. 9c.

Finally, **Figs. 10** outline alternative embodiments for the positioning surface 23 of the positioning means 22, wherein it is obvious that the complementary positioning surface 26 should have a corresponding shape. The concave shape of the positioning surface 23u is visible in Fig. 10u, the convex positioning surface 23v in Fig. 10v and an angled positioning surface 23w in Fig. 10w.

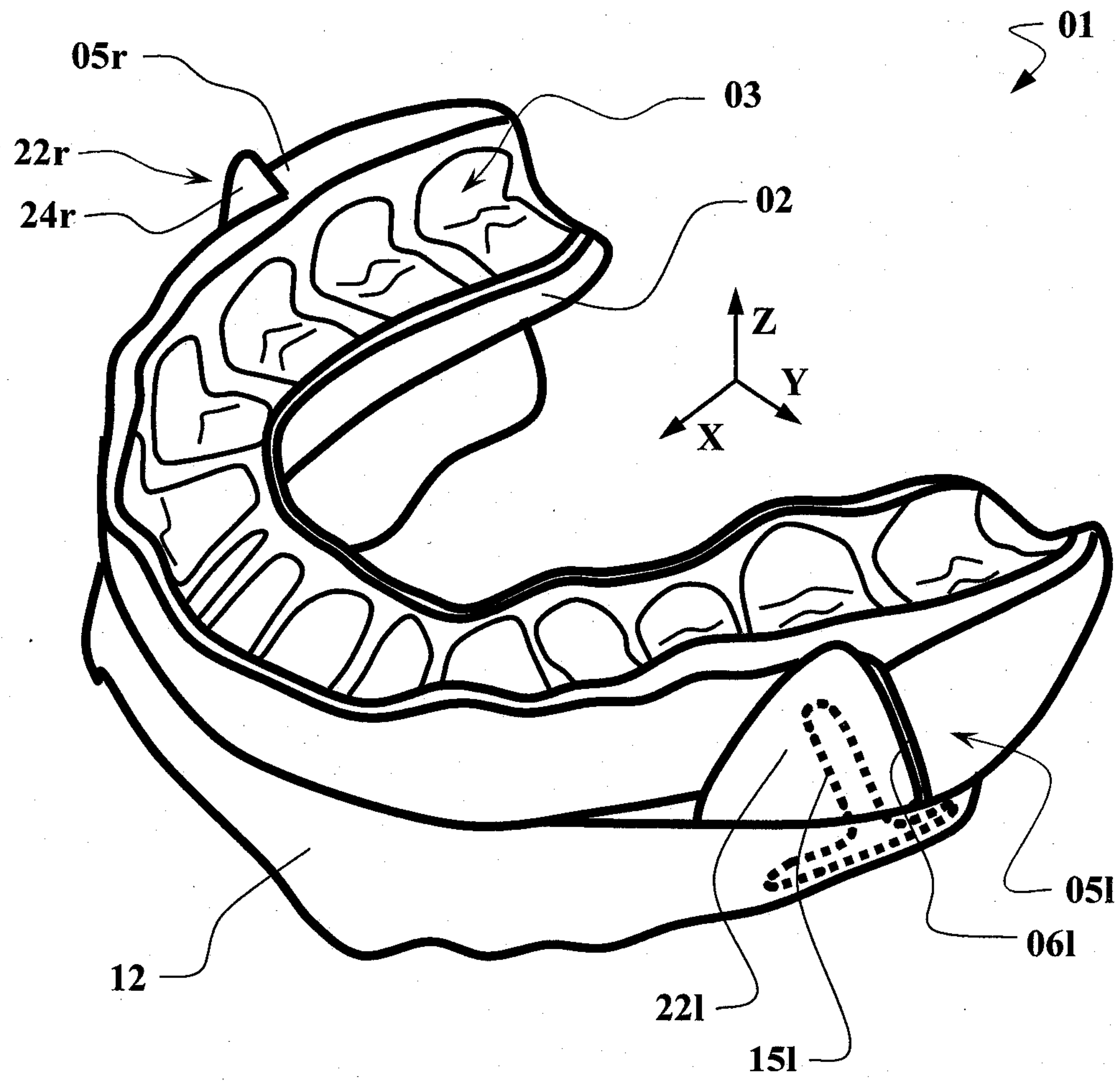
Claims

- I. An occlusal splint arrangement for sleep apnea therapy, the occlusal splint arrangement comprising:
 - a maxillary miniplast splint arrangeable on a maxillary row of teeth; and
 - a mandibular miniplast splint arrangeable on a mandibular row of teeth, wherein the maxillary miniplast splint can be brought to bear against the mandibular miniplast splint, and wherein the miniplast splints include even contact surfaces that substantially oppose each other in an occlusal plane having at least one maxillary positioning guide and at least one mandibular positioning guide, wherein the relative position of the miniplast splints toward each other is definable in a longitudinal direction and/or in a transverse direction by a form fit between the maxillary and the mandibular positioning guides, and wherein each miniplast splint includes one positioning guide arranged on one side in a molar area and another positioning guide on another side in the molar area, and wherein the maxillary and/or mandibular miniplast splint includes at least one centering pin, wherein at least two different positioning guides on the same miniplast splint are alternatively securable to the centering pin of the same miniplast splint, whereby at least two different relative positions are definable between the miniplast splints, and wherein the alternatively securable positioning guides are exchangeable, each exchangeable positioning guide having a centering recess that is complementary to the centering pin for mounting to the miniplast splint, and each exchangeable positioning guide being attachable by placing the centering recess on the centering pin, and the centering pin simultaneously allowing a centering of the exchangeable positioning guide and an attachment of the exchangeable positioning guide, and the exchangeable positioning guide being formed in the shape of a fin, a bottom side of the fin coming to bear on the contact surface of the associated miniplast splint and a portion of a lateral flank of the fin forming the guiding surface and a portion of a front edge of the fin forming the positioning surface, wherein the centering pin is anchored by being cast into the miniplast splint and protrudes beyond the contact surface.

2. The occlusal splint arrangement according to claim 1, wherein the maxillary positioning guide has a maxillary guiding surface that extends substantially in the longitudinal direction and approximately in the vertical direction, and the mandibular positioning guide has a complementary mandibular guiding surface that extends substantially in the longitudinal direction and approximately in the vertical direction, the relative position of the miniplast splints toward each other being definable in the transverse direction by a form fit of the guiding surfaces.
3. The occlusal splint arrangement according to claim 1, wherein the maxillary positioning guide has a maxillary positioning surface that extends substantially in the transverse direction and mainly in the vertical direction, and the mandibular positioning guide has a complementary mandibular positioning surface that extends substantially in the transverse direction and mainly in the vertical direction, the relative position of the miniplast splints toward each other being definable in the longitudinal direction by a form fit of the positioning surfaces.
4. The occlusal splint arrangement according to claim 2, wherein the guiding surface is inclined to the outside deviating from the vertical direction at an angle of between 1° and 10° and/or the positioning surface is inclined forward deviating from the vertical direction at an angle of between 10° and 40° .
5. The occlusal splint arrangement according to claim 1, wherein the mandibular positioning guide is arranged outside and in front of the maxillary positioning guide.
6. The occlusal splint arrangement according to claim 1, wherein the maxillary and the mandibular positioning guides are arranged substantially above the respective contact surface of the maxillary and mandibular miniplast splint, respectively.
7. The occlusal splint arrangement according to claim 1, wherein the maxillary or the mandibular miniplast splint integrally includes the positioning guide.
8. The occlusal splint arrangement according to claim 1, wherein the exchangeable positioning guides that replace one another have positioning surfaces that are arranged differently to one another in the longitudinal direction relative to the centering pin.

9. The occlusal splint arrangement according to claim 8, wherein the exchangeable positioning guides that replace one another have different distances of the positioning surface to the centering recess.
10. The occlusal splint arrangement according to claim 1, wherein the exchangeable positioning guides have a height above the contact surface of between 12 mm and 18 mm.

1 / 5

*Fig. 1*

2 / 5

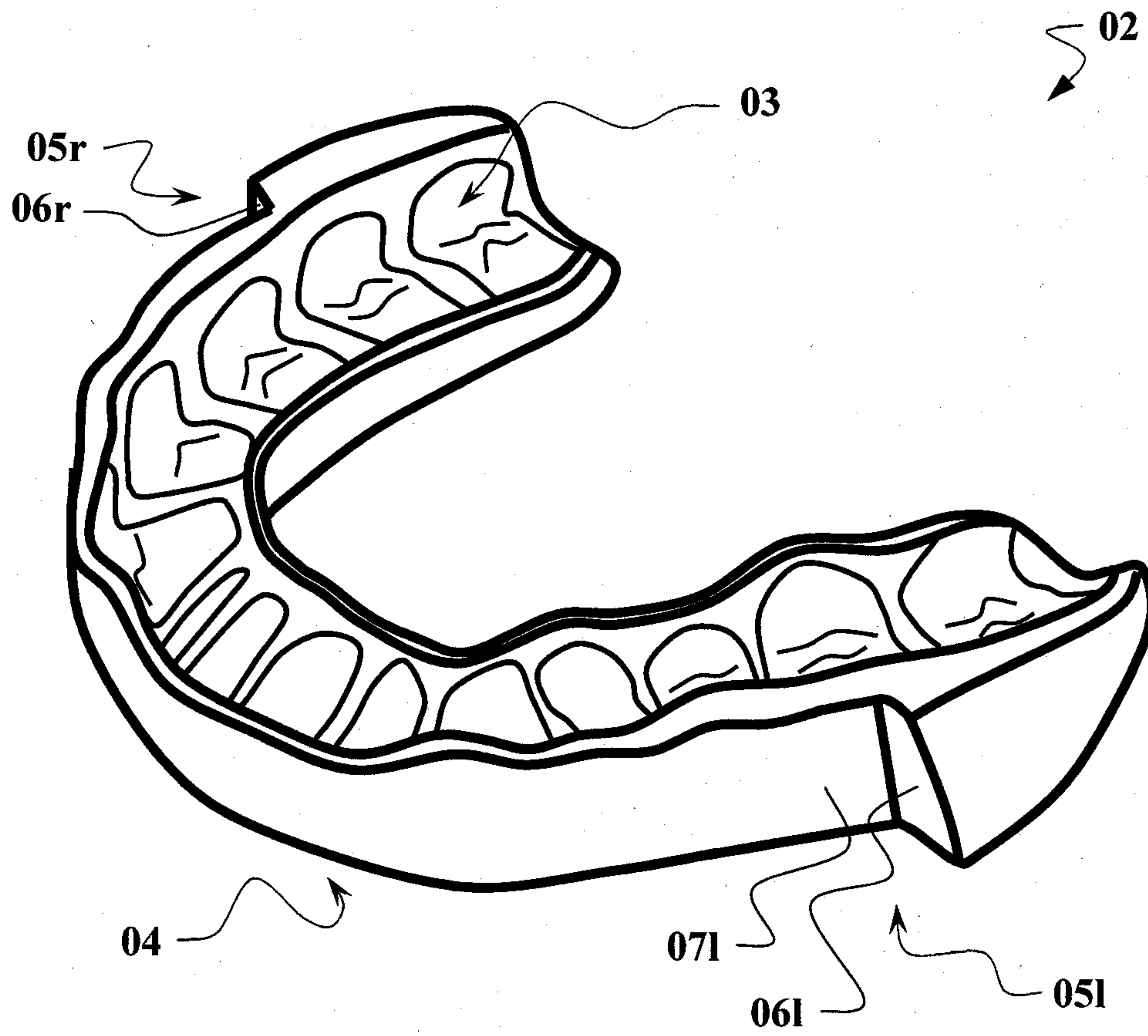


Fig. 2

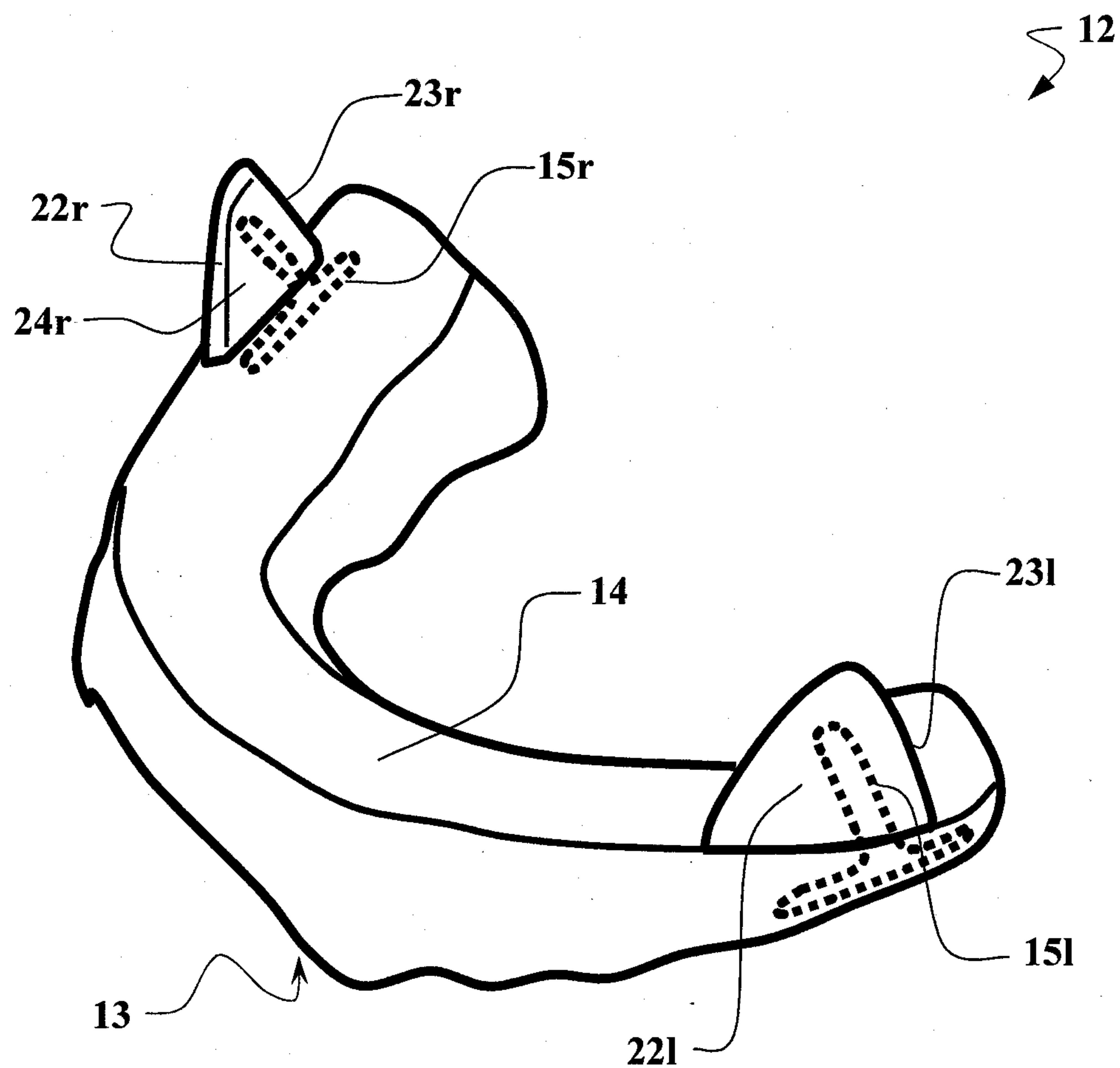


Fig. 3

4 / 5

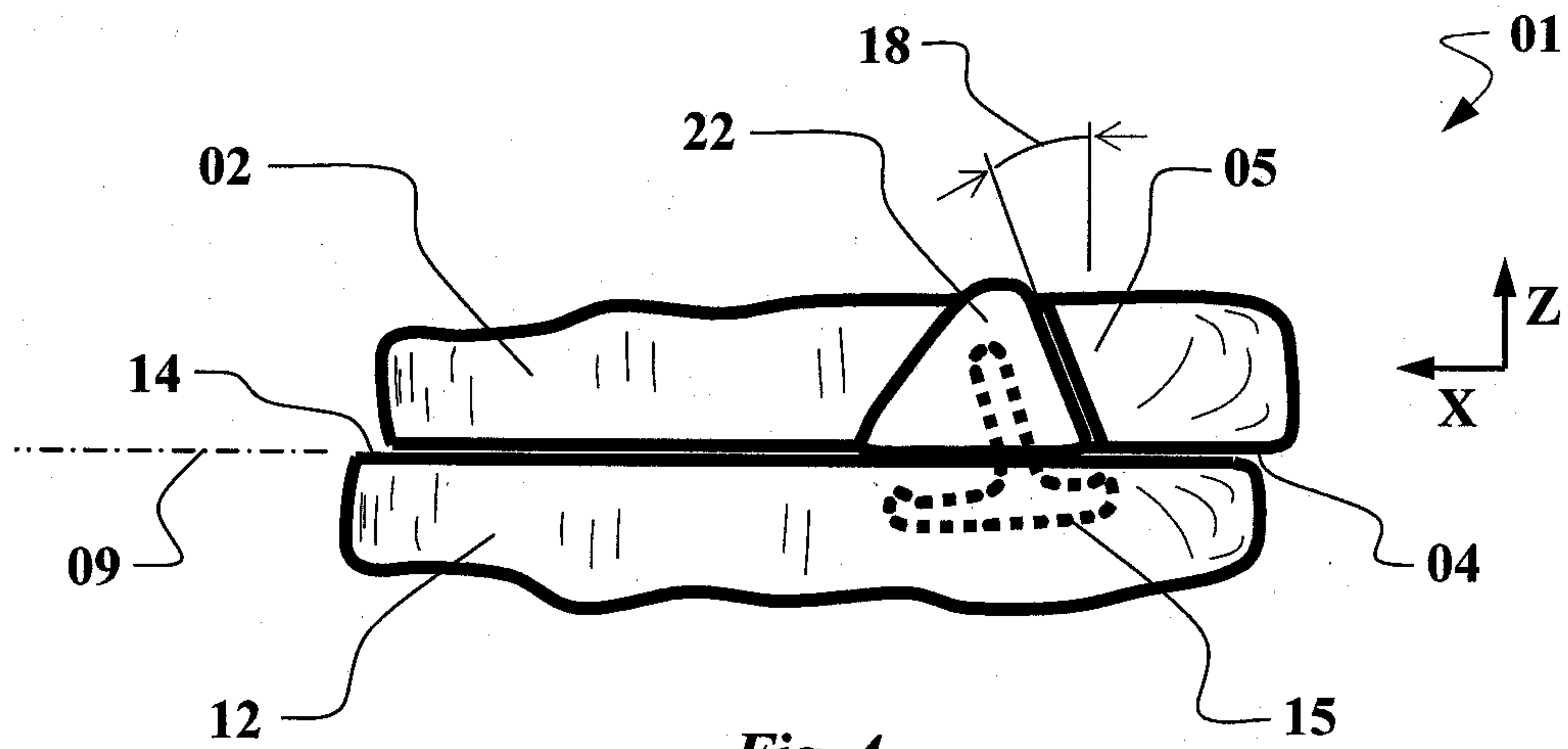


Fig. 4

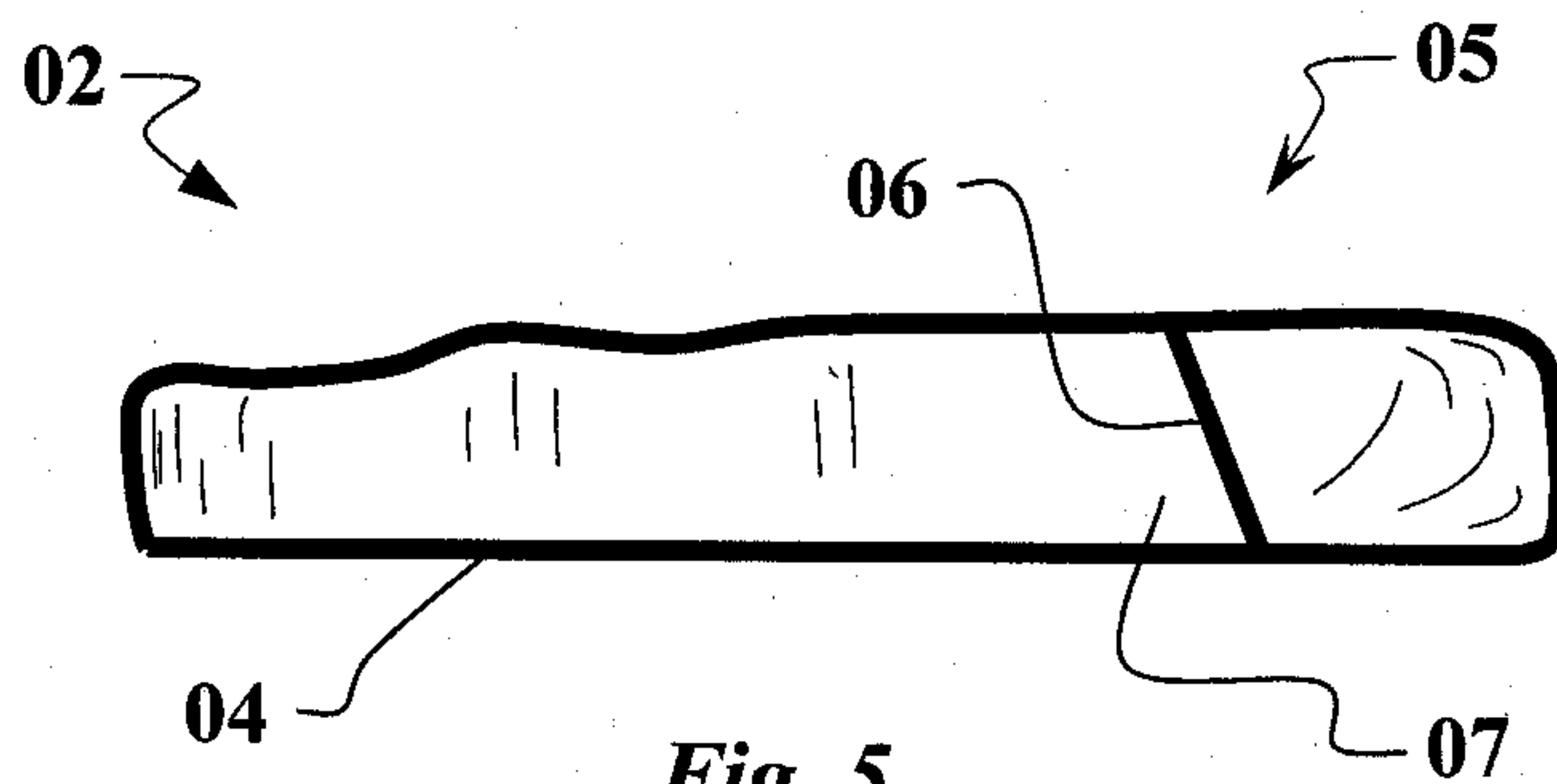


Fig. 5

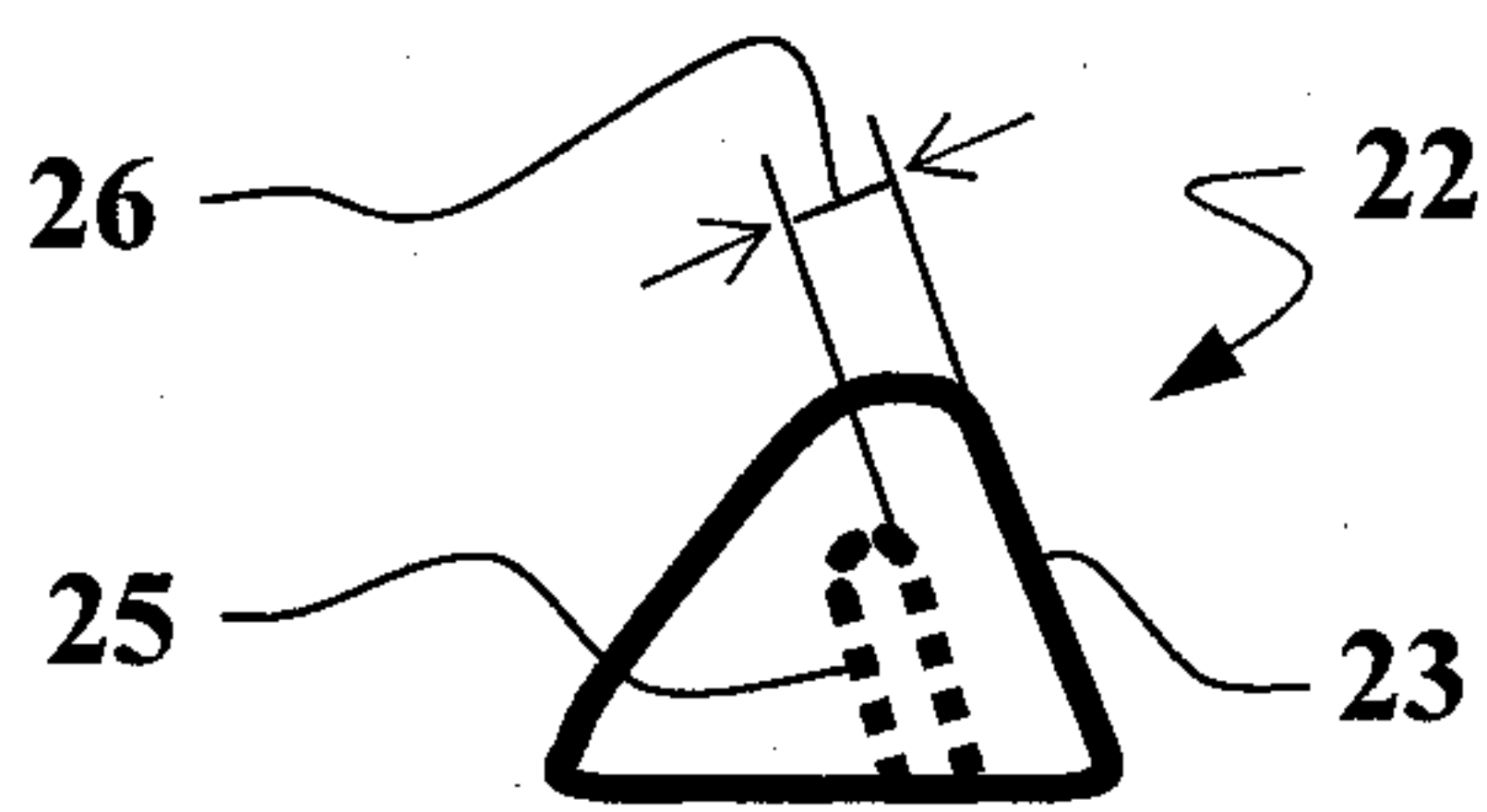


Fig. 6a

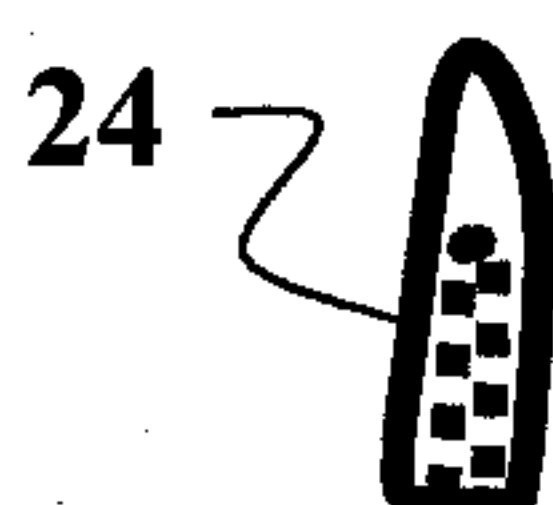


Fig. 6b

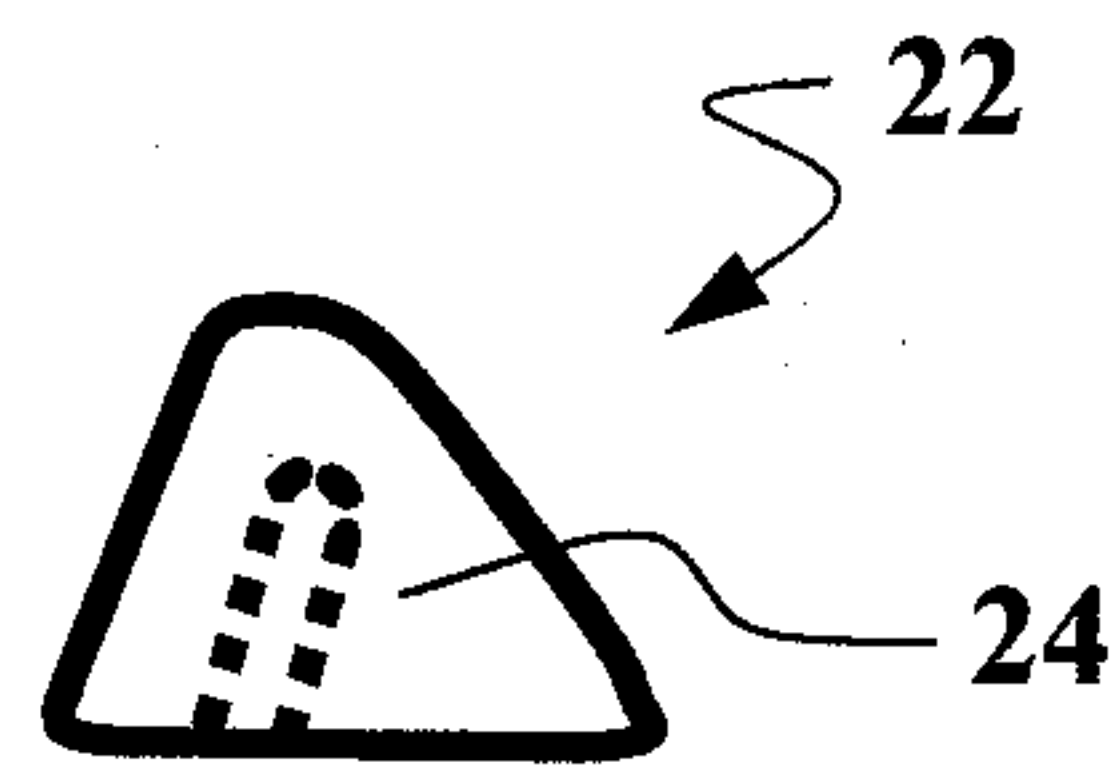


Fig. 6b

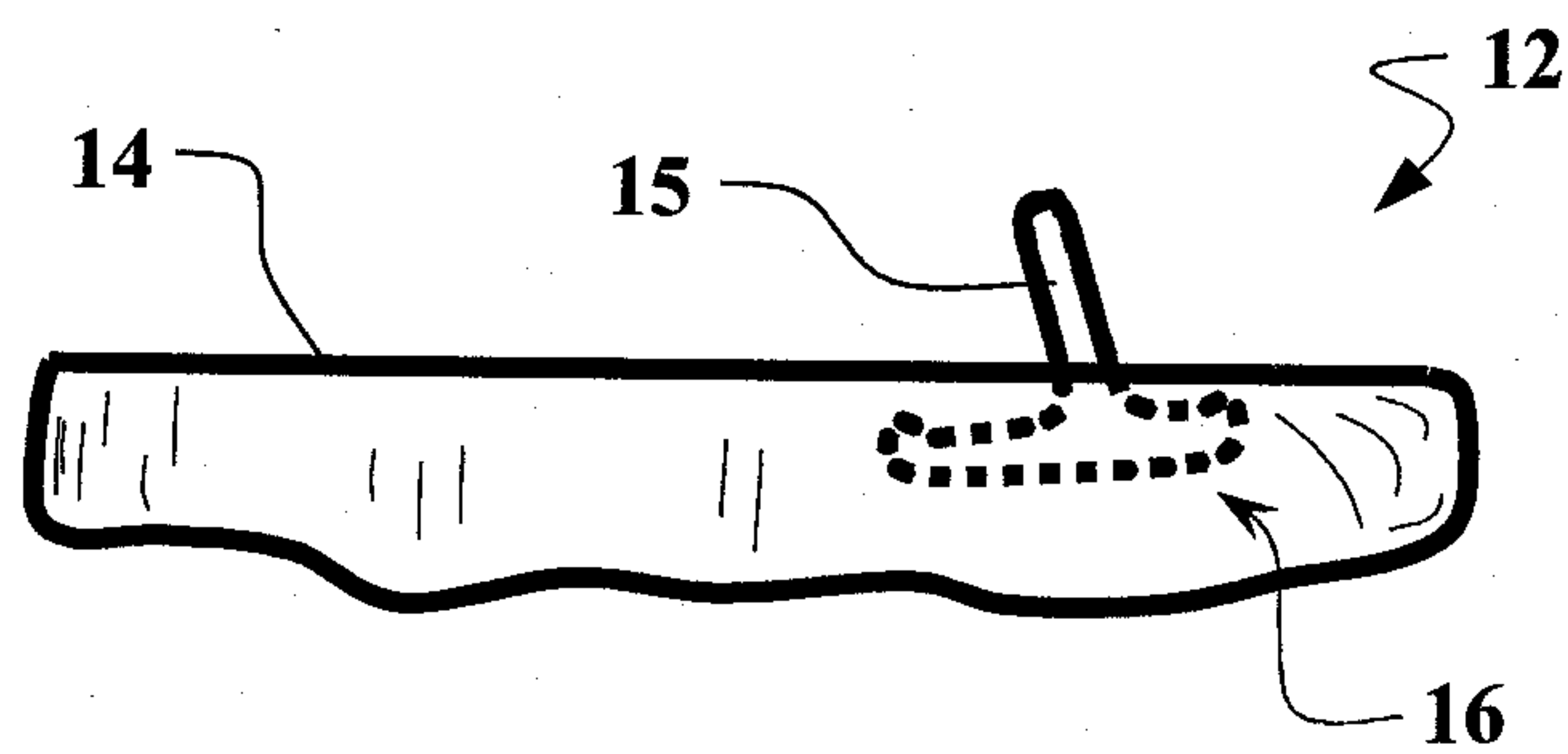


Fig. 7

5 / 5

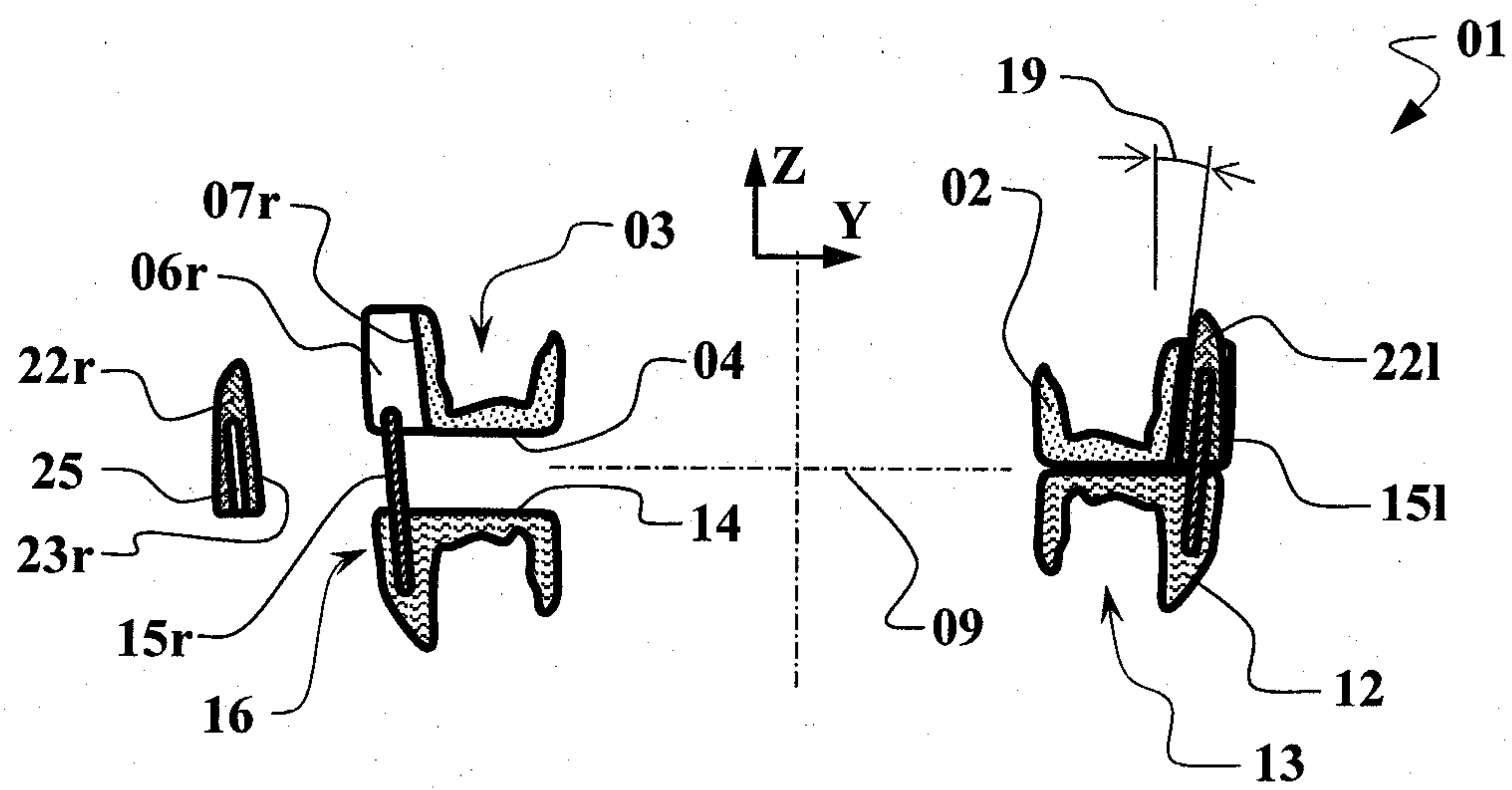


Fig. 8

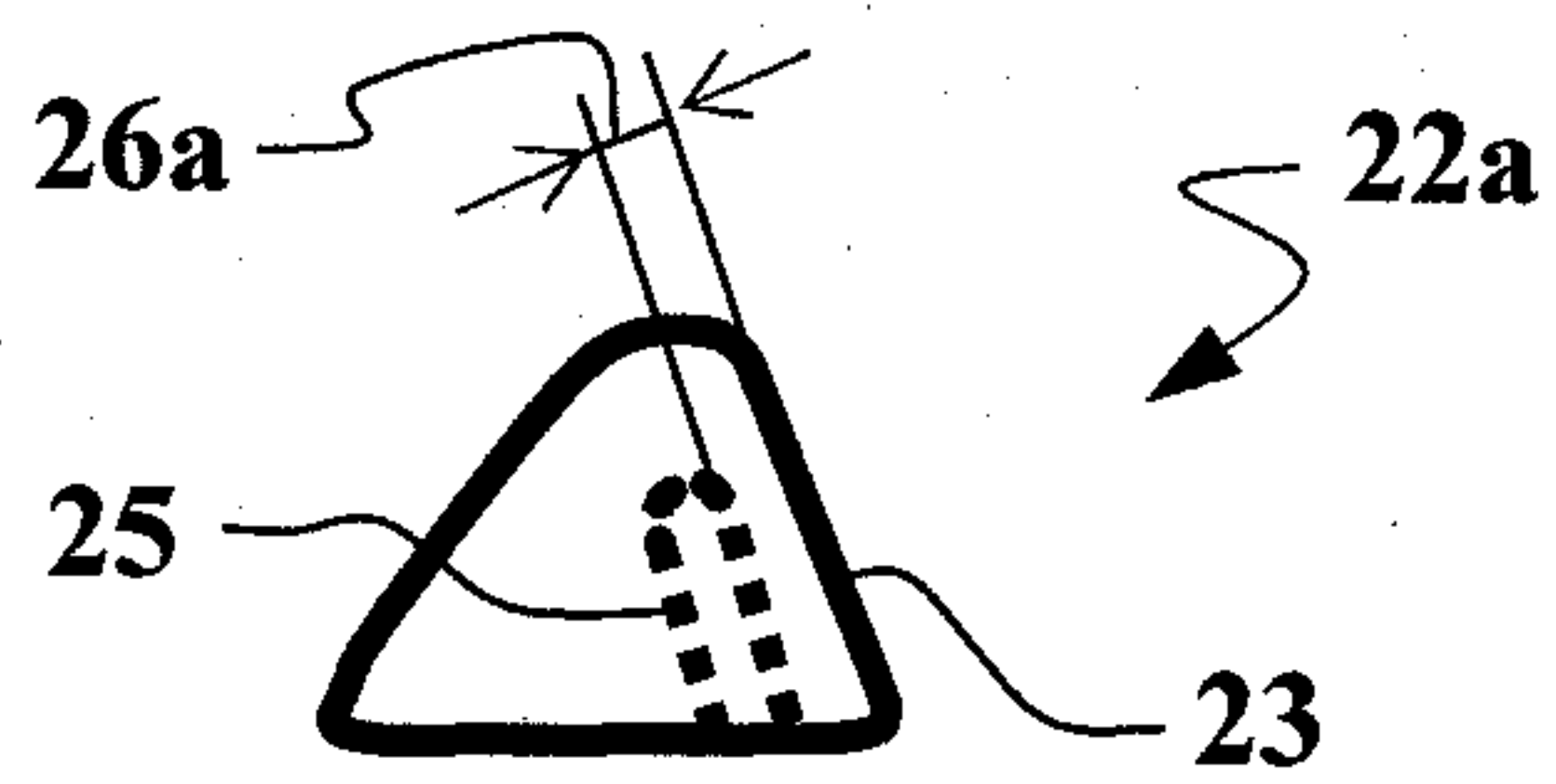


Fig. 9a

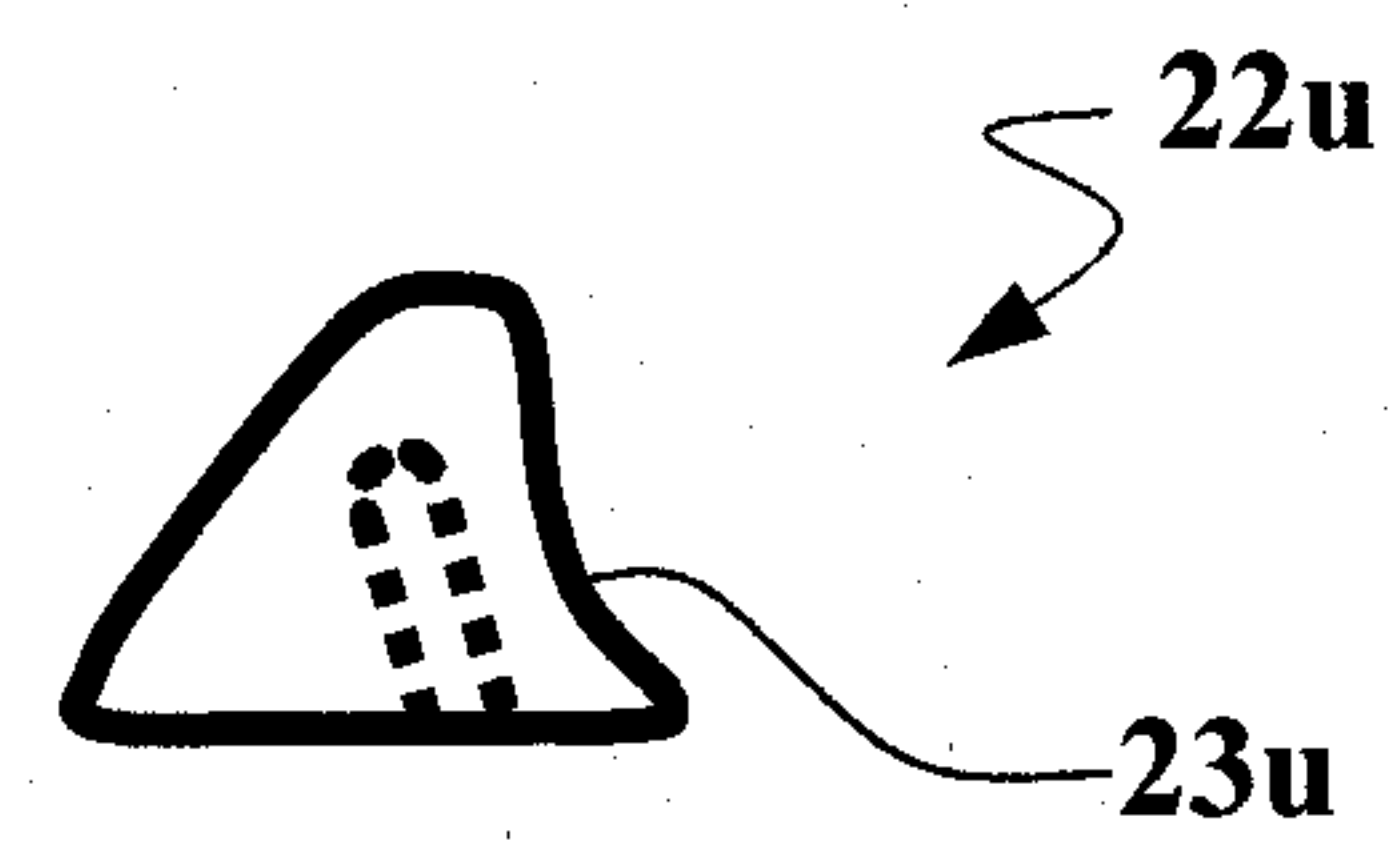


Fig. 10u

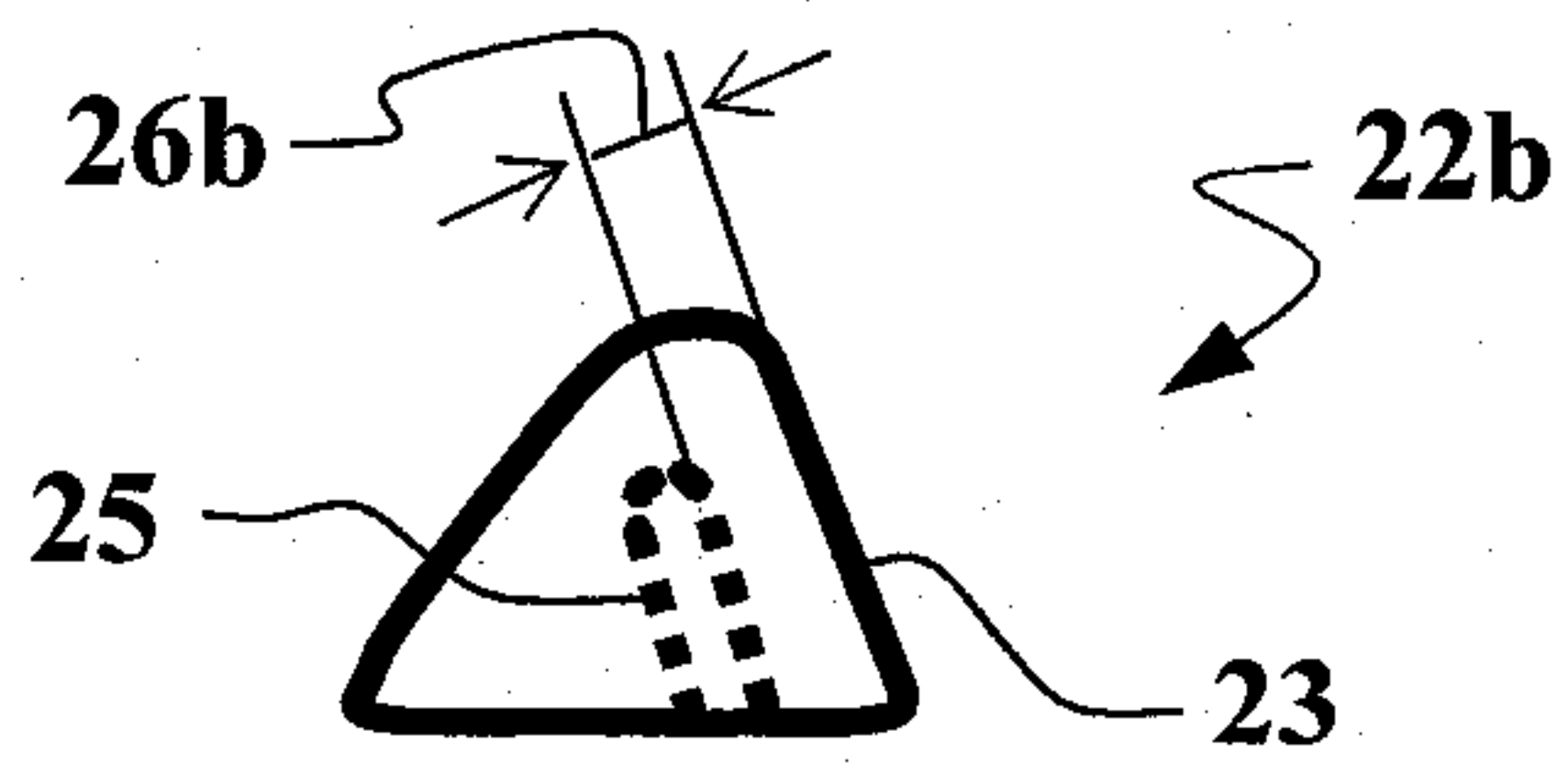


Fig. 9b

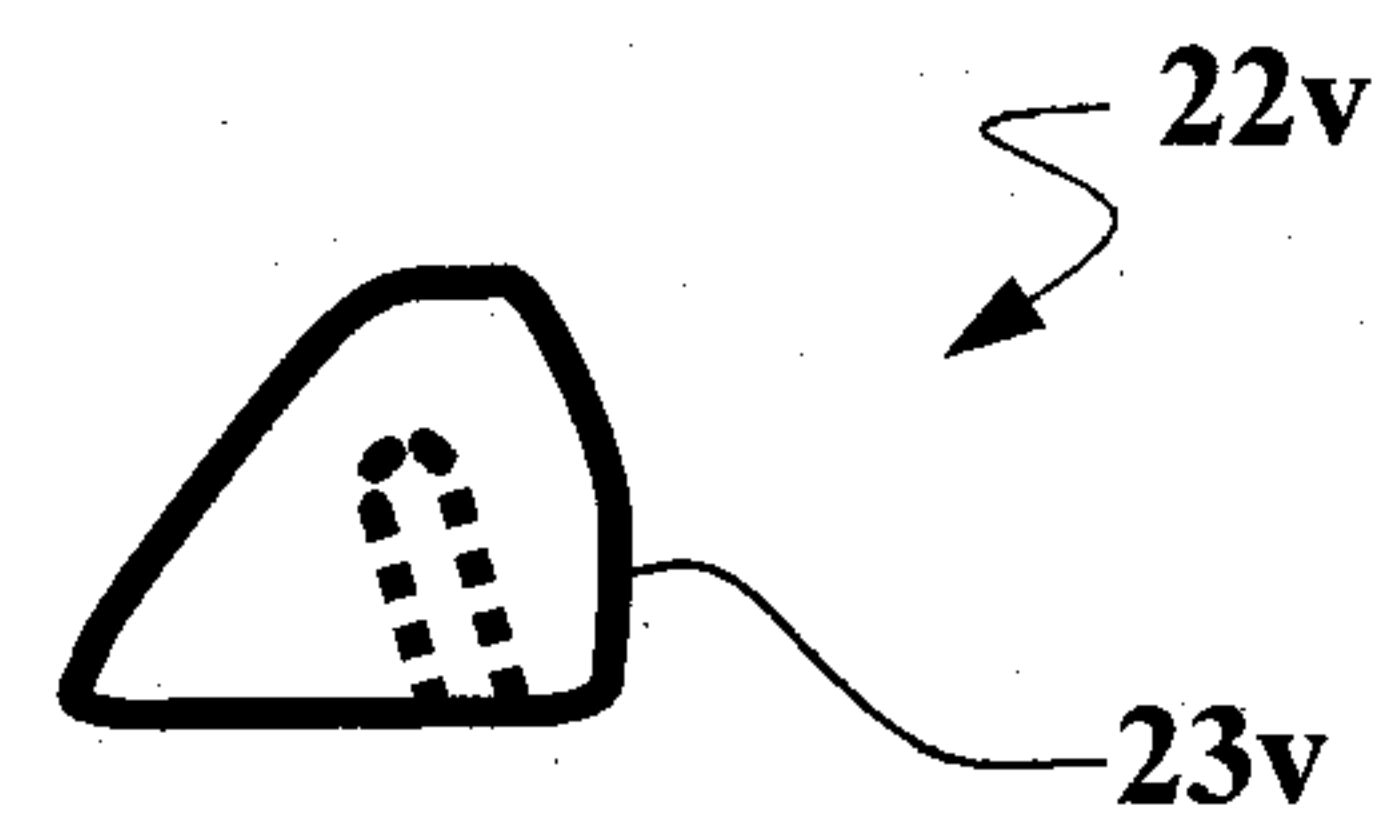


Fig. 10v

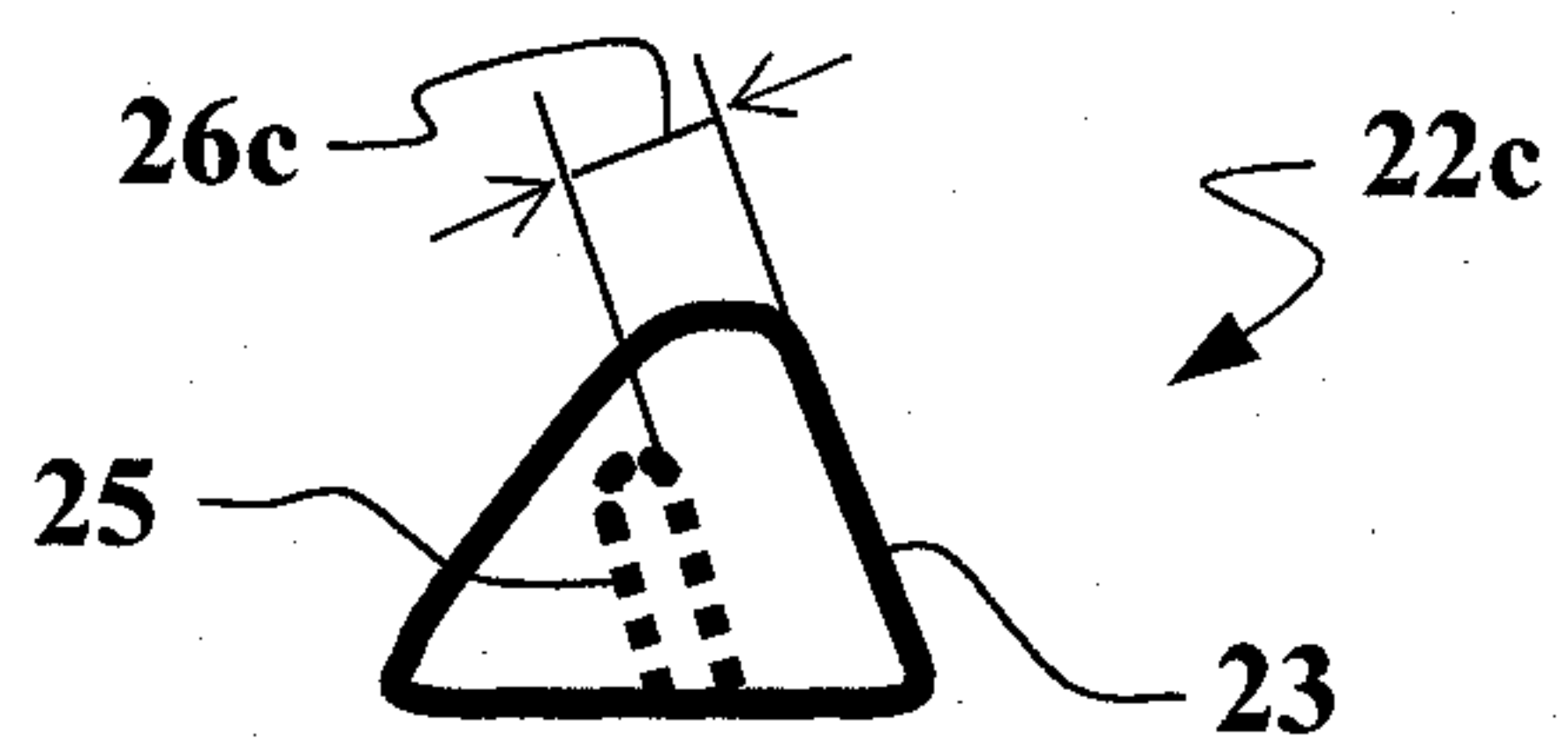


Fig. 9c

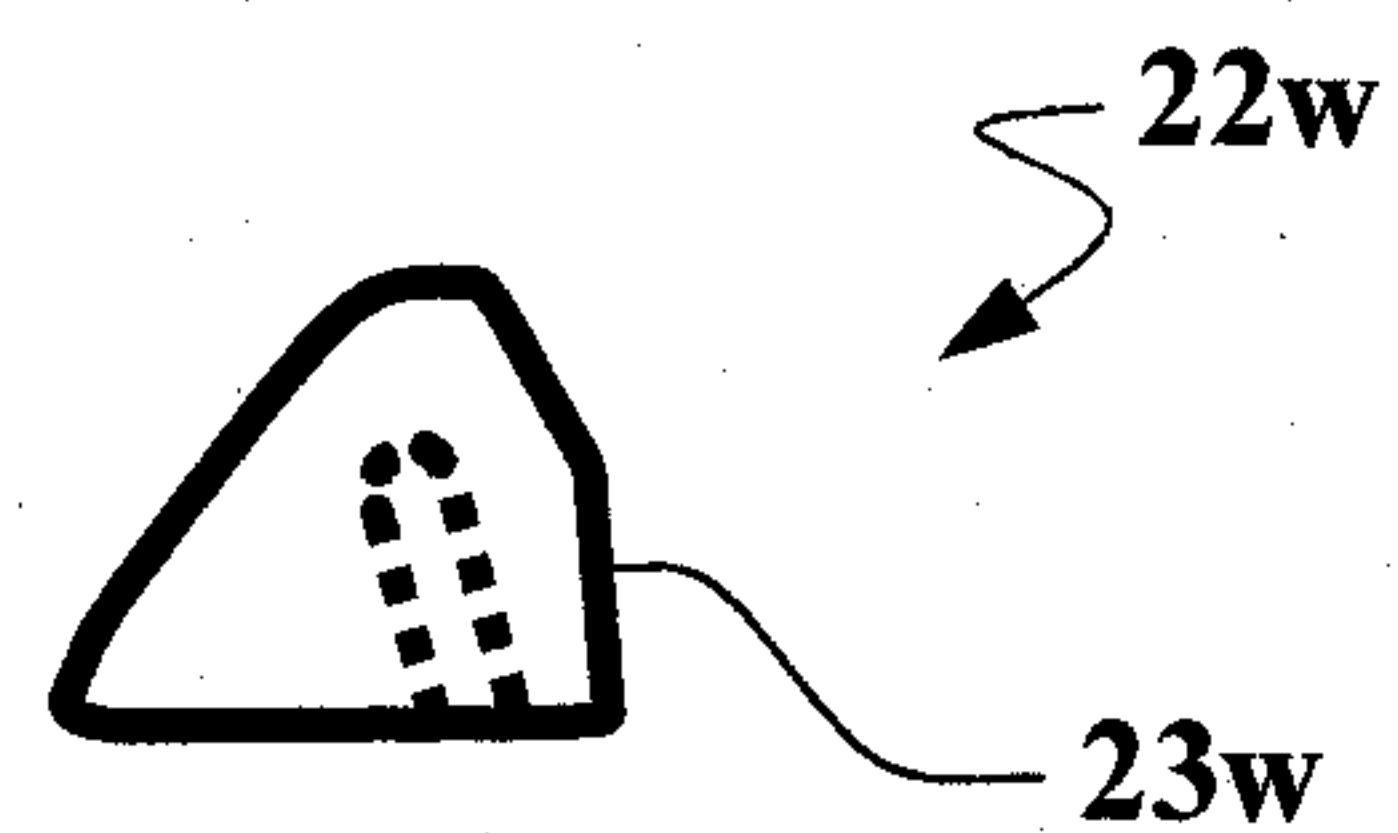


Fig. 10w

