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(54) Shaving systems with handle to razor head attachment mechanism and methods of performing same

(57) A shaving system comprising a razor head, a razor having a gripping portion and an engagement member which is integral with the razor and which is moveable relative to the gripping portion from a first position wherein the engagement member is aligned for engagement with the razor head to a second position wherein the engagement member is engaged with the razor head. The invention also comprises a locking mechanism for locking the engagement member to the razor when disposed in the second position. Embodiments of the invention also comprise methods of attaching a razor head to a razor comprising the steps of: providing a razor head, a razor having a gripping portion and an engagement member; aligning the razor with the razor head; moving the razor towards the razor head such that the engagement member moves from a first position to a second position and engages the razor head; and locking the engagement member in the second position with the razor head engaged.

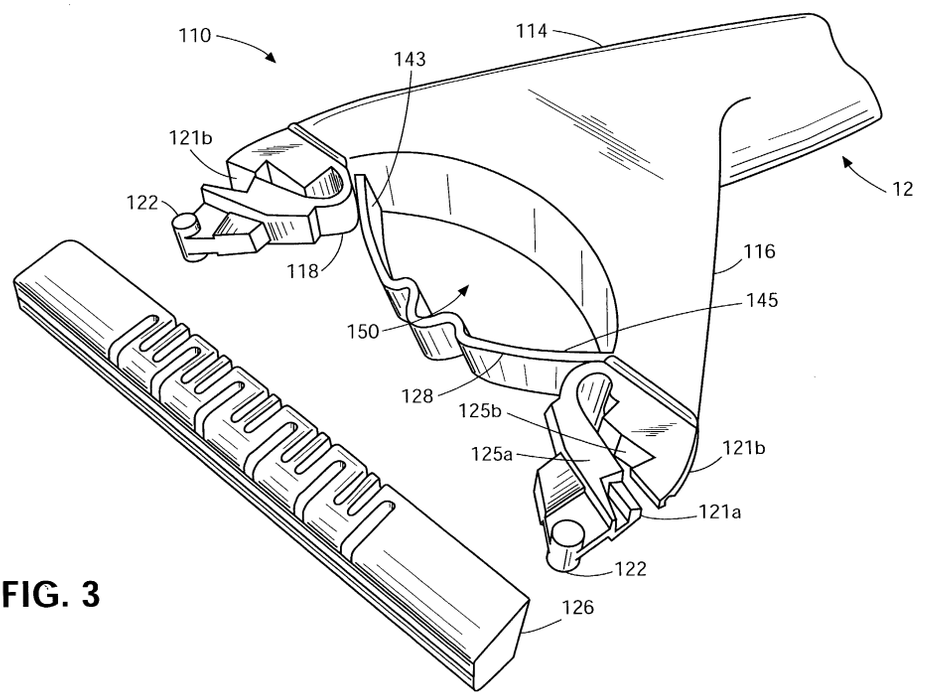

FIG. 3

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Description

[0001] The present invention relates to shaving systems having an integral engagement mechanism and methods for permanently attaching a razor head to a razor.

BACKGROUND

[0002] One common step in the manufacturing of a disposable shaving system is attaching the razor head to the razor in an effective, safe and simple manner. This is important from a manufacturing standpoint since simple and effective manufacturing techniques play a large role in reducing overall cost. As used herein, the term "disposable" is used to indicate that the razor head is permanently attached to a razor or handle, and has no relation to the useful life or number of shaves which should be expected from the claimed systems.

[0003] Known manufacturing techniques for disposable razors sometimes involve elastic deformation or plastic deformation of a portion of either the razor or the razor head during razor head attachment. For example, previously known techniques have involved taking advantage of the plastic deformation properties of portions of a razor to permit a snap-fit with the razor head. For the purposes herein, "elastic deformation" is defined as reversible alteration of the form or dimensions of a solid body under stress or strain. "Plastic deformation" is defined as a permanent change in shape or size of a solid body without fracture resulting from the application of surface stress beyond the elastic limit.

[0004] With some known assembly techniques it is practical to use certain materials which have desirable deformation characteristics. For example, it is known that many of the above-described assembly techniques work well with acetal resins, e.g., acetyl butyl styrene (ABS), since materials of this type have properties which lend themselves to deformation-type assembly. However, it is also known that acetal resins do not bond effectively with certain preferred materials used to form shaving elements such as guard bars, handle grips and lubricant strips. Thus, in order to effectively affix these shaving elements to the razor or razor head, manufacturers have cast razors and razor heads from other materials, e.g., polypropylene, which have superior bonding characteristics with these shaving elements. A disadvantage of using polypropylene rather than ABS is that polypropylene does not easily lend itself to assembly techniques involving elastic or plastic deformation.

[0005] It would therefore be desirable to provide a mechanism for permanently attaching a razor head to a razor and a method of permanently attaching a razor head to a razor which can overcome these and other disadvantages known in the art.

SUMMARY OF THE INVENTION

[0006] The various embodiments of the present invention provide an engagement mechanism for a disposable shaving system which is both simple to employ and cost effective to manufacture. The present invention is particularly useful for disposable systems but can be used with other shaving systems. The shaving system of the present invention also provides effective and efficient permanent attachment of the razor head to the razor in a consistent and secure manner.

[0007] Preferred embodiments of the present invention provide a shaving system comprising a razor head and a razor comprising a gripping portion and at least one living hinge. Preferably, an engagement member is integrally molded with the razor and is moveable relative to the gripping portion about the living hinge from a first position to at least one second position. One embodiment of the present invention comprises a pair of living hinges each having an engagement member integrally formed or attached therewith. As used herein, the term "integrally formed" is defined as being formed, molded or cast as one piece.

[0008] Advantageously, when the engagement members are disposed in the first position the living hinges are relaxed and each of the engagement members is aligned for engagement with a portion of the razor head. When the engagement members are disposed in the second position, the living hinges are stressed and each engagement member engages a portion of the razor head. Preferably, the present invention also comprises a mechanism for permanently locking the engagement members to the razor when disposed in the second position. As used herein, "permanent attachment" or permanently locking" indicates that the members are not adapted for selective detachment by a user after attachment. These terms are not meant to suggest that the pieces could not be separated upon the application of sufficient force which is beyond that typically encountered with a replaceable cartridge or through breakage.

[0009] Embodiments of the present invention also comprise an alignment mechanism which aligns the locking member prior to engagement. Preferably, the alignment mechanism also prevents accidental dislodgment of the locking mechanism, and subsequently the razor head, during the shaving process.

[0010] The present invention also provides methods of attaching a razor head to a razor which permanently secures the razor to the razor head in a simple, efficient and economic fashion. Embodiments comprise the steps of: 1) providing a razor with a gripping portion and an engagement member; 2) providing a razor head; 3) aligning the razor head with the razor; 4) moving the razor towards the razor head such that the engagement member moves relative to the gripping portion from a first position to a second position to engage the razor head; and 5) permanently locking the engaged member in the second position.

[0011] These and other aspects of the present invention are described in greater detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

FIGS. 1A and 2A are front views of a razor of the present invention showing the engagement mechanism in neutral and locked positions respectively;

FIGS. 1B and 2B are enlarged front views of the engagement portions shown in FIGS. 1A and 2A, respectively;

FIGS. 1C, 1D, 2C and 2D are cross-sectional, side views of the locking and aligning mechanism of the engagement portions of FIGS. 1B and 2B.

FIG. 3 is an enlarged, top perspective view of one embodiment of the present invention prior to engagement with a razor head;

FIG. 4 is a top perspective view of the embodiment of FIG. 3 shown engaged with a razor head;

FIG. 5. is a top view of the embodiment of FIG. 3 prior to engagement with the razor head;

FIG. 6 is a top view of the embodiment of FIG. 3 (with portions of the razor head removed) shown engaged with the razor head;

FIG. 7 is a partial side perspective view of the engagement mechanism of FIG. 3; and

FIG. 8 is a partial top view of the engagement mechanism of FIG. 3.

DETAILED DESCRIPTION

[0013] In accordance with one embodiment the present invention, a razor engages a razor head with at least one movable engagement member. The engagement member is integrally formed with the razor and connected to a gripping portion with a living hinge. Advantageously, the engagement mechanism is locked in the engaged position with the razor head by a pair of flanges or some other locking mechanism.

[0014] In one illustrated, preferred embodiment of the present invention, the engagement mechanism comprises at least one trunnion which is integrally formed with the living hinge and which is receivable within a cavity located within the razor head. Advantageously, the trunnion is movable with the living hinge from a first neutral position to a second position where the trunnion rests on a step or cradle within the cavity. Preferably, the locking mechanism and the trunnion cooperate in a manner such that once the trunnion is properly positioned within the cavity of the razor head, the trunnion is locked in the engaged position by the locking mechanism.

[0015] In one embodiment, the shaving system comprises a razor head, a razor head support comprising a gripping portion and at least one engagement member which is integral with the razor head support and which is moveable from a first position relative to the gripping portion wherein the engagement member is aligned for engagement with the razor head to a second position where the engagement member is engaged with the razor head. A locking mechanism locks the engagement member to the razor head support when disposed in the second position.

[0016] One preferred embodiment of the present invention is illustrated in FIGS. 1A and 2A which show a razor 12 having two support members 14 and 16 which extend from a gripping portion (not shown). A living hinge 18 is integrally formed with each support member 14 and 16, preferably, along an inner face 15, 17 of each of the support members 14, 16, respectively. While this preferred illustrated embodiment provides living hinges along the inner sides of the support members, it is also within the scope of the present invention to reverse the operative engagement members so that one or more living hinges are disposed on the outer side of the engagement members or at a mid position. From the present description and drawings, those skilled in the art will appreciate that the advantages of the present invention can readily be attained by simply reversing the position of the disclosed mechanisms with corresponding changes to a razor head.

[0017] With reference again to the illustrated embodiment and as shown in FIGS. 1A-2D, an engagement mechanism 19 is integrally formed with living hinge 18 and extends away from the hinge in an upward and outward direction. Advantageously, each engagement mechanism 19 is initially aligned for engagement with a cavity entrance 131 of the razor head. In this initial "neutral" position, trunnions 22 of the engagement mechanism 19 are spaced by reference distance "A". The engagement mechanisms are subsequently movable to a second spaced position generally defined by reference distance "B" where each trunnion 22 engages a step or cradle 132 of the razor head. In addition to the slight lateral movement of the engagement mechanisms 19, e.g., from distance "A" to distance "B", movement during razor head engagement also preferably results in a slight downward movement of the engagement mechanism 19. In particular, the arcuate-shaped arrows of FIGS. 1A and 1B show the path of this illustrated engagement mechanism 19 about hinge 18 during engagement of the razor head.

[0018] As can be appreciated from the present description, the resulting offset of the engagement mechanism as a result of the movement from the first position to the second position is more than elastic or plastic de-

formation for the material used in forming the engagement mechanism. Further, the movement can be in a lateral, longitudinal, angular, and/or normal direction: lateral movement being defined as movement in the direction along the longer portion of the razor head; longitudinal movement being defined as movement in the direction along the shorter portion of the razor head, i. e, perpendicular to the lateral movement; normal movement being defined as movement perpendicular to both lateral and longitudinal movement and generally along the anticipated path of the razor head during the shaving process; and angular movement is defined as movement along a path composed of the combination of any of the above described movements.

[0019] Movement of the engagement mechanism from the first position to the second position is at least about 0.025 to about 0.100 inches, preferably at least about .050 inches.

[0020] In the particular embodiment of the present invention shown in FIGS. 1A-2D, each engagement mechanism 19 comprises a trunnion 22 which is engageable with a cradle 132 located within the razor head (see FIGS. 5 and 6). Preferably, each trunnion 22 is located at the free end of each engagement mechanism 19 and moves generally in the direction of the arcuate-shaped arrows, but in some cases it may be preferable to alter the movement of the trunnions 22 to effect different, yet secure, engagement with the razor head.

[0021] FIGS. 1B and 2B both show an enlarged view of the engagement mechanism 19 with a locking mechanism 20. In particular, FIG. 1B shows the position of the engagement mechanism 19 and the locking mechanism 20 when disposed in the neutral position, i.e., prior to engagement with the razor head (not shown). FIGS. 2B, 2C and 2D show the position of the engagement mechanism 19 and the locking mechanism when engaged and locked. The illustrated locking mechanism 20 comprises a pair of interlocking C-shaped flanges; a first flange 21A integrally formed with the engagement mechanism 19 and a second flange 21B integrally formed with the supporting member 16. Advantageously, flanges 21A and 21B are generally disposed in substantial vertical alignment with one another such that movement of the engagement mechanism 19 about hinge 18 from the neutral position to the engaged position will result in the interlocking of the two C-shaped flanges 21A and 21B as depicted in FIGS. 2C and 2D. FIGS. 1C, 1D, 2C and 2D show side, cross sectional views of the C-shaped flanges 21A and 21B prior to engagement (FIG. 1C) and engaged/locked (FIG. 2C). As can be appreciated, other locking mechanisms can be utilized to achieve the same result, i.e., locking the engagement mechanism 19 once it is disposed in the engaged position.

[0022] FIGS. 1C, 1D, 2C and 2D show the shaving system with a mechanism 24 for aligning the locking mechanism 20 prior to engagement of the razor head. Preferably, mechanism 24 also secures the locking mechanism 20 and, therefore, the engagement mechanism 19, in a locked position to prevent accidental disengagement during shaving. In particular, mechanism 24 comprises a pair of L-shaped flanges 25a and 25b which intermesh with one another to align C-shaped flanges 21a and 21b for locking during the movement of the engagement mechanism from the neutral position to the engaged position.

[0023] In one embodiment of the present invention, flange 25a is integrally molded with the engagement mechanism 19 and flange 25b is integrally molded with support member 16. Preferably, each leading edge 27a, 27b of each flange 25a and 25b, respectively, is angled in such a manner so as to provide a lead clearance for the intermeshing of the two flanges. As can be appreciated from the present description, the alignment mechanism 24 also prevents accidental dislodgment of the locking mechanism 20 by forces normally encountered during shaving.

[0024] In particular, when a razor head is engaged with the engagement mechanism 19 and the locking mechanism 20 is locked, the intermeshed L-shaped flanges 25a and 25b will oppose those shaving forces which may tend to cause the locking mechanism to dislodge. For example, if the razor head were to encounter a force normal to the arcuate-shaped arrow of FIG. 1B, L-shaped flange 25b would oppose the force on L-shaped flange 25a which moves with C-shaped flange 21a. Thus, mechanism 20 remains engaged. The locking feature is further described below with respect to a second embodiment.

[0025] FIGS. 3-5 show another embodiment comprising a razor 112 having a pair of supporting members 114 and 116, a pair of engagement mechanisms, and a pair of living hinges 118. This embodiment also comprises a locking mechanism 120 and an alignment mechanism 124 similar to the embodiment of FIGS. 1 and 2.

[0026] As can be appreciated from the drawings, this embodiment is particularly adapted for use with a flexible razor head. In particular, FIGS. 3 and 5 show a razor 112 and a razor head 126 in neutral position, i.e., prior to attachment of the razor head 126 to the engagement mechanism 119. Advantageously, a spring 128 is integrally formed with razor 112 such that each end 143 and 145 of the spring, closely abuts against one of the living hinges 118 and traverses the mouth 150 of the razor 112 between each support member 114, 116. In some cases, however, it may be preferable to have the ends 143, 145 of the spring 128 integrally formed with one of the living hinges 118. As depicted in the drawings, razor head 126 is a flexible razor head and spring 128 functions as a mechanism for returning the razor head from a flexed position to a neutral position after the razor head 126 encounters the forces normally associated with shaving.

[0027] From the foregoing it can be appreciated that the living hinges 118 cooperate to align each trunnion 122 with the cavity entrances 131a and 131b of the razor

head 126 such that each trunnion 122, when forced towards the razor head 126, is received within cavities 130a and 130b (see FIG. 5). Each cavity 130a, 130b is defined by two opposing sidewalls 133, 135 and a top wall 139 and is generally dimensioned so as to receive trunnions 122 along with a portion of the engagement mechanism 119. Preferably, each cavity 130a, 130b comprises a cradle 132 for receiving and retaining each trunnion 122 thereon.

[0028] Attachment of the razor head 126 to the engaging mechanism 119 is accomplished as follows: The razor 112 is normally poised in the neutral position prior to engagement with the razor head 126 by the living hinges 118 which cooperate to align each of the trunnions 122 with the entrances 131a, 131b and the cavities 130a, 130b of the razor head. The razor 112 is moved toward the razor head 126 keeping the trunnions 122 and the entrances 131a, 131b in general alignment with each other such that each trunnion 122 is received within each cavity 130a, 130b. Preferably, the upper edge 147 of each engagement mechanism 119 is generally sloped downwardly toward the mouth 150 of the razor 112 such that when each upper edge 147 contacts each sidewall 133 of the razor head 126, each trunnion 122 is moved in a generally lateral and downward direction towards cradle 132. Preferably, simultaneously, as each trunnion 122 is moving toward each cradle 132, each C-shaped flange 121a, 121b and L-shaped flange 125a, 125b are also moving toward one another such that once the trunnions 122 are positioned within the cradles 132, C-shaped flange 121a interlocks with flange 121b thus locking the razor head 126 to the engagement mechanism 119 in a permanent fashion as depicted in FIGS. 4 and 6.

[0029] FIGS. 4 and 6 show the razor head 126 permanently attached to the engagement mechanism 119 with the locking mechanism 120 in locked position and the spring 128 abutting the lower portion 151 of the razor head 126. As mentioned above, L-shaped flanges 125a and 125b are also intermeshed with each other so as to prevent accidental dislodgment of the locking mechanism 120 during shaving.

[0030] As can be appreciated, the locking mechanism 120 is designed to provide a permanent attachment between the razor head and the razor, and to thwart attempts to detach these elements by a mischievous consumer. Most preferably, disengagement of the locking mechanism is not possible without destroying the usefulness of the shaving system.

[0031] FIGS. 7 and 8 show the engagement mechanism 119 and the various components making up the same, namely, trunnion 122 and flanges 121a and 121b. In particular, FIG. 7 is an enlarged side perspective view of the locking mechanism 120 and FIG. 8 is a top view of the engagement mechanism 119 with trunnion 122 poised in the neutral position for receiving the razor head 126. As can be appreciated from these views, the C-shaped flanges 121a and 121b are positioned in substantial vertical alignment such that when pressure is applied to trunnion 122, the outer lip 158 of C-shaped flange 121a will be forced over the outer lip 160 of C-shaped flange 121b and the two flanges 121a and 121b will interlock thus locking the engagement mechanism 119 to the razor head 126 as described above.

[0032] As can be appreciated from the present description and, in particular, as can be appreciated from a manufacturing standpoint, by integrally forming all of the component parts, i.e., the engagement mechanism 19, 119, living hinges 18, 118, locking mechanism 20, 120, alignment mechanism 24, 124, and trunnions 22, 122 with the razor 12, 112, the manufacturing process is greatly simplified. Further, the only step after integrally molding the razor 12, 112 is to complete the shaving system 10, 110 by permanently attaching the razor head 126 which, as described above, also involves a simple one-step process.

[0033] While it is preferred that at least one engagement member is intimately formed with other elements of the razor, according to less preferred embodiments of the present invention, the engagement member can be separately formed.

[0034] From the present description, those skilled in the art will appreciate that various other modifications may be made without departing from the scope of the present invention. For example, while it is preferable for the present invention to comprise a razor 112 having two support members 114 and 116 and two living hinges 118 each for supporting an engagement mechanism 119, in some circumstances it may be preferable to utilize a single movable support member and engagement mechanism with one stationary engagement mechanism.

Claims

1. A shaving system, comprising:

a razor head;
a razor comprising a gripping portion;
at least one engagement member which is integral with said razor and
which is moveable relative to said gripping portion from a first position wherein said engagement member is aligned for engagement with said razor head to a second position wherein said engagement member is engaged with said razor head; and
means for locking said engagement member to said razor when disposed in said second position.

2. A shaving system according to claim 1 further comprising at least one living hinge which is integral with said razor and which supports said engagement member which is pivotable about said living hinge.

3. A shaving system according to claim 1 wherein said engagement member comprises at least one trunnion and a cradle for receiving said trunnion.

4. A shaving system according to claim 1 further comprising means for aligning said locking means when said engagement mechanism is disposed in said first position and preventing said locking means from accidental disengagement once said engagement mechanism is disposed in said second position.

5. A shaving system according to claim 3 wherein said alignment and preventing means comprises a first L-shaped flange member which is integral with said razor and second L-shaped flange member which is integral with said engagement member and wherein said first L-shaped flange member and said second L-shaped flange member cooperate to align said locking means in position prior to engagement and act to prevent said locking means from accidental disengagement once locked.

6. A shaving system according to claim 1 wherein said locking means comprises a first generally C-shaped flange member which is integral with said razor and second generally C-shaped flange member which is integral with said engagement member and wherein said first C-shaped flange member and said second C-shaped flange member cooperate to lock said engagement member in said second position.

7. A shaving system comprising:

a razor head;
a razor comprising a gripping portion and at least one moveable engagement member wherein said razor is separately formed from said razor head and adapted to be permanently connected to said razor head; and

wherein said engagement member is disposed in a first position before said razor and razor head are attached and permanently locked into a second position after said razor and razor head are attached, wherein said second position is spaced from said first position by a distance greater than the plastic deformation of said engagement member.

8. A shaving system according to claim 7 wherein said second position is longitudinally or laterally or angularly spaced from said first position.

9. A method of permanently attaching a razor head to a razor comprising the steps of:

providing a razor head, a razor comprising a gripping portion and an engagement member;
aligning said engagement member of said razor with at least one portion of said razor head;
moving said razor towards said razor head such that said engagement member moves from a first position to a second position where said razor engages said razor head; and
permanently locking said at least one portion of said razor in said second position.

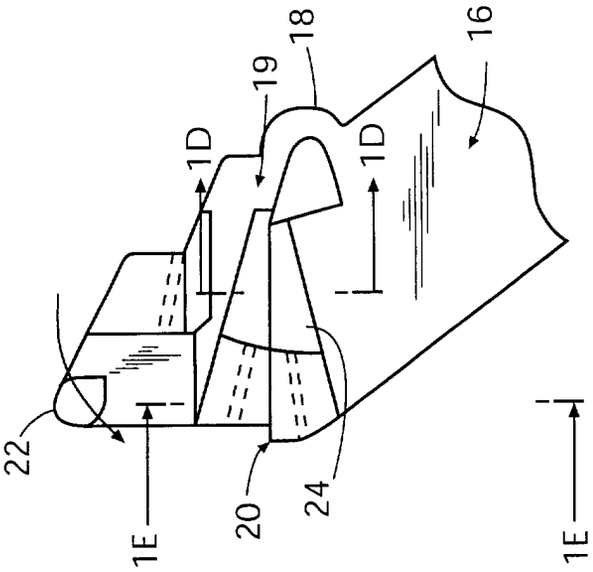

FIG. 1B

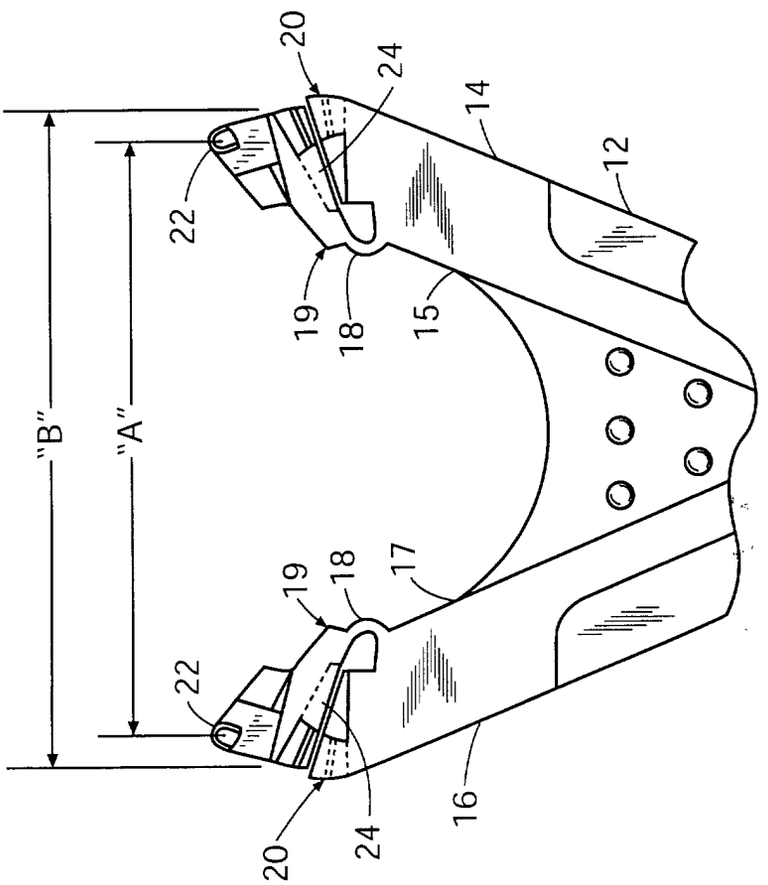

FIG. 1A

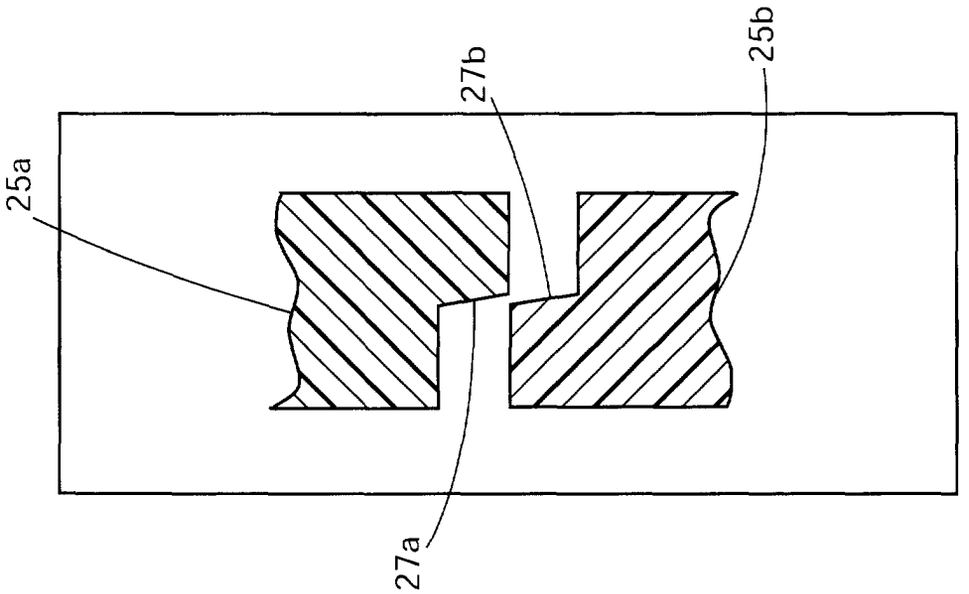

FIG. 1D

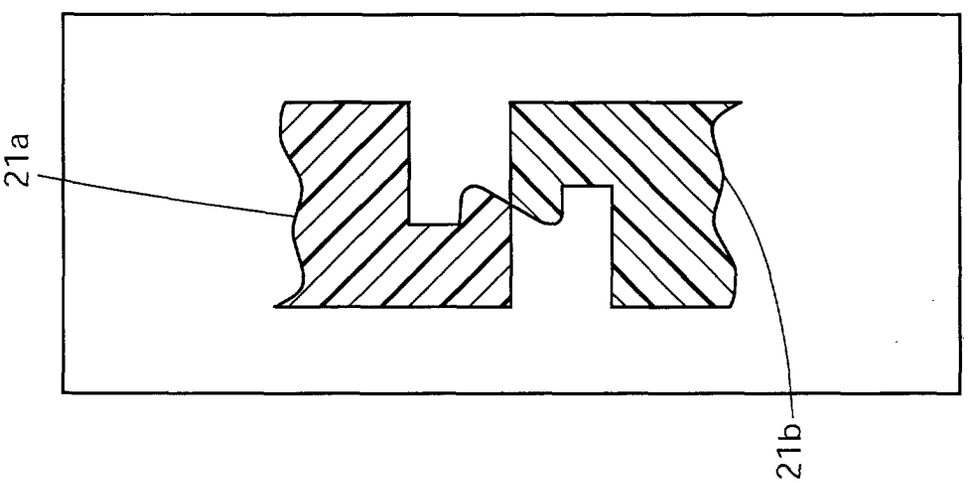

FIG. 1C

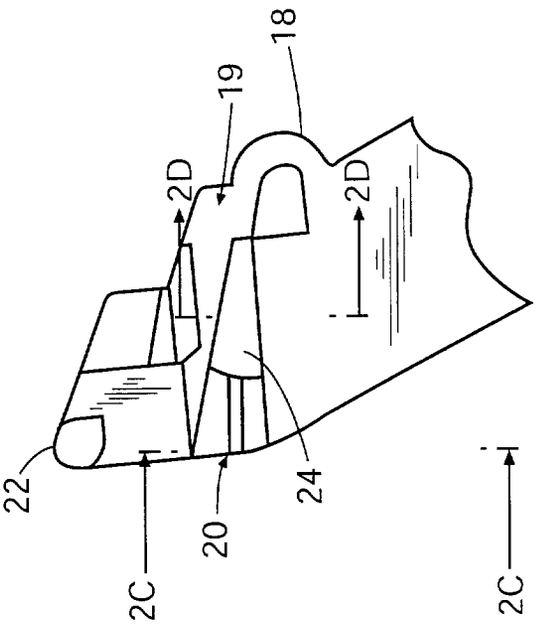

FIG. 2B

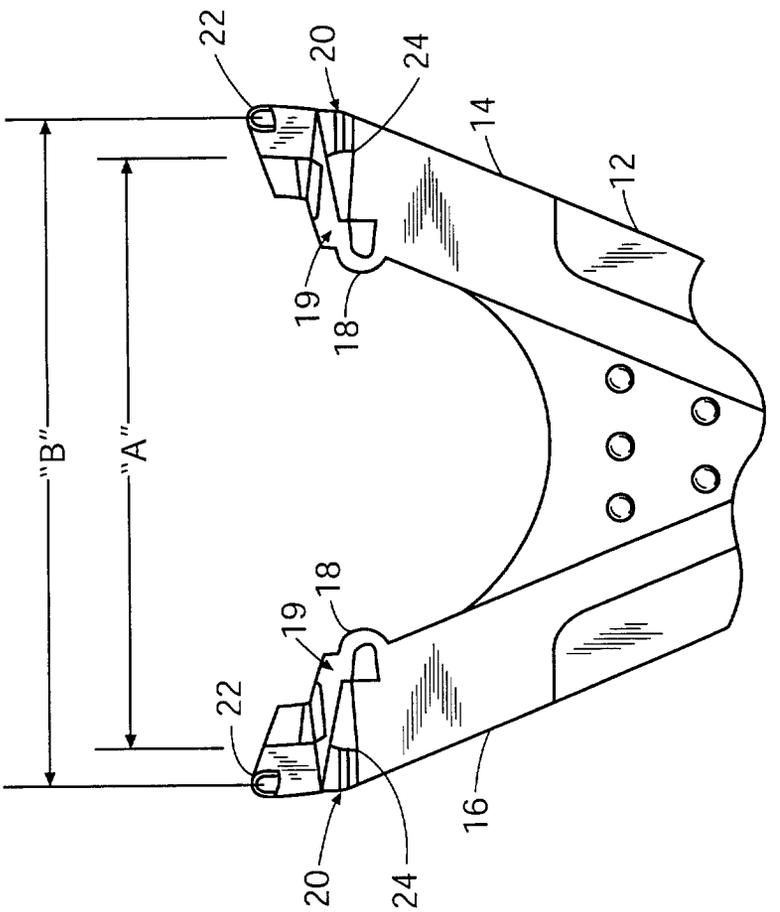

FIG. 2A

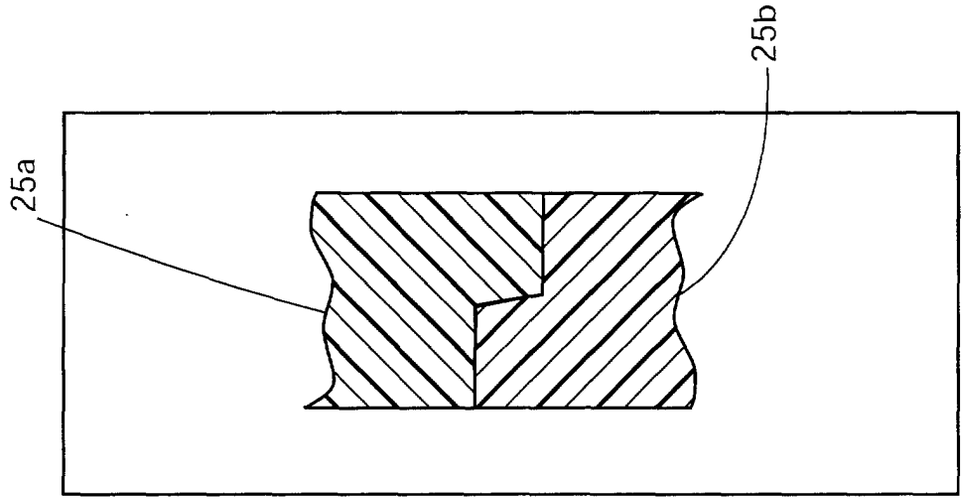

FIG. 2D

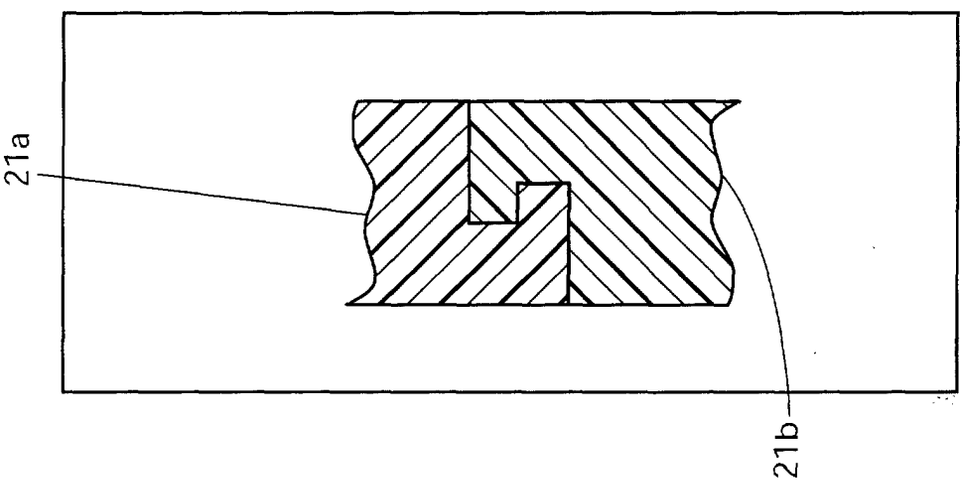

FIG. 2C

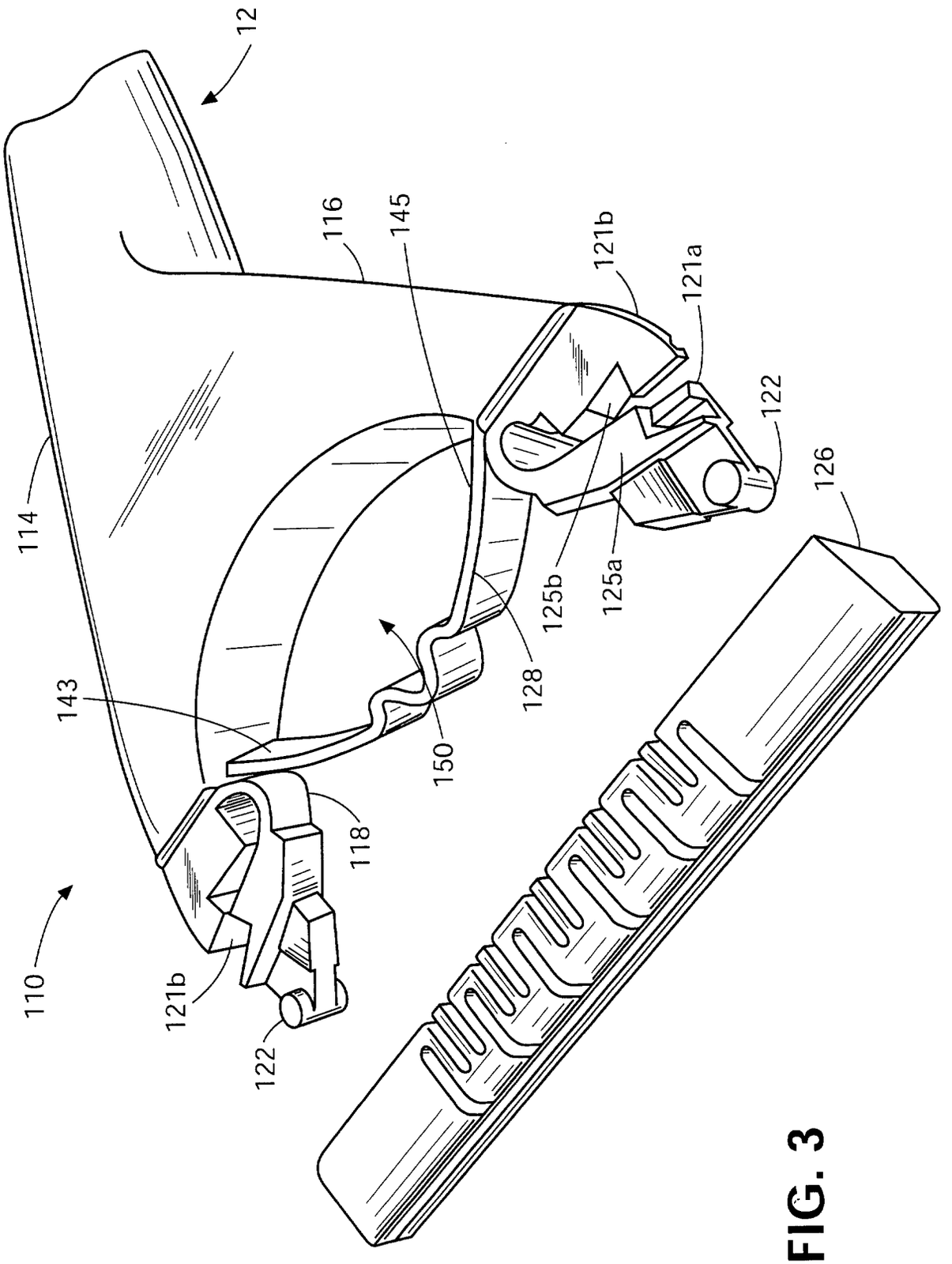
12
116
145
121b
121a
122
126
114
125b
125a
128
143
150
118
110
121b
122

FIG. 3

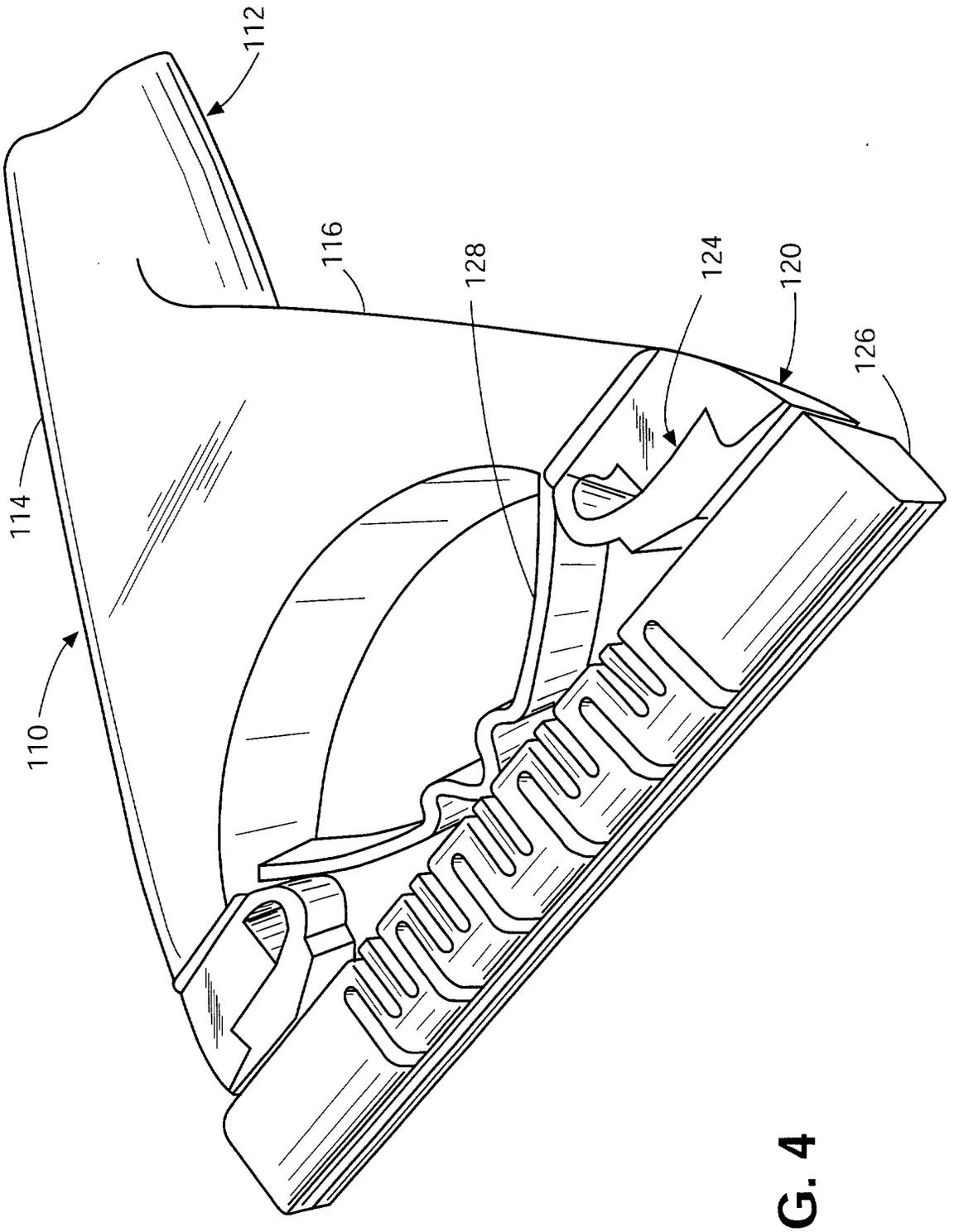

FIG. 4

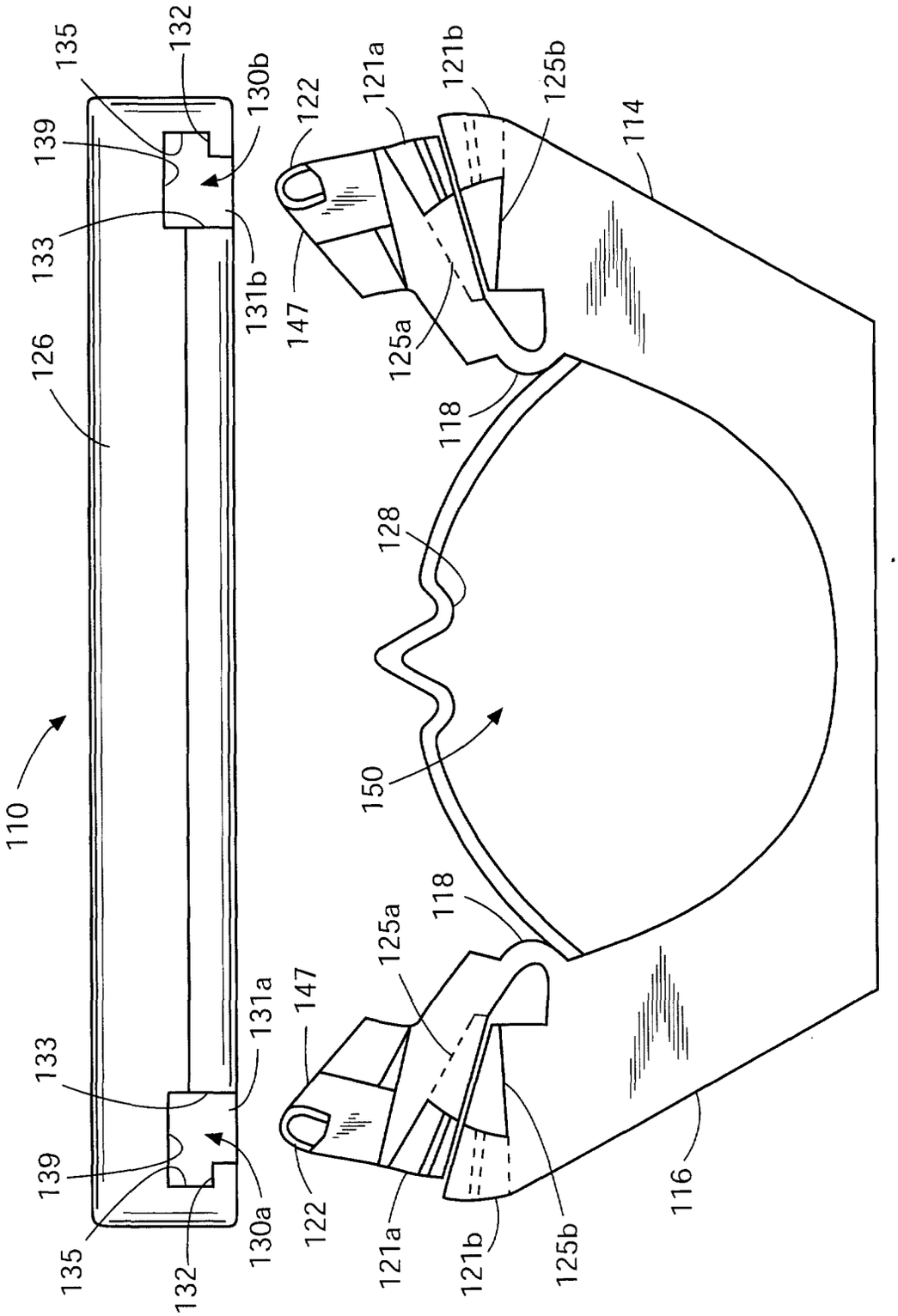
110
126
135
132
139
133
130b
131b
130a
131a
122
121a
121b
125b
125a
147
118
128
150
114
116

FIG. 5

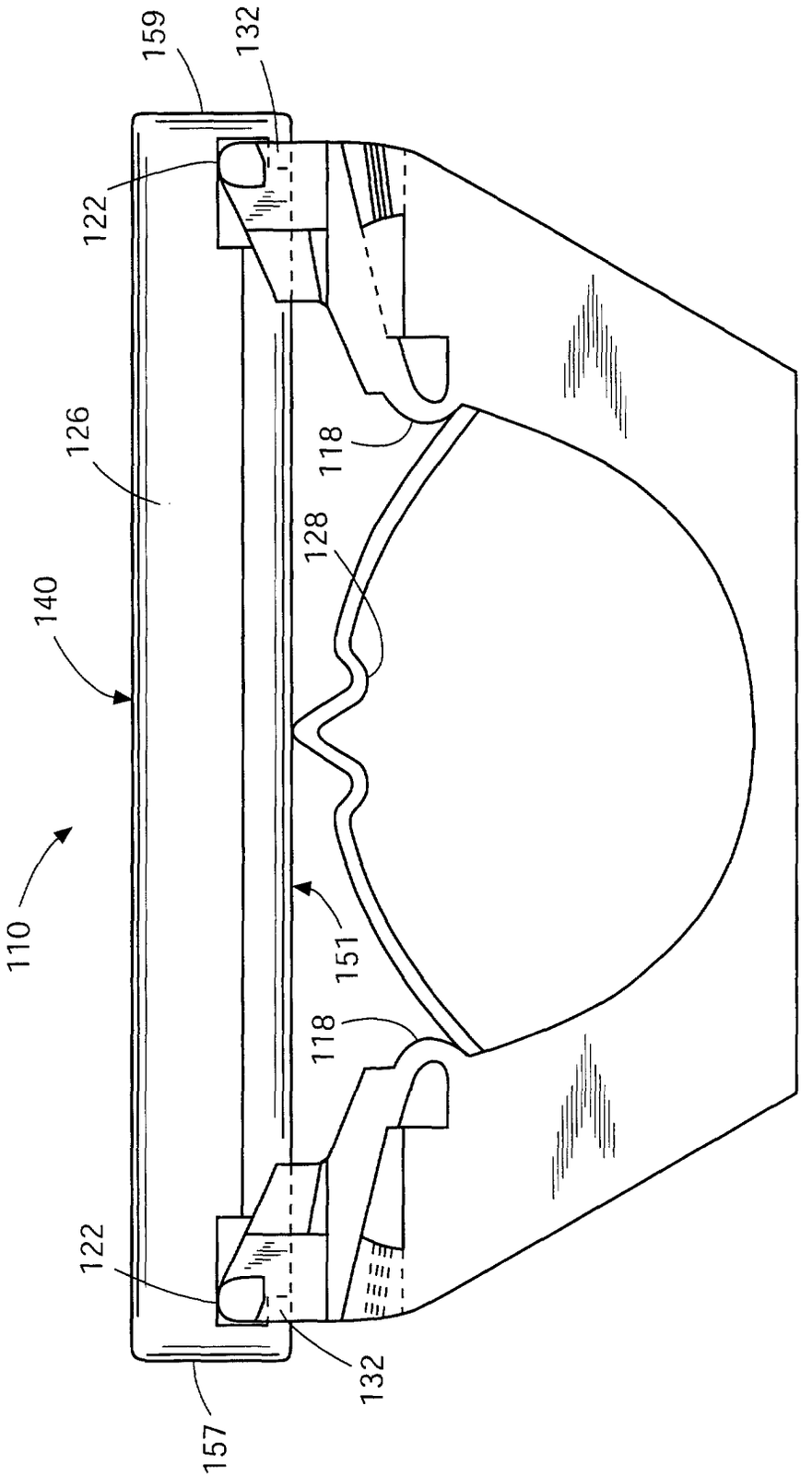

FIG. 6

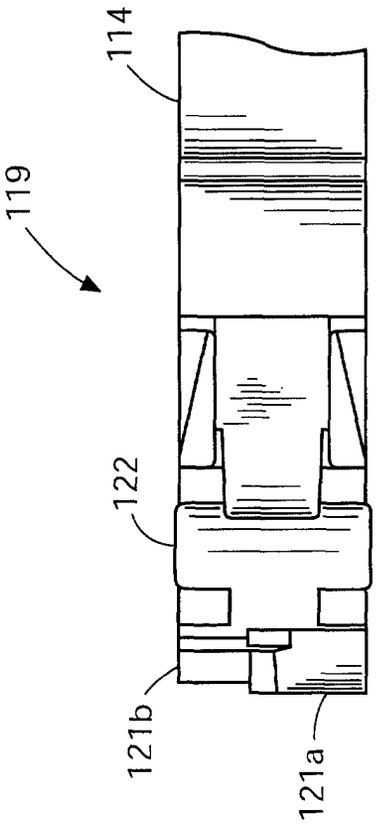

FIG. 8

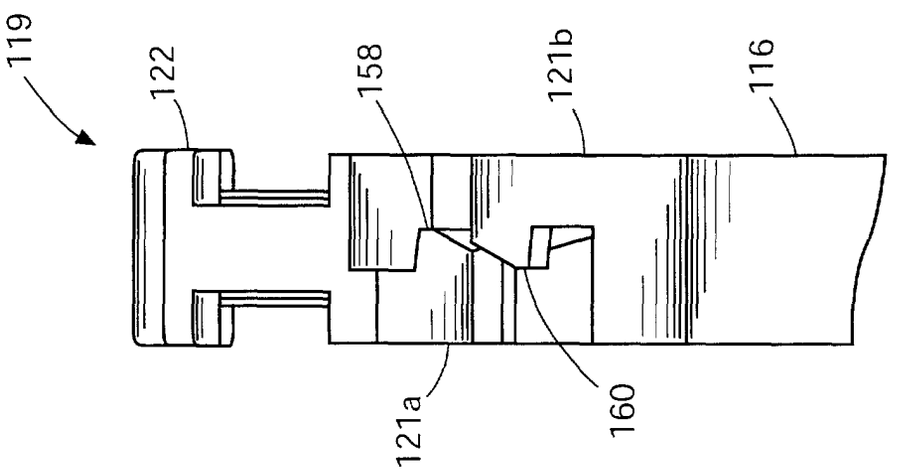

FIG. 7