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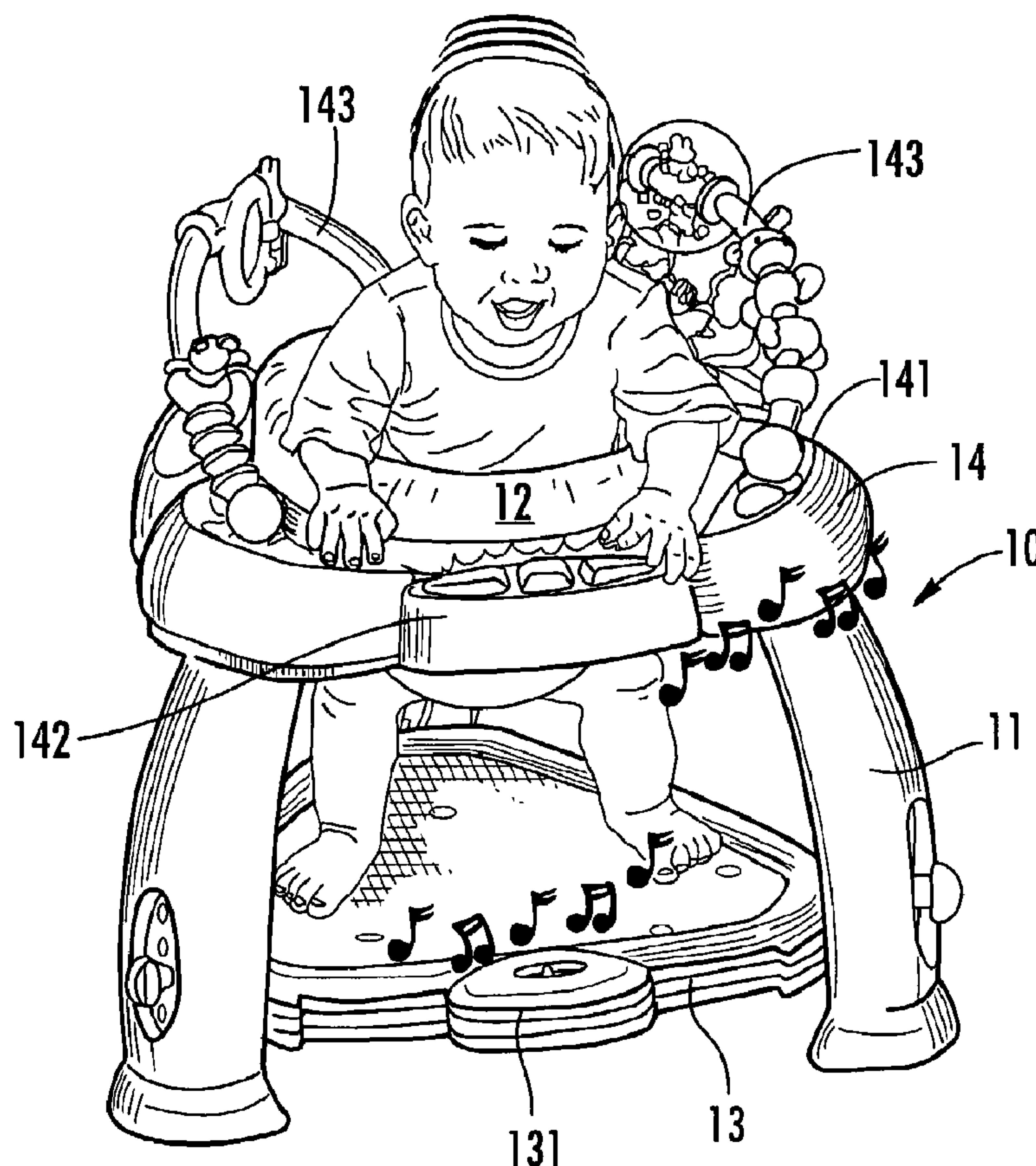
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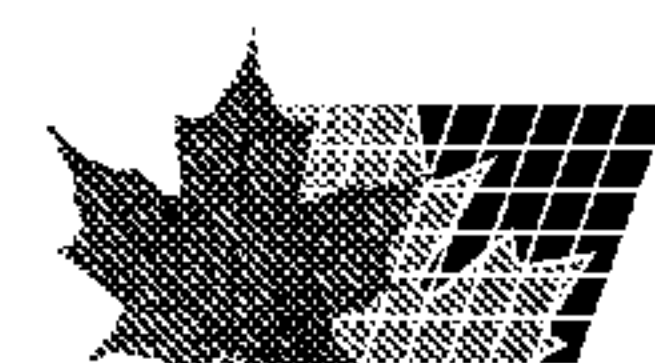
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(57) Abrégé/Abstract:

The invention is directed to a stationary exercise apparatus for small children. The apparatus includes an activity table adapted for receiving one or more children's activity items, one or more legs, a seat supported by the legs, and a resilient support surface



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

suspended generally horizontally from at least one of the legs. The seat has a pair of leg openings that allow the child to touch the resilient support surface with its legs, and the resilient support surface has a resiliency that allows the child to bounce vertically by pushing its legs downwardly against the resilient support surface. Furthermore, the distance between the resilient support surface and the seat can be increased or decreased to account for the height of the child placed within the apparatus by moving the resilient support surface, and a tension element of the resilient support surface can be adjusted to account for the child's strength.

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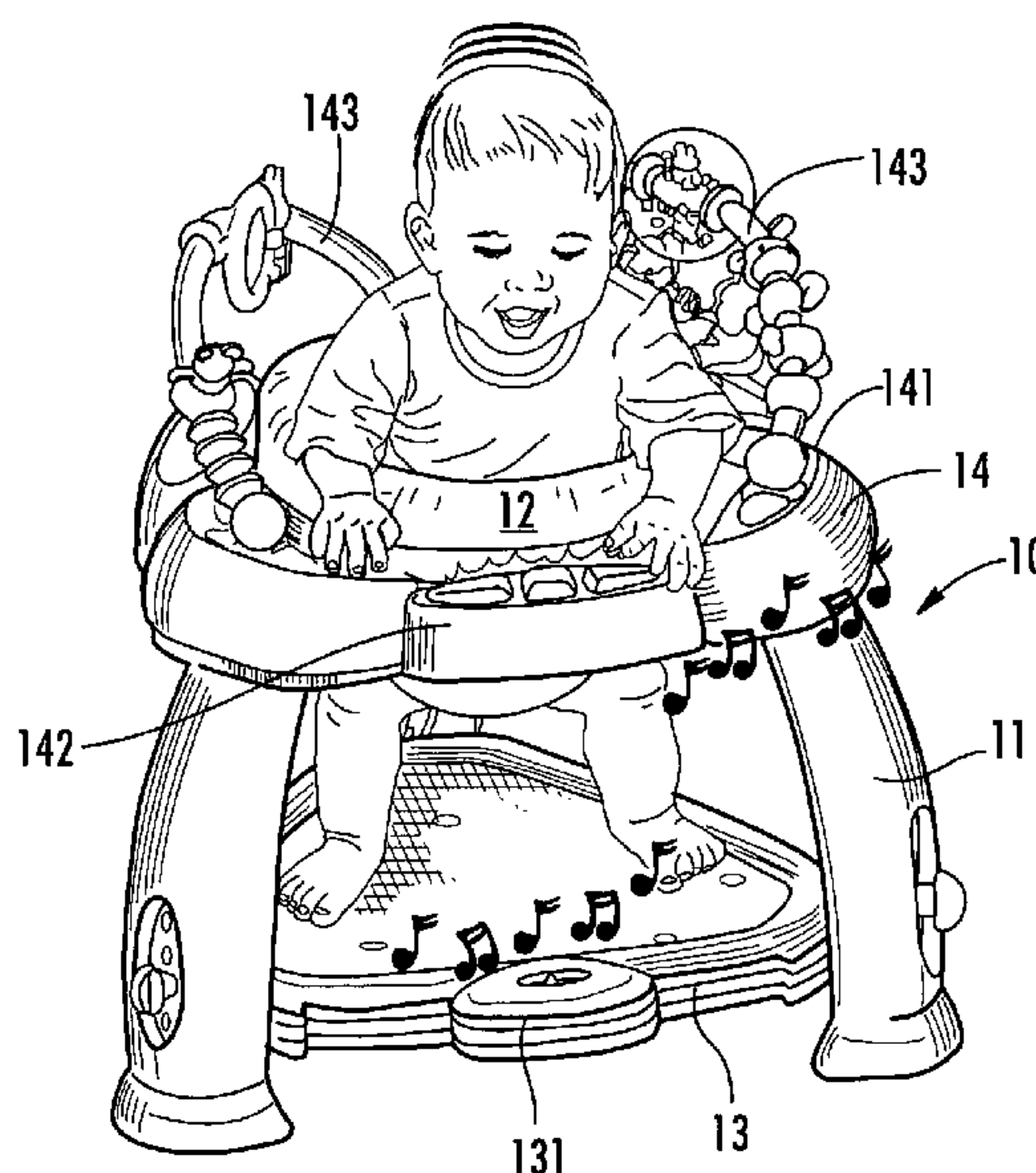
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(54) Title: STATIONARY CHILD EXERCISE APPARATUS WITH BOUNCING PAD



(57) Abstract: The invention is directed to a stationary exercise apparatus for small children. The apparatus includes an activity table adapted for receiving one or more children's activity items, one or more legs, a seat supported by the legs, and a resilient support surface suspended generally horizontally from at least one of the legs. The seat has a pair of leg openings that allow the child to touch the resilient support surface with its legs, and the resilient support surface has a resiliency that allows the child to bounce vertically by pushing its legs downwardly against the resilient support surface. Furthermore, the distance between the resilient support surface and the seat can be increased or decreased to account for the height of the child placed within the apparatus by moving the resilient support surface, and a tension element of the resilient support surface can be adjusted to account for the child's strength.

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STATIONARY CHILD EXERCISE APPARATUS WITH BOUNCING PAD**BACKGROUND OF THE INVENTION**

Stationary exercise apparatuses are used to assist children in the development of the muscles and coordination needed for walking. A typical stationary child exercise apparatus includes a seat portion that is positioned in the center of the apparatus and is at least partially surrounded by an annular-shaped activity tray. The activity tray includes toys that entertain the child. The stationary apparatus is held in a stationary position by legs that extend downwardly from the activity tray. In most stationary exercise apparatuses, the seat portion can rotate 360°, independently of the activity tray, about an axis of rotation that is defined by the center of the seat portion.

U.S. Patent No. 6,299,247 to Meeker (“the ‘247 Patent”) discloses a child exerciser/rocker that includes a bowl-shaped base adapted to rock in any direction, three equally spaced towers extending upwardly from the upper periphery of the base, a circular tray that is positioned on top of the towers, and a seat for receiving a child that is rotatably mounted in the center of the tray. The towers include springs to allow a child positioned in the seat to bounce with respect to the base, and the heights of the towers are adjustable. However, the base itself does not bounce and the vertical motion provided by the springs in the towers is felt by the child through the seat, and not through the child’s legs. In addition, the seat and circular tray move together when the child bounces in the rocker, which may cause food or drinks on the tray to spill.

U.S. Patent 3,195,890 to Salls (“the ‘890 Patent”) discloses a resilient action jumping toy that includes an upstanding, cylindrical-shaped framework with a foot-engageable platform at the bottom of the framework. Between the platform and the floor are compressible elastic energy storing means, such as compression springs, that provide oscillatory movement to the platform when a child standing on the platform jumps up and down. However, because the jumping toy does not have a seat for supporting a child over the foot engageable platform, the toy is unsuitable for small children that have not yet developed the muscles and coordination needed for standing. In addition, the compressive elastic energy

storing means cannot be adjusted to increase or decrease the amount of oscillatory movement of the platform.

U.S. Patent No. 4,900,011 to Nolet ("the '011 Patent") discloses an exerciser and playpen structure that has a trampoline like bottom surface. A child
5 standing on the resilient surface can grip an upper frame of the structure with its hands and move its legs up and down to take advantage of the rebounding effect of the resilient surface. However, like the jumping toy of the '890 Patent, this structure does not include a seat for supporting a child that has not yet developed the muscles and coordination needed for standing, and the tension of the resilient
10 surface cannot be increased or decreased.

Therefore, an unsatisfied need in the art exists for a stationary child exercise apparatus that is able to support a child over a resilient surface while the child develops the muscles and coordination needed for standing and walking and allows for the adjustment of a tension element of the resilient surface.

15 BRIEF SUMMARY OF THE INVENTION

The invention is directed to a stationary exercise and activity apparatus for providing cognitive development activities for small children and exercise functionality. In one embodiment, the apparatus includes an activity table adapted for receiving one or more children's activity items, one or more legs supported on
20 a floor, a seat supported by the legs, and a resilient support surface suspended generally horizontally from at least one of the legs. The seat has a pair of leg openings that allow the child to touch the resilient support surface with its legs, and the resilient support surface has a resiliency that allows the child to bounce vertically by pushing its legs downwardly against the resilient support surface.
25 Furthermore, the distance between the resilient support surface and the seat can be increased or decreased to account for the height of the child placed within the apparatus by moving the resilient support surface, and a tension element of the resilient support surface can be adjusted to account for the strength of the child.

In one embodiment, the legs extend downwardly and outwardly toward the
30 floor. When the resilient support surface is moved closer to the seat, the tension element of the resilient support surface is decreased, resulting in a child having to

apply less force with its legs to achieve a bouncing motion. When the resilient support surface is moved closer to the floor, the tension element is increased, resulting in the child having to apply more force with its legs to achieve a bouncing motion. This feature advantageously accounts for the gradual development of the child's muscles and coordination by automatically adjusting the tension element of the resilient support surface based on the size of the child.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

10 Figure 1 shows a perspective view of a stationary child exercise apparatus according to one embodiment of the invention;

Figure 2 shows a perspective view of a stationary child exercise apparatus according to another embodiment of the invention;

15 Figure 3 shows a perspective view of a stationary child exercise apparatus according to another embodiment of the invention;

Figure 4 shows a top view of a stationary child exercise apparatus according to one embodiment of the invention;

Figure 5 shows a perspective view of a seat carrier ring according to one embodiment of the invention;

20 Figure 6 shows a cross-sectional view of a seat carrier ring and a seat support ring according to one embodiment of the invention;

Figure 7 shows a perspective view of an activity table and a seat support ring according to one embodiment of the invention;

25 Figure 8 shows a cross-sectional view of an activity table and a seat support ring according to one embodiment of the invention;

Figure 9A shows a perspective view of a seat support ring and a leg according to one embodiment of the invention;

Figure 9B shows a perspective view of a seat support ring and a leg according to one embodiment of the invention;

Figure 10 shows a perspective view of a table and a leg according to one embodiment of the invention.

5 Figure 11 shows a perspective view of a seat carrier ring according to one embodiment of the invention;

Figure 12 shows a perspective view of a wheel according to one embodiment of the invention;

10 Figure 13 shows a perspective view of a sling according to one embodiment of the invention;

Figure 14 shows a top view of a resilient support surface according to one embodiment of the invention;

Figure 15 shows a perspective view of a resilient support surface according to one embodiment of the invention;

15 Figure 16 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

Figure 17 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

20 Figure 18 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

Figure 19 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

Figure 20 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

25 Figure 21A shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

Figure 21B shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

Figure 21C shows a perspective view of a pin according to one embodiment of the invention;

5 Figure 22 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

Figure 23 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

10 Figure 24A shows a perspective view of a mounting portion in a leg according to one embodiment of the invention;

Figure 24B shows a perspective view of a pin according to one embodiment of the invention;

Figure 25 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention; and

15 Figure 26 shows a perspective view of a mounting portion in a leg according to one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

20 The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

25 Generally, the present invention is directed to a children's stationary exercise apparatus. In one embodiment, the apparatus includes a seat, one or more legs depending downwardly towards a floor and supporting the seat, an activity table, and a resilient support surface, or bouncing pad. The seat is mounted in the

center of the activity table and can be configured to rotate 360° about its own axis of rotation. The legs extend downwardly and outwardly from the seat, and the resilient support surface is suspended horizontally from the legs and is positioned vertically between the seat and the floor. A child positioned within the apparatus
5 pushes its legs against the resilient support surface to achieve an up and down bouncing motion. This bouncing motion assists in the development of the muscles and coordination needed for standing and walking. Furthermore, the distance between the resilient support surface and the seat can be increased or decreased to account for the height of the child by lowering or raising the resilient support
10 surface, and, in one embodiment, a tension element of the resilient support surface is increased as the distance between the seat and the resilient support surface is increased, which provides more resistance for the child's legs.

As shown in Figure 1, one embodiment of the invention is a children's exercise apparatus 10 for providing exercise functionality for a small child. The
15 apparatus 10 includes one or more legs 11 supported on a floor, a seat 12 supported by the legs 11 and structured to support the child while allowing the child's legs to extend downwardly below the seat 12, and a resilient support surface 13 that is suspended generally horizontally from the legs 11 and positioned vertically between the seat 12 and the floor. The resilient support surface 13 has a resiliency
20 that is adapted for allowing the child to bounce vertically by pushing its legs downwardly against the resilient support surface 13. As shown in Figure 2, a further embodiment of the apparatus 10 includes an activity table 14 that includes an upper surface 141 for supporting activity items 142, such as toys, teething rings, and interactive learning modules. Figure 3 illustrates another embodiment of an
25 activity table 14 that includes toy bars 143 on the upper surface 141 of the activity table 14 on which activity items may be mounted. Further, as shown in Figure 4, the seat 12 defines a pair of leg openings 121 that allow the child to touch the resilient support surface 13 with its legs.

The various embodiments of the elements of the apparatus 10 are discussed
30 in more detail below. However, these embodiments are exemplary and should not limit the scope of the invention, and one or more features from one embodiment could be combined with features from other embodiments.

Seat

The seat 12, according to one embodiment, includes a seat carrier ring 201 and a seat support ring 211. As shown schematically in Figure 6, an annular horizontal surface 202 on the seat carrier ring 201 is mounted adjacent to and
5 vertically supported by an annular horizontal surface 212 of the seat support ring 211, and a central axis B of the seat support ring 211 is coaxial with a central axis A of the seat carrier ring 211. Thus, the seat carrier ring 201 can rotate 360° about the axis A, independently of the seat support ring 211.

As shown in Figures 6 through 8, one embodiment of the seat support ring
10 211 has a central vertical axis B and includes an inner wall 213, an outer wall 214, and an annular horizontal engagement surface 212 positioned between the inner 213 and outer walls 214. The width of the annular horizontal engagement surface 212 is wide enough to provide vertical support for a seat carrier ring 201 mounted adjacent to the horizontal engagement surface 212. As will be discussed below in
15 more detail in the section below entitled "Activity Table," one embodiment of the seat support ring 211 is integrally formed with an activity table 14, as shown in Figure 7, and one embodiment of the seat support ring 211 is separate from the activity table 14, as shown in Figure 8.

As mentioned above, the seat carrier ring 201 has a central vertical axis A
20 and includes an inner wall 203, an outer wall 204, and a horizontal annular surface 202 positioned between the inner 203 and outer walls 204. In one embodiment, shown in Figures 5 and 11, the horizontal annular surface 202 of the seat carrier ring 201 includes a plurality of ribs 205 positioned between the inner wall 203 and outer wall 204. Each of the ribs 205 defines a mounting portion 206 that receives a
25 roller 32. According to one embodiment, as shown in Figure 11, the mounting portion 206 has a C-shaped cross section and defines an aperture 217 having the approximate diameter of an axis 31 of a wheel 32, shown in Figure 12, and an opening 218 into the aperture 217 that has a width slightly less than the diameter of the axis 31 of the wheel 32. Thus, the axis 31 of the wheel 32 can be snapped into
30 the C-shaped mounting portion 206. When the seat carrier ring 201 is positioned within the seat support ring 211, outer surfaces 33 of the wheels 32 engage the horizontal surface 212 of the seat support ring 211, and the wheels 32 rotate about

their axes 31 to facilitate the rotation of the seat carrier ring 201 relative to the seat support ring 211.

In a further embodiment, as shown in Figure 5, the inner wall 203 of the seat carrier ring 201 extends below the lower surface 202 and includes one or more cantilevered latches 207. The cantilevered latches 207 include a horizontal shelf 208 that extends away from the central axis A of the seat carrier ring 201. The latches 207 are configured to deflect slightly inwardly towards the central axis A when the seat carrier ring 201 is inserted into the seat support ring 211. As shown in Figure 6, when the seat carrier ring 201 is fully inserted into the seat support ring 211, the horizontal shelves 208 of the latches 207 are positioned below the inner wall 213 of the seat support ring 211 such that each horizontal shelf 208 is adjacent the bottom edge of the inner wall 213 of the seat support ring 211, preventing the seat carrier ring 201 from being unintentionally removed from the seat support ring 211. To remove the seat carrier ring 201 from the seat support ring 211, the latches 207 are pushed inwardly as the seat carrier ring 201 is urged upwardly.

Figure 13 illustrates one embodiment of a fabric sling 230 that attaches to the seat carrier ring 201. Once attached to the seat carrier ring 201, the child can sit on the sling 230. In one embodiment, the sling 230 includes a pair of leg openings 221 that allow the child to touch the floor with its legs. In addition, the sling 230 includes loops 231 along a top portion 232 of the sling 230 to engage tabs 209, shown in Figure 5, that extend downwardly from the outer wall 204 of the seat carrier ring 201. To secure the fabric sling 230 to the seat carrier ring 201, the sling 230 is positioned through the center of the seat carrier ring 230, the top portion 232 of the sling 230 is wrapped over the outer wall 204 of the seat carrier ring 201, and the loops 231 are hooked over the tabs 209. Alternatively, snaps, buttons, clips, or other suitable fasteners may be used to secure the sling 230 to the seat carrier ring 201.

Resilient Support Surface

As discussed above in relation to Figures 1 through 3, the exercise apparatus 10 includes a resilient support surface 13 that is suspended generally

horizontally from the legs 11 and positioned vertically between the seat 12 and the floor. The resilient support surface 13 has a resiliency that allows the child to bounce vertically by pushing its legs downwardly against the resilient support surface 13. The resiliency may be provided by the support surface 13, by
5 connectors that mount the support surface 13 adjacent to the mounting portions 112 of the legs 11, or both.

When the resiliency is provided by the support surface 13, at least in part, the support surface 13 is formed using various types of materials that provide resiliency. For example, in one embodiment, the support surface 13 is formed of a
10 flexible material, such as nylon, natural or synthetic elastomers, rubber, fabric mesh, woven polypropylene, or fabric. In another embodiment, a center portion 132 of the support surface 13 is a flexible material and at least a portion of an outer periphery 133 of the support surface 13 is a rigid material, such as plastic, metal, or wood. And, in yet another embodiment, the center portion 132 is a rigid material
15 and at least a portion of the outer periphery 133 is a flexible material.

In an embodiment in which the resiliency is provided at least in part by the connector, the support surface 13 may be formed of flexible material, rigid material, or a combination of both. Examples of connectors that provide resiliency include springs, rubber or elastic cords, or rubber rings.

20 Figure 14 illustrates an embodiment in which the resilient support surface 13 is a rigid plastic board that has a triangular shape. As can be seen in more detail in Figure 15, the corners of the resilient support surface 13 include connector portions 135. Each connector portion 135 includes two cylindrical protrusions 136 that extend downwardly from a lower surface 134 of the resilient support surface
25 13 and two threaded apertures 137 that are positioned adjacent to the cylindrical protrusions 136.

Compression molded rubber rings 161 are used to mount the resilient support surface 13 to mounting portions 112 of the legs 11. The rubber rings 161 have a triangular shape and define an aperture 162 at each vertex. Each aperture
30 162 has an inner diameter approximately the same as the outer diameter of the cylindrical protrusion 136 such that an aperture 162 can be aligned with and

positioned over a cylindrical protrusion 136 of the resilient support surface 13. To secure the rubber ring 161 adjacent to the resilient support surface 13, a lower cover 171 is positioned over the connector portion 135 on the lower surface 134 of the resilient support surface 13 and an upper cover 173 is positioned over the
5 connector portion 135 on an upper surface of the resilient support surface 13. The lower cover 171 includes two threaded apertures 172 that align with the threaded apertures 137 of the connector portion 135 and extend all the way through the lower cover 171. The upper cover 173 includes two threaded apertures 174 that extend partially through the upper cover 173. When both covers 171, 173 are in
10 place, screws 175 are inserted into the threaded apertures 172 of the lower cover 171, through the apertures 137 of the connector portion 135, and into the apertures 174 of the upper cover 173. The third aperture 162 of the rubber ring 161 that is not positioned over the cylindrical protrusions 136 extends past the periphery of the resilient support surface 13 and engages a mounting portion 112 on a leg 11.

15 In an alternative embodiment (not shown), the resilient support surface 13 is suspended using springs. For example, a hook on one end of a helical tension spring is inserted into an aperture along the periphery of the support surface 13 and the other end of the spring is inserted into the mounting portion 112 on the leg 11. In another alternative embodiment, one or more elastic or rubber cords are secured
20 to the resilient support surface 13 using tabs, grommets, or by threading the cord through a conduit on the periphery of the support surface 13, and the cord is pulled into tension when coupled to mounting portions 112 defined on the leg 11.

Any of the above described embodiments of the resilient support surface 13 may further include a contact sensor (not shown), such as an inertia sensor, and an
25 electronic sound unit 131, which is shown in Figures 2, 3, and 14. The electronic sound unit 131 emits a sound in response to receiving a signal from the contact sensor that the sensor senses movement of the resilient support surface 13. Thus, the child hears a sound when the child pushes its legs against the resilient support surface 13, which mentally stimulates a child positioned in the apparatus 10. As
30 shown in Figures 2, 3, and 14, the electronic sound unit 131 can be turned on and off by a switch. In addition, the resilient support surface 13 may be covered by a pad (not shown) to add comfort for the child's feet.

Legs and Mounting Portions

As discussed above, one or more legs 11 are supported on a floor, and the legs 11 support the seat 12. Figures 9A and 9B illustrate one embodiment of how the legs 11 are secured to the seat 12. In particular, the seat support ring 211 includes one or more leg mounting portions 215 adapted for receiving and securely fastening one or more legs 11 to the seat support ring 211. Each leg mounting portion 215 is C-shaped and has a horizontal surface 219 that is contiguous with a lower surface of the seat support ring 211. In addition, each C-shaped portion 215 defines an inner diameter, or an inner width and length. An upper end 111 of each leg 11 has an outer diameter, or outer width and length, that is approximately the same as the inner diameter of the leg mounting portions 215, allowing the upper end 111 of the leg 11 to fit adjacent to the leg mounting portion 215. To secure the leg 11 into the leg mounting portion 215, a C-shaped bracket 216 having an inner diameter that is approximately the same as the outer diameter of the upper end 111 of the leg 11 is placed around the upper end 111 of the leg 11 and fastened to the horizontal surface 219 of the leg mounting portion 215. In an alternative embodiment, the leg mounting portion 215 is part of the table 14.

In another embodiment, the upper end 111 of each leg 11 includes a threaded hole that aligns with a threaded hole in the leg mounting portion 215, and a bolt or screw engages the threaded holes to secure the leg 11 to the mounting portion 215. For example, in the embodiment shown in Figure 10, the leg mounting portion 215 defines a socket 235, and the upper end 111 of the leg 11 is positioned within the socket 235. The upper end 111 of the leg 11 further includes a pair of tabs 236 that each define an aperture, and each aperture aligns with and seats adjacent to a pair of cylindrical bosses 238 in the mounting portion 215. A screw, for example, is engaged through the apertures and the cylindrical bosses 238 to secure the leg 11 to the leg mounting portion 215.

In yet another embodiment (not shown), the upper end 111 of each leg 11 is configured to snap into the leg mounting portion 215. And, in an alternative embodiment, the leg mounting portions 215 are positioned on a lower surface of the activity table 14.

After the legs 11 are secured to the seat support ring 211 or the activity table 14 as described above, a resilient support surface 13 is suspended from one or more of the legs 11. The legs 11 include a plurality of mounting portions 112 to which the resilient support surface 13 can be mounted. Various embodiments of mounting portions 112 are envisioned for use with the present invention. For example, in the embodiment shown in Figure 16, the mounting portions 112 are grooves, or recesses, defined on the legs 11 that receive elastic cords attached to the resilient support surface 13. In another example, as shown in Figures 17 through 24, the mounting portion 112 comprises slots or a series of slots that receive tabs attached to the resilient support surface 13 or pins with hook-shaped ends that couple the resilient support surface 13 to a leg 11. And, in yet another example, as shown in Figures 25 through 26, the mounting portions 112 are tabs or protrusions that receive elastic cords or engage mating holes or tabs coupled to the resilient support surface 13. Each of the types of mounting portions 112 is discussed in more detail below.

Figure 16 illustrates an embodiment in which the mounting portion 112 comprises grooves 170 on an outer surface 114 of the legs 11. The grooves 170 are vertically aligned and follow an arcuate path on the outer surface 114 of the leg 11, which is a surface of the leg 11 that is not facing the center of the apparatus 10. An elastic cord 171 is secured to the resilient support surface 13 using grommets, molding, sewing, or other suitable fasteners. To suspend the resilient support surface 13 from the leg 11, the cord 171 is positioned around the outer surface 114 of the leg 11 and seated within a groove 170. To adjust the distance between the seat 12 and the resilient support surface 13, the cord can be seated a higher or lower groove 170. The grooves 170 prevent vertical movement of the cord 171 after the cord 171 is placed into the desired position. In a further embodiment (not shown), the grooves 170 further define a recess for receiving a tab that is attached to the cord 171. The tab makes the cord easier to grab and indicates the position of the cord.

30

Furthermore, if the legs 11 are positioned to extend downwardly and outwardly towards the floor, the tension in the cord 171 will increase as the cord 171 is moved to a lower groove 170, thus increasing the amount of energy required of a child within the apparatus 10 to move the resilient support surface 13 up and
5 down. This effect is achieved regardless of the type of tension element present in the resilient support surface 13. Tension elements, such as flexible materials, springs, rubber cords, and rubber rings, are discussed above in relation to Figures 14 and 15 in the section entitled "Resilient Support Surface."

The mounting portion 112 shown in Figure 17 is a plurality of vertically
10 aligned, horizontally-oriented slots 174 adapted for receiving a tab 175 coupled to the resilient support surfaces 13. In particular, the tab 175 is attached to a cord 171, and the cord 171 is fastened to an outer periphery 133 of the resilient support surface 13. The tab 175 has a width w_t that is smaller than the width w_s of each slot 174, a height h_t that is less than the height h_s of each slot 174, and a length l_t
15 that is longer than the height h_s of each slot 174. To insert the tab 175 into the slot 174, the tab 175 is rotated about an axis W extending through the width w_t of the tab 175, pushed through the slot 174 in the direction towards the outer surface 114 of the leg 11, then rotated back about axis W such that the tab 175 seats against the outer surface 114 of the leg 11.

20 In an alternative embodiment (not shown), the tab 175 is coupled to the resilient support surface 13 without a cord 171. In yet another embodiment (not shown), two tabs 175 are coupled to the resilient support surface 13, and the two tabs 175 are mounted into a pair of slots 174 defined on the inner surface of each leg 11. Each pair of slots 174 are generally horizontally aligned, and the two or
25 more pairs of slots 174 are vertically aligned on a leg 11 to provide the ability to adjust the distance between the seat 12 and the resilient support surface 13.

Like the embodiment described above in relation to Figure 16, the distance of the resilient support surface 13 and the seat 12 can be adjusted by moving the tab 175 into a higher or lower horizontal slot 174. In addition, if the legs 11 are
30 positioned downwardly and outwardly towards the floor, the tension in cords 171 attached to the tabs 175, the tabs 175, or in the resilient support surface 13 will

adjust based on the distance between the resilient support surface 13 and the seat 12.

The mounting portions 112 shown in Figures 18 through 24 include a vertical slot and a plurality of horizontal grooves or slots stemming from the vertical slot. For example, in Figure 18, an embodiment of the mounting portion 112 includes a vertical slot 183 that extends through the leg 11 and horizontal grooves 184 that are centered on and positioned along the length of the vertical slot 183 on the outer surface 114 of the leg 11. A tab 185 attached to the resilient support surface 13 has a width w_t that is less than the height h_s of the vertical slot 183 but greater than the width w_s of the slot 183 and a height h_t that is less than the width w_s of the vertical slot 183. The tab 185 further includes an engaging surface 186 located on the surface of the tab 185 that is adjacent to the resilient support surface 13. To engage the tab 185 through the slot 183, the tab 185 is rotated about its lengthwise axis L, pushed through the slot 183, and then rotated back around axis L. The engaging surface 186 then engages a groove 184 on the outer surface 114 of the leg 11. To adjust the distance between the seat 12 and the resilient support surface 13, the tab 185 is moved to a higher or lower groove 184.

Figure 19 illustrates another embodiment of a mounting portion 112 that includes one central vertical slot 191, an entry portion 192 on the vertical slot 191 for receiving tabs 188, and a plurality of horizontal slots 193 stemming from the vertical slot 191. The tabs 188 are secured to the mounting portion 112 by rotating the tabs 188, pushing them through the entry portion 192, and repositioning them back into an upright position. The distance between the seat 12 and the resilient support surface 13 is adjusted by moving the cords 171 or other material coupling the tabs 188 to the resilient support surface 13 up or down the vertical slot 191 and into the appropriate horizontal slots 193. When the tabs 188 are in the appropriate horizontal slot 193, the tabs 188 seat into grooves 194 positioned on the outer surface 114 of the leg 11 along the horizontal slots 193.

Figures 20 through 24 illustrate embodiments of mounting portions 112 that include vertical slots, such as the vertical slots described above in relation to Figures 18 and 19. However, instead of using tabs to mount the resilient support surface 13 to the legs 11, the embodiments in Figures 20 through 24 include pins

that extend through the vertical slots and receive a connector portion, such as a cord, a grommet, or a ring, that is coupled to the resilient support surface 13.

For example, Figure 20 shows an embodiment of a mounting portion 112 that includes a vertical slot 195 that extends through the leg 11 and a plurality of
5 horizontal slots 251 that are vertically aligned and extend from the vertical slot 195 and partially through the leg 11. A pin 197 has a head end 198, a hook end 199, and an elongated body between the head end 198 and the hook end 199. The head end 198 is wider than the vertical slot 195 extending through the leg 11, and the hook end 199 and the elongated body are thinner than the vertical slot 195. In
10 addition, the pin 197 includes a vertical stop member 253 that extends horizontally across a portion of the elongated body adjacent to the head end 198. The vertical stop member 253 is dimensioned to fit within the horizontal slots 251.

To mount the resilient support surface 13 to the leg 11, the hook end 199 and elongated body are pushed through the vertical slot 195 from the outer surface
15 114 of the leg 11 towards the inner surface of the leg 11, and the vertical stop member 253 is engaged into one of the horizontal slots 251. The connector portion coupled to the resilient support surface 13 is engaged onto the hook end 199, and the tension element of the resilient support surface 13 pulls the head end 198 of the pin 197 into engagement with the outer surface 114 of the leg 11. To adjust the
20 distance between the resilient support surface 13 and the seat 12, the head end 198 of the pin 197 is pulled outwardly relative to the outer surface 114 of the leg 11 until the vertical stop member 253 is disengaged from a horizontal slot 251, and the elongated body of the pin 197 is moved within the vertical slot 195 to the desired position. The vertical stop member 253 is then engaged into the
25 corresponding horizontal slot 251.

In addition, Figure 20 illustrates an embodiment of the mounting portion 112 in which the vertical slot 195 on the inner surface of the leg 11 is positioned within a recessed area 240. When the pin 197 is fully engaged in the vertical slot 195, the hook end 199 of the pin 197 and the portion the connector portion that
30 engages the hook end 199 of the pin 197 are positioned within the recessed area 240, which prevents the child's foot from making contact with the hook end 199 of the pin 197.

Figures 21A, 21B, and 21C illustrate yet another embodiment of a mounting portion 112 that includes a vertical slot 195 that extends through the leg 11. In this embodiment, a plurality of plates 261, 266 are fixed adjacent to each other and mounted through the leg 11 to form the mounting portion 112. In particular, as shown in Figure 21B, an outer plate 261 includes a vertical slot 195, an entry portion 263 that is wider than the vertical slot 195, and a plurality of protrusions 264 extending normally from the outer plate 261 and positioned along the vertical slot 195. Each protrusion 264 includes a depressed portion 265 that is horizontally aligned with another depressed portion 265 on the other side of the vertical slot 195. Adjacent to the outer plate 261 and to the inner surface of the leg 11 is an inner plate 266 that includes a vertical slot 195 that aligns with the vertical slot 195 in the outer plate 261.

The pin 197 described above in relation to Figure 20 can be inserted through the vertical slots 195 in the plates 261, 266, and the vertical stop member 253 can be engaged into the depressed portions 265 of a pair of horizontally aligned protrusions 264 to prevent movement of the pin 197 in a vertical direction or in a horizontal direction towards the inner surface of the leg 11.

Figure 21C illustrates a further embodiment of a pin 197 that can be engaged into the above-described mounting portion 112. The pin 197 includes a vertical stop member 253 adjacent to the head end 198 and an inner horizontal stop member 269 between the vertical stop member 253 and the hook end 199. The inner horizontal stop member 269 is dimensioned slightly smaller than the entry portion 263 in the outer plate 261. To mount the pin 197 into the mounting portion 112, the hook end 199 and inner horizontal stop member 269 are inserted through the entry portion 263 of the outer plate 261, and the hook end 199 is further inserted through the vertical slot 195 of the inner plate 266. The inner horizontal stop member 269 does not extend through the vertical slot 195 of the inner plate 266 as the width of the stop member 269 is dimensioned to be wider than the vertical slot 195. The inner horizontal stop member 269 prevents the unintentional removal of the pin 197 from the leg 11.

In a further embodiment, as shown in Figure 21C, the pin 197 includes an outer stop member 270 that is positioned adjacent to the head end 198 and further

prevents the pin 197 from moving through the vertical slot 195 past the outer surface 114 of the leg 11 and from moving vertically within the slot 195. The outer stop member 270 extends normally from the head end 198 towards the hook end 197 and has an inner diameter (or width and length) that is slightly larger than the outer diameter as measured across two horizontally adjacent protrusions 264 on the outer plate 261. The vertical stop member 253 and the outer stop member 270 are aligned with a pair of horizontally-aligned protrusions 264 on the outer plate 261. The vertical stop member 253 is positioned within the depressed portions 265 of each protrusion 264, and the outer stop member 270 is positioned to fit around the protrusions 264 and seat against a face of the outer plate 261. To move the pin 197 up or down, the pin 197 is pulled outwardly from the outer plate 261 until the outer stop member 270 clears the protrusions 264, while keeping the inner horizontal stop member 269 intermediate the outer 261 and inner plate 266. The pin 197 is then moved up or down in the vertical slot 195 to the desired position, and the vertical stop member 253 and the outer stop member 270 are engaged into a pair of horizontally aligned protrusions 264, as described above.

Figure 22 shows an embodiment of a pin 197 having a biased inner horizontal stop member 269. In this embodiment, two fingers 283 on opposite sides of the elongated body of the pin 197 extend from the head end 198 past the outer stop member 270 towards the hook end 199. Ribs 281 extend from the ends of the fingers 283 near the hook end 199, and each of the ribs 283 has a ramped portion 290 that gradually extends outwardly from the finger 283 in the direction towards the end of the finger 283 adjacent to the hook end 199. To mount the pin 197 within the vertical slot 195, the fingers 283 are pushed inwardly towards the elongated body of the pin 197 such that the width of the pin 197 is less than the width of the vertical slot 195. When the ribs 281 are located between the inner 266 and outer plates 261, the fingers 283 are released and bias the ribs 281 outwardly, preventing the unintentional removal of the pin 197 from the mounting portion 112. To remove the pin 197 from the mounting portion 112, the pin 197 is pulled in an outward direction from the leg 11 and the inner surface of the outer plate 261 adjacent to the vertical slot 195 forces the ramped portion 290 of the ribs 281 inwardly, allowing the pin 197 to be removed.

Figure 23 illustrates an additional embodiment of a mounting portion 112 that includes an outer plate 261 and an inner plate 266. The outer plate 261 defines a vertical slot 195, a plurality of horizontal grooves 196 extending from the vertical slot 195, and an aperture 242 for receiving a protrusion 243 from the inner plate 266. The vertical slot 195 further includes an entry portion 263 for receiving an inner horizontal stop member 269 on a pin 197. The inner plate 266 includes a vertical slot 195, a plurality of horizontal slots 244 extending to one side of the vertical slot 195, and a protrusion 243 extending from the inner plate 266 through the aperture 242 on the outer plate 261. To mount the pin 197 within the mounting portion 112, the protrusion 243 is urged horizontally to align the vertical slot 195 on the inner plate 266 with the vertical slot 195 on the outer plate 261, and the hook end 199 of the pin 197 is inserted through the entry portion 263 in the outer plate 261 and moved to the desired vertical position. When the pin 197 is in the desired position, the protrusion 243 is urged horizontally in the opposite direction as before to align the horizontal slots 244 on the inner plate 266 with the vertical slot 195 on the outer plate 261, which prevents vertical movement of the pin 197.

Figures 24A and 24B illustrate another embodiment of a mounting portion 112 that includes horizontal slots 251 extending from a vertical slot 195. However, as shown in Figure 24A, the horizontal slots 251 extend all the way through the leg 12, and the width of the horizontal slots 251 gradually decreases from the outer surface 114 of the leg 12 towards the inner surface of the leg 12 at a certain angle. A cantilevered latch 280 extends from a side of each horizontal slot 251 adjacent the inner surface of the leg 12 towards the vertical slot 195. The pin 197 shown in Figure 24B further includes a horizontal rib 285 that extends at least partially through the body of the pin 197 adjacent to the hook end 199, and the pin 197 has a width that gradually decreases from the head end 198 towards the hook end 199 at substantially the same angle as the horizontal slots 251. When the pin 197 is pushed through one of the horizontal slots 251, the rib 285 of the pin 197 engages the cantilevered latch 280, causing the latch 280 to deflect away from the inner surface of the leg 12 towards the center of the apparatus 10. Once the rib 285 moves past the cantilevered latch 280, the cantilevered latch 280 returns to its initial position such that it seats adjacent the rib 285 and prevents unintentional movement of the pin 197 in a horizontal direction. To remove the pin 197 or move

it to another horizontal slot **251**, the pin **197** is pulled outwardly from the leg **12** with enough force to deflect the cantilevered latch **280** towards the outer surface **114** of the leg **12** and move the rib **285** past the latch **280**.

In another embodiment of a mounting portion **112**, which is shown in Figure 25, the mounting portion **112** includes a tab or protrusion onto which a connector attached to the resilient support surface **13** can be mounted. The inner surface of each leg **11** includes a generally horizontal flange **301** extending normally from the inner surface of the leg **11**. One or more protrusions **302** extend normally from the flange **301** in an upward direction. A tab **310** attached to the resilient support surface **13** has tabs **310** that include one or more grommets **312**. The grommets **312** receive the protrusions **302**, which may be shaped like hooks, preventing the horizontal movement of the resilient support surface **13** relative to the legs **11**. In an alternative embodiment (not shown), the tabs **310** include protrusions **313** extending from the lower surface of the tabs **310**, and the horizontal flange **301** extending from each leg **11** includes depressed portions **303** for receiving the protrusions **313**. In other embodiments (not shown), the tabs **310** may include cords that extend from the tabs **310** to wrap around the protrusions **302** or flanges that extend downwardly from the tabs **310** to engage the protrusions **302**.

Figure 26 illustrates another embodiment in which the inner surface of the leg **11** includes tabs **320** that extend upwardly and outwardly from the inner surface. Cords **330** attached to the resilient support surface **13** are positioned between the tabs **320** and the inner surface by moving them downwardly behind the tab **320**. The tabs **320** prevent the cords **330** from moving in a horizontal direction away from the legs **11** or a vertical direction relative to the legs **11**. Alternatively, which is not shown, the tabs **320** are located on the outer surface **114** of the leg **11**, and the cords **330** are inserted into and pulled through a horizontal slot **321** positioned below the tab **320** and positioned between the tab **320** and the outer surface **114**. In yet another embodiment in which the tabs **320** are positioned on the outer surface **114** of the leg **11** (not shown), the cords **330** can be wrapped around the outer surface **114** and positioned between the tabs **320** and the outer surface **114** such that the body of the leg **11** prevents the movement of the cord **330**

away from the leg 11 and the tab 320 prevents the movement of the cord 330 in a vertical direction.

Furthermore, in any of the embodiments described above in relation to Figures 16 through 26, if the legs 11 are positioned downwardly and outwardly towards the floor, the tension in cords, in the connector portion, or in the resilient support surface will increase as the distance between the resilient support surface 13 and the seat 12 increases and will decrease as the distance decreases.

Activity Table

As mentioned above, the apparatus 10 may further include an activity table 14. Figures 1 through 4 illustrate an embodiment of an activity table 14 that surrounds the seat 12 of the exercise apparatus 10 and includes an upper surface 141 configured for receiving and supporting one or more children's activity items 142. As shown in Figure 1, the upper surface 141 of the activity table 14 includes depressed receptacles 144 that are dimensioned to receive activity items 142 that have engagement portions for mating with the depressed receptacles 144. For example, the upper surface 141 of the table 14 shown in Figure 1 includes three receptacles 144.

In a further embodiment, each receptacle 144 can be configured to receive a different type of activity item 142, such as an electronic piano, mechanical, or physically interactive toys, and a tray for holding food. A piano is a term used to describe a mechanical or electrical activity item that includes keys or buttons for the child to push, and in response to the child pushing the keys or buttons, music, voice, or other sounds are played. Mechanical toys can include bead-chasers, spring loaded toys that vibrate back and forth when pulled or pushed, toys mounted on an axis that spin when force is applied to the toy. Other activity items 142 that can be mounted to the table 14 or onto handle, or toy, bars 143 that are mounted to the table 14 include bead chasers, flexible mirrors, see-saw clickers, and stalk toys, such as rattle balls, water or gel-filled teething toys, mirrors, and squeakers.

As mentioned above and shown in Figure 7, one embodiment of the activity table **14** is integrally formed with the seat support ring **211**. The outer wall **214** of the seat support ring **211** extends downwardly from the outer periphery of the annular horizontal engagement surface **212**. The activity table **14** defines a horizontal annular groove **145** that has a central vertical axis **C**, which is coaxial with the central vertical axis **B** of the seat support ring **211**, and includes a lower horizontal surface **146**. The wall **214** of the seat support ring **211** intersects the lower horizontal surface **146**, serving as an inner wall of the horizontal annular groove **145**. The groove **145** is useful for containing any food or drink spills that may occur while a child is positioned within the exercise apparatus **10**, which facilitates cleaning up the spills. In an alternative embodiment (not shown), the table **14** does not include a groove **145** and the wall **214** intersects with the upper surface **141** of the activity table **14**.

In another alternative embodiment, the seat support ring **211** and the activity table **14** are separate. As shown in Figure 8, an annular groove **147** is defined in the activity table **14** by an outer vertical wall **148** that extends downwardly from the upper surface **141** of the activity table **14**, a horizontal surface **149** that extends horizontally towards a central vertical axis **D** of the groove, and an inner vertical wall **150** that extends upwardly from the horizontal surface **149** of the groove **147**. The outer wall **214** of the seat support ring **211** extends downwardly from the annular horizontal engagement surface **212**, and the inner diameter of the outer wall **214** is approximately the same as the outer diameter of the inner wall **150** of the annular groove **147**. To couple the seat support ring **211** to the activity table **14**, the outer wall **214** of the seat support ring **211** is positioned adjacent to the inner wall **150** of the groove **147** and the central vertical axis **D** of the groove **147** is coaxial with the central vertical axis **B** of the seat support ring **211**.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are

intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

CLAIMS:

1. A children's exercise apparatus for providing exercise functionality for a small child, said apparatus comprising:

one or more legs supported on a floor;

a seat supported by the legs and being structured to support the child while allowing the child's legs to extend downwardly below the seat; and

a resilient support surface suspended generally horizontally from at least one of the legs and positioned vertically between the seat and the floor, said resilient support surface having a resiliency that is adapted for allowing the child to bounce vertically by pushing its legs downwardly against the resilient support surface.
2. The apparatus of Claim 1 further comprising at least one element under tension to provide the resiliency for the resilient support surface, and wherein at least one leg defines a mounting portion, said mounting portion being adapted for securing said resilient support surface to said leg at a distance below said seat.
3. The apparatus of Claim 2, wherein said mounting portion defines a plurality of vertical stops such that a distance between said seat and said resilient support surface is increased by coupling said resilient support surface to a lower vertical stop and said distance is decreased by coupling the resilient support surface to a higher vertical stop.
4. The apparatus of Claim 3, wherein said one or more legs are positioned to extend outwardly and downwardly from the seat to the floor such that the tension of the element increases when the resilient support surface is secured closer to the floor and the tension of the element decreases when the resilient support surface is secured closer to the seat.
5. The apparatus of Claim 3 wherein said plurality of vertical stops includes a plurality of grooves defined in an outer surface of one of said one or more legs, each of said grooves being adapted for receiving a resilient cord and preventing said resilient cord from moving vertically.
6. The apparatus of Claim 3 wherein said plurality of vertical stops includes a plurality of horizontal slots, each of said horizontal slots adapted for receiving a tab coupled to said resilient support surface and preventing said tab from moving vertically.

7. The apparatus of Claim 3 wherein said plurality of vertical stops includes a plurality of horizontal slots extending from an elongated vertical slot in each of said one or more legs, said vertical slot having a certain width, and said apparatus further comprising a pin adapted for selectively engaging said vertical slot and said horizontal slots and having an elongated body with a width that is less than the width of the vertical slot, a horizontal stop member, and a vertical stop member, wherein said horizontal stop member has a width greater than said width of said vertical slot to prevent said horizontal stop member from passing through said vertical slot and said vertical stop member is adapted for selectively engaging said horizontal slots, preventing said pin from moving vertically.
8. The apparatus of Claim 7 wherein:

each of said plurality of horizontal slots has a width that gradually decreases from an outer surface of said leg to an inner surface of said leg at an angle;

each of said horizontal slots further includes a cantilevered latch extending adjacent said inner surface of said leg towards said vertical slot, said cantilevered latch adapted for seating adjacent a rib extending at least partially through said pin; and

said elongated body of said pin has a width that gradually decreases from said head end towards said hook end at substantially the same angle as said horizontal slots and said rib is positioned adjacent said hook end.
9. The apparatus of Claim 2 wherein said resilient support surface comprises a flexible material.
10. The apparatus of Claim 2 wherein said resilient support surface comprises a middle portion comprising a rigid material and a peripheral portion comprising a resilient material.
11. The apparatus of Claim 2 wherein said resilient support surface comprises a rigid material and a plurality of molded rubber springs attached along the periphery of said resilient support surface.
12. The apparatus of Claim 1 wherein:

each of said legs defines an elongated vertical slot with a certain width and a plurality of projections extending normally from said legs, said projections being vertically aligned adjacent said vertical slot, and said apparatus further comprising:

a pin adapted for selectively engaging said vertical slot and at least a portion of each of said projections, said pin having an elongated body with a width that is less than the width of the vertical slot, a vertical stop member, and a horizontal stop member, wherein said vertical stop member is positioned along the elongated body and is adapted for engaging the projections extending from said legs, preventing said pin from moving up or down within said vertical slot, and

wherein said horizontal stop member has a width greater than said width of said vertical slots, preventing said horizontal stop member from passing through said vertical slot.

13. The apparatus of Claim 1, said resilient support surface further comprising an contact sensor and an electronic sound unit, wherein said electronic sound unit is adapted for emitting a sound when said contact sensor senses movement of the resilient support surface.

14. The apparatus of Claim 1 further comprising an activity table at least partially surrounding said seat, wherein said activity table is adapted for receiving one or more children's activity items.

15. The apparatus of Claim 1 wherein said seat comprises:

a seat support ring having a first central vertical axis and an annular horizontal engagement surface extending towards said first central vertical axis; and

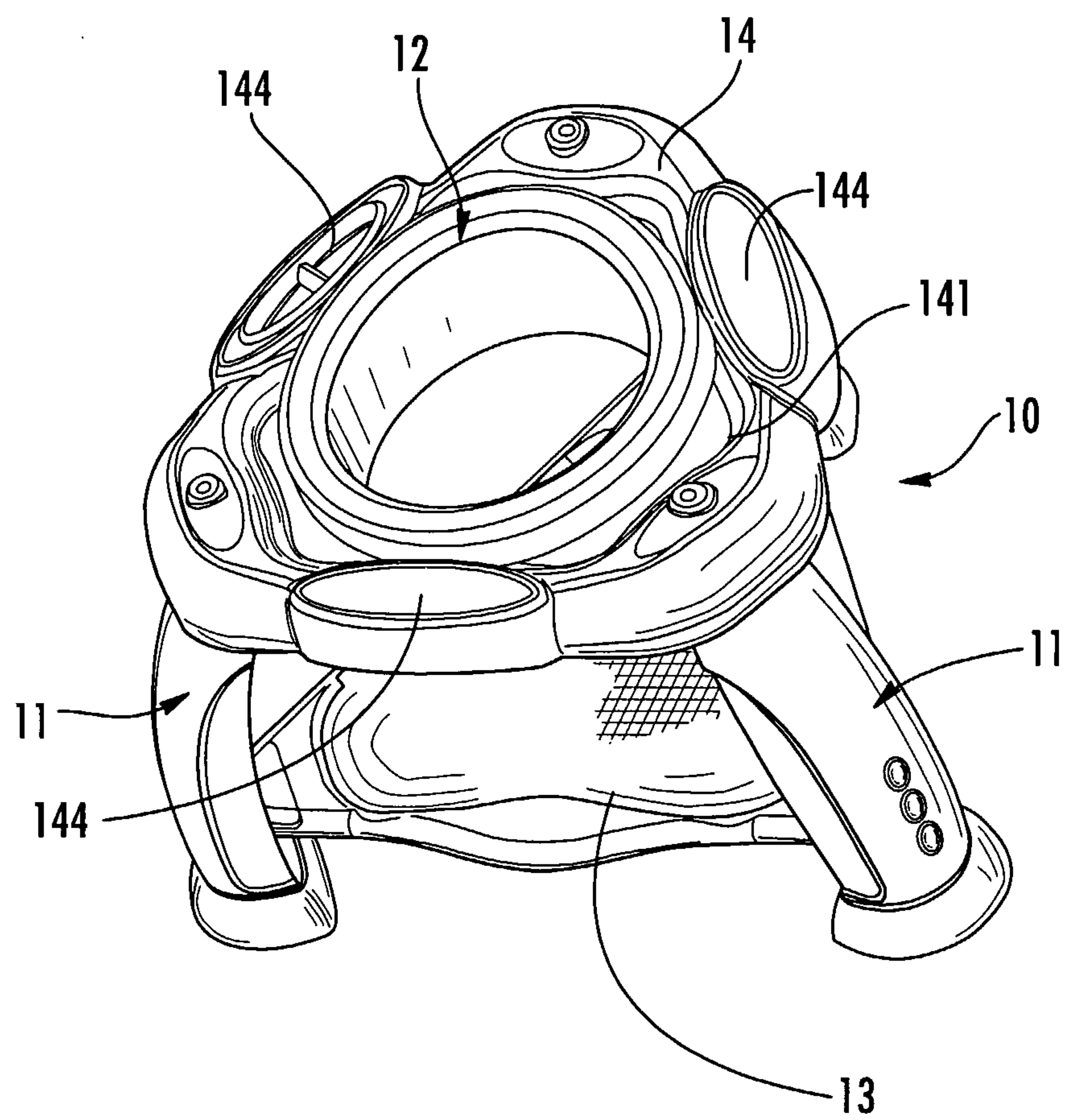
a seat carrier ring having a second central vertical axis, an inner wall, an outer wall, and a lower surface, said lower surface positioned between said inner wall and said outer wall;

wherein said lower surface of said seat carrier ring is positioned adjacent said horizontal engagement surface of said seat support ring such that said central axis of said seat support ring is coaxial with said central axis of said seat carrier ring and said seat carrier ring can rotate about said central axes independently of said seat support ring.

16. The apparatus of Claim 15 further comprising a fabric sling for receiving a child, said sling having a top portion and a bottom portion, wherein said bottom portion defines a pair of holes for receiving a child's legs and said top portion includes one or more fasteners for engaging one or more fastener receiving portions positioned on the seat carrier ring.

17. The apparatus of Claim 15 wherein said lower surface of said seat carrier ring comprises a plurality of ribs positioned between said inner wall and said outer wall, each of said flanges defining a mounting portion for receiving a roller, and each of said rollers adapted for facilitating the rotation of said seat carrier ring around said central axis and independently of said seat support ring.
18. The apparatus of Claim 15 wherein said seat support ring is integrally formed as part of an activity table, said activity table being adapted for receiving one or more children's activity items.

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**FIG. 1**

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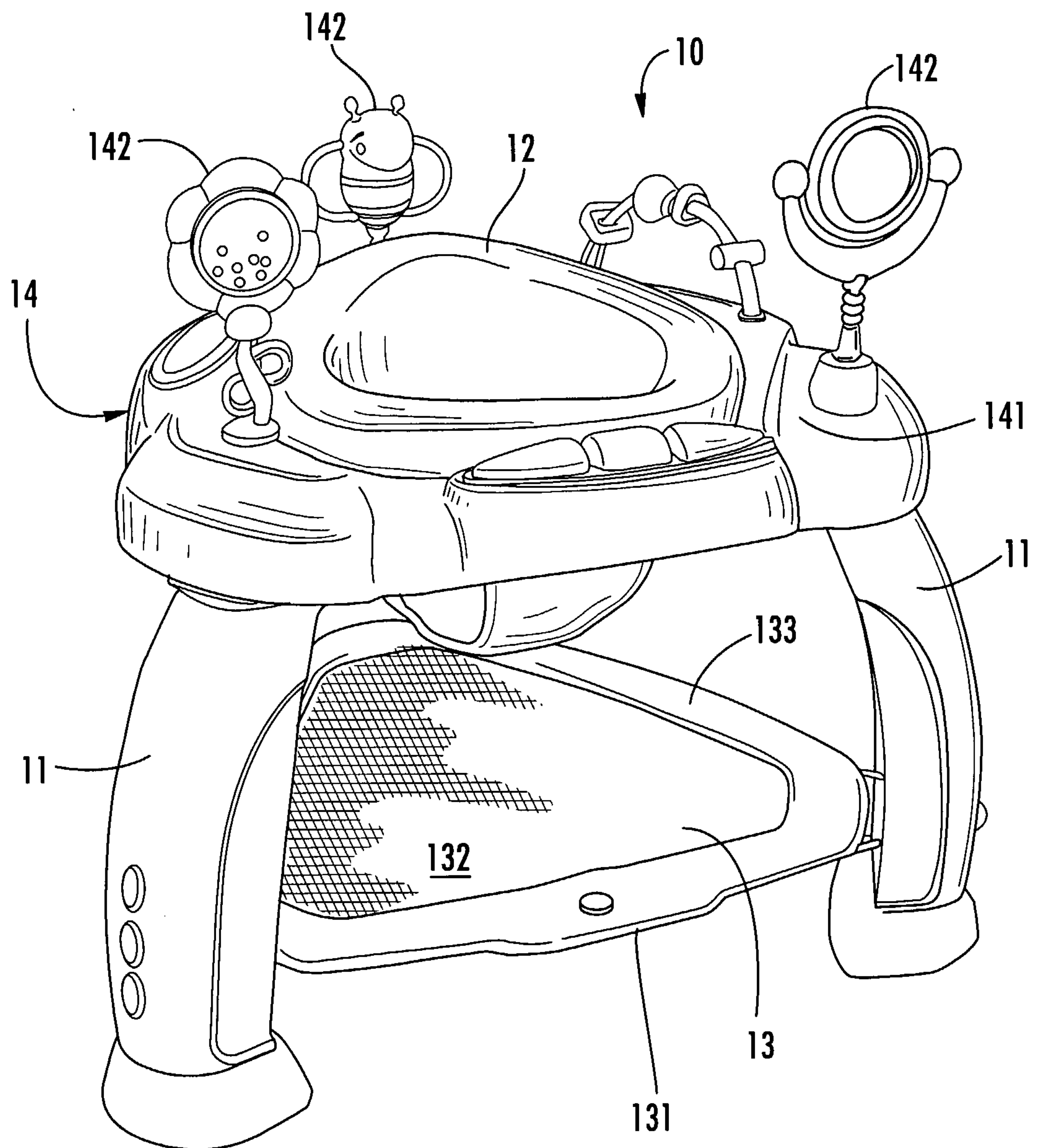


FIG. 2

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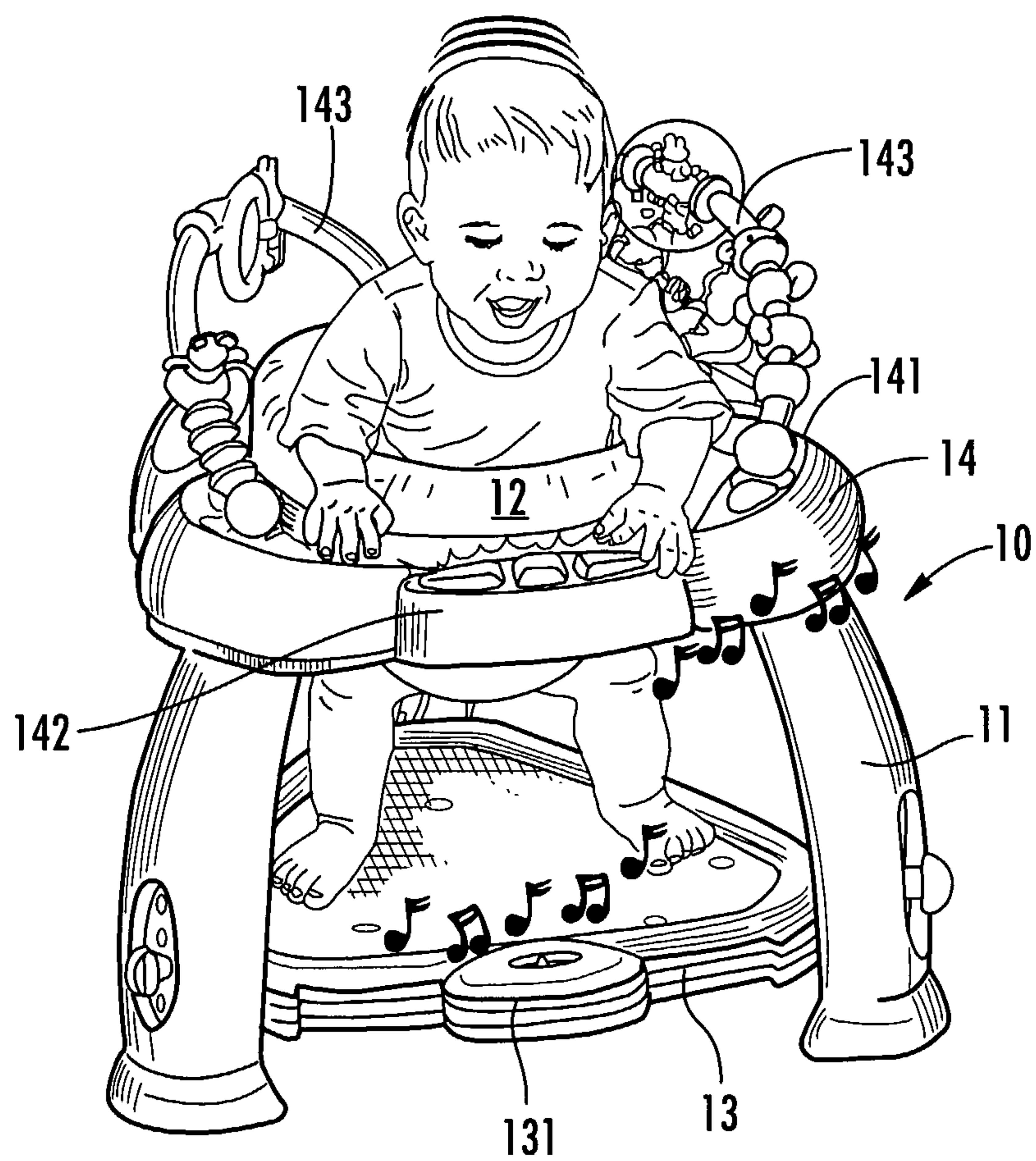


FIG. 3

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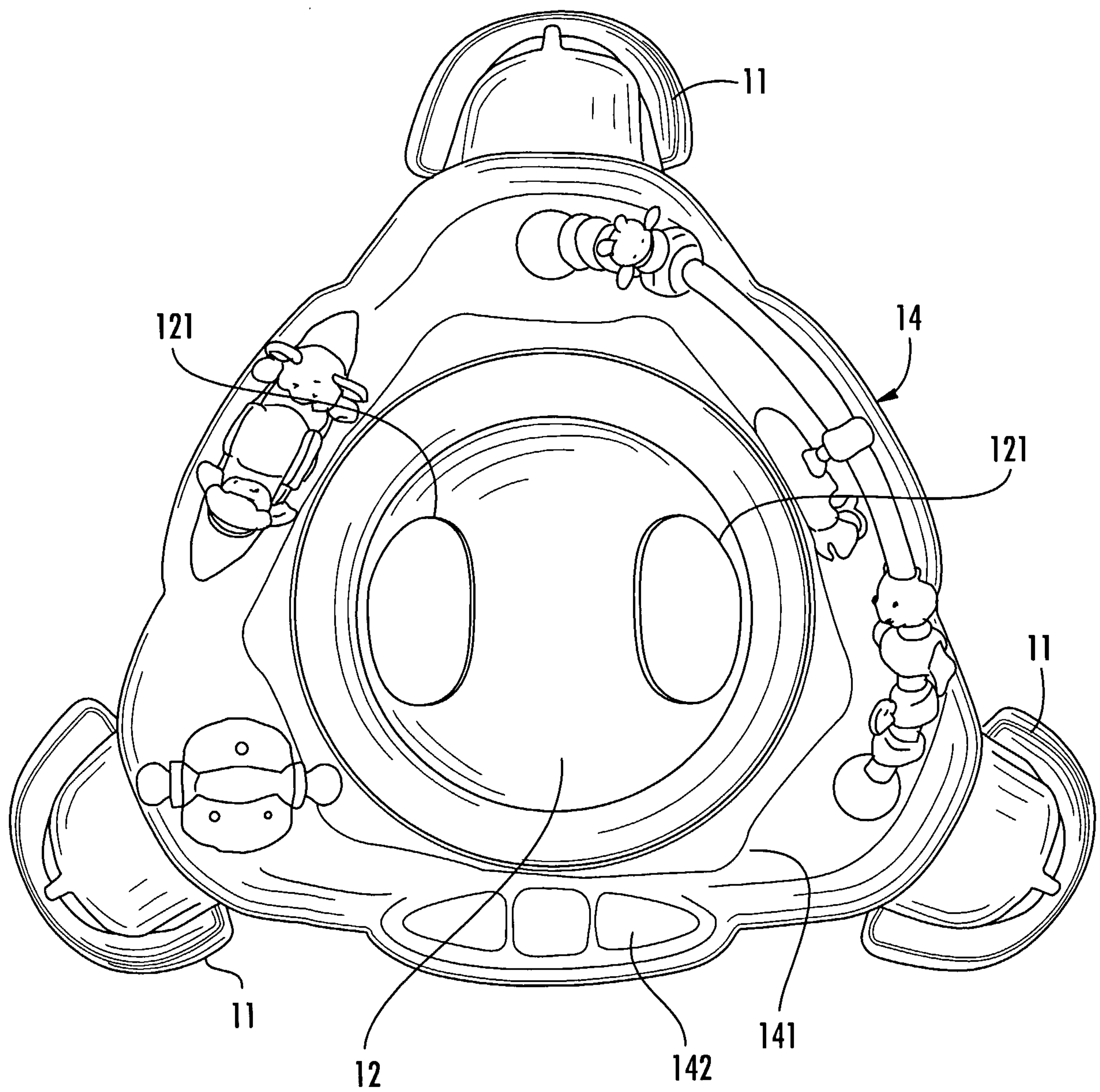


FIG. 4

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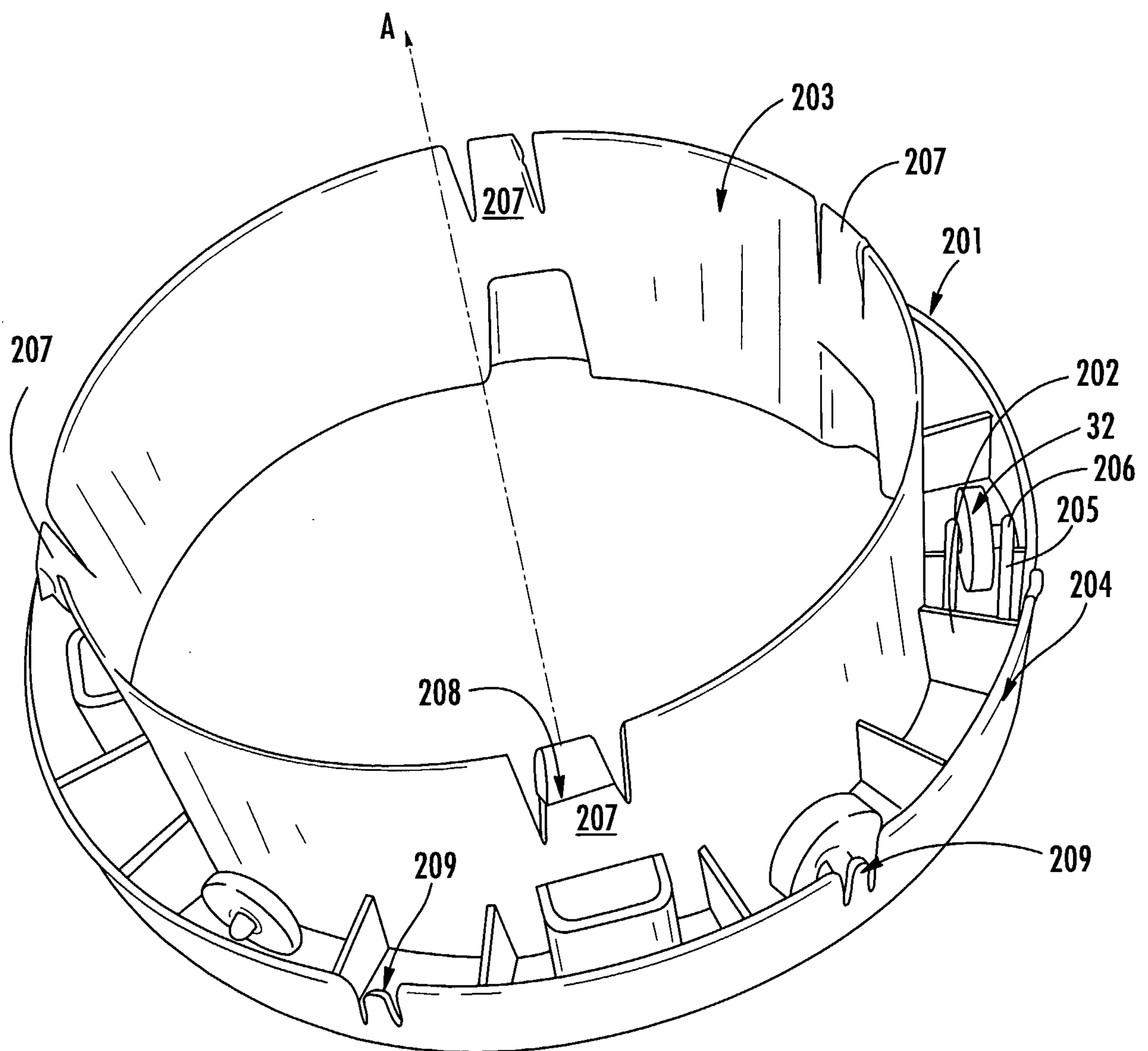


FIG. 5

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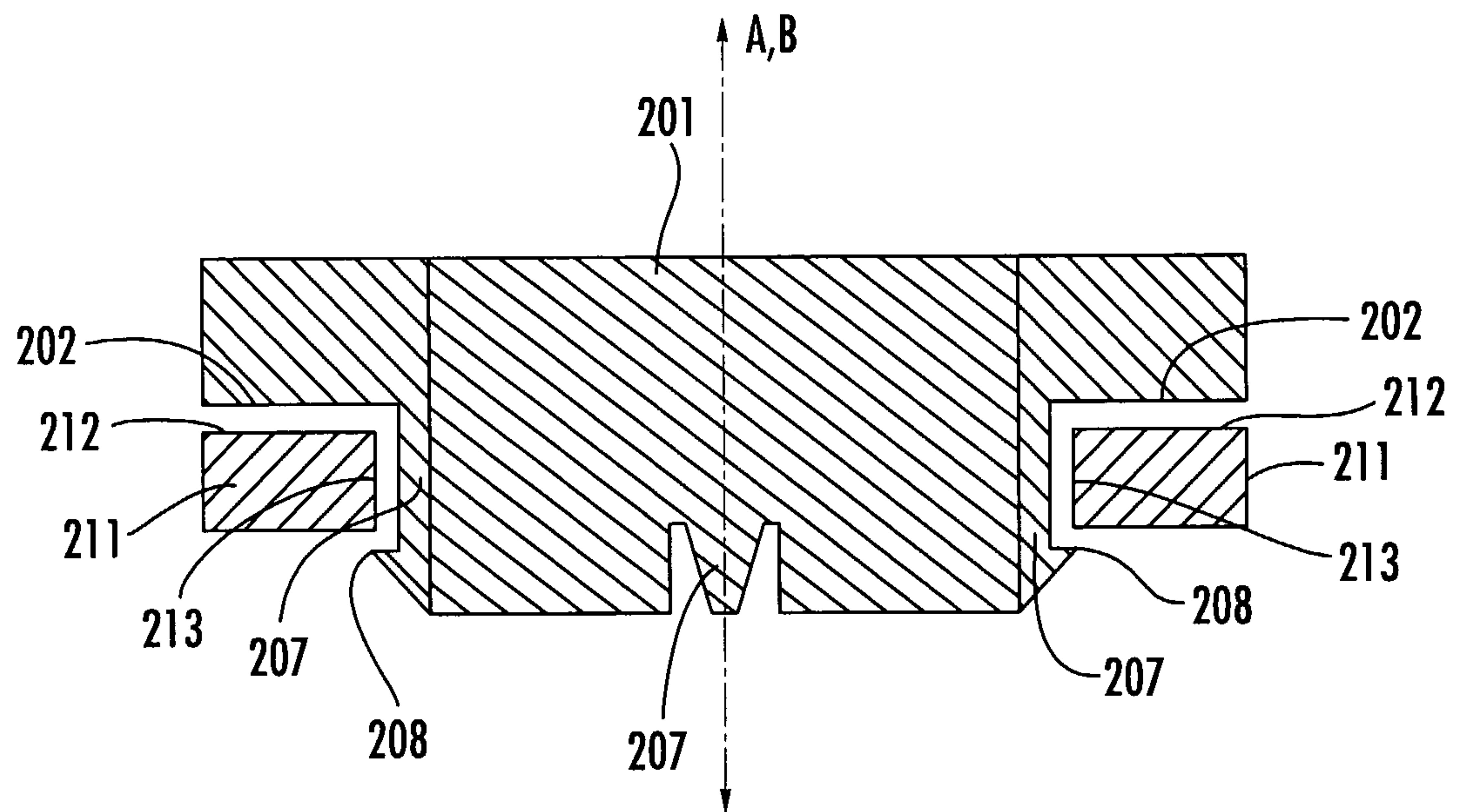
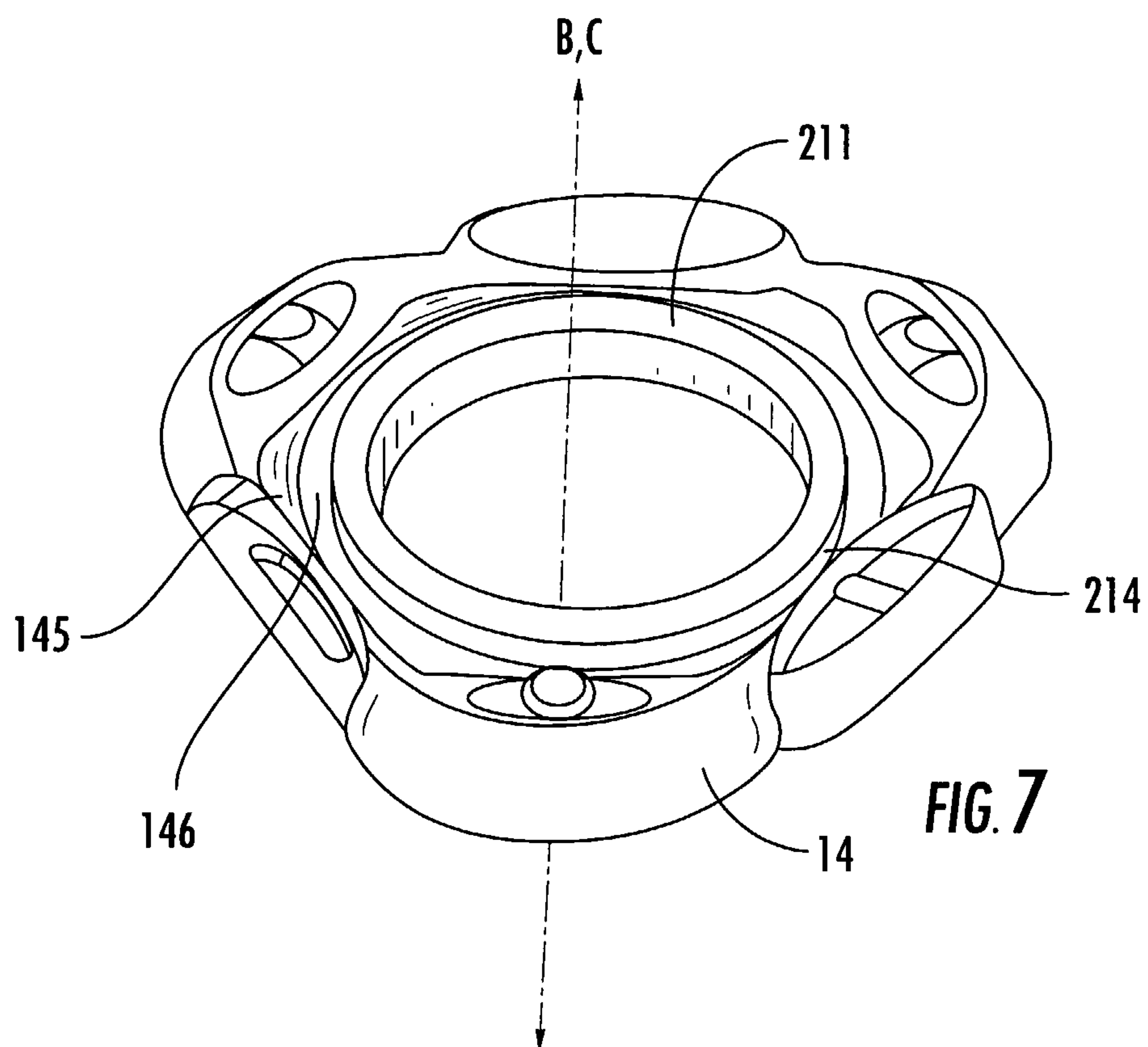


FIG. 6

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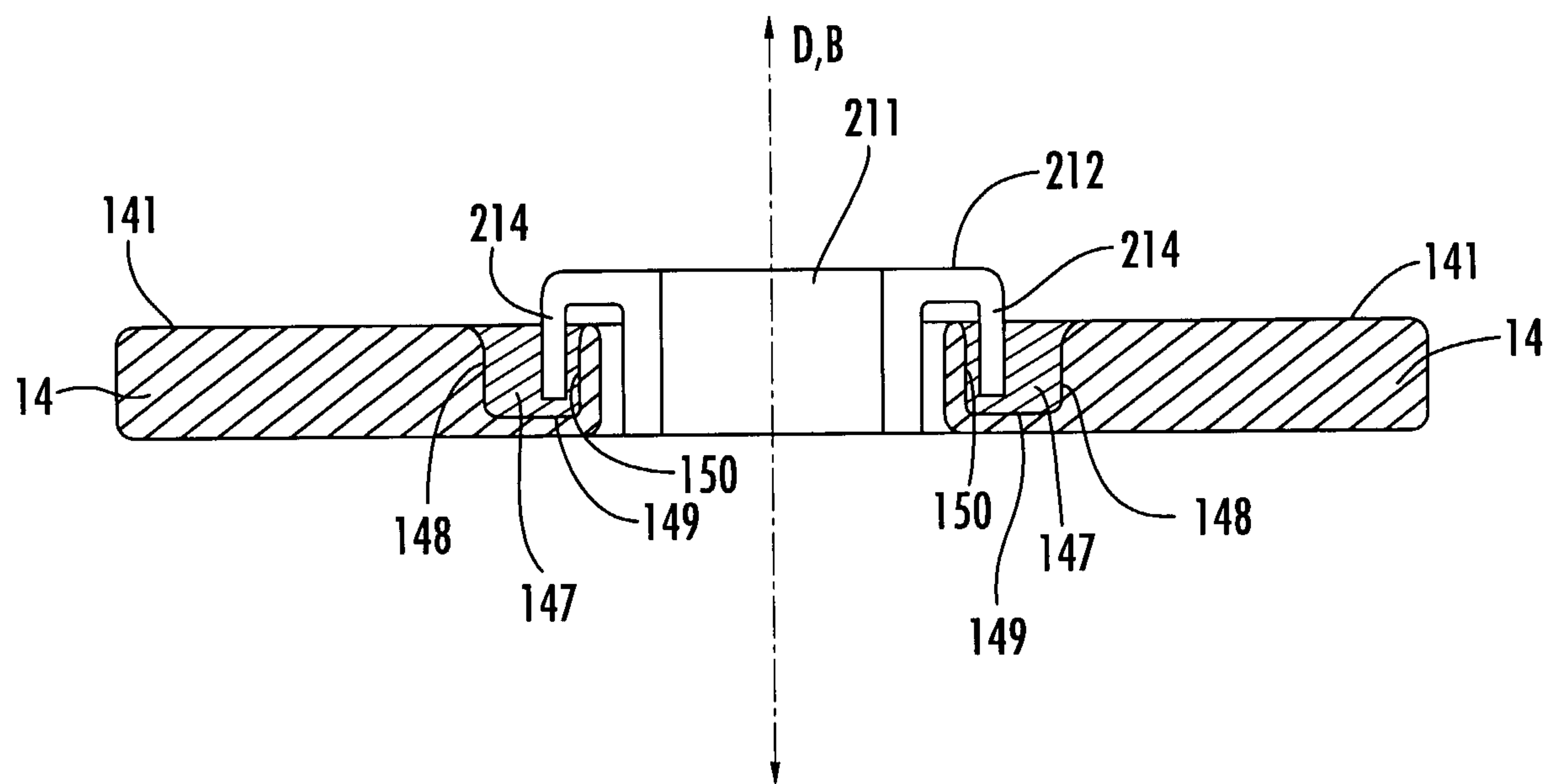
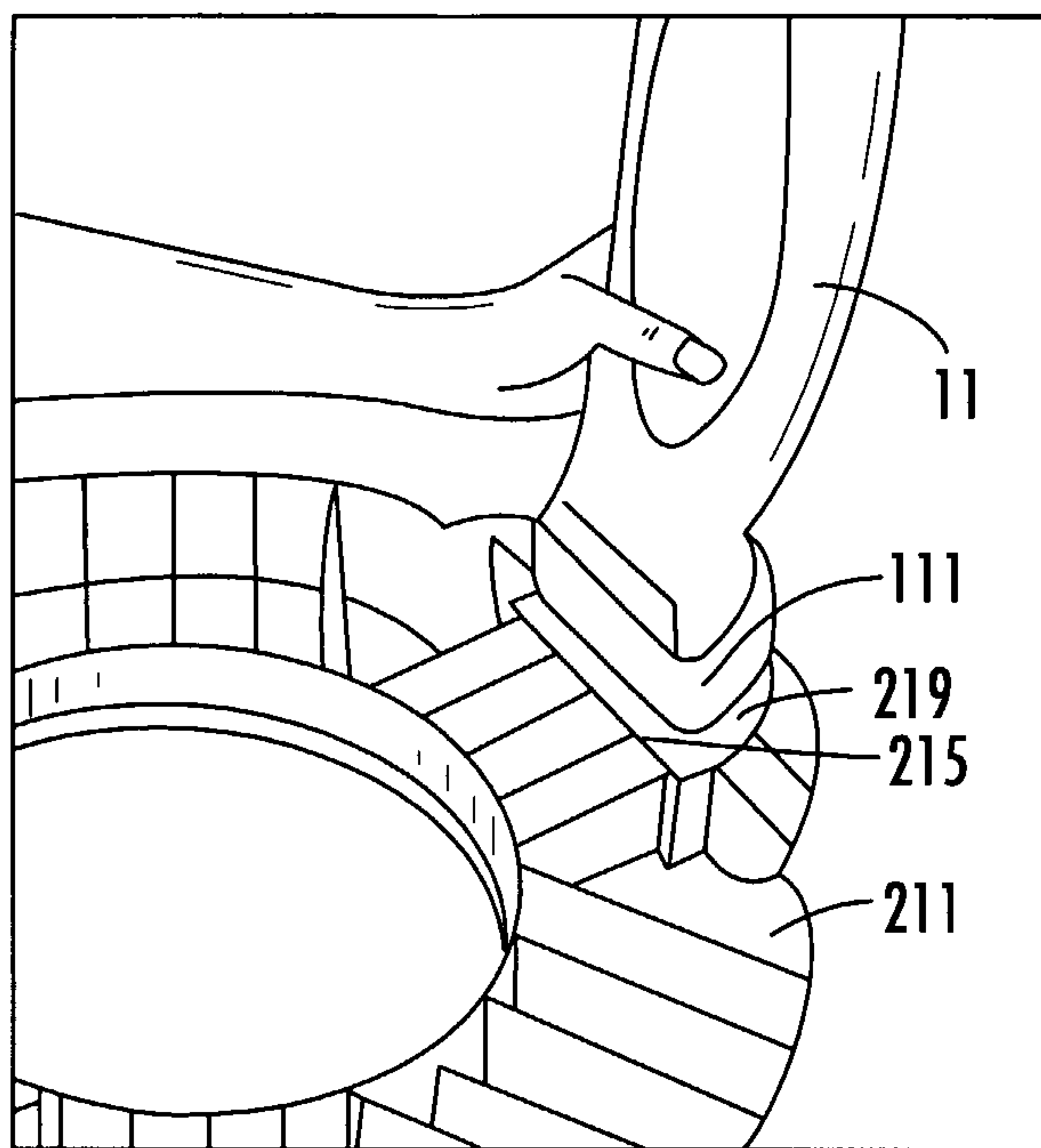
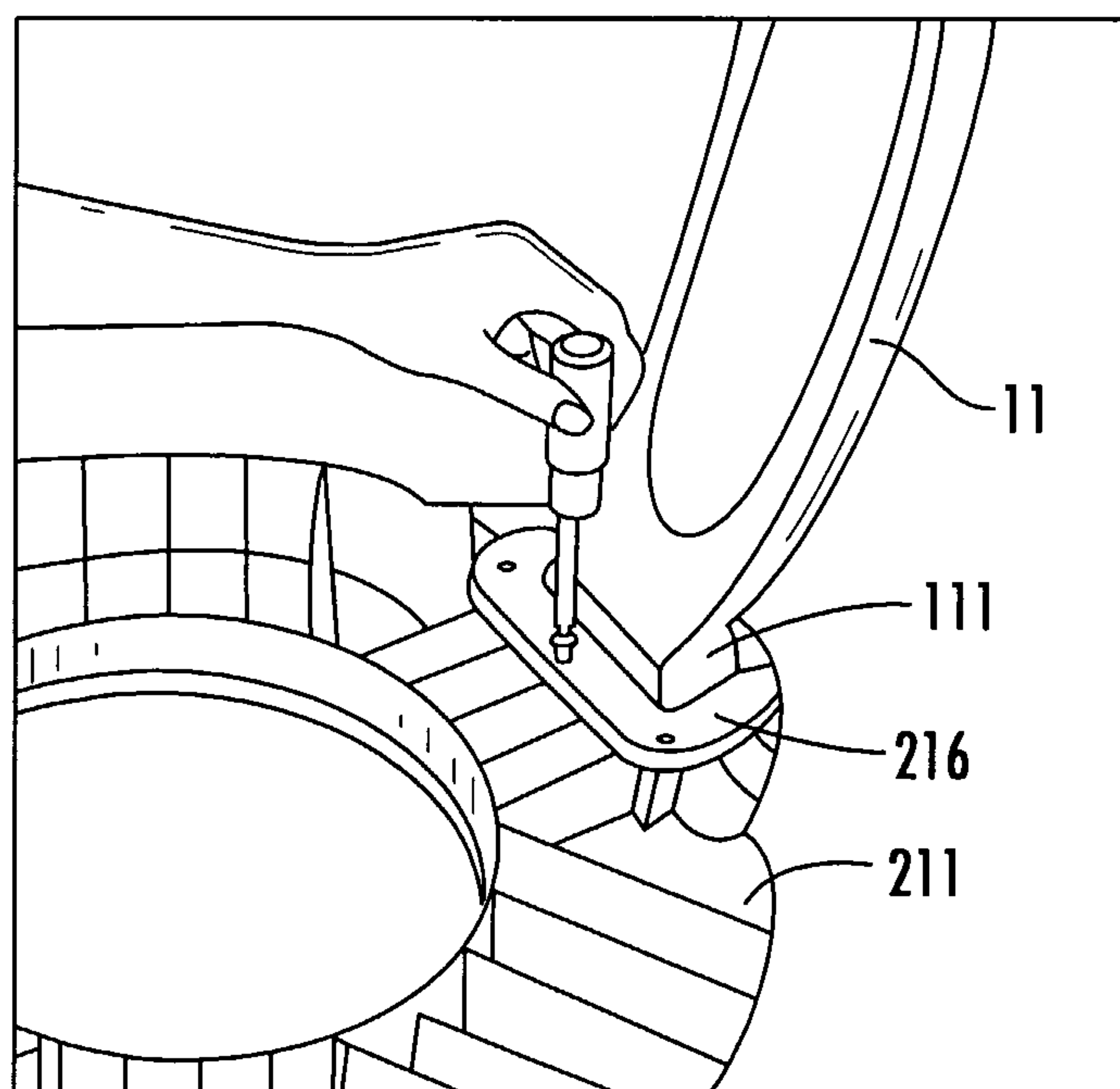


FIG. 8

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**FIG. 9A****FIG. 9B**

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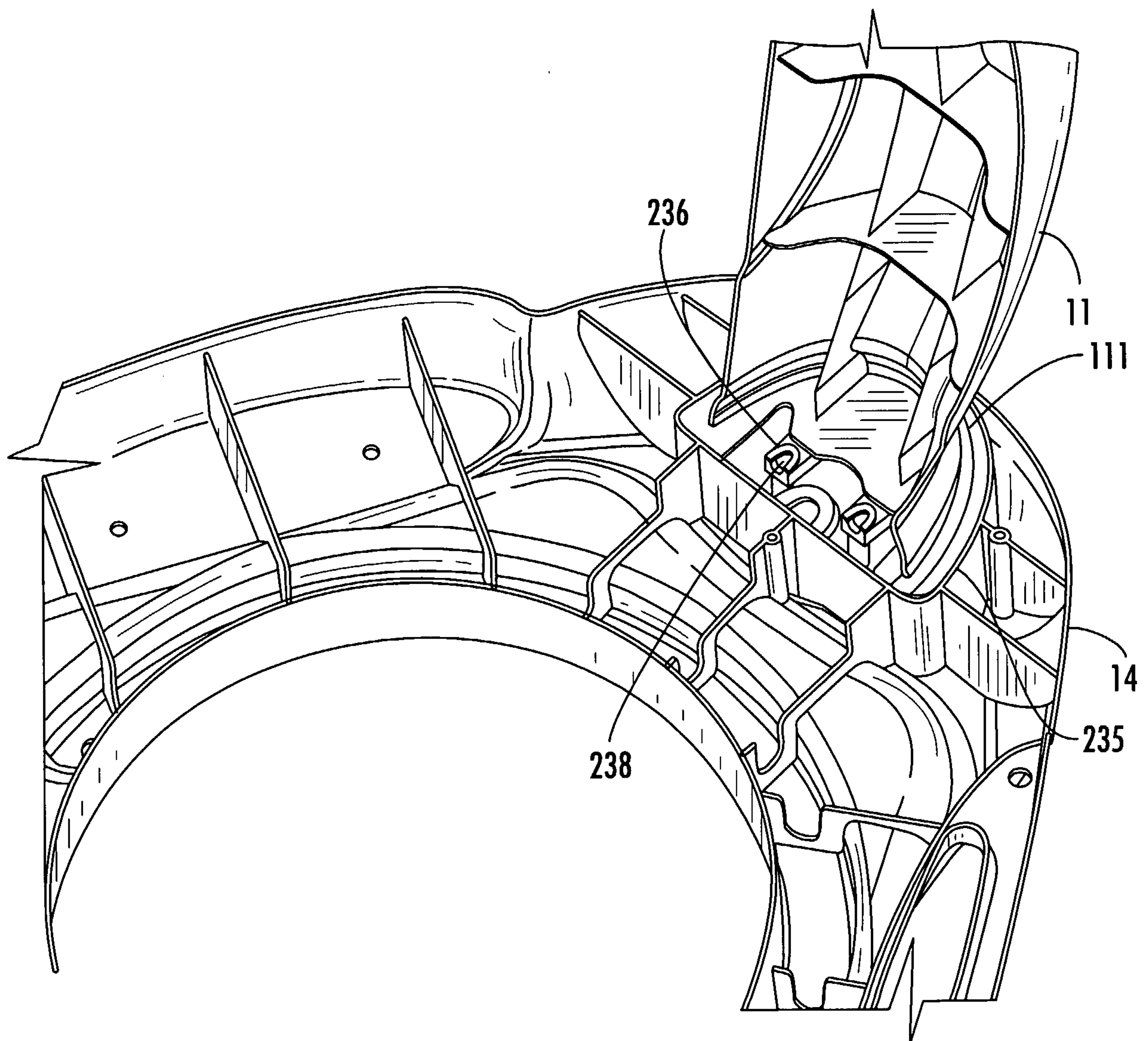
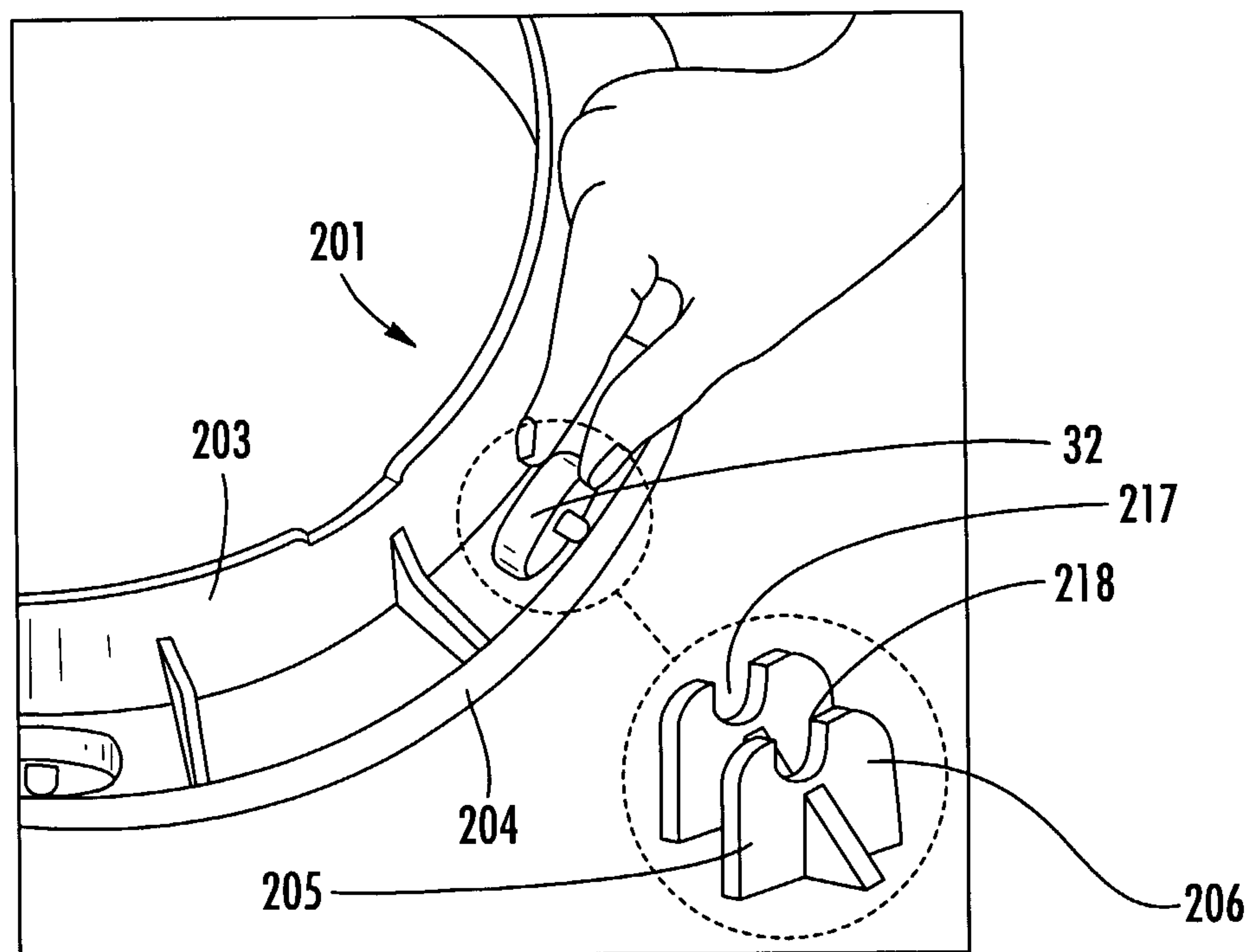


FIG. 10

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**FIG. 11**

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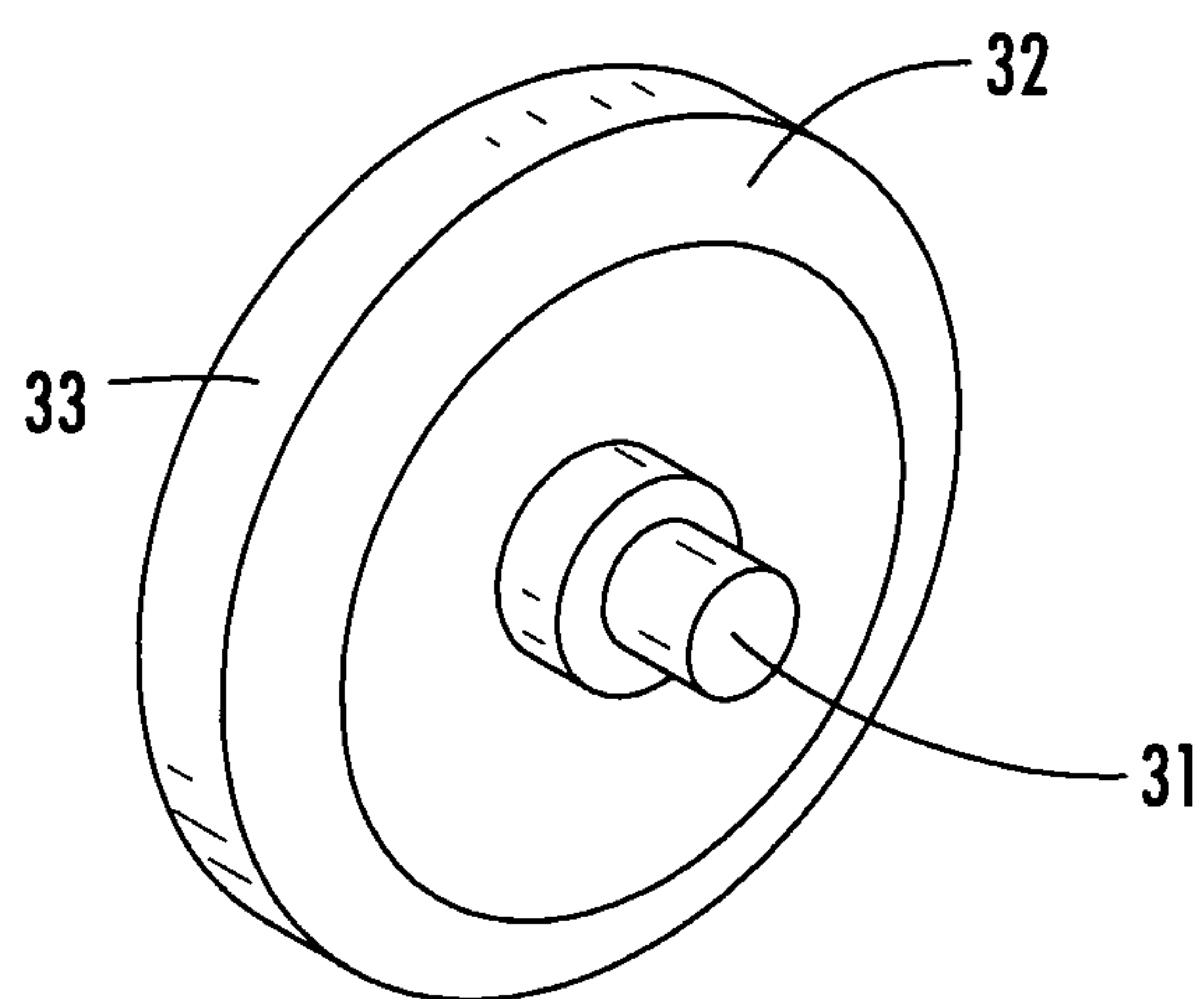
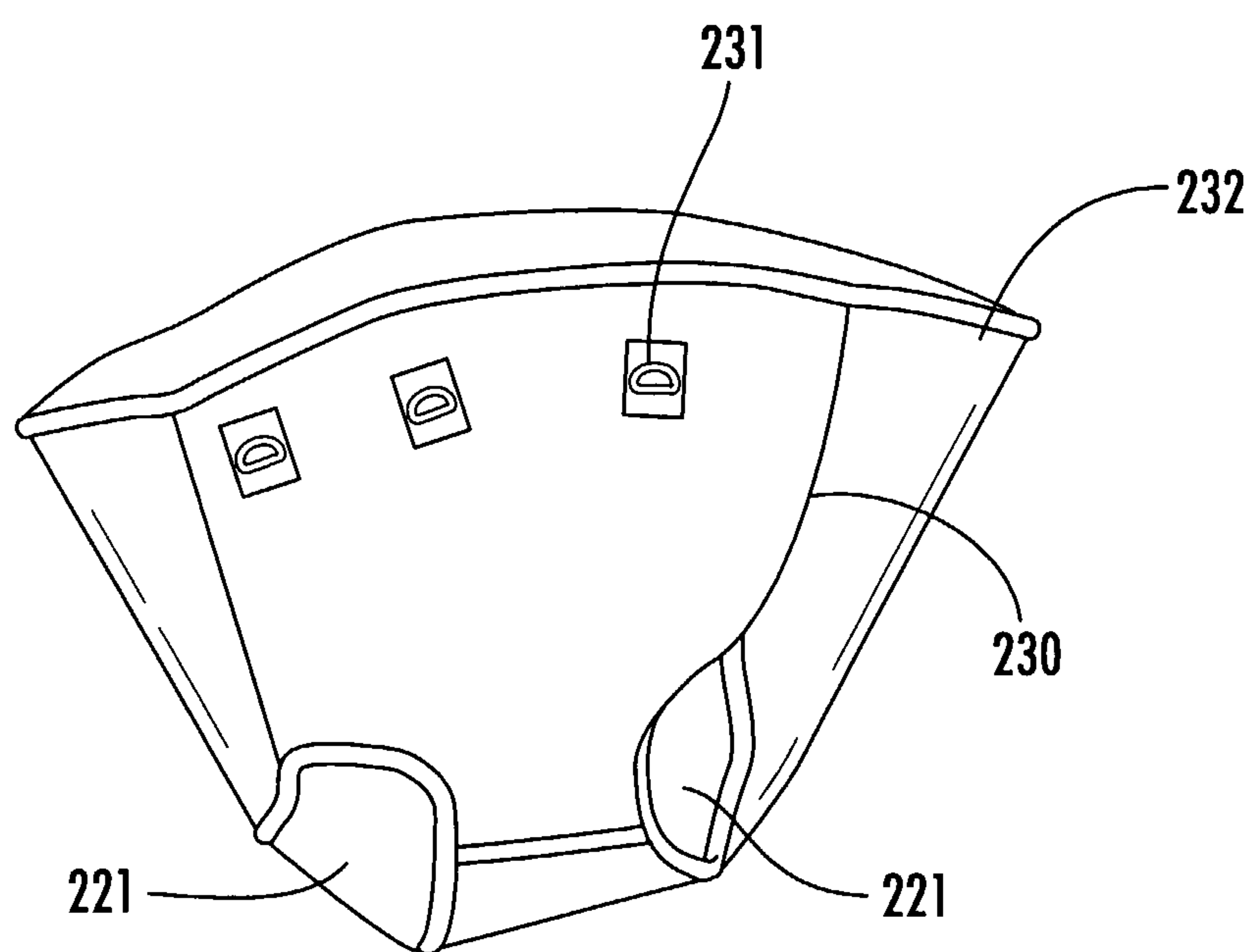


FIG. 12

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**FIG. 13**

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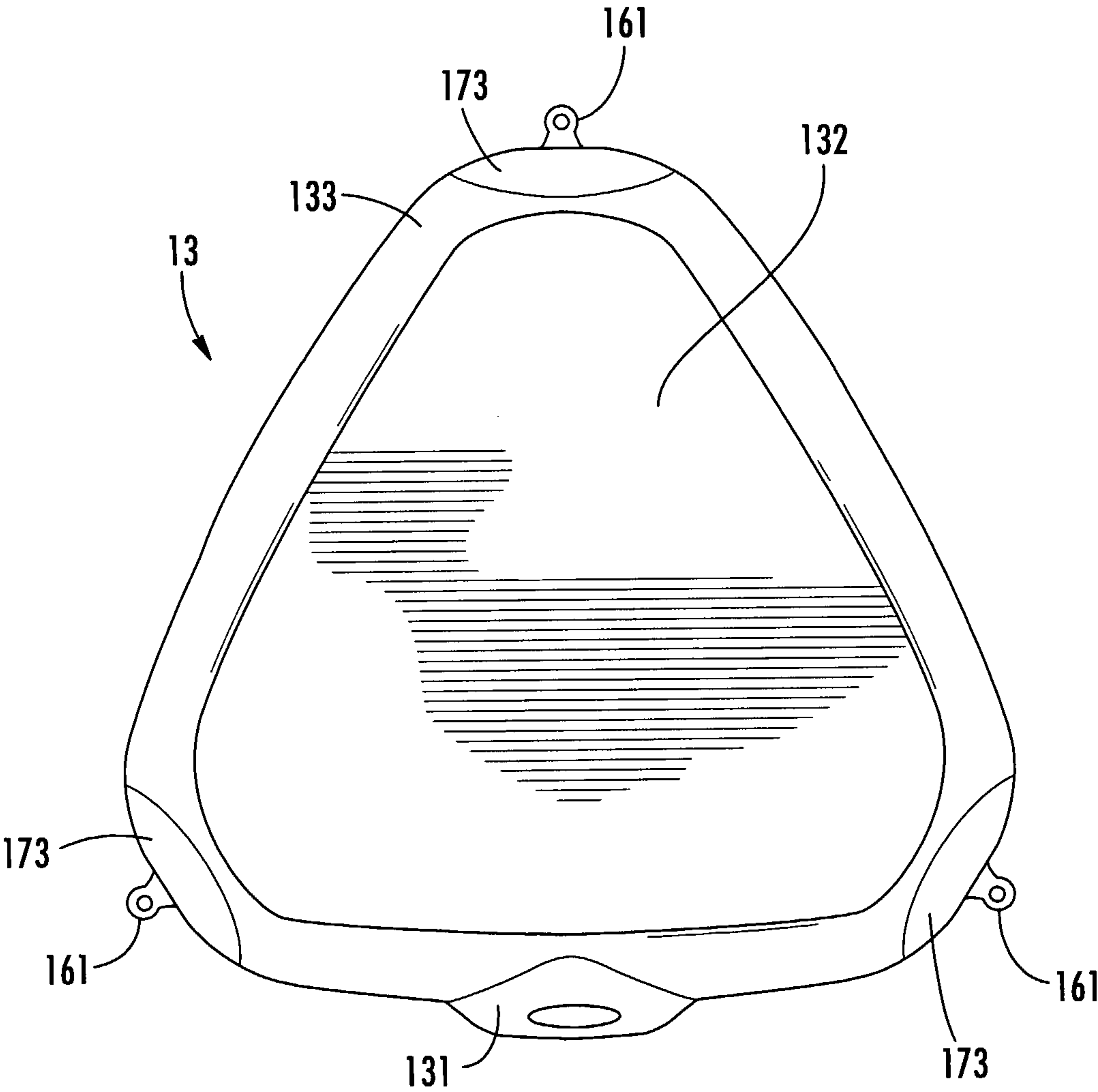


FIG. 14

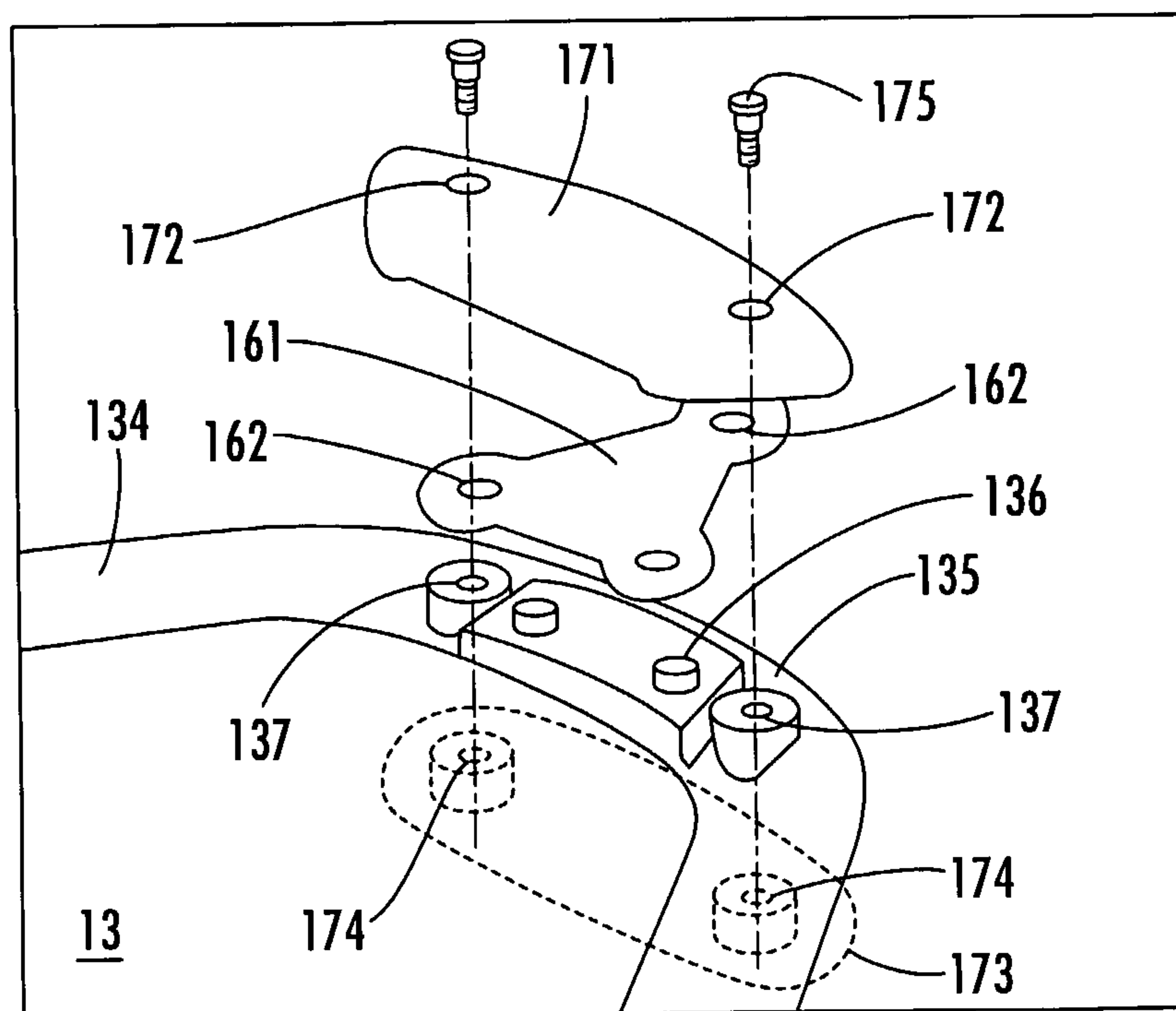
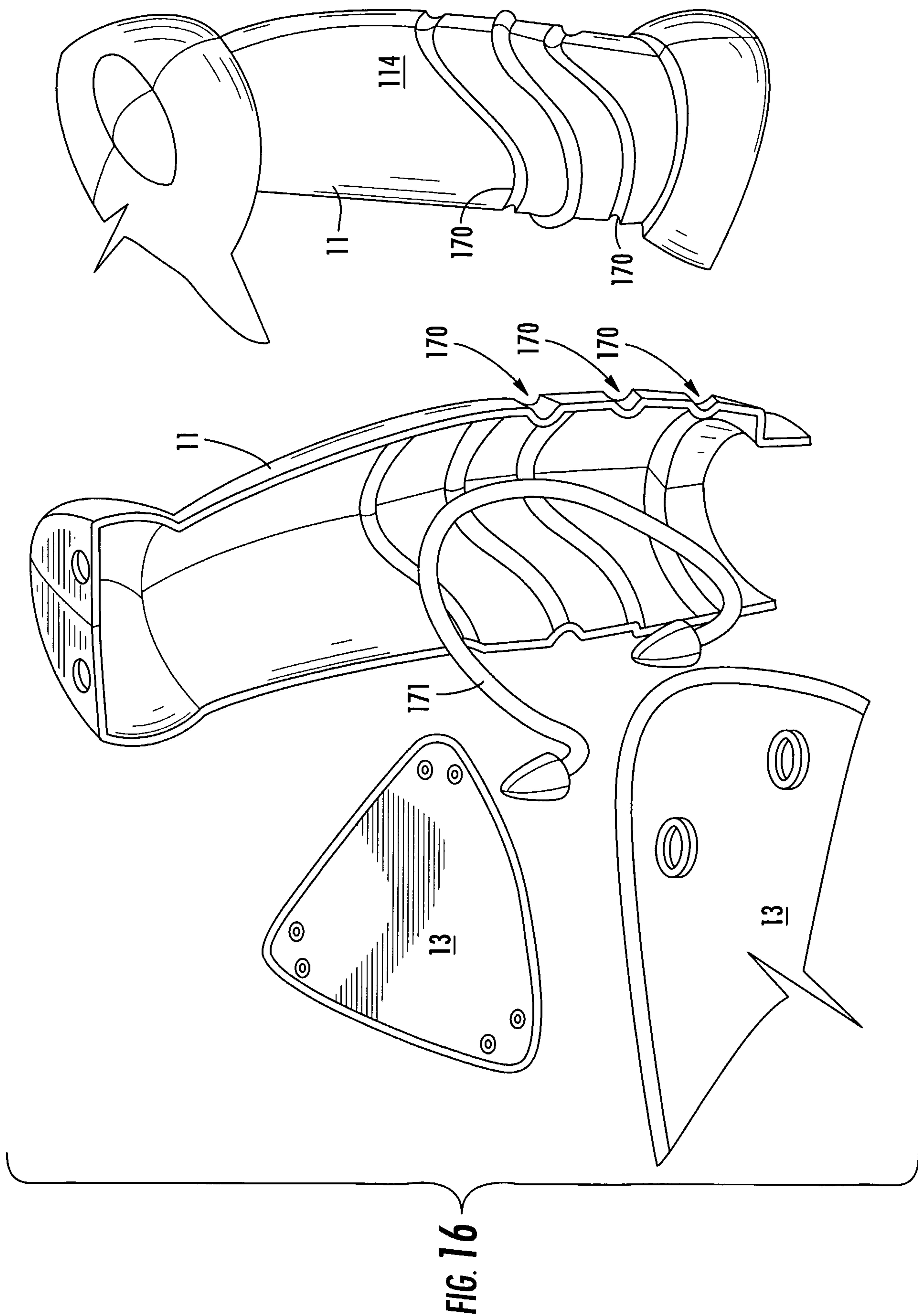


FIG. 15

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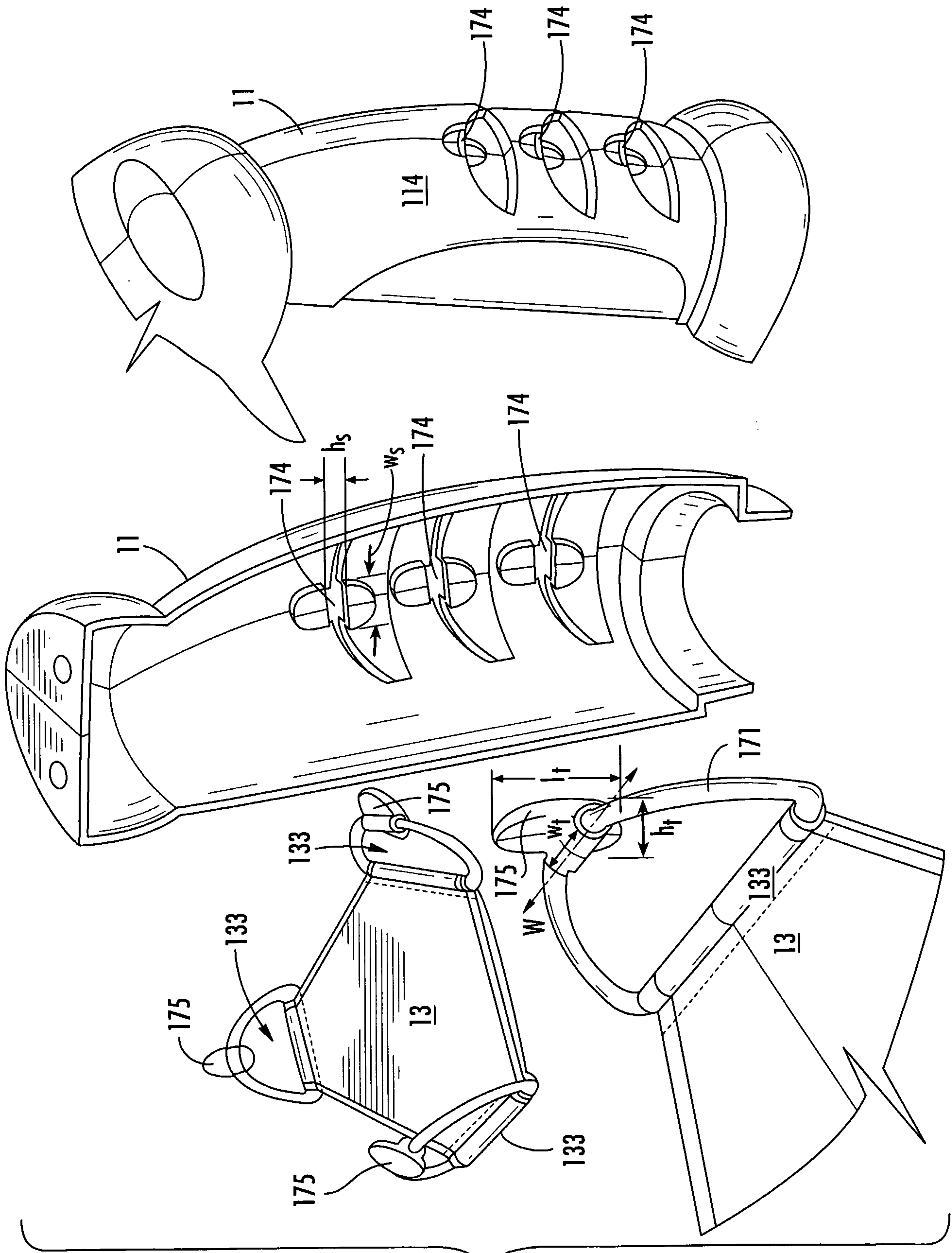


FIG. 17

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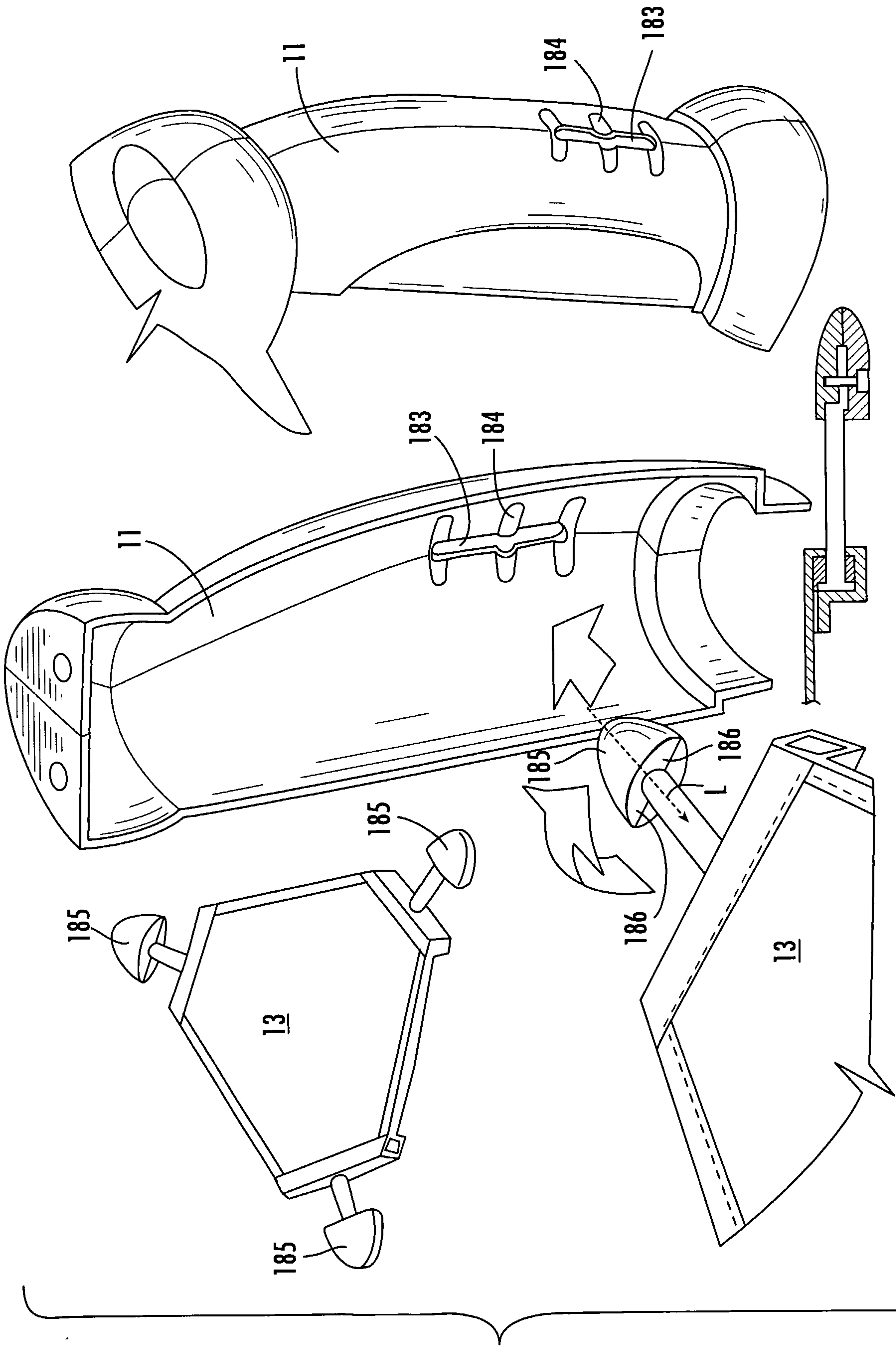


FIG. 18

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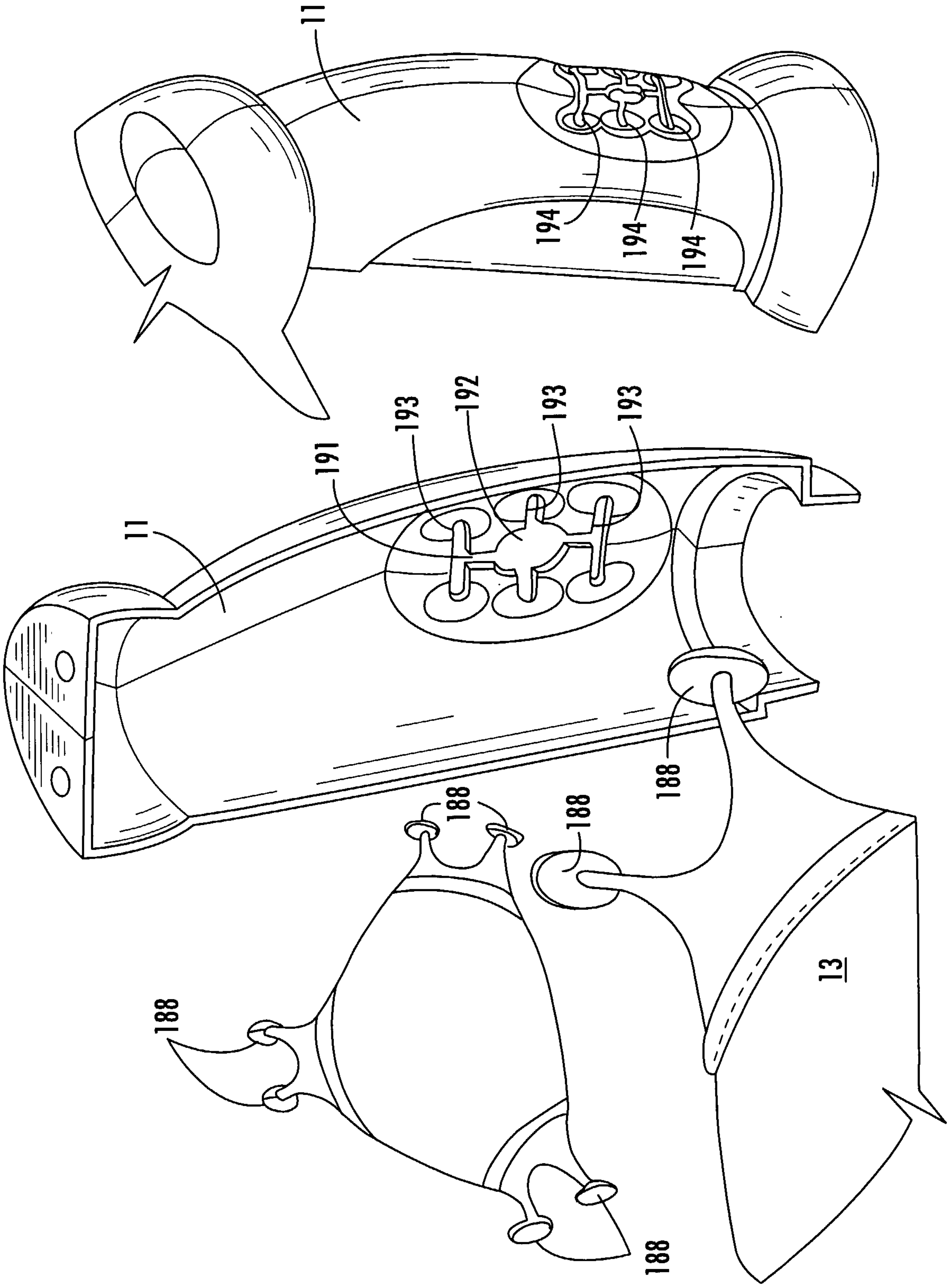


FIG. 19

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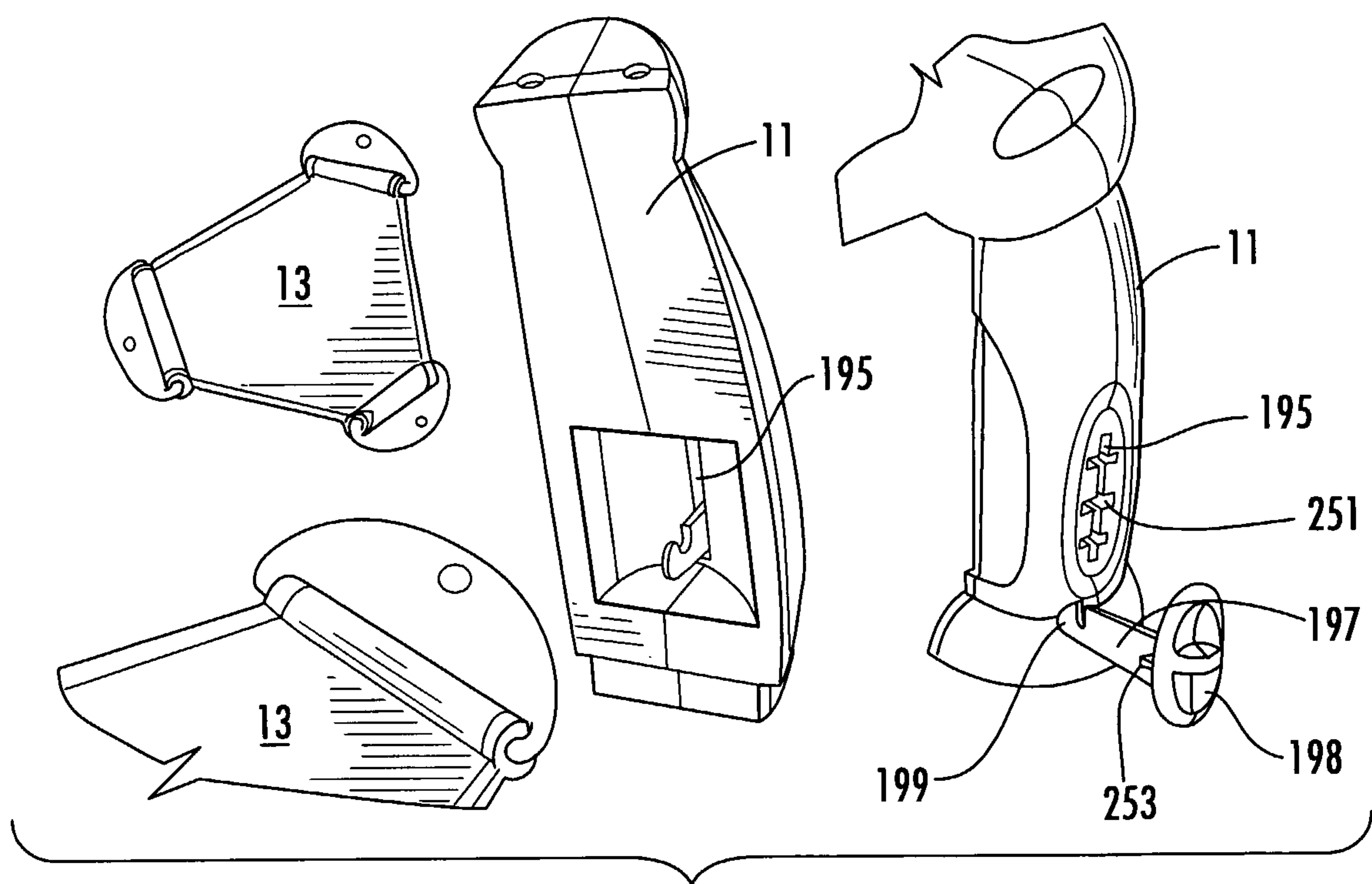
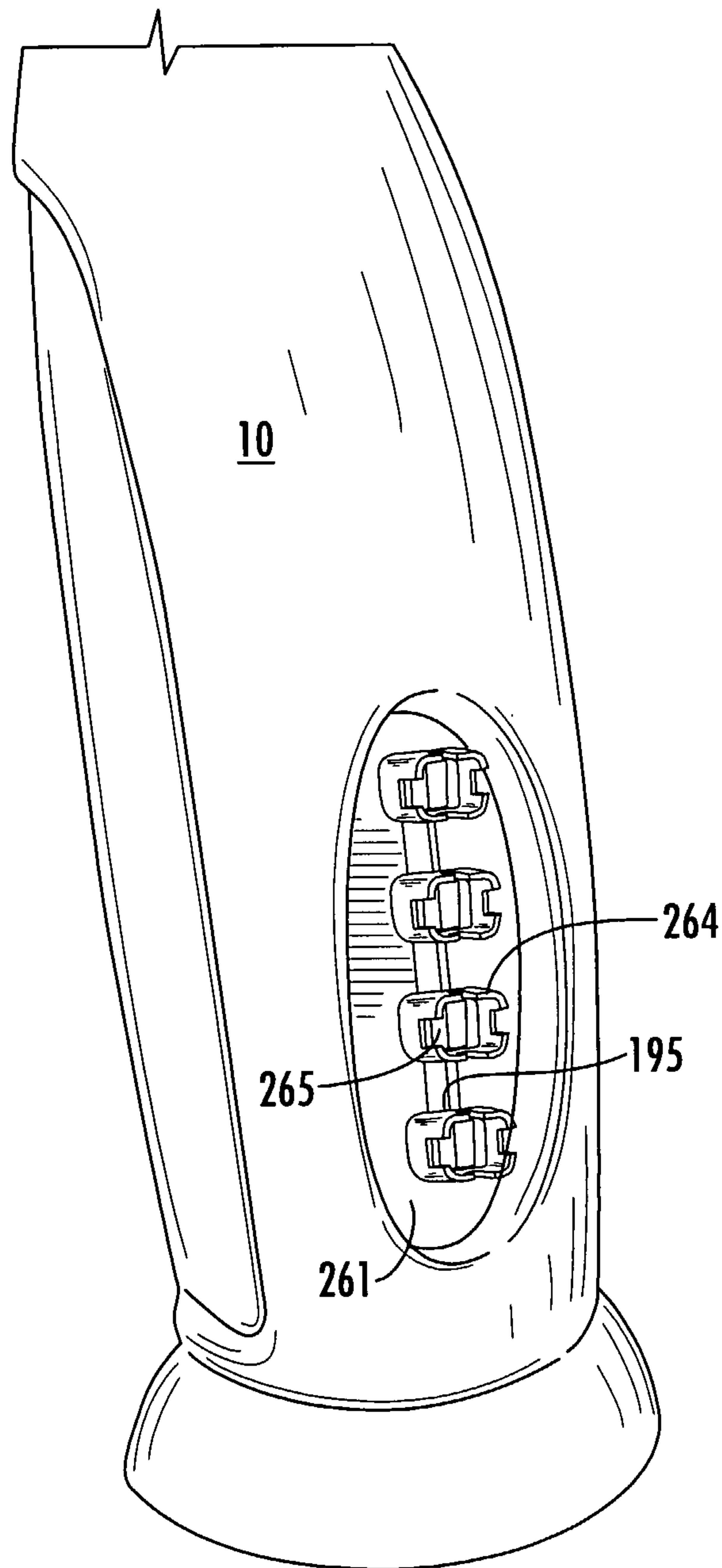
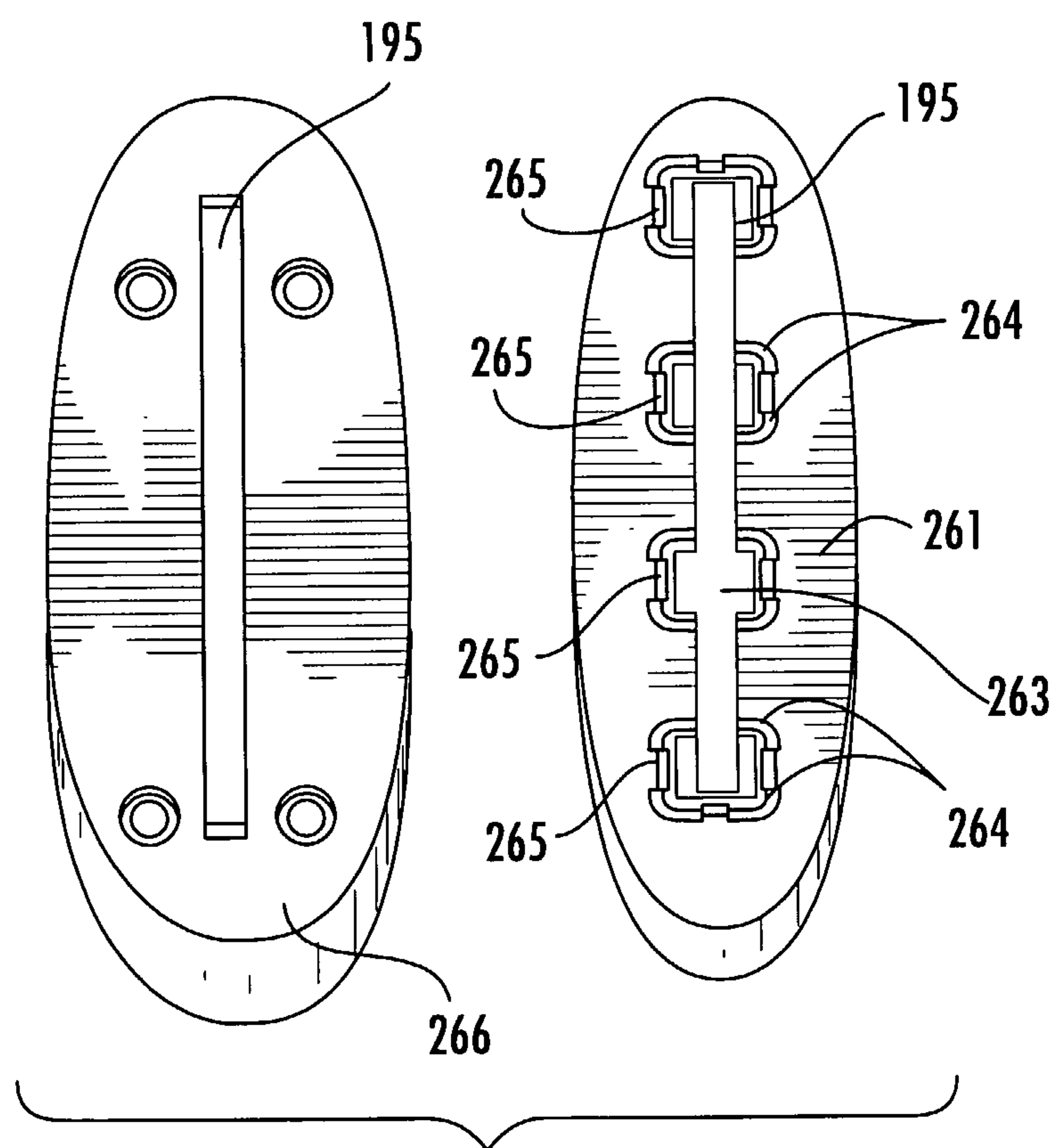


FIG. 20

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**FIG. 21A**

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**FIG. 21B**

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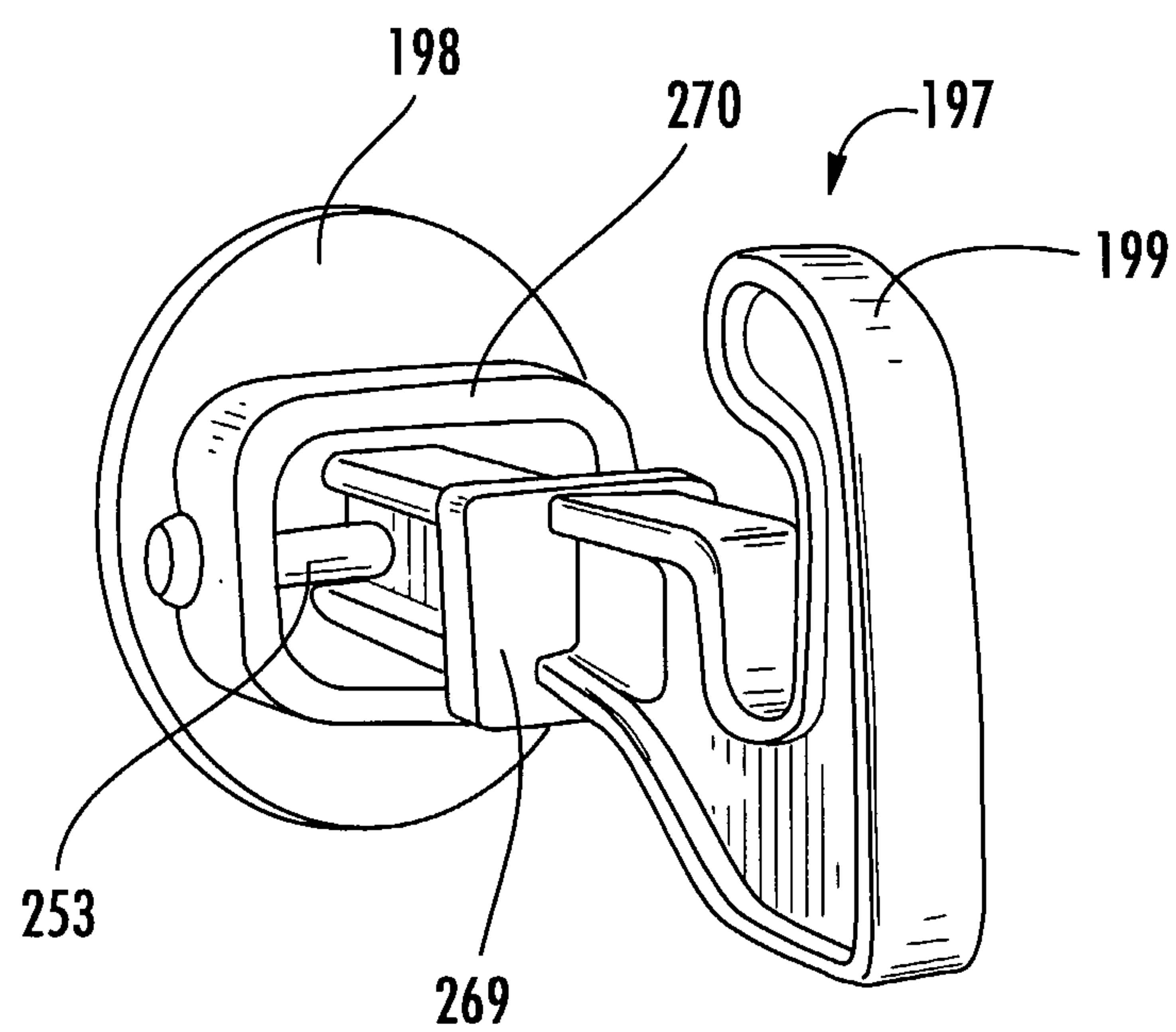
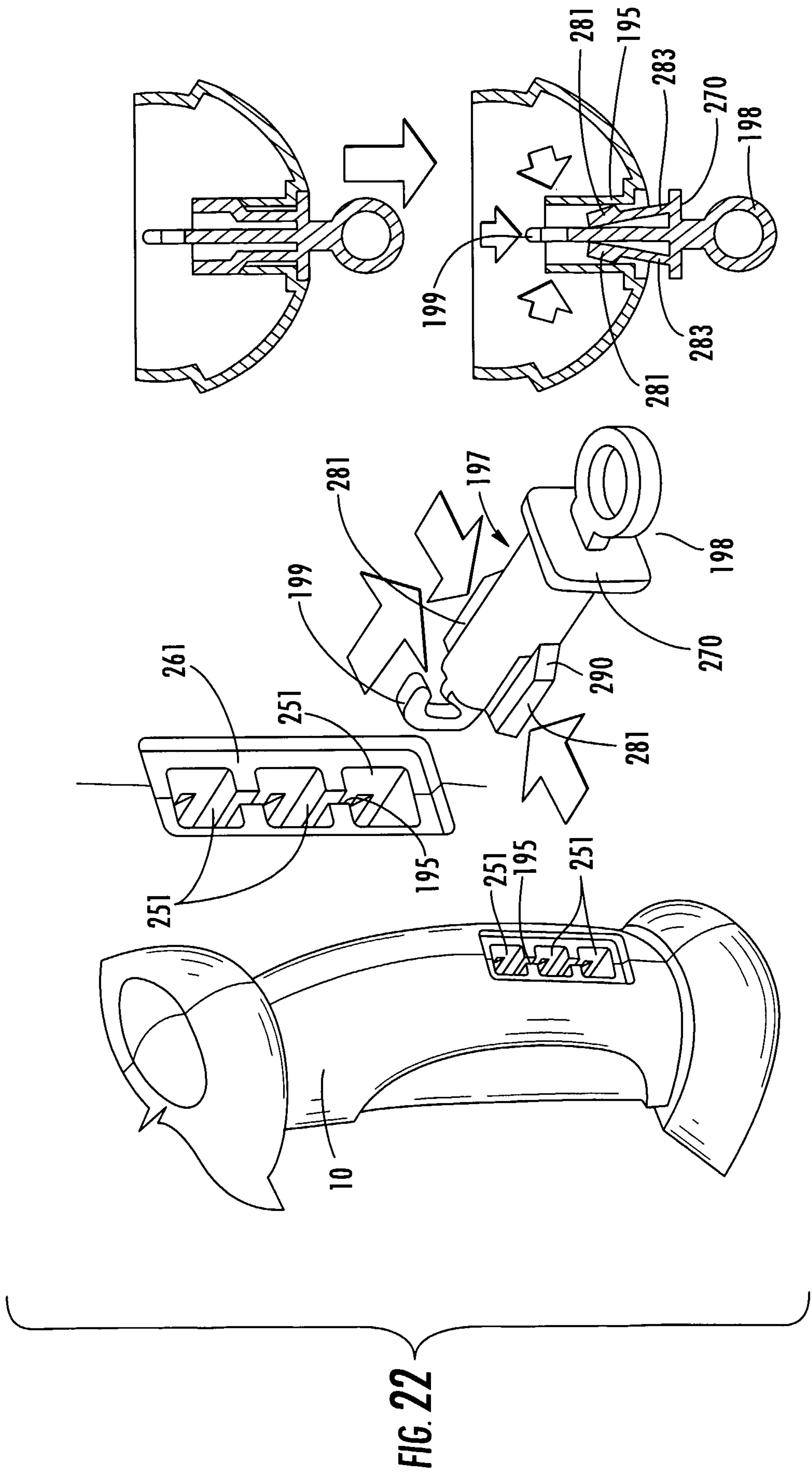
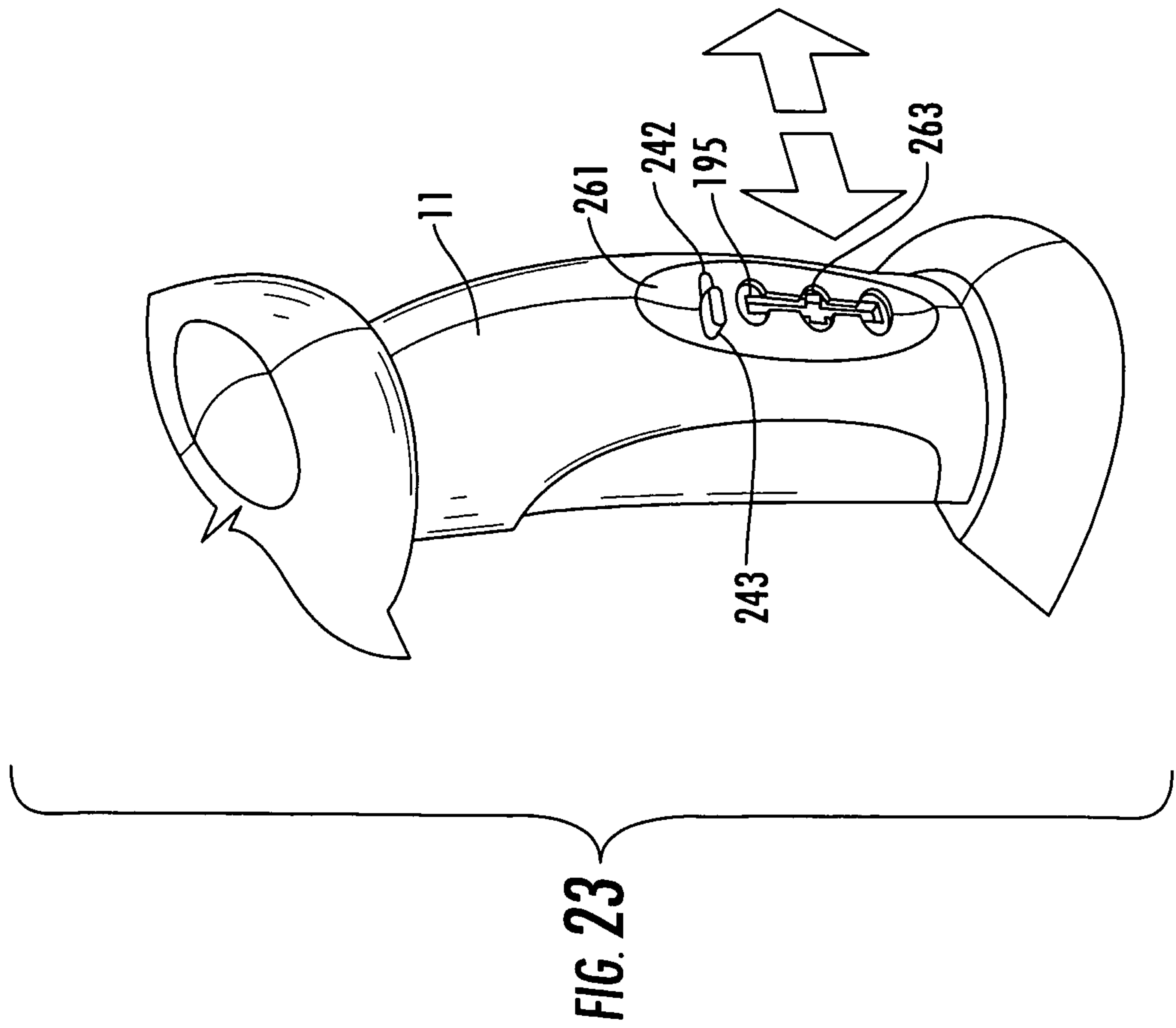
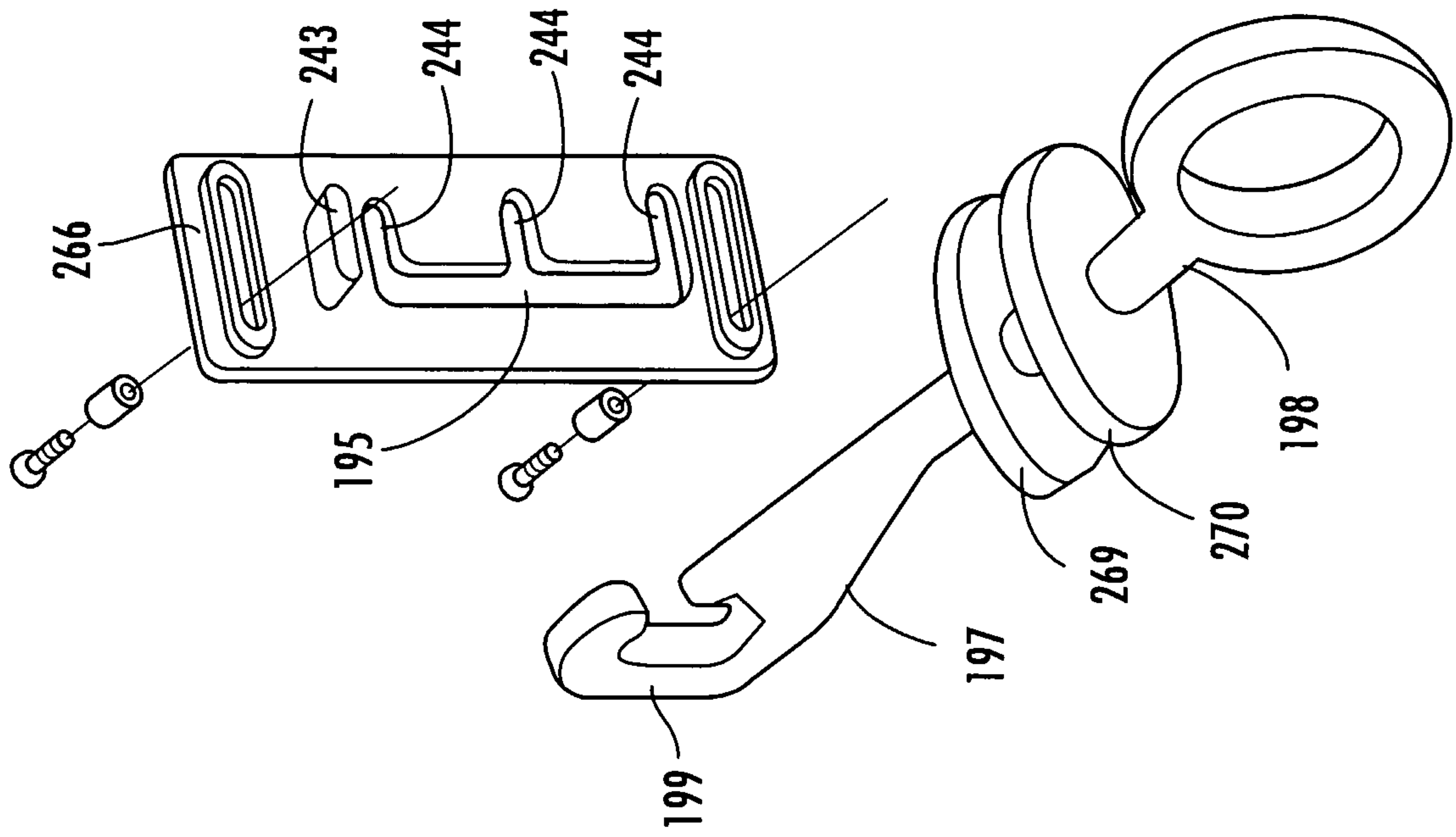


FIG. 21C

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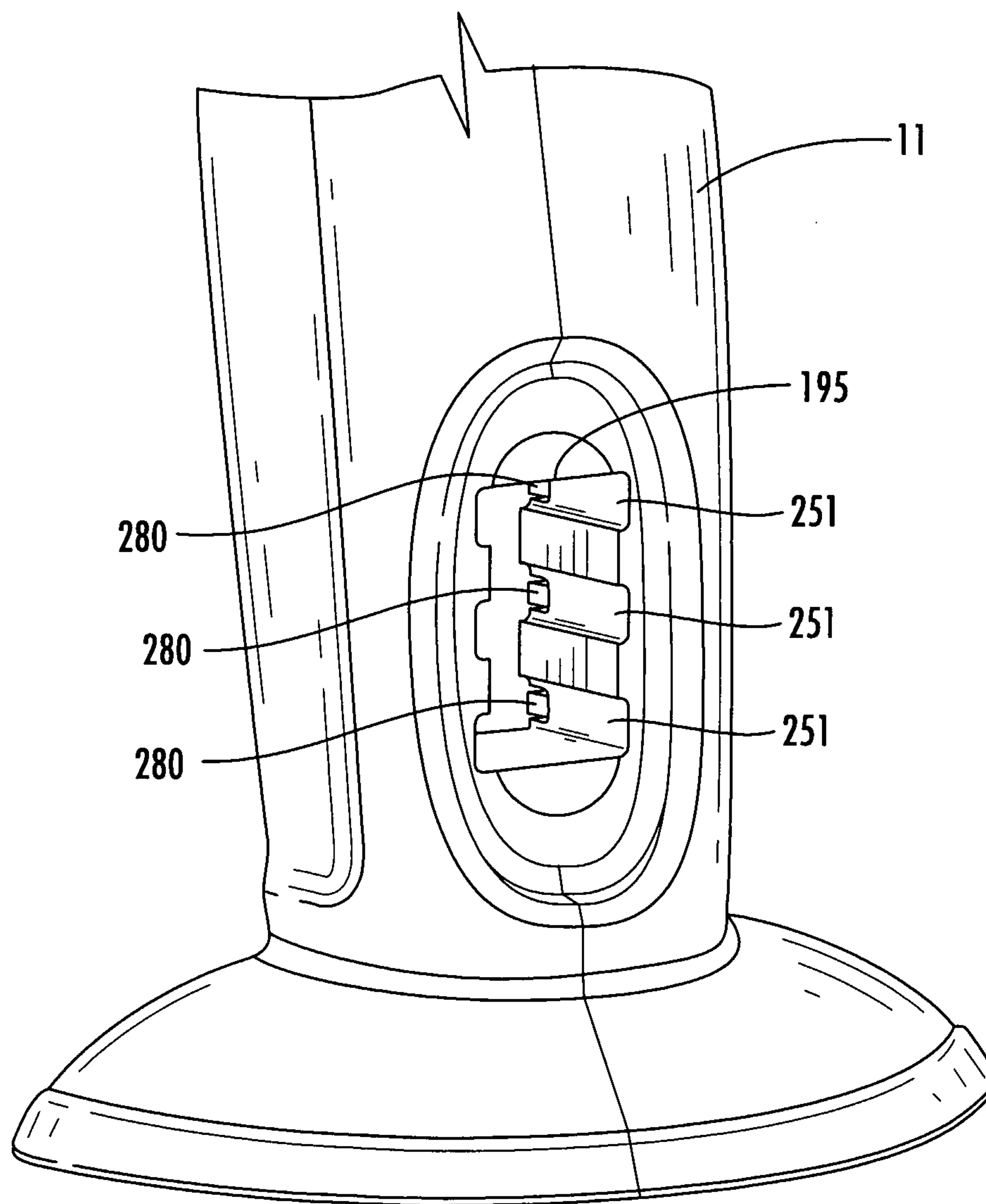


FIG. 24A

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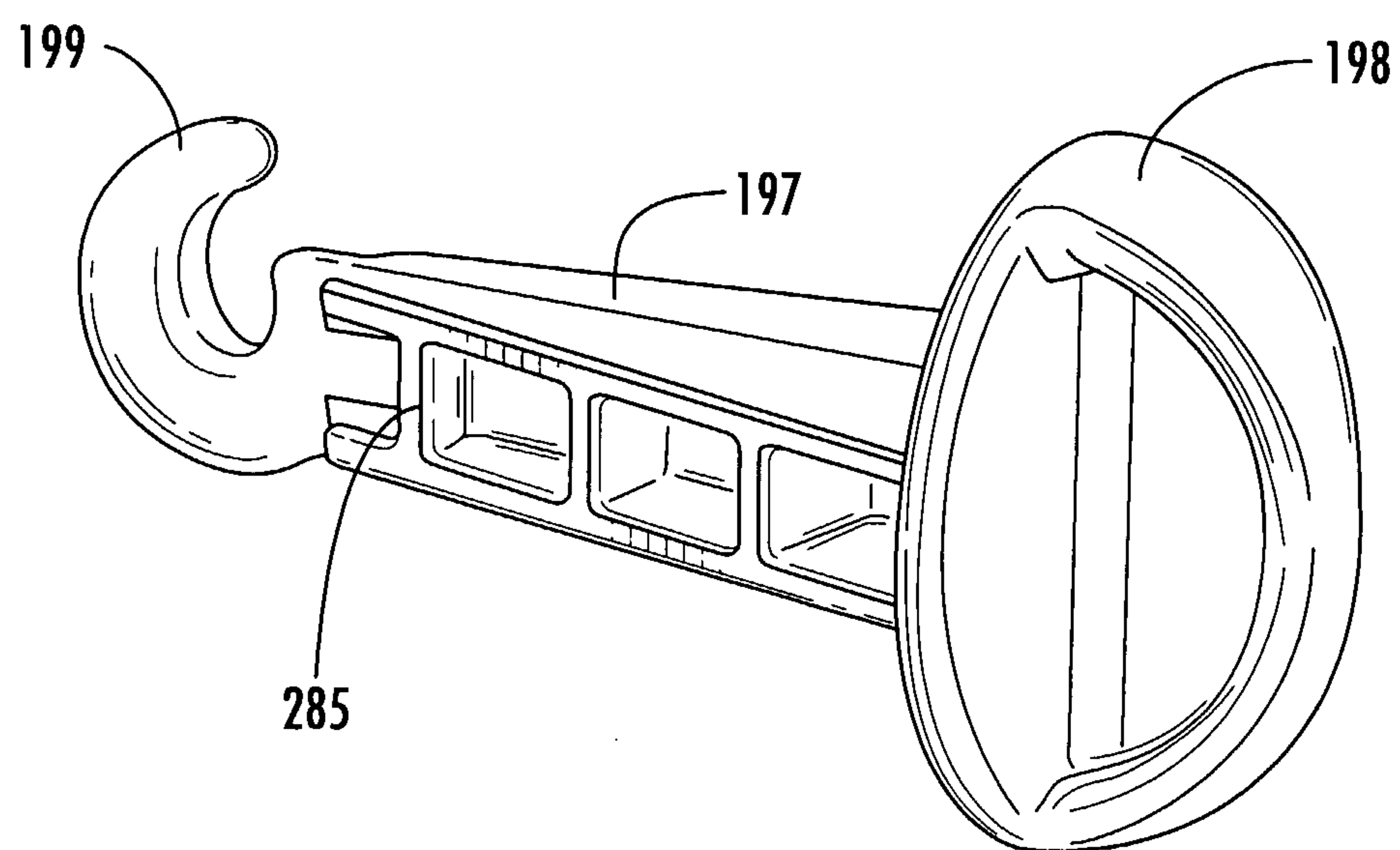


FIG. 24B

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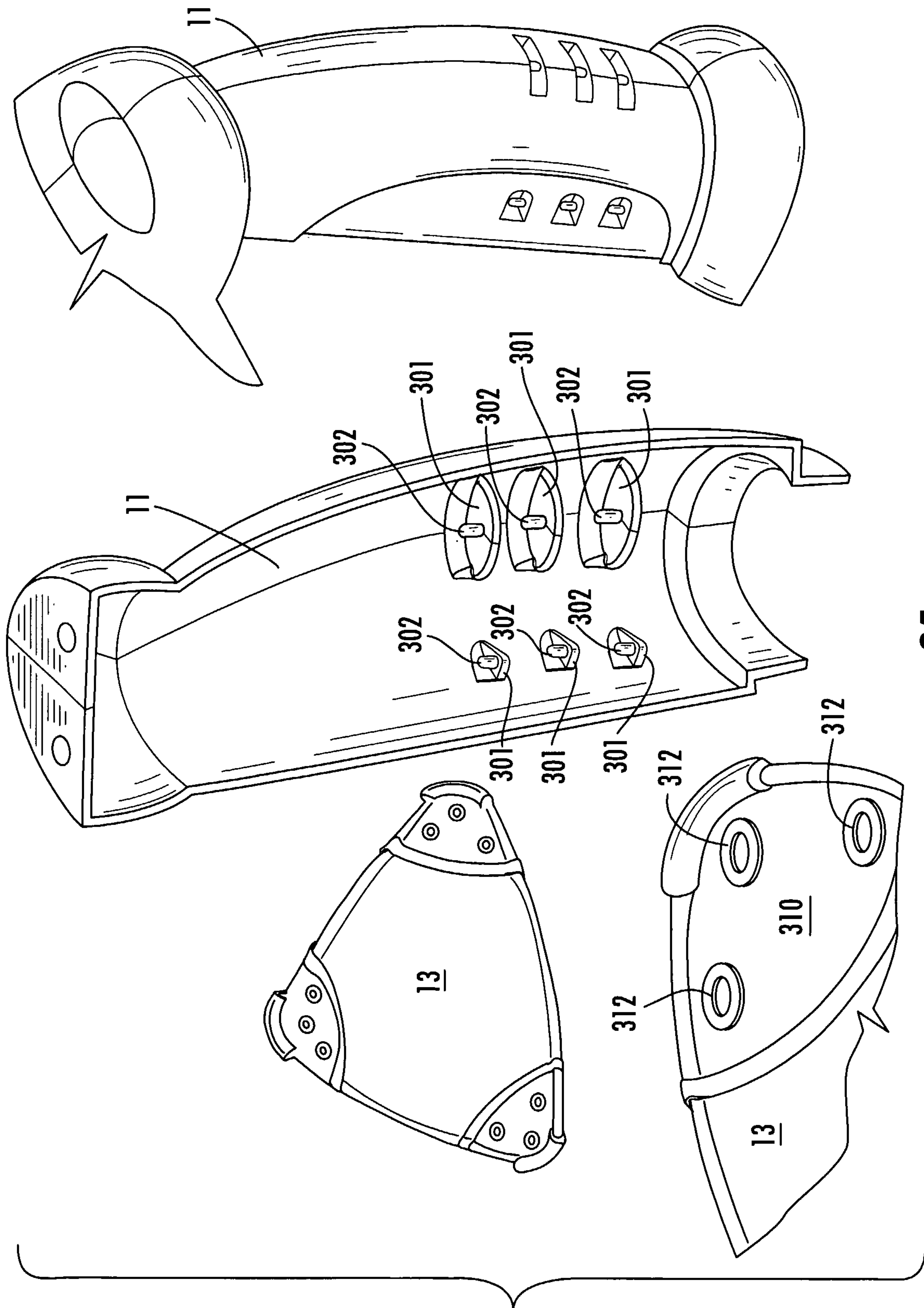


FIG. 25

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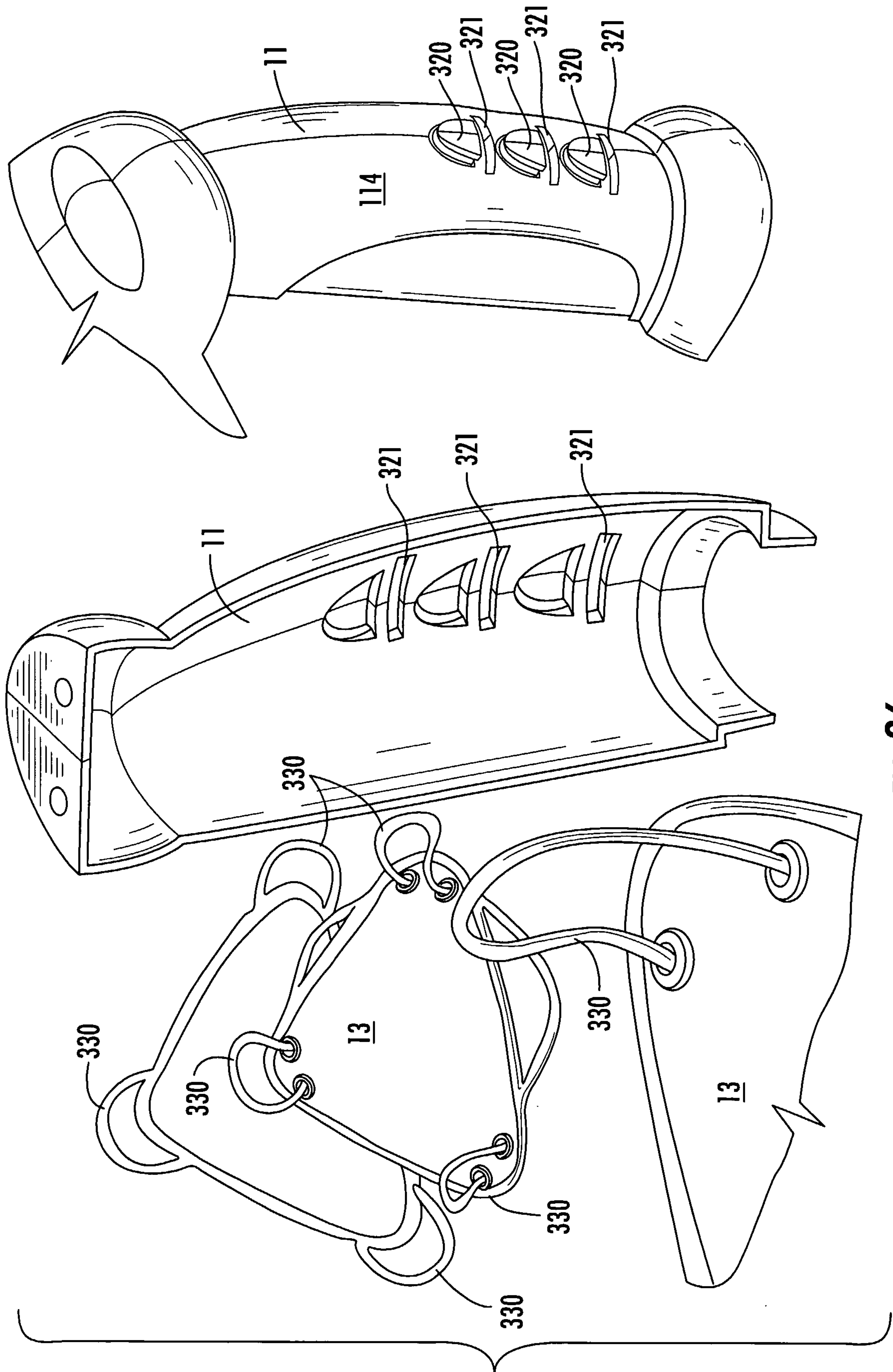


FIG. 26

