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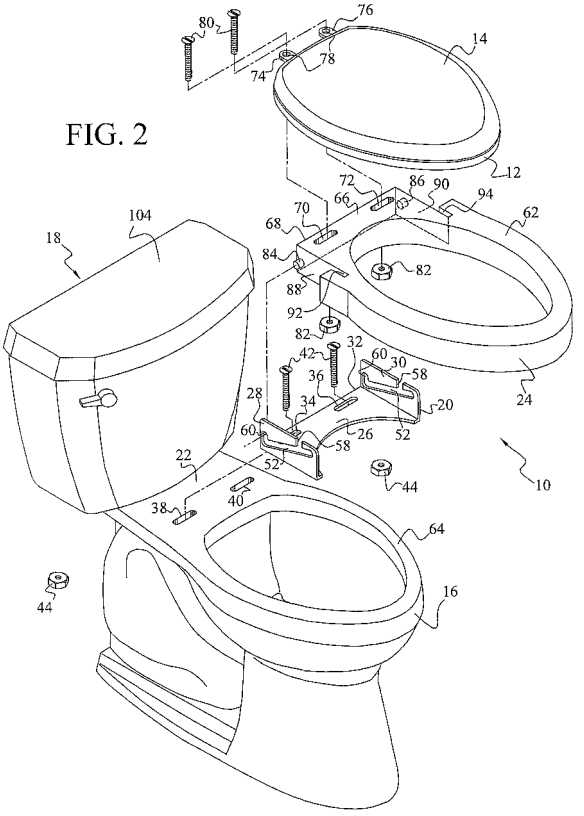
(54) Toilet seat elevator assembly

(57) A toilet seat elevator assembly includes a seat elevator and a bracket for removably connecting the seat elevator to a toilet bowl. The seat elevator has a support portion for resting on the toilet bowl and a mounting portion that extends rearwardly of the support portion. The mounting portion has at least one mounting projection that extends inwardly. The bracket includes a bottom wall that is adapted for securement to the toilet bowl and spaced bracket side walls extending upwardly from the bottom wall. Each bracket side wall has forward and rear edges that extend upwardly from the bottom wall and an elongate slot that extends within each bracket side wall between the forward and rear edges. Each elongate slot is adapted for slidably receiving the at least one mounting projection of the mounting portion to adjust the seat elevator between a retracted position and an extended position to accommodate various configurations of respective toilet bowls.

FIG. 2



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Description

[0001] The present invention relates generally to toilet seat elevators, and more particularly to a toilet seat elevator assembly that is easily installed and removed with respect to a toilet bowl.

[0002] Over the years, toilet bowls have been manufactured in many different sizes and shapes. More recently, the plumbing industry has become conscious of the necessity for the interchangeability of products and thus the dimensions of the bowl have become increasingly limited by consensus standards. One of the standards dictates that the seat on a toilet bowl, when in a horizontal or lowered position, be located between 15 and 16 inches above the floor. The conventional 15-16 inch toilet seat height is common for both residential and commercial bowls and is generally adapted to accommodate needs of the majority of people.

[0003] However, many people with physical limitations and disabilities have difficulty accessing the toilet seat at the conventional height and thus require a seat which is raised 1-5 inches or higher comparative to standards. To meet this need, various seat elevator arrangements have been developed. These elevators raise the level of the horizontal seat and reduce the human body bending required to effectively use the bowl.

[0004] Toilet bowl elevators of various sorts have been commercially available for many years. Many of these elevators must be attached to the bowl in such a way that the bowl is restricted in its use or the elevator simply sits on the bowl. Elevators that are permanently attached or bolted to the bowl either through the conventional seat attachment holes or to the annular rim around the top of the bowl create many areas between the bowl and the elevator which are difficult to clean, while adding moisture and dirt collecting areas in the elevator itself. The result is an unsanitary manner by which the elevators are attached to the toilet bowl. By permanently attaching the elevator to the rim or tail of the bowl, its use is thereafter restricted to seated endeavors. In this manner, the possible utilization of the bowl as a standing urinal for the male users becomes very difficult or is totally eliminated.

[0005] The prior art seat elevators that merely sit on the bowl or are attached by clips, so as to be removed for cleaning, tend to be unstable in use. It should be noted that in view of the limitations of persons disposed to use toilet elevators, stability and security are of primary importance. Another serious drawback of the conventional elevators is that in view of the typically permanent attachment to the bowl, adjustment of the elevator with respect to the bowl is often not possible. This makes it difficult to adapt usage of the same elevator to various sizes and configurations of the bowls. In view of the above, it has been a long felt and unsolved need for a toilet seat elevator which can be easily attached to or removed from a bowl so as to simplify cleaning and replacement as well as facilitate use of the elevator with bowls of various configurations

[0006] According to one aspect of the invention, a toilet seat elevator assembly includes a seat elevator and a bracket for removably connecting the seat elevator to a toilet bowl. The seat elevator has a support portion for resting on the toilet bowl and a mounting portion that extends rearwardly of the support portion. The mounting portion has at least one mounting projection that extends inwardly. The bracket includes a bottom wall that is adapted for securement to the toilet bowl and spaced bracket side walls extending upwardly from the bottom wall. Each bracket side wall has forward and rear edges that extend upwardly from the bottom wall and an elongate slot that extends within each bracket side wall between the forward and rear edges. Each elongate slot is adapted for slidably receiving the at least one mounting projection of the mounting portion to adjust the seat elevator between a retracted position to accommodate various configurations of respective toilet bowls.

[0007] The foregoing summary as well as the following detailed description of the preferred embodiments of the present invention will be best understood when considered in conjunction with the accompanying drawings, wherein like designations denote like elements throughout the drawings, and wherein:

[0008] FIG. 1 is an isometric view of a toilet seat elevator assembly mounted on a conventional toilet in accordance with the present invention;

[0009] FIG. 2 is an exploded isometric view of the elevator assembly of FIG. 1 for mounting to the toilet;

[0010] FIG. 3 is an isometric view of the elevator assembly partially assembled to the toilet and accompanying toilet seat and lid;

[0011] FIG. 4 is a side elevational view of the elevator assembly and a portion of the toilet, showing the manner in which the seat elevator is attached to a mounting bracket which is in turn mounted on the toilet bowl;

[0012] FIG. 5 is a side elevational view similar to FIG. 4 showing further steps of installation of the seat elevator with accompanying toilet seat and lid to the mounting bracket;

[0013] FIG. 5A is an enlarged partial side elevational view of FIG. 5 showing movement of a mounting projection within an elongate slot of the mounting bracket during installation of the seat elevator;

[0014] FIG. 6 is an isometric view of a seat elevator with accompanying toilet seat and lid in a horizontal position that may be assumed during installation;

[0015] FIG. 7 is a side elevational view similar to FIG. 5 showing further movement of the seat elevator with accompanying toilet seat and lid during installation;

[0016] FIG. 8 is a side elevational view of the elevator assembly in the installed horizontal lowered position on the toilet bowl;

[0017] FIG. 9 is a side elevational view of the elevator assembly showing the lid in one upright position;

[0018] FIG. 10 is a side elevational view showing the seat elevator with accompanying toilet seat and lid in another upright position;

[0019] FIG. 11 is an enlarged side elevational view of a mounting bracket in accordance with a further preferred embodiment of the invention;

[0020] FIG. 12 is a side elevational view of an elevator assembly mounted to the toilet bowl and showing the manner in which the mounting bracket can accommodate seat elevators of varying height;

[0021] FIG. 13 is an enlarged side elevational view of a mounting bracket in accordance with yet a further preferred embodiment of the invention;

[0022] FIG. 14 is an enlarged side elevational view of a mounting bracket in accordance with another preferred embodiment of the invention;

[0023] FIG. 15 is an enlarged side elevational view of a mounting bracket in accordance with still another preferred embodiment of the invention;

[0024] FIG. 16 is an enlarged side elevational view of a mounting bracket in accordance with an additional preferred embodiment of the invention; and

[0025] FIG. 17 is a rear isometric view of a toilet seat elevator assembly in accordance with another preferred embodiment of the invention;

[0026] FIG. 18 is a rear isometric view of the elevator assembly of FIG. 17 in a partially raised position with a handle portion removed;

[0027] FIG. 19 is a rear isometric exploded view of the elevator assembly of FIG. 17;

[0028] FIG. 20 is a bottom isometric exploded view of the elevator assembly of FIG. 17 with the handle removed;

[0029] FIG. 21 is a top plan view of the elevator assembly;

[0030] FIG. 22 is a sectional view of the elevator assembly taken along section line 22-22 of FIG. 21;

[0031] FIG. 23 is a sectional view of the elevator assembly taken along section line 23-23 of FIG. 21;

[0032] FIG. 24 is a top plan view of the elevator assembly of FIG. 17 installed on a toilet bowl showing adjustment for elongated and standard bowl configurations;

[0033] FIG. 25 is a side elevational view in partial cross section taken along section line 25-25 of FIG. 24 and showing an attached toilet seat and lid;

[0034] FIG. 26 is a rear isometric view of a mounting bracket in accordance with another preferred embodiment of the invention;

[0035] FIG. 27 is a rear isometric view of a mounting bracket in accordance with a further preferred embodiment of the invention;

[0036] FIG. 28 is a rear isometric view of a mounting bracket in accordance with yet another preferred embodiment of the invention; and

[0037] FIG. 29 is a rear isometric view of a toilet seat elevator assembly in accordance with yet a further preferred embodiment of the invention.

[0038] It is noted that the drawings are intended to depict only typical or exemplary embodiments of the invention and thus may not be necessarily to scale. Accordingly, the drawings should not be considered as limiting the scope of the invention. The invention will now be described in greater detail with reference to the accompanying drawings.

[0039] Referring to the drawings and to FIGS. 1 and 2 in particular, a toilet seat elevator assembly 10 in accordance with an exemplary embodiment of the present invention is illustrated. The elevator assembly 10 serves to increase the height of a conventional toilet seat 12 and lid 14 with respect to a toilet bowl 16 of a conventional toilet 18 to accommodate users who may otherwise experience difficultly with toilet seats of conventional height. The elevator assembly 10 preferably includes a mounting bracket 20 connected to a seat mounting area 22 of the toilet bowl 16 and a seat elevator 24 removably connected to the mounting bracket 20.

[0040] The mounting bracket 20 preferably has a bottom wall 26 and spaced side walls or walls 28, 30 extending upwardly from the bottom wall. The bottom wall 26 includes a rear edge 32 and spaced slots 34, 36 that preferably extend in a parallel manner with respect to the rear edge. The slots 34 and 36 are in alignment with spaced openings 38 and 40, respectively, of the toilet bowl 16 when the mounting bracket 20 is positioned on the seat mounting area 22 of the toilet bowl 16. The slots 34, 36 and openings 38, 40 are sized for accepting many types of conventional fasteners which can be in the form of screws or bolts 42. Nuts 44 are received on the screws 42 underneath the seat mounting area 22 in a conventional manner for securing the mounting bracket 20 to the toilet bowl 16. The lateral extension of the slots 34, 36 accommodates different toilet bowl hole spacings and sizes that may be present because of variations in tolerances during manufacture as well as different toilet bowl configurations or designs. Accordingly, the mounting bracket 20 is adaptable for use with a wide variety of toilet bowl shapes and sizes. Other attachment means including adhesives, clamps, and so on may additionally or alternatively be used to secure the bracket 20 to the toilet bowl 16.

[0041] With additional reference to FIG. 5A, each side wall 28, 30 (only side wall 28 shown in FIG. 5A) of the mounting bracket 20 preferably includes a forward edge 46 and a rear edge 48 that extend upwardly from the bottom wall 26 and an upper edge 50 that extends between the forward and rear edges. An elongate slot 52 extends diagonally from a first slot position 54 proximal the forward edge 46 and upper edge 50 to a second slot position 56 proximal the rear edge 48 and bottom wall 26. A first slot segment 58 extends from the upper edge 50 of the side wall to the elongate slot 52, preferably between the first and second slot positions. A second slot segment 60 is spaced rearwardly of the first slot segment 58 and preferably extends toward the upper edge 50 from the second slot position 56 of the elongate slot 52. The purpose of the elongate slot and slot segments will be described in greater detail below.

[0042] With particular reference to FIG. 2, the seat elevator 24 is preferably of lightweight, hollow construction

and includes a generally ring-shaped seat support portion 62 that is adapted to rest on or otherwise be supported by an upper surface 64 of the toilet bowl 16 and an elevator mounting portion 66 that extends rearwardly of the ring-shaped portion 62. Preferably, the seat support portion 62 and mounting portion 66 form a unitary structure but may alternatively be formed separately and connected together through mechanical fasteners, brackets, adhesives, welding, or any other well-known connection means.

[0043] The mounting portion 66 includes a rear wall 68 and spaced slots 70, 72 that preferably extend parallel with the rear wall. The slots 70 and 72 preferably extend through the mounting portion 66 and are in alignment with spaced openings 74 and 76, respectively, of conventional seat hinges 78 when the seat 12 and lid 14 are aligned over the seat support portion 62. The slots 70, 72 and openings 74, 76 are sized for accepting screws or bolts 80. Nuts 82 are received on the screws 80 underneath the mounting portion 66 in a conventional manner for securing the mounting bracket 20 to the toilet bowl 16. If desired, the nuts 82 may be recessed into the bottom of the mounting portion 66. The lateral extension of the slots 70, 72 accommodate different toilet seat hinge spacings due to variations in tolerances during manufacture as well as different toilet seat and/or hinge configurations. In accordance with a further embodiment of the invention, the slots 70, 72 and nuts 82 may be replaced with threaded openings formed in the mounting portion 66 to directly receive the screws 80.

[0044] The mounting portion 66 also includes mounting projections 84 and 86 that extend outwardly from opposite side mounting walls 88 and 90, respectively. Each mounting projection 84, 86 is preferably cylindrical in shape and is sized for reception into one of the elongate slots 52 and its associated slot segments 58, 60. Spaced grooves 92, 94 are formed in the seat elevator 24 at the junction of the ring-shaped portion 62 and the mounting portion 66 for receiving the side walls 28, 30 of the mounting bracket 20 when the seat elevator 24 is connected to the mounting bracket 20.

[0045] Referring now to FIGS. 3-8, a method of connecting the elevator assembly 10 to the toilet bowl 16 is illustrated. The mounting bracket 20 is first secured to the seat mounting area 22 of the toilet bowl 16 in the manner as previously described, as shown in FIGS. 3 and 4. For convenience, the toilet seat 12 and lid 14 may be pre-mounted to the seat elevator 24, so as to form a respective sub-assembly in the manner as previously described before connecting the seat elevator to the mounting bracket 20. The seat elevator sub-assembly, is then moved over the toilet bowl 16 until the mounting projections 84, 86 are aligned with the first slot segments 58 of the mounting bracket side walls 28, 30. Once aligned, the seat elevator 24 is then lowered in a direction as represented by arrow 96 (see FIG. 4), until the mounting projections 84, 86 are positioned in the respective elongate slots 52. Subsequently, the seat elevator 24 is slid downwardly and rearwardly toward the second slot position 56, as denoted by arrow 98 in FIG. 5A, with the mounting projections 84, 86 guiding movement of the seat elevator 24 along their respective elongate slots 52. The rotational ability of the mounting projections 84, 86 within their respective slots 52, as represented by an arrow 100 in FIG. 5A, allows the seat elevator 24 to be installed on the bracket 20 at an adjustable angle A (see FIG. 5) convenient to the installer. In this manner, the seat elevator 24 can be connected to the bracket 20 in a more natural upright position. This reduces the possibility of back strain or related injuries that may otherwise occur if the installer or user is required to bend over during installation. As shown in FIG. 6, if an attempt is made to install the seat elevator in a horizontal position, further rearward movement of the mounting projections 84, 86 in their respective slots 52 is inhibited due to the sloping nature of the slots and the position of the mounting projections on the mounting portion 66 of the seat elevator 24. Accordingly, the present embodiment discourages a user or installer from assuming a potentially unsafe bent-over position during installation of the seat elevator 24 to the mounting bracket 20.

[0046] As shown in FIG. 7, when the mounting projections 84, 86 have reached the second slot position 56, the seat elevator 24 and accompanying toilet seat 14 and lid 12 can be rotated in a direction, as represented by arrow 102, to the lowered or horizontal position shown in FIG. 8. In this position, the mounting projections 84, 86 are located at the upper part of the respective second slot segments 60. In this manner the seat elevator 24 is secured against sliding movement along the elongate slots 52. Subsequently, as shown in FIG. 9, the lid 14 can be rotated to an open position for use. Likewise, as shown in FIG. 10, the seat elevator with the associated seat and lid can be slid diagonally and forwardly along the slots 52 until the mounting projections are located at the first slot position 54. The seat elevator with the associated seat and lid can then be rotated so that the lid 14 rests against the tank 104 of the toilet 18. This stable, over-center position ensures that the seat elevator 24 and the accompanying seat and lid can be moved and rotated for use as a urinal and/or for cleaning without removal from the mounting bracket 20. Also, the seat elevator with toilet seat and lid may be easily and conveniently removed from the bracket 20 for cleaning or replacement simply by reversing the installation procedure as described above.

[0047] With reference now to FIG. 11, in order to provide even greater stability in the upright position, a mounting bracket 110 in accordance with a further embodiment of the invention is illustrated. The mounting bracket 110 is similar in construction to the mounting bracket 20 of the previous embodiment, with the exception that each side wall 112 is provided with a third slot segment 114 that extends downwardly from the elongate slot 52, preferably from the first slot position 54. When the seat elevator and accompanying seat and lid are raised to lean

against the tank, as illustrated in the FIG. 10 position, the mounting projections 84, 86 (projection 84 shown in phantom line in FIG. 11) are located in the third slot segment 114 of the respective side walls 28, 30. This secures the seat elevator 24 against undesirable at this time sliding movement along the elongate slots 52.

[0048] As shown in FIG. 12, due to the sloping nature of the elongate slot 52, the mounting bracket of any of the preceding or following embodiments is particularly useful for accommodating seat elevators 24 of various heights "H". When a seat elevator of a greater height is used, the mounting projection 84 is located in the elongate slot 52 somewhere between the first slot position 54 and second slot position 56. Although not shown, the other mounting projection 86 would be positioned at a similar location in the respective side wall 30. In this position, forward and rear sliding movement of the seat elevator 24 with accompanying seat 12 and lid 14 along the toilet bowl 16 is prevented when the seat elevator is in the lowered position. This is primarily due to the engagement between the elevator 24 and the upper surface of the toilet bowl 16. Accordingly, it is anticipated that the mounting bracket 20 of the present invention can accommodate a wide variety of seat elevator heights without modification. However, it will be understood that different mounting brackets with different elongate slot elevations may be provided for different seat heights when it is desirous to lock the mounting projections 84, 86 in their respective second slot segments 60.

[0049] The present invention provides seat elevator arrangement capable of accommodating various configurations of the toilet bowls. Referring now to FIG. 13, wherein a mounting bracket 116 in accordance with a further embodiment of the invention is illustrated. The mounting bracket 116 is similar in construction to the mounting bracket 20 of the previous embodiment, with the exception that each side wall 118 is provided with a third slot segment 120 that extends upwardly toward the upper edge 50 from the elongate slot 52, preferably between the first slot segment 58 and second slot segment 60. With this arrangement, the mounting bracket 116 can be mounted on either round or elongate toilet bowls with the mounting projections 84, 86 (only 84 shown in FIG. 13 in phantom line) located in the slot segment 60 for round toilet bowls and in the slot segment 120 for elongate toilet bowls. It will be understood that the slot segment 120 can be located at a different position than that shown. Still further, more than one slot segment 120 may be provided to accommodate a wide variety of toilet bowl sizes and configurations.

[0050] Referring now to FIG. 14, a mounting bracket 122 in accordance with still another embodiment of the invention is illustrated. The mounting bracket 122 is similar in construction to the mounting bracket 110 (see FIG. 11) of the previous embodiment, with the exception that the first slot segment 58 is in alignment with the third slot segment 114. With this arrangement, the seat elevator with accompanying toilet seat and lid may be installed in the over-center position, as shown in FIG. 10, without the need to lift the seat elevator to the first slot position as in the previous embodiments. It will therefore be understood that the first slot segment 58 may be located anywhere along the upper edge 50 of the mounting bracket between the first and second slot positions 54, 56. It will be further understood that the first slot segment 58 may intersect with one of the forward and rear edges 46, 48 instead of the upper edge 50.

[0051] Referring now to FIG. 15, a mounting bracket 124 in accordance with still further embodiment of the invention is illustrated. The mounting bracket 124 is similar in construction to the mounting bracket 20 previously described, with the exception that each side wall 126 includes a series of slot segments 128 that extend downwardly from the elongate slot 56. Each slot segment 128 is preferably semi-circular in shape for receiving the mounting projections 84, 86 during assembly or disassembly of the seat elevator with respect to the mounting bracket 124. In this embodiment the seat elevator can be moved and/or rotated in controlled, discrete stops or positions.

[0052] Referring now to FIG. 16, a mounting bracket 130 in accordance with a further embodiment of the invention is illustrated. The mounting bracket 130 is similar in construction to the mounting bracket 20 previously described, with the exception that the side wall 132 includes an elongate slot 134 with a series of steps 136 located between the first slot position 54 and second slot position 56. With this arrangement, the seat elevator can be moved in controlled, discrete steps during assembly/disassembly. Furthermore, the mounting bracket 130 can be adapted to accommodate a wide variety of toilet bowl shapes, sizes, and elevator thicknesses.

[0053] Referring now to FIGS. 17-18, an elevator assembly 140 in accordance with a further embodiment of the invention is illustrated. The elevator assembly 140 preferably includes a mounting bracket 142 for connection to a seat mounting area 22 (see FIG. 25) of the toilet bowl 16 and a seat elevator 144 removably connected to the mounting bracket 142. A support handle 146 can be connected to the mounting bracket 142 for grasping by a user to facilitate sitting and standing motions. Preferably, the support handle 146 comprises a mounting section 150 and handle sections 152, 154 that extend in the same direction from the mounting sections. The support handle 146 can be constructed from a single bar or rod 148 and bent into the shape as shown. Alternatively, the mounting section 150 and handle sections 152, 154 can be formed as separate elements and joined together through fastening, welding, or other well-known connection means. Although the support handle is shown as being generally circular in cross section, it will be understood that the support handle may be configured with other cross sectional shapes, such as square, rectangular, oval, triangular, hexagonal, and so on.

[0054] With additional reference to FIGS. 19-20, the mounting bracket 142 preferably has a bottom wall 156

and spaced side panels or walls 158, 160 extending upwardly from the bottom wall. The bottom wall 156 includes a rear bracket section 162 that receives the mounting section 150 of the support handle 146. As shown, the rear bracket section 162 is preferably semi-cylindrical in shape for accommodating the respective shape of the mounting section 150 of the support handle. However, it will be understood that the rear bracket section 162 may be of any shape, and preferably of a shape that is complementary to the shape of the mounting section 150. The support handle 146 can be connected to the rear bracket section 162 through conventional connecting means, such as fasteners, adhesive bonding, welding, clamps, and so on and/or may be adjustably fixed for accommodating the needs of different users.

[0055] Spaced slots 164, 166 preferably extend in a parallel manner with respect to the rear bracket section 162. The slots 164, 166 are in alignment with spaced openings 38 and 40 (see FIG. 2), respectively, of the toilet bowl 16 when the mounting bracket 142 is positioned on the seat mounting area 22 of the toilet bowl 16, as previously described. The slots 164, 166 and openings 38, 40 are sized for accepting many types of conventional fasteners which can be in the form of screws or bolts 42. Nuts 44 are received on the screws 42 underneath the seat mounting area 22 (see FIG. 2) in a conventional manner for securing the mounting bracket 142 to the toilet bowl 16. The lateral extension of the slots 164, 166 accommodates different toilet bowl hole spacings and sizes that may be present because of variations in tolerances during manufacture as well as different toilet bowl configurations or designs. Accordingly, the mounting bracket 142 is adaptable for use with a wide variety of toilet bowl shapes and sizes. Other attachment means including adhesives, clamps, and so on may additionally or alternatively be used to secure the bracket 142 to the toilet bowl 16.

[0056] As best shown in FIG. 20, the bottom wall 156 also preferably includes a depression 165 that extends around the slots 164, 166 and a ridge 167 that borders the depression 165. Reinforcing ribs 169 preferably crisscross through the depression to strengthen the bottom wall 156.

[0057] As best shown in FIG. 19, each side wall 158, 160 of the mounting bracket 142 preferably includes a forward edge 168 and a rear edge 170 that extend upwardly from the bottom wall 156 and an upper edge 172 that extends between the forward and rear edges. An elongate slot 174 preferably extends diagonally from a first slot position 176 proximal the forward edge 168 and upper edge 172 to a second slot position 178 proximal the rear edge 170 and bottom wall 156. A first slot segment 180 extends from the upper edge 172 of the side wall to the elongate slot 174, preferably between the first and second slot positions. A second slot segment 182 is spaced rearwardly of the first slot segment 180 and preferably extends transversely relative to the elongate slot 174 toward the upper edge 172 from the second slot position 178 of the elongate slot 174. A third slot segment 184 is located between the first and second slot segments and preferably extends transversely to the elongate slot 174 toward the upper edge 172. As shown, the third slot segment 184 is in the form of a groove or indentation and is preferably at the same height of the second slot segment 182 and provided to accommodate different bowl sizes, as will be described in greater detail below. It will be understood that the first, second and third slot segments may extend in other directions from the elongate slot 174.

[0058] Turning again to FIGS. 19-20, each side wall 158, 160 also preferably includes a depression 186 that extends around the elongate slot 174 as well as the first, second and third slot segments. Inner and outer ridges 188 and 190, respectively, border the depression 186. Reinforcing ribs 192 preferably extend through the depression between the outer and inner ridges to strengthen the side walls 158, 160.

[0059] The mounting bracket 142 is preferably constructed of an injection-molded plastic material. However, it will be understood that the bracket can be formed using other molding or forming techniques as well as other materials, such as metals, composites, ceramics, and so on.

[0060] Referring now to FIGS. 19-23, the seat elevator 144 is preferably of lightweight, hollow construction and includes a generally ring-shaped seat support portion 194 that is adapted to rest on or otherwise be supported by an upper surface 64 (see FIGS. 24-25) of the toilet bowl 16 and an elevator mounting portion 196 that extends rearwardly of the support portion 194. In one embodiment of the invention, the seat elevator 144 is constructed of a lower shell section 198 and an upper shell section 200, each including a segment of the ring-shaped support portion and integrally formed elevator mounting portion. As best shown in FIGS. 20 and 23, in this embodiment, hollow stubs 202 are formed in the lower shell portion 198 and solid shafts 204 are formed in the upper shell portion 200 in alignment with the stubs 202. A fastener (not shown), such as a screw, can be inserted into each hollow stub 202 and screwed into its corresponding shaft 204 for securing the upper and lower shell portions together. An inner wall 206 extends downwardly from the upper shell portion 200 and past the lower shell portion 198 to form a lip 208 which can be used for properly locating and positioning the seat elevator 144 on the toilet bowl 16.

[0061] It will be understood that the lower and upper shell portions 198, 200 can be connected together through other connection means such as brackets, adhesives, welding, and so on. It will be further understood that the entire seat elevator 144 can be of a unitary structure for example through a blow-molding operation. In accordance with yet a further embodiment of the invention, the seat elevator 144 can be formed as a partially solid or completely solid structure with little or no hollow interior space.

[0062] The mounting portion 196 includes a rear wall 210 and spaced grooves 212, 214 that preferably extend forwardly from the rear wall 210. The grooves 212 and 214 are spaced to receive the side walls 158 and 160, respectively, of the mounting bracket 142 when the seat elevator 144 is installed on the mounting bracket.

[0063] The mounting portion 196 also includes side mounting walls 216 and 218 that extend rearwardly from the support portion 194 and mounting projections 220 and 222 that extend inwardly toward each other from their respective side mounting walls 216, 218. Each mounting projection 220, 222 preferably includes a substantially cylindrical shaft 224 which can be hollow and a head 226 formed at the outer free end of the shaft. However, it will be understood that the shaft 224 can be of different configuration and/or that the head 226 can be eliminated. Preferably, the shaft 224 is sized for reception into one of the elongate slots 174 and its associated slot segments 180, 182 and 184 in a similar manner as described with respect to the previous embodiments.

[0064] In accordance with yet a further embodiment of the invention, the mounting projections can be in the form of spring-loaded plungers, and/or flexible or compressible shafts. Alternatively, the side walls 216, 218 of the mounting portion 196 and/or the side walls 158, 160 of the mounting bracket 142 can have some measure of resilience to ensure adequate engagement of the mounting projections with the slot segments during use.

[0065] The method of connecting the elevator assembly 140 to the toilet bowl 16 is similar to the method previously described and therefore will not be further elaborated on. With this arrangement, the mounting bracket 142 can be smaller in size than the mounting brackets of the previous embodiments since the mounting projections 220, 222 extend inwardly, thus conserving space on the toilet bowl while reducing material and it's associated costs.

[0066] Referring now to FIGS. 24-25, the provision of the mounting bracket 142 with the slot segments 182 and 184 permits the elevator assembly 140 to be installed on end used with both elongate toilet bowls 16 or standard sized toilet bowls 16A (represented by phantom line in FIGS. 24 and 25). As shown, when the shaft 224 is located in the third or forward slot segment 184, the seat elevator is in the extended position so that a forward end 228 of the seat elevator 144 is in alignment with a forward end 230 of the elongate toilet bowl 16. Likewise, when the shaft 224 (shown in phantom line) is located in the second or rearward-most slot segment 182, the seat elevator is in the retracted position so that a forward end 228A (shown in phantom line) of the seat elevator 144 is in alignment with a forward end 230A (shown in phantom line) of the standard size toilet bowl 16A. Although two sizes of the toilet bowls are being discussed in the embodiment of the invention, it should be clear that the invention is capable of accommodating the toilet bowls of the many other shapes and sizes. Accordingly, a wide variety of toilet bowl sizes and configurations can be accommodated. It will be understood that the slot segments can be located at different positions than that shown. Still further, more or less slot segments may be provided.

[0067] In accordance with a further embodiment of the invention, the elongate slot 174 may be eliminated and the slot segments may be in the form of openings and/or depressions of any desired shape in each side wall 158, 160. This embodiment is especially advantageous when used with spring-loaded or resilient plungers for the mounting projections.

[0068] Referring now to FIG. 26, a mounting bracket 232 in accordance with a further embodiment of the invention is illustrated. The mounting bracket 232 is similar in construction to the mounting bracket 142 of the previous embodiment, with the exception that each side wall 234, 236 is provided with a wall segment 238 that covers a portion of the elongate slot 174. In the illustrated embodiment, the wall segment 238 covers the second slot segment 182. The wall segments 238 are preferably constructed, so as to be removable from the side walls 234, 236 through any well known removable connection means such as perforations or grooves for punching out the wall segment, fasteners, clamps, temporary adhesive, and so on. The removable wall segments 238 are useful when the mounting bracket 232 and seat elevator 144 are to be associated with elongated toilet bowls only. In this manner, a user is prevented from inadvertently moving the seat elevator in the standard bowl position. This is because such position is effectively blocked by the wall segments 238. When the seat elevator 144 will be used with a standard toilet bowl, the wall segments 238 can simply be removed, so as to enable to locate the seat elevator in the standard bowl position.

[0069] Referring now to FIG. 27, a mounting bracket 240 in accordance with a further embodiment of the invention is illustrated. The mounting bracket 240 is similar in construction to the mounting bracket 232 of the previous embodiment, with the exception that each side wall 242, 244 is provided with a wall segment 246 that extends across the elongate slot 174. In this manner, a portion of the elongate slot 174 facing the interior of the mounting bracket is blocked. Thus, outwardly facing the first slot segment 180, second slot segment 182 and third slot segment 184 are formed. The wall segment 246 can be either removably connected or permanently attached to the side walls 242, 244. In any event, in this embodiment, shorter inwardly extending mounting projections 220, 222 (see FIG. 19) can be used to slide along the elongate slot 174 and slot segments. This arrangement is especially advantageous for use with mounting projections that resiliently engage the wall segment 246 within the slot and slot segments. In this embodiment, the mounting projections can be in the form of spring-loaded plunger mechanisms, flexible shafts, resilient side walls, and so on, as previously discussed.

[0070] Referring now to FIG. 28, a mounting bracket 250 in accordance with a further embodiment of the in-

vention is illustrated. The mounting bracket 250 is similar in construction to the mounting bracket 240 of the previous embodiment, with the exception that each side wall 252, 254 is provided with an outer wall segment 256 that extends across the elongate slot 174. In this manner, a portion of the elongate slot 174 facing the exterior of the mounting bracket is blocked. Thus, inwardly facing the first slot segment 180, second slot segment 182 and third slot segment 184 are formed. As in the previous embodiment, the wall segment 256 can be either removably connected or permanently attached to the side walls 252, 254. In any event, shorter outwardly extending mounting projections, such as 84 and 86 (FIG. 2) can be used to slide along the inwardly facing elongate slot 174 and the respective slot segments. This arrangement is especially advantageous for use with mounting projections that resiliently engage the wall segment 256 within the slot and slot segments through spring-loaded plunger mechanisms, flexible shafts, resilient side walls, and so on, as previously discussed.

[0071] Turning now to FIG. 29, an elevator assembly 260 in accordance with a further embodiment of the invention is illustrated. The elevator assembly 260 is similar in construction to the elevator assembly 140 previously described, with the exception that the inwardly extending mounting projections 220, 222 (FIG. 19) are replaced with a single mounting projection or shaft 264 that extends between the side walls 216 and 218 of the seat elevator 262. The shaft 264 engages the elongate slot 174 and slot segments 180, 182 and 184 in a similar manner as the projections 220, 222 previously described. On the other hand, this embodiment in some instances provides greater stability during installation and adjustment than the previous embodiments. In a further embodiment, the shaft 264 can be integrally formed with the lower and upper shell portions 198, 200 of the seat elevator 262. However, it may alternatively be separately formed and attached to the side walls 216, 218 of the seat elevator in a conventional manner.

Claims

1. A toilet seat elevator assembly comprising:

a seat elevator having a generally ring-shaped portion for resting on a toilet bowl and a mounting portion extending rearwardly of the ring-shaped portion, the mounting portion having opposing mounting projections; and
a bracket including:

a bottom wall adapted for securement to the toilet bowl;
spaced side panels extending upwardly from the bottom wall, each side panel having forward and rear edges extending upwardly from the bottom wall and an upper edge extending between the forward and rear edges, each side panel including:

an elongate slot extending from a first slot position proximal the upper and forward edges to a second slot position proximal the rear edge and bottom wall;
a first slot segment extending from the upper edge to the elongate slot for receiving one of the mounting projections during installation of the mounting portion of the seat elevator on the bracket; and
a second slot segment spaced rearwardly of the first slot segment, the second slot segment extending toward the upper edge from the elongate slot, each mounting projection being positioned in its respective second slot segment when the toilet seat elevator is in a lowered position on the toilet bowl to thereby secure the seat elevator against sliding movement along the elongate slot when in use.

2. A toilet seat elevator assembly according to claim 1, wherein the first slot segment is located between the first and second slot positions.

3. A toilet seat elevator assembly according to claim 1, wherein each mounting projection is located at its respective first slot position when the seat elevator is rotated to a raised position from a lowered position.

4. A toilet seat elevator assembly according to claim 1, wherein each side panel further comprises a third slot segment positioned between the first slot segment and the second slot segment and extending toward the upper edge from the elongate slot, the mounting projections being positioned in its respective second and third slot segments adapted to receive and hold the mounting projections and thus the seat elevator in the retracted and extended positions respectively.

5. A toilet seat elevator assembly according to claim 4, wherein each side panel further comprises a fourth slot segment extending from the first slot position toward the bottom wall, wherein each mounting projection is located in its respective fourth slot segment when the seat elevator is rotated to a raised position from the lowered position to thereby securely hold the seat elevator in the raised position.

6. A toilet seat elevator assembly according to claim 1, wherein each bracket side wall further comprises a rearward slot segment and a forward slot segment extending transversely from the elongate slot to re-

ceive and hold the at least one mounting projection and the seat elevator in retracted and extended positions, respectively and further comprising a wall segment extending across at least a portion of the elongate slot and the rearward slot segment of the bracket side walls, so as to limit slidable movement of the respective mounting portion.

7. A toilet seat elevator assembly according to claim 6, wherein the wall segment is removable to expose the elongate slot and the rearward slot segment to facilitate slidable movement of the respective mounting projection.

8. A toilet seat elevator assembly according to claim 6, wherein the wall segment is integrally formed with each bracket side wall, so as to extend through the elongate slot and the rearward and forward slot segments and to face outwardly or inwardly.

9. A toilet seat elevator assembly according to claim 1, wherein the bottom wall is formed with a rear bracket which extends along the length of the bottom wall and is provided with a recess for receiving the support handle.

10. A toilet seat elevator assembly according to claim 1, wherein the opposing mounting projections comprise a pair of mounting projections extending outwardly from the respective side panels.

11. A toilet seat elevator assembly according to claim 1, wherein the opposing mounting projections comprise a pair of mounting projections extending inwardly toward each other from the spaced side panels.

12. A toilet seat elevator assembly according to claim 1, wherein each side wall includes a series of slot segments extending downwardly from the elongate slot, each said slot segment is adapted for receiving the respective mounting projections, so as to enable the seat elevator to move in controlled, discrete stops or positions.

13. A toilet seat elevator assembly according to claim 1, wherein the elongate slot is formed with a series of steps located between a first slot position and a second slot position, so as to enable the seat elevator to be moved in controlled, discrete steps.

14. A toilet seat elevator assembly according to claim 4, wherein when the respective mounting projections are located in the third or forward slot segment the seat elevator is in the extended position so that a forward end of the seat elevator is in alignment with a forward end of an elongate toilet bowl, and when the respective mounting projections are located in the second or rearward slot segment the seat elevator is in the retracted position so that a forward end of the seat elevator is in alignment with a forward end of a standard size toilet bowl.

15. A toilet seat elevator assembly according to claim 1, wherein the seat elevator further comprises a lower part engaging the toilet bowl and an upper part, the lower part is provided with a pair of spaced grooves extending forwardly from the rear wall and adapted to receive the side walls of the mounting bracket when the seat elevator is installed on the mounting bracket.

FIG. 1

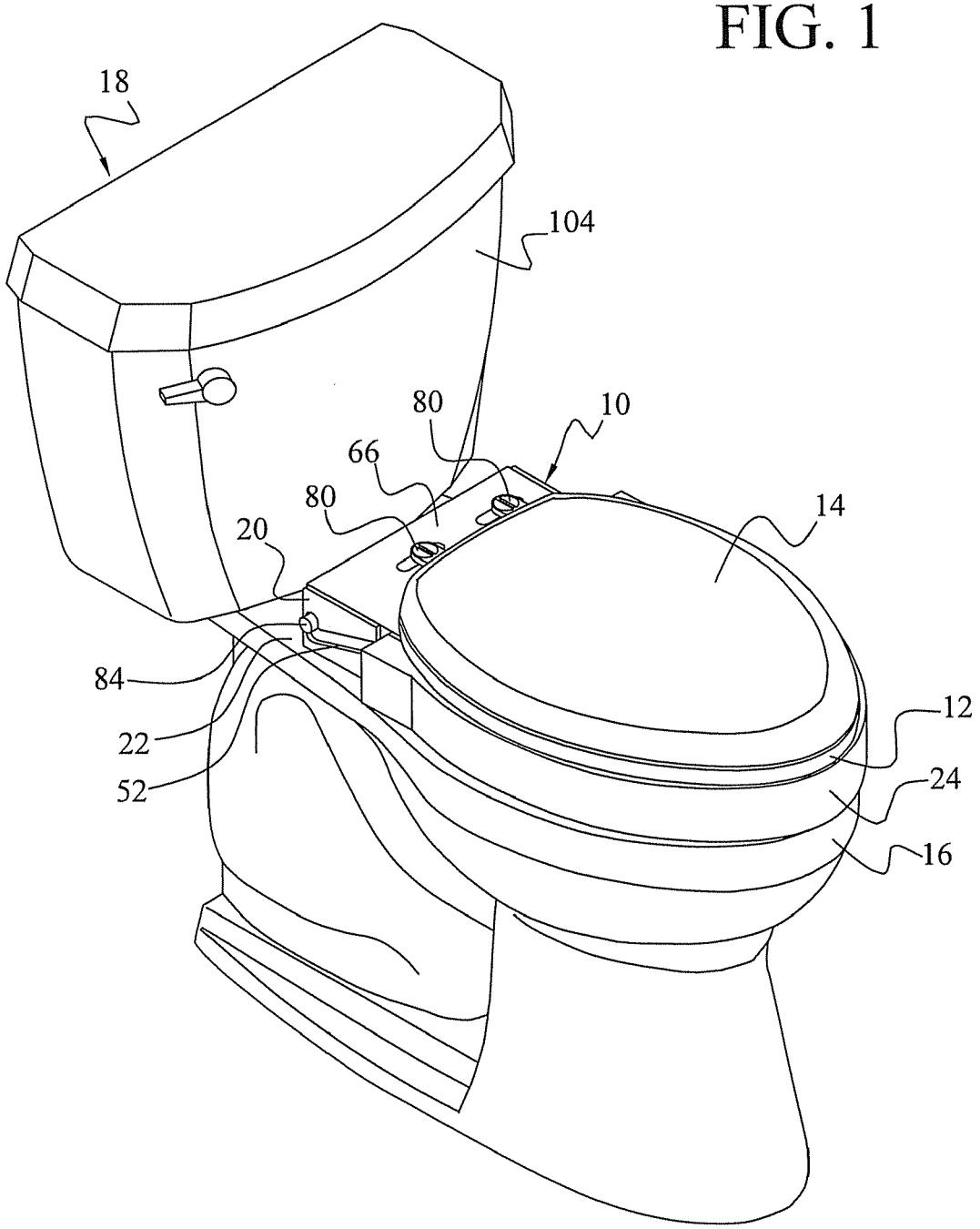

FIG. 2

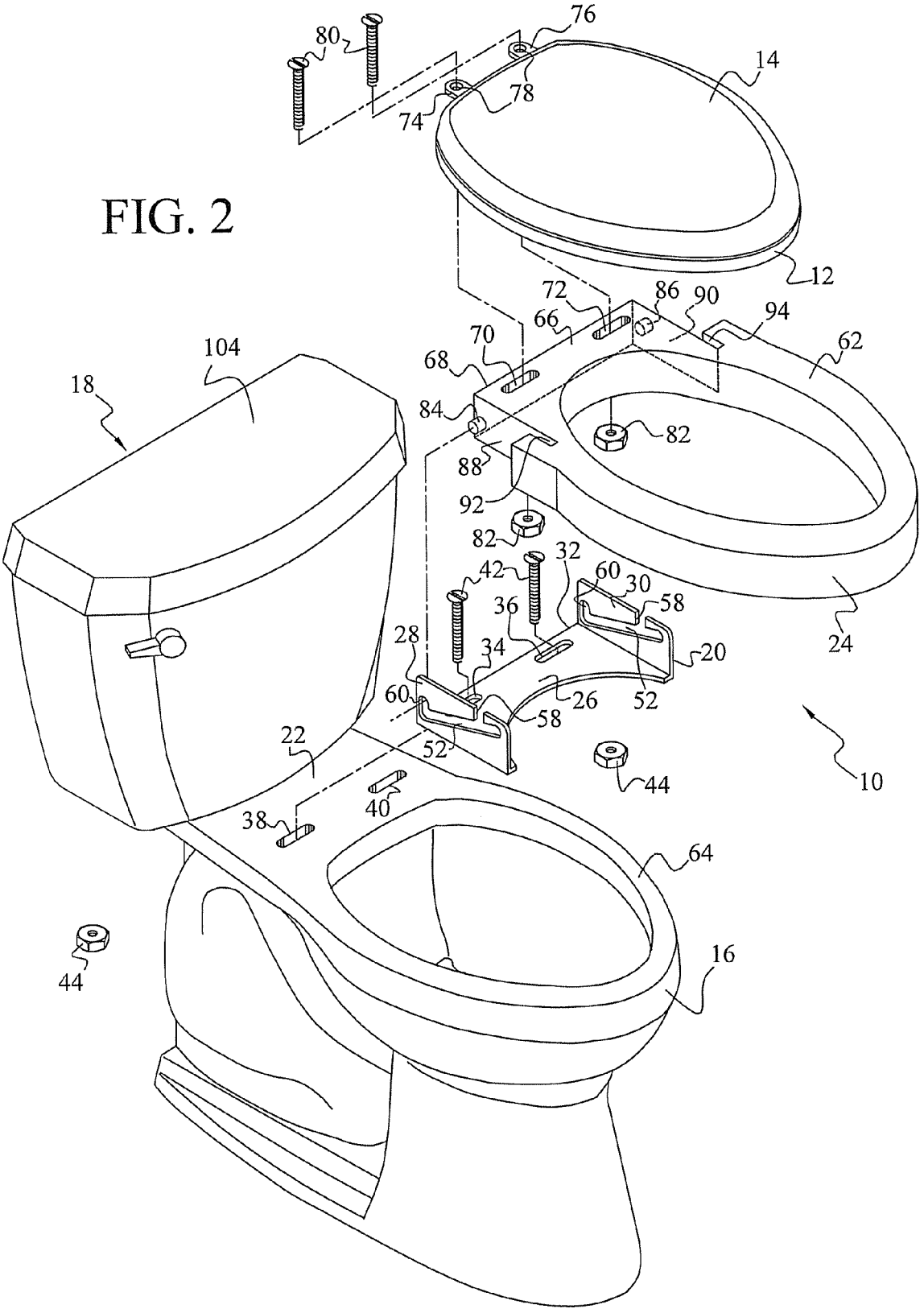
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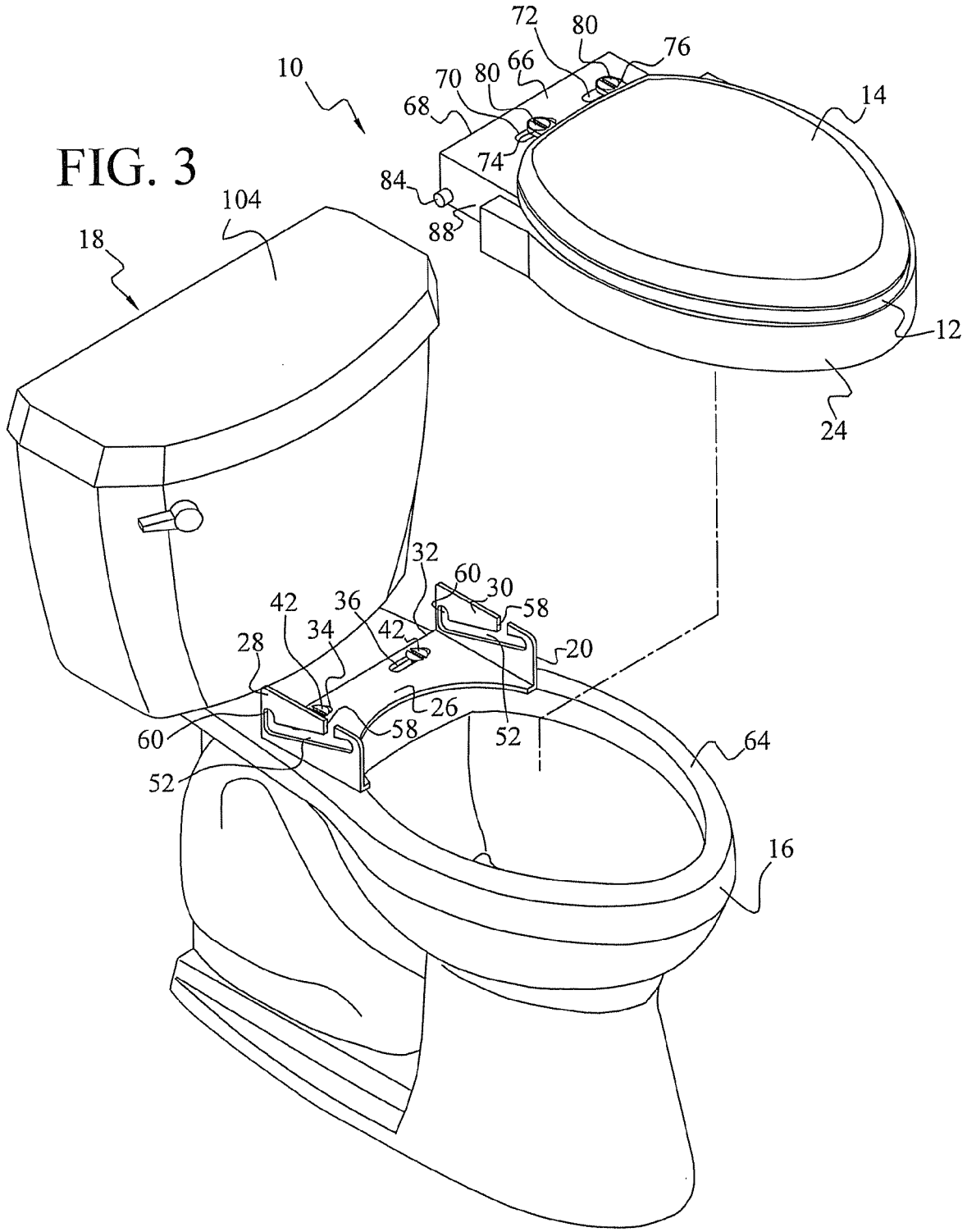
FIG. 3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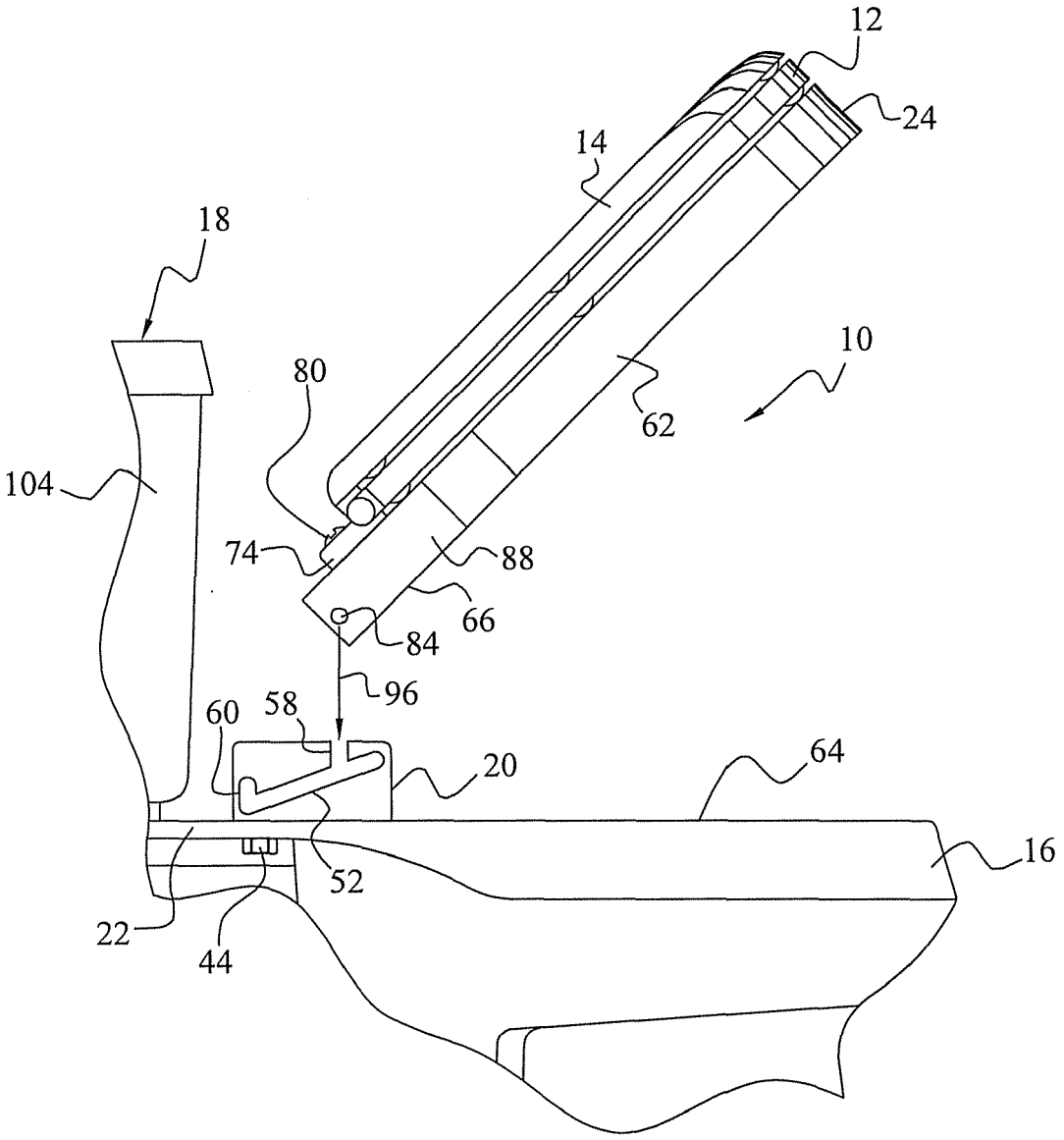

FIG. 4

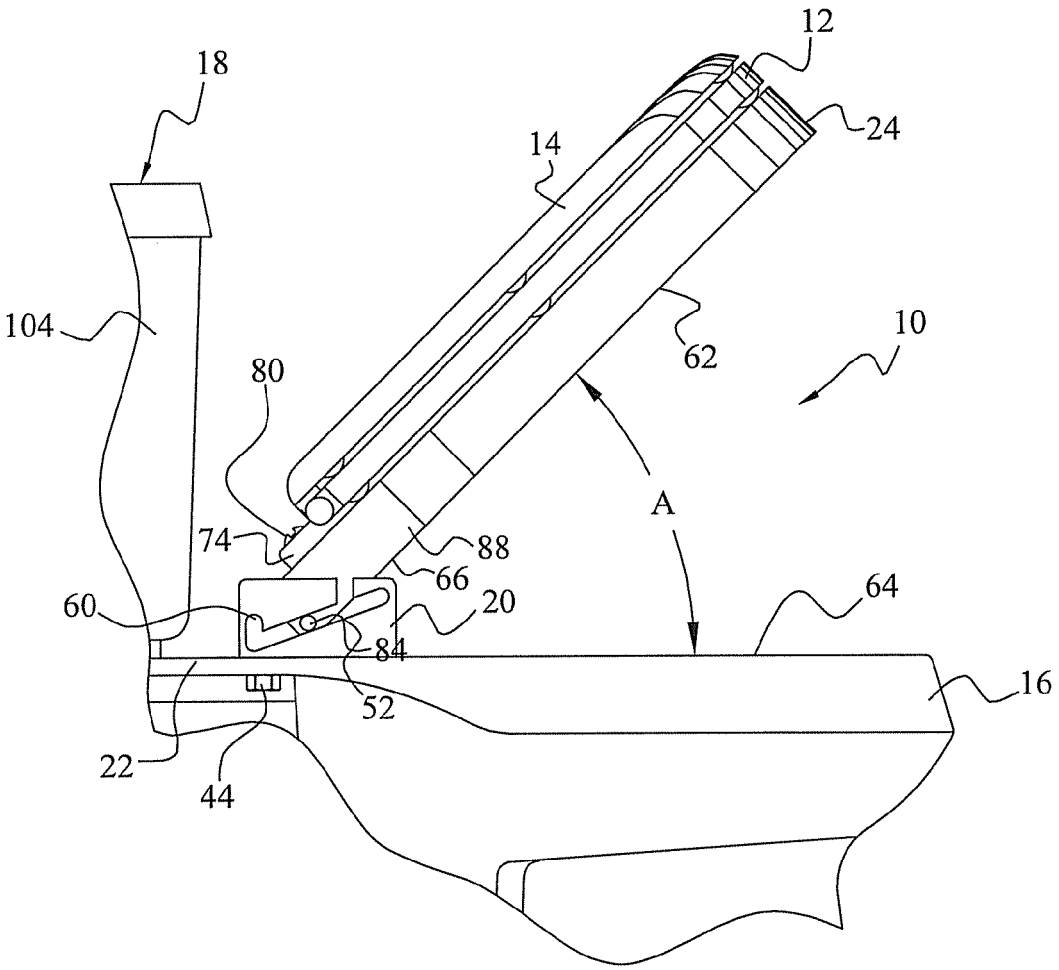
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FIG. 5

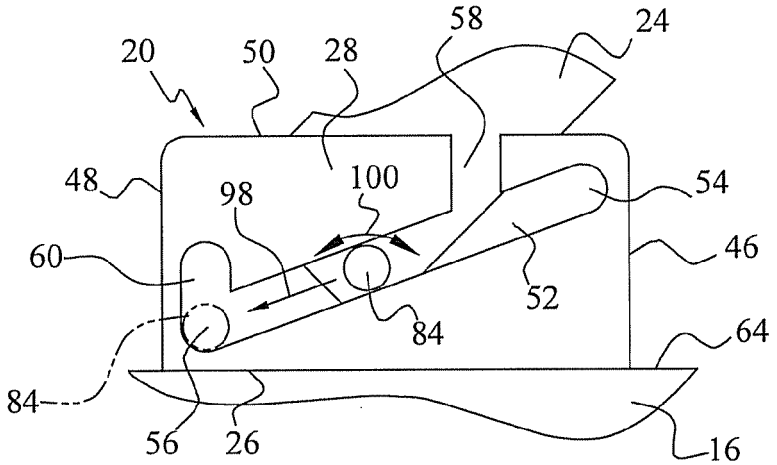
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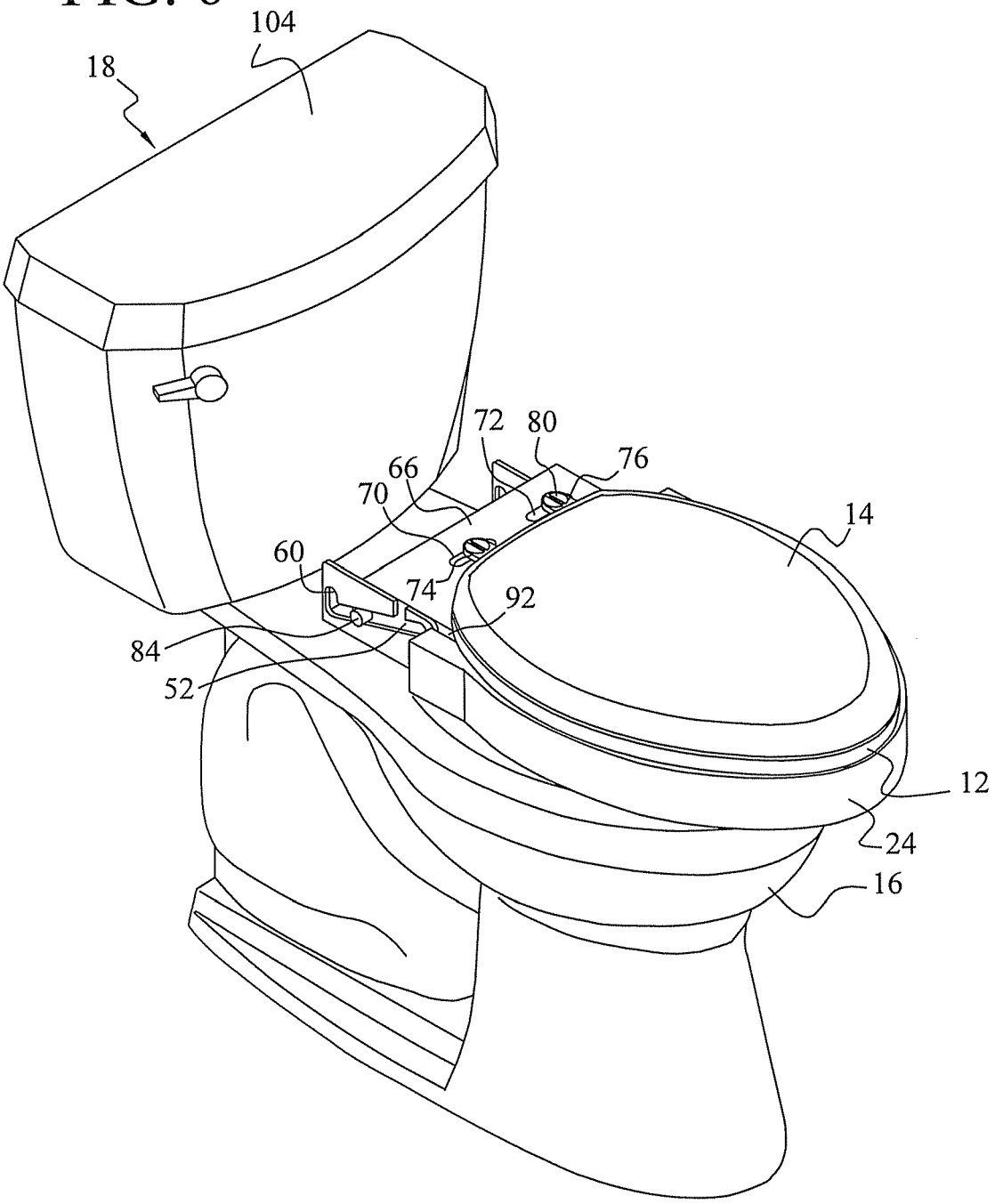
FIG. 5A

FIG. 6



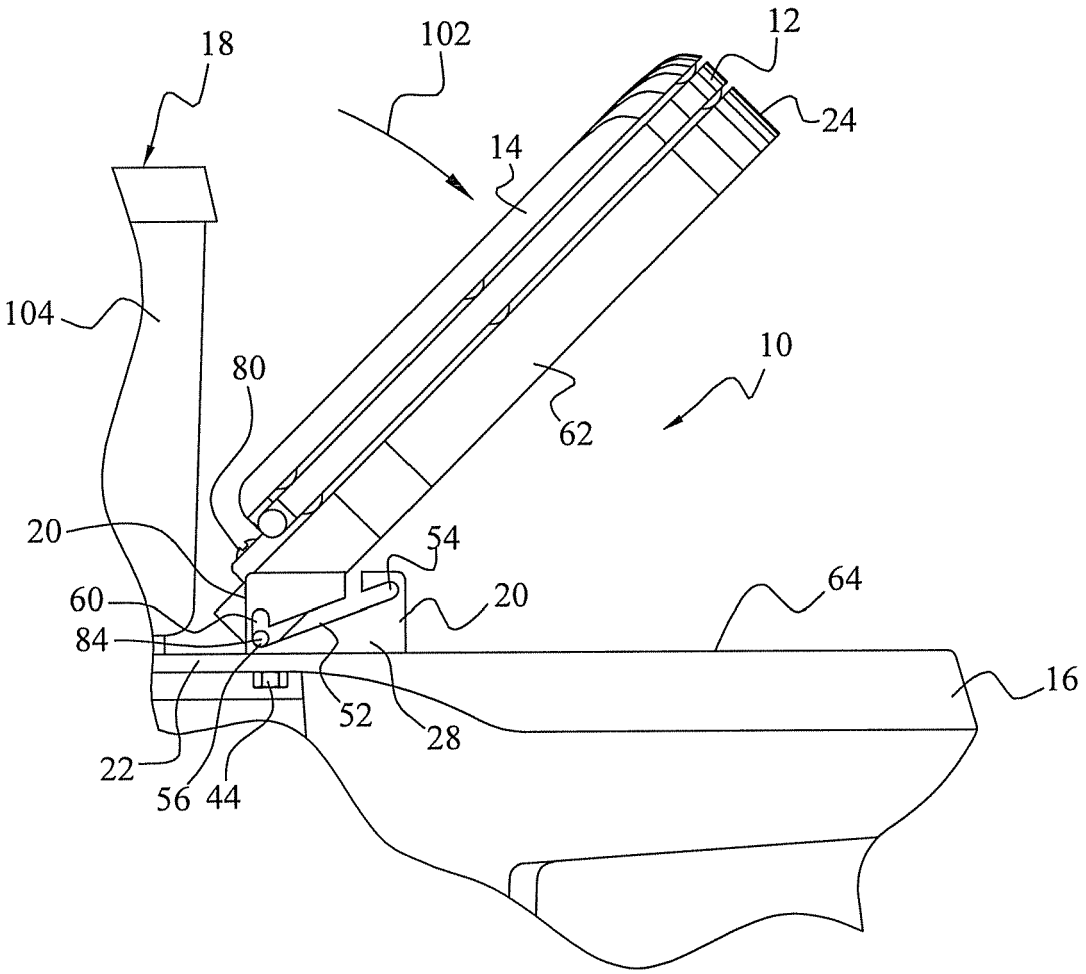


FIG. 7

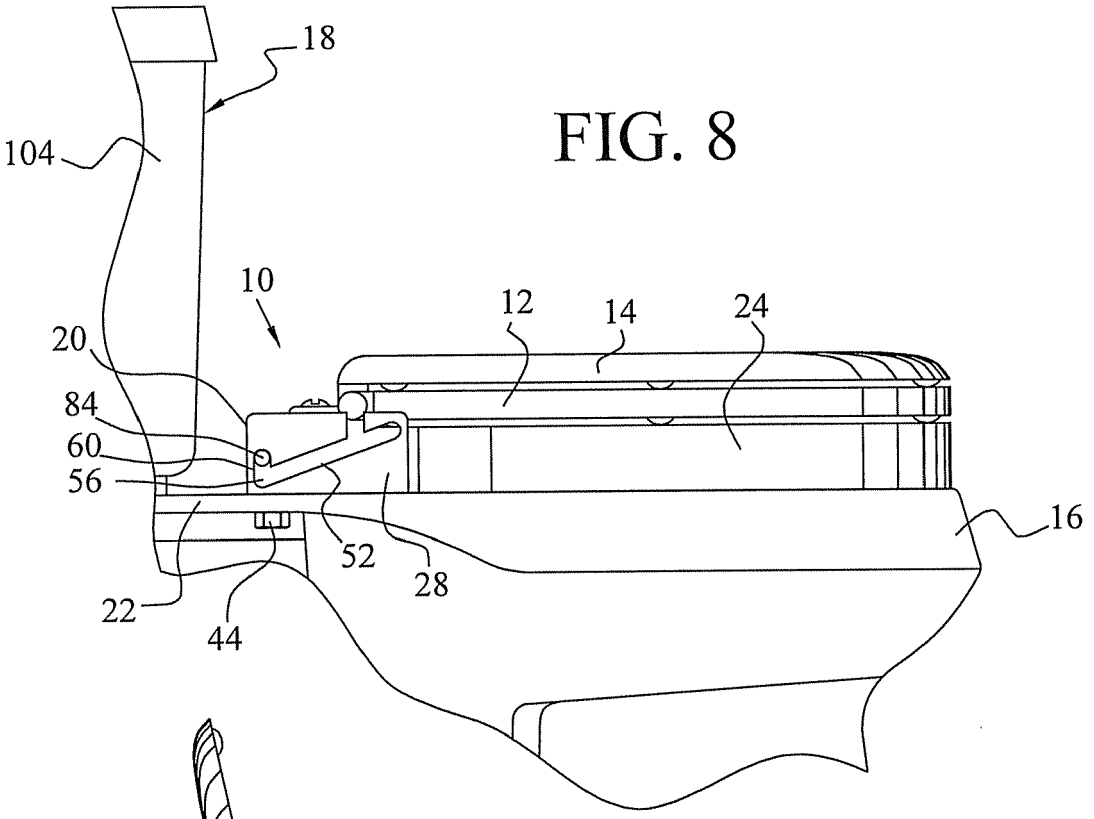

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FIG. 8

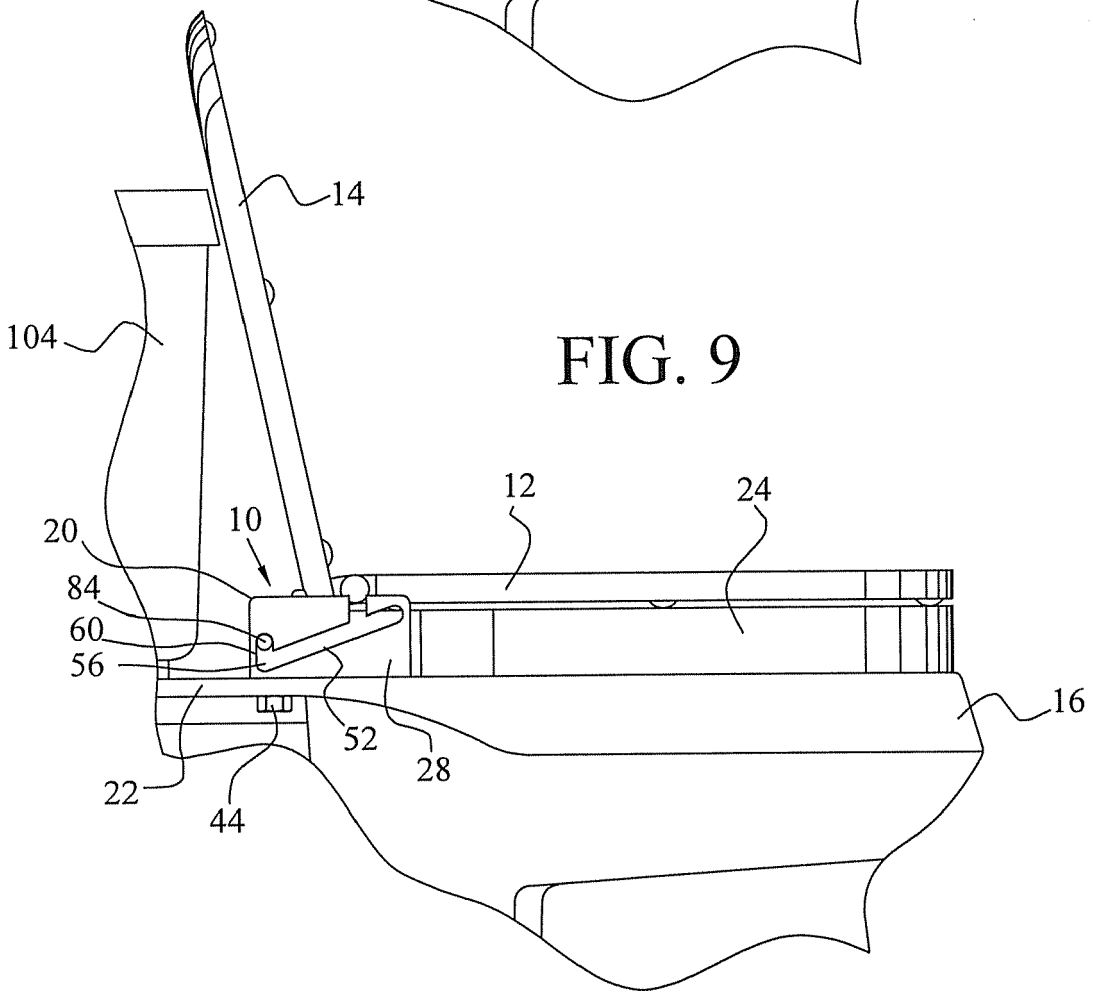
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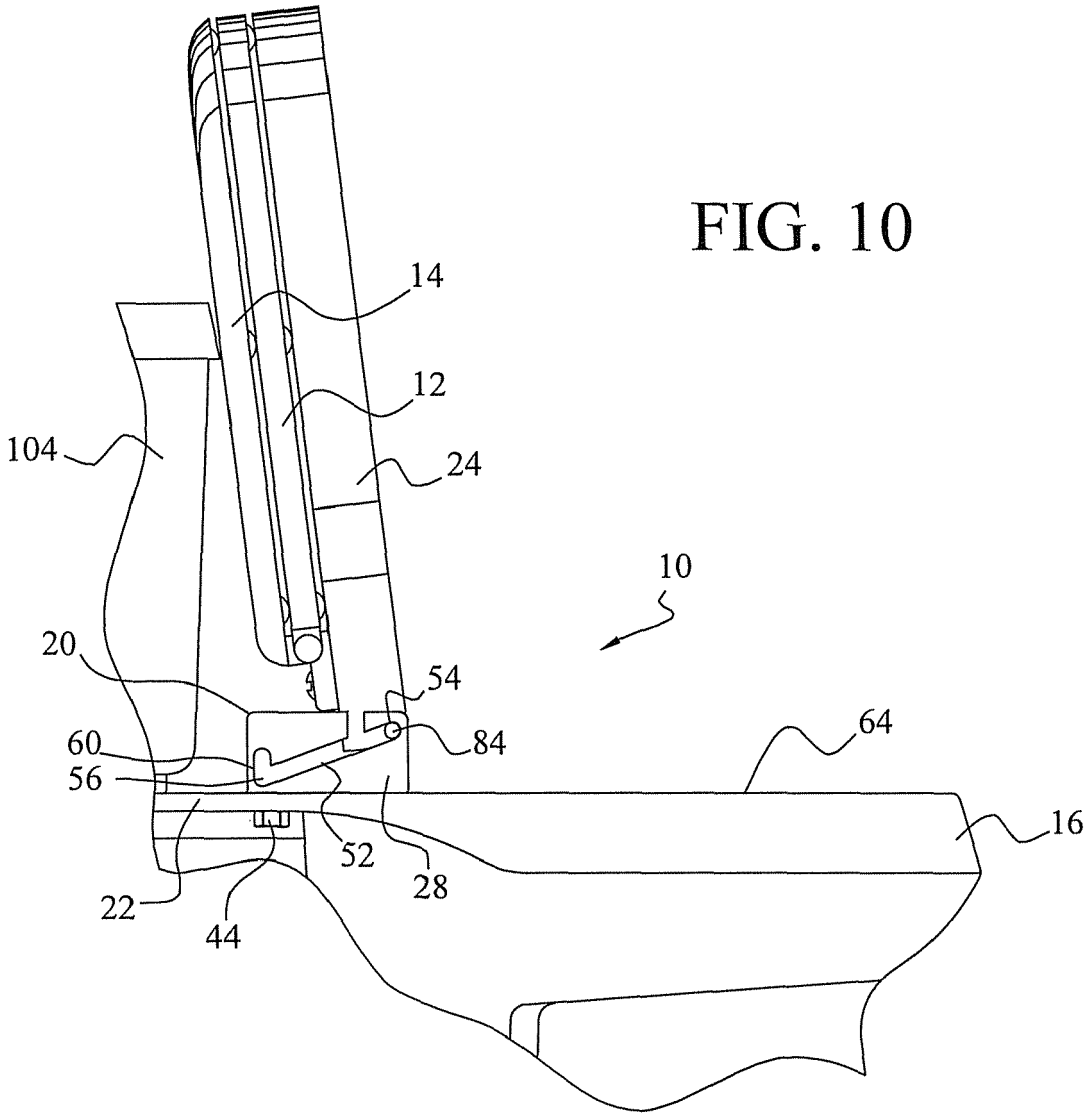
FIG. 9

FIG. 10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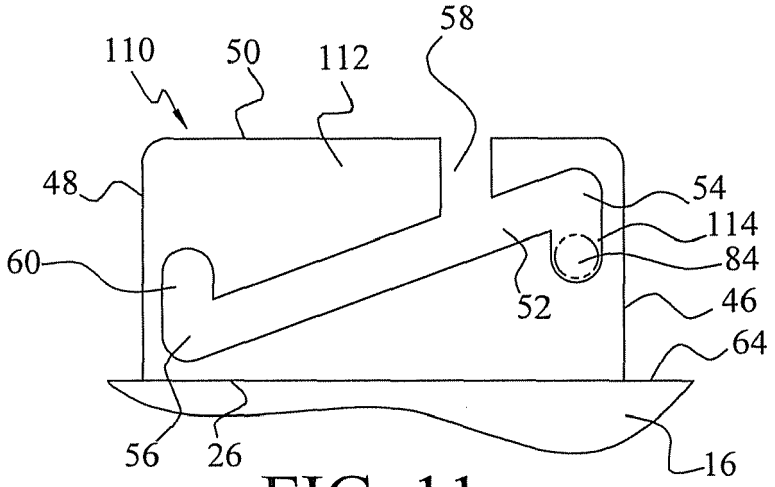
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FIG. 11

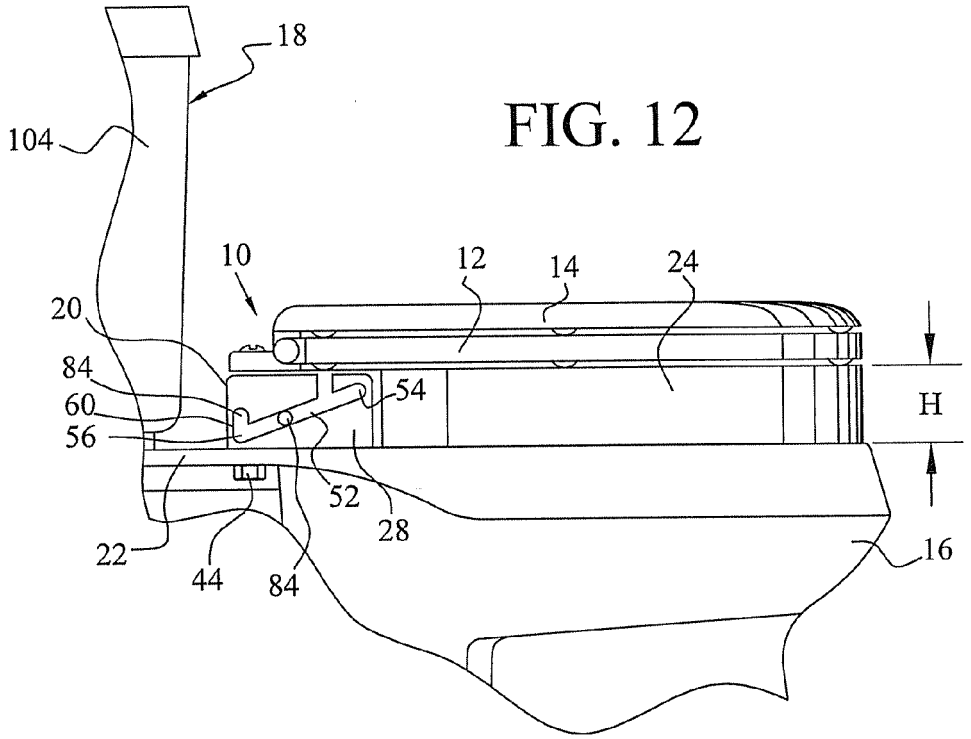

FIG. 12

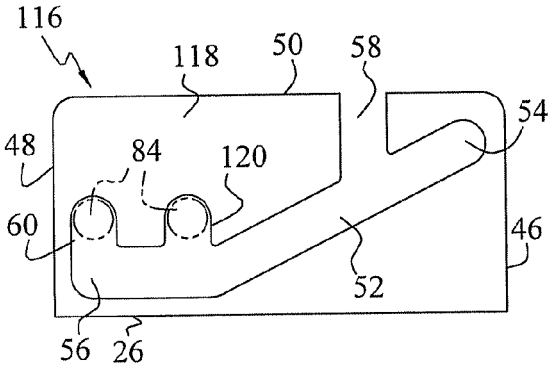

FIG. 13

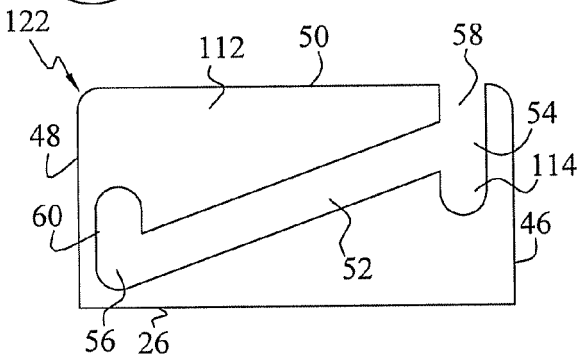

FIG. 14

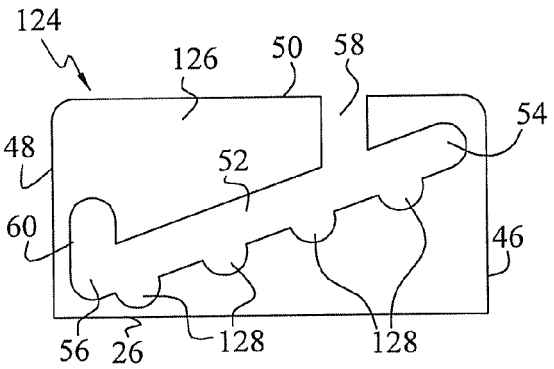

FIG. 15

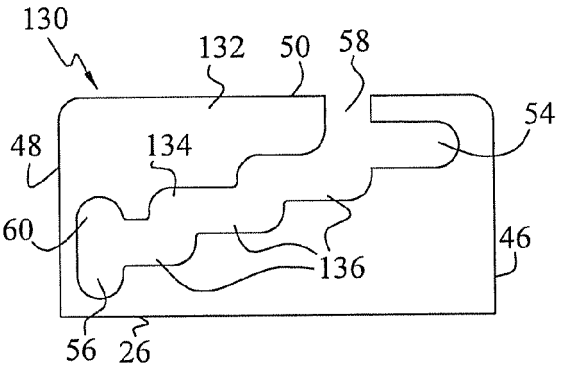

FIG. 16

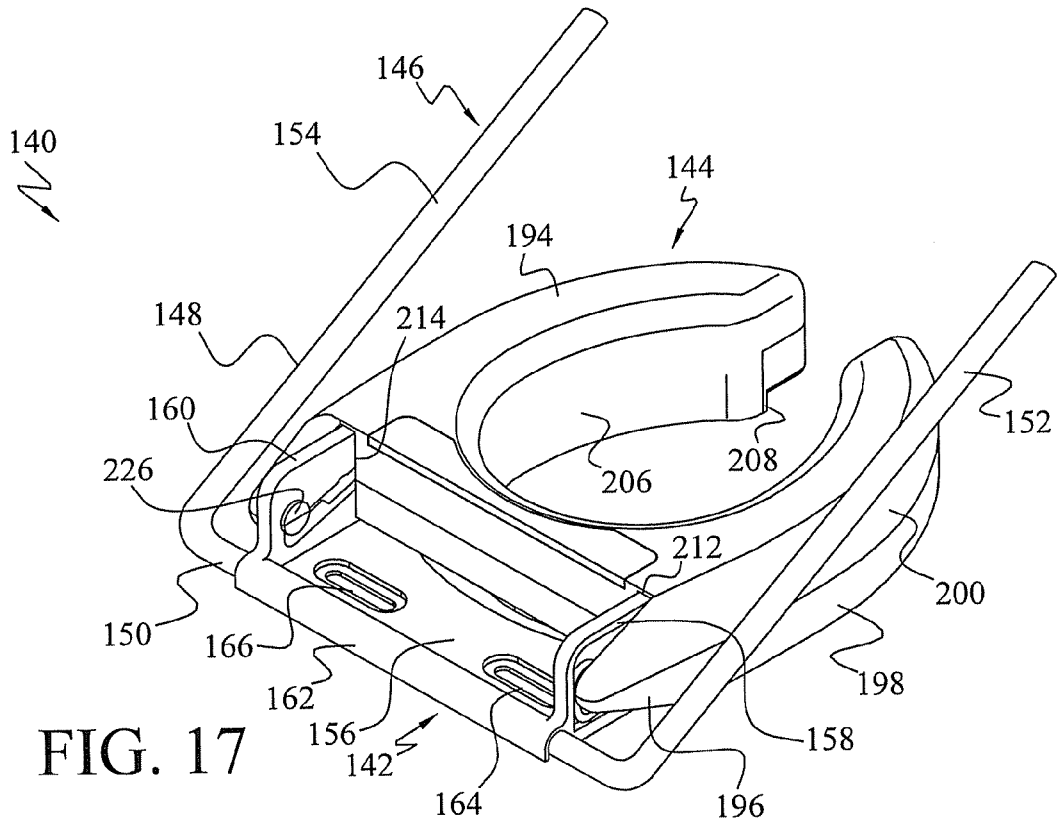
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FIG. 17

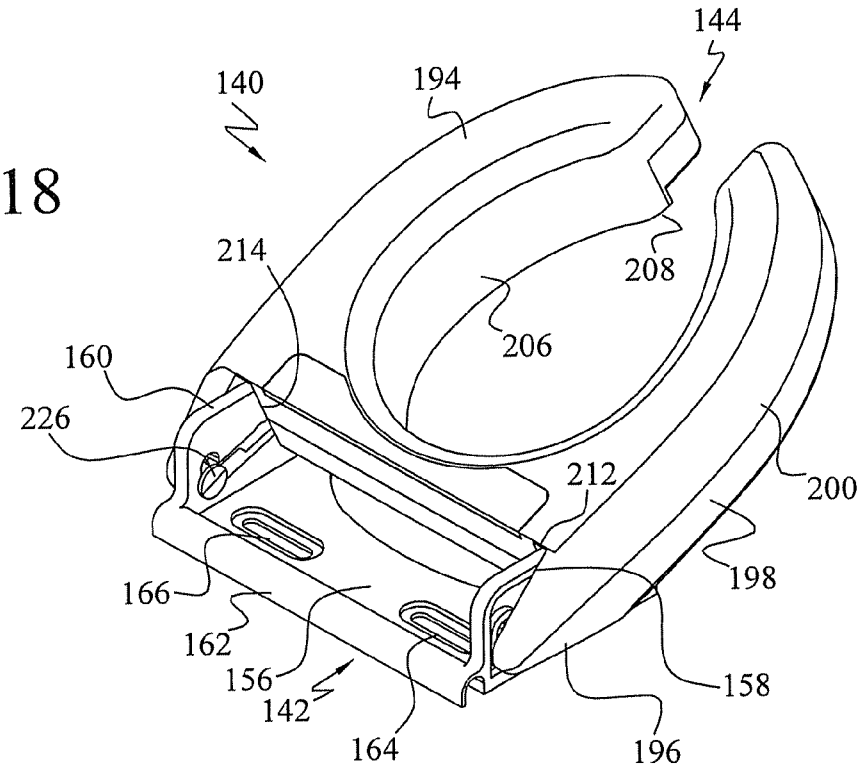
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FIG. 18

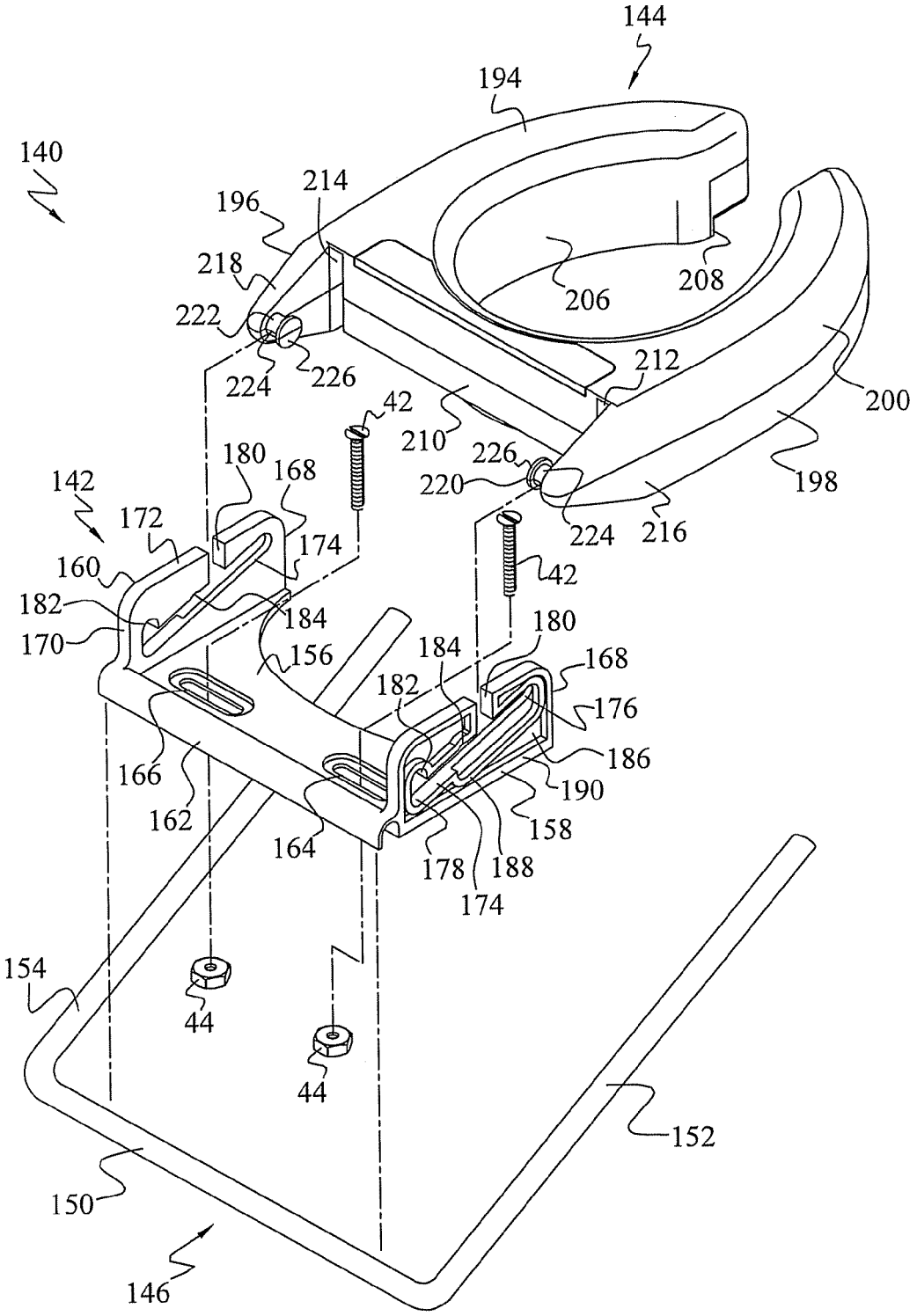
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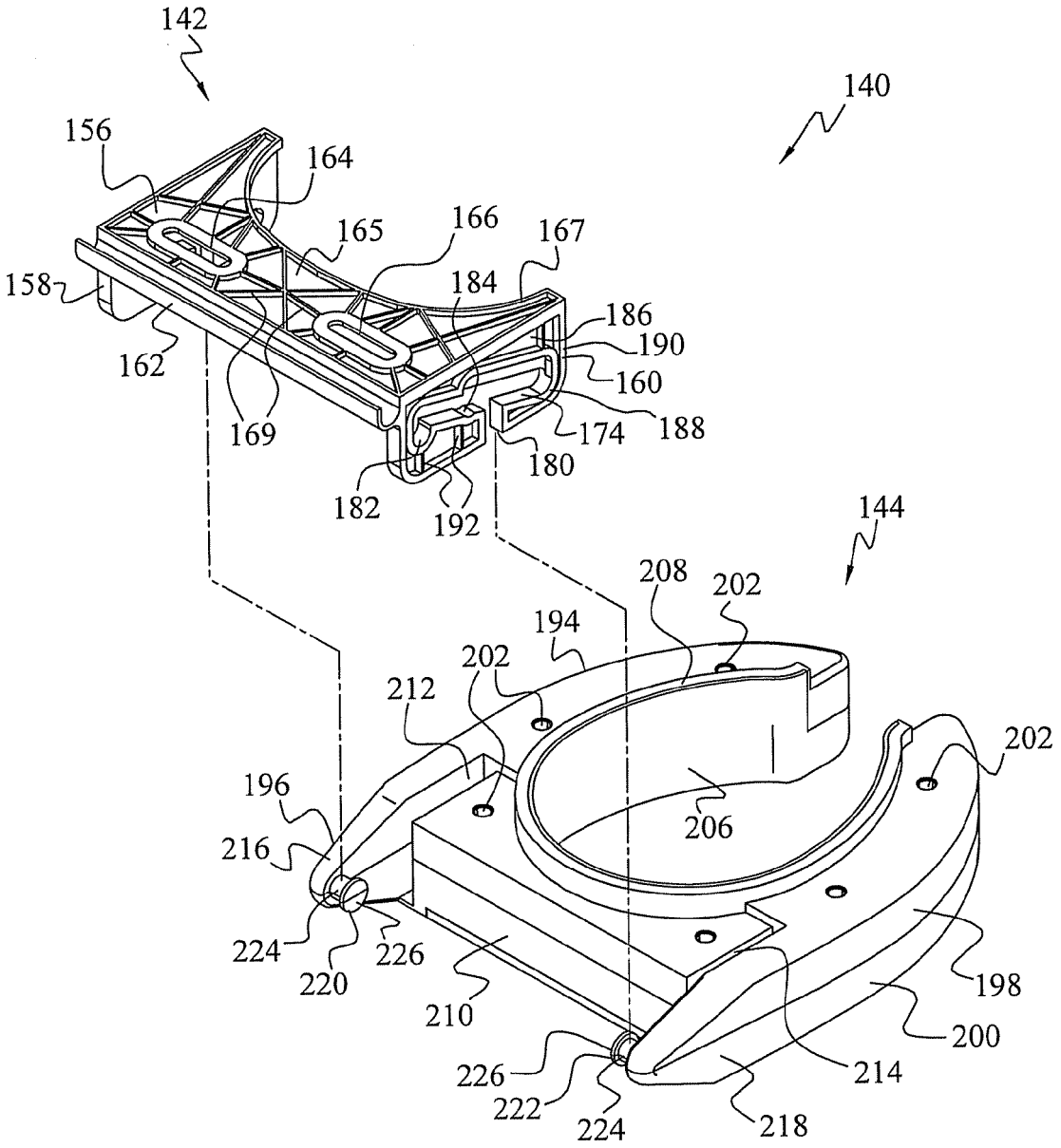
FIG. 19

FIG. 20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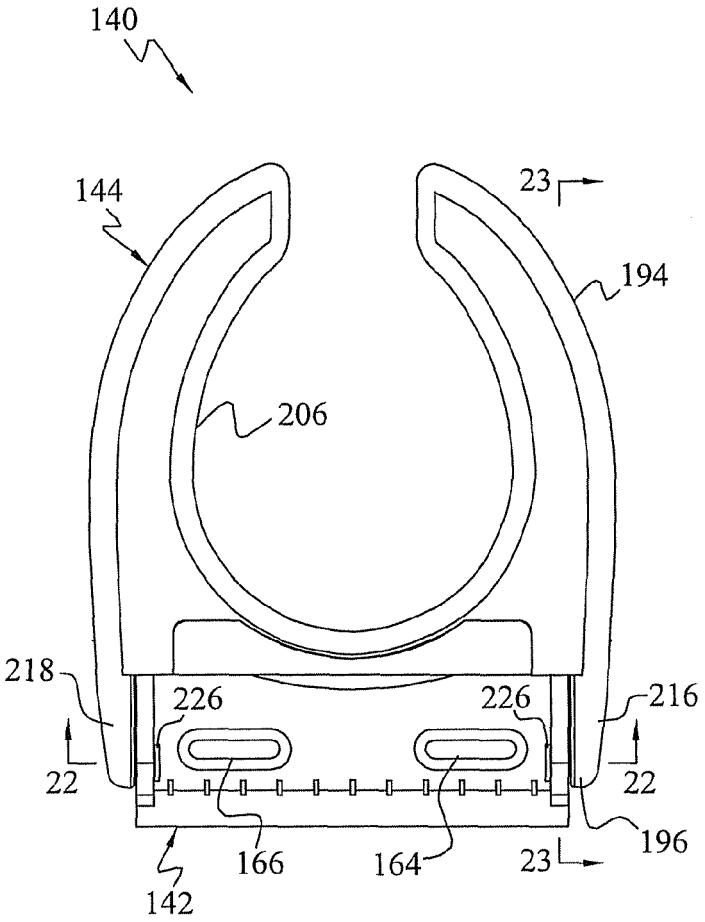

FIG. 21

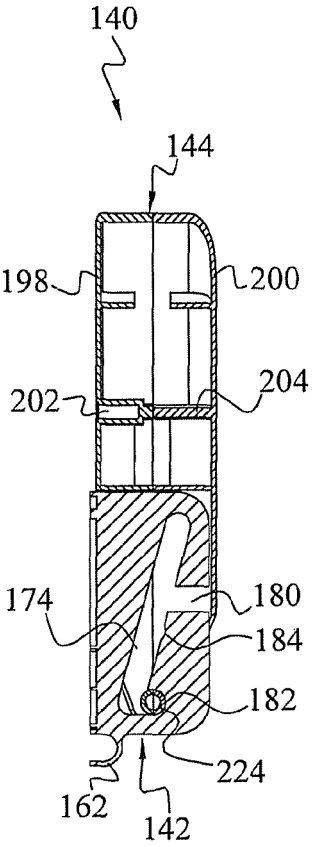

FIG. 23

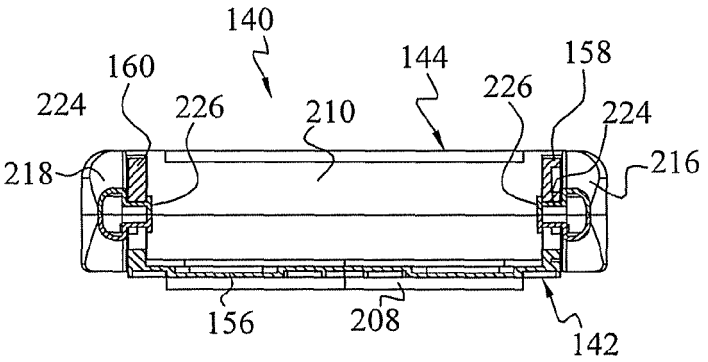

FIG. 22

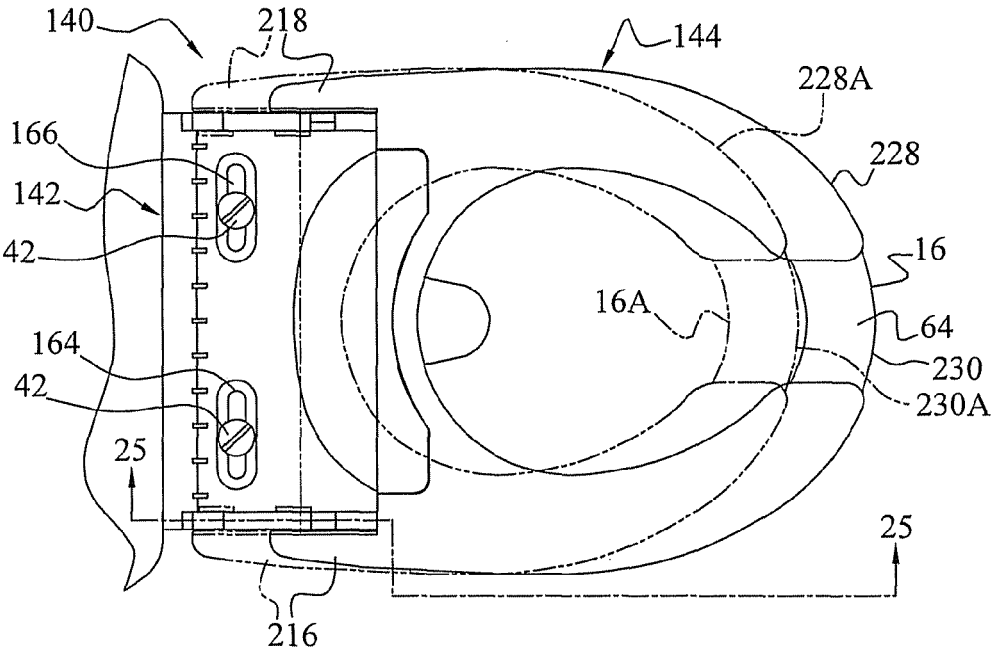
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FIG. 24

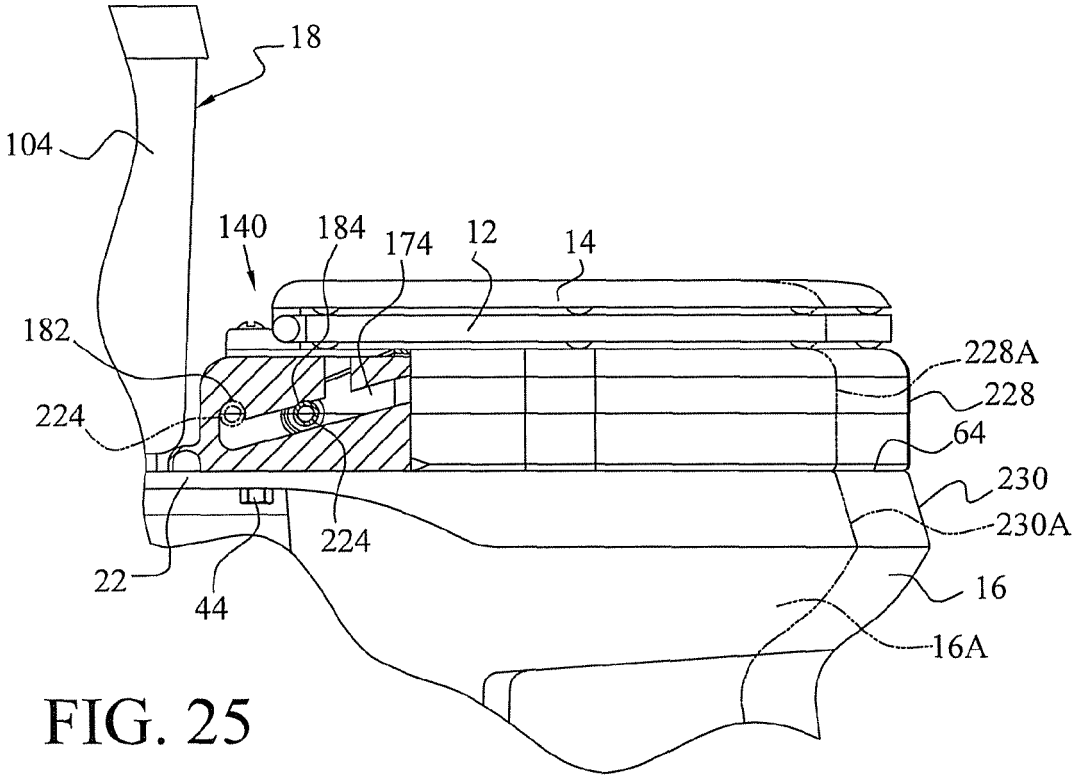
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FIG. 25

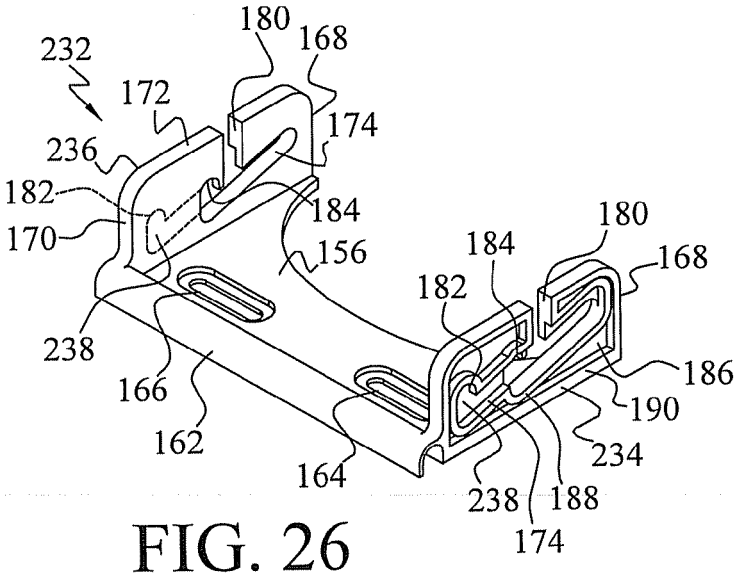

FIG. 26

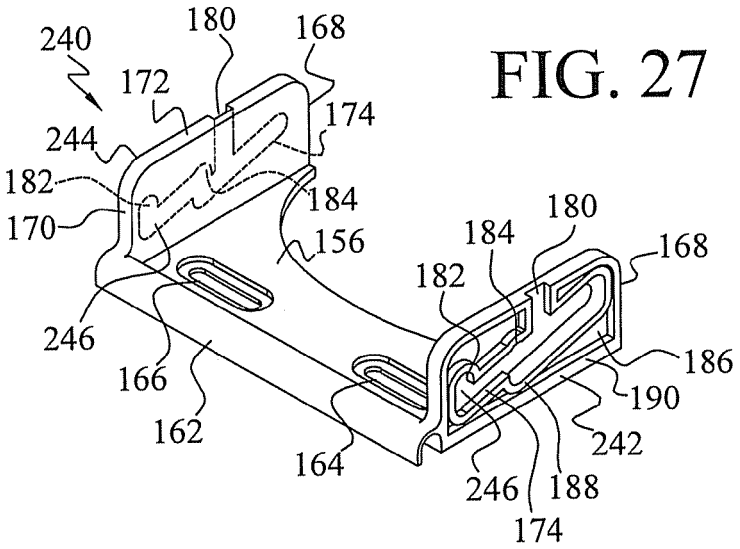

FIG. 27

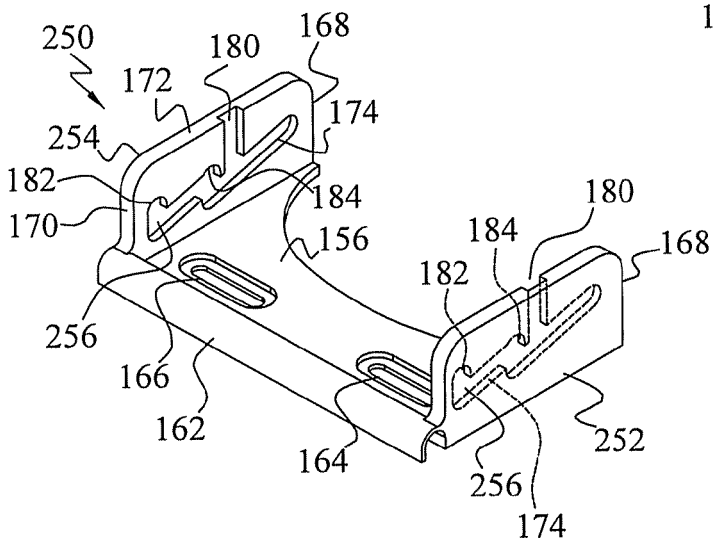

FIG. 28

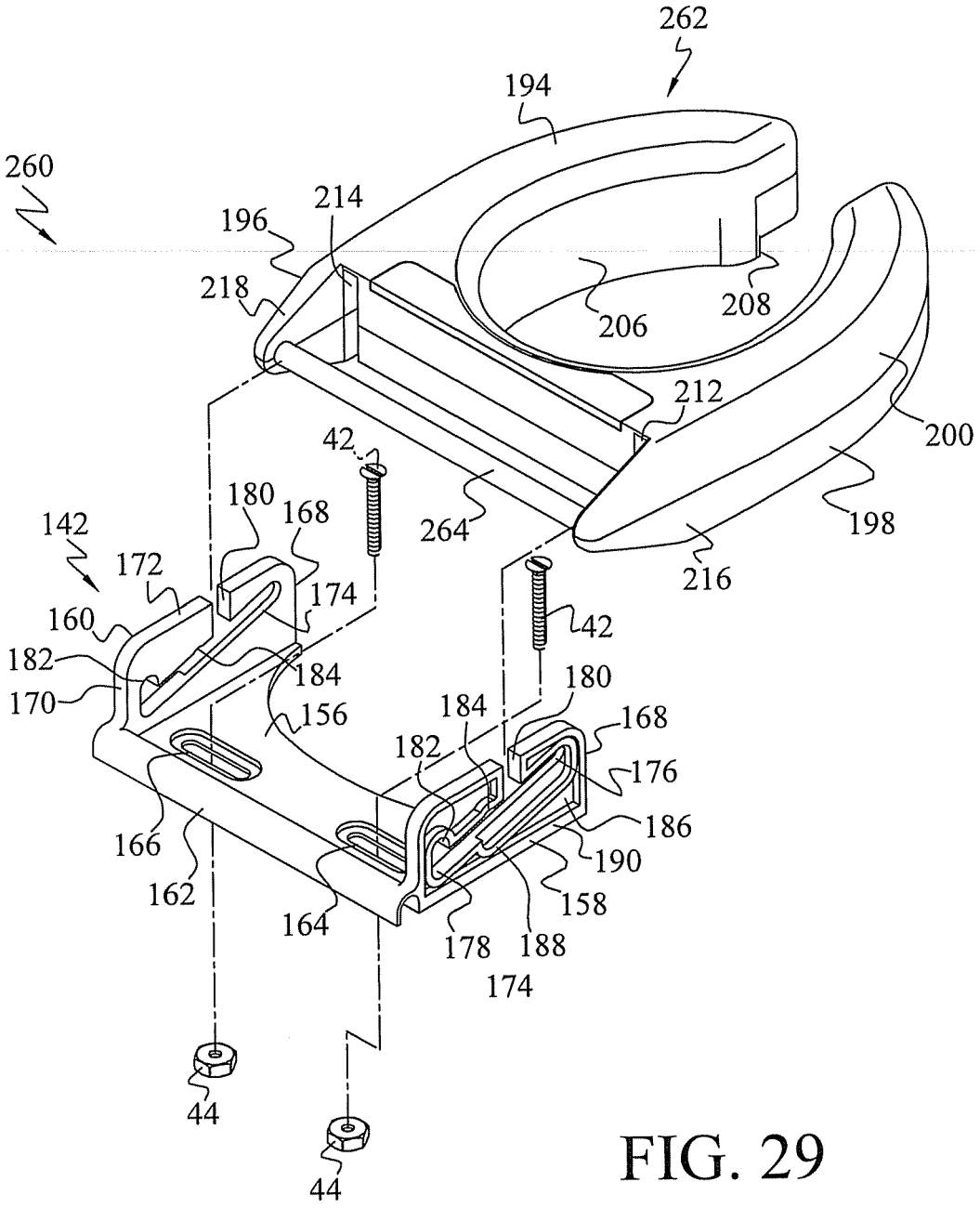
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FIG. 29