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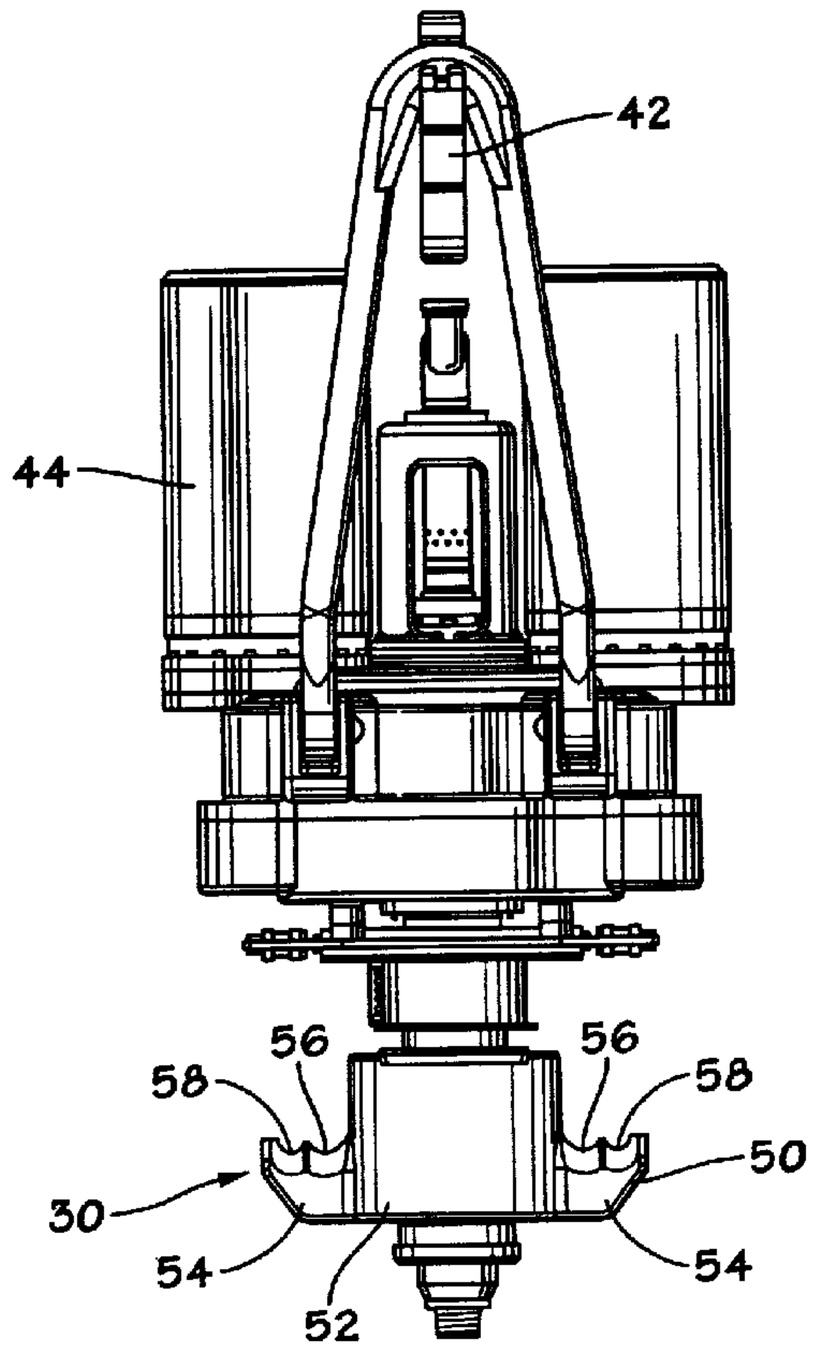

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An apparatus for use in wellbore operations, the apparatus comprising a main body (52) and at least one ear (54) projecting from the main body (52), said ear (54) for receiving a link, characterised in that said ear (54) has an inner ear support (56) near to the main body (52) and an outer ear support (58) spaced further away from the main body (52).

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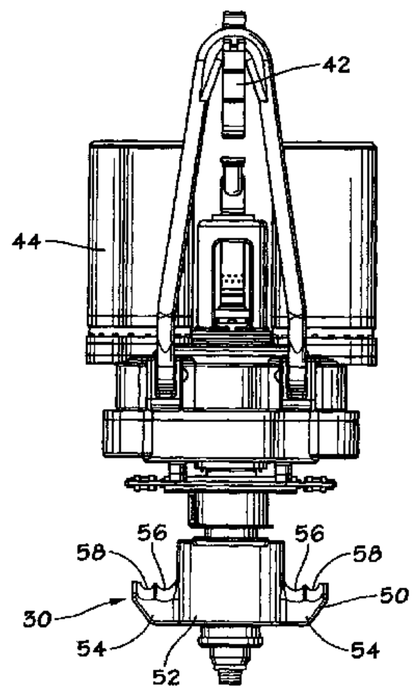

(57) **Abstract:** An apparatus for use in wellbore operations, the apparatus comprising a main body (52) and at least one ear (54) projecting from the main body (52), said ear (54) for receiving a link, characterised in that said ear (54) has an inner ear support (56) near to the main body (52) and an outer ear support (58) spaced further away from the main body (52).

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APPARATUS AND METHOD FOR USE IN SUSPENDING LOADS IN WELLBORE OPERATIONS

The present invention relates to apparatus and method for suspending loads, and particularly but not exclusively, to wellbore drilling apparatus supporting or depending from links or bails.

In the drilling of a borehole in the construction of an oil or gas well or geothermal well or fresh water well or the like, a drill bit is arranged on the end of a drill string, which is rotated to bore the borehole through a formation.

The apparatus of the present invention may be used with any item which supports or depends from links or bails, such as elevators, link adapters, hooks, block adapters and beckets.

A top drive apparatus for drilling bore holes, such as oil and gas wells, is one of two common types of apparatus for drilling bore holes, the other being a rotary table apparatus.

A drilling rig having a rotary table generally comprises a supporting derrick structure with a crown block at the top. A travelling block is movably suspended from the crown block by a cable, which is supplied by draw works. A hook or block adapter may be suspended from the travelling block on bails. A kelly is hung from the travelling block by a hook. The lower end of the kelly is secured to a drill string. The lower end of the drill string has a bottom hole assembly that carries a drill bit. The drill string and drill bit are disposed within a borehole that is being drilled and extends downwardly from the surface. The kelly is rotated within the borehole by the rotary table.

A top drive apparatus generally comprises a main

body which houses a motor for rotating a drive shaft which has a sub connectable to a single, stand or string of tubulars. The tubulars may be any of: drill pipe, casing, liner, premium tubular or any other such tubular used in the construction, maintenance and repair of wellbores, such as oil and gas wells. A top drive apparatus is generally arranged on a substantially vertical track on a derrick of a rig. The top drive apparatus is lifted and lowered on the track with a line over a crown block on a travelling block connected to the top drive apparatus via a hook or block adapter which may be suspended from the travelling block on bails. The line is reeled in and let out using a winch commonly known as a drawworks. The top drive apparatus can thus be used to trip tubulars in and out of the wellbore; turn the drill string to facilitate drilling the wellbore; and turn a single or stand of tubulars in relation to a string of tubulars hung in the wellbore to threadly connect or disconnect tubulars from a string of tubulars in the drill string to lengthen or shorten the string of tubulars. The top drive has a link adapter from which a pair of links depend. An elevator depends from links attached to the top drive to facilitate handling of tubulars and alignment with the sub for connection and disconnection therewith. A top drive apparatus may also be used in conjunction with a passive or active spider and/or with rotary tongs to facilitate connection and disconnection of tubulars from the string of tubulars.

The elevator may be a single joint elevator for handling single joints and stands of pipe or may be a main elevator which can also carry the entire weight of the string of pipe in the wellbore. Such an operation is sometimes referred to as "tripping in" for moving pipes

down into a borehole and "tripping out" for moving pipes up and out of a borehole. Each of these operations requires pipes to be moved around a drilling rig. Accordingly, there are many problems associated with the handling and logistics of pipe handling of a drilling rig especially in the interconnecting, disconnecting, and storing of pipes on an oil drilling platform without interrupting the drilling process. Generally, Both single joint elevators and main elevators are used in these operations.

Current systems for moving pipes on and around a drilling rig incorporate an elevator arranged on the end of a line hanging over a pulley wheel or travelling block hung from a derrick of the drilling rig. The other end of the line is wound round a winch. The elevator generally comprises a pair of hinged semicircular segments, a latch and a safety mechanism to ensure the latch is closed properly. Such an elevator is sold by BJVarco under the trade name “A-Series Elevators” and “Single Joint Elevator”. The pipe lays horizontally on a “catwalk” or on an inclined ramp or conveyor and is lifted manually clear of the surface on which it lays or the end of the pipe is exposed over a ledge. The segments of the elevator are closed about the body of the drill pipe and the latch is closed and the safety mechanism, usually a split pin is pushed into position to ensure the latch is properly closed and will not allow the latch to be opened until the split pin is removed. The elevator loosely fits around the body of the pipe such that the elevator can slide therealong until the elevator abuts an upset in the pipe or a collar threaded to an end of the pipe. Drill pipe comprises an upset known as a “box” in which a female threaded end is located, alternatively an end of

the pipe is threaded on to which is threaded a collar of larger outer diameter, which form a shoulder. The winch is activated to lift the elevator and the pipe hanging therefrom clear of the rig floor to facilitate movement of the pipe on and around the drilling rig. A roughneck is then able to swing the pipe to another location, usually for stabbing into a string of pipe already in the well or located in a mousehole. One particular use is to facilitate movement of the drill pipe from the pipe storage areas to the well centre and the storage area close to the well centre known as the "fingerboard". This method is used in tripping-in operations.

The prior art discloses a variety of apparatuses and items which have supports projecting out from a main body. In many instances these supports are referred to as "support ears" or "ears." The prior art also discloses a variety of support links which are used in conjunction with such supports. For example, and not by way of limitation, the following patents disclose structures with such supports and links used with them: 7,032,678; 6,725,938; 6,626,238; 6,494,273; 6,520,709; 6,073,699; 5,906,450; 5,755,289; 5,529,316; 4,605,077; 4,800,968; 4,753,300; 4,449,596; 4,421,447; 3,996,737; 3,777,046; 3,461,666; 1,842,638; 1,779,845; 1,756,376; 1,021,984; D 523,210; and D 523,451.

In accordance with the present invention, there is provided an apparatus for use in wellbore operations, the apparatus comprising a main body and at least one ear projecting from the main body, the ear for receiving a link, characterised in that the ear has an inner ear support near to the main body and an outer ear support spaced further away from the main body. Preferably, the main body has two ears. Each link may have an eye, which

is received by each ear of the apparatus of the present invention. The link may be a bail suitable for carrying the full load of a string of drill pipe or casing, which could be around 1250 tonnes or a link, or a link suitable for carrying 500 tonnes, 250 tonnes or simply stands of drill pipe and casing, which may only be capable of handling a few tonnes, which may be the case with single joint elevators depending from links supported by a link adapter. Generally, the heavier the load the link is designed to carry, the larger diameter the link and material forming the eyes. The links are usually cast in one piece.

Preferably, the inner ear support is able to support a greater weight than the outer ear support. Thus the inner ear support will be structurally stronger than the outer ear support and may have more structural material. Advantageously, the inner ear support is adjacent the main body. Preferably, the apparatus further comprises a further ear, the further ear spaced from the ear about the main body. Preferably, the ear and the further ear are spaced apart about the body by substantially 180 degrees. The apparatus of the present invention may provide more than two ears, but it is at present standard on drilling rigs to have a pair of ears for a pair links. Advantageously, the further ear comprises an inner ear support near to the main body and an outer ear support spaced further away from the main body.

Preferably, the ear is supported by a link. Such an apparatus may be a becket or link adapter from which links depend for the attachment of a further apparatus such as a top drive apparatus, a single joint elevator or main elevator. Preferably, the link comprises an elongate member with an eye at each end.

Advantageously, the ear supports a link. Such an apparatus may be a single joint elevator or main elevator.

Preferably, the inner and/or outer ear support comprises a saddle. Preferably, the saddle is a depression, recess or groove formed in or on a top and sides of the ear, most preferably suitable for receiving a link having a eye, the perimeter of material which has a cross-section suitable for being received by the depression. Preferably, the inner saddle is larger than the outer saddle. Advantageously, the outer saddle is arranged above the inner saddle. Preferably, such that a larger link would tend to move inwardly to the inner saddle and also less likely to move outward on to the outer ear support.

Preferably, the ear has a top surface extending from the outer ear support to the inner ear support to the main body, each top surface inclined upwardly from the main body to the outer ear support so that a link part on an ear tends to move down toward the main body.

Advantageously, the apparatus is any of a link adapter, a block adapter, an elevator, a becket, and a drilling hook.

Preferably, the inner and outer ear support supports have a ridge between the inner ear support and the outer ear support. Preferably, to inhibit movement of the link between the inner and outer ear supports. Advantageously, the apparatus further comprises maintenance apparatus to inhibit a link on the inner or outer ear support to move therefrom. Advantageously, the maintenance apparatus comprises a latch apparatus movably connected to in the ear to inhibit a link on the inner or outer ear support to move therefrom. Preferably, the latch apparatus spans

from the body to an outer most portion of the ear. Advantageously, the apparatus further comprises a lug projecting from the body above the ear, the latch apparatus spanning a gap between the lug and the ear to inhibit a link on the inner or outer ear support. Preferably, the latch apparatus comprises a body and a projection projecting from the body for abutment with a large link, the abutment preventing closure of the latch apparatus if part of the large link is on the outer ear support.

Preferably, the inner ear support can support a load of at least 1250 tons. Preferably, the inner ear support of the ear and the inner ear support of the further ear combined can support a load of at least 1250 tonnes.

Advantageously, the inner ear support can support at least 1000 tons, and each outer support area can support up to 750 tons. Preferably, the inner ear support of the ear and the inner ear support of the further ear combined can support a load of at least 1000 tonnes and the outer ear support of the ear and the outer ear support of the further ear combined can support a load of at least 750 tonnes.

Preferably, the inner ear support can support at least twice as much weight as the outer ear support. Advantageously, the ear can be used with links with different end eye opening sizes.

Advantageously, the ear is cast with the main body.

The present invention also provides a method for suspending loads in wellbore operations, the method comprising the steps of suspending an item from an apparatus as claimed in any preceding claim the method comprising the steps of selecting a link and placing the link on the inner ear support if the link is a large link

and placing the link on an outer ear support if the link is a small link.

Preferably, the method further comprises the step inhibiting a small link from moving into the inner ear support, preferably, using a maintenance apparatus, such as a latch apparatus. The latch apparatus may have a projection which inhibits the small link from moving into the inner ear support.

Advantageously, the method further comprises the step inhibiting a large link from moving into the outer ear support, preferably, using a maintenance apparatus, such as a latch apparatus. The latch apparatus may have a projection which inhibits the large link from moving into the outer ear support.

Preferably, the method further comprises the step of applying a load of about 1250 tons is applied to the inner ear support.

Preferably, the method further comprises the step of applying a load of about 750 tonnes to the outer ear support.

The present invention, in certain aspects, provides an apparatus with opposed support ears projecting out from a main body of an apparatus useful in wellbore operations, each ear having dual adjacent areas or saddles around which an end eye of a support link is positionable. The saddle areas are of different dimensions for receiving links with end eye openings of different size. Thus, in certain aspects, a single ear can accommodate end eye openings of links which have a range of eye opening sizes; for example in certain aspects an inner saddle accommodates links with relatively larger end eye openings (in one aspect which can support relatively larger weights) and also an outer

saddle that accommodates links with relatively smaller end eye openings (in one aspect which can support relatively smaller weights).

In certain aspects, in a dual saddle ear in accordance with the present invention with two adjacent saddles, a first saddle and a second saddle, the first saddle is relatively larger than the second saddle so that it can support a larger weight than can the second saddle, the first saddle adjacent a main body of an apparatus from which the ears project, the second saddle spaced-apart from the main body by the first saddle. In certain aspects the larger links are prevented from placement on a smaller saddle.

In certain aspects, the two saddles of a dual saddle ear in accordance with the present invention are configured and sized so that a relatively larger link for use with a first larger saddle area cannot be placed on a relatively smaller second saddle area. Also in certain aspects, an end eye opening of a relatively smaller link cannot fit around the relatively larger saddle. Grooves in the saddles, either completely around a saddle area or located only where they will receive part of a link, facilitate positioning of a link eye on a saddle; a saddle part that contacts a link, for example only a top of a saddle area has a groove.

In particular aspects, a relatively larger seat first saddle has a lip or projection which inhibits a link disposed in an adjacent relatively smaller second saddle from exiting the second saddle and moving into the first saddle so that correct positioning of the link is maintained for example during link movement in rotating on a saddle.

In certain aspects a movable member which

selectively closes off a space adjacent an ear's saddles (for example a latch, catch link or retainer bar) is sized and shaped so that it will not close when a larger link is on a smaller saddle which is not sized for the larger link. In certain aspects the movable member encloses a portion of a link that is on a saddle of a dual saddle ear in accordance with the present invention. The movable member provides for opening and closing an entry to the space adjacent the saddles of the dual saddle ear. In certain particular aspects the retainer bar is adjacent the outer saddle area of a dual saddle area ear. Such a retainer bar is of such a size and/or has structure thereon which prohibits a larger link from becoming positioned on the outer saddle area of a dual saddle area ear. Such a retainer bar will not close and shut when a larger link is on a smaller saddle area.

It is within the scope of the present invention for any ear disclosed herein in accordance with the present invention to be used on any apparatus used in any wellbore operation which has dual spaced-apart support projections or ears, including, but not limited to, on link adapters, block adapters, elevators, and drilling hooks.

The present invention discloses, in certain aspects, an apparatus for use in wellbore operations, the apparatus having: a main body; two support ears spaced-apart and projecting from the main body, the ears for supporting two support links and an item connected to the support link, each ear having an inner ear part adjacent the main body and an outer ear part spaced-apart from the main body; each inner ear part having an inner support area; each outer ear part having an outer support area; the inner support area able to support a weight greater

than can be supported by the outer support area; and each ear able to be used with a variety of support links of different end eye opening sizes. In such an apparatus each ear can have a top surface extending from the outer support area to the inner support area to the main body, each top surface inclined upwardly from the main body to the outer support area so that a link part on an ear tends to move down toward the main body. The apparatus can be, for example, any of a link adapter, a block adapter, an elevator, a becket, and a drilling hook.

In such apparatuses wherein each support area can have a grooved portion for receipt therein of part of an end eye opening of a support link. Maintenance apparatuses (for example spacer members) can be used for maintaining a support link on a desired support area; and/or each ear can have latch apparatus movably connected thereto for selective releasable connection to the main body for closing off a space adjacent a corresponding ear.

Accordingly, the present invention includes new and nonobvious features and advantages. Characteristics and advantages of the present invention described above and additional features and benefits will be readily apparent to those skilled in the art upon consideration of the following detailed description of preferred embodiments and referring to the accompanying drawings.

For a better understanding of the present invention, reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 shows schematically a drilling apparatus comprising a top drive apparatus in accordance with the present invention;

Figure 2 is a front view of the top drive apparatus shown in Figure 1 comprising a link adapter in accordance with the present invention;

Figure 3A is a front view showing a drilling hook in accordance with the present invention;

Figure 3B is a side view of the drilling hook shown in Figure 3A;

Figure 4A is a front view of a link adapter in accordance with the present invention;

Figure 4B is a perspective view of an ear of the link adapter shown in Figure 4A;

Figure 4C is a cross-section view of the ear shown in Figure 4B;

Figure 4D is a partial view of the ear shown in Figure 4B;

Figure 5 is a side view of a link adapter, in accordance with the present invention shown partly in cross-section;

Figure 6 is a side view of a link adapter in accordance with the present invention shown partly in cross-section;

Figure 7 is a side view of a link adapter in accordance with the present invention shown partly in cross-section;

Figure 8 is a front view of an elevator in accordance with the present invention;

Figure 9A is a front view of a top drive apparatus

comprising a block adapter in accordance with the present invention;

Figure 9B is a front view of the apparatus shown in Figure 9A;

Figure 9C is a view in cross-section of the block adapter shown in Figure 9A;

Figure 10 is a front view of an apparatus in accordance with the present invention;

Figure 10A is a front view of a spacer in accordance with the present invention;

Figure 10B is a side view of the spacer shown in Figure 10A;

Figure 10C is a front view of a spacer in accordance with the present invention;

Figure 10D is a side view of the spacer shown in Figure 10C;

Figure 11A is a perspective view of a link adapter in accordance with the present invention;

Figure 11B is a perspective view of the link adapter shown in Figure 11A;

Figure 11C is a top view of the link adapter shown in Figure 11A;

Figure 11D is a bottom view of the link adapter shown in Figure 11A;

Figure 11E is a partial view of part of the front of the link adapter shown in Figure 11A;

Figure 11F is a partial view of part of the front of the link adapter shown in Figure 11A; and

Figure 11G is a partial view of part of the front of the link adapter shown in Figure 11A.

Figure 1 illustrates an apparatus in accordance with the present invention which is structurally supported by a derrick 11. The apparatus 10 has a plurality of

components including: a swivel 13, a top drive 14 with a block adapter and/or link adapter in accordance with the present invention, a main shaft 16, a housing 17, a drill stem 18/drillstring 19 and a drill bit 20. The components are collectively suspended from a traveling block 12 that allows them to move upwardly and downwardly on rails 22 connected to the derrick 11 for guiding the vertical motion of the components. The main shaft 16 extends through the motor housing 17 and connects to the drill stem 18. The drill stem 18 is connected to one end of a series of tubular members collectively referred to as the drillstring 19. An opposite end of the drillstring 19 is connected to a drill bit 20 which produces an earth bore 21.

Figure 2 illustrates a top drive apparatus 30 having a link adapter 50 in accordance with the present invention. The top drive apparatus 30 comprises a top drive 44 suspended from a block adapter or becket 42.

The link adapter 50 is connected to the top drive 44. The link adapter 50 has a body 52 with opposed support ears 54 projecting from the body 52. Each ear 54 has an inner saddle 56 and an outer saddle 58. The inner saddles 56 are wider then the outer saddles 58.

Figures 3A and 3B illustrate a drilling hook 60 in accordance with the present invention which has a body 62 to which is rotatably connected a hook member 64. The hook member 64 has a hook saddle 66 for receiving an item to be releasably connected to the hook 60 and a movable latch 68 which selectively closes off an entry path to the hook saddle 66 (see open latch illustrated in dotted lines, Figure 3B). On the hook member 64 is a support 70 in accordance with the present invention which has a body with two spaced-apart support projections 74. Each

support projection 74 has dual saddles 76, 77, with the saddles 76 larger than the saddles 77. Movable latch members 78 (also called retainer bars or catch links) selectively close off entry pathways for the eyes of support links to be placed on one or the other of the saddles (dotted lines, Figure 3A, show a latch member 78 open).

Figures 4A to 4D show a link adapter 80 with dual opposed ears 81 projecting from a body 82. Each ear 81 has an inner ear part 85 with an inner saddle 86 and an outer ear part 87 with an outer saddle 89. A bore 82a goes through the adapter 80 and it has portions 83 with holes 83a for attachment to another item (for example a retainer bar or latch). The inner ear part is larger and more massive than the outer ear part.

As shown in Figure 4C a relatively larger link K has an eye that can rest in an inner saddle 86, but it cannot rest in an outer saddle 89. A link N can rest in either saddle (shown in an outer saddle 89). Top projections 84 have attachment holes 84a. An optional lip or ridge 88 (shown in Figures 4B, 4C) helps to maintain part of a link on a desired saddle, for example the ridge 88 can inhibit or prevent a smaller link from moving from an outer saddle 89 to an inner saddle 86, or a larger link from moving from an inner saddle to an outer saddle.

Figure 5 to 7 show the link adapter 80 in accordance with the present invention supporting various support links. As shown in Figure 5 an eye 83 of a 1250 ton link 84 is supported by an inner part 85 of an ear 81 with the eye of the link in an inner saddle 86 of the ear 81. In certain aspects, inner ear parts of an apparatus in accordance with the present invention can support at least 1250 tons.

Figure 6 shows an eye 91 of a 750 ton link 90 supported by an outer part 82 of an ear 81.

Figure 7 shows an eye 92 of a 500 ton link 94 supported by an outer part 85 of an ear 81. Neither the link 90 nor the link 94 can move onto the inner part.

Figure 8 shows an elevator 110 with a body 112 having a bore 114 therethrough. A latch apparatus 116 selectively provides opening for an entry passage for tubulars. Two opposed supports 120 project out from the body 112. Each support 120 has a space 122 selectively closed off by movable latches 124. Each support 120 has a first inner part 126 with an inner saddle 128 and a second outer part 127 with an outer saddle 129. The inner saddles 128 are larger than the outer saddles 129, as are the first inner parts compared to the second outer parts. Optionally each support 120 has an upper inner saddle 121 and an upper outer saddle 123. Any structure herein in accordance with the present invention for preventing a larger link from being placed on a smaller saddle may be used with the elevator 110 or with an apparatus A, Figure 10.

Figures 9A and 9B show a system 130 in accordance with the present invention with a top drive apparatus 134 suspended by links 136 from a block adapter (or "becket") 140. An eye of each link 136 is in an inner saddle 141 of an ear 142 of the adapter 140. Each ear 142 also has an outer saddle 143. Optionally a body of the adapter 140 has a cutout portion 145 to reduce weight. A link adapter 138 of the top drive apparatus 134 is shown with single saddle ears 139; but any dual saddle ear in accordance with the present invention may be used instead of the single saddle ears 139.

Figure 10 illustrates the applicability of two ears

with dual saddles to any suitable wellbore operations apparatus A shown schematically in Figure 10. The apparatus A has a body B from which extend opposed support projections P (or ears) each with dual saddle areas D and L. The saddle areas may be any saddle area in accordance with the present invention with or without grooves. Optionally (or instead of the dual opposed lower ears as shown), the apparatus A may have dual opposed upper ears in accordance with the present invention (any disclosed herein).

Figure 10 illustrates the applicability of two ears with dual support areas to any suitable wellbore operations apparatus A shown schematically in Figure 10. The apparatus A has a body B from which extend opposed support projections P each with dual support areas D and L. The areas D and L may be any saddle or area in accordance with the present invention. The apparatus A may have any latch or latches disclosed herein. The support projections P may have any groove or grooves disclosed herein. The mass of the areas D is such that the areas D will support a greater weight than the areas L which are of less mass than the areas D. The areas D have a greater cross-sectional area than the cross-sectional area of the areas L; thus a support link with an eye end opening sufficiently large to fit around and encompass an area D will also fit over an area L; but a support link with an end eye opening not large enough to encompass an area D will not be moveable around an area D and B, therefore prevented from being placed around an area D, while such an end eye opening is of sufficient size to fit around an area L. The top surfaces of the areas D and L may be substantially horizontal; or, as shown, these surfaces may be inclined upwardly from the

body B to an outer extremity of each projection P. This inclined surface, of sufficient inclination, insures that a relatively larger support link is moved by gravity down the inclined surface so that a relatively larger link will not remain in position on a support area L; thus insuring that a relatively larger load suspended from relatively larger support links is not imposed on the smaller support areas L. In certain particular aspects the support areas D are sized to support at least twice as much weight as the support areas L. In one particular aspect the support areas L are sized to support up to 500 tons or up to 750 tons while the support areas D are sized to support at least 1000 tons and in one aspect up to 1250 tons. The over all shape and the cross-sectional shape of the support areas D and L may be the shape of any known support ear or support projection or any shape disclosed herein.

In any embodiment of the present invention a spacer member may be used on either an inner support area (or inner saddle) or on an outer support area (or outer saddle) to occupy the space above the area (or saddle) to prevent an eye part of a support link from occupying the chosen area (see, for example Figures 11E, 11F). The size of the spacer member is chosen to occupy a chosen amount of the space above a support area or saddle so that a support link eye is positioned as desired on the support area or saddle. In one aspect using such a spacer member on ears or projections as in Figure 10 insures that a support link with an eye opening to be positioned in a support area L can be so positioned and maintained in place so that the link can pivot as desired about the support area L without moving down so far on a projection p that the link binds on the projection P and

cannot move as desired. In other aspects a spacer member is releasably emplaced on an outer support area or saddle so that a relatively larger link is maintained in positioned on an inner support area or saddle.

Figures 10A and 10B show a spacer member SM in accordance with the present invention which has a body BY and a throat opening TO. The throat opening TO is placed adjacent a support area or saddle of an ear or projection and then the spacer member SM is moved onto the ear or projection and is held in place there by gravity.

Optionally, a throat opening of a spacer member in accordance with the present invention may have a movable closure or latch so that once a spacer member is in place on a support area or saddle, the latch or closure is closed so that the spacer member cannot fall off. Any suitable latch or closure member may be used. In one aspect a spacer member SR, Figures 10C and 10D, has a throat opening TH and a movable latch ML pivotably pinned at one end to the spacer member SR with a pin PN and releasably held to the opposite end of the spacer member SR with a removable pin PI. A spacer member or members, any in accordance with the present invention, may be used with any apparatus in accordance with the present invention; for example, but not limited to, those of Figures 2 to 11G. A spacer member or members may be used to insure that each of two links is maintained in position either both on inner support areas or saddles or both on outer support areas or saddles - for example to insure that whatever is supported by support links is maintained in balance; or to insure that a single link is maintained on a desired support area or saddle.

Figures 11A to 11G show a link adapter 200 in accordance with the present invention with dual saddle

ears 210, 220 in accordance with the present invention. The ears 210, 220 may be used on any wellbore operations device or apparatus which supports or is supported by links.

The link adapter 200 has a body 202 with a central bore 204 therethrough from top to bottom. Latches 206 pivotably connected to latch holders 207 of the ears are releasably connectible to latch holders 209 on the body to selectively enclose eyes of links supported by the ears 210, 220.

The ear 210 has dual saddles 212, 214 and the ear 220 has dual saddles 222, 224. A ridge 213 is formed between the saddles 212, 214 with the ridge 213 rising up from grooves 215, 217 in the saddles 212, 214, respectively. A ridge 223 is formed between the saddles 222, 224 with the ridge 223 rising up from grooves 225, 227 in the saddles 222, 224, respectively. As with any ridge between saddles or support areas, the ridges 213, 223 help to maintain part of a link on a desired saddle or support area.

Figure 11E shows part of an eye of a link 230 in the saddle 212 with the latch 206 closed. The latch 206 pivots on a pin 201 and is held to the latch holders 209 with a removable pin 203. A hole 215 facilitates movement of the latch 206. A projection 217 of the latch 206 does not contact the link 230.

Figure 11F shows part of an eye of a link 232 on the saddle 214 with the latch 206 closed. A recess 219 in the latch 206 accommodates the top of the link 232.

As shown in Figure 11G, with the link 230 on the saddle 214, the projection 217 of the latch 206 contacts the top of the link 230 and prevents the latch 206 from closing (the pin 203 cannot be inserted through holes 236

in the latch 206 and into the holes 239 of the latch holders 209). A latch or latches 206 may be used on any apparatus in accordance with the present invention and on any embodiment in any of the drawing figures.

As shown in Figure 11F with or instead of a latch 206 with a projection 217, a spacer member SP (shown in dotted lines) may be used, releasably installed on the saddle 212 to prevent the link 232 from moving onto the saddle 212. Also as illustrated by the spacer member SC (shown in dotted lines, Figure 11E) may be used with or instead of the latch 206 to prevent the link 230 from moving onto the saddle 214.

The present invention, therefore, provides in some, but not in necessarily all, embodiments an apparatus for use in wellbore operations, the apparatus including: a main body; two ears spaced-apart and projecting from the main body, each of said ears for supporting a support link and an item connected to the support link, each ear having an inner ear part adjacent the main body and an outer ear part spaced-apart from the main body; each inner ear part having an inner support area; each outer ear part having an outer support area; and the inner support area able to support a weight greater than can be supported by the outer support area. Such a system may have one or some, in any possible combination, of the following: each ear having a top surface extending from the outer support area to the inner support area to the main body, each top surface inclined upwardly from the main body to the outer support area so that a link part on an ear tends to move down toward the main body; wherein the apparatus is any of a link adapter, a block adapter, an elevator, a becket, and a drilling hook; wherein each support area has a grooved portion for

receipt therein of part of an end eye opening of a support link; maintenance apparatus for maintaining a support link on a support area; each ear having latch apparatus movably connected thereto for selective releasable connection to the main body for closing off a space adjacent a corresponding ear; each latch apparatus including a body and a projection projecting from the body for abutment with a large link, said abutment preventing closure of the latch apparatus if part of the large link is on an outer support area; a ridge between the inner ear part and the outer ear part, the ridge inhibiting movement of a link end eye opening over the ridge; wherein the apparatus is a link adapter, and wherein the main body is a link adapter body, the link adapter body has a top and a bottom, the link adapter body has a central bore therethrough from top to bottom, and each inner ear part larger than each outer ear part; wherein each inner support area part can support at least 1250 tons; wherein each inner support area can support at least 1000 tons, and each outer support area can support up to 500 tons or up to 750 tons; each inner support area can support at least twice as much weight as each outer support area; and/or wherein each ear can be used with links with different end eye opening sizes.

The present invention, therefore, provides in some, but not in necessarily all, embodiments a method for supporting an item useful in wellbore operations, the method including connecting the items to a support apparatus with support links, suspending the item below the support apparatus using the support links, the support apparatus having: a main body, two ears spaced-apart and projecting from the main body, each of said ears for supporting one of the support links and the item

connected to the support links, each ear having an inner ear part and an outer ear part, each inner ear part having an inner support area, each outer ear part having an outer support area, and the inner support area able to support a weight greater than can be supported by the outer support area. Such a system may have one or some, in any possible combination, of the following: each support link having a top end eye opening, each top end eye opening on an inner part of one of the two ears, the method further including preventing each top end eye opening from moving onto an outer ear part; maintaining with maintenance apparatus the support links in place with respect to the inner ear parts and the outer ear parts; wherein the support apparatus includes each ear having latch apparatus movably connected thereto for selective releasable connection to the main body for closing off a space adjacent a corresponding ear and the method further including closing each latch apparatus with each top end eye opening on an inner ear part; wherein each latch apparatus has a projection for abutment against a link part with the top end eye opening, said abutment prohibiting closure of the latch apparatus if the link part is on the outer part of an ear; and/or wherein each inner support area can support at least 1250 tons and each outer support area can support up to 500 tons or up to 750 tons.

CLAIMS:

1. An apparatus for use in suspending loads in wellbore operations, the apparatus comprising a main body (52) and at least one ear (54) projecting from the main body (52), said ear (54) for receiving a link, characterised in that said ear (54) has an inner ear link support (56) near to the main body (52) and an outer ear link support (58) spaced further away from the main body (52), the inner ear link support (56) configured for receiving a link in supporting a loaded elevator and the outer ear link support (58) configured for receiving a link in supporting a loaded elevator.

2. The apparatus as claimed in Claim 1, wherein said inner ear link support (56) is able to support a greater weight than the outer ear link support (58).

3. The apparatus as claimed in Claim 1 or 2, wherein said inner ear link support (56) is adjacent said main body.

4. The apparatus as claimed in Claim 1, 2 or 3, further comprising a further ear, said further ear spaced from said ear (54) about said main body (52).

5. The apparatus as claimed in any one of Claims 1 to 4, wherein said further ear comprises an inner ear link support (56) near to the main body (52) and an outer ear link support (58) spaced further away from the main body (52).

6. The apparatus as claimed in any one of Claims 1 to 5, wherein said ear (54) is supported by a link.

7. The apparatus as claimed in any one of Claims 1 to 5,

wherein said ear (54) supports a link.

8. The apparatus as claimed in any one of Claims 1 to 7, wherein said inner ear link support (56) comprises a saddle.

9. The apparatus as claimed in any one of Claims 1 to 8, wherein the outer ear link support (58) comprises a saddle.

10. The apparatus as claimed in any one of Claims 1 to 7, wherein said inner ear link support (56) comprises an inner saddle and said outer ear link support (58) comprises an outer saddle.

11. The apparatus as claimed in claim 10, wherein the inner saddle is larger than the outer saddle.

12. The apparatus as claimed in any one of Claims 1 to 11, wherein the outer ear link support (58) is arranged above the inner ear link support (56).

13. The apparatus as claimed in any one of Claims 1 to 12, wherein each ear has a top surface (86,89) extending from the outer ear link support (87) to the inner ear link support (85) to the main body (582), each top surface (86,89) inclined upwardly from the main body (82) to the outer ear link support so that a link part on an ear tends to move down toward the main body (82).

14. The apparatus as claimed in any one of Claims 1 to 13, wherein the apparatus is any of a link adapter, a block adapter, an elevator, a becket, and a drilling hook.

15. The apparatus as claimed in any one of Claims 1 to

14, wherein said inner and outer ear link support supports have a ridge (88) between the inner ear link support (85) and the outer ear link support (89).

16. The apparatus as claimed in any one of Claims 1 to 15, further comprising maintenance apparatus (124,206) to inhibit a link on said inner or outer ear link support (212,214) from moving therefrom.

17. The apparatus as claimed in Claim 16, wherein said maintenance apparatus comprises a latch apparatus (206) movably connected to inhibit a link on said inner or outer ear link support (212,214) from moving therefrom.

18. The apparatus as claimed in Claim 17, further comprising latch apparatus (206) having a body and a projection (217) projecting from the body for abutment with a large link, said abutment preventing closure of the latch apparatus if part of the large link is on said outer ear link support (214).

19. The apparatus as claimed in any one of Claims 1 to 18, wherein each inner ear link support (56) supporting a load of at least 1250 tons.

20. The apparatus as claimed in any one of Claims 1 to 19, wherein said inner ear link support supporting a load of at least 1000 tons.

21. The apparatus as claimed in any one of Claims 1 to 20, wherein each outer ear link support supporting up to 750 tons.

22. The apparatus as claimed in any one of Claims 1 to 21, wherein said ear can be used with links with different

end eye opening sizes.

23. The apparatus as claimed in any one of Claims 1 to 22, wherein said ear is cast with said main body.

24. A method for use in suspending loads in wellbore operations, the method comprising the steps of suspending an item from an apparatus as claimed in any one of claims 1 to 23, the method comprising the steps of selecting a link and placing the link on the inner ear link support if the link is a large link and placing the link on the outer ear link support if the link is a small link.

25. The method in accordance with Claim 24, further comprising the step of inhibiting a small link from moving into the inner ear link support.

26. The method in accordance with Claim 24 or 25, further comprising the step inhibiting a large link from moving into the outer ear link support.

27. The method in accordance with any one of Claims 24 to 26, further comprising the step of applying a load of at least 1250 tons to the inner ear link support.

28. The method in accordance with any one of Claims 24 to 26, further comprising the step of applying a load of at least 1250 tons to the outer ear link support.

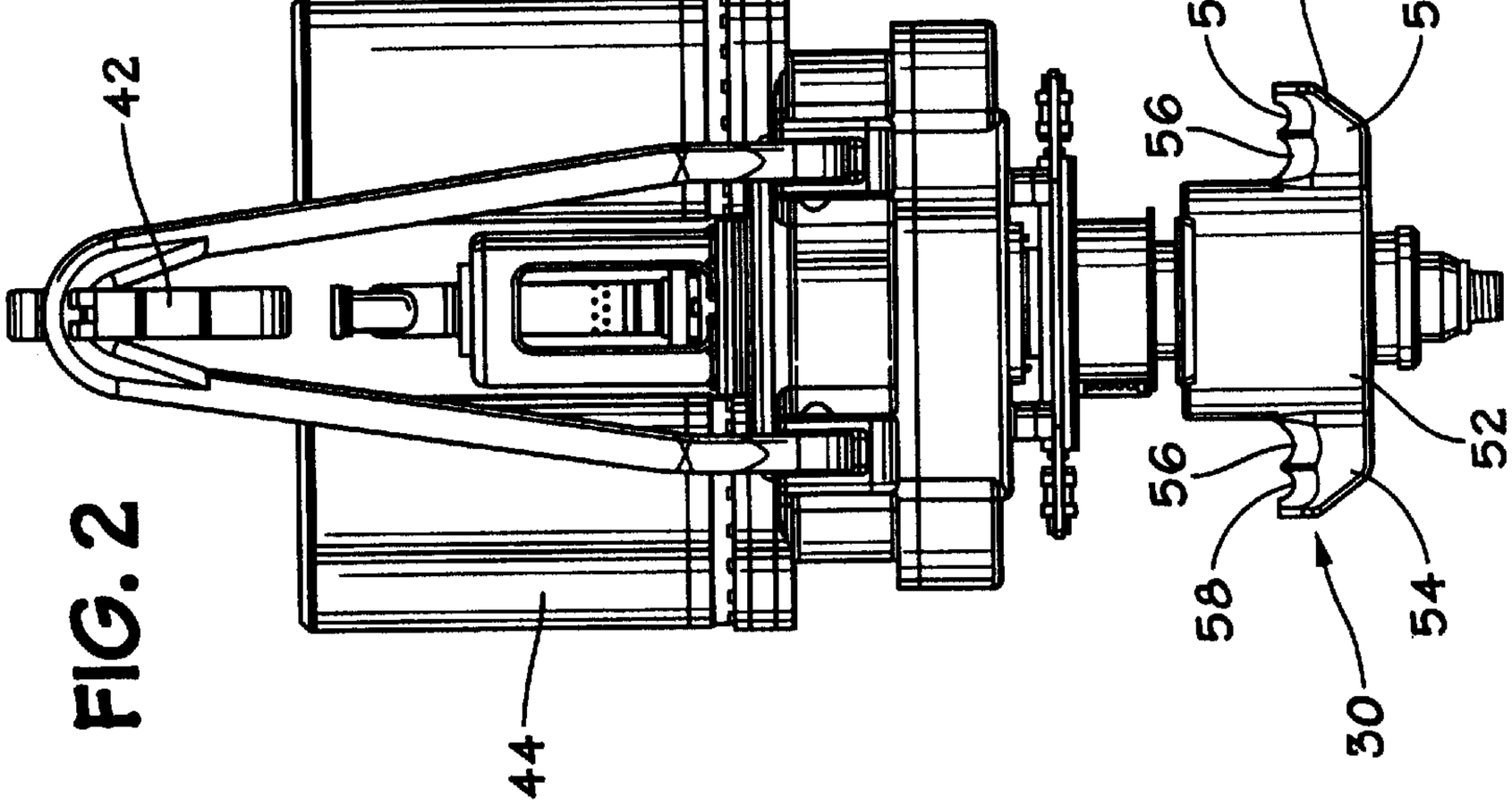

FIG. 2

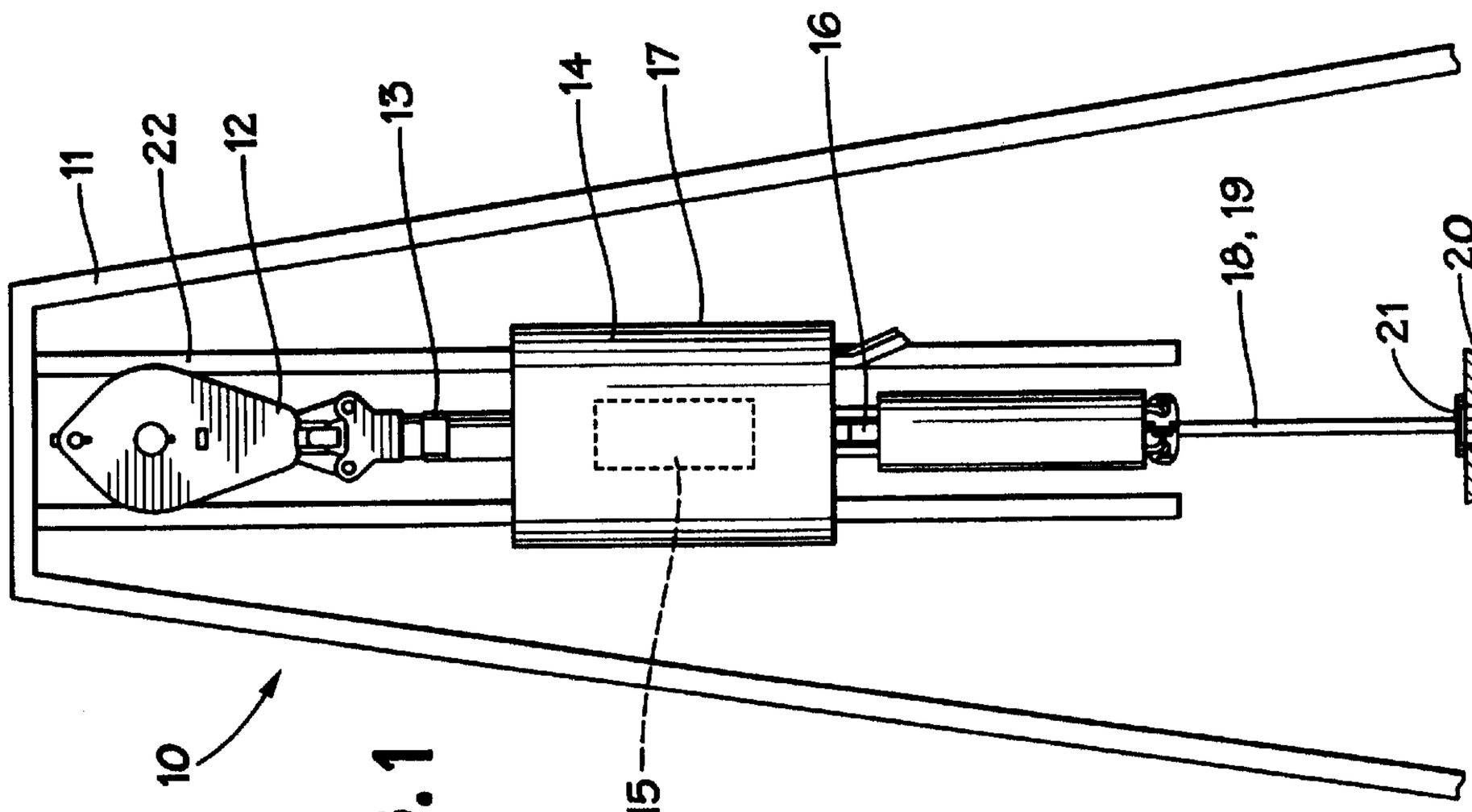

FIG. 1

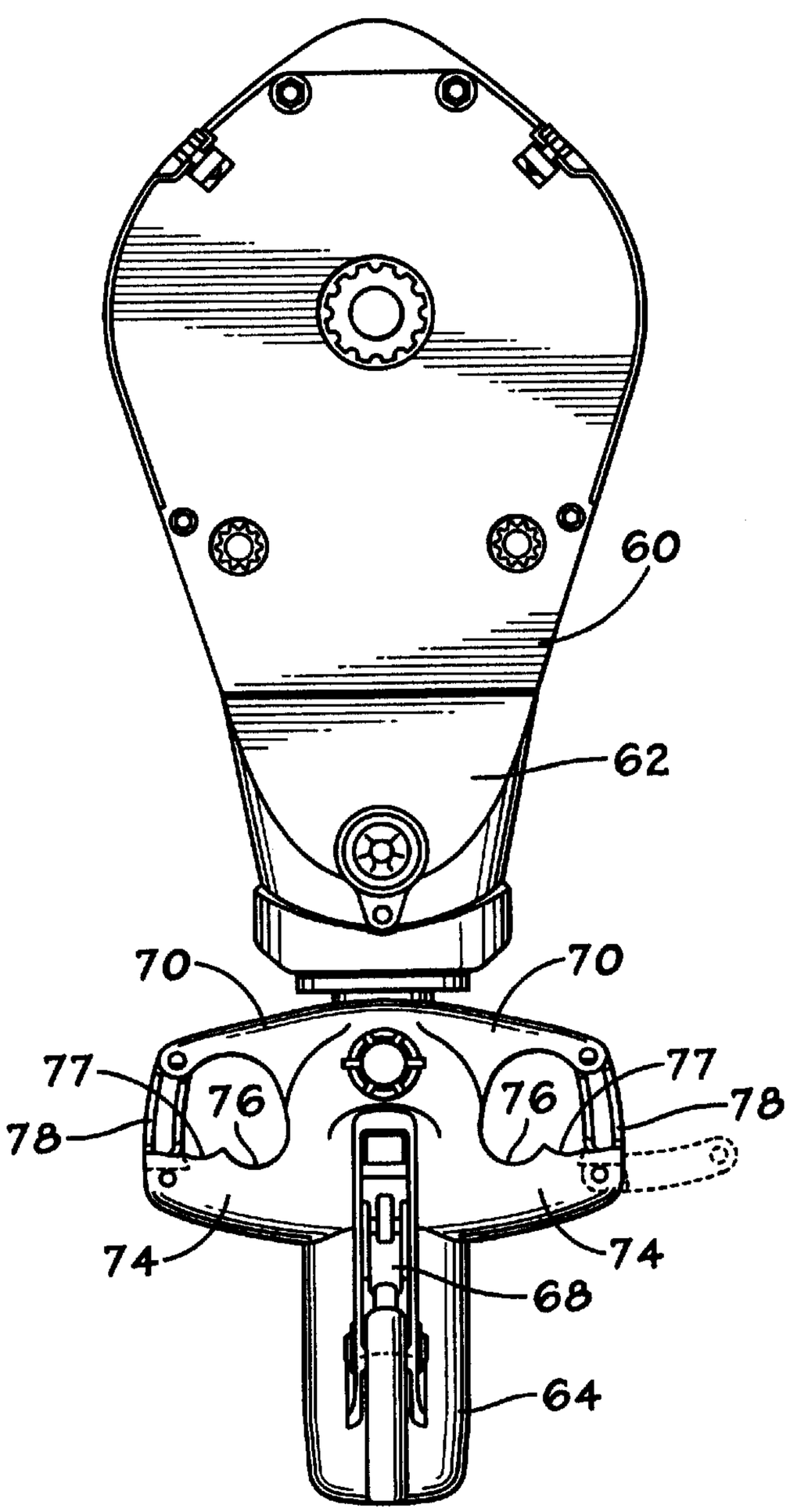

FIG. 3A

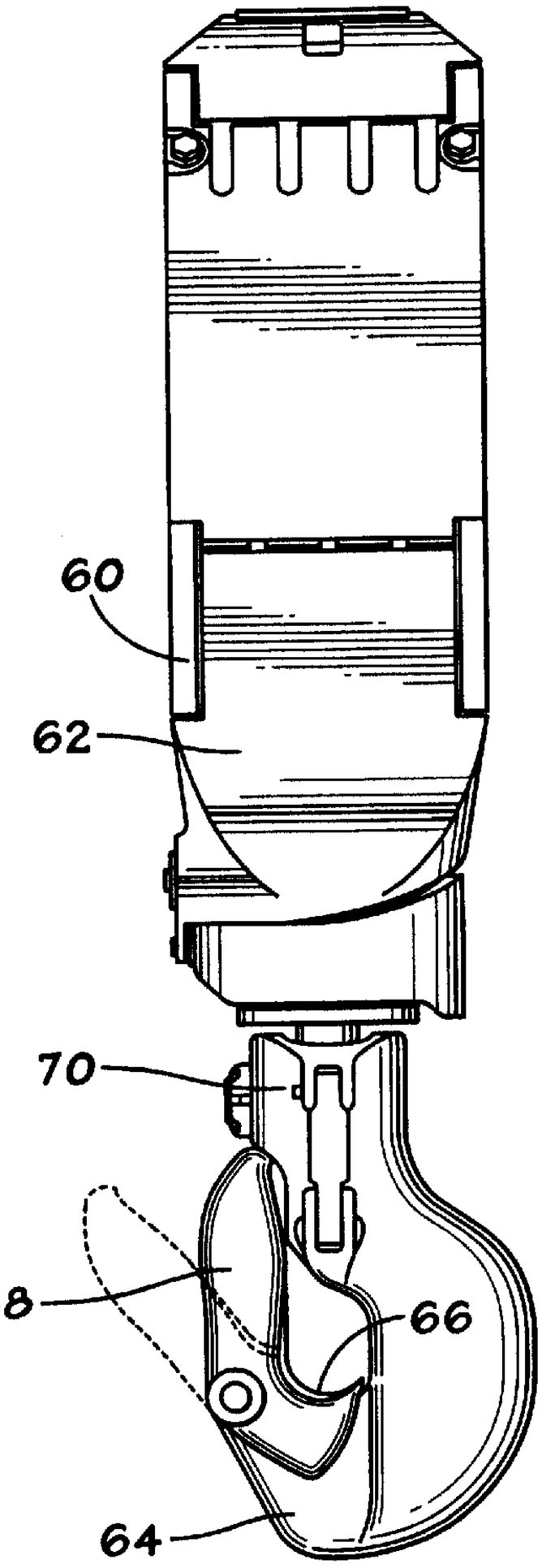

FIG. 3B

FIG. 4A

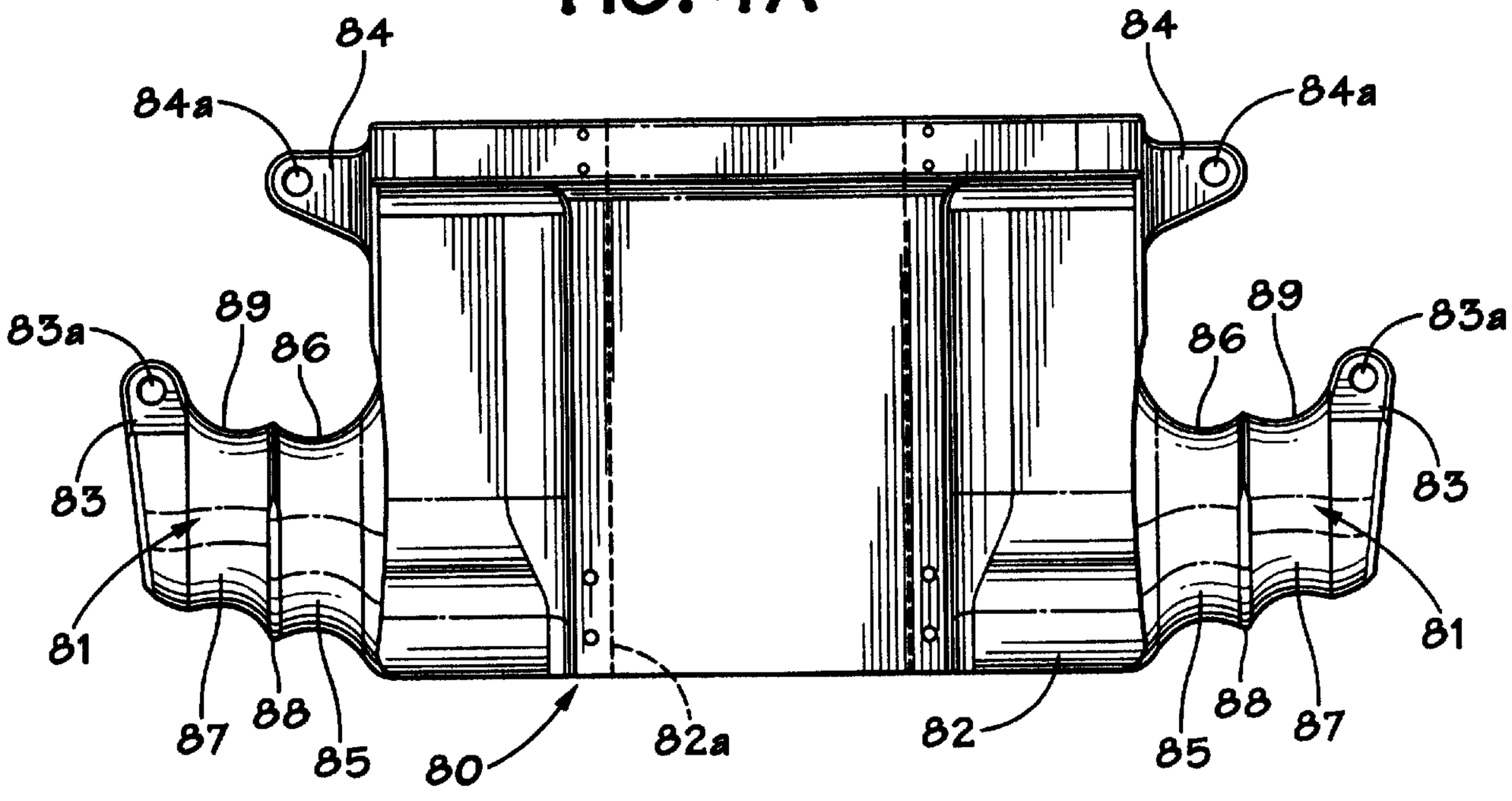
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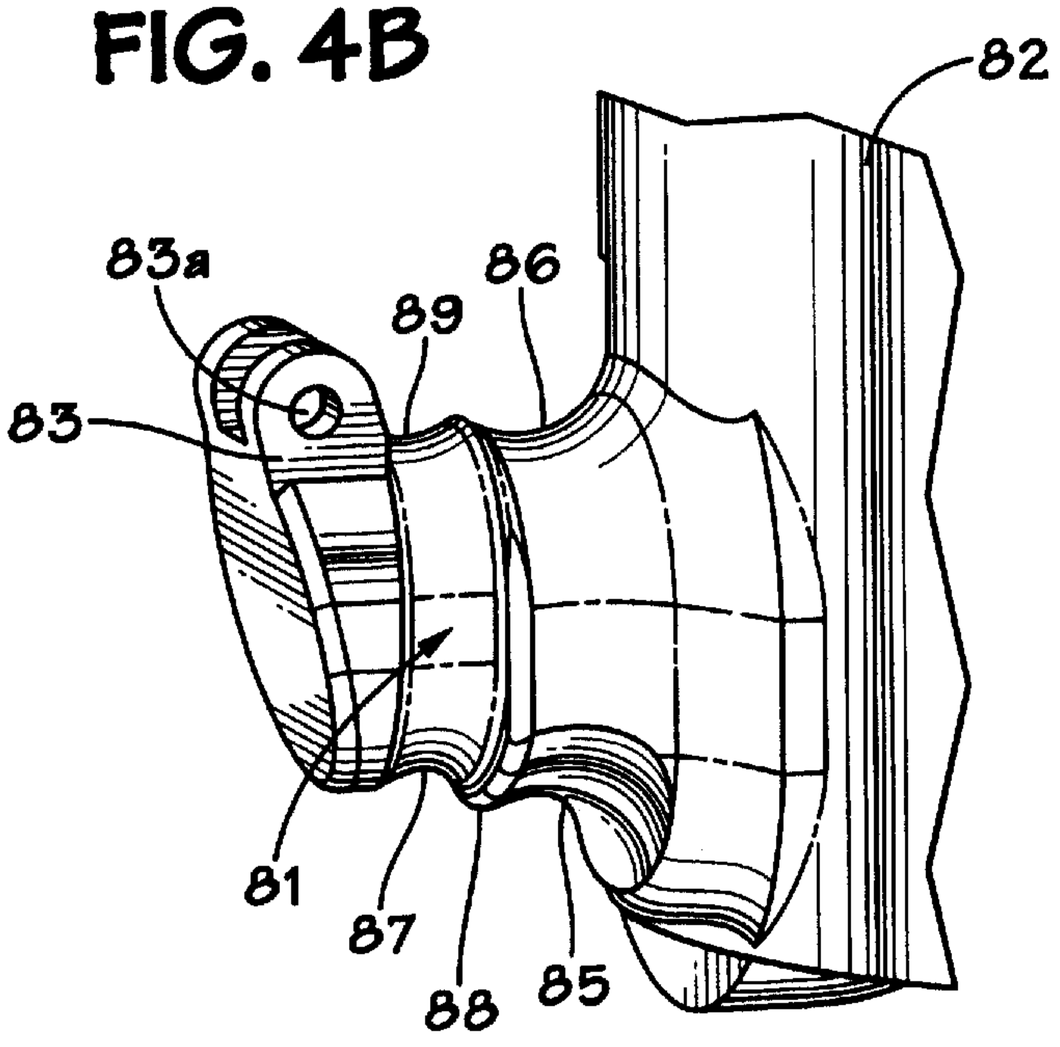
FIG. 4B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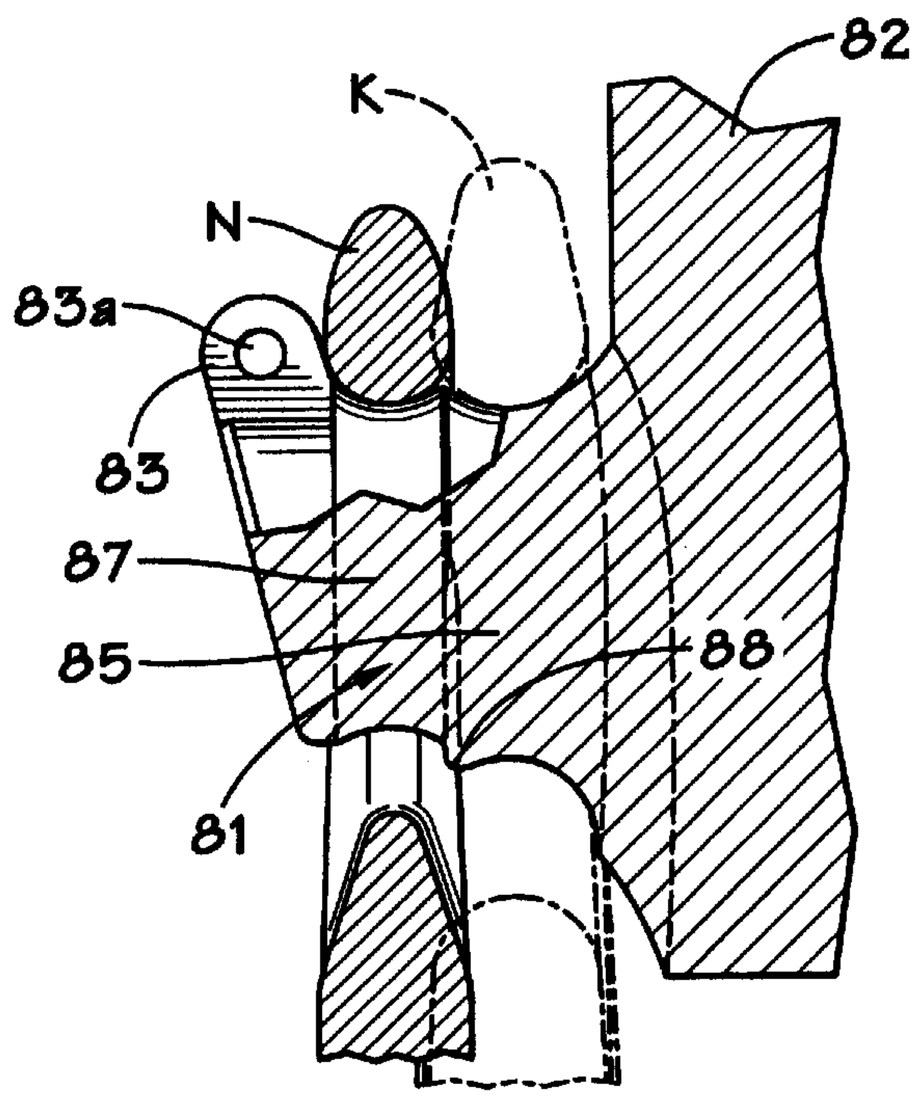

FIG. 4C

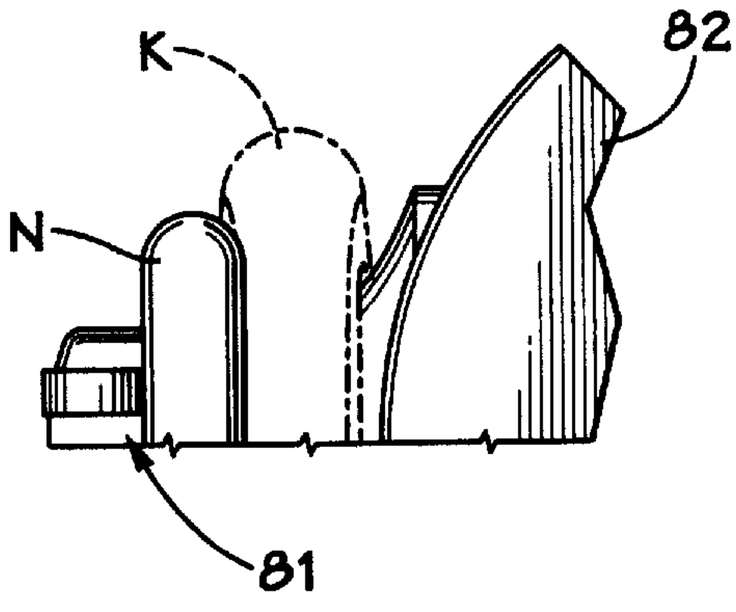

FIG. 4D

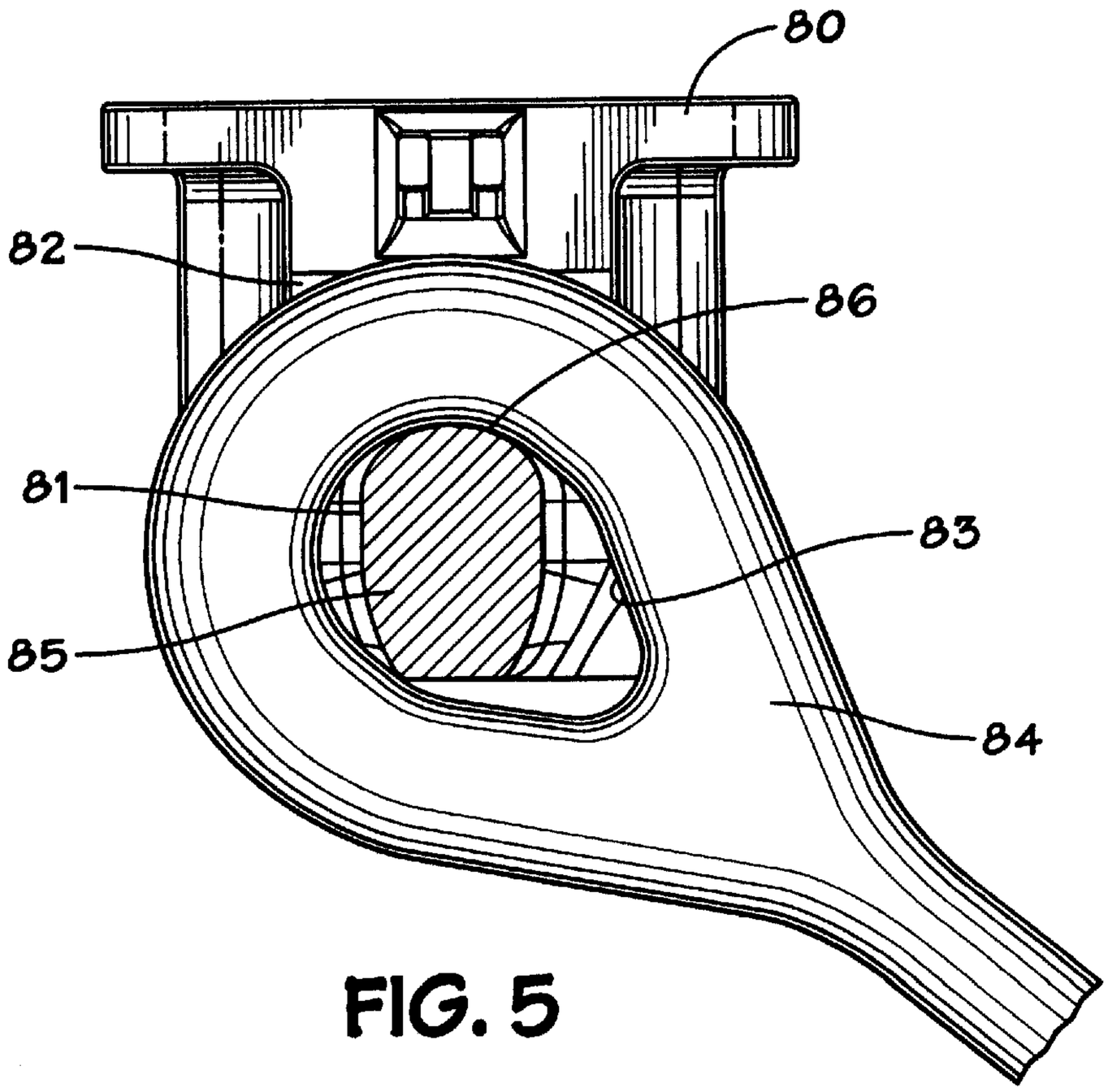

FIG. 5

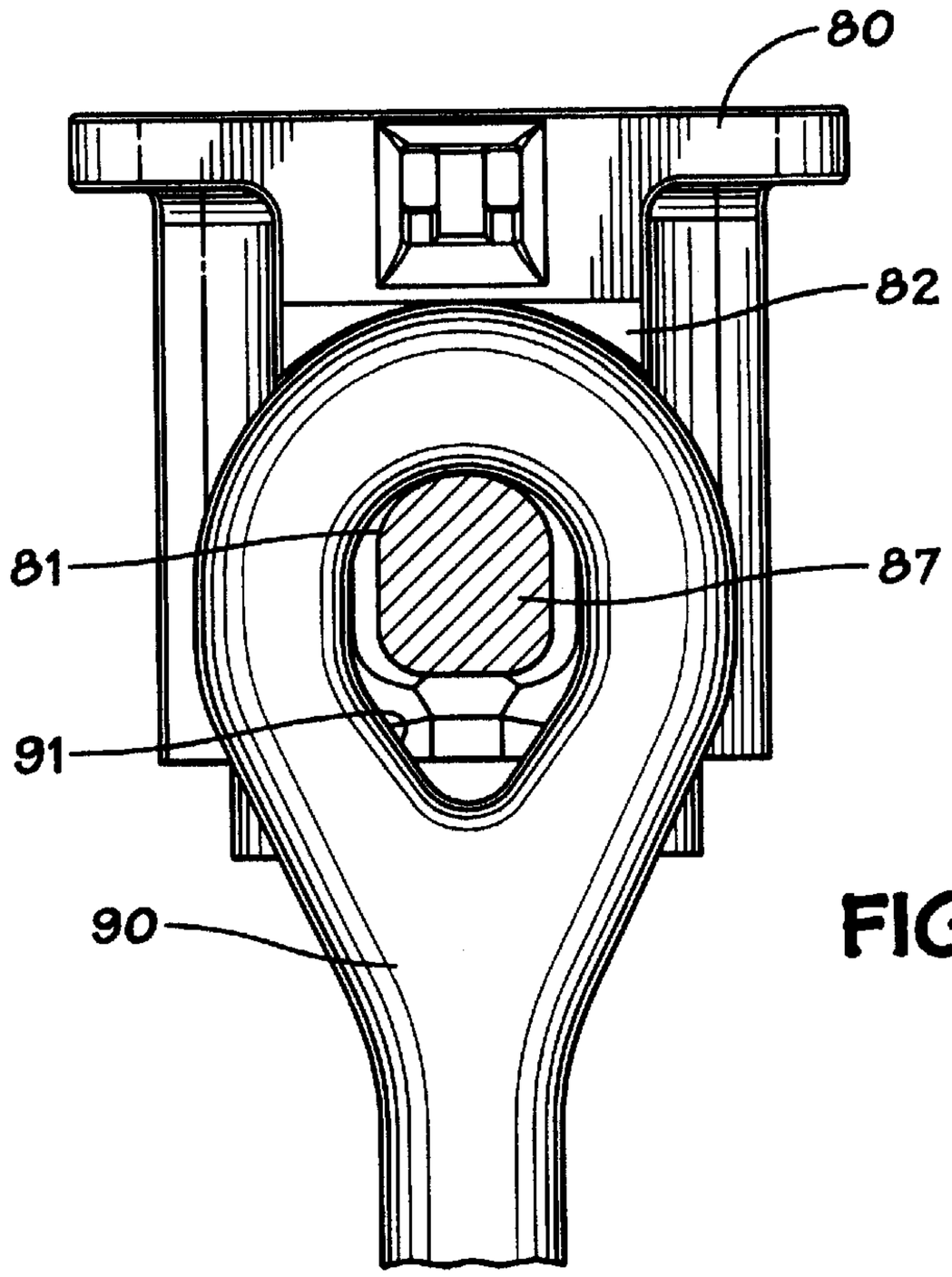

FIG. 6

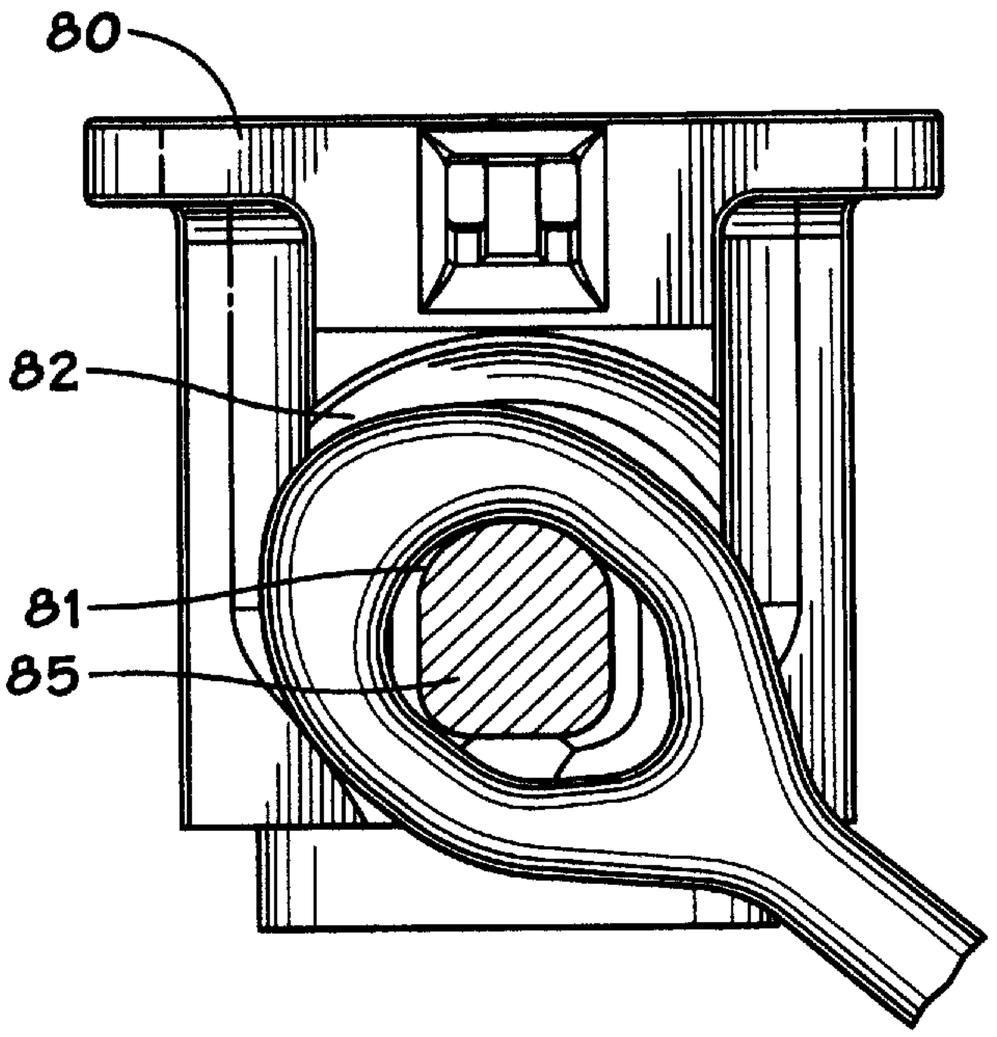

FIG. 7

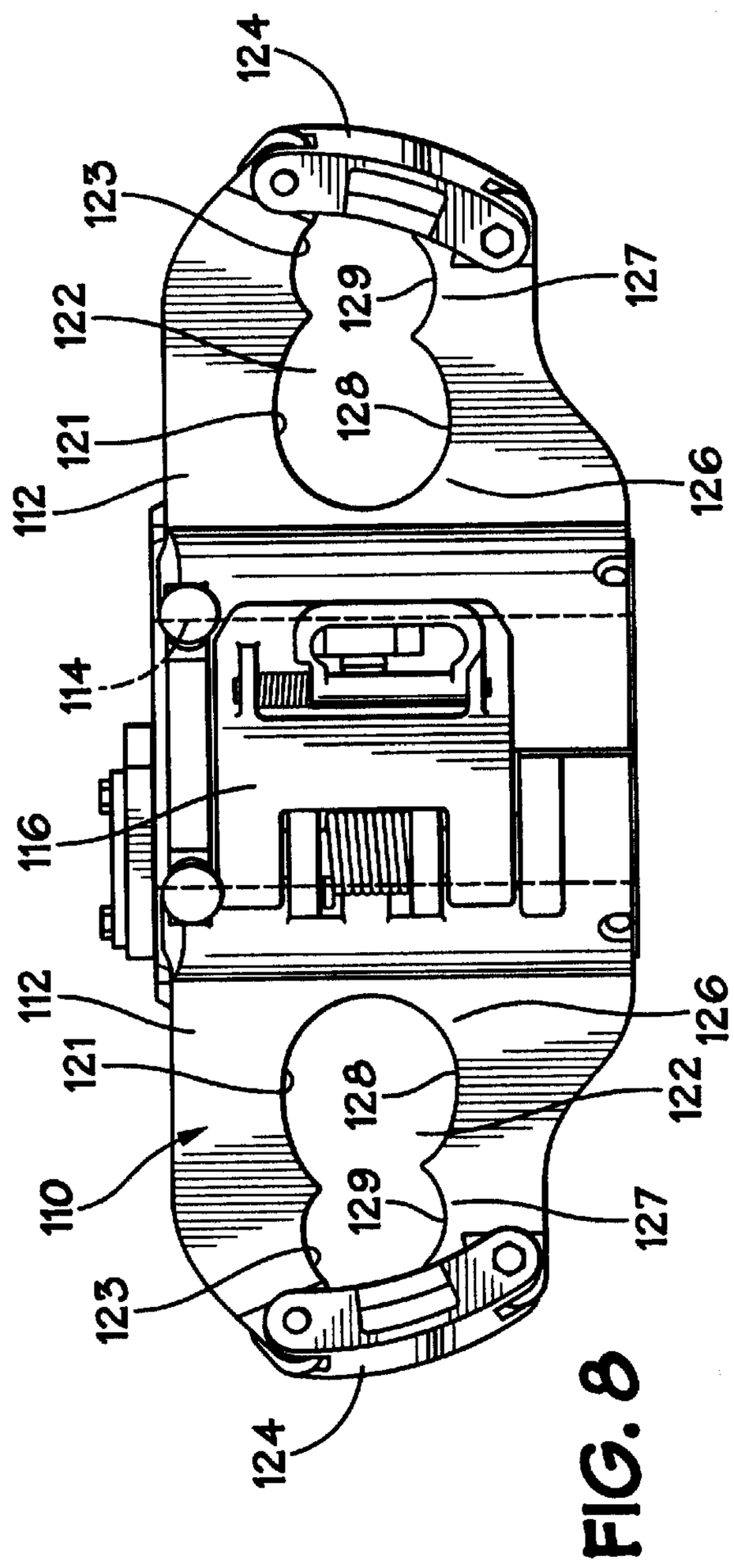
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FIG. 8

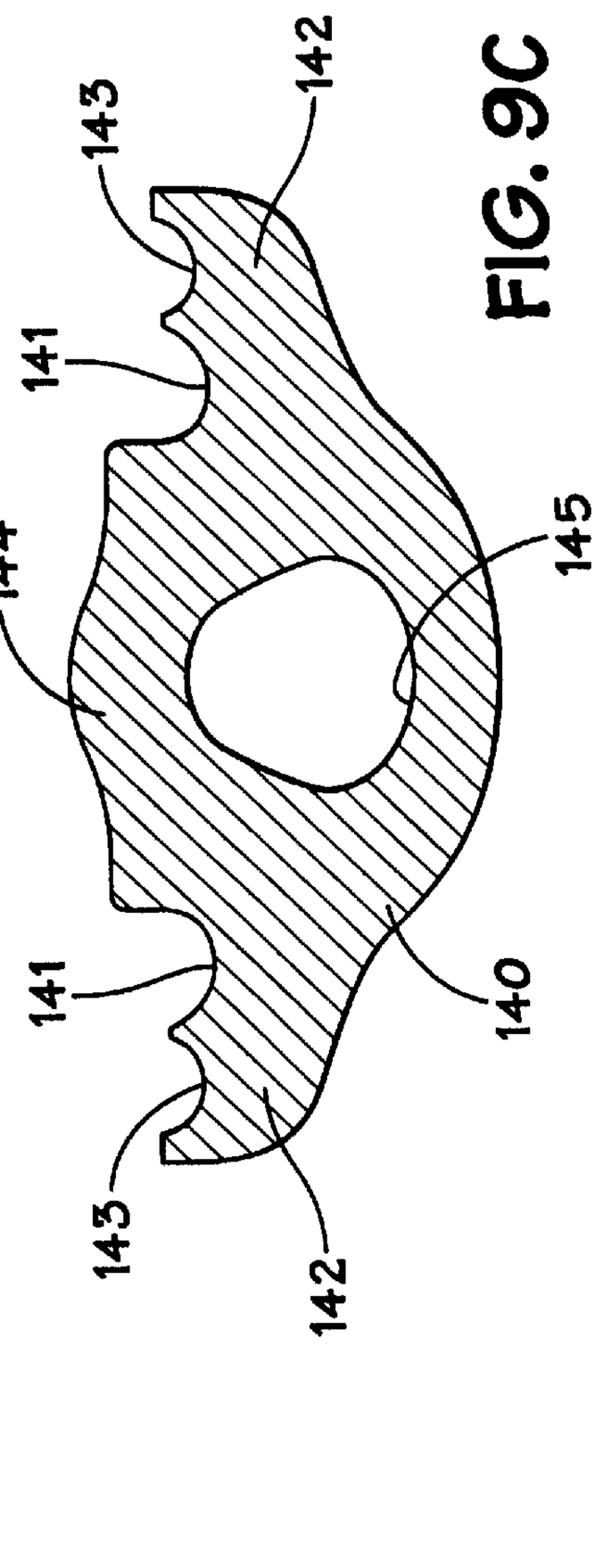
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FIG. 9C

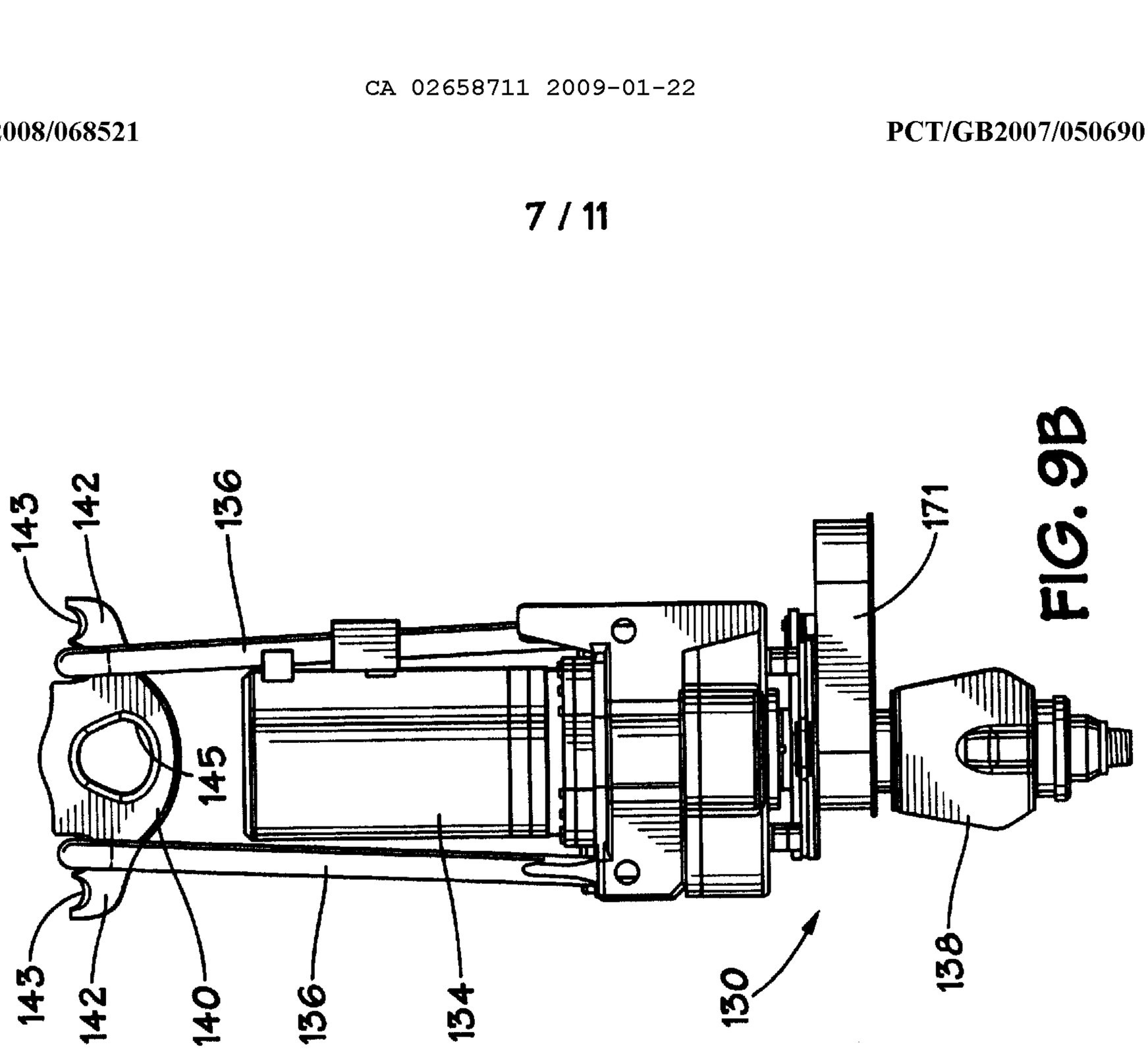
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FIG. 9B

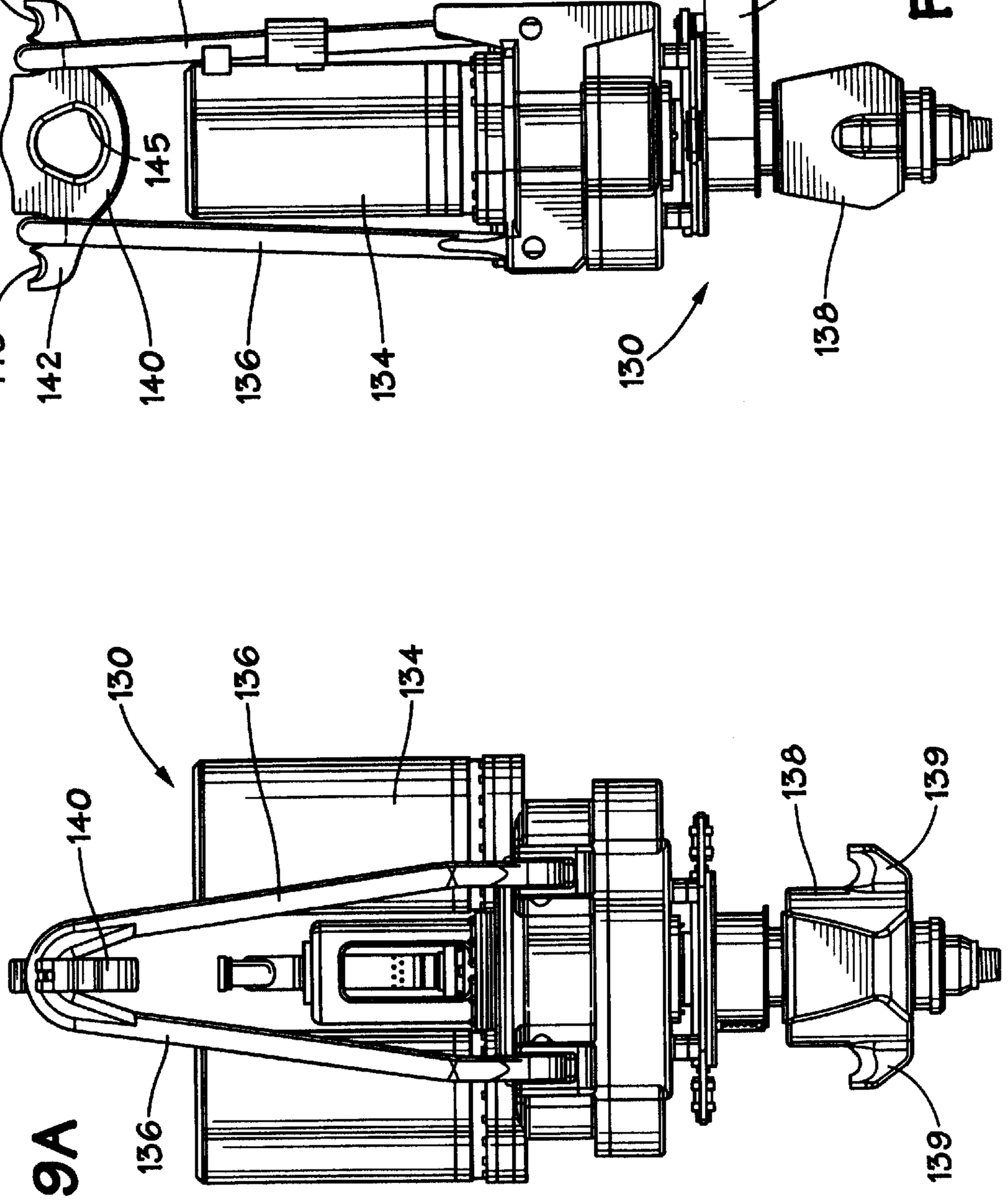
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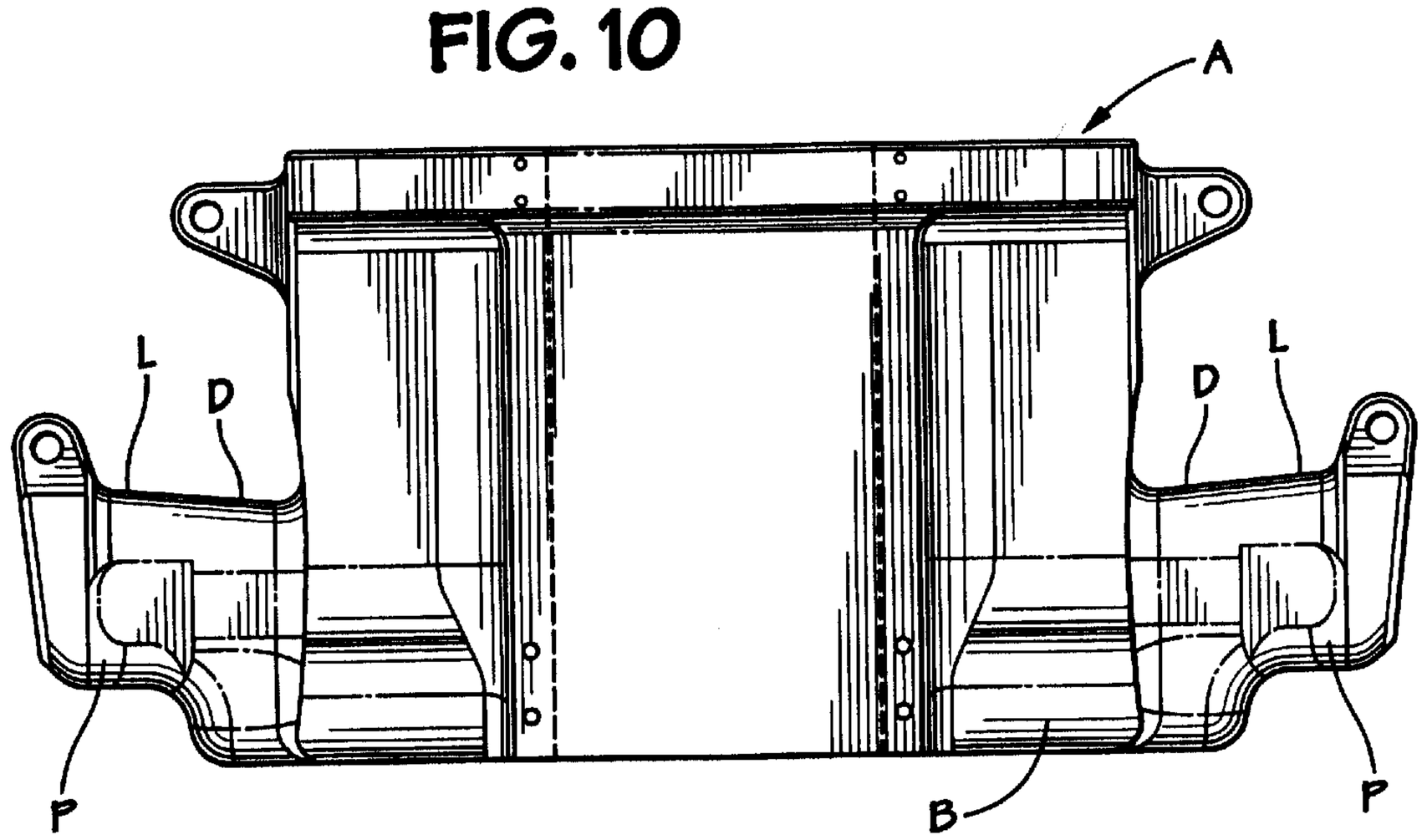
FIG. 9A

FIG. 10



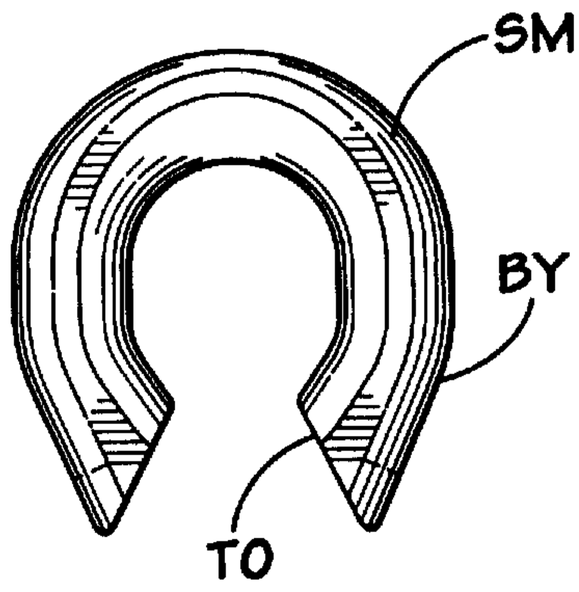


FIG. 10A

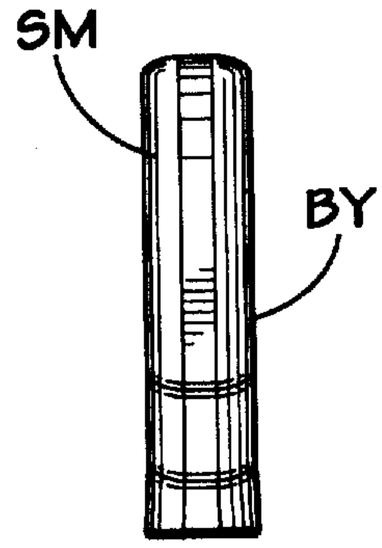


FIG. 10B

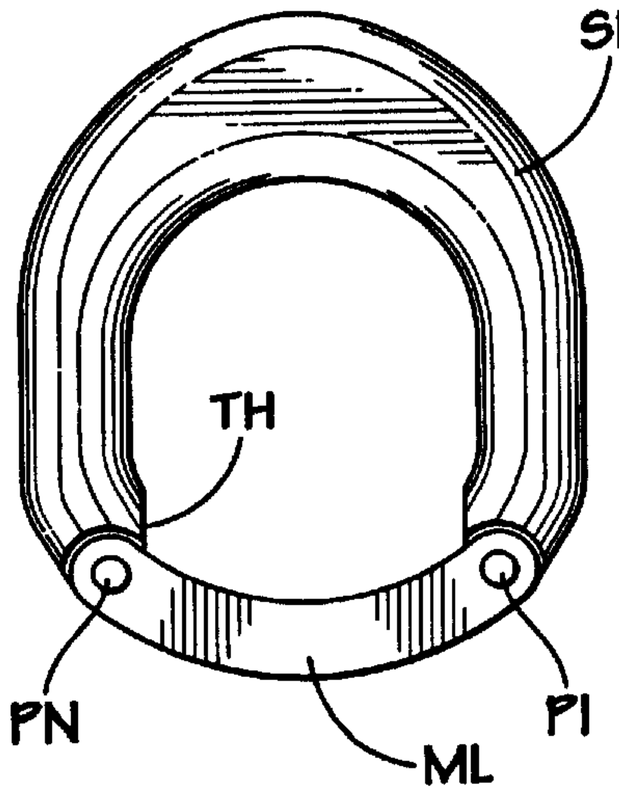


FIG. 10C

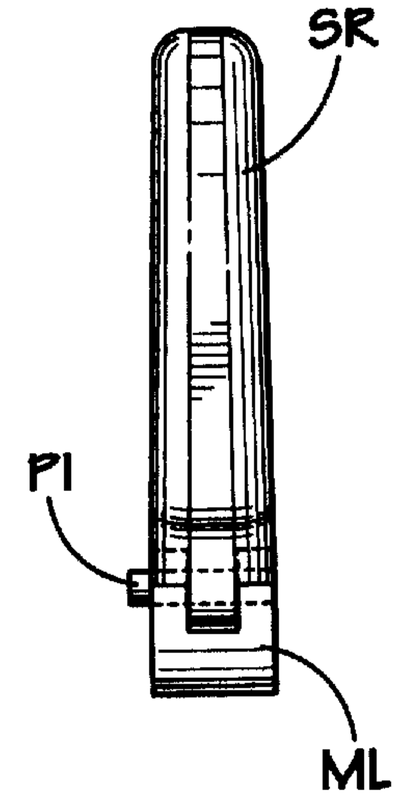


FIG. 10D

FIG. 11A

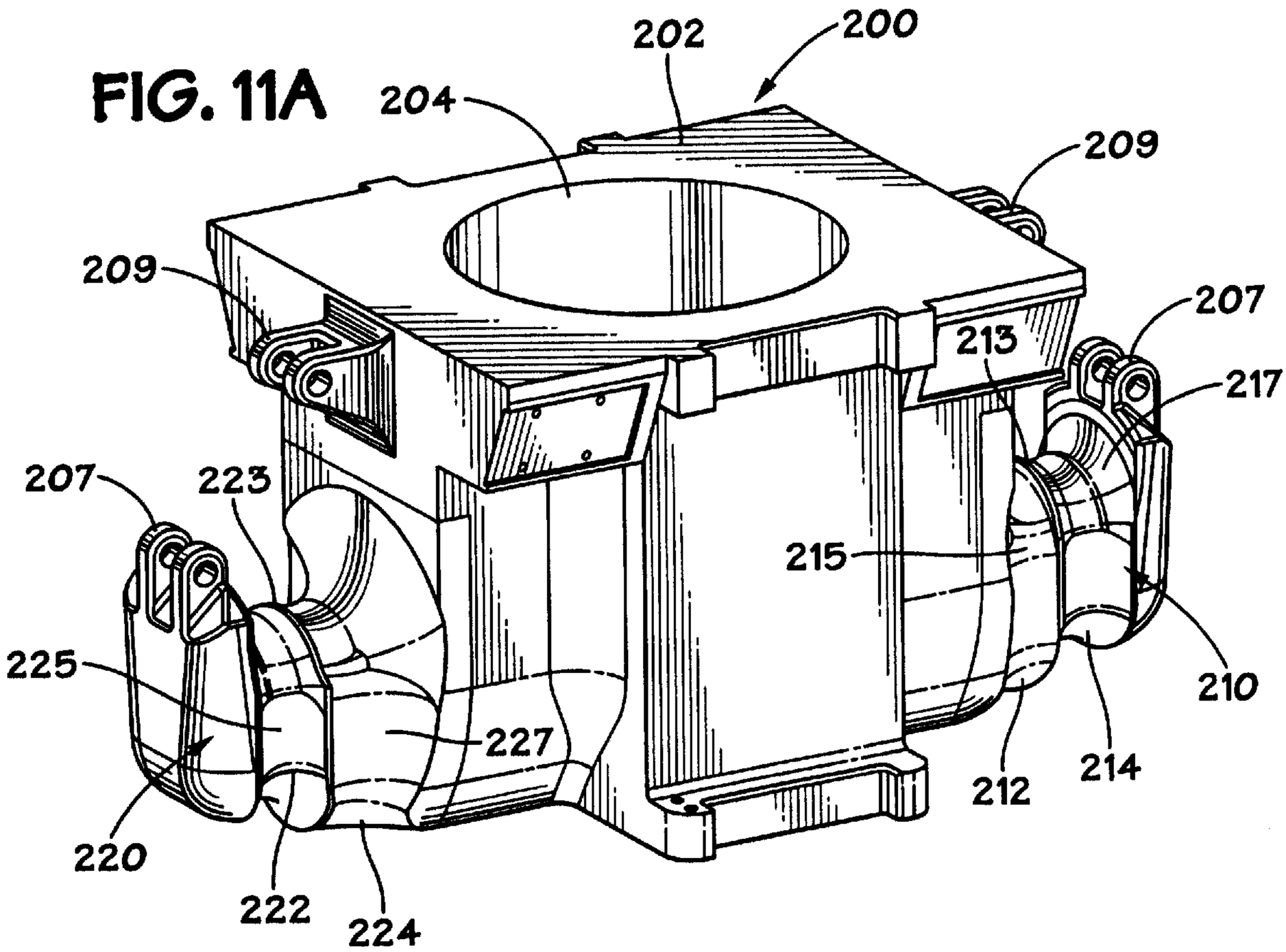
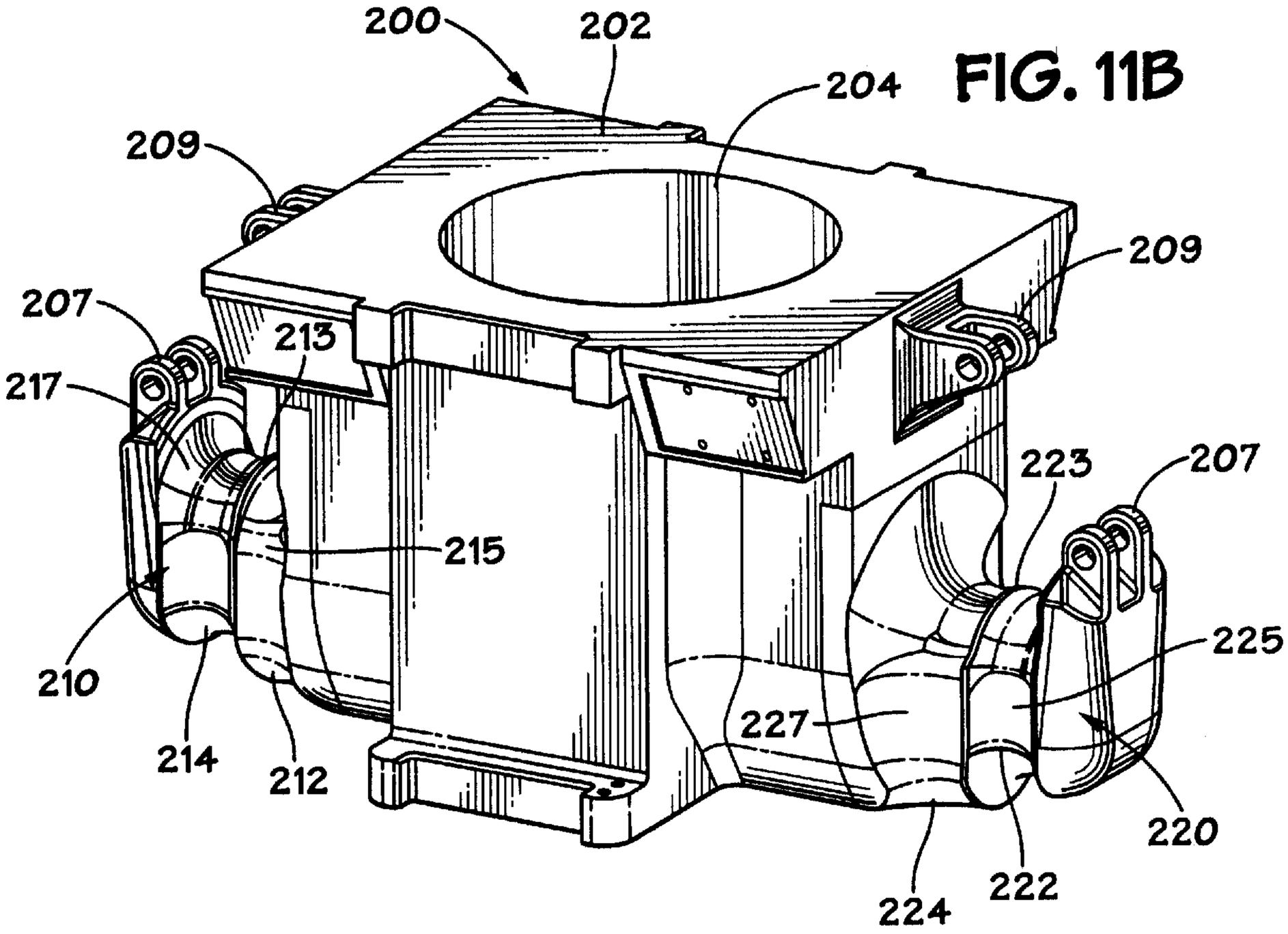


FIG. 11B



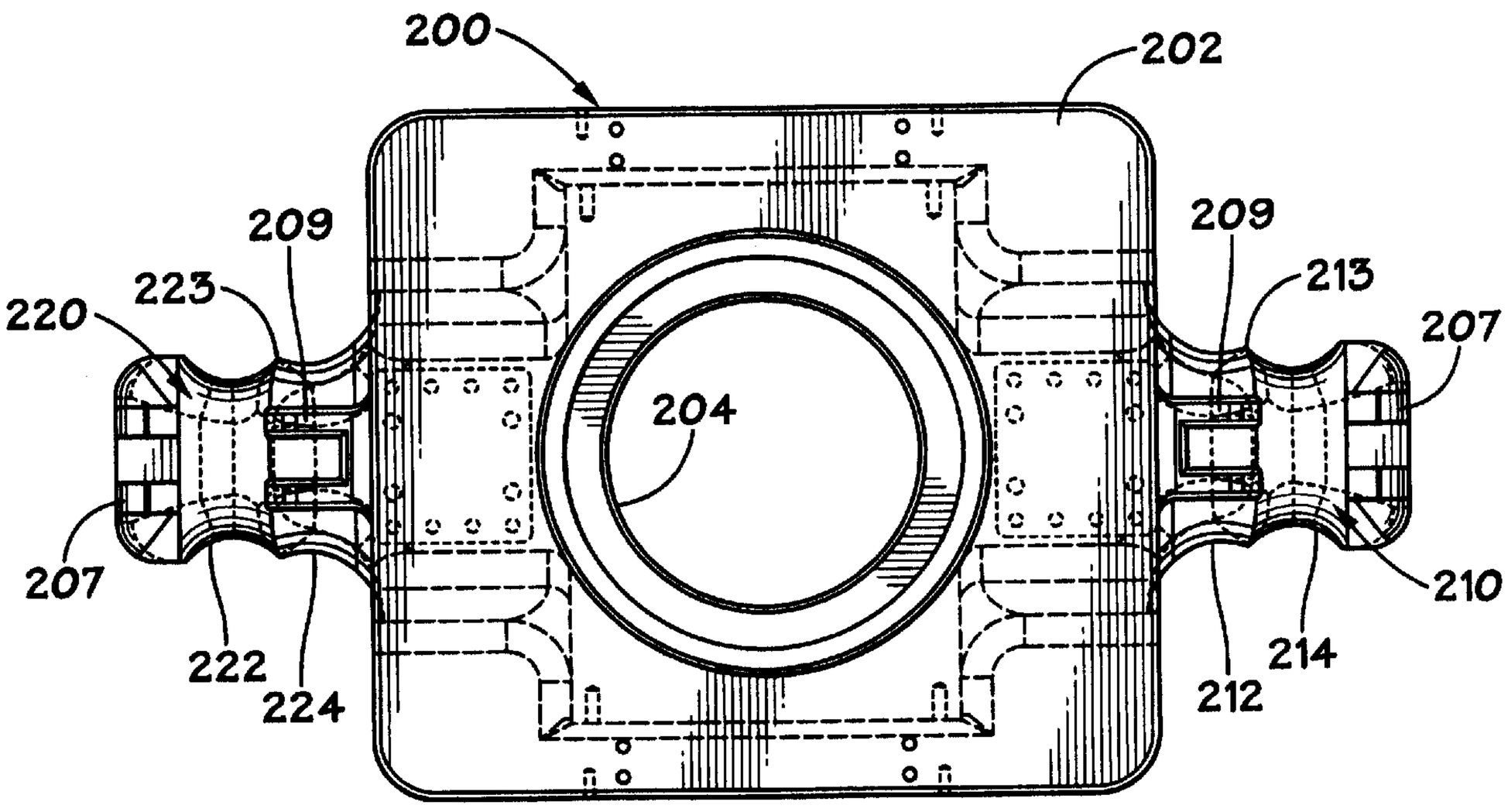


FIG. 11C

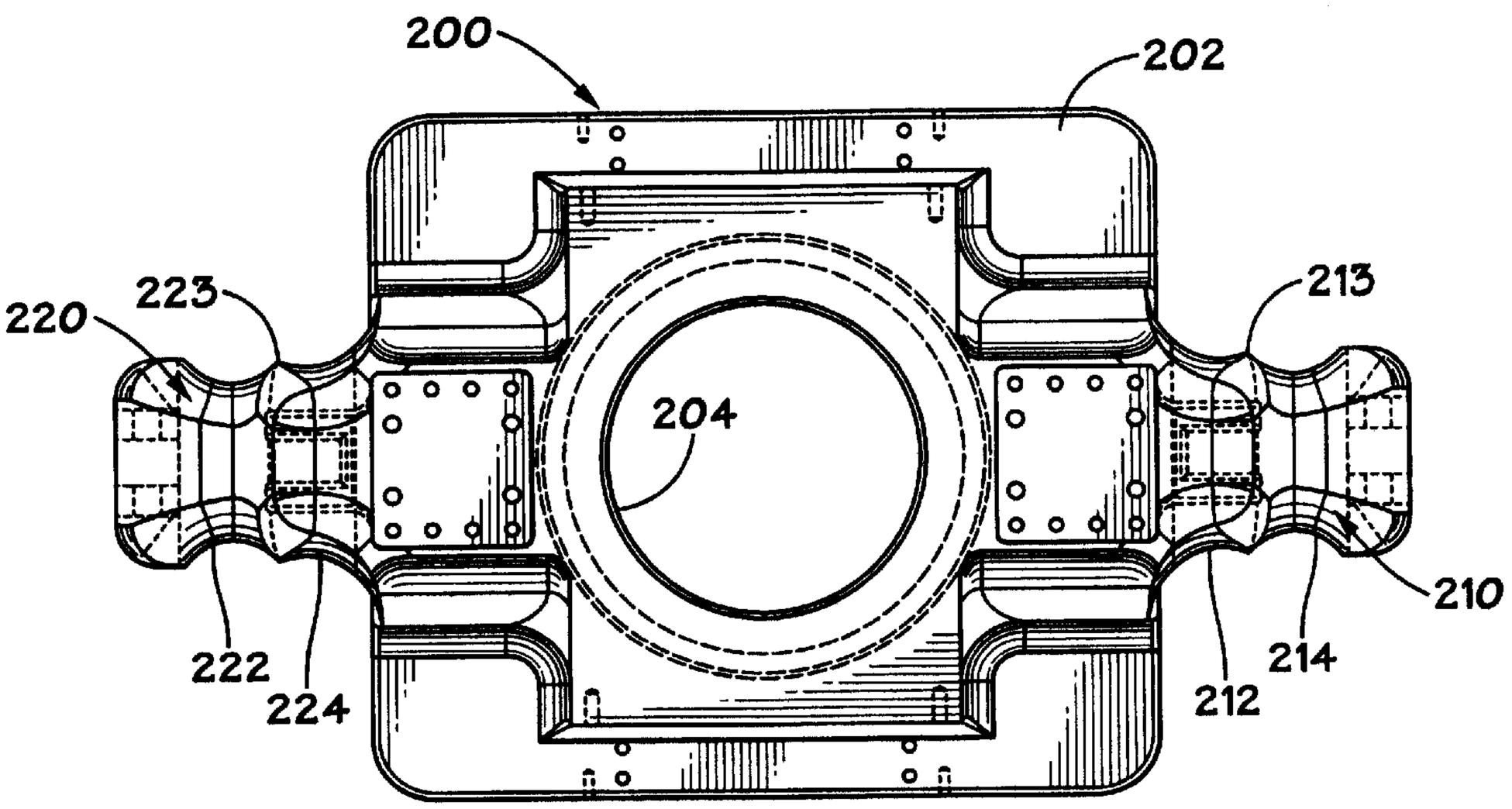


FIG. 11D

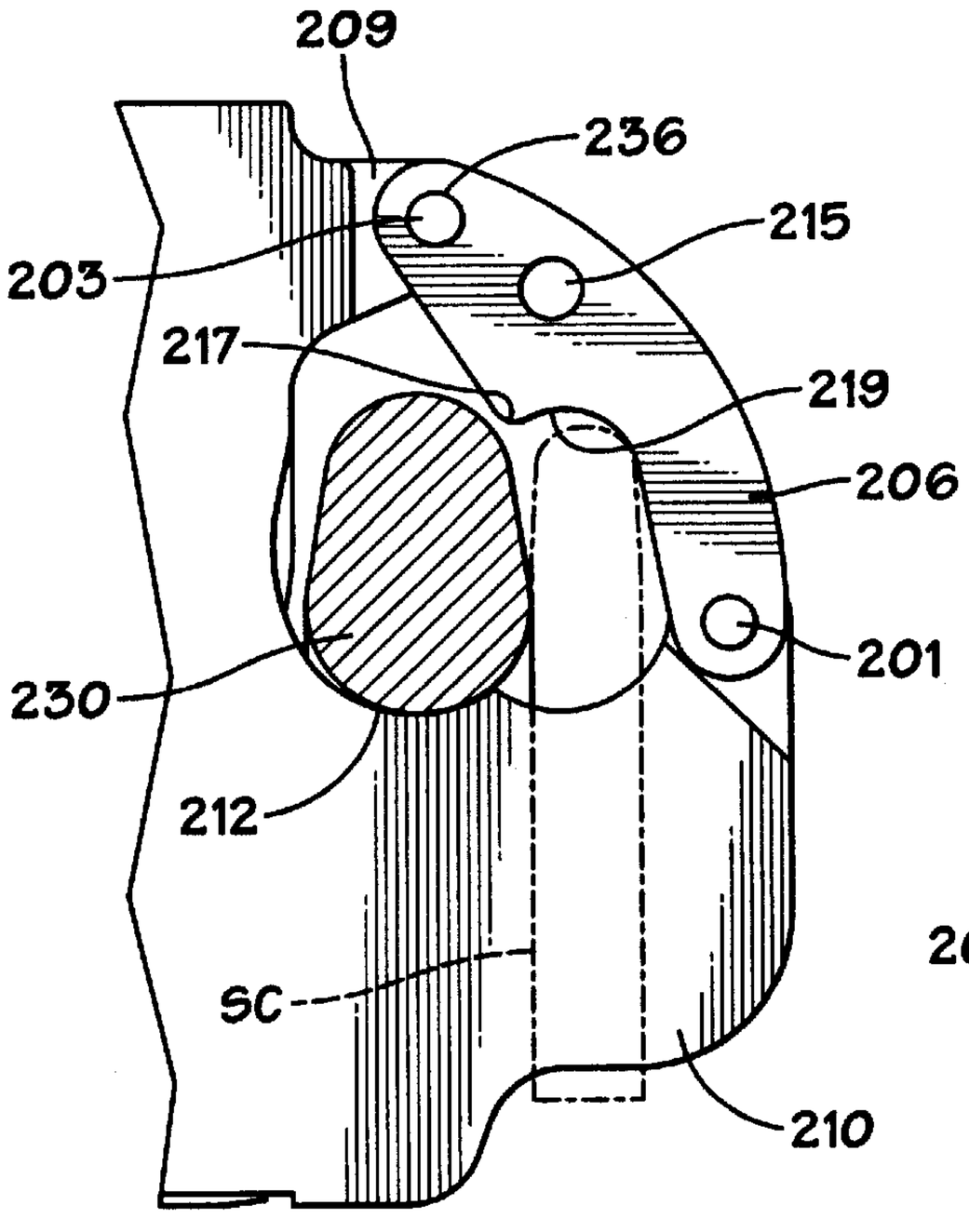


FIG. 11E

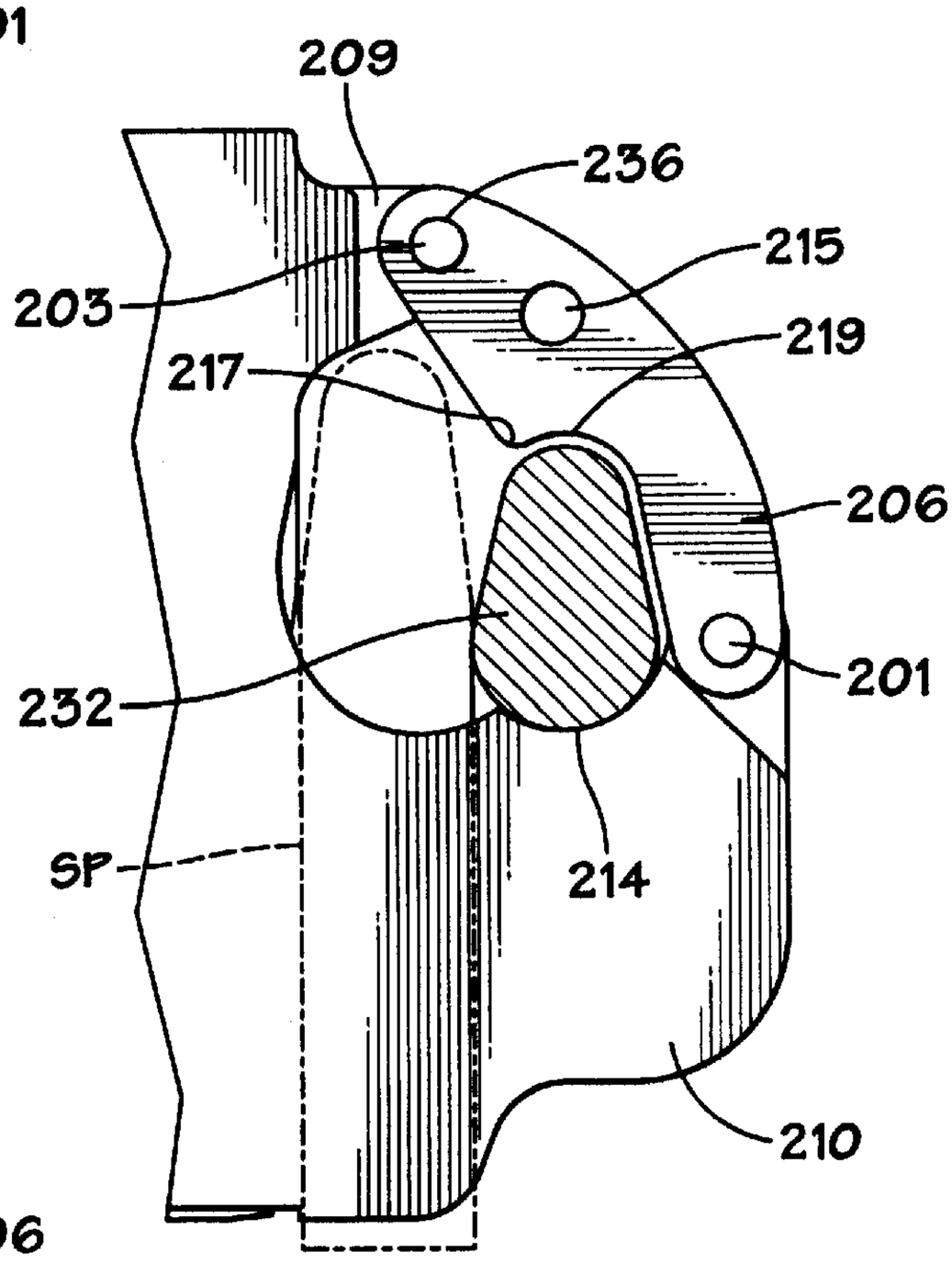


FIG. 11F

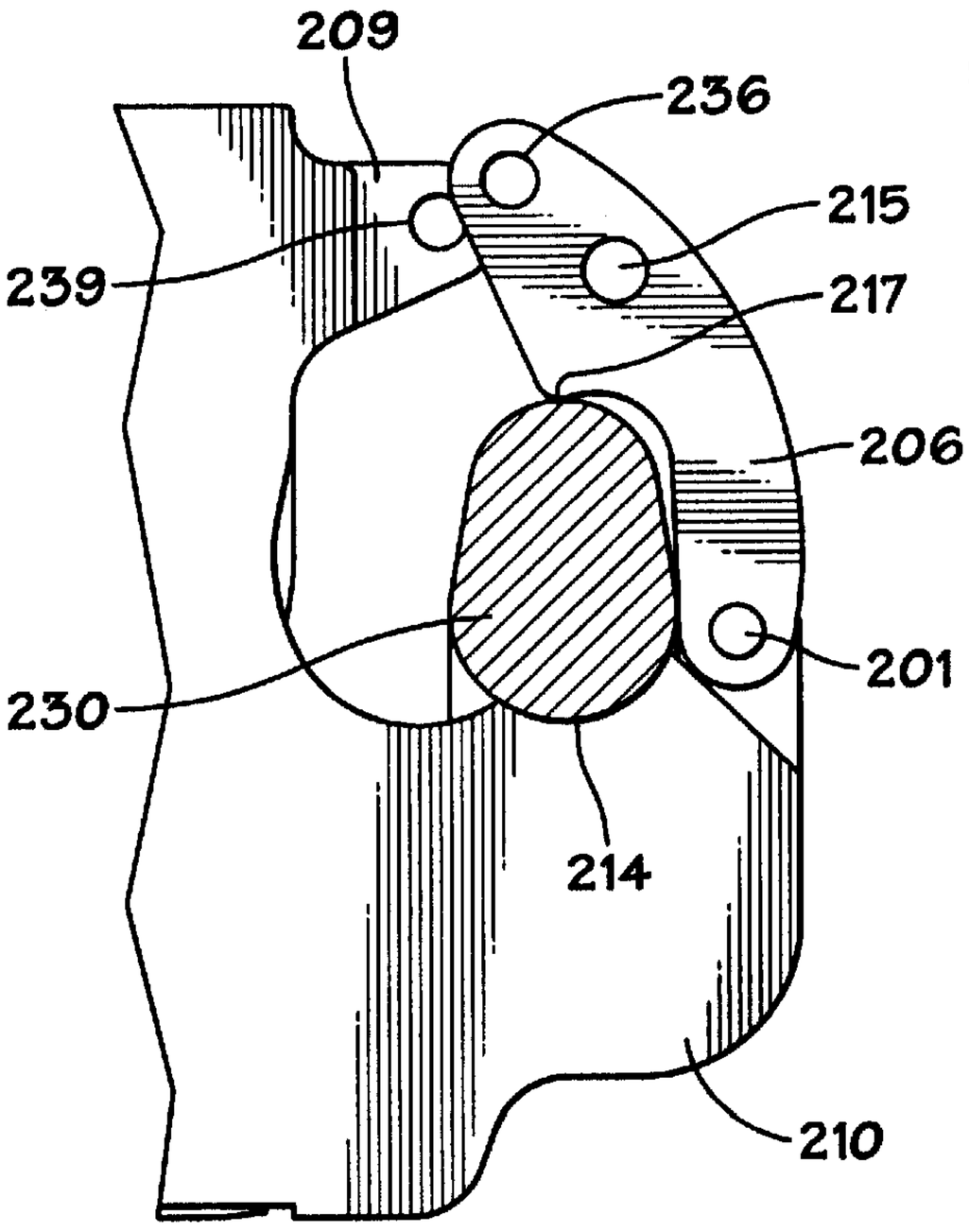
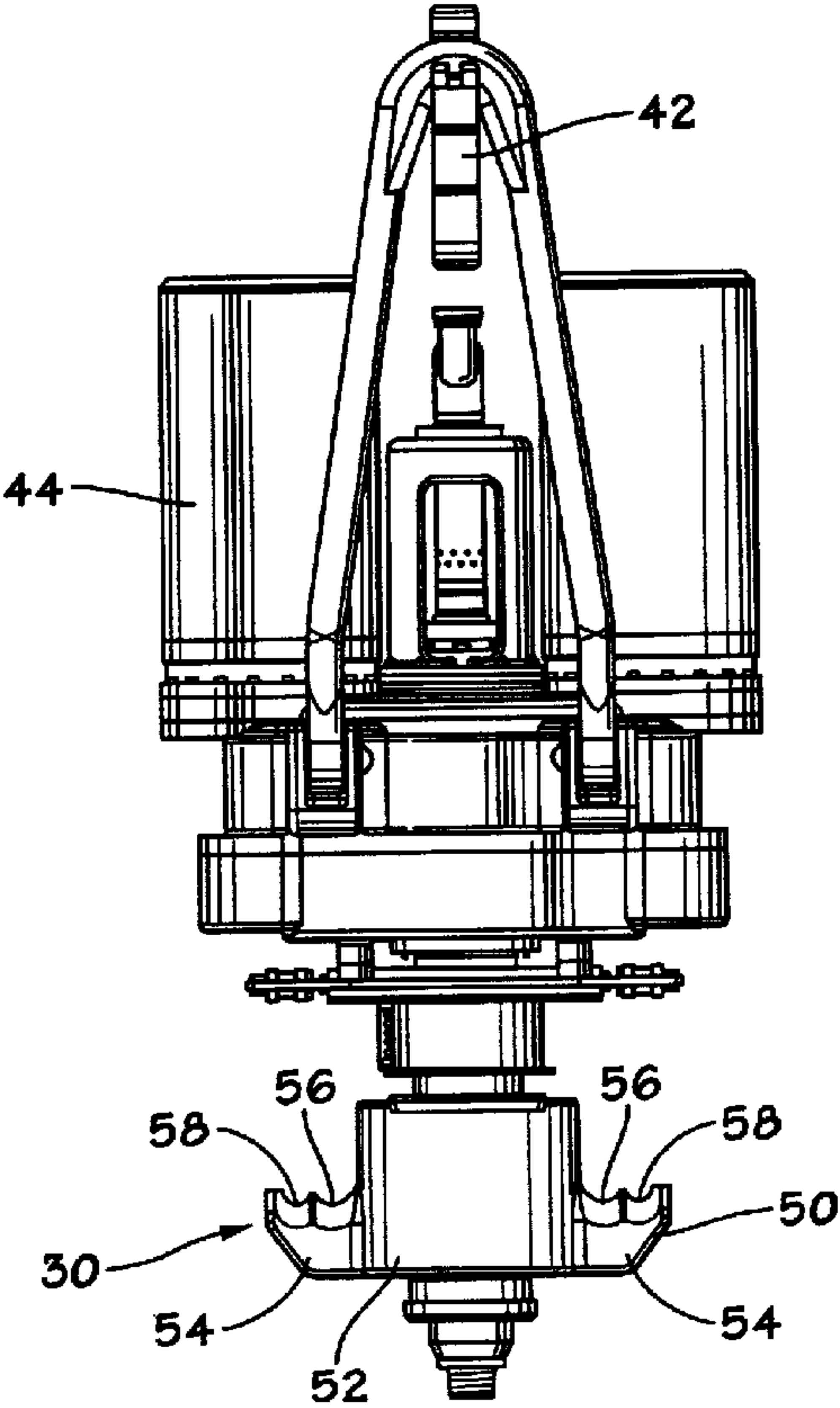


FIG. 11G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