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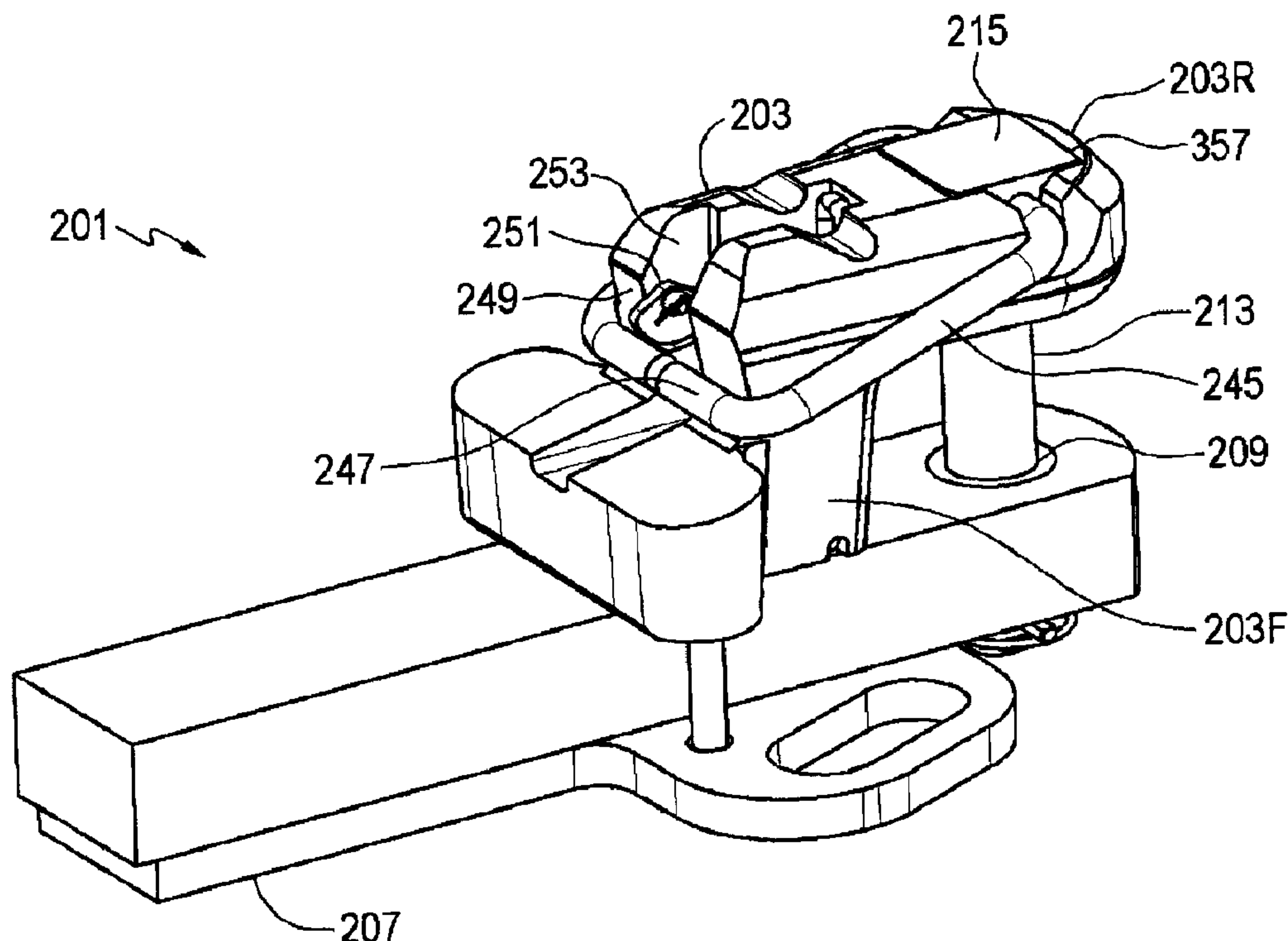
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(54) Titre : TIGE D'ATTELAGE ET APPAREIL D'ATTELAGE

(54) Title: DRAWPIN AND HITCH APPARATUS



(57) Abrégé/Abstract:

A clevis and drawpin apparatus has a top strap defining a top pin hole, and a bottom strap defining a bottom pin hole having a diameter less than a diameter of the top pin hole. The top and bottom straps are fixed together such that a gap is formed between

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

them and hole centers are aligned. A drawpin has a head that rests on the top strap, and a top pin portion with a diameter equal to the diameter of the top pin hole, a bottom pin portion with a diameter equal to the diameter of the bottom pin hole, and a middle pin portion extending through the gap. The middle pin portion has a diameter equal to the diameter of one of the top and bottom pin holes. A handle on the drawpin and a lock member are configured to prevent upward movement of the drawpin.

ABSTRACT

A clevis and drawpin apparatus has a top strap defining a top pin hole, and a bottom strap defining a bottom pin hole having a diameter less than a diameter of the top pin hole. The top and bottom straps are fixed together such that a gap is formed between them and hole centers are aligned. A drawpin has a head that rests on the top strap, and a top pin portion with a diameter equal to the diameter of the top pin hole, a bottom pin portion with a diameter equal to the diameter of the bottom pin hole, and a middle pin portion extending through the gap. The middle pin portion has a diameter equal to the diameter of one of the top and bottom pin holes. A handle on the drawpin and a lock member are configured to prevent upward movement of the drawpin.

DRAWPIN AND HITCH APPARATUS

This invention is in the field of towed vehicles, such as trailers and agricultural implements, and in particular hitch mechanisms for attaching such towed vehicles to a towing vehicle such as a tractor used in agriculture.

BACKGROUND

Clevis and tongue connections are known for connecting a towed vehicle such as a trailer or agricultural implement to a towing vehicle. A problem with such connections is that the drawpin holes in the upper and lower clevis members and the drawpin hole in the tongue extending between them are very often of different sizes.

For example in agriculture, an implement is typically hitched to a tractor drawbar by a clevis and tongue connection. The clevis provides upper and lower clevis members each defining a drawpin hole, and the tongue defines a drawpin hole and is inserted between the clevis members to align all the drawpin holes such that a drawpin can be inserted through them and thereby connect the clevis and tongue. Where the drawpin holes are the same size, a corresponding size of drawpin can be inserted to connect the clevis and tongue in the preferred manner such that there is only minimal movement at the connection.

The clevis may be mounted to the tractor drawbar and the tongue mounted to the implement hitch, or vice versa. Tractors come in a wide variety of sizes, and the tractor drawpin hole is typically sized for a pin of sufficient strength to match the power of the tractor. Implements also come in a wide variety, and similarly have a hitch with a drawpin hole that is sized for a pin of sufficient strength to match the power requirement of the implement. There has been some standardization in the agricultural implement

industry, with hitches categorized by size. For example a Category 5 tractor hitch will have a 2¾" (inch) diameter drawpin, a Category 4 will have a 2" drawpin, and so on.

Since there are typically a limited number of tractors on a farm that are required to tow a wide variety of implements, often the drawpin holes are of different sizes, and a drawpin that fits through the smaller of the holes must be used. The implement and tractor are thus connected by a loose fitting connection that allows significant movement. Control of the implement is thus reduced, and undesirable shock forces are exerted on the drawpin, implement hitch, and tractor drawbar during use, causing excessive wear.

This problem has been addressed for example in United States Patent Number 5,671,938 to the present inventor Olson. The disclosed implement hitch provides a hitch member defining a drawpin hole that is adjustable by moving a back portion of the hitch member forward and rearward by securing a variety of spacers in the hitch member, or by securing in the hitch member an auxiliary member that defines a smaller drawpin hole. The disclosed hitch requires considerable machining to make, and as well it also requires a significant amount of time to change the size of the drawpin hole.

United States Published Patent Application 2007/0052207 also of the present inventor Olson, discloses implement hitches that provide a hitch member defining a drawpin hole that is adjustable by moving a spacer forward into and rearward out of the rear portion of the drawpin hole. The spacer can be moved incrementally by turning a threaded actuator to accommodate a drawpin of any size.

Drawpins used in heavy duty applications such as in agricultural tractors and implements can rotate in response to the forces exerted thereon, and can work themselves upward and out of engagement with the clevis. It is therefore desirable to provide some mechanism to prevent the drawpin from moving upward.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a drawpin and hitch apparatus that overcomes problems in the prior art.

In a first embodiment the present invention provides a clevis and drawpin apparatus comprising a top strap defining a substantially vertical top pin hole, and a bottom strap defining a substantially vertical bottom pin hole having a diameter less than a diameter of the top pin hole. The top and bottom straps are fixed together such that a gap is formed between the top and bottom straps and such that centers of the top and bottom pin holes are substantially aligned. A drawpin has a head on a top end thereof configured to rest on a top side of the top strap when the drawpin extends down through the top pin hole and into the bottom pin hole. The drawpin has a top pin portion with a diameter substantially equal to the diameter of the top pin hole, a bottom pin portion with a diameter substantially equal to the diameter of the bottom pin hole, and a middle pin portion substantially extending between a bottom surface of the top strap and a top surface of the bottom strap. The middle pin portion has a diameter substantially equal to the diameter of one of the top and bottom pin holes.

In a second embodiment the present invention provides a hitch apparatus for selectively connecting a first tongue of a first agricultural implement to a drawbar of an agricultural tractor and for connecting a second tongue of a second agricultural implement to the drawbar of the agricultural tractor. The apparatus comprises a substantially vertical drawbar pin hole extending through a rear portion of the drawbar, and a clevis strap attached at a front portion thereof to the drawbar forward of the drawbar pin hole, and configured such that a gap is formed between a bottom surface of the clevis strap and a top surface of the drawbar above the drawbar pin hole. The clevis strap defines a substantially vertical clevis pin hole with a center substantially vertically aligned with a center of the drawbar pin hole, and the clevis pin hole has a diameter greater than a

diameter of the drawbar pin hole. The first tongue defines a substantially vertically oriented first tongue pin hole having a diameter substantially equal to the diameter of the clevis pin hole, and the second tongue defines a substantially vertically oriented second tongue pin hole having a diameter substantially equal to the diameter of the drawbar pin hole. First and second drawpins, each have a head on a top end thereof configured to rest on a top of the clevis strap when the drawpin extends down through the clevis pin hole and into the drawbar pin hole. Each drawpin has a top pin portion with a diameter substantially equal to the diameter of the clevis pin hole, a bottom pin portion with a diameter substantially equal to the diameter of the drawbar pin hole, and a middle pin portion substantially extending through the gap between the bottom surface of the clevis strap and the top surface of the drawbar. The first drawpin has a middle pin portion with a diameter substantially equal to the diameter of the clevis pin hole for connecting the first tongue of the first agricultural implement to the drawbar of the agricultural tractor, and the second drawpin has a middle pin portion with a diameter substantially equal to the diameter of the drawbar pin hole for connecting the second tongue of the second agricultural implement to the drawbar of the agricultural tractor.

The apparatus of the present invention allows a towing vehicle to tow vehicles with two different tongue pin hole sizes, or can also allow a towed vehicle to be towed by towing vehicle with two different tongue sizes, both with minimal movement at the connection.

In a third embodiment the present invention provides a hitch and drawpin apparatus for a tractor drawbar. The apparatus comprises a drawbar defining a substantially vertical drawpin hole, and a clevis strap with an upright front member attached to the drawbar forward of the drawpin hole and extending upward, and a top strap extending rearward from a top end of the front member substantially parallel to the drawbar, such that a gap is formed between the top strap and the drawbar. The top strap defines a substantially vertical top pin hole substantially aligned with the drawpin hole in the drawbar. A drawpin has a head on a top end thereof configured to rest on a top side of the top strap

when the drawpin extends down through the top pin hole and into the drawpin hole. A handle is pivotally attached to the head about a substantially horizontal handle pivot axis oriented substantially perpendicular to a longitudinal axis of the drawbar such that a rear bar of the handle can move from a raised position above the top strap, to a lowered position extending laterally across a front face of the front member. A lock member is pivotally attached to the front member about a lock pivot axis such that a front portion of the lock member extends forward beyond the front face of the front member when the lock member is in a locked position. The rear bar of the handle and the lock member are configured such that when the rear bar moves down from the raised position to the lowered position the rear bar contacts the front portion of the lock member and moves the front portion of the lock member downward and rearward as the rear bar moves downward toward the lowered position, and when the rear bar is in the lowered position the lock member then pivots back to the locked position and the front portion of the lock member is above the rear bar preventing upward movement of the rear bar.

Upward movement of the drawpin is prevented, and the risk of disengaging the drawpin from the clevis is greatly reduced.

DESCRIPTION OF THE DRAWINGS

While the invention is claimed in the concluding portions hereof, preferred embodiments are provided in the accompanying detailed description which may be best understood in conjunction with the accompanying diagrams where like parts in each of the several diagrams are labeled with like numbers, and where:

Fig. 1 is a side view of an embodiment of a clevis and drawpin apparatus of the present invention;

Fig. 2 is a side view of a hitch apparatus using the clevis and drawpin apparatus of Fig. 1 to connect a tongue that has a tongue pin hole that is the same diameter as that of the top pin hole;

Fig. 3 is a side view of a hitch apparatus using the clevis and drawpin apparatus of Fig. 1 to connect a tongue that has a tongue pin hole that is the same diameter as that of the bottom pin hole;

Fig. 4 is a schematic sectional side view of an embodiment of an alternate clevis and drawpin apparatus of the present invention;

Fig. 5 is a schematic side view of an implement with a tongue that has a tongue pin hole that is the same diameter as that of the top pin hole of the apparatus of Fig. 4;

Fig. 6 is a schematic side view of an implement with a tongue that has a tongue pin hole that is the same diameter as that of the bottom pin hole of the apparatus of Fig. 4;

Fig. 7 is a schematic sectional side view of a bushing for use in filling the enlarged upper portion of the bottom pin hole in the apparatus of Fig. 4;

Fig. 8 is a perspective view of an embodiment of an alternate hitch and drawpin apparatus for a tractor drawbar of the present invention that includes a pin locking mechanism;

Fig. 9 is a schematic side view of the embodiment of Fig. 8 with the handle in the lowered position and the lock member in the locked position;

Fig. 10 is a schematic side view of the embodiment of Fig. 8 with the handle partially raised from the lowered position and the lock member pivoted forward to allow the

rear bar of the handle to move upward or downward along the front face of the front member of the clevis strap;

Fig. 11 is a schematic side view showing the rear bar of the handle in the lowered position and the lock member in the locked position;

Fig. 12 is a schematic side view showing the rear bar of the handle partially raised from the lowered position and the lock member pivoted forward to allow the rear bar of the handle to move upward or downward.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

Fig. 1 illustrates a side view of an embodiment of a clevis and drawpin apparatus 1 of the present invention. The apparatus 1 comprises a top strap 3 defining a substantially vertical top pin hole 5, and a bottom strap 7 defining a substantially vertical bottom pin hole 9 having a diameter D1 that is less than a diameter D2 of the top pin hole 5. The top and bottom straps 3, 7 are fixed together to form a clevis with a gap 11 between the top and bottom straps 3, 7 and the centers of the top and bottom pin holes 5, 9 substantially aligned.

A pair of drawpins 13 are provided. Each has a head 15 on a top end thereof configured to rest on a top of the top strap 3 when the drawpin 13 extends down through the top pin hole 5 and into the bottom pin hole 9. Each drawpin 13 has a top pin portion A with a diameter substantially equal to the diameter D2 of the top pin hole 5, a bottom pin portion B with a diameter substantially equal to the diameter D1 of the bottom pin hole 9, and a middle pin portion C substantially extending between a bottom surface 17 of the top strap 3 and a top surface 19 of the bottom strap 7. The middle pin portion C of drawpin 13X has a diameter substantially equal to the diameter D2 of the top pin hole 5, and the middle pin portion C of drawpin 13Y has a diameter substantially equal to the diameter D1 of the

bottom pin hole 9. Thus the diameter of the drawpin 13 steps down from D2 to D1 either at the top of the gap 11, or the bottom of the gap 11, depending on the size of the pin hole in the tongue being connected.

In this description it will be understood that when it is stated that a pin and hole have the same diameter it will be understood that the pin is slightly smaller than the hole so that the pin is slidingly received in the hole as is well known in the art, with minimal lateral movement of the pin in the hole.

The clevis and drawpin apparatus 1 is schematically illustrated in Figs. 2 and 3 used in a hitch apparatus 10 for connecting first and second towed vehicles 21X, 21Y to a towing vehicle 23. In Fig. 2, a first tongue 25 is attached to the first towed vehicle 21X and is configured to extend into the gap 11 between the top and bottom straps 3, 7. The first tongue 25 defines a first tongue pin hole 27 with a diameter substantially equal to the diameter D2 of the top pin hole 5. Drawpin 13X, with a middle pin portion with the diameter D2, is inserted down through the top pin hole 5, the first tongue pin hole 27, and the bottom pin hole 9. The diameter of the top, bottom, and middle pin portions A, B, C of the drawpin 13X correspond to the diameters of the pin holes 5, 7, and 27 the portions are located in when the head 15 of the drawpin 13X is resting on top of the top strap 3. Thus there is minimal movement at the connection, with resulting improved control and reduced wear at the connection.

In Fig. 3, a second tongue 29 is attached to the second towed vehicle 21Y and is also configured to extend into the gap 11 between the top and bottom straps 3, 7. The second tongue 29 defines a second tongue pin hole 31 with a diameter D1 substantially equal to the diameter D1 of the bottom pin hole 7. Drawpin 13Y, with a middle pin portion with the diameter D1, is inserted down through the top pin hole 5, the second tongue pin hole 31, and the bottom pin hole 9. Again the diameter of the top, bottom, and middle pin portions A, B, C of the drawpin 13Y correspond to the diameters of the pin holes 5, 7,

and 31 the portions are located in when the head 15 of the drawpin 13Y is resting on top of the top strap 3. Thus again there is minimal movement at the connection.

It is contemplated that the clevis and drawpin apparatus 1 will more commonly be attached to a towing vehicle to facilitate towing towed vehicles with different sized tongue holes, however it is readily apparent that the clevis and drawpin apparatus 1 could as easily be attached to the towed vehicle to facilitate connection to towing vehicle that have a tongue with different sized pin holes. This can be easily illustrated by referring to Figs. 2 and 3 and simply calling the towed vehicle "23" and the towing vehicles "21X" and "21Y".

In the agricultural industry, large tractors and large implements are connected together by similar hitch apparatuses using a clevis, tongue, and drawpin. The present invention provides, as illustrated in Figs. 4 - 6 a hitch apparatus for selectively connecting a first tongue 125 of a first agricultural implement 121X to a drawbar 107 of an agricultural tractor and for connecting a second tongue 129 of a second agricultural implement 121Y to the drawbar 107 of the agricultural tractor.

The hitch apparatus comprises a clevis and drawpin apparatus 101 substantially as described above, and the tongues of the implements to be connected. A substantially vertical drawbar pin hole 109 extends through a rear portion of the drawbar 107, and a clevis strap 103 is attached at a front portion thereof to the drawbar 107 forward of the drawbar pin hole 109, and is configured such that a gap 111 is formed between a bottom surface 117 of the clevis strap 103 and a top surface 119 of the drawbar 107 above the drawbar pin hole 109. The clevis strap 103 defines a substantially vertical clevis pin hole 105 with a center substantially vertically aligned with a center of the drawbar pin hole 109. The clevis pin hole 105 has a diameter D2 that is greater than the diameter D1 of the drawbar pin hole 109.

As seen in Fig. 5, the first tongue 125 defines a substantially vertically oriented first tongue pin hole 127 having a diameter substantially equal to the diameter D2 of the clevis pin hole 105, and as seen in Fig. 6, the second tongue 129 defines a substantially vertically oriented second tongue pin hole 131 having a diameter D1 substantially equal to the diameter of the drawbar pin hole 109.

First and second drawpins 113X, 113Y, each have a head 115 on a top end thereof configured to rest on a top of the clevis strap 103 when the drawpin 113 extends down through the clevis pin hole 105 and into the drawbar pin hole 107. Each drawpin 113 has a top pin portion A with a diameter D2 substantially equal to the diameter of the clevis pin hole 105, a bottom pin portion B with a diameter D1 substantially equal to the diameter of the drawbar pin hole 107, and a middle pin portion C substantially extending through the gap 111.

The first drawpin 113X has a middle pin portion with a diameter D2 substantially equal to the diameter of the clevis pin hole 105 for connecting the first tongue 125 of the first agricultural implement 121X to the drawbar 107 of the agricultural tractor. The second drawpin 113Y has a middle pin portion with a diameter D1 substantially equal to the diameter of the drawbar pin hole 107 for connecting the second tongue 129 of the second agricultural implement 121Y to the drawbar 107.

In the clevis and drawpin apparatus 101 of Figs. 4 – 6, the drawbar pin hole 109 has an enlarged upper hole portion 109A with a diameter D2 substantially equal to the diameter of the clevis pin hole 105. The first drawpin 113X is configured such that the middle pin portion C of the first drawpin 121X extends not just through the gap 111 as above, but further into the upper hole portion 109A. Where heavy loads are borne by the drawpin 113X, as in the case of large agricultural tractors and implements, this feature provides an increased size of pin in the drawbar 107, and an increased bearing area of pin surface of

the drawpin 113X and hole surface of the drawbar 107 in the enlarged hole portion 109A, thus providing a stronger connection with a greater wearing surface.

To reduce sharp edges, the bottom pin hole 109 also includes a tapered transition portion 109B between the upper hole portion 109A and the bottom portion of the bottom pin hole 109.

Where the smaller drawpin 113Y is used, the smaller size is an indicator that the second implement 121Y has a reduced load compared to the first implement 121X, and so the smaller pin is satisfactory. A bushing 133, as illustrated in Fig. 7, can be provided in the upper hole portion 109A with an outside diameter D2 substantially equal to the diameter of the upper hole portion 109A and an inside diameter substantially equal to the diameter of the bottom pin hole 109. The bushing 133 will keep dirt and the like from filling the upper hole portion 109A when the smaller drawpin 121Y is being used.

The bottom pin hole 109 also includes a tapered transition portion 109B between the upper hole portion 109A and the bottom portion of the bottom pin hole 109.

As seen in Fig. 4, the drawbar 107 comprises an upper bar 135 extending forward and connected to the tractor 123, and a lower bar 135 bolted to a bottom surface of the upper bar 135. The drawbar pin hole 109 is defined by the upper and lower bars 135, 139 which together form the drawbar 107. The enlarged upper hole portion 109A of the bottom pin hole 109 is defined by the upper bar 135. Adding the lower bar 139 provides for a longer bottom pin hole 109 thus providing a larger bearing surface for the drawpins.

The clevis strap 103 and lower bar 139 are attached to the upper bar 135 by bolts 141 extending substantially vertically through holes in the front portion of the clevis strap 103 and through corresponding holes in the upper and lower bars 135, 139.

Thus the drawbar of a large agricultural tractor, for example, could be configured with a clevis and drawpin apparatus 101 to accommodate a Category 5 implement tongue with a 2¾" diameter drawpin hole and also a Category 4 implement tongue with a 2" drawpin hole, both with minimal movement at the connection, as is desirable. Other combinations of tongue sizes could be accommodated in a like manner, and other types of towing and towed vehicles can use the apparatus of the present invention as well.

The drawpin 113 can be secured in place by extending a lock pin or the like through a lock hole 143 in the bottom of the drawpin 113 under the drawbar 107.

An alternate hitch and drawpin apparatus 201 for a tractor drawbar that includes a pin locking mechanism is illustrated in Figs. 8 – 10. The apparatus 201 comprises a drawbar 207 defining a substantially vertical drawpin hole 209. A clevis strap 203 with an upright front member 203F attached to the drawbar 207 forward of the drawpin hole 209 and extending upward, and a top strap 203R extending rearward from a top end of the front member 203F substantially parallel to the drawbar 207, such that a gap 211 is formed between the top strap 203R and the drawbar 207. The top strap defines a substantially vertical top pin hole 205 substantially aligned with the drawpin hole 209 in the drawbar 207.

A drawpin 213 has a head 215 on a top end thereof configured to rest on a top side of the top strap 203F when the drawpin 213 extends down through the top pin hole 205 and into the drawpin hole 209. A handle 245 is pivotally attached to the head 215 about a substantially horizontal handle pivot axis HA oriented substantially perpendicular to a longitudinal axis of the drawbar 207 such that a rear bar 247 of the handle 245 can move from a raised position RP above the top strap 203R as shown in Fig. 10, to a lowered position LP extending laterally across a front face 249 of the front member 203F, as shown in Fig. 9. In the illustrated embodiment the front face 249 also provides a ledge 250 under the lowered position LP of the rear bar 247.

A lock member 251 is pivotally attached to the front member 203F about a lock pivot axis LA oriented substantially parallel to the handle pivot axis HA such that a front portion 251F of the lock member extends forward beyond the front face 249 of the front member 203F when the lock member 251 is in the locked position.

The rear bar 247 of the handle 245 and the lock member 251 are configured such that when the rear bar 247 moves down from the raised position RP to the lowered position LP the rear bar 247 contacts the front portion 251F of the lock member 251 and moves it downward and rearward as the rear bar 247 moves downward toward the lowered position LP. When the rear bar 247 is in the lowered position of Fig. 9 the lock member 251 then pivots back to the locked position and the front portion 251F of the lock member 251 is above the rear bar 247, as seen in Fig. 9, preventing upward movement of the rear bar 247.

In the illustrated apparatus 201 the front face 249 of the front member 203F defines a recess 253 and the lock member 251 is pivotally attached inside the recess 253 where same is tucked out of the way and protected from inadvertent contact and possible damage.

In the illustrated apparatus 201 the lock member 251 is shaped like a segment of a circle, as best seen in Figs. 11 and 12. The lock pivot axis LA extends through the lock member 251 in proximity to a center of the circle and front and rear edges 255 of the lock member 251 extend downward and outward from a top end of the lock member 251T to an outer arced edge 257 of the lock member. In this configuration the weight of the lock member 251 causes the lock member 251 to hang from the lock pivot axis LA. When the rear bar 247 moves down and contacts the front portion 251F of the lock member 251, the lock member 251 pivots on the lock pivot axis and the front portion 251F moves downward and rearward and allows the rear bar 247 to move down to the lowered position LP.

When the rear bar 247 is in the lowered position of Fig. 9 the lock member 251 then pivots back to the locked position.

The front portion 251F of the lock member 251 is accessible when the rear bar 247 is in the lowered position LP such that same may be pushed, as by an operator's finger for example, downward and forward to allow the operator to raise the rear bar to the raised position RP and remove the drawpin 213.

In the illustrated apparatus 201 as well, the top side of the top strap 203R defines a recess 257 configured such that the head 215 of the drawpin 213 is located in the recess 257 and the head 215 of the drawpin 213 is prevented from rotating. In the illustrated apparatus 201 the head 215 and recess 257 are rectangular but other configurations could be used as well. This arrangement prevents rotational torque from the drawpin 213 from being transmitted to the handle 245.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous changes and modifications will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all such suitable changes or modifications in structure or operation which may be resorted to are intended to fall within the scope of the claimed invention.

CLAIMS

What is claimed is:

1. A clevis and drawpin apparatus comprising:

a top strap defining a substantially vertical top pin hole;

a bottom strap defining a substantially vertical bottom pin hole having a diameter less than a diameter of the top pin hole;

wherein the top and bottom straps are fixed together such that a gap is formed between the top and bottom straps and such that centers of the top and bottom pin holes are substantially aligned;

a drawpin having a head on a top end thereof configured to rest on a top side of the top strap when the drawpin extends down through the top pin hole and into the bottom pin hole;

wherein the drawpin has a top pin portion with a diameter substantially equal to the diameter of the top pin hole, a bottom pin portion with a diameter substantially equal to the diameter of the bottom pin hole, and a middle pin portion substantially extending between a bottom surface of the top strap and a top surface of the bottom strap;

wherein the middle pin portion has a diameter substantially equal to the diameter of one of the top and bottom pin holes.

2. The apparatus of claim 1 wherein the bottom pin hole has an enlarged upper hole portion with a diameter substantially equal to the diameter of the top pin hole.

3. The apparatus of claim 2 wherein the middle pin portion of the drawpin has a diameter substantially equal to the diameter of the top pin hole, and wherein the middle pin portion of the drawpin extends into the upper hole portion.
4. The apparatus of claim 2 wherein the middle pin portion of the drawpin has a diameter substantially equal to the diameter of the bottom pin hole.
5. The apparatus of claim 4 comprising a bushing located in the upper hole portion and having an outside diameter substantially equal to the diameter of the top pin hole and an inside diameter substantially equal to the diameter of the bottom pin hole.
6. The apparatus of any one of claims 2 - 5 wherein the bottom pin hole includes a tapered transition portion between the upper hole portion thereof and the bottom pin hole.
7. The apparatus of any one of claims 1 - 6 comprising a first drawpin with a middle portion having a diameter substantially equal to the diameter of the top pin hole, and a second drawpin with a middle portion having a diameter substantially equal to the diameter of the bottom pin hole.
8. A hitch apparatus for connecting a towed vehicle to a towing vehicle, the apparatus comprising:

a clevis and pin apparatus according to any one of claims 1 - 7 attached to one of the towed vehicle and the towing vehicle;

a tongue attached to the other of the towed vehicle and the towing vehicle and extending into the gap between the top and bottom straps, and defining a tongue

pin hole with a diameter substantially equal to the diameter of the middle pin portion of the drawpin.

9. A hitch apparatus for connecting first and second towed vehicles to a towing vehicle, the apparatus comprising:

a clevis and pin apparatus according to any one of claims 1 - 7 attached to the towing vehicle;

a first tongue attached to the first towed vehicle and configured to extend into the gap between the top and bottom straps, and defining a first tongue pin hole with a diameter substantially equal to the diameter of the top pin hole, and a first drawpin having a middle pin portion with a diameter substantially equal to the diameter of the top pin hole;

a second tongue attached to the second towed vehicle and configured to extend into the gap between the top and bottom straps, and defining a second tongue pin hole with a diameter substantially equal to the diameter of the bottom pin hole, and a second drawpin having a middle pin portion with a diameter substantially equal to the diameter of the bottom pin hole.

10. A hitch apparatus for connecting first and second towing vehicles to a towed vehicle, the apparatus comprising:

a clevis and pin apparatus according to any one of claims 1 - 7 attached to the towed vehicle;

a first tongue attached to the first towing vehicle and configured to extend into the gap between the top and bottom straps, and defining a first tongue pin hole with a diameter substantially equal to the diameter of the top pin hole, and a first

drawpin having a middle pin portion with a diameter substantially equal to the diameter of the top pin hole;

a second tongue attached to the second towing vehicle and configured to extend into the gap between the top and bottom straps, and defining a second tongue pin hole with a diameter substantially equal to the diameter of the bottom pin hole, and a second drawpin having a middle pin portion with a diameter substantially equal to the diameter of the bottom pin hole.

11. A hitch apparatus for selectively connecting a first tongue of a first agricultural implement to a drawbar of an agricultural tractor and for connecting a second tongue of a second agricultural implement to the drawbar of the agricultural tractor, the apparatus comprising:

a substantially vertical drawbar pin hole extending through a rear portion of the drawbar;

a clevis strap attached at a front portion thereof to the drawbar forward of the drawbar pin hole, and configured such that a gap is formed between a bottom surface of the clevis strap and a top surface of the drawbar above the drawbar pin hole;

wherein the clevis strap defines a substantially vertical clevis pin hole with a center substantially vertically aligned with a center of the drawbar pin hole;

wherein the clevis pin hole has a diameter greater than a diameter of the drawbar pin hole;

wherein the first tongue defines a substantially vertically oriented first tongue pin hole having a diameter substantially equal to the diameter of the clevis pin hole,

and the second tongue defines a substantially vertically oriented second tongue pin hole having a diameter substantially equal to the diameter of the drawbar pin hole;

first and second drawpins, each drawpin having a head on a top end thereof configured to rest on a top of the clevis strap when the drawpin extends down through the clevis pin hole and into the drawbar pin hole;

wherein each drawpin has a top pin portion with a diameter substantially equal to the diameter of the clevis pin hole, a bottom pin portion with a diameter substantially equal to the diameter of the drawbar pin hole, and a middle pin portion substantially extending through the gap between the bottom surface of the clevis strap and the top surface of the drawbar;

wherein the first drawpin has a middle pin portion with a diameter substantially equal to the diameter of the clevis pin hole for connecting the first tongue of the first agricultural implement to the drawbar of the agricultural tractor, and the second drawpin has a middle pin portion with a diameter substantially equal to the diameter of the drawbar pin hole for connecting the second tongue of the second agricultural implement to the drawbar of the agricultural tractor.

12. The apparatus of claim 11 wherein the drawbar pin hole has an enlarged upper hole portion with a diameter substantially equal to the diameter of the clevis pin hole.
13. The apparatus of claim 12 wherein the first drawpin is configured such that the middle pin portion of the first drawpin extends into the upper hole portion.
14. The apparatus of claim 12 comprising a bushing located in the upper hole portion and having an outside diameter substantially equal to the diameter of the top pin

hole and an inside diameter substantially equal to the diameter of the bottom pin hole.

15. The apparatus of any one of claims 12 - 14 wherein the bottom pin hole includes a tapered transition portion between the upper hole portion thereof and the bottom pin hole.
16. The apparatus of any one of claims 12 - 15 wherein the drawbar comprises an upper bar extending forward and connected to the tractor, and a lower bar bolted to a bottom surface of the upper bar, and wherein the drawbar pin hole is defined by the upper and lower bars, and wherein the enlarged upper hole portion of the bottom pin hole is defined by the upper bar.
17. The apparatus of claim 16 wherein the clevis strap and lower bar are attached to the upper bar by bolts extending substantially vertically through holes in the front portion of the clevis strap and through corresponding holes in the upper and lower bars.
18. A hitch and drawpin apparatus for a tractor drawbar, the apparatus comprising:

a drawbar defining a substantially vertical drawpin hole;

a clevis strap with an upright front member attached to the drawbar forward of the drawpin hole and extending upward, and a top strap extending rearward from a top end of the front member substantially parallel to the drawbar, such that a gap is formed between the top strap and the drawbar;

wherein the top strap defines a substantially vertical top pin hole substantially aligned with the drawpin hole in the drawbar;

a drawpin having a head on a top end thereof configured to rest on a top side of the top strap when the drawpin extends down through the top pin hole and into the drawpin hole;

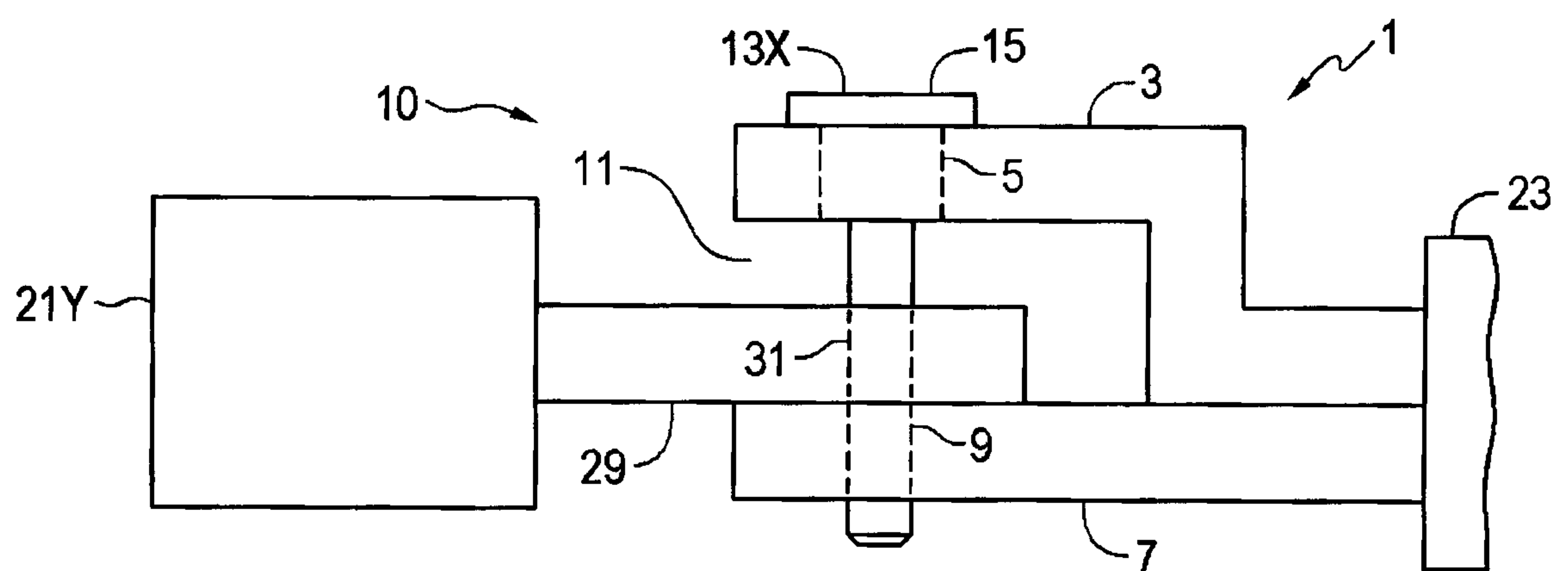
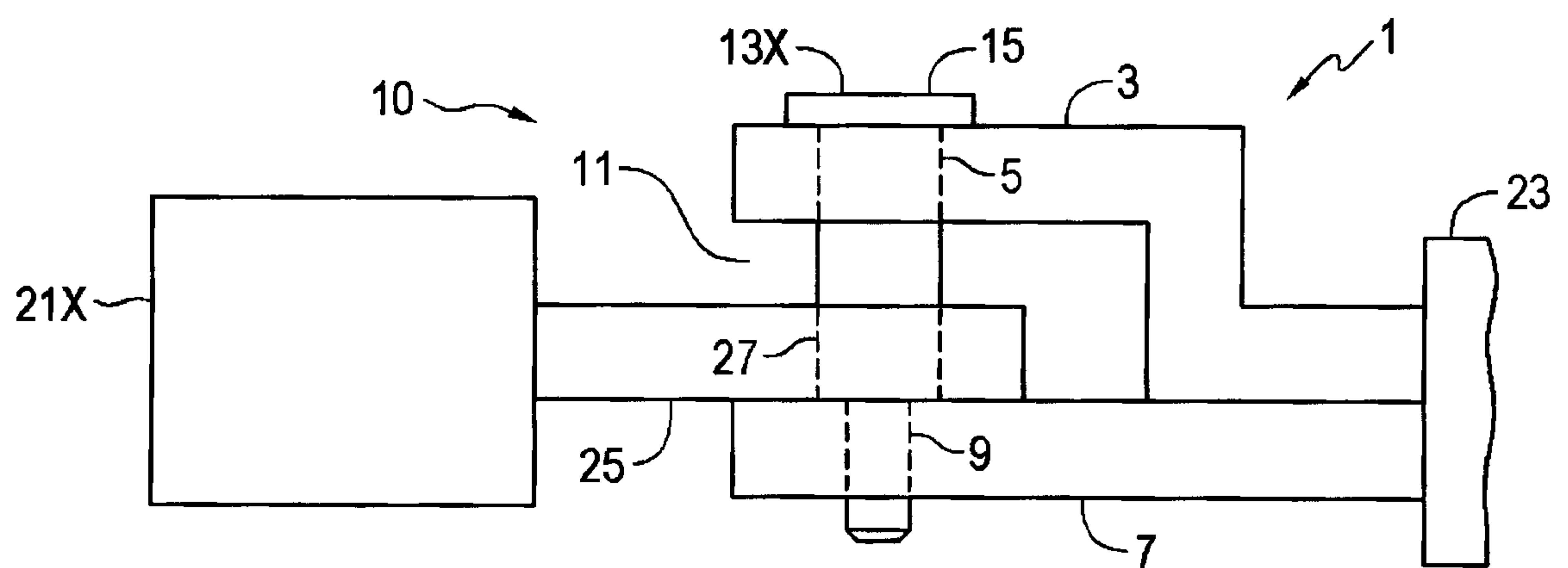
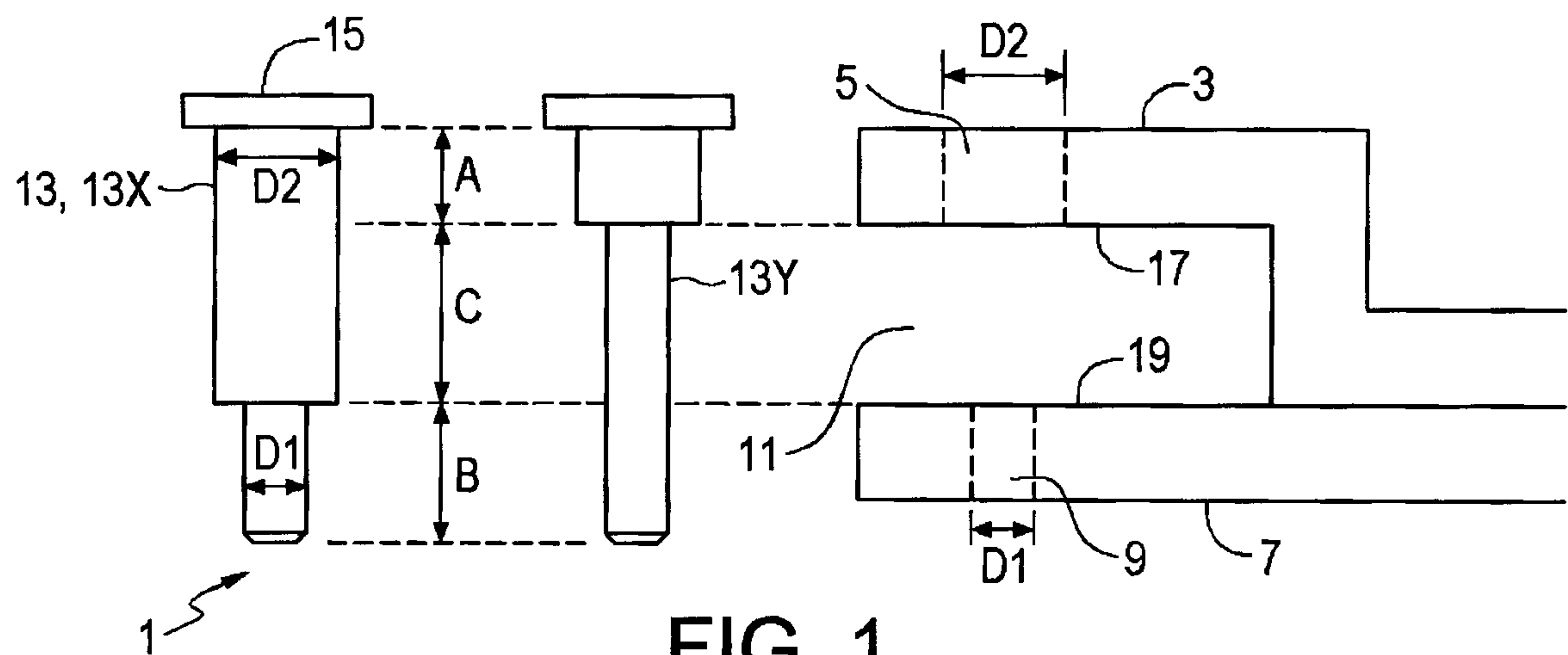
a handle pivotally attached to the head about a substantially horizontal handle pivot axis oriented substantially perpendicular to a longitudinal axis of the drawbar such that a rear bar of the handle can move from a raised position above the top strap, to a lowered position extending laterally across a front face of the front member;

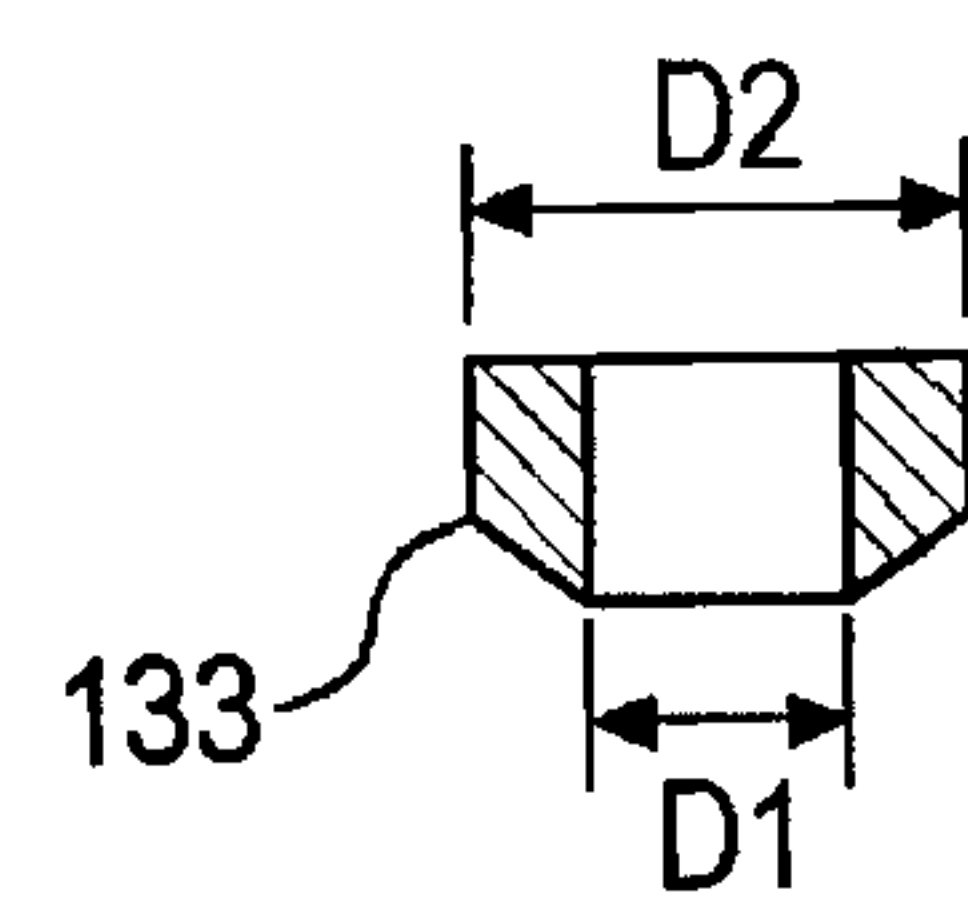
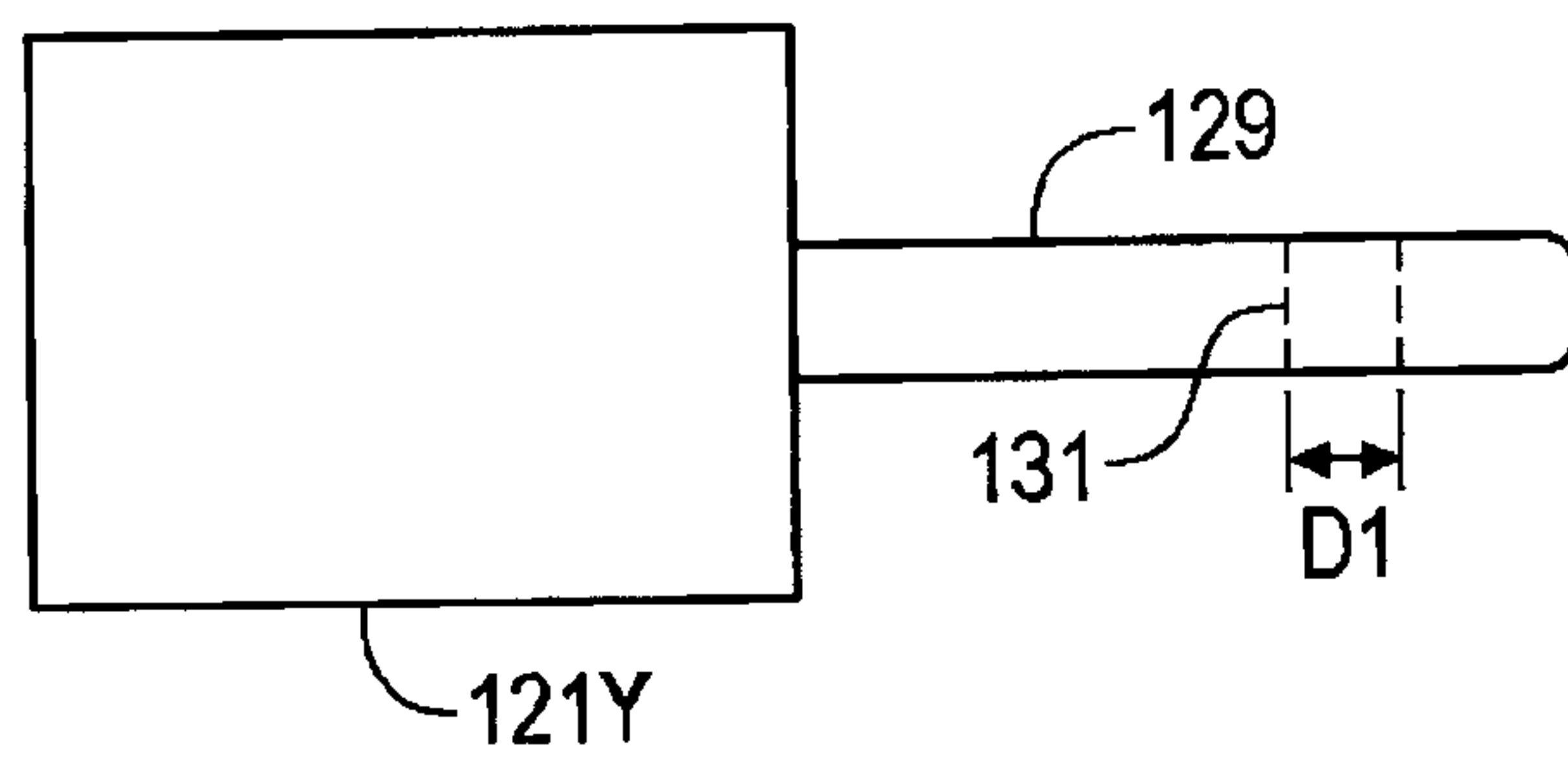
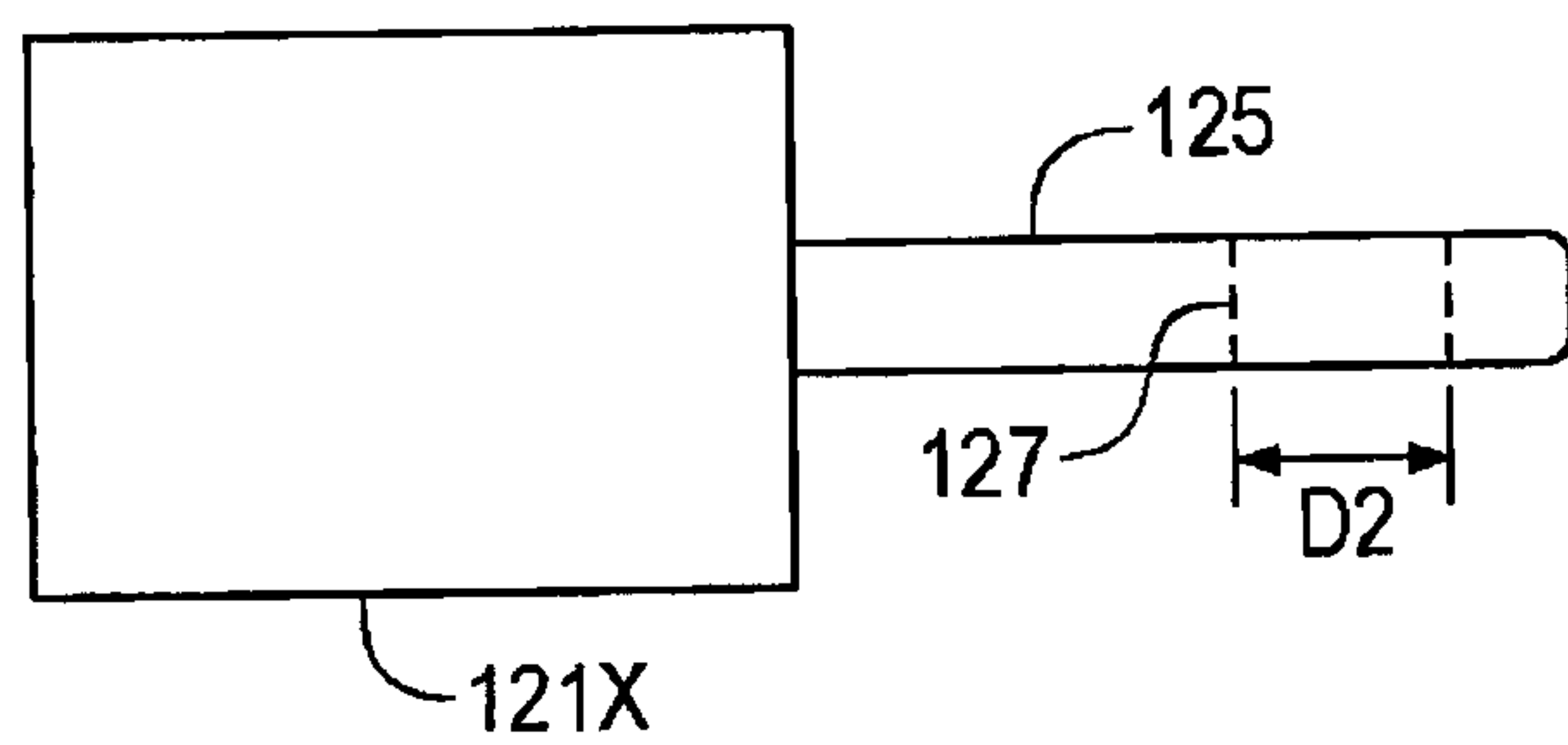
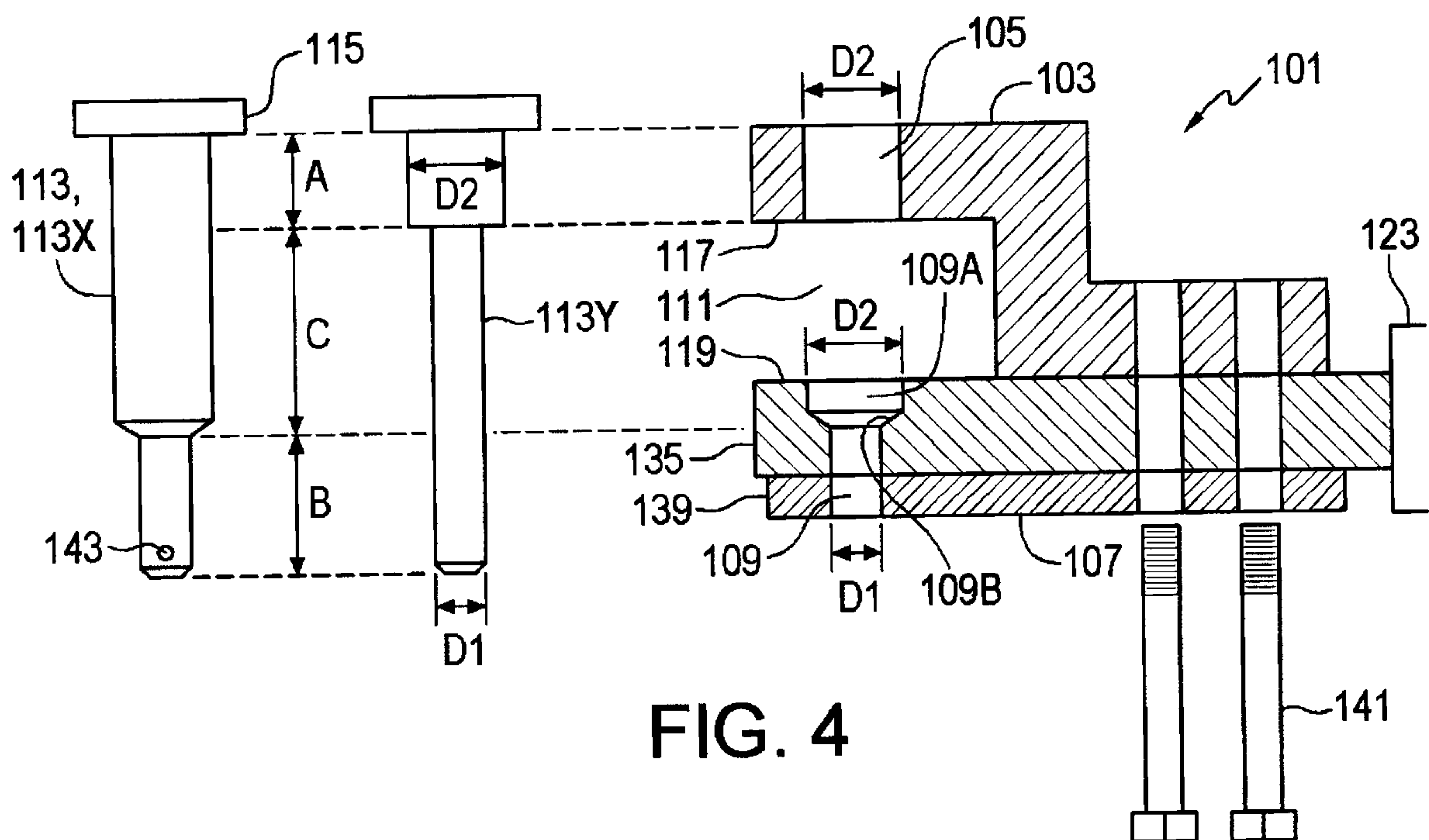
a lock member pivotally attached to the front member about a lock pivot axis such that a front portion of the lock member extends forward beyond the front face of the front member when the lock member is in a locked position;

wherein the rear bar of the handle and the lock member are configured such that when the rear bar moves down from the raised position to the lowered position the rear bar contacts the front portion of the lock member and moves the front portion of the lock member downward and rearward as the rear bar moves downward toward the lowered position, and when the rear bar is in the lowered position the lock member then pivots back to the locked position and the front portion of the lock member is above the rear bar preventing upward movement of the rear bar.

19. The apparatus of claim 18 wherein the front face of the front member defines a recess and wherein the lock member is pivotally attached inside the recess.
20. The apparatus of any one of claims 18 and 19 wherein the lock member is shaped substantially like a segment of a circle, and wherein the lock pivot axis extends through the lock member in proximity to a center of the circle and front and rear edges of the lock member extend downward and outward from a top end of the lock member to an outer arced edge of the lock member.

21. The apparatus of any one of claims 18 – 20 the front portion of the lock member is accessible when the rear bar is in the lowered position such that same may be pushed downward and forward to allow the rear bar to be raised.
22. The apparatus of any one of claims 18 – 21 wherein the top strap defines a recess configured such that the head of the pin is located in the recess and the head of the drawpin is prevented from rotating.





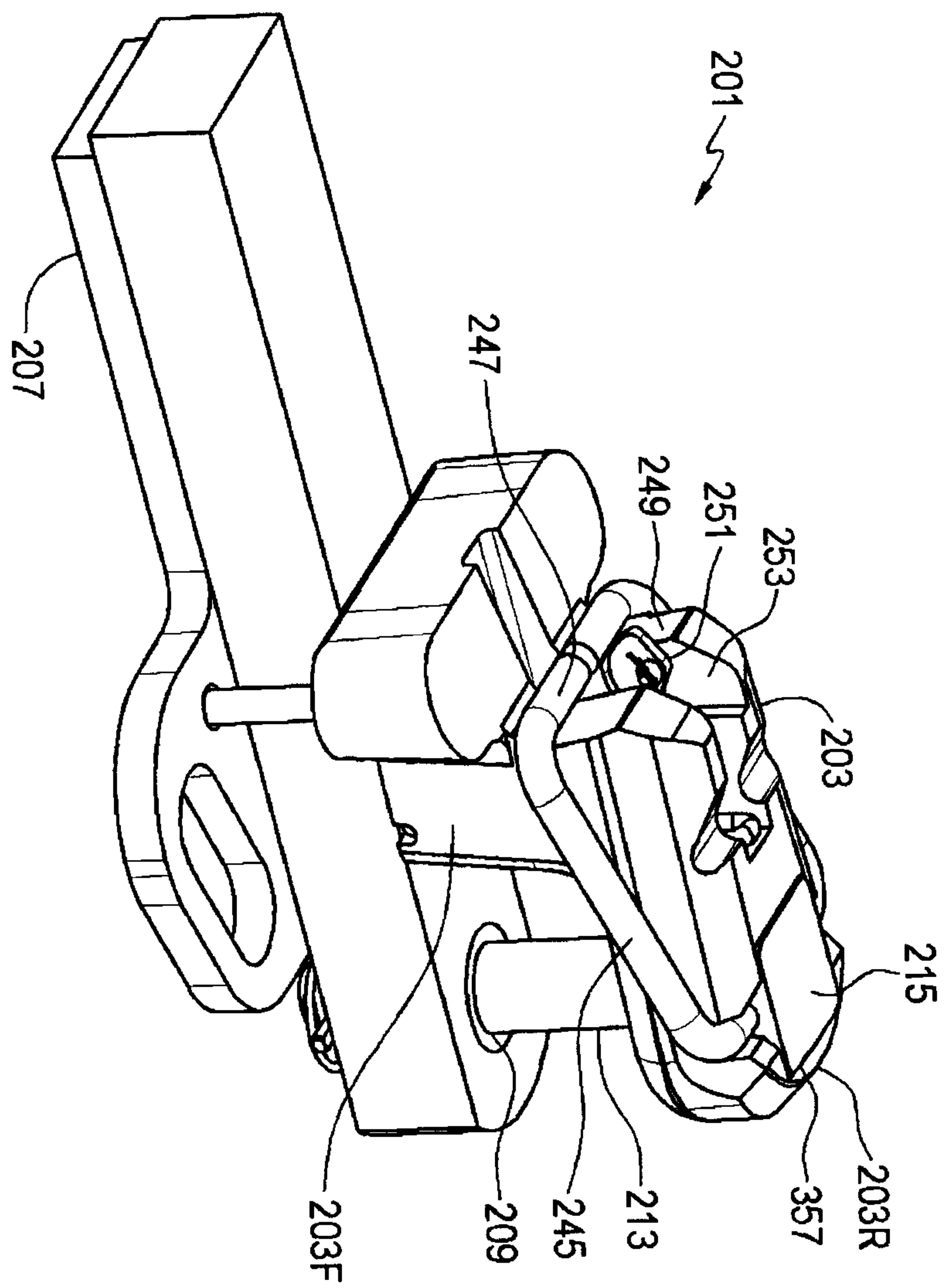


FIG. 8

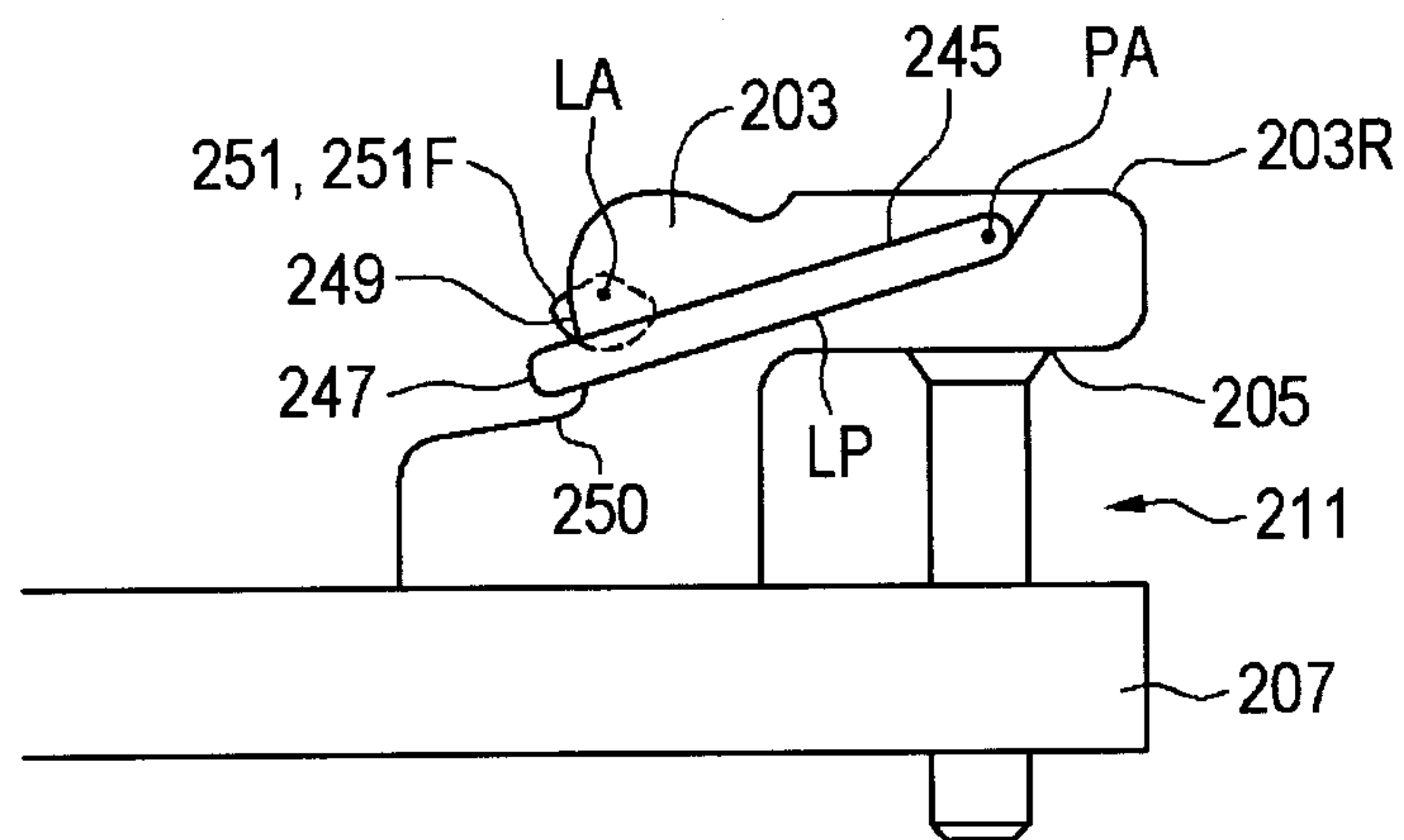


FIG. 9

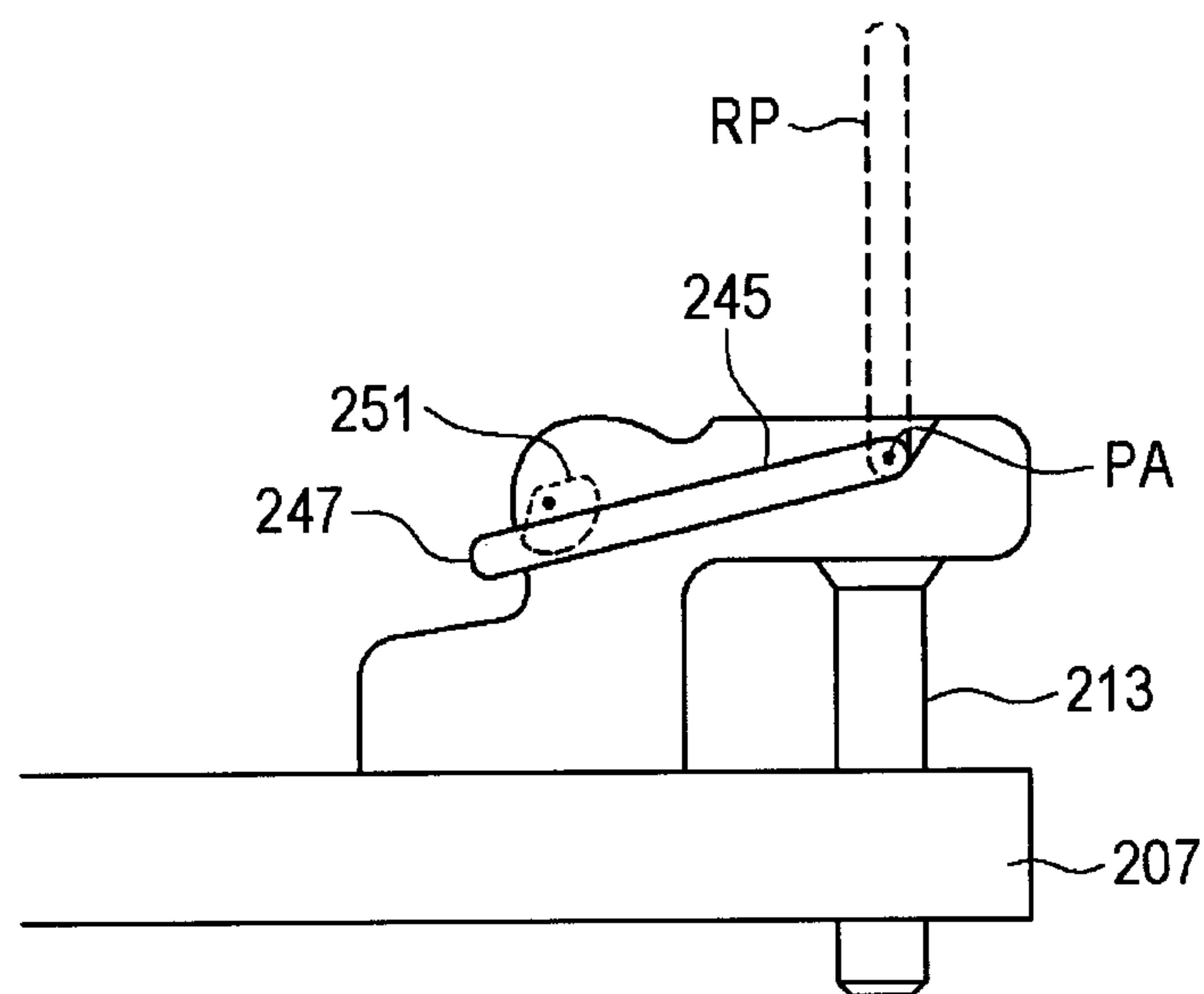


FIG. 10

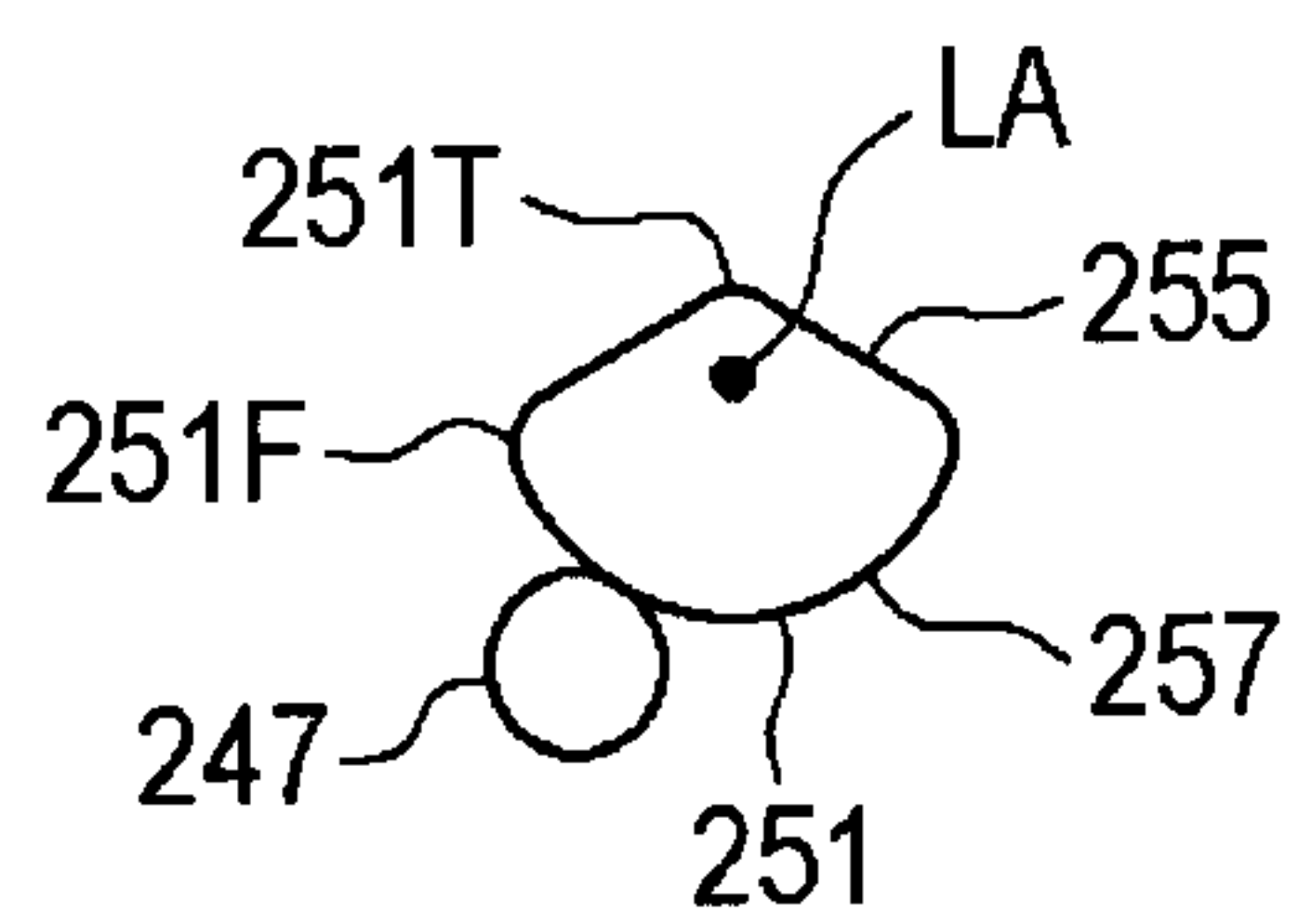


FIG. 11

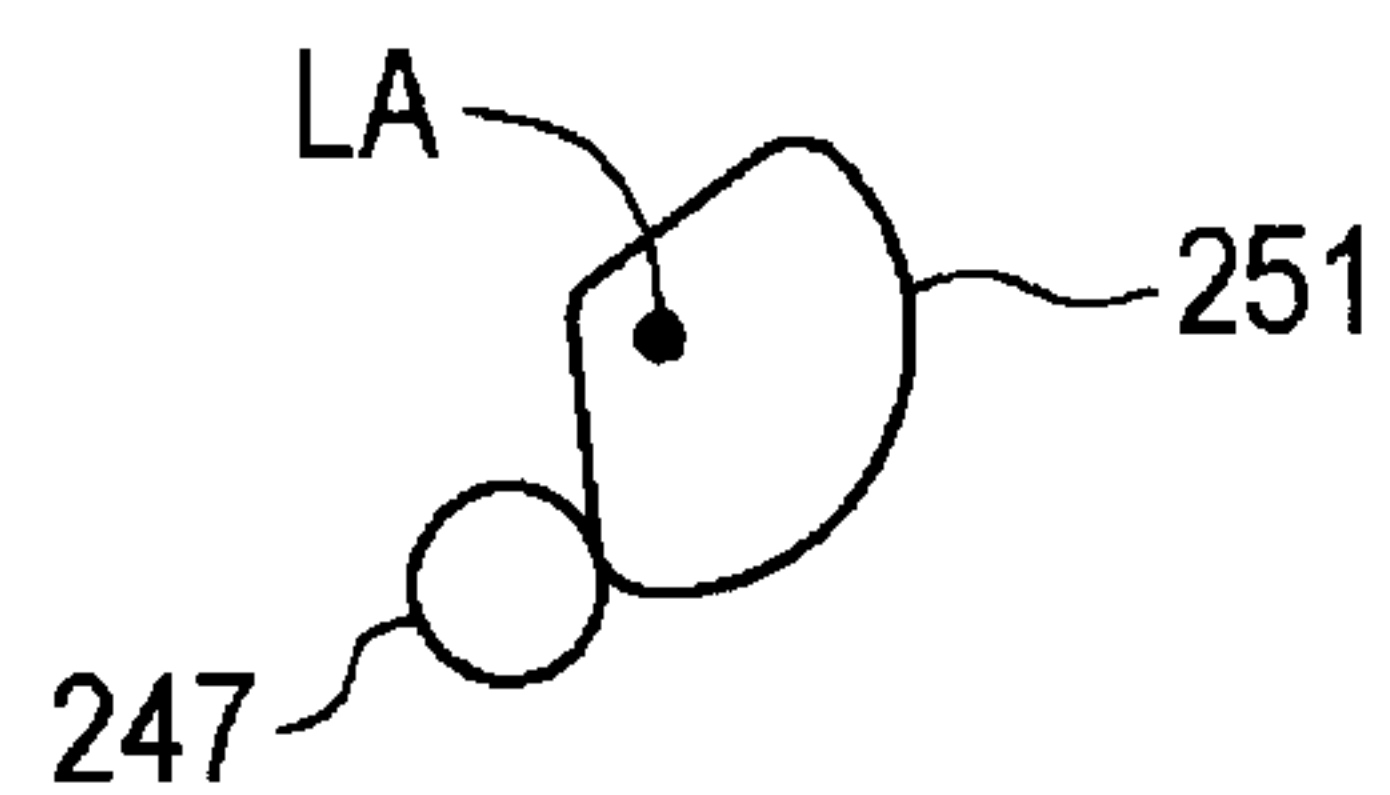


FIG. 12

