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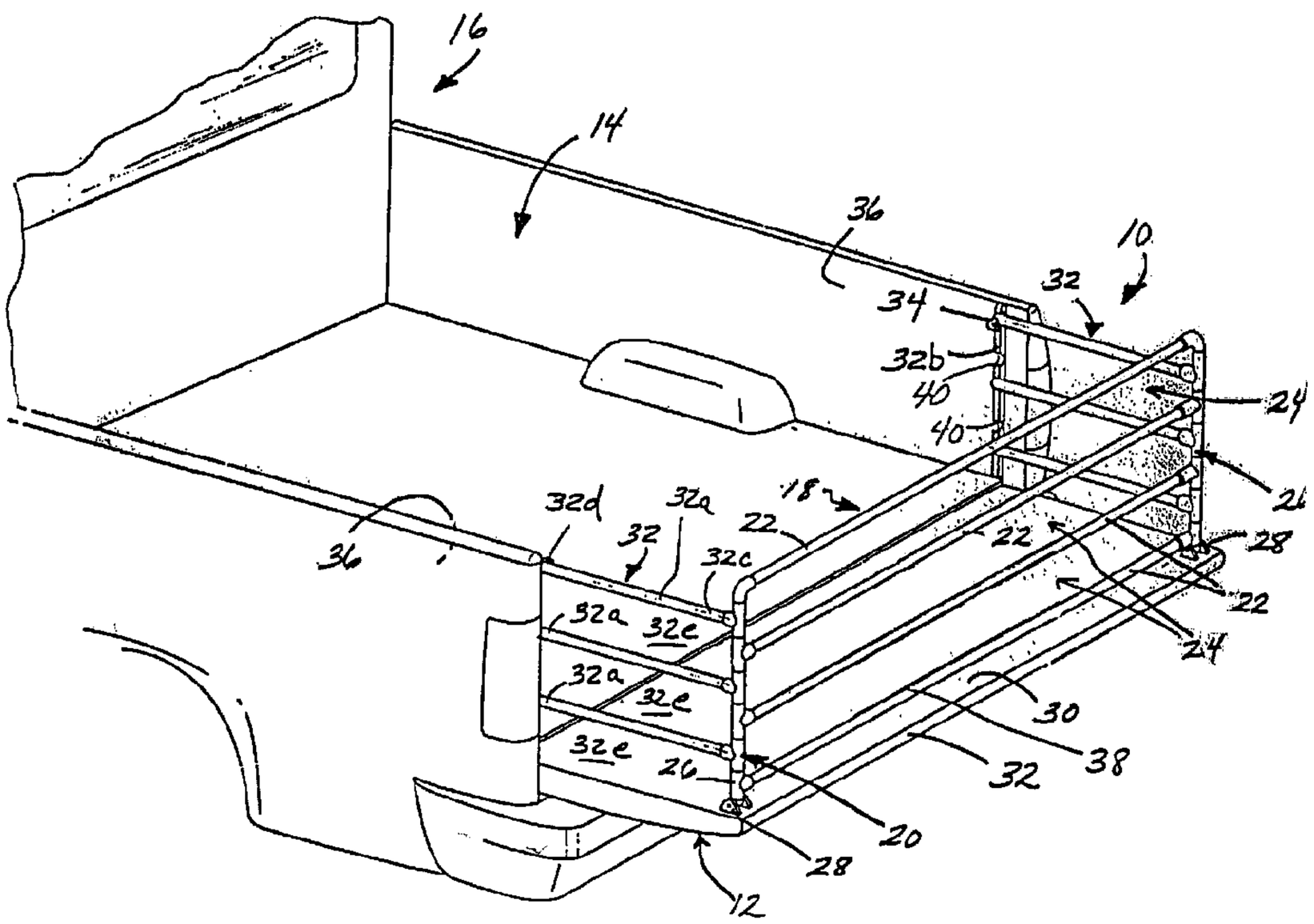
(54) Title: PICKUP TRUCK BED EXTENDER APPARATUS



(57) Abrégé/Abstract:
A bed extender apparatus adapted for use with a pickup truck bed to functionally enlarge the useable cargo area within the truck bed when a tailgate is in a lowered position. The bed extender includes a center wall which is pivotably mounted to an inner surface of the tailgate, and which can be pivoted into an upright position once the tailgate is moved into a lowered position. A pair of end walls are pivotably secured to opposite ends of the center wall. Each end wall can be pivoted out to a position extending perpendicular to the center wall once the center wall is in its raised or operative position. Each of the end walls can then be secured to an associated one of the vertical walls of the pickup truck bed. A principal advantage of the bed extender is that the end walls and center wall each include a plurality of members which, when the end walls are folded against the center wall, form an extremely compact arrangement which takes up virtually no appreciable cargo space within the pickup truck bed. The bed extender also forms an extremely aerodynamically efficient structure when in use.

ABSTRACT OF THE DISCLOSURE

A bed extender apparatus adapted for use with a pickup truck bed to functionally enlarge the useable cargo area within the truck bed when a tailgate is in a lowered position. The bed extender includes a center wall which is pivotably mounted to an inner surface of the tailgate, and which can be pivoted into an upright position once the tailgate is moved into a lowered position. A pair of end walls are pivotably secured to opposite ends of the center wall. Each end wall can be pivoted out to a position extending perpendicular to the center wall once the center wall is in its raised or operative position. Each of the end walls can then be secured to an associated one of the vertical walls of the pickup truck bed. A principal advantage of the bed extender is that the end walls and center wall each include a plurality of members which, when the end walls are folded against the center wall, form an extremely compact arrangement which takes up virtually no appreciable cargo space within the pickup truck bed. The bed extender also forms an extremely aerodynamically efficient structure when in use.

PICKUP TRUCK BED EXTENDER APPARATUS

Cross Reference to Related Application

This application is a continuation-in-part of U.S. serial no. 09/429,613, filed October 29, 1999, and presently pending.

Technical Field

This invention relates to devices adapted to be used in connection with a bed of a pickup truck to enhance the cargo carrying capacity of the pickup truck bed, and more particularly to a bed extender apparatus which is adapted to be foldably extended into position to form a three sided upright structure over the tailgate of a pickup truck bed to thereby functionally extend the useable area of the bed when the tailgate is in its lowered position.

BACKGROUND OF THE INVENTION

Discussion

Various devices have been developed in an attempt to extend the useable space within a bed of a pickup truck. Such attempts are illustrated and described in the following U.S. patents: 797,900; 2,872,239; 4,023,850; 4,136,905; 4,472,639; 4,513,773; 4,778,213; 4,824,158; 4,830,242; 5,154,470; 5,328,225; 5,700,047; 5,775,759.

The devices illustrated and described in the above-referenced patents suffer from a variety of drawbacks. Certain of the devices disclosed are relatively complicated and expensive to construct. Others interfere with placement of cargo in a pickup truck bed area when the device is not in use. Still other ones of the devices disclosed are not capable of being collapsed in an efficient, compact arrangement when the device is not in use.

Another drawback with present day bed extender devices is their inability to be quickly and easily removed from a truck bed when not needed or to be repositioned to perform a restraining function for holding smaller cargo items against movement in the bed while the vehicle is travelling. Thus, it would be desirable to provide a bed extender for a pickup truck which could be used in a first orientation to provide a bed extending function, and also used in a second orientation to provide a cargo restraining function in the truck bed.

It is still a further object of the present invention to provide a bed extender apparatus which can be quickly articulated into its operative position without the need for any external tools.

It is still another object of the present invention to provide a bed extender which is relatively inexpensive to produce and which can be secured to a tailgate of a pickup truck with little or no modifications to the tailgate and/or to the pickup truck bed.

SUMMARY OF THE INVENTION

The above and other objects are provided by a bed extender apparatus in accordance with preferred embodiments of the present invention. The bed extender apparatus of the present invention is adapted to be secured to a tailgate of a pickup truck bed and quickly and easily articulated into its operative position after the tailgate is lowered. The bed extender apparatus further does not require any external tools to place it in its operative position or to collapse it from its operative position into a "storage" or fully retracted position.

In one preferred embodiment the bed extender apparatus comprises a center wall having a width substantially in accordance with the width of the tailgate on which it is to be installed. The center wall is formed by a pair of opposing uprights between which extend a plurality of generally linear, elongated members. Each of the uprights are adapted to be pivotably secured to an inner surface of the liftgate at an upper edge of the tailgate such that the entire center wall can be pivoted upwardly once the liftgate is moved into a lowered position.

Extending from each of the uprights is an end wall. Each end wall is formed from a plurality of generally linearly extending members. Each of the members have a first end and a second end. The first ends are operatively coupled to the uprights such that each end wall can be pivoted to a position extending generally perpendicularly from the center wall once the center wall is lifted into its operative position. Each end wall further has a locking mechanism associated therewith. Each locking mechanism is adapted to engage a suitable securing member mounted at or near the rearmost portion of the upright walls of the pickup truck bed.

It is a principal advantage of the bed extender apparatus of the present invention that the elongated members of the end walls are staggered and positioned relative to the members of the center wall such that when the end walls are retracted into the stored position they can be positioned in the open areas formed between adjacent ones of the members of the center wall. This allows the end walls to be stored within the plane formed by the members of the center wall but without interference from the center wall members. When in the stored position, the end walls and center wall form a very thin, compact assembly which rests against an inner surface of the tailgate.

When in the operative position, the bed extender apparatus of the present invention forms an extremely strong yet aerodynamically efficient structure which allows the useable space of the pickup truck bed to be functionally enlarged by forming a three-sided wall portion over the tailgate. Another important advantage of the bed extender apparatus is that it does not take up any significant cargo area within the pickup truck bed when it is in its stored position.

In an alternative preferred embodiment of the present invention a bed extender is disclosed which can be quickly and easily removed from a tailgate to which it is attached and reattached so as to form a cargo restraining area within the bed of a pickup truck. With this embodiment a first pair of mounting elements are fixedly disposed within the tailgate. A second pair of mounting elements are fixedly disposed at upper areas of sidewalls of the truck bed adjacent the tailgate. A third pair of mounting elements are fixedly disposed in the bed forwardly of the first pair.

The bed extender is similar to the previous embodiments discussed in that a pair of uprights are formed by a plurality of T-shaped fittings secured together by rods

which extend substantially the entire length of each upright. The T-shaped fittings are secured alternately to main supports which extend between the two uprights to form a center wall, and a plurality of end support members which form two separate endwalls. The main supports are spaced apart parallel to one another to form a plurality of open areas therebetween. The end support members can be pivoted down to rest inbetween, and flush with, the main supports.

A principal advantage with the alternative preferred embodiment described above is the inclusion of quick release mounting assemblies incorporated at the bottom of each upright, and a pair of quick release latching pins associated with the end walls. The quick release mounting assemblies engage with the first pair of mounting elements to maintain the center wall securely attached to the tailgate. Since the mounting assemblies and mounting pins can be quickly and easily manually released, the entire bed extender can be removed from the tailgate. The bed extender can then be rotated 180 degrees and the quick release mounting assemblies secured to the third pair of mounting elements. This positions the center wall within the area of the truck bed. The locking mechanisms of the end walls can then be secured to the second pair of mounting elements disposed on the sidewalls of the truck bed. When the tailgate is in a raised position, the bed extender thus forms a cargo restraining device for holding smaller articles in the bed against movement.

BRIEF DESCRIPTION OF THE DRAWINGS

The various advantages of the present invention will become apparent to one skilled in the art by reading the following specification and subjoined claims and by referencing the following drawings in which:

Figure 1 is a perspective view of a bed extender apparatus in accordance with a preferred embodiment of the present invention secured to a pickup truck bed, showing the apparatus in its operative position;

Figure 2 is a plan view of the bed extender apparatus of Figure 1;

Figure 3 is a cross sectional end view in accordance with section line 3-3 in Figure 2 illustrating how compactly the members of each of the center wall and the end walls reside within a generally common plane when the bed extender is in its stored position;

Figure 4 is a side, fragmentary view of a portion of the center wall pivotably secured via a mounting bracket to an inner surface of the tailgate;

Figure 4a is a cross sectional view taken in accordance with section line 4a-4a in Figure 4 of the bracket member which secures an associated upright for pivotable movement; and

Figure 5 is a fragmentary, perspective view of a portion of the end wall illustrating more clearly the locking mechanism which secures the end wall to the vertical wall of the pickup truck bed.

Figure 6 is a perspective view of a portion of a locking mechanism in accordance with an alternative preferred embodiment of the present invention.

Figure 7 is a perspective view of a bed extender in accordance with an alternative preferred embodiment of the present invention;

Figure 8 is a top view of the bed extender of Figure 7;

Figure 9 is a rear view of the bed extender of Figure 7;

Figure 10 is a partial cross-sectional side view of the bed extender showing the center wall in its fully raised position;

Figure 11 is a view of the center wall shown in Figure 10 after having been tilted rearwardly to unlock the locking pin from its mounting element;

Figure 12 is a side view of the locking pin used with the bed extender of the present invention;

Figures 13-16 are views of the mounting element;

Figure 17 is a plan view of the truck bed with the bed extender mounted to pen rearwardly, thus forming a cargo restraining implement;

Figure 18 is a side view of the quick release mounting assembly secured to each of the uprights;

Figure 19 is a side view of a quick release clamping assembly used to secure the bed extender in a folded position;

Figure 20 is a perspective view of the bed extender in its folded position;

Figure 21 is a side view of the bed extender in its folded position; and

Figures 22-25 illustrate the first mounting element.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figure 1, there is shown a pickup truck bed extender 10 in accordance with a preferred embodiment of the present invention. The bed extender 10 is shown secured to a tailgate 12 of a pickup truck bed 14 of a vehicle 16. The bed extender 10 generally comprises a center wall 18 and a pair of end walls 32. The center wall 18 has a pair of uprights 20 and a plurality of linear, elongated members 22 extending between the uprights 20. The members 22 are spaced apart so as to provide open areas 24 between adjacent ones of the members 22. Each upright 20 is secured at a first end 26 by a bracket member 28 which is fixedly secured to an inner surface 30 of the tailgate 12 near an upper edge 32 of the tailgate 12. The brackets 28 allow the uprights 20 to be pivoted between the position shown in Figure 1 (i.e., the operative position) and the stored or retracted position shown in Figure 2.

Pivotably secured to each upright 20 is one of the end walls 32. Each end wall 32 is formed by a plurality of elongated members 32a which are secured to a common end post 32b. The members 32a extend generally parallel to one another to form open areas 32e therebetween. The end wall 32 is secured at a first end 32c to an associated one of the uprights 20. A second end 32d thereof is secured via a locking mechanism 34 to an associated vertical wall 36 of the pickup truck bed 14.

When in the operative position shown in Figure 1, the bed extender 10 forms a strong yet very aerodynamically efficient means for functionally extending the useable interior area of the truck bed 14. The open areas 24 and 32e allow air to flow easily

through the bed extender 10 thus significantly reducing the wind drag which would typically be produced by other forms of bed extenders.

With further reference to Figure 1, one or more support blocks 38 may also be fixedly secured to the inner surface 30 of the liftgate 12 to help support the center wall 18 when the bed extender 10 is in its stored position. To assist in accomplishing this, each support block 38 preferably includes a plurality of recesses or cutouts 40 formed so as to receive portions of the support members 22 of the center wall 18 when the center wall is folded into its stored position. Preferably, metal interfering clips could be provided in the recesses 40 to releasably latch onto their associated members 22 when the center wall is folded down into its stored position.

Referring now to Figure 2, the bed extender 10 is illustrated in its stored position. The members 32a of the end walls 32 fit within the open areas 24 between adjacent ones of the members 22. As such, the members 32a rest within the same plane as the members 22, as can be even better seen in Figure 3. The members 22 rest in the recesses 40 of the support blocks 38 to help prevent vibration or rattling when the vehicle 16 is travelling over rough surfaces.

Each of the members 32a of the end walls 32 preferably are secured by T-shaped fittings 42 to a frame member 44 which extends through each of the fittings 42. Similarly, each member 22 is secured by identical T-shaped fittings 42 to the frame member 44. It will be appreciated, however, that any means which allows the members 32a to be pivoted relative to the center wall 18 may be used to couple the members 32a to the uprights 20. The members 32a and 22 may comprise lightweight, tubular metal components such as tubular aluminum or steel lengths which are lightweight and yet structurally strong.

Referring now to Figures 1 and 4 and 4a, a portion of one of the uprights 20 can be seen with the bracket member 28 shown in enlarged fashion coupling the upright 20 to the inner surface 30 of the tailgate 12. The bracket member 28 preferably forms a U-shaped component having a threaded bolt 46 or other like member which extends through openings 48 to pivotably secure the first end 26 of the upright 20 thereto. It will be appreciated, however, that a variety of differently shaped brackets could be employed, the only requirement being that the bracket allow easy pivoting movement of the upright 20 between its operative and stored positions. The bracket member 28 is preferably formed from metal or another suitably high strength material.

Referring now to Figure 5, the locking mechanism 34 and an associated securing member 50 can be seen in greater detail. The locking mechanism 34 preferably comprises a curved locking member 52 which extends through an opening 54 in an end of one of the members 32a. The locking member 52 preferably includes two L-shaped ends, a portion 52a being adapted to be manually grasped by an individual, and portion 52b adapted to engage within an opening 50a of the securing member 50. A spring 56 is operably associated with the locking member 52 so as to bias portion 52a away from the member 32a once portion 52b is inserted within the opening 50a and rotated approximately 90° into the position shown in Figure 5. Securing member 50 is preferably fixedly attached to the vertical wall portion 36 of the truck bed 14. Thus, to lock the end wall 32 associated with locking mechanism 34, the user pushes against portion 52a which causes portion 52b to enter the opening 50a and, while maintaining this pushing force, rotates portion 52a either clockwise or counterclockwise 90° before releasing the locking member 52.

Referring to Figure 6, an alternative preferred embodiment 60 of the locking mechanism 34 will be described. The locking mechanism 60, which is the more preferred locking arrangement at the present time, includes an elastic strap 62 which is captively secured by a U-shaped member 64 fastened to the end post 32b, such as by threaded screws (not shown). The strap 62 includes an opening 66 and a handle portion 68. The handle portion 68 can be grasped to stretch the strap 62. A securing post 70 is fixedly secured by a threaded screw 72 to the inside surface 36a of the vertical wall 36 of the truck bed 14. A U-shaped bracket 74 having an opening 76 is also fixedly secured to the inside surface 36a of the wall 36 of the truck bed 14.

The end post 32b is preferably molded from a suitably high strength plastic and includes a projecting portion 78. The end post 32b may further include a recessed area (not shown) immediately surrounding the projection portion 78.

The end wall 32 is secured to the bracket 74 by positioning the end post 32b such that the projecting portion 78 fits within the opening 76 in the bracket 74. The user than grasps the strap 62 by handle portion 68 pulls outwardly while urging the strap over the securing post 70. In this manner the end post 32b is held securely to the bracket 74.

To articulate the apparatus 10 from the position shown in Figure 2 into the position shown in Figure 1, the user first lifts the center wall 18 upwardly until it is approximately perpendicular to the upper surface 30 of the tailgate 12. The user then folds out each of the end walls 32 into the position shown in Figure 1. The locking mechanism 34 associated with each end wall 32 can then be secured to its associated securing member 50. Collapsing of the bed extender 10 is performed in the opposite order just given.

The bed extender apparatus 10 thus forms a relatively low cost, easy to install and use apparatus for functionally enlarging the useable cargo area of a pickup truck bed. Importantly, when not in use, the bed extender 10 of the present invention forms an extremely compact assembly which does not take up any appreciable cargo area within a pickup truck bed. The apparatus is easy to construct, strong and yet light in weight and is extremely aerodynamically efficient when in use. The bed extender 10 forms an extremely slim, compact arrangement when not in use.

Referring now to Figures 7-9, a bed extender 100 is illustrated in accordance with an alternative preferred embodiment of the present invention. The bed extender 100 is similar to the bed extender 10 in that it includes a center wall 102 and a pair of end walls 104. The center wall 102 includes a pair of uprights 106 at its outermost ends which are formed by a plurality of tubular, T-shaped fittings 108 and 108a. Alternating ones of the fittings 108 are coupled to main supports 110 and to end wall support members 112. The main supports 110 and end wall support members 112 are each preferably formed by tubular lengths of strong yet lightweight material, such as aluminum, or any other suitably strong and lightweight material. As shown in Figure 10, a rod 114 runs through each of the T-shaped fittings 108 and is threadably secured to a terminal fastening element 116.

The center wall 102 includes a manually graspable hold down element 119 having a threaded shaft 119a that can be engaged with a rivnut (not shown) disposed in the tailgate 12 when the center wall is in its folded orientation. Turning the hold down element 119 allows the user to quickly lock the center wall 102 in a folded position.

A lower end of each upright 106 includes a slot 122 and a through aperture 124. A pivot pin 126 is used to secure the lower end to a quick release mounting assembly 128, shown in Figure 18, which is in turn fixedly secured to the tailgate 12 of the vehicle 16. A camming surface 130, as best shown in Figures 10 and 11, makes contact with a spring biased latching pin 132 captively retained in a housing 134 (Figure 18) of the mounting assembly 128 when the center wall 102 is pivoted in the direction of arrow 136. This pivoting motion depresses a plunger 132a of the latching pin 132 which allows the latching pin 132 to be disengaged from one of a first pair of mounting elements 133 fixedly secured to the inside surface of the tailgate 12. One of the mounting elements 133 is shown in Figures 22-25 and includes a central opening 133a for receiving the latching pin 132 and a pair of holes 133b for allowing conventional fastening elements to be used to secure the mounting element 133 to the tailgate 12. A shoulder portion 133c engages a portion of the latching pin 132 to maintain the latching pin 132 secured thereto.

Referring further to Figures 7-9, the end walls 104 also each include an end post 140. Each end post 140 is secured to an outermost end of one of the end wall support members 112, and each includes a plurality of recesses 141 for accepting the outermost end portions of the support members 112. Pins, threaded screws or even adhesives can be used to secure the outermost ends of the support members 112 within their respective recesses 141.

Each end post 140 further includes a locking mechanism 142 for securing its associated end wall 104 to one of a pair of second mounting elements 154, which are in turn secured to an inside surface 36a of the sidewall 36 of the bed 14. The locking mechanism 142 includes a housing 146 which has a captively held, spring biased

latching pin 148, also shown in Figure 12, secured thereto. The locking mechanisms 142 allow the end walls 104 to be quickly and easily secured to the sidewalls 36.

Referring now to Figures 13-16, one of the second pair of mounting elements 154 is illustrated. The mounting element 154 is secured to a frame member disposed within the tailgate 12 by a pair of conventional fastening elements which extend through openings 156. Central opening 158 has an internal shoulder portion 160 (Figure 14) which engages the latching pin 132 to maintain it secured thereto.

Latching pins 132 and 148 are identical in construction, and thus only one will be described. Referring to Figure 12, latching pin 148 is known in the industry as a "positive lock pin". This component is commercially available from Pivot Point, Inc. of Hustisford, WI. The plunger 148a of latching pin 148 includes ball bearings 148b spring biased by an internally mounted spring (not shown). The ball bearings 148b engage with the internal shoulder 160 of the mounting element 164 (shown in Figure 14) to maintain the uprights 106 secured to the mounting elements 154. Pushing on the plunger 132a allows ball bearings 148b to be retracted so that the latching pin 148 can be removed from the mounting element 154. With the support columns 106 and locking mechanisms 142 unlatched from their respective securing structures the assembly comprising the center wall 102 and end walls 104 can be removed.

A principal advantage of the bed extender 100 is that once detached, it can be rotated 180 degrees and reattached so as to open rearwardly. This is shown in simplified form in the plan view of Figure 17. The quick release mounting assembly of each upright 106 is attached to a respective one of a third pair of mounting elements 155 mounted within a floor 14a of the bed 14. Mounting elements 155 are spaced apart such that the uprights 106 can be directly secured thereto. Mounting

elements 155 are identical in construction to mounting elements 154. The locking mechanisms 142 are secured to their respective mounting elements 154 to hold the end walls 104 to the vehicle's sidewalls 36.

When positioned to open rearwardly as shown in Figure 17, the bed extender 100 can function as a cargo restraining device to restrain small and medium sized items of cargo therewith. The tailgate 12 is positioned in its closed position and thus forms one wall which cooperates with the bed extender 100 in defining the area within which cargo can be placed. In this orientation, the bed extender 100 prevents small and medium sized cargo items from moving around within the bed 14 when the vehicle 16 is in motion.

With either of the embodiments 10 or 100 of the bed extender, a quick release clamping assembly 180, shown in Figure 19, can be incorporated with the center wall 18 or 102 to clamp the center wall to an inside surface 12a of the tailgate 12 when the bed extender 100 is in its folded orientation. This clamping assembly 180 is commercially available from Southco, Inc. of Concordville, PA. The clamping assembly includes a lever 182 which is pivotally attached to a threaded shaft 184. The lever includes a camming surface 186. A washer 188 and a bushing 190 are both disposed over the shaft 184. A nut 185 secures the washer 188 and bushing 190 to the shaft 184.

The clamping assembly 180 is secured to a central area of the center wall 102. A hole is formed on an inside surface of the tailgate 12 at the point of contact of the shaft 184 when the center wall 102 is folded down onto the tailgate 12. The bushing 190 extends down into the hole. When the lever 182 is urged into the position shown in Figure 19, the bushing 190 is compressed, causing it to bulge outward. The

bulging portion is disposed within the hole, which maintains the assembly 180 secured to the tailgate 12.

The bed extender 100 is shown in its folded orientation in Figures 20 and 21. Recesses 140a in the end posts 140 allow them to be folded down over the middle support 110. In this manner the bed extender 100 forms a very compact assembly that does not interfere with the area of the bed 14a when not in use.

Those skilled in the art can now appreciate from the foregoing description that the broad teachings of the present invention can be implemented in a variety of forms. Therefore, while this invention has been described in connection with particular examples thereof, the true scope of the invention should not be so limited since other modifications will become apparent to the skilled practitioner upon a study of the drawings, specification and following claims.

WHAT IS CLAIMED IS:

1. A bed extender apparatus for enlarging the effective cargo area of a bed of a pickup truck, comprising:

an center wall having a length sufficient to extend along a major portion of a tailgate of said pickup truck;

a pair of sidewalls pivotally secured to said center wall at opposite longitudinal ends of said center wall to form a;

at least one first mounting element fixedly secured to an inner wall of said tailgate;

at least one second mounting element secured to one of said sidewalls of said bed of said pickup truck;

at least one base assembly forming a portion of said center wall for pivotally and detachably supporting said center wall to said one first mounting element, said base assembly, said center wall and said sidewall forming a cargo extending assembly;

at least one locking mechanism for engaging said second mounting element to secure said one sidewall to said sidewall of said pickup truck bed;

at least one third mounting element disposed within said bed forwardly of said first and second mounting elements; and

wherein said cargo extending assembly can be detached from said first and second mounting elements, reoriented 180 degrees and resecured within said bed with said base assembly detachably engaging said third mounting element and said locking mechanism detachably engaging said second mounting element, to thereby perform a cargo restraining function.

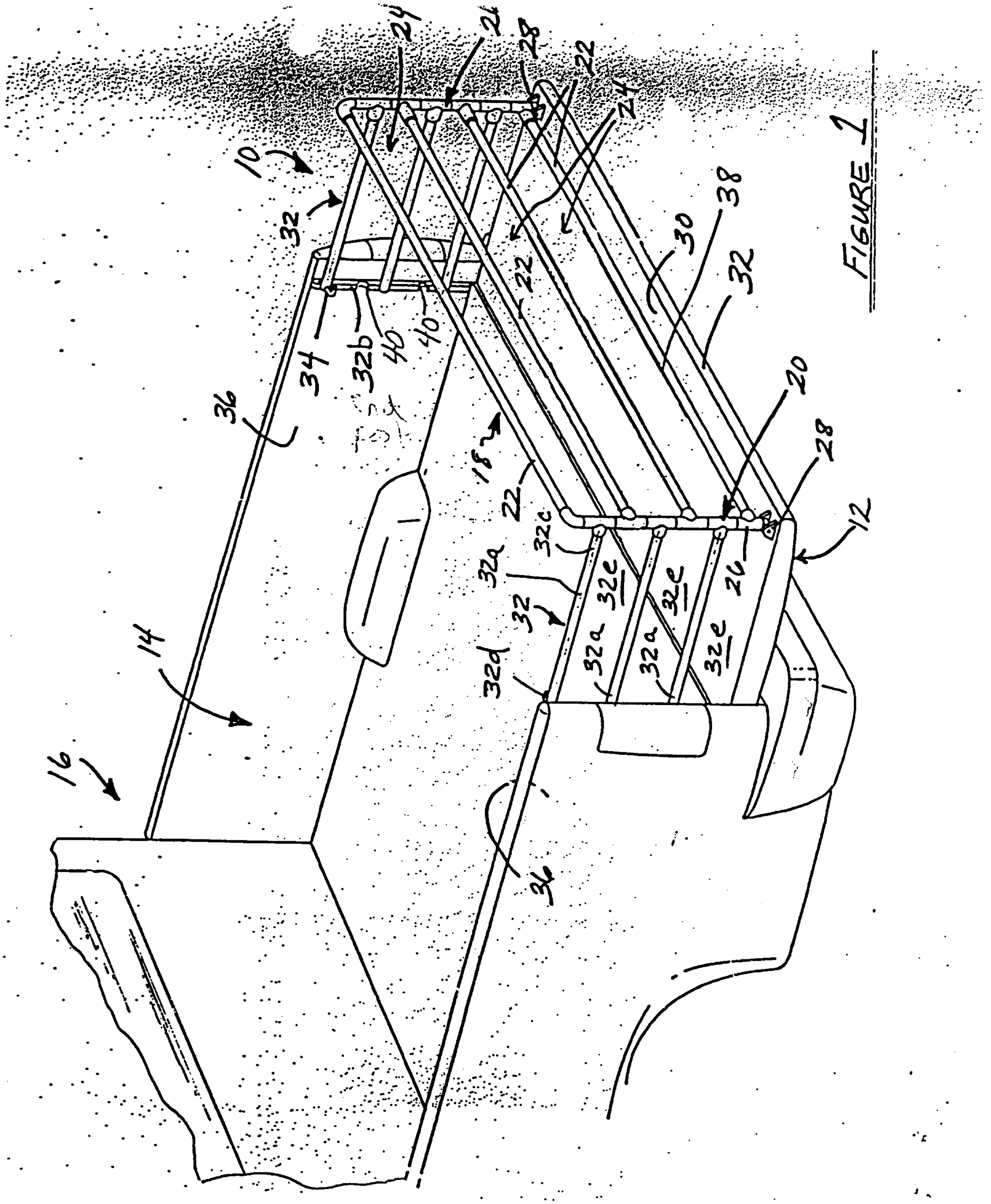

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FIGURE 1

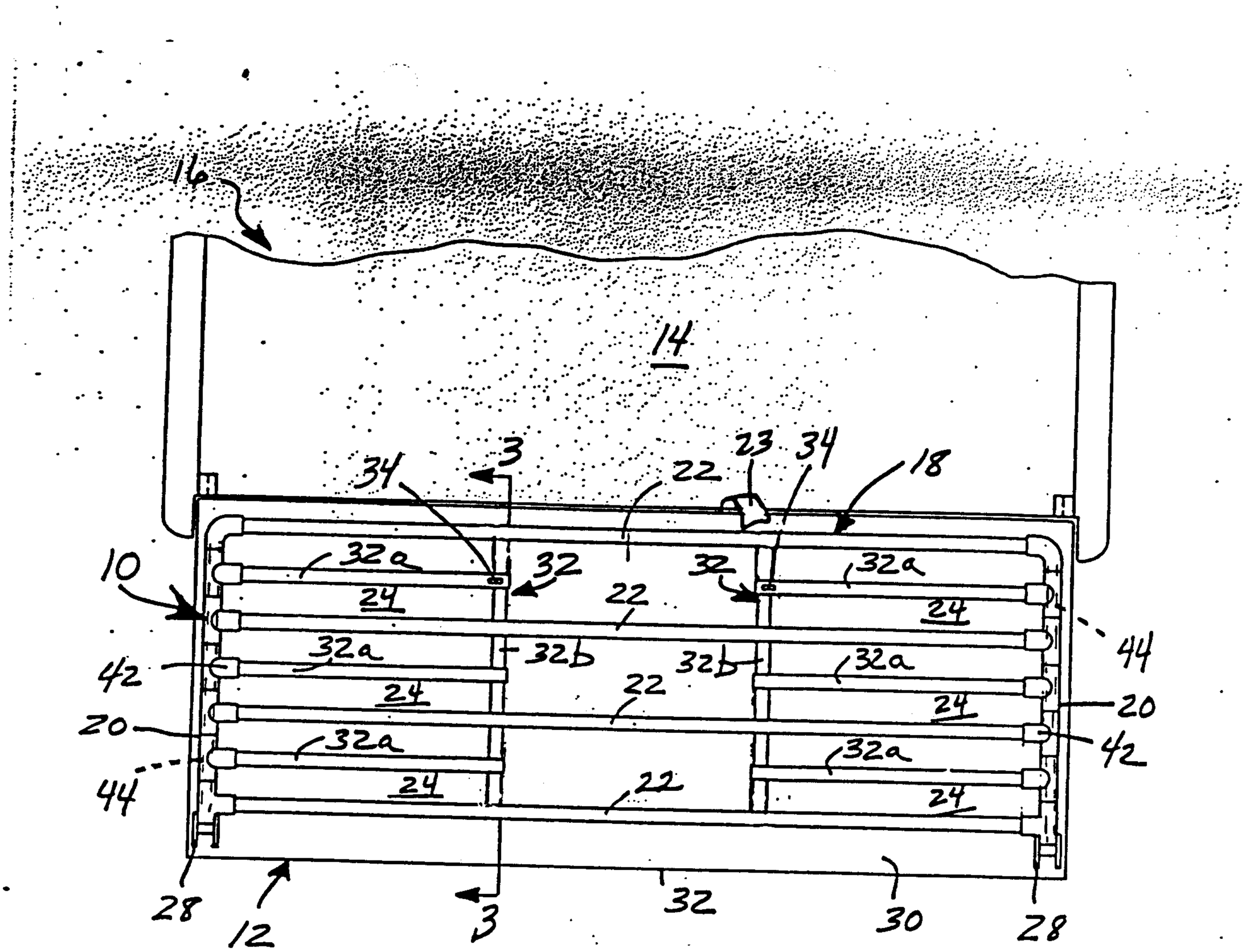


FIGURE 2

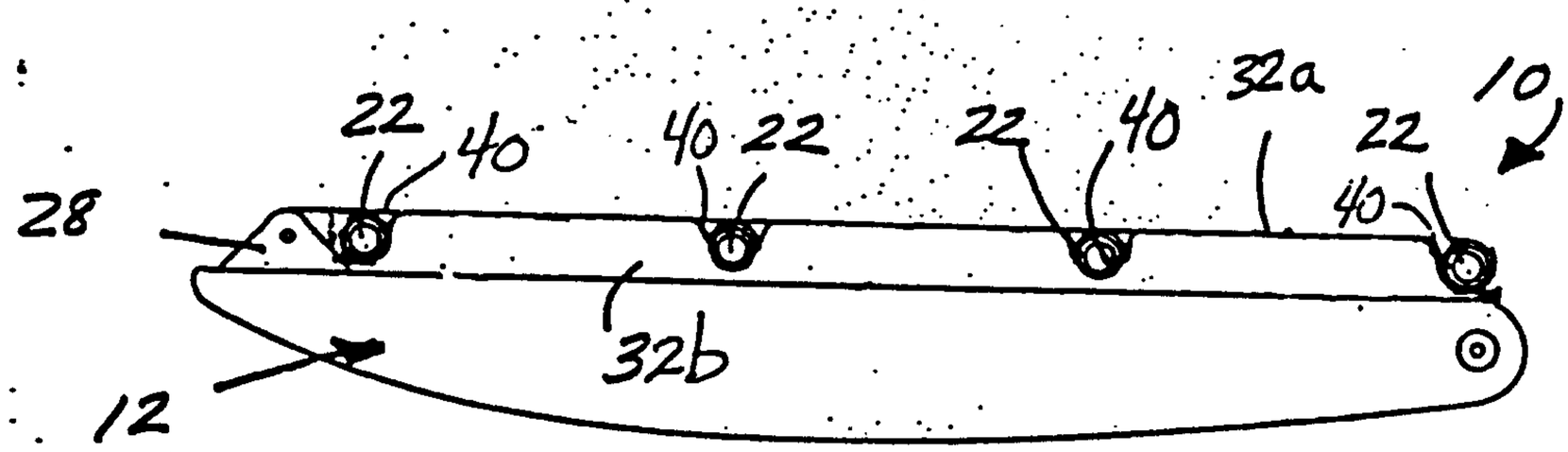


FIGURE 3

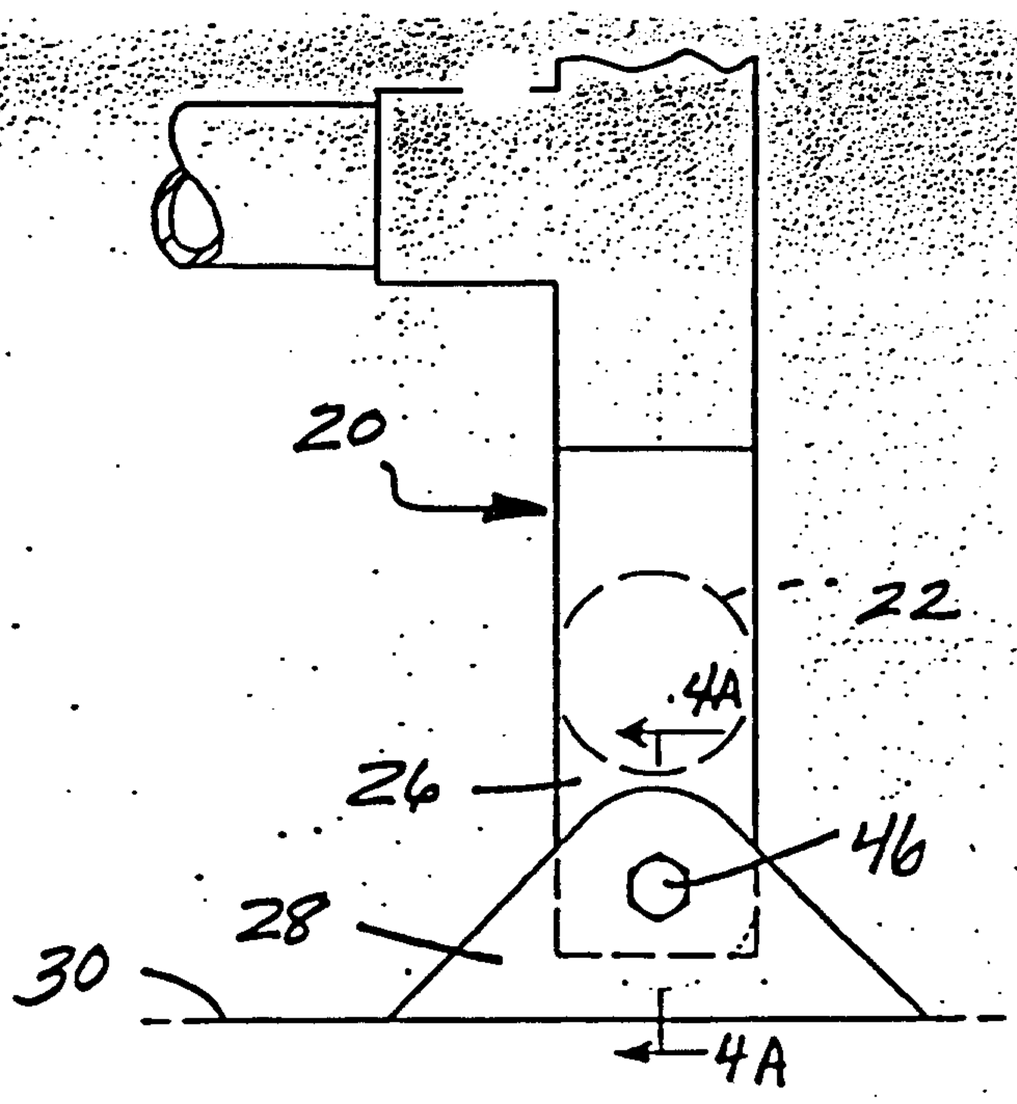


FIGURE 4

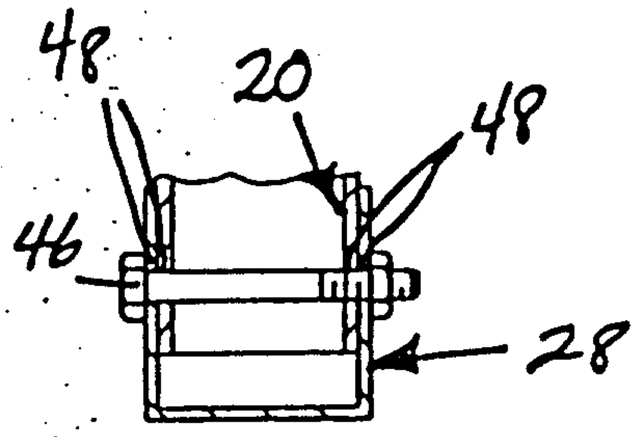
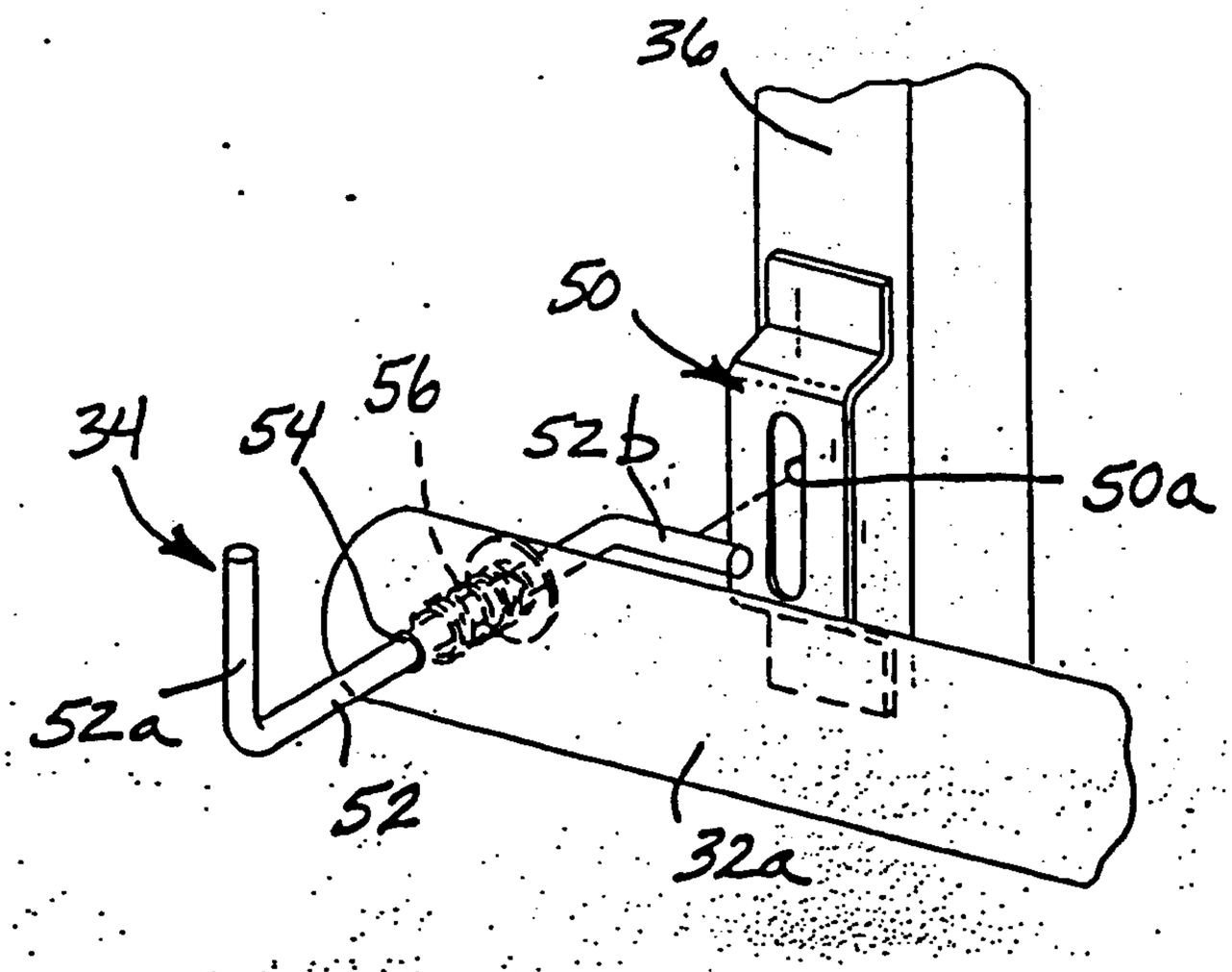


FIGURE 4A



FIGUBE 5

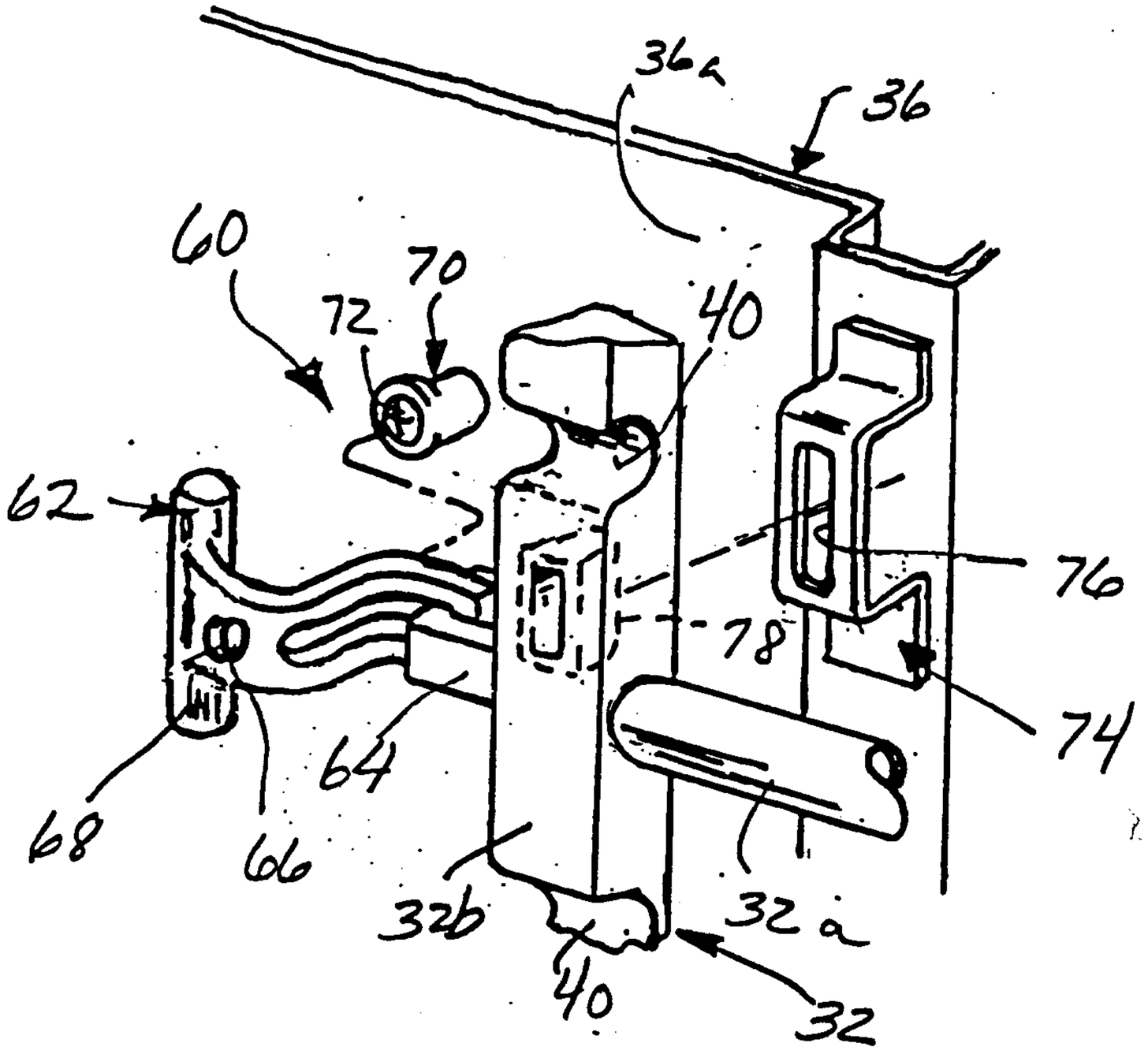


FIGURE 6

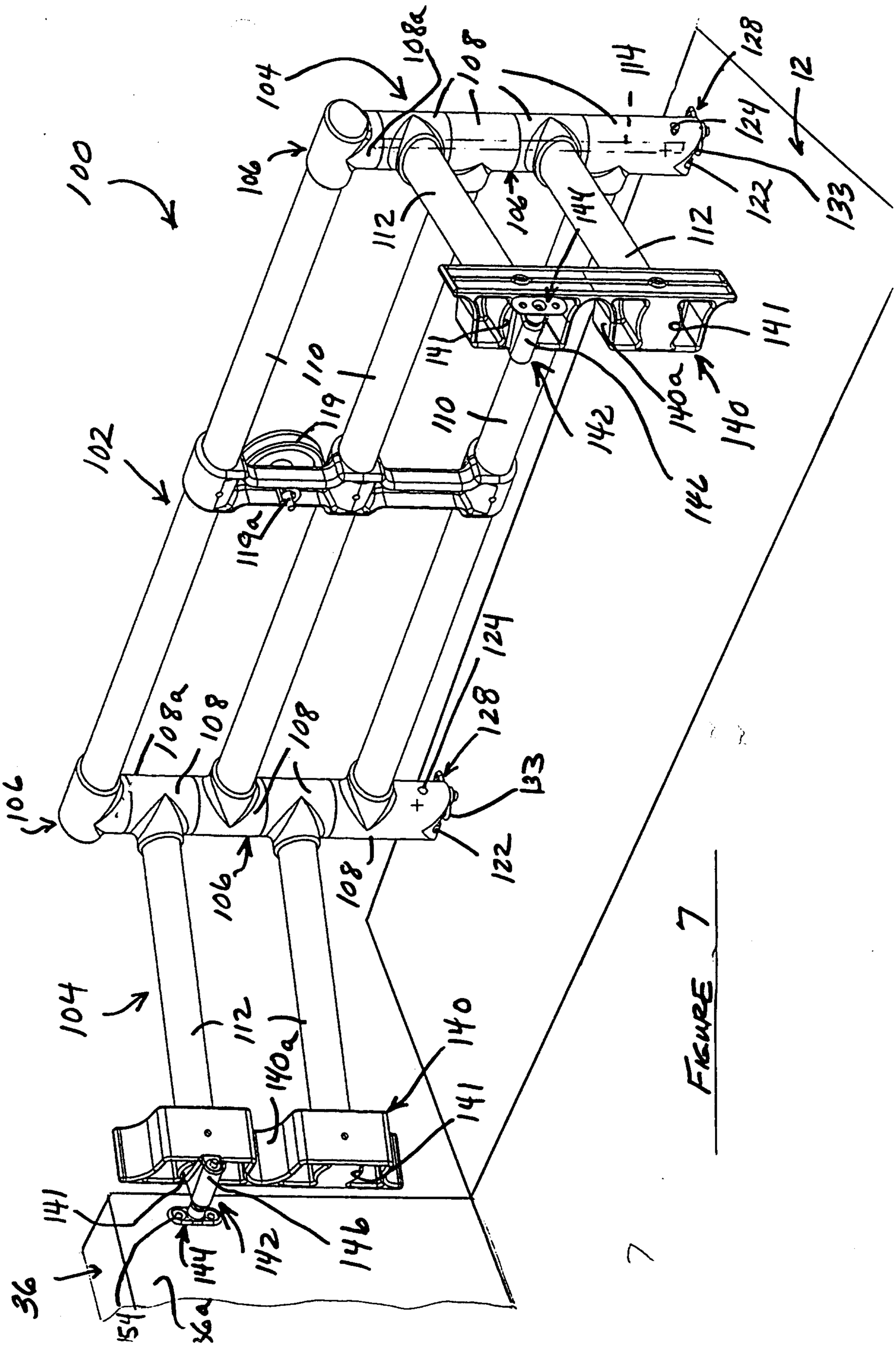

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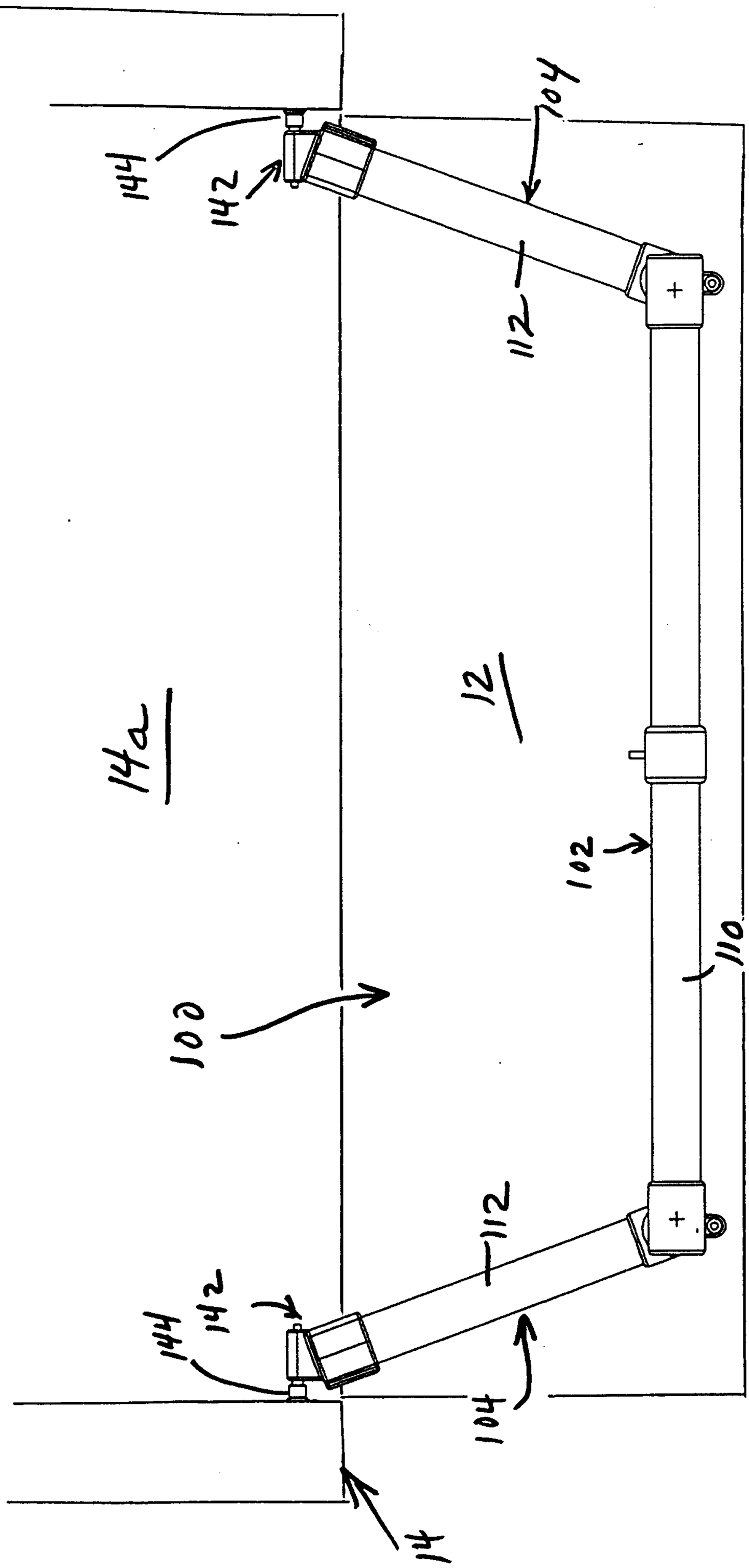
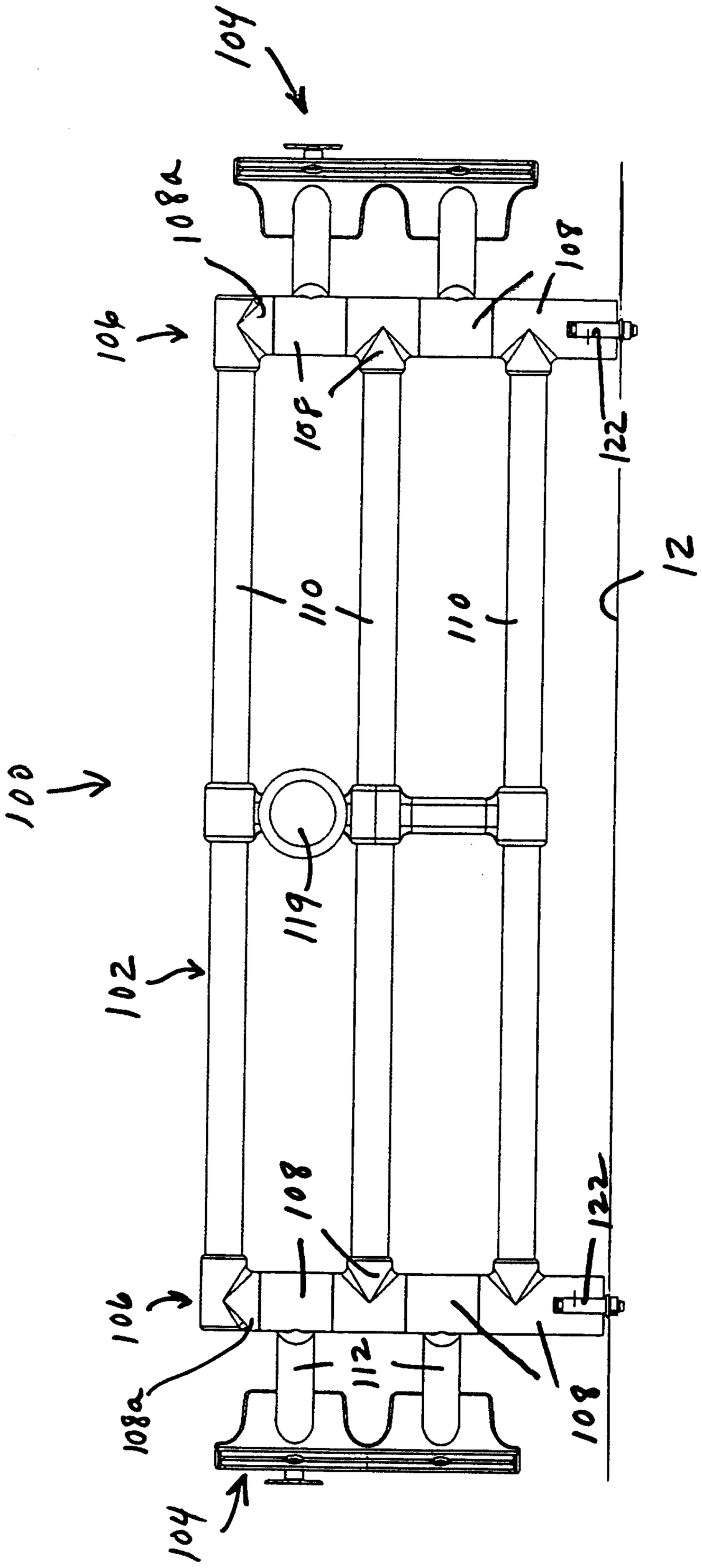
FIGURE 7



14a

12

Figure 8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108a
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FIGURE 9

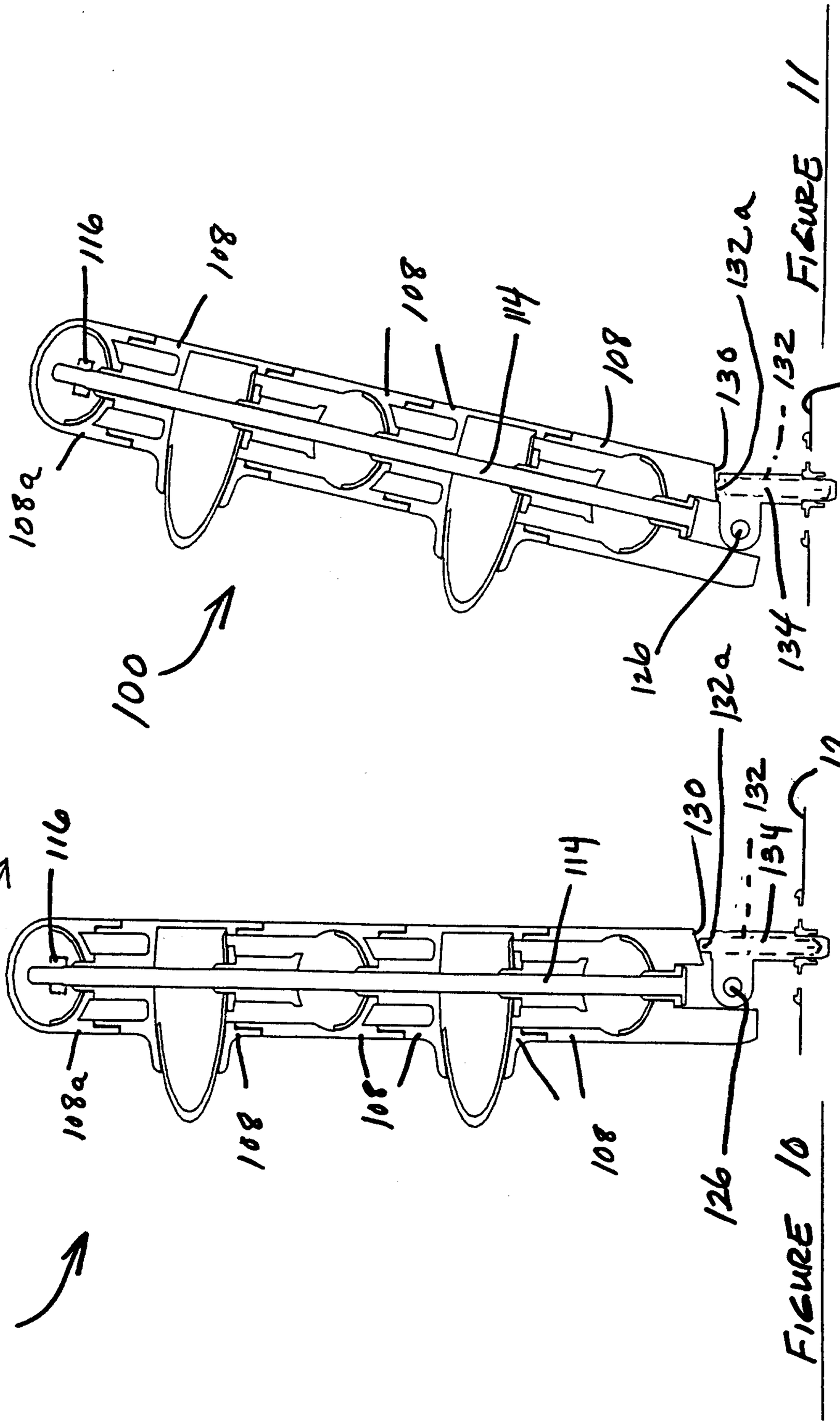

FIGURE 11

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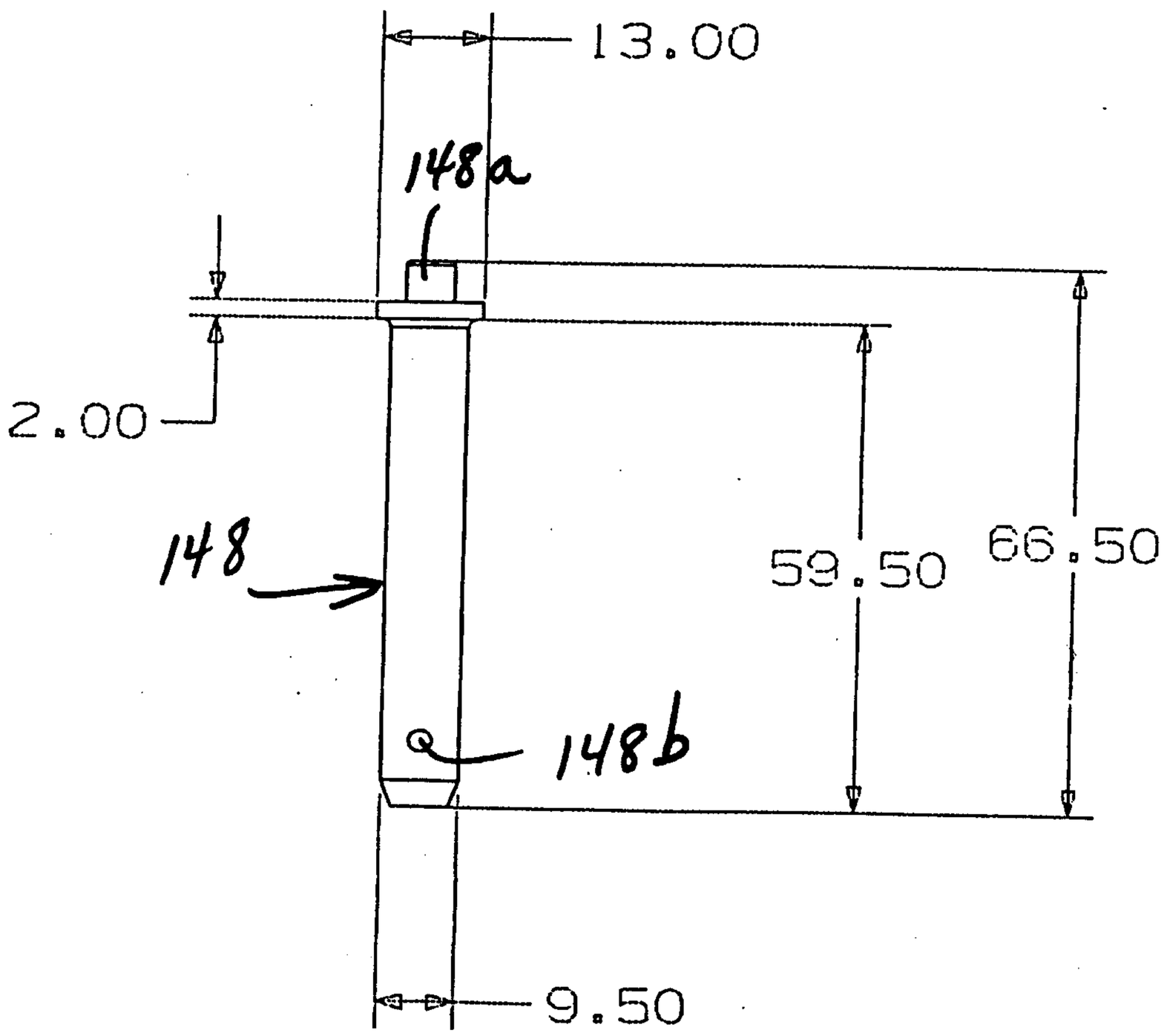
FIGURE 12



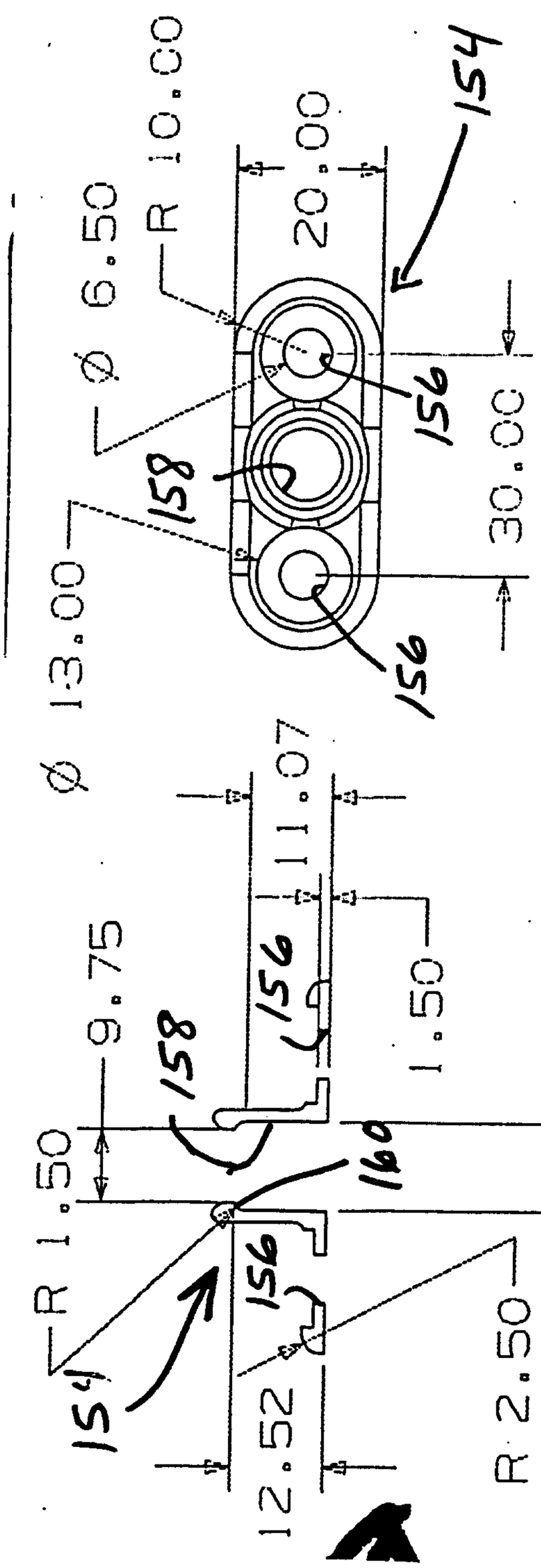


FIGURE 13

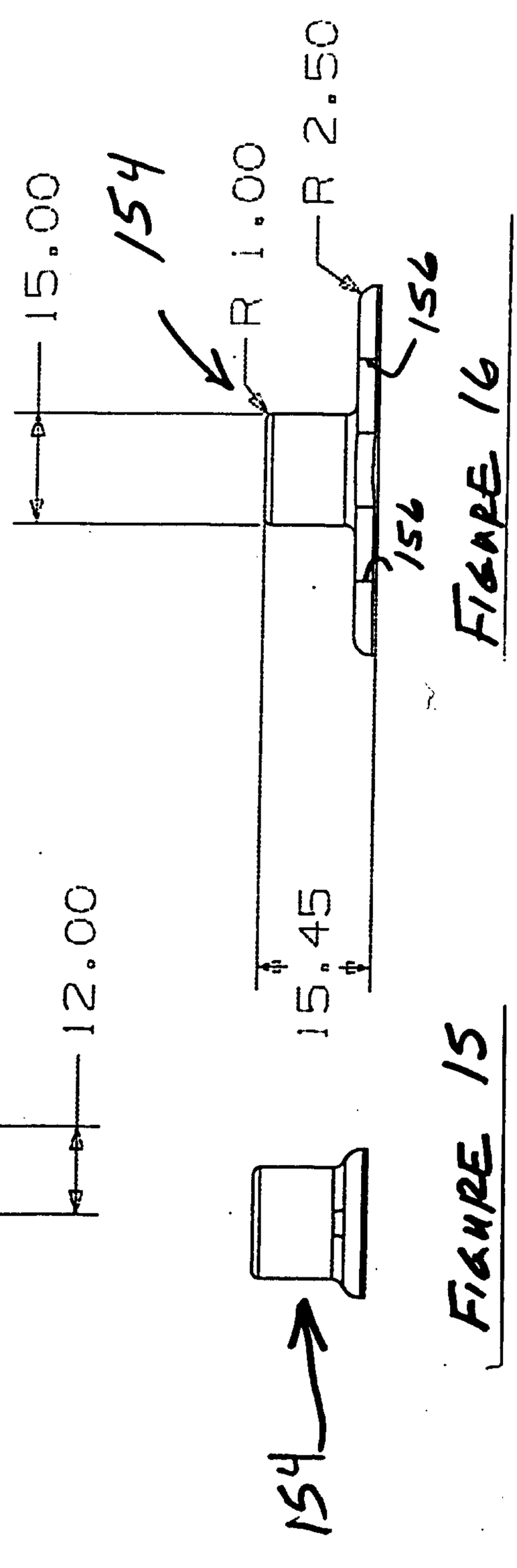


FIGURE 16

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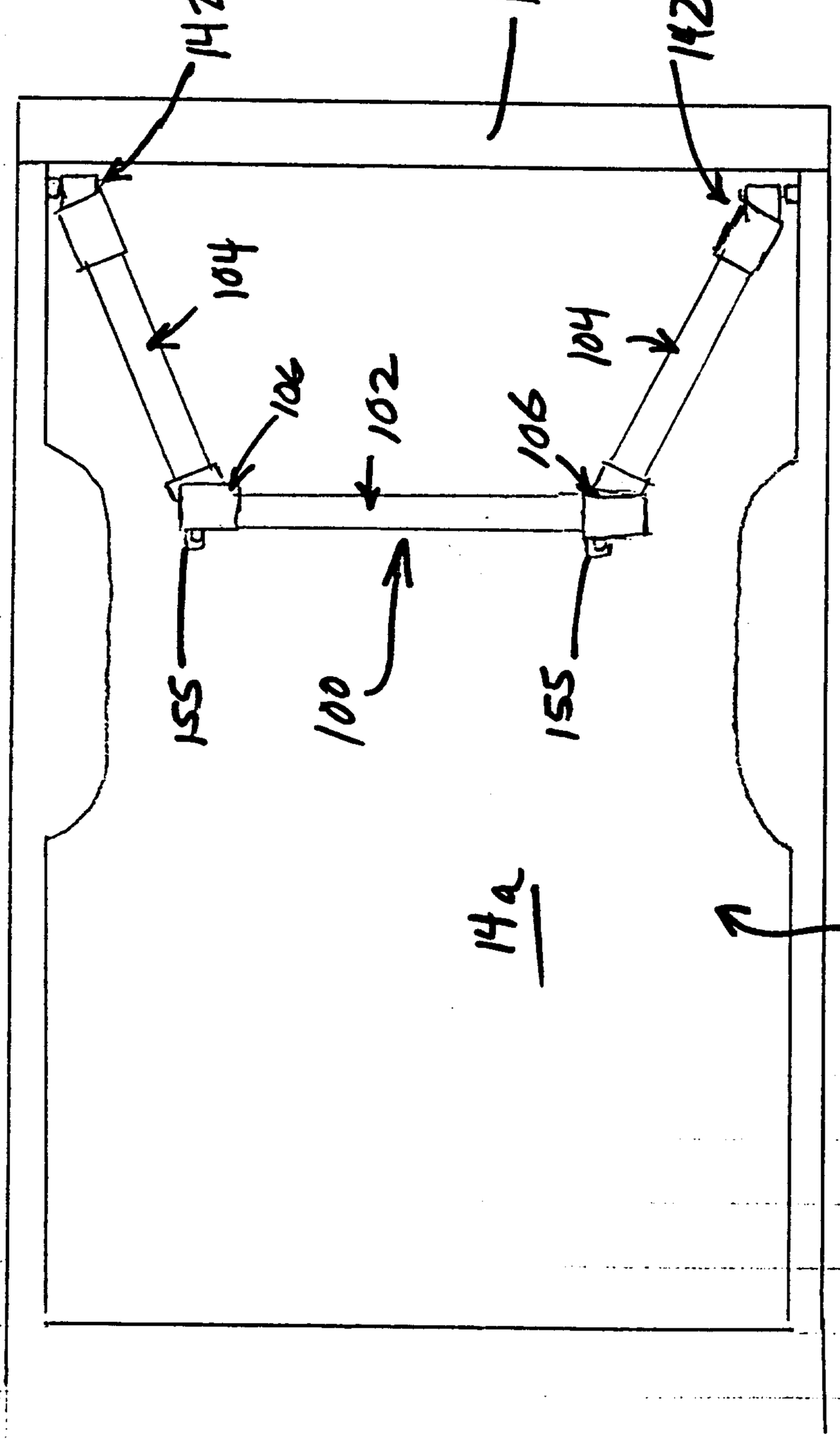
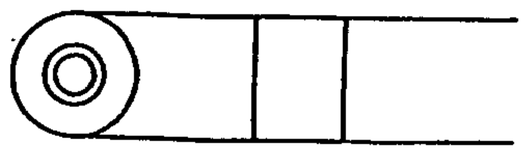


FIGURE 17



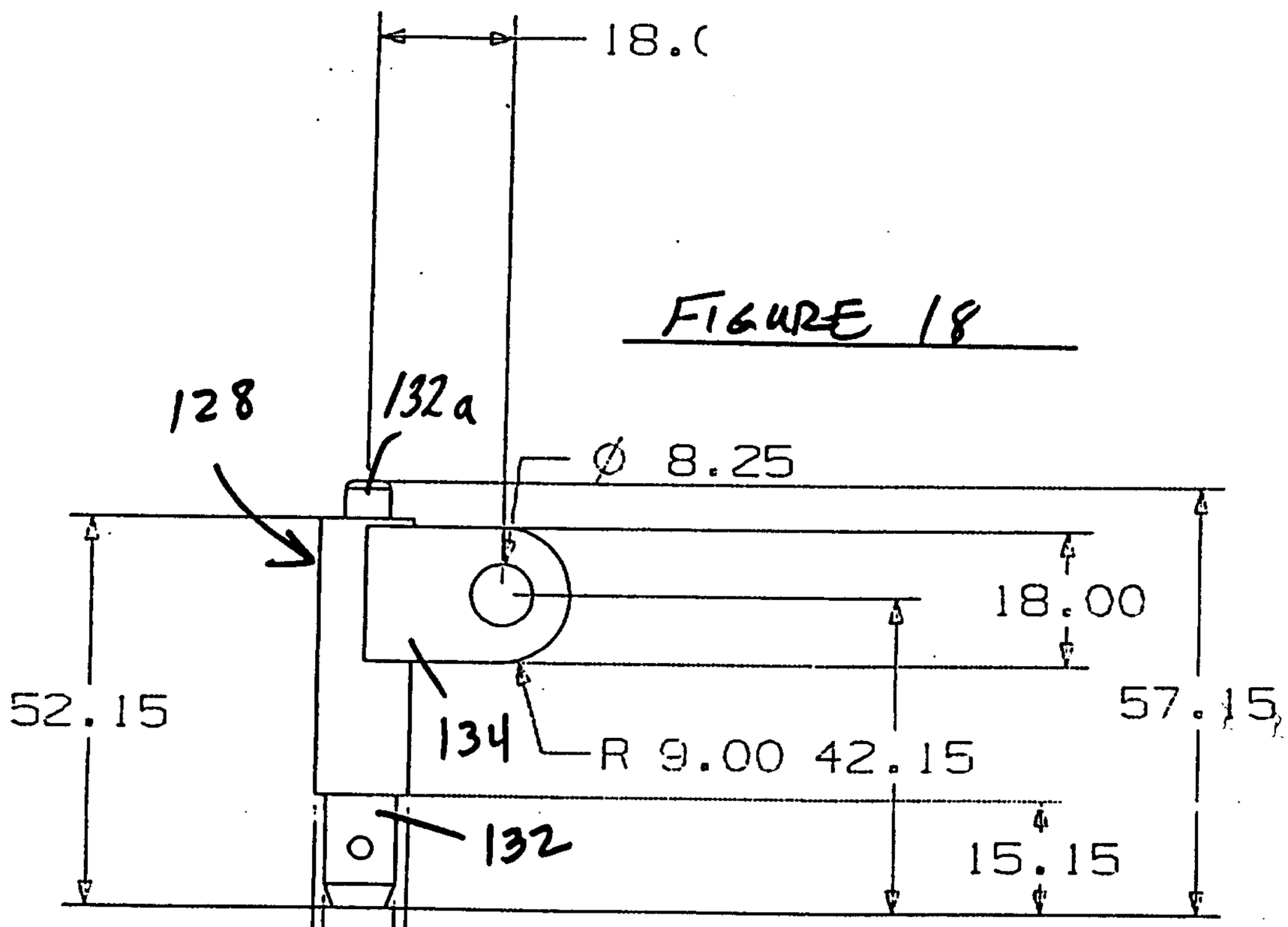


FIGURE 18

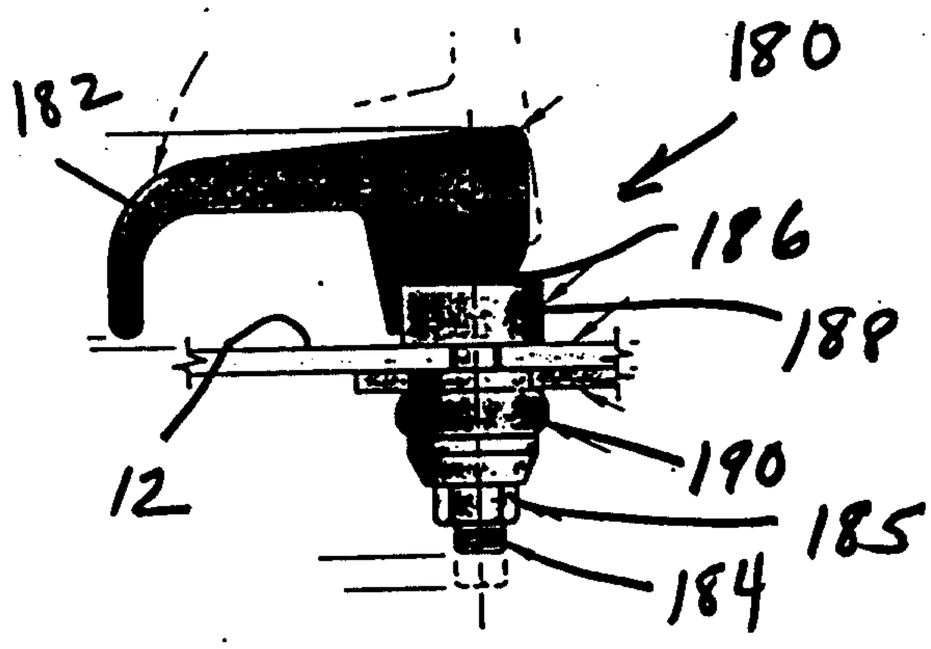
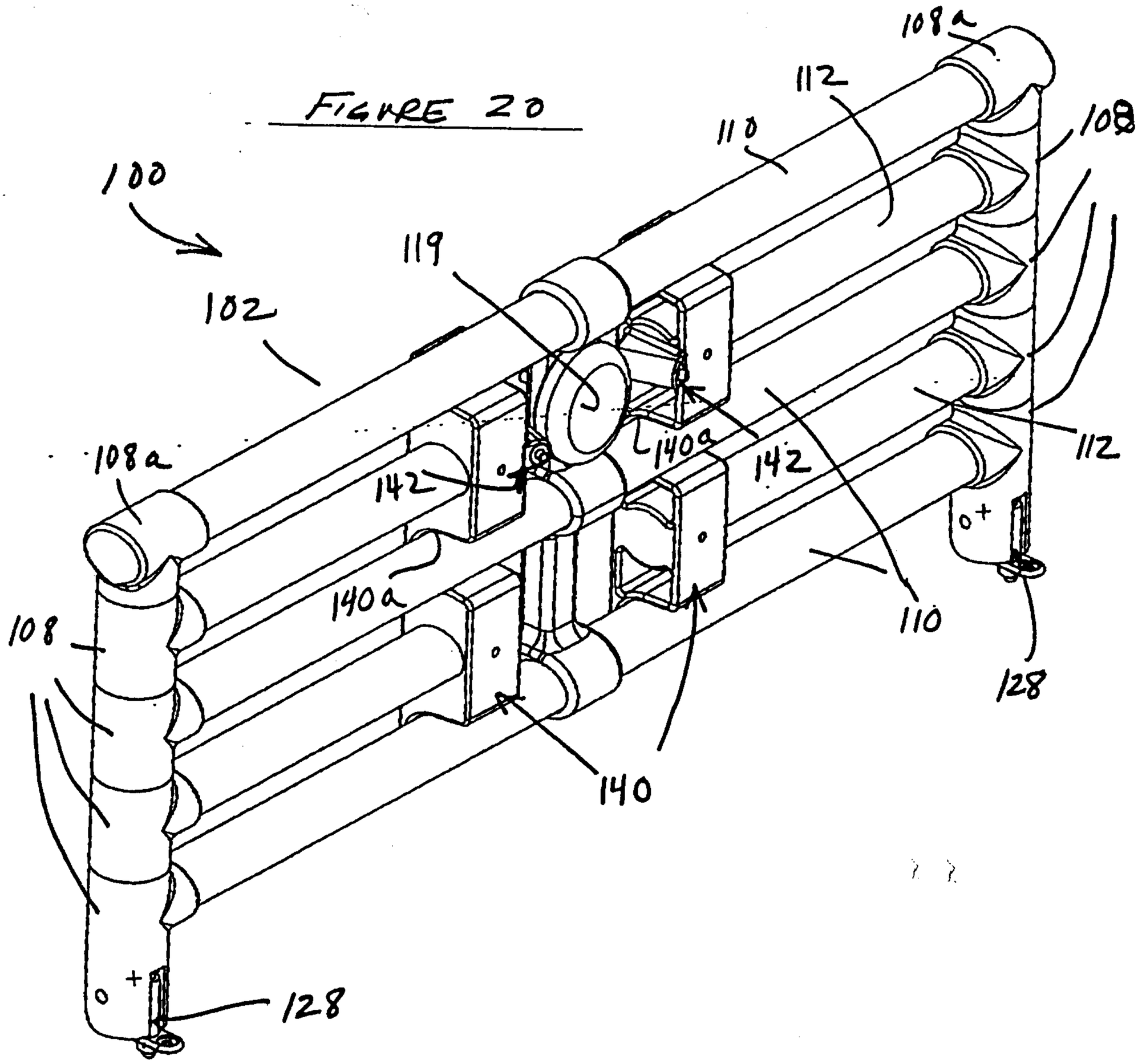


FIGURE 19

FIGURE 20



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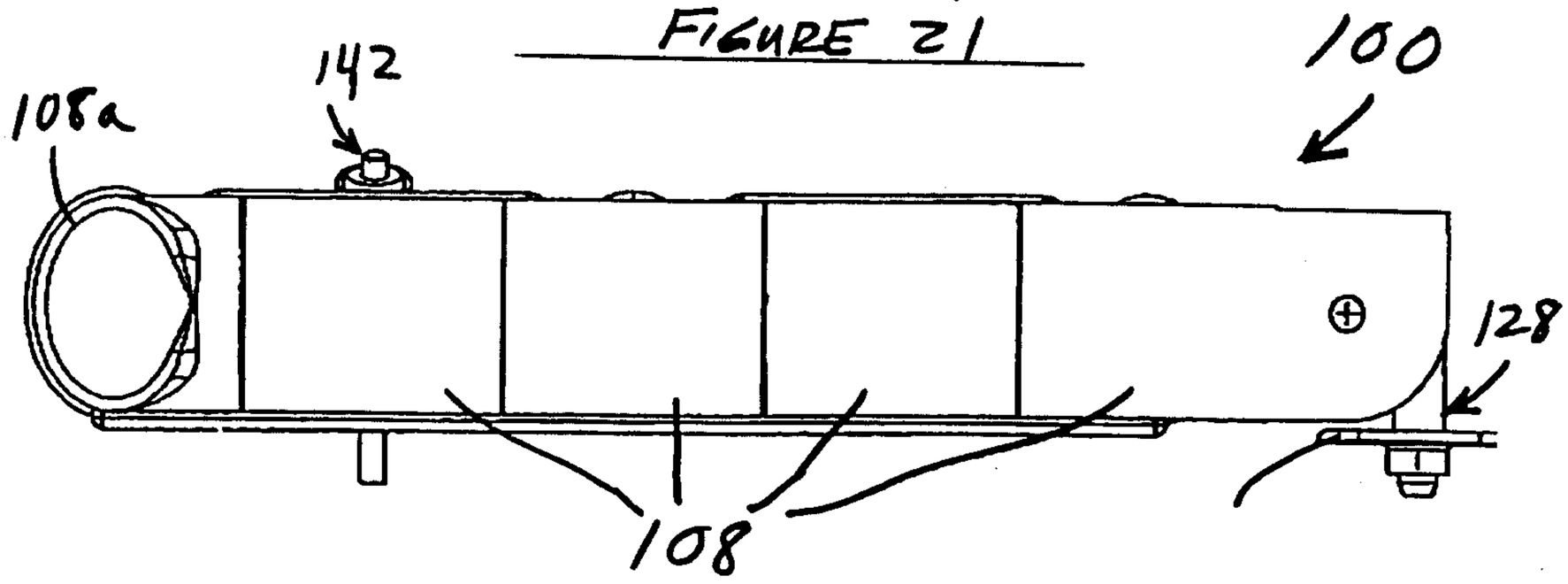

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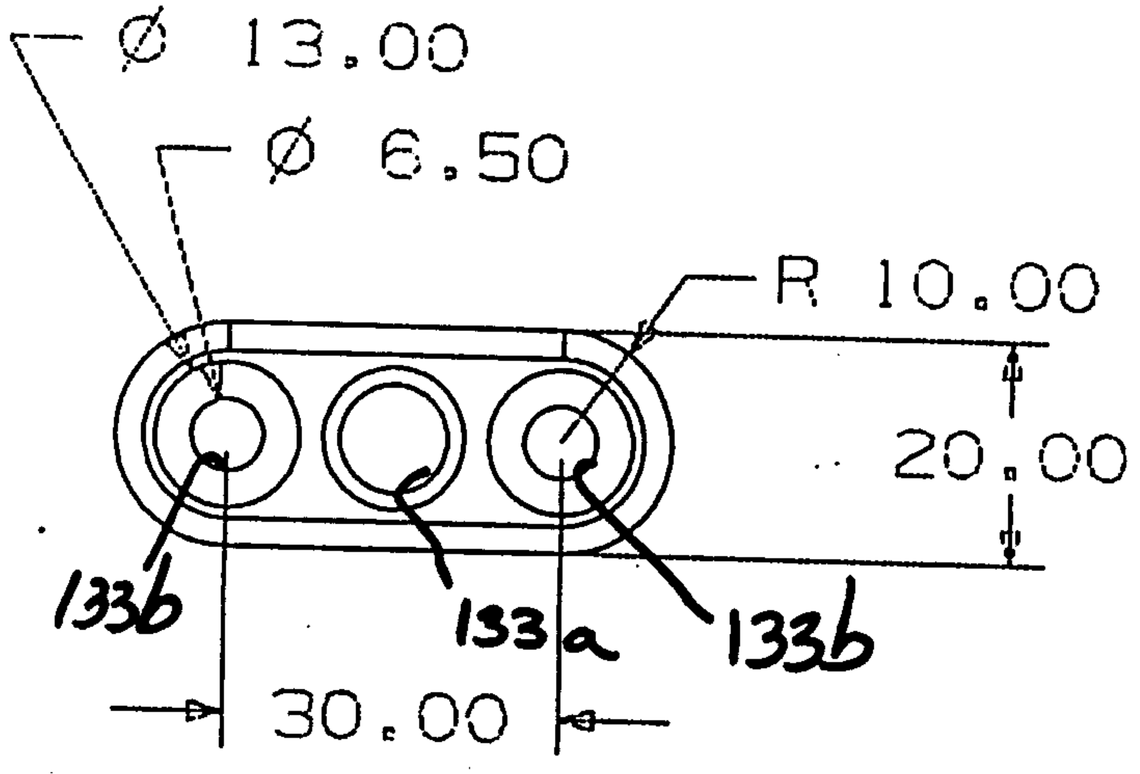

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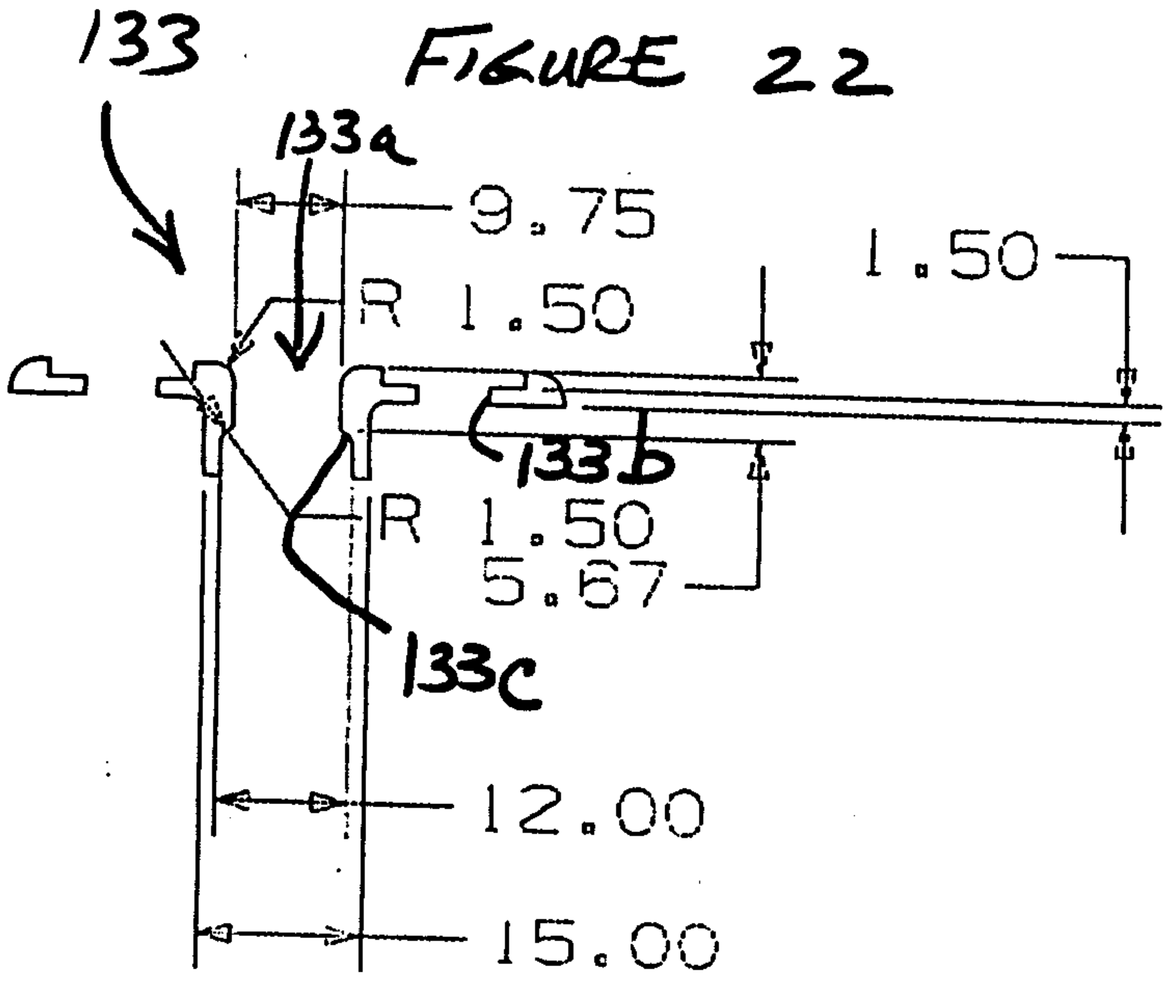
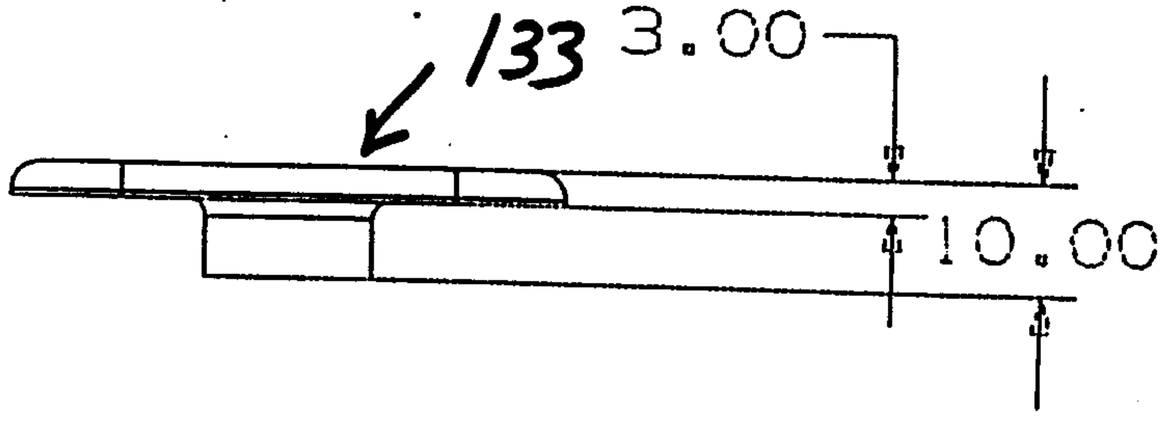
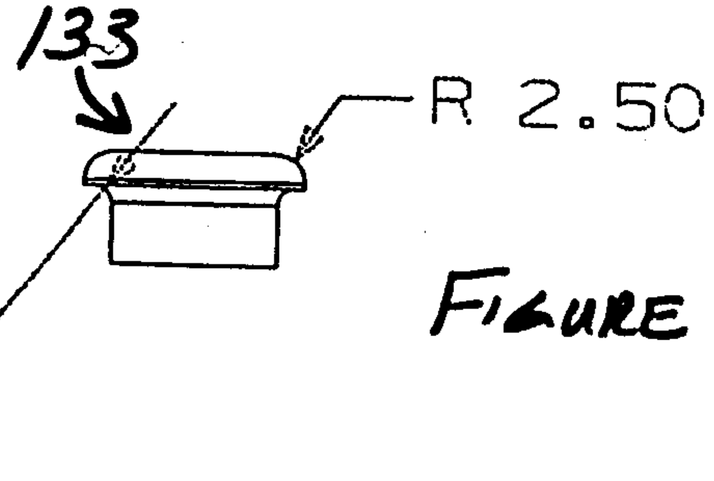


FIGURE 24





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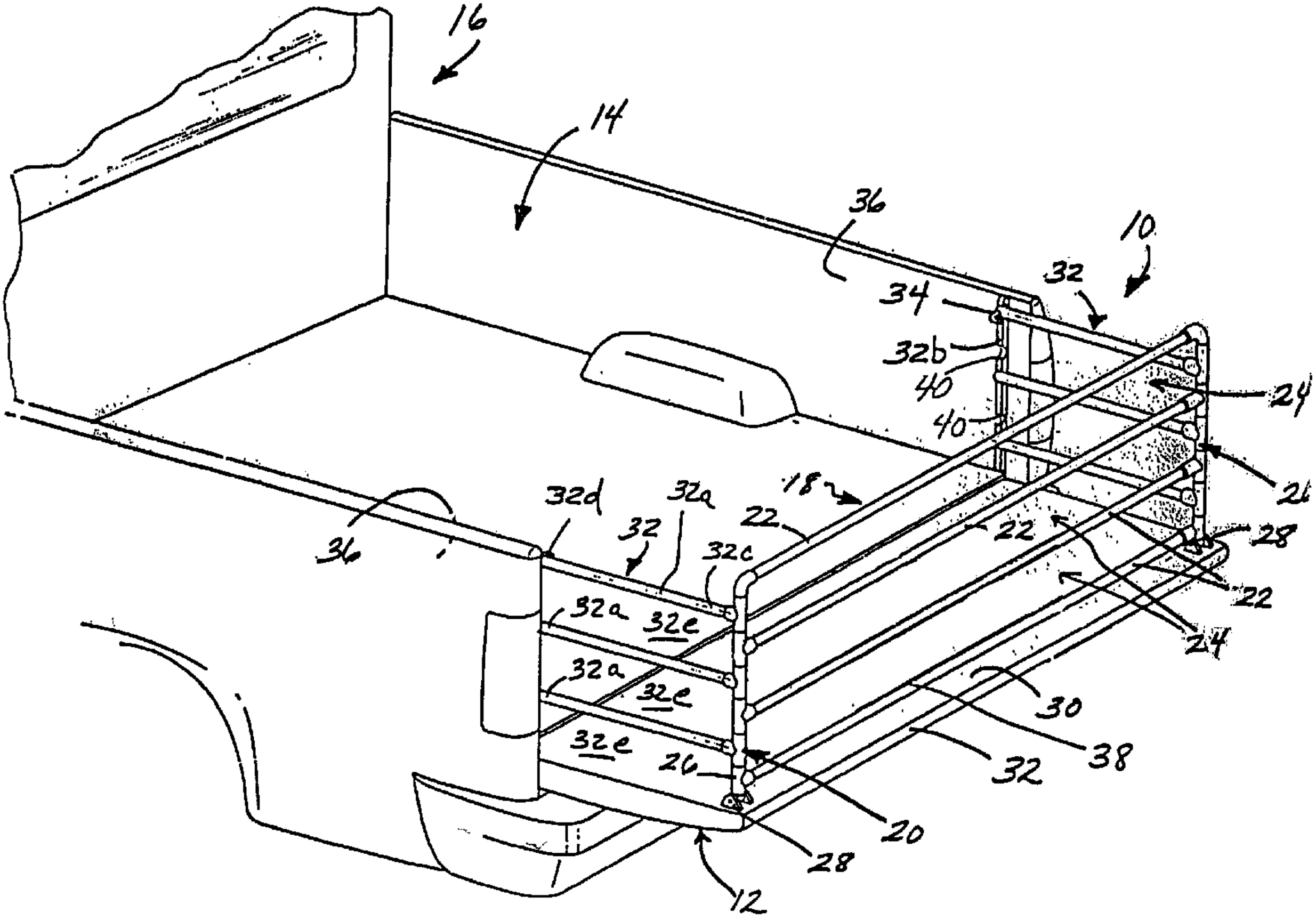
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