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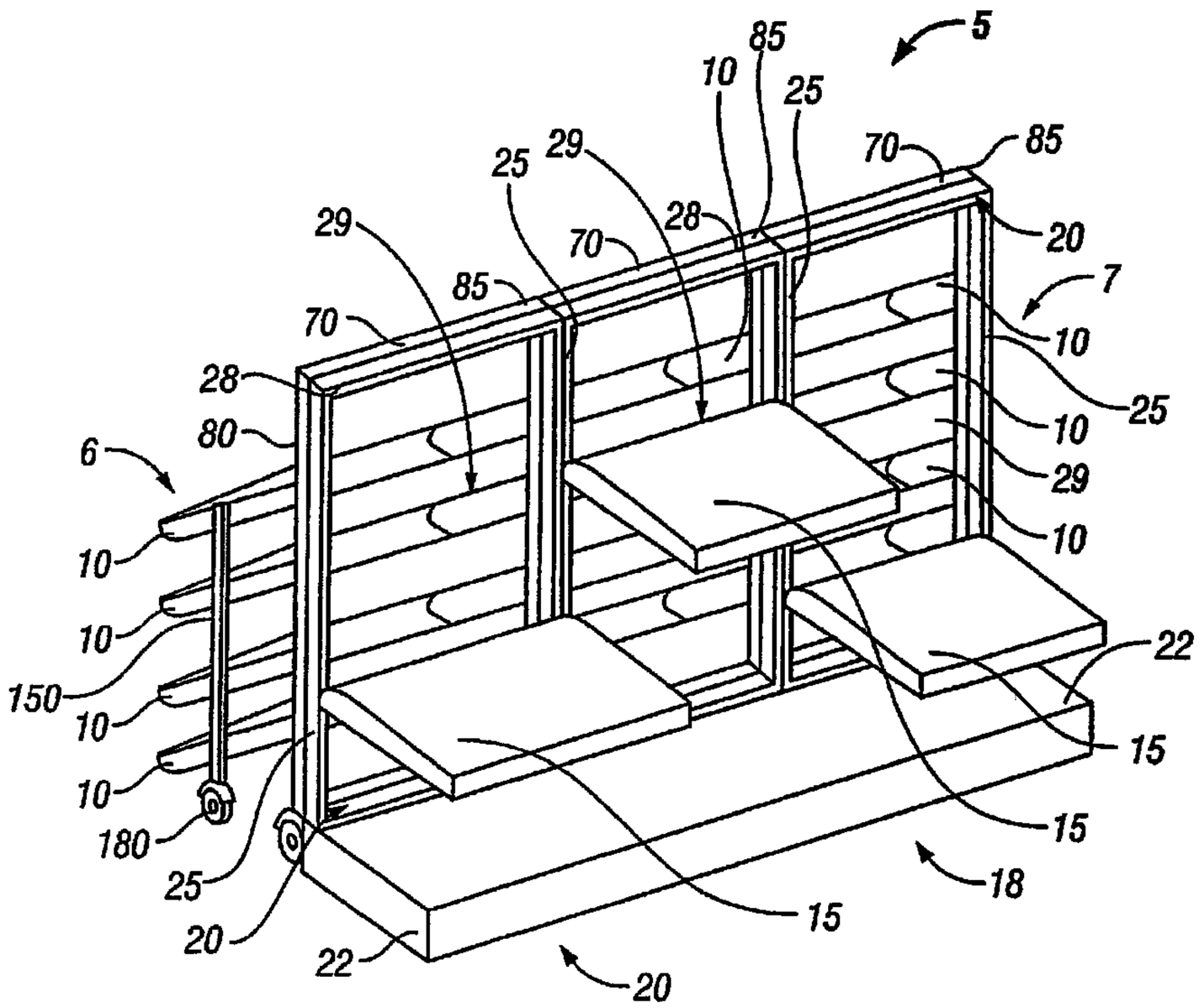
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(57) Abrégé/Abstract:
Some embodiments of the shelving system according to the present invention include a row of shelving units rotatably attached to a support structure, and can include an oppositely facing row of rotatable or stationary shelving units also attached to the support structure at a rear side of the rotatable shelving units. By rotating the rotatable shelving units, an operator can access the rear side of the rotatable shelving unit (as well as the shelving unit behind the rotatable shelving unit) for loading product. In some embodiments, a shelving unit can be moved clear from adjacent shelving units and can then be rotated to a loading position. Some embodiments of the shelving system include a row of rotatable shelving units arranged in a staggered manner providing clearance for the shelving units to rotate without interference with adjacent shelving units.

Abstract

Some embodiments of the shelving system according to the present invention include a row of shelving units rotatably attached to a support structure, and can include an oppositely facing row of rotatable or stationary shelving units also attached to the support structure at a rear side of the rotatable shelving units. By rotating the rotatable shelving units, an operator can access the rear side of the rotatable shelving unit (as well as the shelving unit behind the rotatable shelving unit) for loading product. In some embodiments, a shelving unit can be moved clear from adjacent shelving units and can then be rotated to a loading position. Some embodiments of the shelving system include a row of rotatable shelving units arranged in a staggered manner providing clearance for the shelving units to rotate without interference with adjacent shelving units.

PRODUCT DISPLAY AND DISPENSING SYSTEM

Field of the Invention

This invention relates to racks and shelving systems for displaying and dispensing products for sale in a self-service retail environment. In particular, the invention relates to a rear-loadable shelving system.

Background of the Invention

Rotating retail store inventory on a first-in, first-out basis is normally desirable, such as with perishable foodstuffs. Rear loading of product onto retail store shelves is one way of allowing consumers to withdraw product from the front and for delivery personnel to re-stock from the rear of the shelves. In light of these design considerations, gravity feed shelving is often very desirable for use in first-in, first-out and rear loading merchandise storage and display systems. However, the ability to readily and easily access the rear areas of racks, shelving units, or other product storage and display units in a retail environment remains a problem. Solutions to this problem should take into account one or more of the following issues: storage and display unit costs (which are often prohibitively expensive for many merchants, retail users, and others desiring to purchase such units), unit size, and unit suitability for various environments and applications.

As used herein and in the appended claims, the terms "shelving unit" and "rack" are considered to be interchangeable and to have the same meaning, and encompass any structure having one or more shelves, platforms, baskets, chutes, rails, hanging rods or arms, or any other element, device, or assembly used to support, hang, hold, or otherwise store and/or display products. In this regard, the term "shelf" is intended to encompass all such elements, devices, and assemblies. In addition, it

should be noted that the terms "shelving system" and "rack system" each refer to a system having at least part of a "shelving unit" or "rack" as just defined.

Summary of the Invention

In some embodiments of the present invention, a shelving system having one or more shelving units is provided in which one or more of the shelving units is pivotable from a closed position adjacent to a wall, frame, another shelving unit, or other adjacent structure to an opened position with respect to the wall, frame, other shelving unit, or other adjacent structure in which access to the rear of the shelving unit(s) is enabled. The shelving units movable in this manner can be pivotably attached to the wall, frame, another shelving unit, or other adjacent structure.

In other embodiments, the shelving system can have one or more shelving units that are movable from a closed position as described above to an opened position (also described above) while being guided by one or more rails. Such units can also be pivotable as described above in order to permit the units to be translated and rotated to their opened positions.

In some embodiments, the invention provides a shelving system comprising a gondola display having two rows of rear-loading shelves arranged back-to-back. In at least one of the rows of shelves, the shelves are rotatably attached to the gondola display, thereby allowing the shelves to be rotated away from the gondola. This exposes both the rear of the rotated shelves and the rear of the shelves located behind the rotated shelves, thereby allowing for easy rear loading of product into both rows of shelves at the same time.

In other embodiments, the invention provides a shelving system comprising a conventional gondola display having a fixed base or bases. A row of rotating shelf units, each having a retractable support wheel, is attached to at least one side of the conventional gondola. When the units are in their display positions and when first rotated away from the gondola, the wheels are in retracted positions so that they are in contact with and can be rolled along the top surface(s) of the fixed base or bases. As a unit is rotated away from the gondola display and into its loading position, the wheel will extend or can be extended downwardly from the bottom of the unit so that the wheel contacts and moves along the ground surface.

In still other embodiments, the center panel of a conventional gondola system is removed and a row of rotating shelf units is installed on the conventional gondola system. With this modification, rotating a shelf unit into its loading position also exposes the rear of shelves located behind the rotating shelf unit, thereby allowing for easy rear loading of both rows of shelves at the same time.

Although some gondola shelving units according to the present invention can be adapted solely for translation or pivoting, some shelving units according to the present invention are both rotatably and slidably attached to the gondola so that the unit can be pulled forward from the gondola (and the adjacent shelf units) and can be rotated into a loading position.

Some embodiments of the present invention provide for shelving systems having shelving units arranged in staggered rows. A wall, storage area or rack, or another pivotable and/or translatable row of shelving units can be located behind the staggered row of shelving units. For example, a shelving system can comprise two rows of rear-loading shelving units arranged in back-to-back fashion and in a staggered configuration. The staggered configuration creates clearance that allows shelving units to be individually and selectively moved (e.g., pivoted) to a loading position.

Brief Description of the Drawings

In the drawings:

FIG. 1 is a rear perspective view of an exemplary shelving system according to an embodiment of the present invention;

FIG. 2 is a side elevational view of the exemplary shelving system illustrated in FIG. 1;

FIG. 3 is a schematic plan view of the exemplary shelving system illustrated in FIGS. 1 and 2, shown with shelving units in display positions;

FIG. 4 is a schematic plan view of the exemplary shelving system illustrated in FIGS. 1-3, shown with shelving units in loading positions;

FIG. 5 is a detail view of the exemplary shelving system illustrated in FIGS. 1-4, showing a shelf and vertical supports according to an embodiment of the invention;

FIG. 6 is a front perspective view of a shelving unit of the exemplary shelving system illustrated in FIGS. 1-5, shown in a display position;

FIG. 7 is a front perspective view of the shelving unit illustrated in FIG. 6, shown in a loading position;

FIG. 8 is a detail view of the shelving unit illustrated in FIGS. 6 and 7, showing a shelf and a vertical support according to an embodiment of the present invention;

FIG. 9 is detail view of the shelving unit illustrated in FIGS. 6 and 7, showing the hinge assembly of the shelving unit and a manner of connection to a gondola frame according to an embodiment of the present invention;

FIG. 10 is a detail view of the shelving unit illustrated in FIGS. 6 and 7, showing the hinge assembly of the shelving unit and a manner of connection to a gondola frame according to an embodiment of the present invention;

FIG. 11 is a front perspective view of an exemplary shelving system according to another embodiment of the present invention, shown with one shelving unit in a loading position and one shelving unit partially rotated toward a loading position;

FIG. 12 is a detail view of a shelving unit in the exemplary shelving system illustrated in FIG. 11, showing an extended wheel assembly of the shelving unit according to one embodiment of the present invention;

FIG. 13 is a detail view of an exemplary retractable wheel assembly according to another embodiment of the present invention;

FIG. 14 is a front detail view of the retractable wheel assembly illustrated in FIG. 13, shown in a retracted position;

FIG. 15 is a front detail view of the retractable wheel assembly illustrated in FIGS. 13 and 14, shown in an extended position;

FIG. 16 is a perspective view of an adjustable wheel assembly according to an embodiment of the present invention;

FIG. 17 is a cross-sectional view of the adjustable wheel assembly illustrated in FIG. 16, taken along lines 17-17 of FIG. 16;

FIG. 18 is a perspective view of an exemplary gondola assembly for use in an embodiment of the present invention;

FIG. 19 is a perspective view of the exemplary gondola assembly illustrated in FIG. 18, shown with bay braces installed;

FIG. 20 is a perspective view of an exemplary bay brace shown in FIG. 19;

FIG. 21 is a perspective view of an exemplary rotatable shelving unit according to an embodiment of the present invention, shown installed in the gondola assembly illustrated in FIG. 19;

FIG. 22 is a front perspective detail view of an exemplary shelving unit according to another embodiment of the present invention, showing a retracted wheel assembly in a display position of the shelving unit;

FIG. 23 is a rear perspective detail view of the shelving unit illustrated in FIG. 22, showing the wheel assembly in a loading position of the shelving unit;

FIG. 24 is a schematic plan view of an exemplary pull and rotate shelving system according to an embodiment of the present invention, shown with the shelving units in display positions;

FIG. 25 is a schematic plan view of the exemplary pull and rotate shelving unit illustrated in FIG. 24, shown with one of the shelving units in an extended position;

FIG. 26 is a schematic plan view of the exemplary pull and rotate shelving unit illustrated in FIGS. 24 and 25, shown with one of the shelving units in a loading position;

FIG. 27 is a front perspective view of part of the exemplary pull and rotate shelving system illustrated in FIGS. 24-26, shown with the shelving units in display positions;

FIG. 28 is a front perspective view of the exemplary pull and rotate shelving system illustrated in FIG. 27, shown with one of the shelving units in an extended position;

FIG. 29 is a front perspective view of the exemplary pull and rotate shelving system illustrated in FIGS. 27 and 28, shown with one of the shelving units in a loading position;

FIG. 30 is a detail view of an exemplary telescoping assembly used with the pulled shelving unit illustrated in FIGS. 28 and 29;

FIG. 30A is a perspective view of the rail and hinge assembly shown in FIG. 30;

FIG. 31 is a schematic plan view of an exemplary pull and rotate endcap shelving system according to the present invention, shown with the shelving units in display positions;

FIG. 32 is a schematic plan view of the exemplary pull and rotate endcap shelving system illustrated in FIG. 31, shown with one of the shelving units in an extended position;

FIG. 33 is a schematic plan view of the exemplary pull and rotate endcap shelving system illustrated in FIGS. 30 and 31, shown with one of the shelving units in a loading position;

FIG. 34 is a detail view of an exemplary telescoping assembly according to another embodiment of the present invention, shown with the telescoping assembly in a display position;

FIG. 35 is a detail view of the exemplary telescoping assembly illustrated in FIG. 34, shown with the telescoping assembly in an extended position;

FIG. 36 is a detail view of the exemplary telescoping assembly illustrated in FIGS. 34 and 35, shown with the telescoping assembly in a loading position;

FIG. 37 is a schematic plan view of an exemplary 2-bay staggered shelving system according to the present invention, shown with the shelving units of the shelving system in display positions;

FIG. 38 is a schematic plan view of the exemplary staggered shelving system illustrated in FIG. 37, shown with one of the shelving units in a loading position;

FIG. 39 is a perspective view of part of the exemplary staggered shelving system illustrated in FIGS. 37 and 38, shown with the shelving units in display positions;

FIG. 40 is a perspective view of the staggered shelving units illustrated in FIG. 39, shown with one of the shelving units in a loading position;

FIG. 41 is schematic plan view of an isle defined by two of the exemplary shelving systems illustrated in FIGS. 37 and 38;

FIG. 42 is a detail view of an exemplary shelving unit according to an embodiment of the present invention;

FIG. 43 is a side elevational view of the shelving unit illustrated in FIG. 42;

FIG. 44 is a detail view of an exemplary support assembly used in the staggered shelving system illustrated in FIGS. 37-40;

FIG. 45 is a detail view of an exemplary latch and pivot assembly used in the staggered shelving system illustrated in FIGS. 37-40;

FIG. 46 is a cross-sectional view of the exemplary latch and pivot assembly illustrated in FIG. 45, taken along lines 46-46 in FIG. 45;

FIG. 47 is a detail view of part of the exemplary latch and pivot assembly illustrated in FIGS. 45 and 46;

FIG. 48 is a plan view of an exemplary endcap for the exemplary staggered shelving system illustrated in FIGS. 37-40;

FIG. 49 is a top view of an exemplary sleeve assembly that can be used in shelving units of the exemplary staggered shelving system illustrated in FIGS. 37-40;

FIG. 50 is a schematic plan view of an exemplary 3-bay staggered shelving system according to the present invention, shown with three shelving units in loading positions;

FIG. 51 is a perspective view of part of the exemplary staggered shelving system illustrated in FIG. 50, shown with the shelving units in display positions;

FIG. 52 is a side elevational view of an exemplary shelf that can be inclined according to an embodiment of the present invention;

FIG. 53 is a plan view of the exemplary shelf illustrated in FIG. 52, shown mounted in a shelving unit according to the present invention;

FIG. 54 is a side cross-sectional view of the exemplary shelf and shelving unit illustrated in FIG. 53, taken along lines 54-54 of FIG. 53;

FIG. 55 is a side elevational view of an exemplary wheel assembly according to an embodiment of the present invention;

FIG. 56 is a top plan view of the exemplary wheel assembly illustrated in FIG. 55 (the wheels of the assembly being visible in FIGS. 55 and 57);

FIG. 57 is another side elevational view of the exemplary wheel assembly illustrated in FIGS. 55 and 56; and

FIG. 58 is a bottom plan view of a rotatable shelving unit according to the present invention, shown with four wheel assembly mounting plates installed thereon.

Detailed Description

Before any embodiments of the present invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of "including," "comprising," or "having" and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items.

FIGS. 1 and 2 illustrate an exemplary first embodiment of a product display and dispensing system 5 in accordance with the present invention. The product display and dispensing system 5 includes a row of rotatable shelving units 6 positioned back-to-back with a row of stationary shelving units 7.

The shelving units 6 and 7 include shelves 10 and 15, respectively, attached to a support structure 18. In the exemplary embodiment shown in FIGS. 1 and 2, the shelving units 6 and 7 are attached to a gondola 20. A gondola 20 is an island or wall fixture well known in the art and is often used in stores to display merchandise. The gondola 20 includes a base 22 and vertical supports 25 and horizontal supports 28 (see FIG. 1). The spaces 29 between the base 22 and the vertical and horizontal supports 25, 28 can be left substantially open, such that no dividing panels separate the back-to-back product and display units 6, 7. For example, in the illustrated embodiment of FIGS. 1 and 2, there are no panels or similar structural members separating the row of rotatable shelving units 6 facing outward from one side of the gondola 20 from the stationary row of shelving units 7 facing outward from the other side of the gondola 20. The open nature of such a support structure provides access for rear-loading of the stationary shelves 15. It is to be understood that the gondola 20 illustrated in FIGS. 1 and 2 is shown for illustrative purposes only and is not meant to limit the scope of the invention in any way. Of course, other types of support structures 18 can

be used, such as free-standing standards. Additionally, the support structure 18 can be located or backed against a wall or the back of another group of shelves.

The rotatable shelving units 6 in the embodiment illustrated in FIGS. 1 and 2 are rotatably attached to the gondola 20 such that an operator can rotate the shelving units 6 from their normal display position into a loading position. FIG. 3 is a plan view of a row of rotatable shelving units 6 and a row of stationary shelving units 7 in display positions, each unit 6, 7 comprising one or more vertically spaced shelves 10 and 15. The shelving units 6 and 7 can be aligned to present a uniform, outwardly facing facade for displaying and selling product. FIG. 4 shows the rotatable shelving units 6 in loading positions, rotated away from the gondola 20 in the directions of the arrows.

When the rotatable shelving units 6 are rotated into the loading positions, the rear 30 of each unit 6 is exposed. The exposed rear 30 allows the unit 6 to be rear-loaded. The open nature of the gondola support structure 20 in the illustrated embodiment of FIGS. 1 and 2 (i.e., the lack of panels dividing one row of shelving units 6 from the other row of shelving units 7) and the ability to move the rotatable shelving units 6 into their loading positions also exposes the rear 35 of the stationary shelving units 7 directly behind the corresponding rotatable shelving units 6. Accordingly, rotating the shelving units 6 into their loading positions allows for easy rear-loading of the corresponding stationary shelving units 7 located behind the rotatable shelving units 6.

In an alternative embodiment, both oppositely facing rows of the shelving system 5 include rotatable shelving units 6. This configuration allows either row of shelving units 6 to be rear-loaded independently from the other row of oppositely facing shelving units 6.

Because the row of rotatable shelving units 6 are rotatably attached to the gondola display 20, the rotatable shelving units 6 can be placed back into their original display positions within the row merely by rotating the units 6 back in place. Therefore, there is no need to realign the rotatable shelving units 6 after rear-loading them. Likewise, there is no need to realign the row of stationary shelving units 7 because they can be rear-loaded in their original display positions.

In the exemplary embodiment shown in FIG. 1, the stationary shelves 15 are attached to the gondola 20 in any conventional manner. By way of example only, and with reference to FIG. 5, the shelves 15 can be attached to the gondola 20 by brackets or hook-like members 45 that are shaped and sized to fit within and engage apertures or slots 50 in the gondola vertical supports 25. However, any other suitable attachment elements, structure, or method can be used (e.g., spot welding, pegs, bolts, etc).

As depicted in the exemplary embodiment shown in FIG. 1, the stationary shelves 15 are inclined downwardly from front to rear in order to cause the displayed and stored products thereon to slide forward as product is removed from the front of the shelves 15. Alternatively, the shelves 15 can also be oriented in a substantially horizontal fashion. Regardless of how the shelves 15 are oriented, and as is customary in the art, the heights and spacings between the shelves 15 can be adjusted by selectively mounting the shelves 15 at desired mounting slots 50.

The shelves 15 can take a number of different forms, including without limitation shelves having a grid of wires such as metal wires, plastic wires, plastic coated metal wires (i.e. vinyl-coated), or shelves made from any other suitable material, shelves including sheet material made of plastic, metal, composite materials, heavy cardboard, etc., and the like.

The rotatable shelving units 6 in the embodiment of FIGS. 1 and 2 are rotatably attached to the support structure 18 in any suitable manner known to those in the art. In the exemplary embodiment of FIGS. 1 and 2, the shelving units 6 are directly or indirectly attached to the support structure 18, either individually or as a group, by one or more hinges (described in greater detail below). With reference now to FIGS. 6 and 7, the shelving units 6 can include shelving unit frames 70 that are hingedly attached to the support structure 18. The shelving unit frame 70 can include vertical standards 80 that are interconnected with horizontal beams 85.

Analogous to the shelves 15 described above, FIG. 8 shows one embodiment of a shelf 10. This exemplary shelf 10 includes a grid of wires such as metal wires, plastic wires, plastic coated metal wires (i.e. vinyl-coated), or any other suitable material. Alternatively, the shelves 10 can be made entirely or partially of a sheet material made of plastic, metal, composite materials, heavy cardboard, etc., or any

other material suitable for product support and display. In the exemplary embodiment shown in FIGS. 1, 2, 6, and 7, each shelf 10 is removably mounted to the vertical standards 80 and is cantilevered outwardly and downwardly therefrom. One example of a structure facilitating such removable mounting is illustrated in FIG. 8. In the illustrated embodiment of FIG. 8, the vertical standards 80 have apertures or slots 90 disposed along the length of their front surfaces for receiving rearwardly-extending brackets 95 on the shelves 10. An operator can adjust the heights and spacings of the shelves 10 by selecting the desired mounting holes or slots 90 to which such brackets 95 are attached. Of course, the shelves 10 can attach to the frame 70 or vertical standards 80 using any other suitable attachment elements or structure known in the art, and (like the stationary shelves 15) can even be permanently mounted if desired.

In the exemplary embodiment of the present invention illustrated in FIG. 2, the angle φ formed between each shelf 10 and the standards 80 creates an incline sufficient to cause the displayed product to slide forward towards the front of the shelf 10. The selected angle φ can be adjustable, depending in part upon the type of product stored or displayed upon the shelf 10 and the materials comprising the shelf 10. In some embodiments, the shelves 10 can be oriented substantially horizontally.

With continued reference to the exemplary embodiment of FIGS. 1, 2, 6, and 7, the shelf frame 70 is rotatably attached to the support structure 18 in any suitable manner. With particular reference to FIGS. 4 and 7, the shelf frame 70 can be attached to a gondola vertical support 25 by a hinge assembly 120. This allows the rotatable shelving unit 6 to rotate about the hinge assembly 120.

FIGS. 9 and 10 show an exemplary hinge assembly 120 and its components in detail. The hinge assembly 120 includes a hinge plate 125 rotatably attached to a hinge base 130 by a pivot pin 135. The pivot pin 135 extends through hinge sleeves 136 on the hinge base 130 as well as hinge sleeves 138 on the hinge plate 125 to rotatably secure the hinge plate 125 to the hinge base 130 and to thereby form the hinge structure. The exemplary hinge base 130 illustrated in FIGS. 9 and 10 is removably attached to a vertical support 25 by protrusions 140 located along the length of the hinge base 130. The protrusions 140 are shaped and sized to fit within and engage apertures or slots 145 in the vertical support 25. In other embodiments, the hinge base 130 can be permanently secured to the vertical upright 25, such as by

spot welding, by screws, bolts, rivets, or other conventional fasteners, and the like. The hinge base 130 can be removably or permanently affixed to the vertical support 25 by suitable elements and structure known in the art. The exemplary hinge plate 125 is spot welded to the vertical standard 80 of frame 70. Alternatively, the hinge plate 125 can be attached to the frame 70 by any suitable means known in the art.

In the exemplary embodiment of the present invention illustrated in FIGS. 1-4, 6, 7, 9, and 10, the hinge assembly 120 extends along at least a substantial length of the vertical standard 80 and the vertical support 25. This arrangement prevents the load created by the weight of the frame 70, shelves 10, and merchandise stored and displayed thereon from being focused upon just one point on the hinge assembly 120. Such a hinge assembly 120 is more durable and is more capable of supporting heavier loads. In other embodiments, a plurality of hinge assemblies 120 can be spaced along the lengths of a vertical standard 80 and a vertical support 25. For example, the plurality of hinge assemblies 120 can include one hinge assembly 120 attached near the top of the frame 70, one hinge assembly 120 attached near the middle of the frame 70, and one hinge assembly 120 attached near the bottom of the frame 70.

With reference again to FIGS. 2, 6, and 7, a vertical support member 150 runs between and connects the vertically spaced shelves 10. This vertical support member 150 can extend through or beside the spaced shelves, and in the illustrated embodiment runs along the sides 155 of the spaced shelves at a location opposite from the hinge assembly 120. The vertical support member 150 can define a handle that can be grasped in order to rotate the shelving unit 6 outwardly from the display position into the loading position. Additionally, the vertical support member 150 can help support the shelves 10 and can help prevent the shelves 10 from sagging at their sides 155.

FIG. 7 also shows exemplary fastening devices to prevent the shelving units 10 from unintentionally rotating outward (e.g., as a result of unevenness of a store's floor or because the rack becomes unbalanced as product is emptied). In the exemplary embodiment of FIGS. 1-4, 6, 7, 9, and 10, one or more magnets 170 are located on the gondola vertical support 25 that is not attached to the hinge assembly 120. The magnets 170 engage the frame 70 (or elements on the frame 70 responsive to magnetic force) to hold the frame 70 in the product display position until the frame

70 is deliberately rotated outward about the hinge assembly 120. In alternative embodiments, other fastening devices, (e.g., hook and loop fastening material, latches or catches, door springs, and the like) can be employed to releasably secure the frame 70 to the gondola 20.

In some embodiments, the rotatable shelving units 6 are provided with wheels, casters, or other rolling elements to provide support and/or to facilitate easier movement of the rotatable shelving units 6. With reference again to the illustrated embodiment of FIGS. 1-4, 6, 7, 9, and 10, the rotatable shelving units 6 are provided with wheel casters 180 (see FIG. 7). Each castor 180 can have a bracket 185 and a wheel 190. The casters 180 can be connected in any suitable manner to the rotatable shelving units 6, and in the illustrated embodiment are mounted to the vertical support member 150 and the frame (e.g., a horizontal beam 85 of the frame 70). The casters 180 help support the load created by the weight of the frame 70, the shelves 10, and the merchandise stored thereon. They also facilitate easy rotating of the rotatable shelving units 6 between the product display and loading positions.

In alternative embodiments of the product display and dispensing system 5, the rotatable shelving units 6 can be adapted to pre-existing support structures such as a gondola display having a gondola base. With reference to FIGS. 11 and 12 for example, the gondola display 215 to which the rotatable shelving units are attached can have a base 220 and a top surface 222 located beneath the rotatable shelving units 6. In this embodiment, a row of one or more rotatable shelving units 6 is rotatably attached to a side of the conventional gondola 215 as described above such that the rotatable shelving units 6 can be rotated into and out of their rear-loading positions. In the exemplary embodiment of FIGS. 11 and 12, the rotatable shelving units 6 are rotatably attached to the gondola 215 by a hinged frame 70 similar to that described above, although alternative rotatable connections can also be employed as also described above. In some embodiments, the row of shelves on the other side of the gondola 215 (not shown) are stationary shelves 15 as described above. Alternatively, both back-to-back rows of shelves facing outwardly from each other on the gondola 215 are rotatable shelving units 6 attached to the gondola 215. In the exemplary embodiment of the invention shown in FIGS. 11 and 12, the center panel 223 of the pre-existing gondola 215 is removed so that moving the rotatable shelving unit 6 into

its loading position also exposes the rear of the shelves (not shown) located directly behind the rotatable shelving units 6. This additional modification allows for easy rear loading of both rows of shelves at the same time. In still other embodiments, the gondola 215 has no oppositely-facing shelves.

In some embodiments such as that shown in FIGS. 11 and 12, at least one retractable wheel assembly 225 is associated with the shelving units 6 in order to permit rotation of the rotatable shelving units 6 over a fixed base 220 of the gondola 215 and to provide additional support for the shelving units 6. The exemplary retractable wheel assembly 225 shown in FIGS. 11 and 12 includes a leg 235 having a proximal end pivotally connected to the frame 70. A wheel 240 is rotatably attached to the distal end of the leg 235. A spring mechanism 245 biases the wheel leg 235 towards an extended position X as shown in FIG. 11. When the rotatable shelving unit 6 and the frame 70 are in the product display position, the wheel assembly 225 is held in a retracted position (see FIG. 11) by the wheel's contact with the top surface 222 of base 220. As the rotatable shelving unit 6 and the frame 70 rotate away from the gondola 215, the wheel 240 remains in contact with and moves across the top surface 222 of the base 220. When the rotatable shelving unit 6 rotates farther away and out from the gondola display 215, the wheel 240 no longer contacts the surface 222. Once the wheel 240 loses contact with the surface 222, the surface 222 no longer acts upon the wheel assembly 225 to keep it in the retracted position. Therefore, the spring mechanism 245 biases the wheel assembly 225 to pivot into the extended position X. In this extended position X, the leg 235 extends from the frame 70 and the wheel 240 engages the ground surface 250. The extended wheel assembly 225 provides support for and facilitates movement of the frame 70 and the shelves 10 attached thereto as the frame 70 rotates toward a loading position.

After loading the shelving units 6, the operator can rotate the shelving units 6 back to their display positions. During the initial return rotation, the wheel assembly 225 of each shelving unit 6 remains in the extended position X. In the extended position, the wheel 240 is in contact with the ground surface 250 to both support the frame 70 and to facilitate its movement. As the shelving unit 6 approaches the display position, the leg 235 contacts the base 220 as shown in FIG. 12. Further rotation of the shelving unit 6 towards the display position forces the wheel assembly 225 to

pivot into its retracted position Y. In the retracted position, the wheel assembly 225 can continue to support the shelving unit 6 as it moves over the base 220 and returns to the display position.

In an alternative embodiment of the present invention shown in FIGS. 13-15, a retractable wheel assembly 225 is provided having an extension 270, a wheel 275, an extension spring 280 (see FIG. 14), a catch 282, and a lever 285. In this embodiment, the vertical support member 150 is hollow such that the extension 270 fits within the support member 150. The extension 270 can telescope into and out of the support member 150. When the rotatable shelving unit 6 is in the display position, the extension 270 is retracted within support member 150. In this position (shown in FIGS. 13 and 14), the wheel 275 attached to the extension 270 can rest on the top surface 222 of the base 220. The wheel 275 and the extension 270 help to support the weight of the frame 70, the shelves 10 attached to the frame 70, and merchandise stored upon the shelves 10.

With reference now to FIG. 14, the extension spring 280 can be located within the support member 150. For example, one end of the extension spring 280 can be anchored within support member 150 and the other end of extension spring 280 can be affixed to the proximal end of extension 270. As mentioned above, the wheel 275 is located on the distal end of the extension 270. The extension spring 280 biases the extension 270 in an upward direction as indicated by arrow 290 in FIG. 14. After the rotatable shelving unit 6 has been rotated away from the base 220 and over the ground surface 250, the extension 270 is movable to an extended position so that wheel 275 rests upon the ground surface 250. The extension 270 can be extended in any suitable manner, such as by pushing a finger or step on the extension 270, and the like. By way of example only, to extend the extension 270 in the embodiment of FIGS. 13-15, the operator applies a force (e.g., steps upon) the lever 285 to push the lever 285 downward into a horizontal position as shown in FIG. 15. Once the lever 285 has been placed in this position, the operator can apply a force downward upon the lever 285 in the direction of arrow 295 to force the extension 270 downward into an extended position such that the wheel 275 rests on the ground surface 250. A catch 282 locks the extension 270 into the fully extended position, thereby allowing the

wheel 275 to continue to bear the weight of the shelving unit 6 as it rotates toward the loading position.

When loading is complete, the operator can rotate the shelving unit 6 back toward the base 220 and the display position. As the shelving unit 6 approaches the base 220, the lever 285 can be pivoted upward (e.g., by a foot of the operator) into its "off" position to release the catch 282. Upon release of the catch 282, the spring 280 draws the extension 270 upward into its retracted position so that the wheel assembly 225 can retract to a position over the base 220 and/or can roll upon the surface 222 of the base 220. In the retracted position, the retractable wheel assembly 225 can support and assist the rotation of the shelving units 6 toward the display position.

Although the retractable wheel assembly 225 in FIGS. 13-15 employs an extension 270 retractable into the support member 250, it will be appreciated that the extension 270 can be retractably connected to the support member 250 in a number of other manners, such as by receiving the end of the support member 250, by sliding in a groove in the support member (or vice versa), and the like. All such retractable extension and support member relationships fall within the spirit and scope of the present invention.

As shown in FIG. 11, the shelving units 6 can be provided with other types of wheel assemblies 300 located in different positions to support and help move the shelving units 6. Such wheel assemblies 300 can be used instead of or in addition to retractable wheel assemblies 225 as described above. In the embodiment of FIGS. 11 and 12, one or more additional wheel assemblies 300 are attached to the frame 70 to provide additional support for the frame 70 and the shelves 10 attached thereto. The wheel assemblies 300 can be located anywhere on the frame 70, and in some embodiments are located closer to the hinge assembly 120 and remain over the gondola base 220 during the rotation of the shelving unit 6 as shown in FIGS. 11 and 12. Therefore, such wheel assemblies 300 need not necessarily be retractable. Of course, the location of the wheel assemblies 300 can vary. Other suitable types of retractable and non-retractable wheel assemblies can be located to provide additional support for the shelving units 6 if necessary or desired.

An example of the wheel assembly 300 is illustrated in FIGS. 16 and 17. The exemplary wheel assembly 300 in FIGS. 16 and 17 is adjustably attached to the frame

70 in order to allow the wheel assembly 300 to be used on gondola bases 220 having different sizes. Specifically, the exemplary wheel assembly 300 includes a wheel 302 and a bracket 305 that fits around a horizontal beam 85 (e.g., a bottom horizontal beam 85) of the frame 70. The bracket 305 and the wheel 302 can be slidably adjustable along a length of the beam 85 until in a desired location. The bracket 305 and wheel 302 can be secured in place upon the beam 85 in any suitable manner, such as by tightening a screw 310 to engage the horizontal beam 85.

In some embodiments, the exemplary wheel assembly 300 is slidably adjustable and can be moved closer to or farther away from the hinge assembly 120 of the shelving unit 6. Thus, an operator can adjust the wheel assembly 300 to remain in contact with the base 220 based upon the size of the base 220. For example, for narrower bases 220, the operator can move the wheel assembly 300 closer to the hinge assembly 120. For wider bases 220, the operator can move the wheel assembly 300 farther away from the hinge assembly 120.

With reference to FIGS 18-21, in alternate embodiments of the present invention, an operator can adapt a gondola 215 (pre-existing or otherwise) for use with the rotatable shelving units 6 by replacing the gondola's existing base 220 with one or more bay braces 320. As shown in FIGS. 11 and 12, conventional gondola bases 220 often include a top surface 222 and front 325, both of which can be attached to shoes 330 (See FIGS. 18 and 19) of the gondola 215. In the embodiment of the present invention illustrated in FIGS. 19-21, the operator can remove the top surface 222 and front 325 of the gondola 215 to facilitate rotation of the shelving units 6 toward and away from their loading positions.

As shown in FIG. 18, removing the top surface 222 and the front 325 of the gondola 215 exposes the shoes 330. In many cases, the shoes 330 are located approximately every forty-eight inches along the length of the gondola 215 and extend outward approximately twenty-four inches. The shoes 330 provide support for the weight of the gondola 215 shelves attached thereto. To support such weight, the gondola 215 illustrated in FIGS. 18 and 19 includes shoes 330 positioned substantially perpendicularly to the length of gondola 215.

To provide structural support for the modified gondola 215, the bay braces 320 can be connected between the shoes 330 of the gondola 215. With reference now

to FIG. 20, each bay brace 320 can have a horizontal base 335, uprights 340, and gussets 345. The uprights 340 can attach to the ends of the shoes 330 as shown in FIG. 19 such that the horizontal base 335 extends between adjacent shoes 330 to keep the shoes 330 in positions substantially perpendicular to the length of the gondola 215. In alternative embodiments, the bay braces 320 can take other shapes and can be assembled in other manners performing the same function as just described.

In the exemplary embodiment shown in FIG. 21, the shelving units 6 include one or more wheels 310 to help support the load of the shelving units 6 and to facilitate rotation of such shelving units 6. Although the wheels 310 can be retractable in any of the manners described above, the wheels 310 can be non-retractable provided that the bay braces 320 are sufficiently flat or that the wheels 310 are positioned on the frame 70 to never traverse the bay braces 320. In the exemplary embodiment of FIGS. 19-21, the horizontal base 335 is substantially flat (e.g., approximately .075 inches thick) in order to allow the wheel 310 to roll over the base 335. Thereby, the shelving units 6 can rotate over the bay brace 320 between the loading and display positions.

Yet another retractable wheel assembly embodiment is illustrated in FIGS. 22 and 23. In this embodiment, a pivoting wheel assembly 440 is used instead of an articulated wheel assembly 225 as shown in FIG. 12 or a telescoping wheel assembly 225 as shown in FIGS. 13-15. The pivoting wheel assembly 440 is pivotably attached to the shelving unit 6, such as to the frame 70 of the shelving unit 6. By way of example only, the pivoting wheel assembly 440 can have a leg 445 that is pivotally attached at one end in any suitable manner to the frame 70 and at another end to a wheel 450. The leg 445 can be pivotably attached to a plate 452 (such as by a bolt 460 or other conventional fastener or fastening means), which can be secured to the frame 70 in any suitable manner (e.g., by one or more bolts 462, welds, and the like). Alternatively, the leg 445 of the pivoting wheel assembly 440 can be attached to the frame 70 using any other element or device providing the desired pivotal movement (e.g., a hinge, pivot pin, etc.).

As the rotatable shelving unit 6 is rotated away from the base 220 and over the ground surface 250, the leg 445 drops down such that wheel 450 rests upon the ground surface beneath the frame 70. In some embodiments, the leg 445 can then be

urged back (e.g., pushed by an operator's foot) into an over-center position where it will help to support the load of the shelving unit 6 as it rotates into a loading position. To this end, the leg 445 can be curved as shown in FIG. 23 or can be shaped in any other manner in order to make it easier to push the wheel 450 into an over-center position beneath the frame 70. The downward force created by the weight of the shelving unit 6 can keep the pivoting wheel assembly 440 in place as the shelving unit 6 is rotated toward a loading position.

Once loading is completed, an operator can rotate the shelving unit 6 back towards the base 220 to its display position. As the shelving unit 6 approaches the base 220, a portion of the wheel assembly 440 (such as leg 45) can make contact with the base 220, thereby forcing the wheel assembly 440 to pivot back to its original position. In its original position, the wheel 450 rests upon the base 220 as the shelving unit 6 returns to its display position upon the gondola 215.

FIGS. 24-30 show an exemplary embodiment of another shelving system according to the present invention. This shelving system (indicated generally at 500) enables a user to pull and pivot one or more shelving units 505 to their loading positions. Specifically, the pull and pivot shelving system 500 includes one or more shelving units 505 slidable from a display position (See FIGS. 24 and 27) to an extended position (See FIGS. 25 and 28) with respect to adjacent shelving units 505 in order to provide pivoting clearance for the extended shelving units 505. Upon attaining sufficient clearance, an extended shelving unit 505 is rotatable about a hinge or other pivot toward a loading position (See FIGS. 26 and 29) without the need for moving adjacent shelving units 505. Analogous to the previous embodiments described above, some embodiments of the shelving unit 500 include a movable shelving unit 505 and a gondola 215 (pre-existing or otherwise). As described above and shown in FIG. 18, a gondola 215 can include shoes 330. The shelving unit 505 according to the present invention can be received between a pair of adjacent shoes 330 in the gondola 215 and can slidably and pivotably mount to one of the adjacent shoes 330. Alternatively, the pull and pivot shelving system 500 can by employed in other types of support structures as described above (e.g., free standing standard, etc.).

In the exemplary embodiment shown in FIGS. 24-29, the shelving unit 505 slidably mounts to a gondola shoe 330 or the ground surface and can thereby slide

toward and away from the gondola 215. Sliding the shelving unit 505 from the gondola 215 creates clearance to the side of the rack 505 so that the rack 505 can pivot into a loading position (See FIGS. 26 and 29) without interference from or the need to move adjacent shelving units 505.

The shelving unit 505 can be slidable and rotatable with respect to the gondola 215 (or other structure) in various manners. With reference to FIG. 30 for example, the shelving unit 505 is slidably attached to the gondola 215 by a telescoping rail 520. The exemplary telescoping rail 520 includes an outer stationary rail 525 mounted to a gondola shoe 330 (or alternatively to the ground surface 250) and an inner sliding rail 530 slidable within the stationary rail 525. The stationary rail 525 is connected to the gondola shoe 330 in any conventional manner, such as with screws 535, welding, bolts, and the like. The inner sliding rail 530 has a front end 540 and a rear end 545. The exemplary shelving unit 505 in FIGS. 24-30 is pivotally attached to the telescoping rail 520 by a hinge assembly 550. The exemplary hinge assembly 550 includes a pivot pin 555 mounted within a sleeve 560. The sleeve 560 can be attached to the shelving unit 505 in any conventional manner, such as by screws, welding, bolts, and the like. The end of the pin 555 includes a mounting disc or wheel 565 that is slidably received within the telescoping rail 520. The pin 555 is movable along the inner sliding rail 530 (and in some embodiments, the stationary rail 525), such as by sliding in slots 570, 575 in the rails 530, 525 as shown in FIG. 30.

To move the shelving unit 505 from its display position to a loading position, the operator slides the shelving unit 505 away from the gondola 215. Sliding the shelving unit 505 causes the disc or wheel 565 (and the pin 555) to slide forward within the telescoping rail 520. As the shelving unit 505 slides away from the gondola 215, the disc or wheel 565 contacts and abuts the front end 540 of the inner sliding rail 530. The continued forward motion of the disc or wheel 565 causes the inner sliding rail 530 to slide forward and telescope out from the stationary rail 525. The forward-sliding rail 530 allows the shelving unit 505 to clear the gondola 215 and any adjacent shelving units 505. When the inner sliding rail 530 reaches sufficient clearance with respect to adjacent shelving units 505 (See FIGS. 25 and 28), the shelving unit 505 can be rotated about the hinge assembly 550 to the loading position (See FIGS. 26 and 29).

To prevent the inner sliding rail 530 from sliding out of the stationary rail 525, a screw or other projection 580 can be located near the rear 545 of the inner sliding rail 530 for interference with the stationary rail 525. As the inner sliding rail 530 moves forward, the projection 580 can abut the front of the stationary rail 525 to thereby prevent further forward movement of the inner sliding rail 530 and to stop the inner sliding rail 530 from sliding out of the stationary rail 525.

To return the shelving unit 505 to its display position, the above-described procedure can be reversed. First, an operator rotates the shelving unit 505 from the loading position so that the shelving unit 505 is aligned with the adjacent shelving units 505 and can be received between the adjacent shelving units 505 (See FIGS. 25 and 28). The telescoping rail 520 helps to align the shelving unit for this purpose. Once the shelving unit 505 is properly aligned, the operator can push the shelving unit 505 back towards the gondola 215 into its display position between adjacent shelving units 505 (see FIGS. 24 and 27). As the shelving unit 505 moves backward, the disc or wheel 565 can slide backward within the telescoping rail 520. As the shelving unit 505 continues back toward its display position, the disc or wheel 565 contacts and abuts the rear end 545 of the inner sliding rail 530. The continued backward motion of the shelving unit 505 and disc or wheel 565 (as well as the pin 555) moves the inner sliding rail 530 back within the stationary rail 525. In this manner, the shelving unit 505 can be readily returned to its display position in alignment with the other shelving units 505 of the gondola 215.

The shelving unit 505 illustrated in FIGS. 24-30 is shown installed in a gondola 215 and slidable along a telescoping rail 520. In other embodiments, the shelving unit 505 can be movable as just described by employing other structure performing the same or similar functions as the telescoping rail 520. For example, the disc or wheel 565 can be received within or can otherwise be guided along a number of other elements, including without limitation a channel, a floor recess, a track having any cross-sectional shape, an L, V, C, or U-shaped beam, and the like. As used herein and in the appended claims, all such elements and structure are referred to as "rails".

Although a rotatable disc or wheel provides good results for easily traveling along a rail according to the present invention, other elements can instead be

employed to perform the same or similar functions. By way of example only, a carriage can be connected to the shelving unit 505 and can be slidably mounted upon the rail 520. As another example, the pin 555 can be attached to the rail 520 via one or more ball bearing sets, roller bearings, and the like. As yet another example, a carriage having one or more low-friction slides can be connected to the shelving unit 505 and can slide along the rail 520. In another example, the pin 555 is directly or indirectly connected to a wheel that is guided along a rail 520 connected to the ground or to the shoe 330. Any other element or structure enabling the shelving unit 505 to travel along the rail 520 can be employed, each of which falls within the spirit and scope of the present invention.

In addition, it should be noted that the rail 520 need not necessarily be telescoping in order to enable the shelving unit 505 to travel as described above. Specifically, the rail 520 can be a one-piece unit along which the shelving unit 505 moves as described above to and from a position in which the shelving unit 505 has cleared the front of any adjacent shelving units 505. Alternatively, the rail 520 can itself be mounted for sliding movement with respect to the ground, such as by sliding over one or more bearing sets, low-friction pads or other elements, and the like. In short, any rail to which the shelving unit 505 can be connected and that permit the shelving unit to slide therealong can be employed and falls within the spirit and scope of the present invention.

Although the use of a pin 555, disc or wheel 565, and sleeve 560 is a desirable manner in which to pivotably mount the shelving unit 505 to the rail 520, any other element or structure capable of pivotably mounting one element to another can instead be used as desired.

The shelving unit 505 can be installed in a number of other environments for moving in the manner described above. In particular, the shelving unit 505 (as well as the other shelving units described herein and illustrated in FIGS. 58) need not necessarily be installed on a gondola. Like the other shelving units described herein, the shelving unit 505 can be installed in any location desired, such as adjacent a wall, frame, or other structure for movement with respect to the wall, frame, or other structure, adjacent to or on another shelving system, and the like. Accordingly, the

shelving units in the various embodiments of the present invention are not limited in application to gondolas.

The foregoing "pull-and-pivot" shelving system can also be employed in endcap shelving arrangements. An endcap is a display unit located at the end of a shelving system, display row, or gondola aisle. FIGS. 31-33 show an exemplary embodiment of an endcap 590 located at the end 592 of display row 594. The endcap 590 includes an end display 596 and two side displays 598, each of which are shelving units in the illustrated embodiment. The end display 596 includes a front 605, sides 610 and a rear 615 as shown in FIG. 31. In the exemplary embodiment of FIGS. 31-33, an operator loads the end display 596 at the rear 615 for display at the front 605. Each side display 598 includes a front 620, sides 625 and a rear 630. As with the end display 596, an operator loads the side display 598 with product at the rear 630 for display at the front 620. Of course, the end display 596 and side displays 598 can include elements suitable for displaying products (e.g., horizontal or angled shelves, advertisement structure, etc.).

In the exemplary embodiment of the endcap 590 shown in FIG. 31, the side displays 598 are arranged back-to-back such that their sides 625 are adjacent the rear 615 of the end display 596 and the end 592 of the gondola or display row 594. In the exemplary embodiment of FIGS. 31-33, the fronts 620 of the side displays 598 are substantially aligned with the sides 610 of the end display 596 to form an attractive, continuous face (although such alignment need not necessarily exist). As shown in FIGS. 32 and 33, each side display 598 includes a hinge assembly 550 slidably attached to a rail 520 located at the rear 615 of the end display 596. The hinge assemblies 550 and rails 520 are analogous to the hinge assemblies 550 and telescoping rails 520 described above and shown in FIG 30, although the rail 520 and hinge assembly 550 can take any of the other forms also described above. Any suitable hinge assembly and rail (telescoping or otherwise) known to those in the art can be used.

To load the endcap 590, one or both of the side displays 598 are slid forward in the telescoping rails 520 (such as the side display 598 moved in the direction of arrow 637 in FIG. 32). As described above and in connection with the embodiment of the present invention illustrated in FIGS. 24-30, moving the side display 598 forward

in this manner causes the inner sliding rail 530 of the telescoping rail 520 to extend forward, allowing the side display 598 to move into a position with enough clearance to rotate about the hinge assembly 550 (such as in the direction of arrow 640 in FIG. 33). As shown in FIG. 33, rotating the side display 598 exposes the rear 630 of the side display 598 and at least part of the rear 615 of the end display 596 for loading with product. To return the endcap 590 to its display position as shown in FIG. 31, the operator simply reverses the order of side display movement just described.

FIGS. 34-36 illustrate another embodiment of a pull and pivot shelving system employing a telescoping rail performing a function similar to the telescoping rail 520 in the embodiment of FIGS. 24-30. In the embodiment of FIGS. 34-36, the support structure 18 (e.g., a gondola 215 as described above or other shelving system) includes a base or deck 220 for storing and/or displaying product. As the shelving unit 6 is pulled from the display position, the base or deck 220 (and any product resting thereon) remain stationary by virtue of the attachment of the base or deck 220 to the support structure 18. Accordingly, the bottom of the shelving unit 6 is adapted to slide beneath the base or deck 220 in order to leave the base or deck 220 and any product thereon undisturbed. To this end, the shelving unit 6 has a telescoping rail 620 permitting the shelving unit 6 to be pulled away from the support structure 18. The exemplary telescoping rail 620 illustrated in FIGS. 34-36 includes a stop 625 located at the fully extended position of the telescoping rail 620. The stop 625 thereby prevents the shelving unit 6 from sliding completely out from the telescoping rail 620. Once the shelving unit 6 has been slid sufficiently along the telescoping rail 620 toward a fully extended position, the shelving unit 6 can be rotated about a pivot 630 without interfering with adjacent shelving units 6 or the base or deck 220 and product thereon.

The rail 620 in the embodiment illustrated in FIGS. 34-36 can take a number of different forms including any of the forms described above with reference to the pull and pivot embodiment of FIGS. 24-30, only some of which telescope as just described. Similarly, the shelving unit 6 can be pivotably connected to the rail 620 in any of the manners also described above with reference to the pivotable connection between the shelving unit 505 and the rail 530.

After loading, the operator can rotate the shelving unit 6 about the pivot 630 back to its extended position where the telescoping track 620 helps to align the shelving unit 6 with adjacent shelving units 6. To move the shelving unit 6 from the extended position to the display position, an operator slides the shelving unit 6 along the telescoping rail 620 back towards the gondola 215. The telescoping rail 620 can include a second stop 635 to prevent the shelving unit 6 from sliding too far toward the gondola 215. In the exemplary embodiment shown in FIGS. 34-35, the shelving unit 6 includes at least one wheel assembly 622 that is movable along the telescoping rail 620 and helps to support the weight of the shelving unit 6 as the shelving unit 6 and product are moved from the display position to the loading position.

FIGS. 37 and 38 illustrate another embodiment of the present invention in which shelf units 705 are arranged in a staggered fashion, with each shelving unit 705 positioned rearwardly or forwardly of a laterally adjacent shelving unit 705. A staggered shelving system (indicated generally at 700) can have two or more such shelving units 705, 710. FIGS. 37 and 38 are plan views of an exemplary staggered shelving system 700 arranged in a two-bay staggered configuration. This exemplary shelving system 700 has a row of rotatable shelving units 705a-e (e.g., gondola-mounted shelving units 705, free-standing shelving units 705, and the like) positioned back-to-back with a staggered row of stationary rear-loading shelving units 710 a-e. In alternative embodiments, both rows of shelving units can include rotatable shelving units 705. Alternatively, the rotatable shelving units 705 can be arranged against a wall or other barrier that limits access to the rear of the shelving units 705.

As shown in FIGS. 37-40, the row of rotatable shelving units 705 and the row of stationary shelving units 710 are each arranged in a staggered configuration (rather than a linear configuration). For example, as shown in FIG. 37, the rotatable shelving unit 705b is not linearly aligned with rotatable shelving unit 705a. Rather, rotatable shelving unit 705b is located to the side of and forward of rotatable shelving unit 705a (forward referring to a direction toward an isle running alongside the rotatable shelving units 705). This pattern is continued for rotatable shelving units 705c, 705d and 705e, each such rotatable shelving unit being located to the side of and forward of the previous rotatable shelving unit. In this manner, the rotatable shelving units 705 create a stepped, diagonal, or "staggered" row of rotatable shelving units 705. The

stationary shelving units 710 are likewise arranged in a staggered row. For example, as shown in FIG. 37, stationary shelving unit 710b is located to the side of and rearwardly of stationary shelving unit 710a (rearwardly referring to a direction away from an isle running alongside the stationary shelving units 710), stationary shelving unit 710c is located to the side of and rearwardly of stationary shelving unit 710b, etc.

Each rotatable and stationary shelving unit 705, 710 comprises a front 715 (e.g., facing an aisle running alongside the respective rows of shelving units), a rear 717, and sides 718. In FIGS. 37 and 39, each shelving unit 705 and 710 is positioned in a display position, wherein the front 715 of each unit faces outwardly toward an aisle for displaying product and positioning product in a readily accessible position for consumers. FIG. 38 shows one of the rotatable shelving units 705c in a loading position after having been rotated in the direction of arrow 720. In the loading position, the rear 717 of the rotatable shelving unit 705c is easily accessible for loading product on the shelves of the rotatable shelving unit 705c. As seen in FIGS. 38 and 40, rotating the shelving unit 705 into a loading position also provides access to the rear 717 of the stationary unit 710 located behind the rotated shelving unit 705, thereby allowing the stationary unit 710 to be easily rear-loaded as well.

Because the shelving units 705 and 710 are arranged in staggered rows rather than linear rows, each rotatable shelving unit 705 can be individually and selectively rotated without rotating adjacent shelving units 705. If the same shelving units 705 and 710 were arranged in linear rows (e.g., such that the front 715 of each rotatable shelving unit 705 was substantially aligned with the front 715 of laterally adjacent shelving units), then rotatable shelving unit 705b could not be rotated from its display position to its loading position until rotatable shelving unit 705a was already rotated into its loading position. This is due to the lack of clearance between adjacent rotatable shelving units 705 sufficient to enable rotation of the rotatable shelving units 705 without movement of one or more laterally adjacent units 705. However, if the rotatable shelving units 705 are arranged in staggered rows as shown in FIGS. 37-40, rotatable shelving unit 705a does not interfere with the rotation of rotatable shelving unit 705b (and vice versa).

Arranging the shelving units 705, 710 in a staggered rather than a linear arrangement reveals at least part of a side 718 of each unit 705, 710 to shoppers in

aisles running past the shelving units 705, 710. Therefore, a large surface area of the shelving units 705, 710 is available for "point-of-purchase" displays and/or for advertisements. For example, and as shown in FIG. 39, an operator can mount advertisements 725 on sides 718 of the shelving units 705 and/or 710 in any manner. In a linear arrangement, these sides 718 would be largely hidden from view by adjacent shelving units 705, 710 and no such advertising or point-of-purchase displays could be featured on the shelving units 705 and 710.

Arranging the shelving units 705 and 710 in a staggered rather than a linear arrangement also creates off-aisle parking areas 728 (see FIG. 41) for shopping carts (such as, for example, in a grocery store or other retail shopping facility). The off-aisle areas 728 allow shoppers or other users to examine items in a shelving unit 705, 710 without blocking the passage of others through the aisle. FIG. 41 is a schematic figure showing how a pair of staggered two-bay shelving systems 700 creates an aisle 730 (indicated by dotted lines 732). If the display systems 700 were arranged in a linear rather than a staggered arrangement, then the shelving units 705, 710 would be linearly aligned as described above, and there would be no off-aisle parking areas 728 for shopping carts, shoppers, and other users of the shelving system(s) 700. Because the shelving units 705, 710 in the display systems 700 illustrated in FIGS. 37-41 are staggered, off-aisle parking areas 728 are available.

The shelving systems 700 illustrated in FIGS. 37-41 can have any type of shelving units described herein, including those described above with reference to the embodiments illustrated in FIGS. 1-36. In addition, the shelving systems 700 (as well as the other shelving systems described herein) can have any type of shelves desired. In some embodiments, the shelf 735 illustrated in FIGS. 42, 43 and 52-54 is employed. The shelf 735 has a front side 737 and a rear side 738. The shelf 735 is provided with one or more mounting hooks 740 at or near the rear side 738 of the shelf 738. With reference to FIG. 53 for example, a mounting hook 740 is associated with each rear corner of the shelf 735. Each mounting hook 740 is shaped and sized to connect to a frame or other structure of a shelving unit.

By way of example only, the mounting hooks 740 in the embodiment of FIGS. 42, 43 and 52-54 are shaped and sized to fit within and engage selected vertical slots 745 in the front faces 750 of vertical uprights 755 of a shelving unit, adjacent

framework, or other adjacent structure. The exemplary vertical upright 755 illustrated in FIGS. 42, 43, 53, and 54 are rear uprights 755 of a shelving unit similar to the rotatable shelving units 705 described above, although the uprights 755 can be members of a frame adjacent to the shelving units, uprights of a stationary shelving unit 710 such as those also described above, and the like.

The shelf 735 in FIGS. 42, 43, and 52-54 is adjustably mounted to the vertical uprights 755 by being connectable to the vertical uprights in any number of different locations in a manner as described above. The front corners of the exemplary shelf 735 each include a spring-loaded shelf mount 760. The shelf mount 760 allows the shelf 735 to be mounted at different angles with respect to a horizontal plane. In the exemplary shelf of FIGS. 42, 43, 52-54, the shelf mount 760 includes an arm 765 connected to the shelf 735. In some embodiments, the arm 765 can be connected to the shelf 735 by a bolt, pin, screw, or other conventional fastener, or can be connected to the shelf 735 in any other suitable manner. In the exemplary shelf 735 shown in FIG. 54 for example, each arm 765 is connected to the shelf 735 by a bolt 757. Other manners of connecting the arms 765 to the shelf 735 can be employed as desired. The exemplary embodiment of the shelf mount 760 is a spring loaded mechanism that forwardly biases the free end 770 of the arm 765.

The shelf mount 760 of the embodiment illustrated in FIGS. 42, 43, and 52-54 further includes a mounting pin 775 that extends perpendicularly and outwardly from the free end 770 of the arm 765. In some embodiments, the mounting pin 775 is located and shaped to fit within and engage a selected elongated slot 780 in the side face 782 of a vertical upright 755. As mentioned above, the vertical upright 755 can be a vertical upright 755 of a shelving unit, adjacent framework, or other adjacent structure. In the exemplary embodiment of FIGS. 42, 43, and 52-54, the vertical uprights 755 to which the mounting pins 775 attach are front vertical uprights 755 of a rotatable shelving unit 705. Because the pin 775 is received within a elongated slot 780 of the vertical upright 755, the pin 775 can slidably adjust to different positions along the length of the elongated slot 780. This arrangement allows the shelf 735 to readily mount at different angles with respect to a horizontal plane.

FIG. 54 shows an exemplary shelf 735 mounted level with a horizontal plane, wherein the pin 775 is situated in a forward end of elongated slot 780. Alternatively,

this shelf 735 can be positioned at an angle with respect to a horizontal plane simply by locating the pin 775 in a lower elongated slot 780. Because of the elongated shape of the slot 780, the pin 775 can slide rearwardly in the slot 780 as may be needed to compensate for the change in the inclination of the shelf 735. The underside 786 of hook 740 can be shaped and sized to accommodate the downward rotation of the shelf 735 while still engaging the slot 780 in the vertical upright 755.

Although the pins 775 and mounting hooks 740 can be employed to engage the shelf 735 with the uprights 755 as described above, it should be noted that a number of other types of elements and structure can be employed to mount the shelf 735 to the uprights 755 in different orientations. By way of example only, the mounting hook 740 and spring-loaded pin 775 could be replaced by front and rear angles, fingers, or other extensions which can be engaged with front and rear slots 780 of the vertical uprights 755 at various locations along the upright 755 (and to thereby support the shelf 735). As another example, studs, fingers, bosses, angles, or other protrusions on the front and rear of the shelf 735 can rest upon ledges, ribs, or other protrusions of the vertical uprights 755 (and vice versa) in different vertical locations along the vertical uprights 755. Still other manners of supporting the front and rear of the shelves 735 in different vertical positions along the vertical uprights 755 and at different angles of inclination with respect to a horizontal plane are possible and fall within the spirit and scope of the present invention.

With reference now to FIGS. 52 and 54, the shelf 735 has a base 790 that supports product thereon, and in some embodiments can includes a recess 795. This recess 795 can create a front wall 800 that prevents product stored on shelf 735 from sliding off the shelf's front edge when the shelf 735 is positioned at an angle with respect to a horizontal plane.

In some embodiments such as the exemplary embodiment shown in FIGS. 42, 43, and 52-54, the shelf 735 can includes a series of apertures 805 (see FIG. 53) spaced along the front wall 800 and/or back wall 810 defined by the recess 795 in the shelf 735. These apertures 805 can be used to mount wires or other dividers 815 on the shelf 735 (such as, for example, dividers 815 running in a front-rear orientation on the shelf 735). Such dividers 815 can be employed to align and keep products stored on the shelf 735 in neat uniform rows. If desired, slots 820 can instead or also be used

to receive extensions (not shown) of dividers 815 and to thereby keep the dividers 815 in vertical orientations.

As discussed above, advertisements can be positioned on or mounted to an exposed side 718 of each shelving unit 705 and/or 710. An exemplary manner in which this is accomplished is illustrated in FIG. 49. In this embodiment, a planar advertisement 725 is positioned on a side 718 of a shelving unit 705, 710 using two sleeves or channel members 825 having U-shaped cross-sections. In any suitable manner (e.g., welds, pegs, bolts, and the like), each sleeve 825 can be positioned along at least part of the length of the shelving unit vertical uprights 755 bordering the side 718 of the shelving unit 705, 710. The sleeves 825 can be configured to receive and secure the sides 830 of the planar advertisement 725. If desired, a transparent cover 835 can be positioned on the sleeves 825 to protect the advertisement 725. Of course, other suitable methods, elements, and structure can also or instead be used to secure the advertisement 725 to the side 718 of the shelving units 705, 710.

In the exemplary embodiment of the present invention shown in FIGS. 37-40, each stationary shelving unit 710 is connected to adjacent stationary shelving units 710 to create a fixed staggered row of stationary shelving units 710. With reference also to FIG. 44, the stationary shelving units 710 can be connected using an S-shaped bracket 840. In other embodiments, adjacent stationary shelving units 710 can be attached in any other suitable manner. The S-shaped bracket 840 of the illustrated embodiment in FIGS. 37-40 and 44 is configured such that a flange 845 of the S-shaped bracket 840 fits against and attaches to a vertical upright 755 of one stationary shelving unit 710 while another flange 850 wraps around and attaches to a proximate vertical upright 710 of an adjacent stationary shelving unit 710. FIG. 44 shows the use of mounting bolts 852 to attach the S-shaped bracket 840 to the vertical uprights 755. Of course, other elements, devices, and methods can be employed to connect the S-shaped bracket 840 to the vertical uprights 755, such as welding, inter-engaging elements, pins and other conventional fasteners, and the like.

In the exemplary embodiment, each rotatable shelving unit 705 is pivotally attached to an adjacent stationary shelving unit 710 (although the rotatable shelving unit 705 can be attached to a wall, support or frame, or other adjacent structure in other embodiments as described above - such as in cases where stationary shelving

units are not located behind the rotatable shelving units 705). In the exemplary embodiment illustrated in FIGS. 37-40, the rotatable shelving units 705a, 705b, 705c, and 705d are pivotally attached to the stationary shelving unit 710b, 710c, 710d, 710e, respectively. More specifically, the vertical upright 755 at a front corner 854 of each rotating shelving unit 705 is pivotably attached to a vertical upright 755 at an adjacent rear corner 856 of an adjacent stationary shelving unit 710. In this embodiment, the rotatable shelving unit 705a is pivotably connected to the adjacent rear vertical upright 755 of the stationary shelving unit 710b, and is pivotable about its front corner 854 in a counter-clockwise direction.

It should be noted that the any or all of the rotatable shelving units 705 can be connected to pivot in an opposite manner to that shown in FIGS. 37-40. In particular, in some alternative embodiments, the vertical upright 755 at the back corner 872 of the rotatable shelving unit 705 is pivotably attached to a vertical upright 755 at the adjacent stationary shelving unit 710 (or other stationary structure) in a manner similar to that described above with reference to the embodiment of FIGS. 37-40. In these alternative embodiments, the rotatable shelving unit 705 would pivot about the corner 856 of the rotatable shelving unit 705 toward a loading position in a clockwise direction. Although this pivoting arrangement can result in reduced access to an adjacent rotatable shelving unit 705 when a rotatable shelving unit 705 is pivoted to a loading position, such an arrangement provides design alternatives that can be employed as needed or desired. In addition, in some embodiments one or more of the shelving units 705 can include a rail 520 as described above to enable the shelving units 705 to slide as well as rotate. Such embodiments combine the "pull and rotate" system with the staggered shelving unit system described above.

A rotatable shelving unit 705 can be pivotably attached to an adjacent stationary shelving unit 710 (or other adjacent structure) in any suitable manner. For example, the rotatable shelving unit 705 can be directly or indirectly attached to a stationary shelving unit 710 by one or more hinges. In the exemplary embodiment illustrated in FIGS. 37-40, a front corner 854 of the rotatable shelving unit 705 is pivotably attached to an adjacent rear corner 856 of a stationary shelving unit 710 by an upright hinge assembly 858. This allows the rotatable shelving unit 705 to be rotated about the upright hinge assembly 858.

An exemplary hinge assembly 858 is illustrated in FIG. 45. This hinge assembly 858 includes a hinge plate 860 rotatably attached to a hinge base 862 by a pivot pin 864. The hinge plate 860 and the hinge base 862 each have a hinge sleeve (not shown) through which the pivot pin 864 is received to pivotably connect the hinge plate 860 and the hinge base 862. As is known in the art, the pivot pin 864 extends through the hinge sleeve 866 on the hinge base 862 and the hinge sleeve (not shown) on the hinge plate 860 to rotatably secure the plate 860 to the base 862 and to thereby form the hinge structure. In the exemplary embodiment of FIGS. 37-40, the hinge base 862 is connected to the vertical support 755 at a corner 856 of the stationary shelving unit 710 in any suitable manner (e.g., welding, inter-engaging elements, bolts, screws, pins, and other conventional fasteners, and the like). Likewise, the hinge plate 860 of this exemplary embodiment is connected to the vertical support 755 of the rotatable shelving unit 705 at a corner 854 of the rotatable shelving unit 705 in any suitable manner (including those just mentioned with regard to the hinge base connection). The embodiment in FIG. 45 shows a hinge base 862 and hinge plate 860 welded to their respective vertical uprights 755.

As with the embodiment of the present invention illustrated in FIGS. 37-40, the hinge assembly 858 can extend along any part of the vertical upright, and in some embodiments extends along at least a substantial length of the vertical uprights 755. This arrangement prevents the load created by the weight of the rotatable shelving unit 705, shelves 735 therein, and merchandise stored thereon from being focused upon one point or area of the hinge assembly 858 and thereby makes the hinge assembly 858 more durable and able to support heavier loads. In some embodiments, a plurality of hinge assemblies 858 can be spaced along the length of the vertical uprights 755. For example, there can be one hinge assembly 858 attached near the top of the uprights 755, one near the middle, and one near the bottom.

In the exemplary embodiment shown in FIGS. 37-40, each rotatable shelving unit 705 is releasably locked to a stationary shelving unit 710 located back-to-back with the rotatable shelving unit 705. For example, the rotatable shelving unit 705a in FIGS. 37 and 38 is releasably locked to the stationary shelving unit 710a, the rotatable shelving unit 705b is releasably locked to the stationary unit 710b, etc. This arrangement prevents the rotatable shelving units 705 from unintentionally rotating

outward due to the unevenness of a store's floor or the rotatable shelving unit 705 being inadvertently knocked by a shopper, because the unit 705 becomes unbalanced as it is emptied of product, or for any other reason.

With reference to FIGS. 45-47, the rotatable shelving units 705 in the embodiment of FIGS. 37-40 are releasably locked by spring-loaded or gravity-loaded latches 868. Each latch 868 is pivotally mounted upon a pivot pin 870 within a vertical upright 755 at a corner 872 of a rotatable shelving unit 705. The exemplary latch 868 illustrated in FIGS. 45-47 includes a handle end 874 and a hook end 876. The latch 868 is positioned substantially parallel to the side 718 of the rotatable shelving unit 705, with the handle end 874 extending out from the vertical upright 755 at corner 872 through the slot 878 in the front face of the vertical upright 755. The hook end 876 of the latch 868 extends out from the upright 755 at the corner 872 through a slot 880 in the rear face of the vertical upright 755.

When the rotatable shelving unit 705 of FIGS. 37-40 is in its display position, the hook end 876 of the latch 868 extends through the slot 882 in the vertical upright 755 at a corner 858 of the corresponding stationary unit 710 as best shown in FIGS. 46 and 47. The engagement of the hook 886 with the vertical upright 755 secures the rotatable shelving unit 705 to the stationary shelving unit 710. When the rotatable shelving unit 705 is to be rotated into a loading position, an operator unlocks the latch 868 by moving the handle end 874 in the direction of arrow 888 in FIG. 47. Moving the handle 874 in this manner pivots the hook end 876 up into alignment with the slot 882 so that the hook end 876 can be pulled out from slot 882. After releasing the latch 868, the rotatable shelving unit 705 can be rotated into a loading position.

To return the rotatable shelving unit 705 to the locked display position, an operator rotates the rotatable shelving unit 705 back towards the corresponding stationary shelving unit 710. As the rotatable shelving unit 705 nears its display position, the hook end 876 of the latch 868 encounters the vertical upright 755 of the stationary shelving unit 710. The hook end 876 can have an angled, curved, or ramped underside 890 or can otherwise be shaped to ride over the confronting edge of the slot 882 in the vertical upright 755 as it encounters the upright vertical 755. Continued movement of the rotatable shelving unit 705 moves the hook end 876 of the latch 868 through the slot 882 until the latch 868 pivots down into its original

locked position, thereby locking the rotatable shelving unit 705 into the display position.

In alternative embodiments of the present invention, the latch 868 described above and illustrated in FIGS. 45-47 can be located on or in a vertical upright 755 of a stationary shelving unit 710 for releasable engagement with a rotatable shelving unit 705. It should also be noted that the latch 868 of the present invention can be employed to lock the rotatable shelving unit 705 to a wall, frame, another rotatable shelving unit 705, or any other structure desired. In addition, the latch 868 can be pivotably connected to any part of a vertical upright 755 (i.e., at a top, middle, or bottom location on the vertical upright 755, inside or outside of a vertical upright 755 for releasable connection within a slot or other aperture of another vertical upright, for releasable connection with a pin, hook, finger, or other feature of another vertical upright, and the like). In alternative embodiments of the present invention, other releasable fastening devices (such as magnets, hook and loop fastener material, other types of latches, and the like) can be used to secure the rotatable shelving unit 705 to a corresponding stationary shelving unit 710.

To facilitate easy movement of the rotatable shelving units 705 between display and loading positions in the illustrated embodiment of FIGS. 37-40, wheels can be provided on the base 892 of each rotatable shelving unit 705. Any number of wheels can be employed in any locations on the base 892. By way of example only, and with reference to FIGS. 55-58, wheels 894 can be mounted proximate to each corner of the base 892. In some embodiments, the wheels 894 are fixed in a desired rotational position on the base 892. In one embodiment for example, each wheel 894 is mounted on a non-rotatable caster 900 with its axle affixed perpendicular to a line drawn from the hinge assembly 858 to the caster 900. This arrangement helps prevent the wheels 894 from becoming misaligned during movement of the rotatable unit 705, thereby making it easier to move the rotatable unit 705 in and out of its loading position.

In other embodiments however (such as the embodiment of FIGS. 55-58), the wheels 894 can be mounted on rotatable casters 900 that allow the axle 896 of each wheel 894 to rotate relative to the base 892 as is well known in the art. In the exemplary embodiment of FIGS. 55-58, the wheels 894 are mounted to the base 892

using a mounting plate 898. Of course, the wheel casters 900 can be mounted to the base 892 of a rotatable shelving unit 705 in alternative suitable manners.

With continued reference to the exemplary embodiment of FIGS. 55-58, the casters 900 are mounted to the mounting plate 898 using screws 902. However, the casters 900 can be mounted in any other suitable manner (e.g., by welding, bolts, and the like). In some embodiments, each mounting plate 898 features a U-shaped channel 904 dimensioned to receive a beam of the rotatable shelving unit 704 in order to connect the mounting plate 898 to the rotatable shelving unit. By way of example only, the mounting plate 898 in FIGS. 55-58 has U-shaped channels 904 bordering three of the four edges of the mounting plate 898, and are shaped and sized to receive the outer edges 906 of the base 892 and/or one of the base's other (e.g., horizontal) support beams 908. Each mounting plate 898 can be mounted to the base 892 by placing the plate 898 under the appropriate corner of the base 892 so that the edges 906 and the support beam 908 rest in the channels 904. The channels 904 and the weight of the rotatable shelving unit 705 secure the mounting plate 898 in place to the base 892. In some embodiments such as that shown in FIG. 58, the mounting plates 898 for each corner of the rotatable shelving unit 705 are configured to fit only that corner, thereby insuring that the mounting plate 898 with the appropriately angled wheel 894 and axle 896 will be used under the correct corner 909.

As mentioned above, it is desirable in some cases to employ wheels 894 that are not pivotable about a vertical or substantially vertical axis. In such cases, the bracket, yoke, or other structure to which the wheel axle 896 is mounted is fixed in place in any suitable manner. In such cases, the wheels 894 can be mounted perpendicularly with respect to radii extending from the pivot axis (i.e., wherein the wheel axles 896 are parallel or substantially parallel with a line extending to the pivot axis) in order to provide smooth rolling motion for the rotatable shelving unit 705. Examples of such wheel orientations are illustrated in FIG. 58, in which four radial lines 909 are shown extending from a point about which the rotatable shelving unit 704 pivots. In the case where wheels 894 are employed that are fixed against rotation about a vertical or substantially vertical axis, the wheels 894 can be oriented in a direction that is substantially perpendicular to the lines 909 in FIG. 58 for smooth rolling motion of the rotatable shelving unit 705.

It should be noted that the hinge assembly 858 and/or the latch 868 described above (and their alternative embodiments also described above) can be used in connection with an endcap for use with the foregoing display system 700. FIG. 48 illustrates an exemplary rotatable endcap shelving unit 910 rotatably attached to a staggered two-bay display system 700 arranged in accordance with the present invention. As shown, a rear corner 912 of the rotatable endcap shelving unit 910 is pivotably attached to a front corner 914 of a stationary shelving unit 916 by a hinge assembly 858 as described above. Likewise, an opposite rear corner 919 of the rotatable endcap shelving unit 910 is releasably locked to a front corner 918 of a rotatable shelving unit 916 by a latch 868 as described above.

The staggered shelving system of the present invention can take a number of different forms. For example, in some embodiments of the present invention, a three-bay staggered system is employed. As illustrated in FIGS. 50 and 51, an exemplary three-bay staggered system 922 includes three rows of shelving units arranged in a stepped, diagonal, or "staggered" fashion similar to the shelf arrangement described above with reference to the exemplary embodiment of FIGS. 37-40. The three rows include two outer staggered rows of rotatable shelving units 925a, 925b and a middle row of stationary shelving units 927 located between the pairs of rotatable shelving units 925a, 925b. The middle row of stationary shelving units 927 provides additional storage space for products. For example, if not all of the products being delivered can fit onto a rotatable shelving unit 925 at the time of delivery, then the leftover product can be stored in the corresponding stationary shelving unit 927 until there is room for the product on the rotatable shelving unit 925. The middle stationary shelving units 927 can also function as shelf extensions corresponding to the outer rotatable shelving units 925, thereby increasing the amount of shelf space available for product. The outer rotatable shelving units 925 can be any suitable rear-loading display unit.

An exemplary embodiment of an end cap 935 for a 3-bay staggered shelving system 922 is also shown in FIGS. 50 and 51. Each rotatable shelving unit 925 includes a gondola (similar to that discussed above for gondola 20 and 215) having vertical uprights 755, a base 892 and a number of horizontal supports 929. The stationary units 927 can be gondolas including an extension 930 having at least one

other vertical upright 755 and horizontal support 929. Each pair of outer rotatable shelving units 925 can be pivotally attached to a middle stationary shelving unit 927. In this regard, one staggered row of rotatable shelving units 925a is pivotably attached to the extensions 930 of the stationary shelving units 927 located directly behind the rotatable shelving units 925a. The other row of rotatable shelving units 925b are each pivotably attached at the corners 932 of the stationary shelving units 927 that are adjacent to and aligned with the rotatable shelving units 925b. The rotatable shelving units 925a, 925b are selectively and individually rotatable away from the stationary shelving units 927, thereby allowing for easy loading of the rotatable shelving units 925a, 925b and the stationary shelving units 927 therebetween.

In some 3-bay configuration embodiments according to the present invention (and as shown in the exemplary 3-bay embodiment of FIGS. 50 and 51), one rear corner of an endcap unit 935 can be pivotably attached to a middle stationary unit 927. The other rear corner of the endcap 935 can be releasably secured to the middle stationary unit 927. The exemplary endcap 935 includes pivotal and lock connections using any of the latch and hinge assemblies described above. By way of example only, a hinge assembly 858 can pivotably attach the vertical uprights 755 of the rotatable shelving units 925a, 925b to the vertical uprights 755 of the stationary shelving units 927 in any of the manners described above in connection with the two-bay shelving unit configuration. Also by way of example only, a latch 868 can releasably secure each rotatable shelving unit 925a, 925b to the stationary units 927 in any of the manners described above. Of course, any other suitable pivotal attachment or lock connection can instead be used as desired.

There has been described, with reference to exemplary embodiments thereof, a product display and dispensing system. It will be apparent to those skilled in the art that modifications can be made without departing from the spirit and scope of the present invention. All modifications are considered within the sphere, spirit, and scope of the present invention as set forth in the appended claims. The specification and drawings, therefore, are to be regarded in an illustrative rather than restrictive sense. Various features and advantages of the invention are set forth in the following claims.

CLAIMS

1. A merchandise rack system comprising:

a first plurality of merchandise racks each having a front for user access to merchandise thereon and a rear, the first plurality of merchandise racks arranged in a staggered line in which the front of each merchandise rack in the first set of merchandise racks is set back with respect to the front of an adjacent merchandise rack in the first set of merchandise racks, at least one of the first plurality of merchandise racks pivotable between a first open position providing access to the rear of the merchandise rack, and a first closed position; and

a second plurality of merchandise racks each having a front for user access to merchandise thereon and a rear, the second plurality of merchandise racks arranged in a staggered line in which the front of each merchandise rack in the second set of merchandise racks is set back with respect to the front of an adjacent merchandise rack in the second set of merchandise racks, at least one of the second plurality of merchandise racks pivotable between a second open position providing access to the rear of the merchandise rack, and a second closed position;

wherein the first and second pluralities of merchandise racks are separated from one another by an aisle.

2. The merchandise rack system of claim 1, wherein the at least one of the first plurality of merchandise racks is pivotable about a pivot that is stationary with respect to a floor surface upon which the merchandise rack system rests.

3. The merchandise rack system of claim 1, wherein the at least one of the first plurality of merchandise racks is pivotable about a location proximate the front of the at least one of the first plurality of merchandise racks.

4. The merchandise rack system of claim 1, wherein the at least one of the first plurality of merchandise racks is pivotable about a location proximate the rear of the at least one of the first plurality of merchandise racks.

5. The merchandise rack system of claim 1, wherein the at least one of the first plurality of merchandise racks has a substantially open rear through which merchandise can be loaded onto the rack.

6. The merchandise rack system of claim 1, wherein the at least one of the first plurality of merchandise racks is pivotable toward and away from a fixed and stationary structure located adjacent the rear of the at least one of the first plurality of merchandise racks.

7. The merchandise rack system of claim 1, wherein the first plurality of merchandise racks define a row, and one of the first plurality of merchandise racks is an end cap of the row.

8. A merchandise rack system for use on a floor surface, the merchandise rack system comprising:

a first merchandise rack having a front through which merchandise on the first merchandise rack is accessible by a user, and a rear, the first merchandise rack pivotable about a first pivot from an open position providing access to the rear of the first merchandise rack, and a closed position, wherein the pivot has a fixed position with respect to the floor surface during pivotal motion of the first merchandise rack about the pivot; and

a second merchandise rack having a front through which merchandise on the second merchandise rack is accessible by a user, and a rear, the second merchandise rack pivotable from an open position providing access to the rear of the second merchandise

rack, and a closed position in which the rear of the second merchandise rack is adjacent to and faces the rear of the first merchandise rack.

9. The merchandise rack system of claim 8, wherein:

the pivot is a first pivot; and

the second merchandise rack is pivotable about a second pivot disposed a distance from the first pivot.

10. The merchandise rack system of claim 8, wherein the first merchandise rack is pivotable about a location proximate the front of the first merchandise rack.

11. The merchandise rack system of claim 8, wherein the first merchandise rack has a substantially open rear through which merchandise can be loaded onto the first merchandise rack.

12. The merchandise rack system of claim 8, further comprising a third merchandise rack adjacent the first merchandise rack, the third merchandise rack having a front set back with respect to the front of the first merchandise rack.

13. The merchandise rack system of claim 12, further comprising a fourth merchandise rack adjacent the second merchandise rack, wherein the front of the second merchandise rack is set back with respect to a front of the fourth merchandise rack.

14. The merchandise rack system of claim 8, wherein the third and fourth merchandise racks are in back-to-back relation in closed positions of the third and fourth merchandise racks.

15. A method of loading and displaying merchandise, the method comprising:

providing a first merchandise rack having a front through which customer access to merchandise on the first merchandise rack is permitted, and a rear;

loading merchandise onto the first merchandise rack through the rear of the first merchandise rack;

pivoting the first merchandise rack to a closed position beside a second merchandise rack, the second merchandise rack having a front through which customer access to merchandise on the second merchandise rack is permitted, and a rear;

positioning the front of the first merchandise rack in a position set back with respect to the front of the second merchandise rack by pivoting the first merchandise rack to the closed position.

16. The method of claim 15, further comprising pivoting the second merchandise rack between an opened position providing access to the rear of the second merchandise rack and a closed position.

17. The method of claim 15, further comprising loading merchandise onto the second merchandise rack through the rear of the second merchandise rack.

18. The method of claim 15, further comprising latching the first merchandise rack in the closed position.

19. The method of claim 15, further comprising moving the rear of the first merchandise rack to a location adjacent a rear of a third merchandise rack by pivoting the first merchandise rack to the closed position.

20. The method of claim 15, further comprising moving the rear of the first merchandise rack to a location adjacent a fixed and stationary structure by pivoting the first merchandise rack to the closed position.

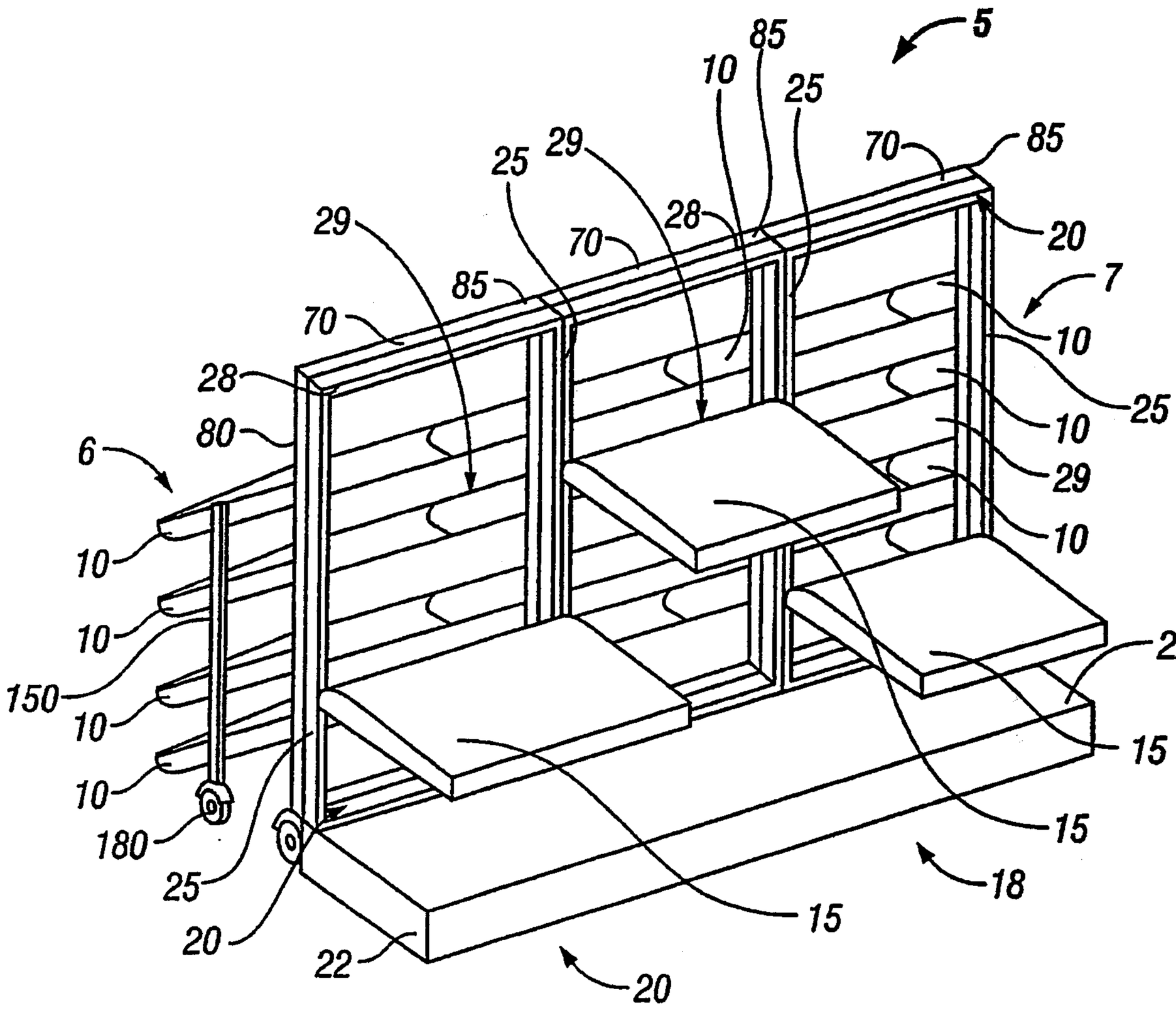

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FIG. 1

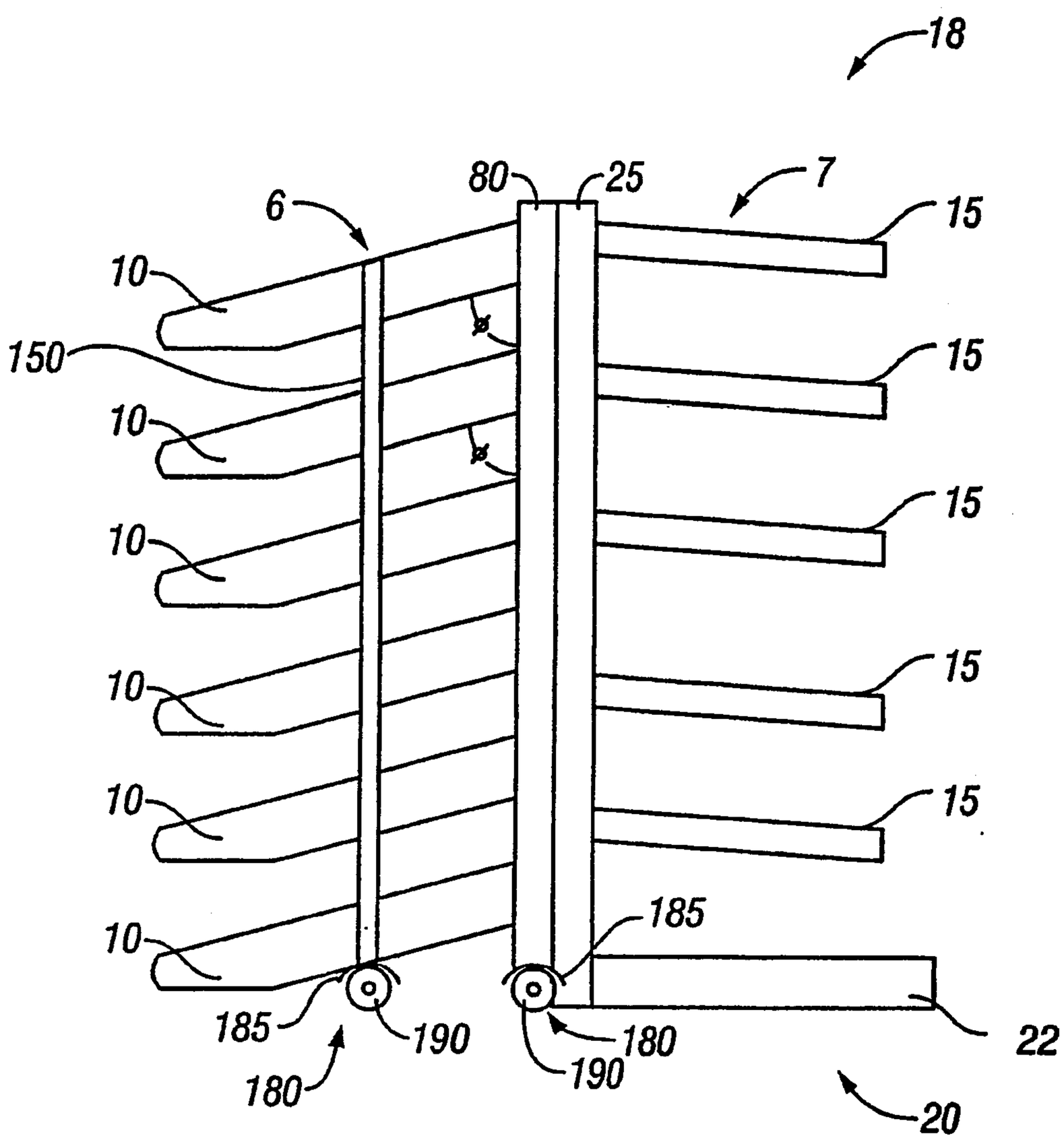

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FIG. 2

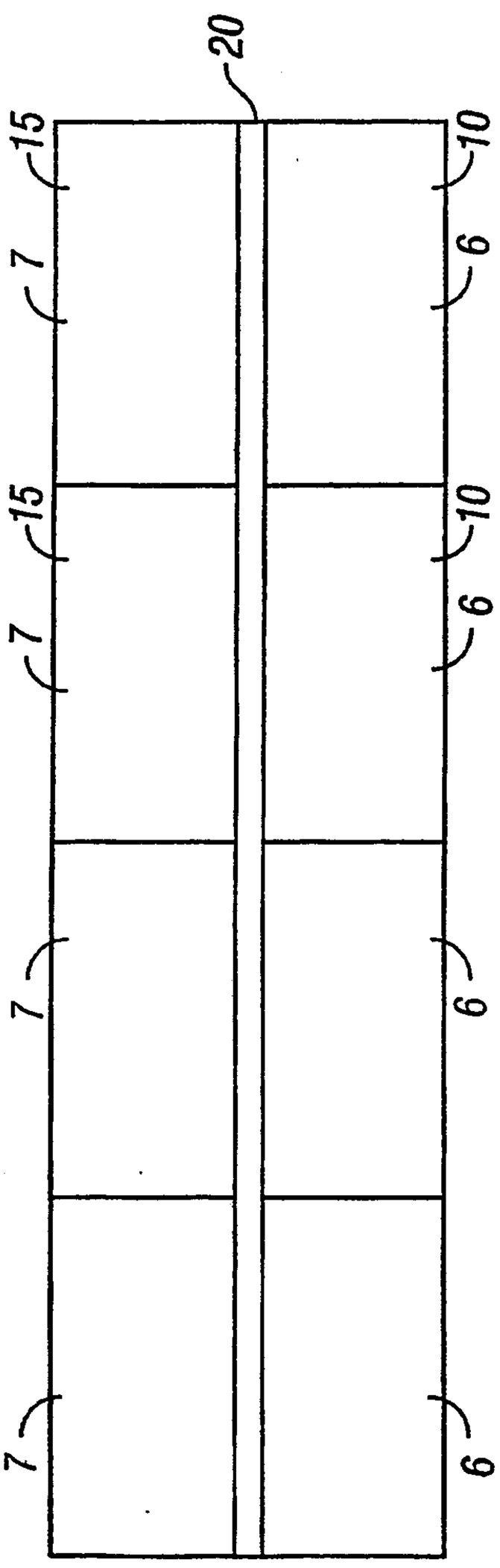

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FIG. 3

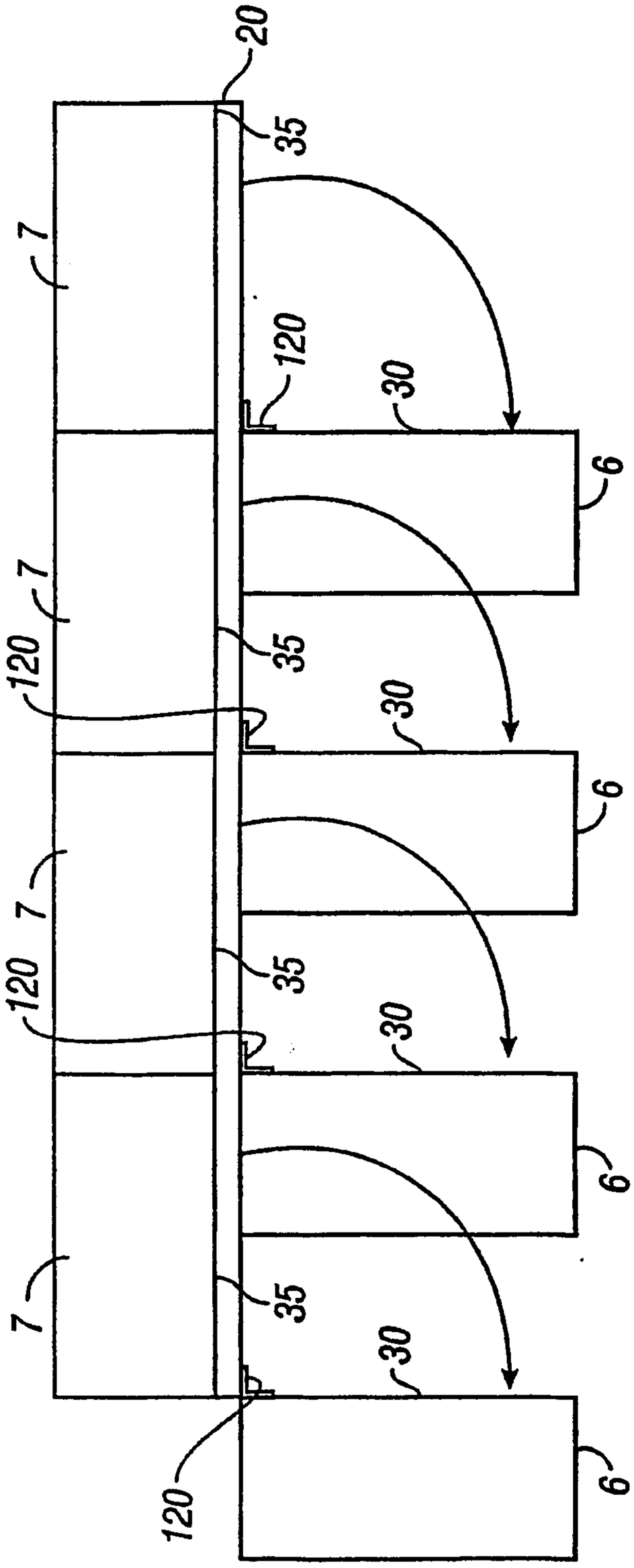

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FIG. 4

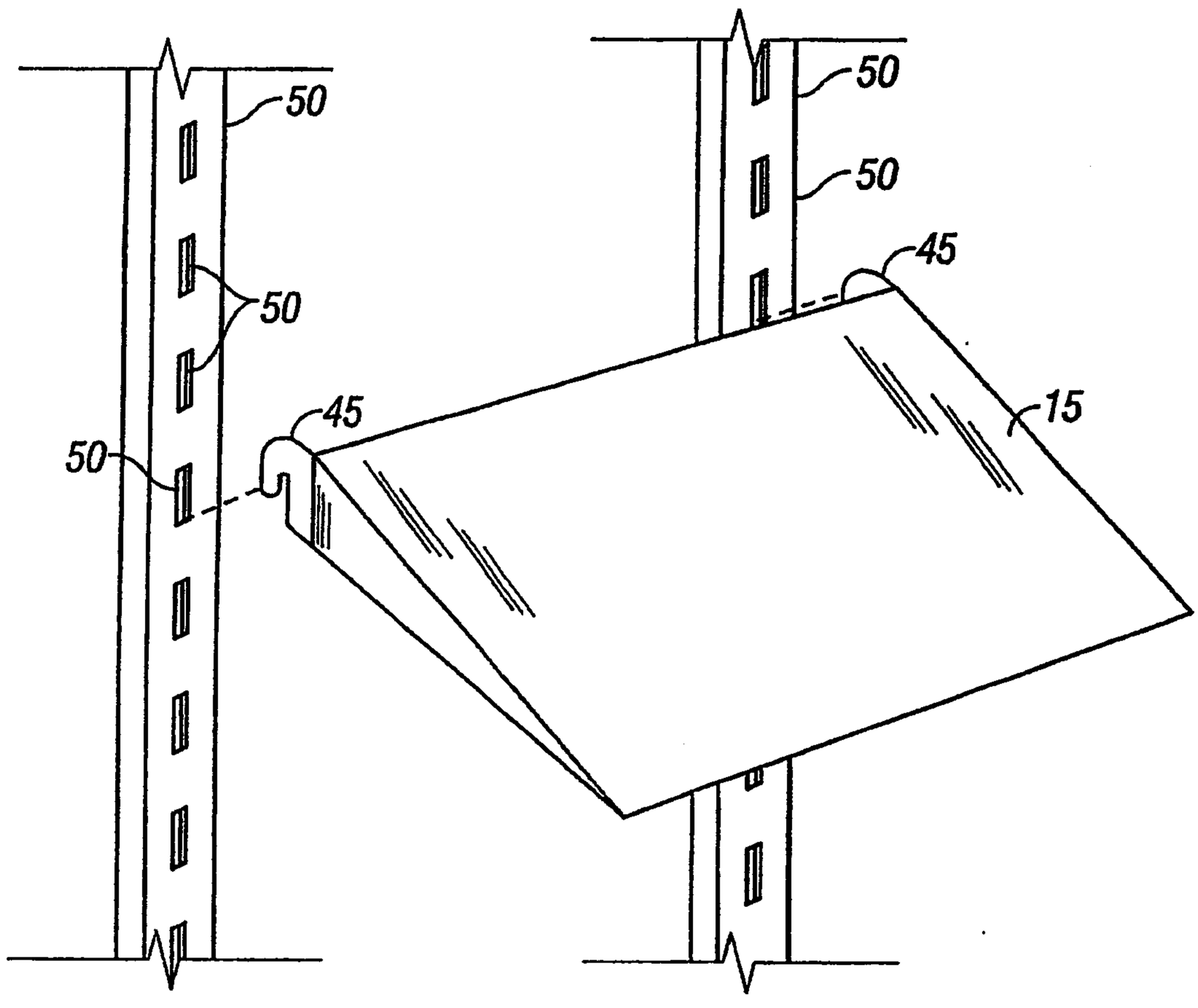


FIG. 5

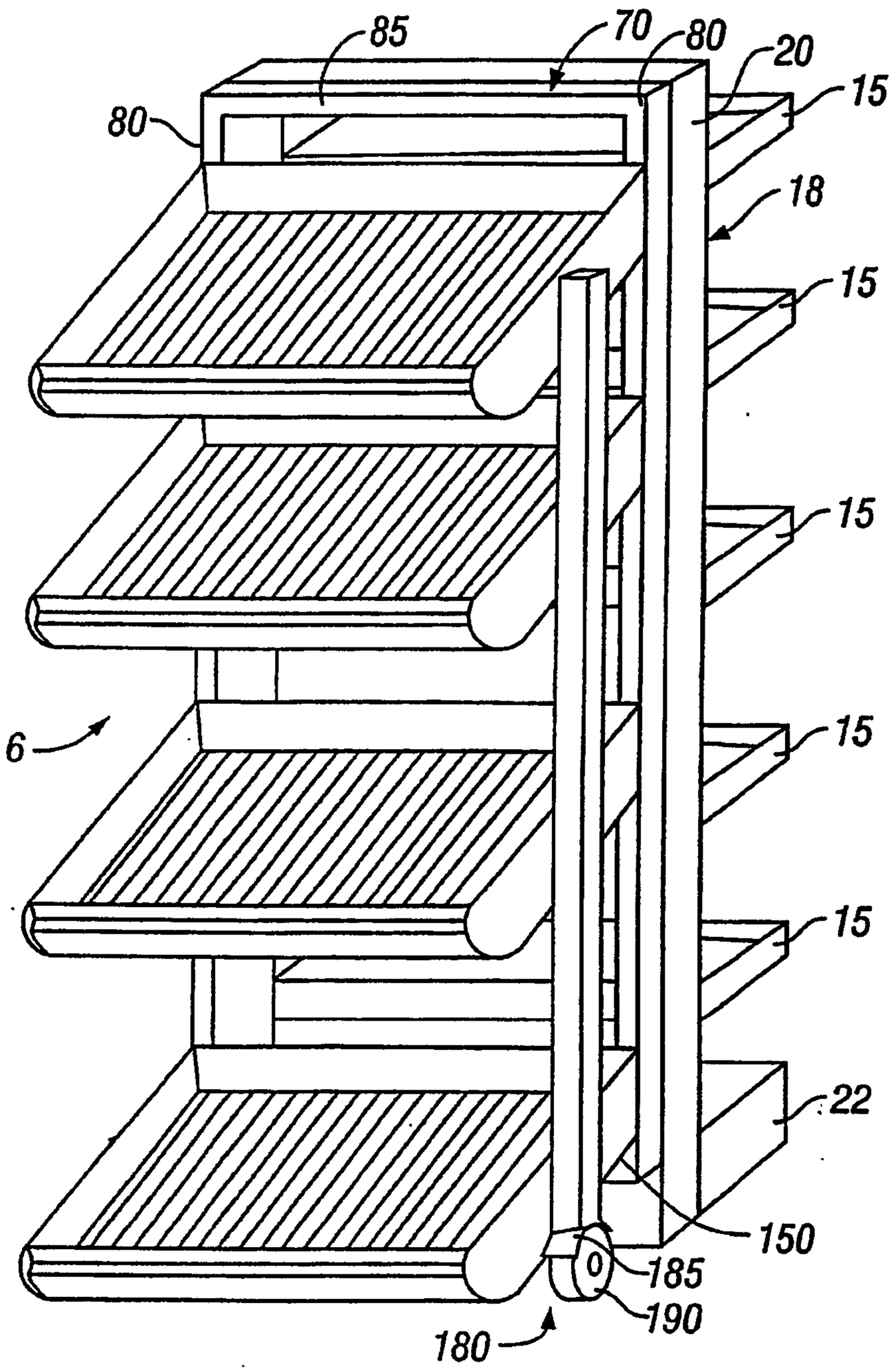


FIG. 6

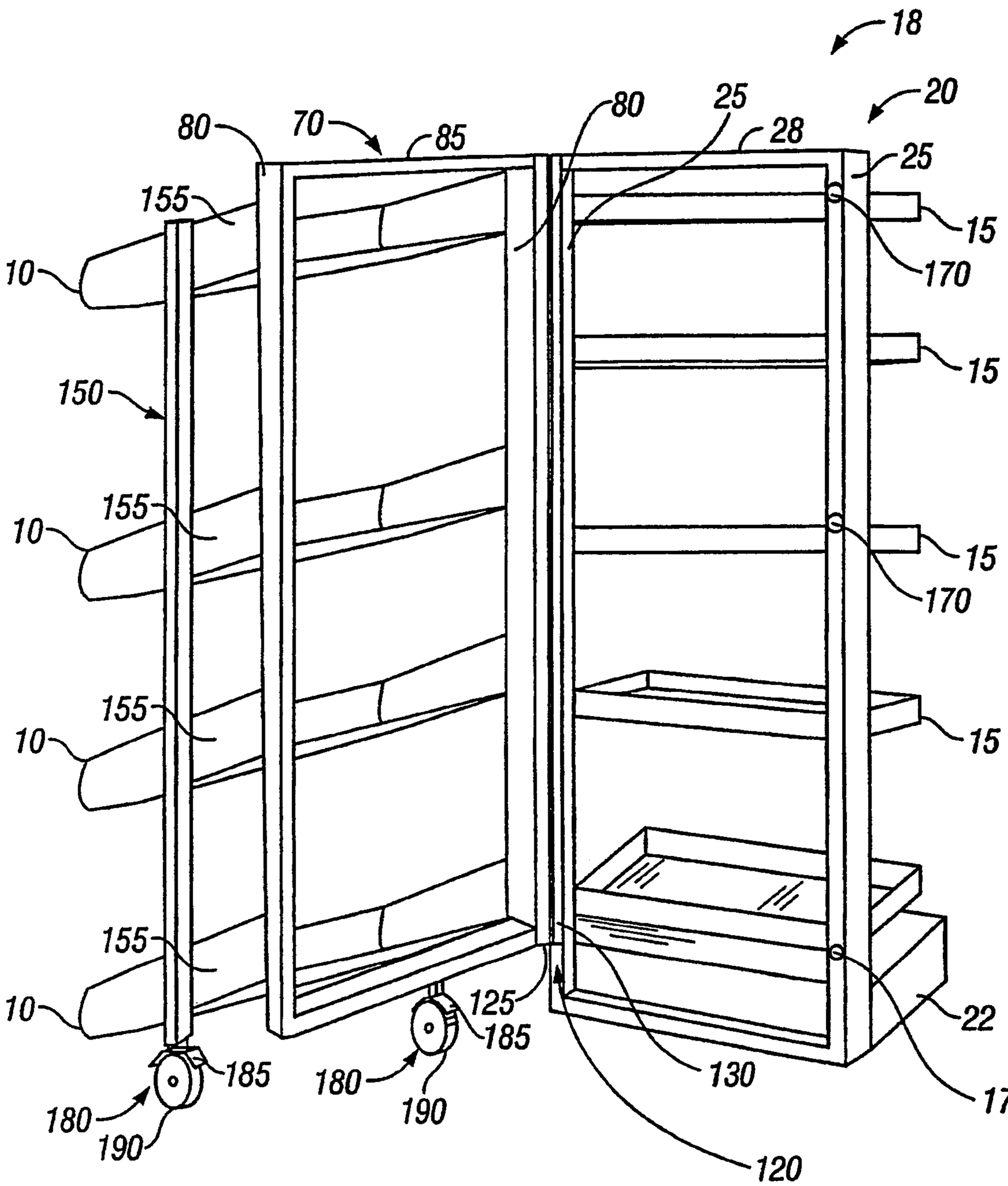

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FIG. 7

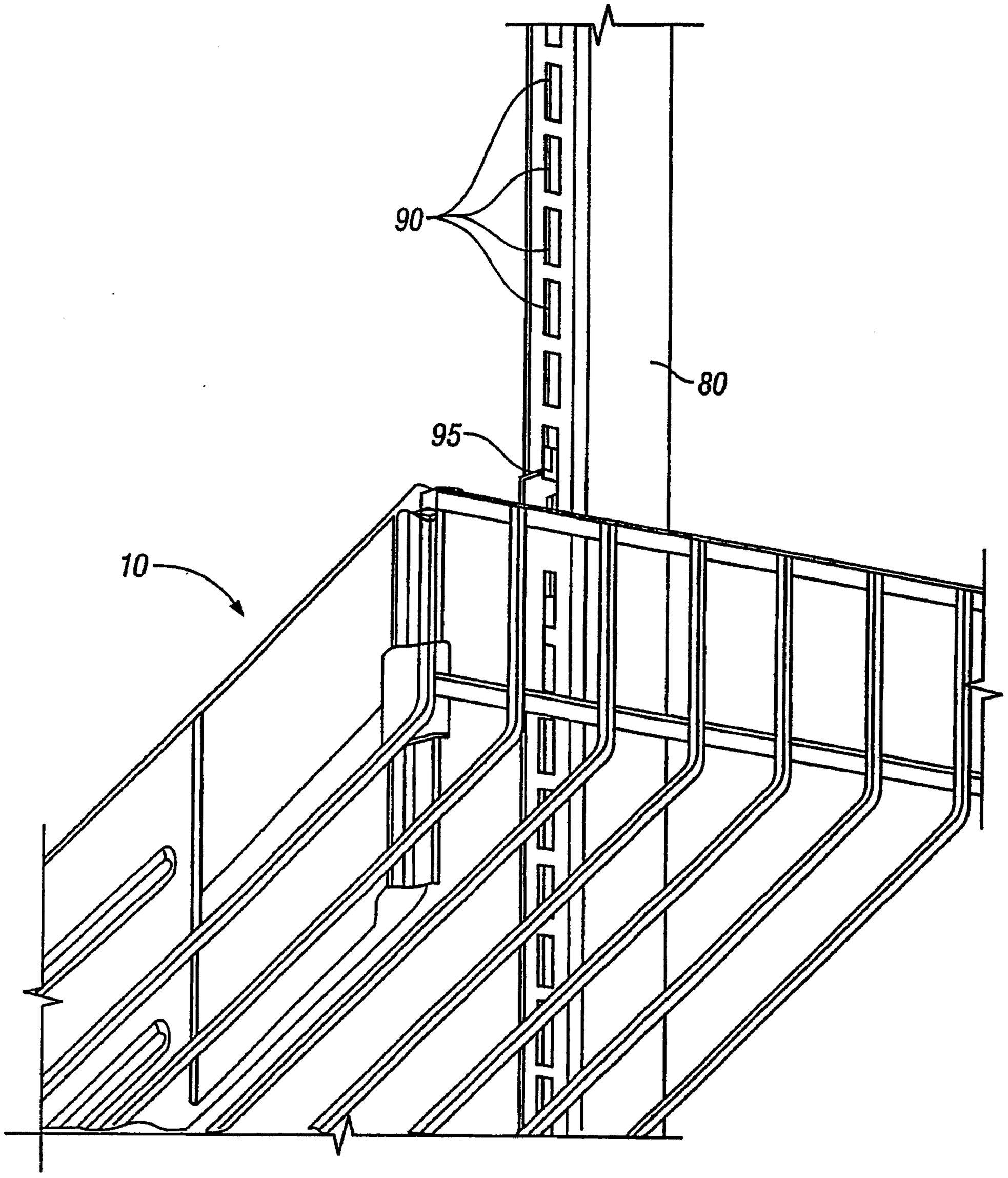


FIG. 8

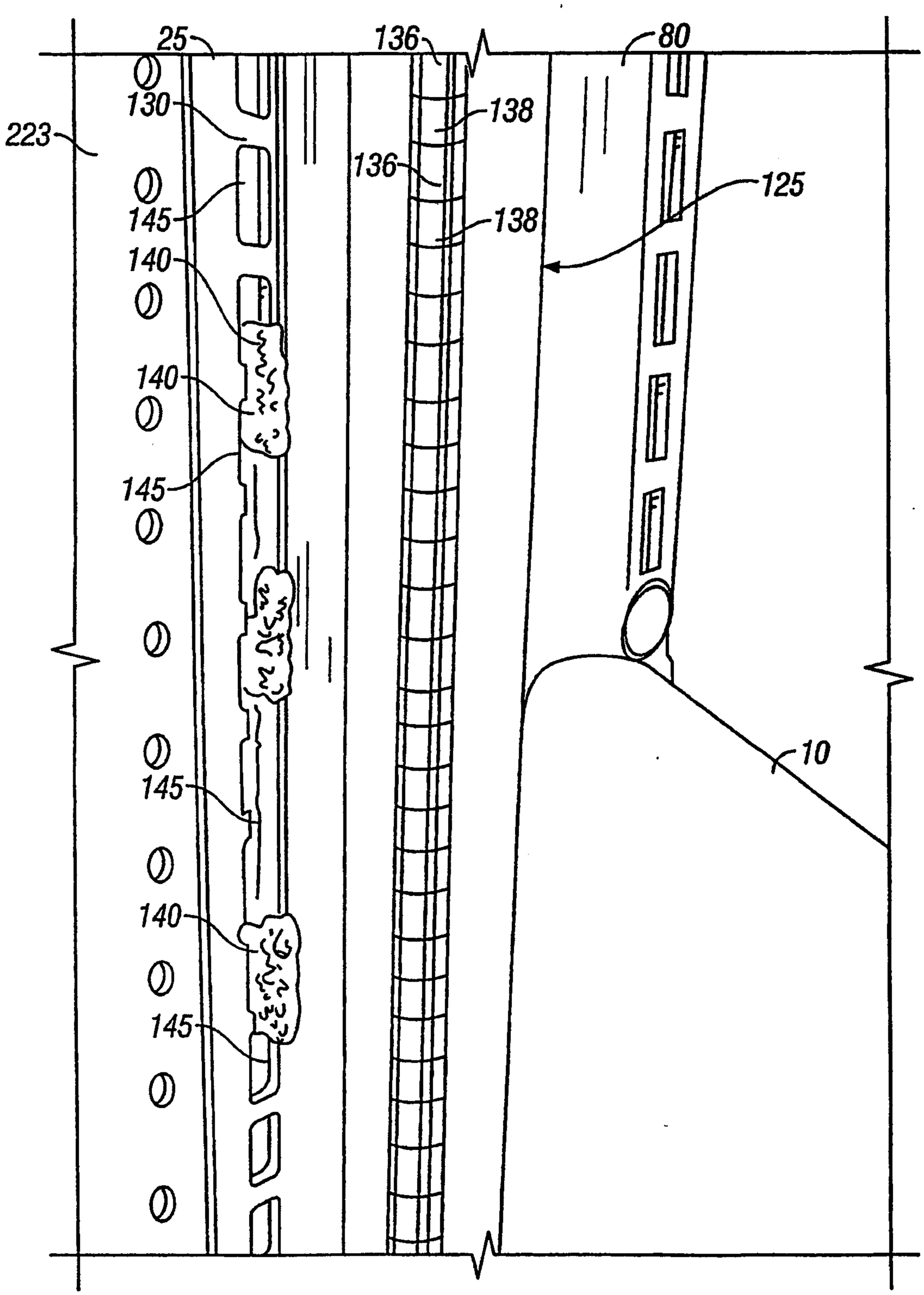


FIG. 9

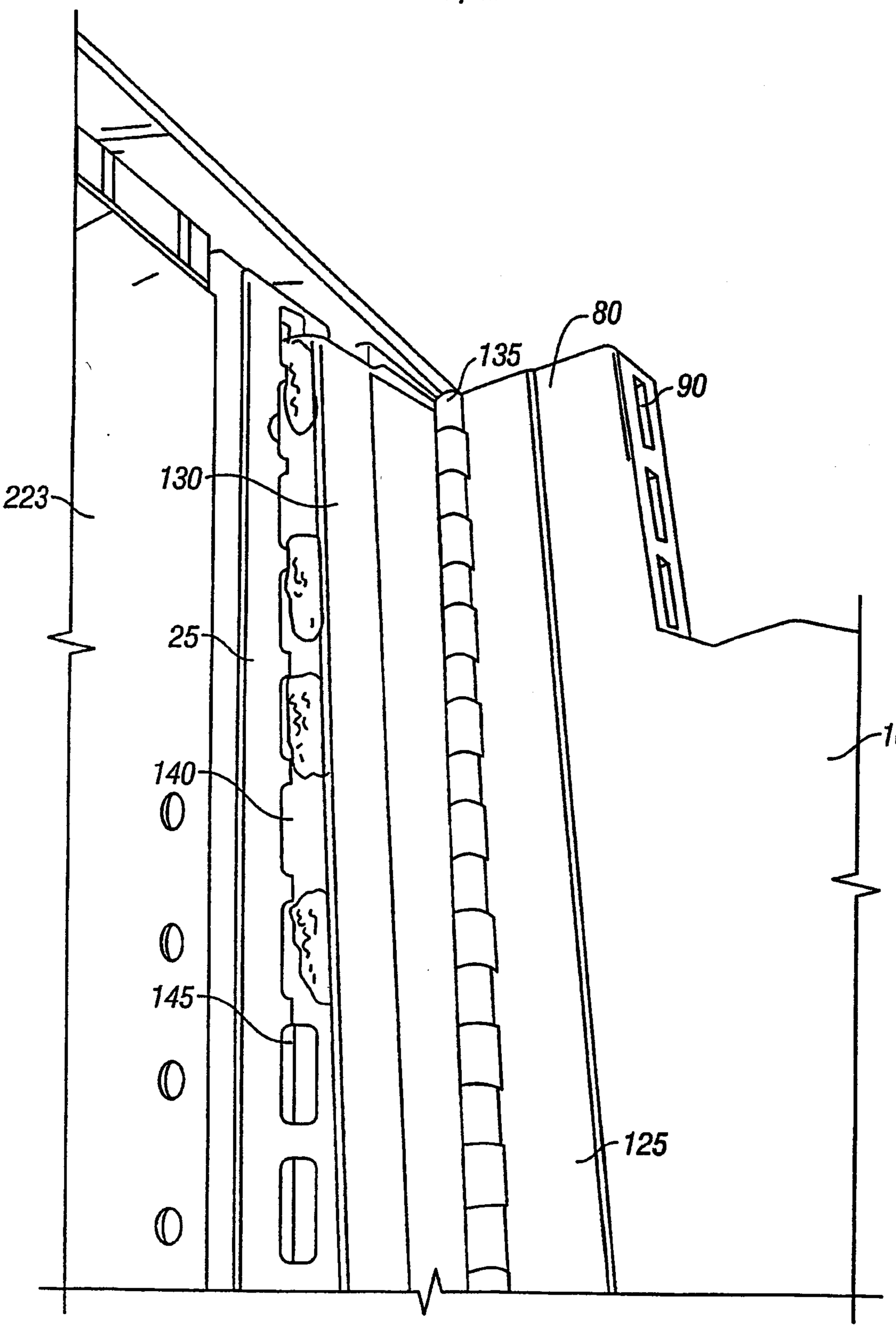


FIG. 10

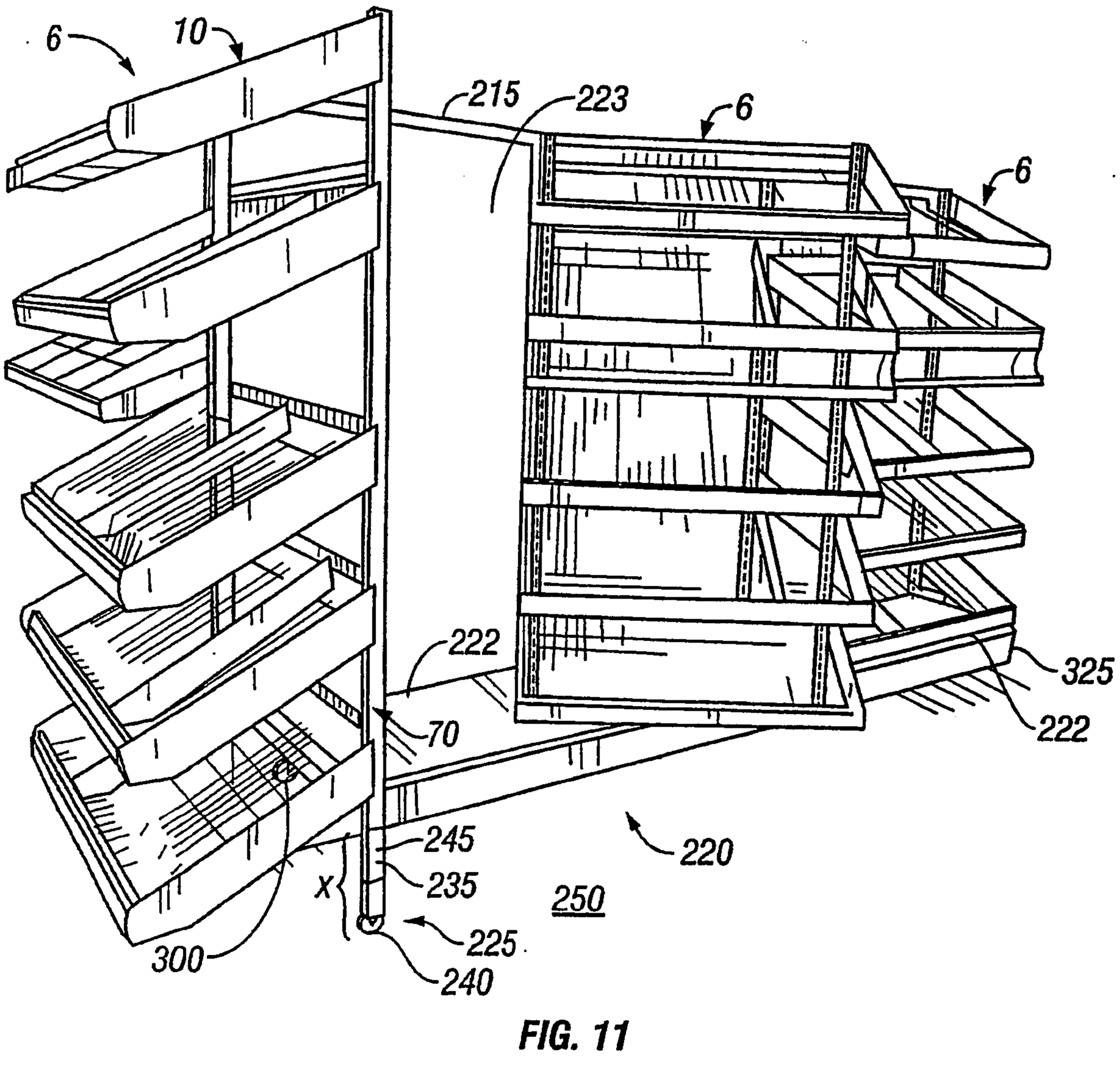


FIG. 11

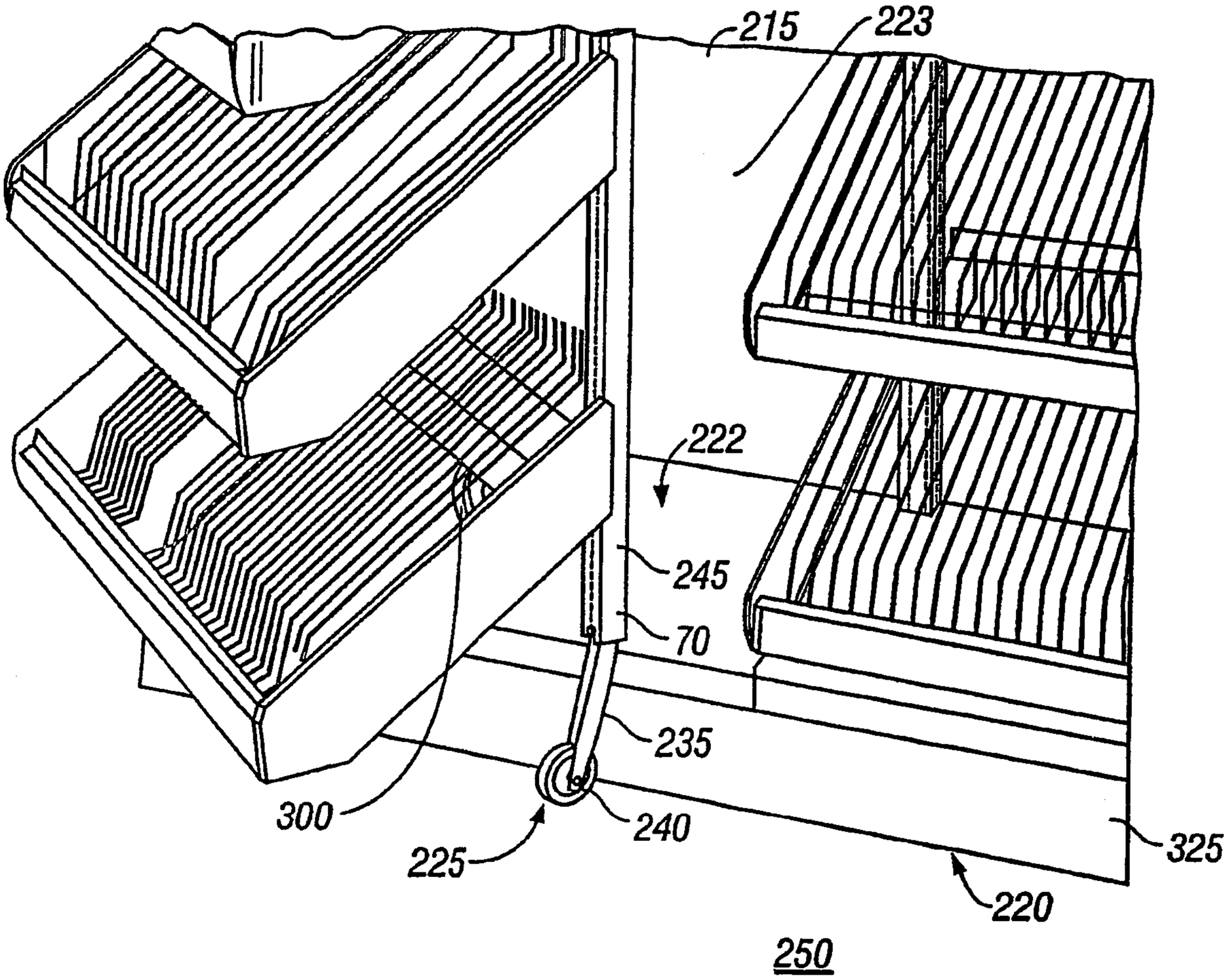


FIG. 12

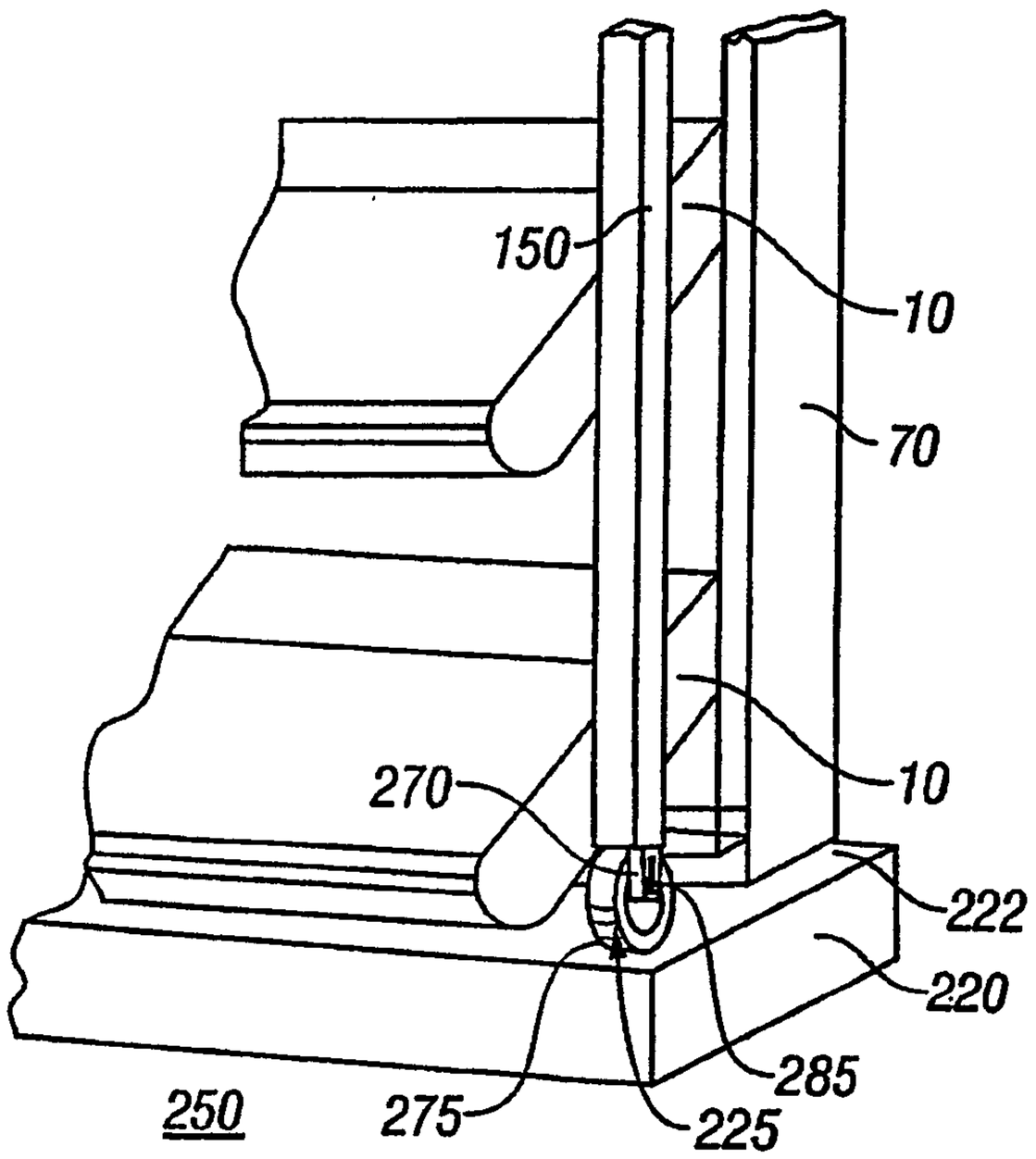


FIG. 13

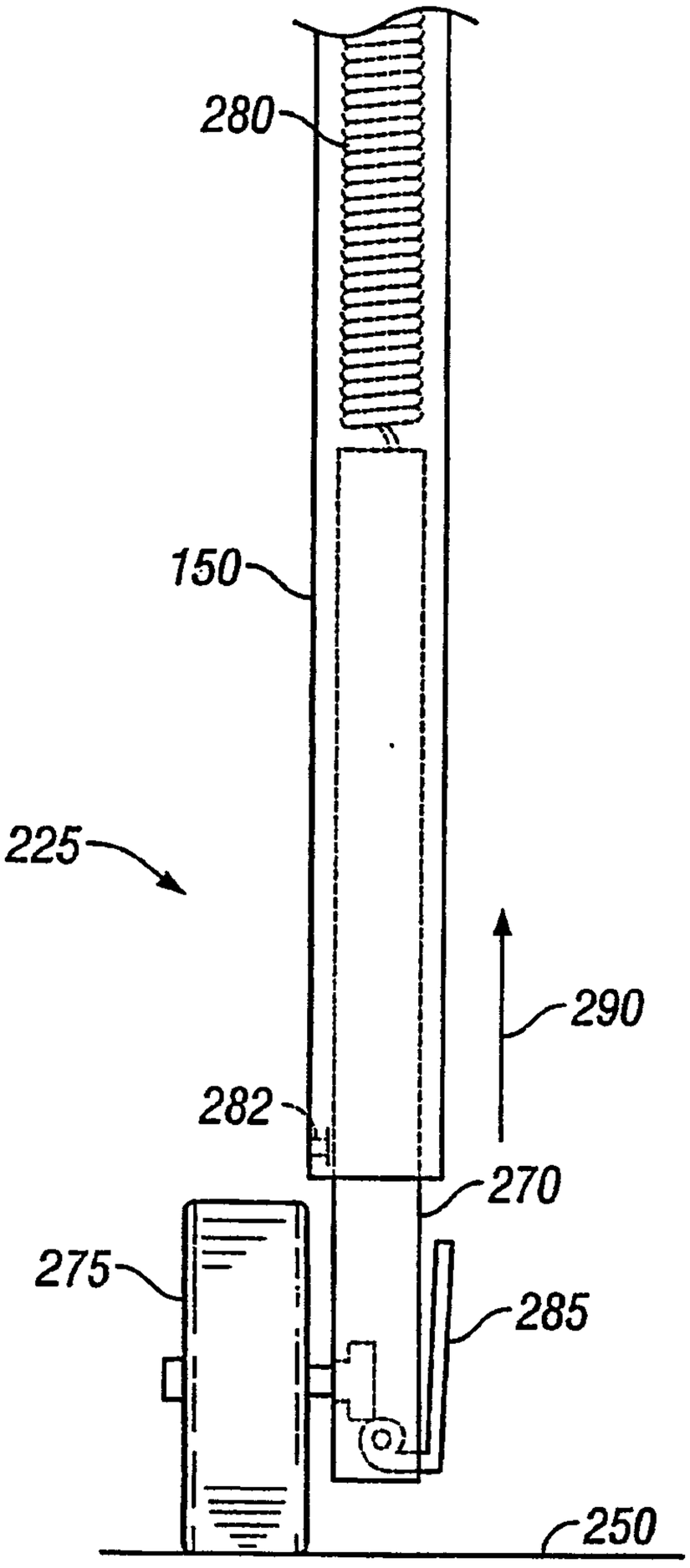


FIG. 14

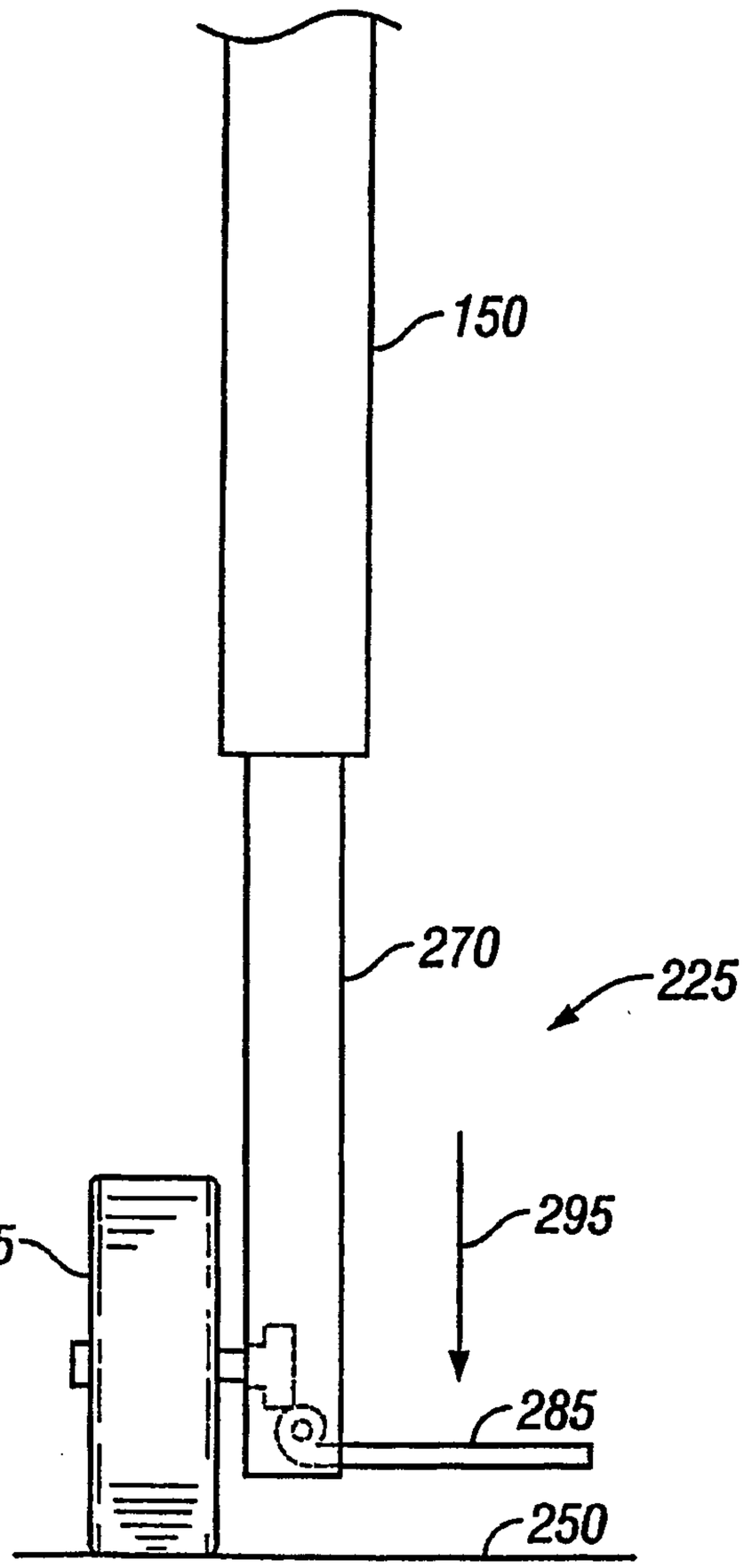


FIG. 15

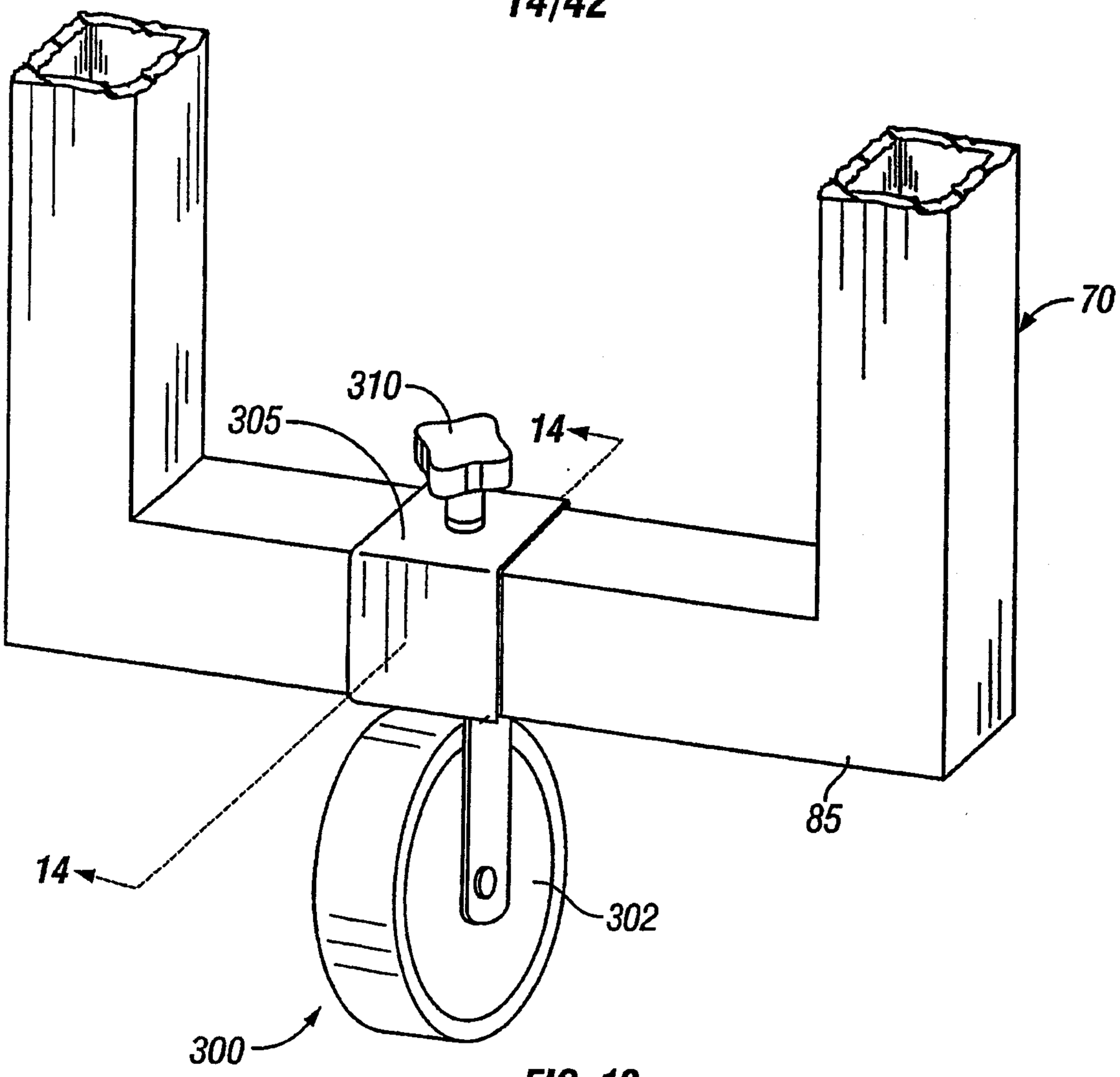


FIG. 16

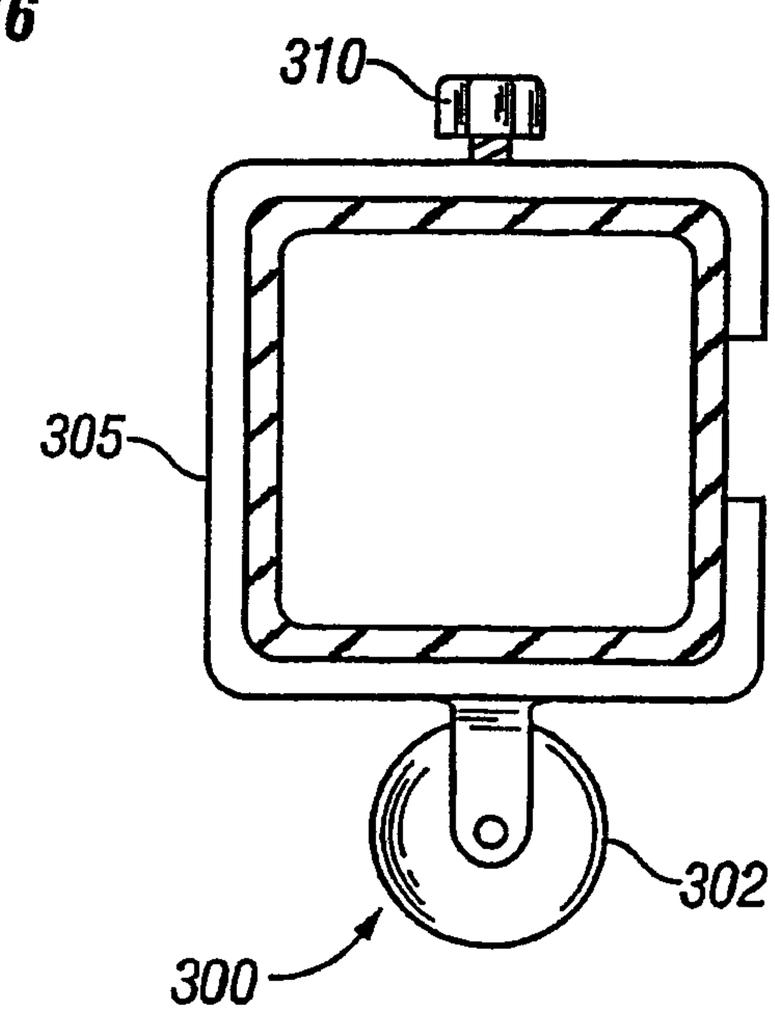


FIG. 17

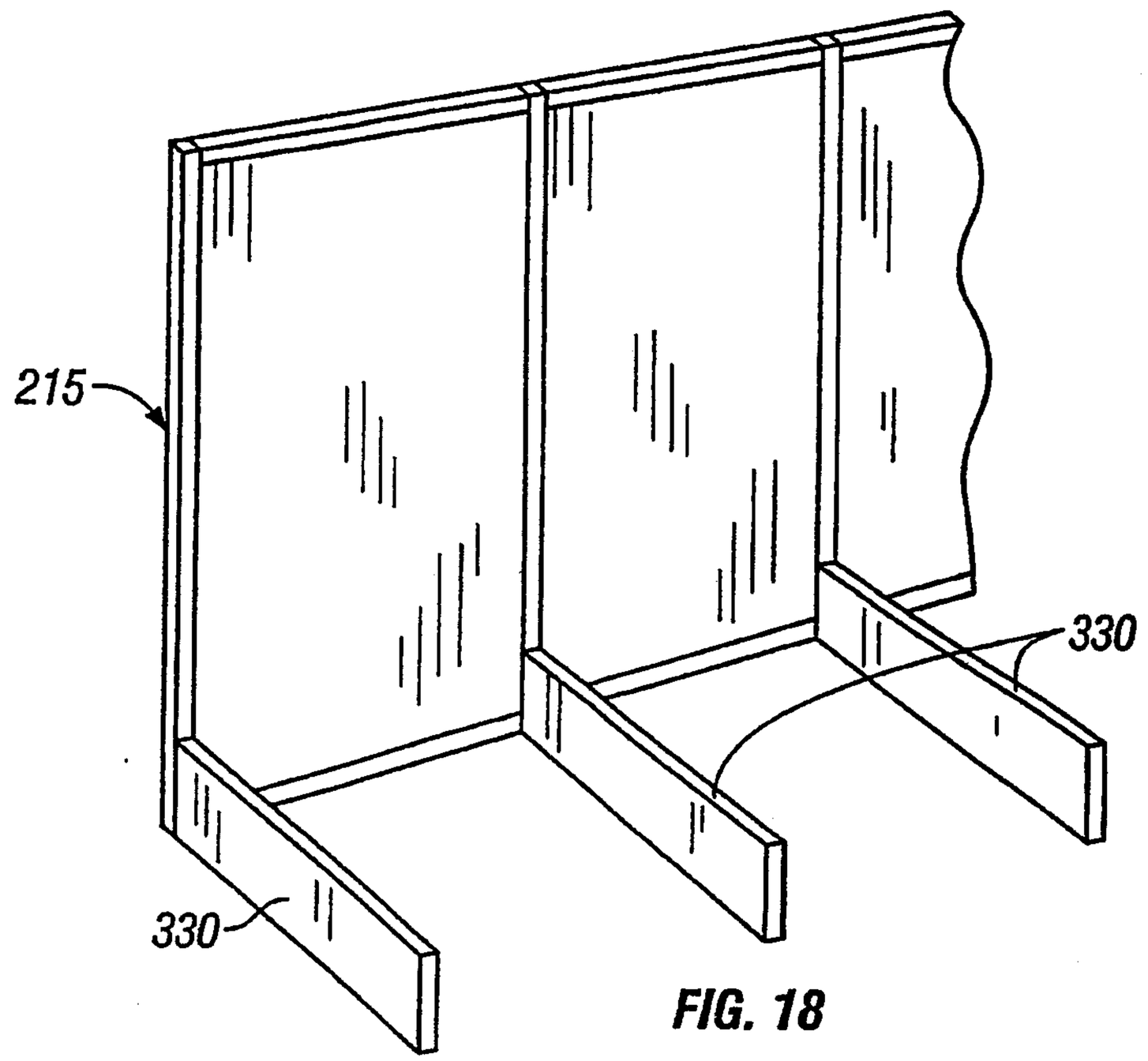


FIG. 18

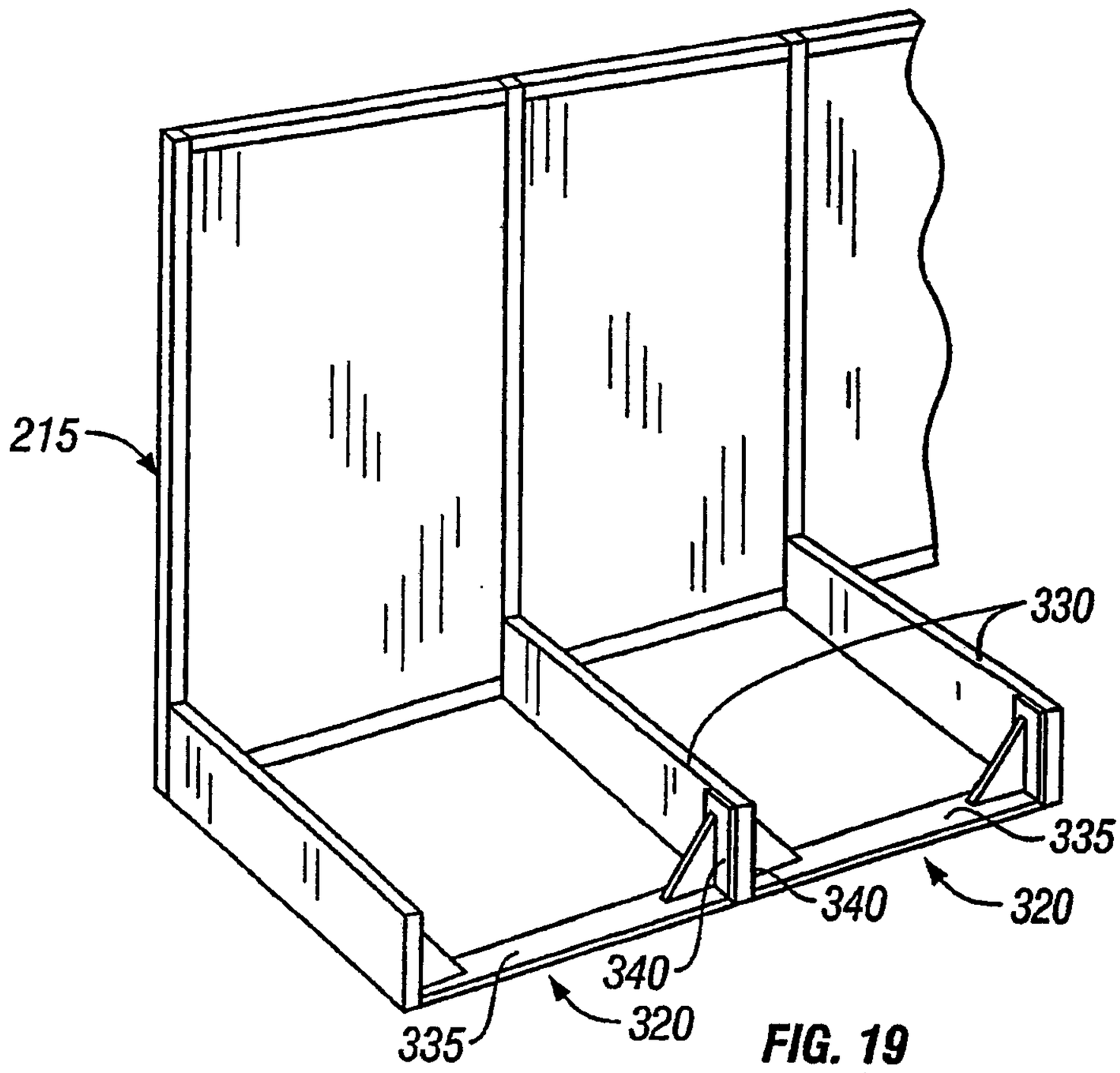


FIG. 19

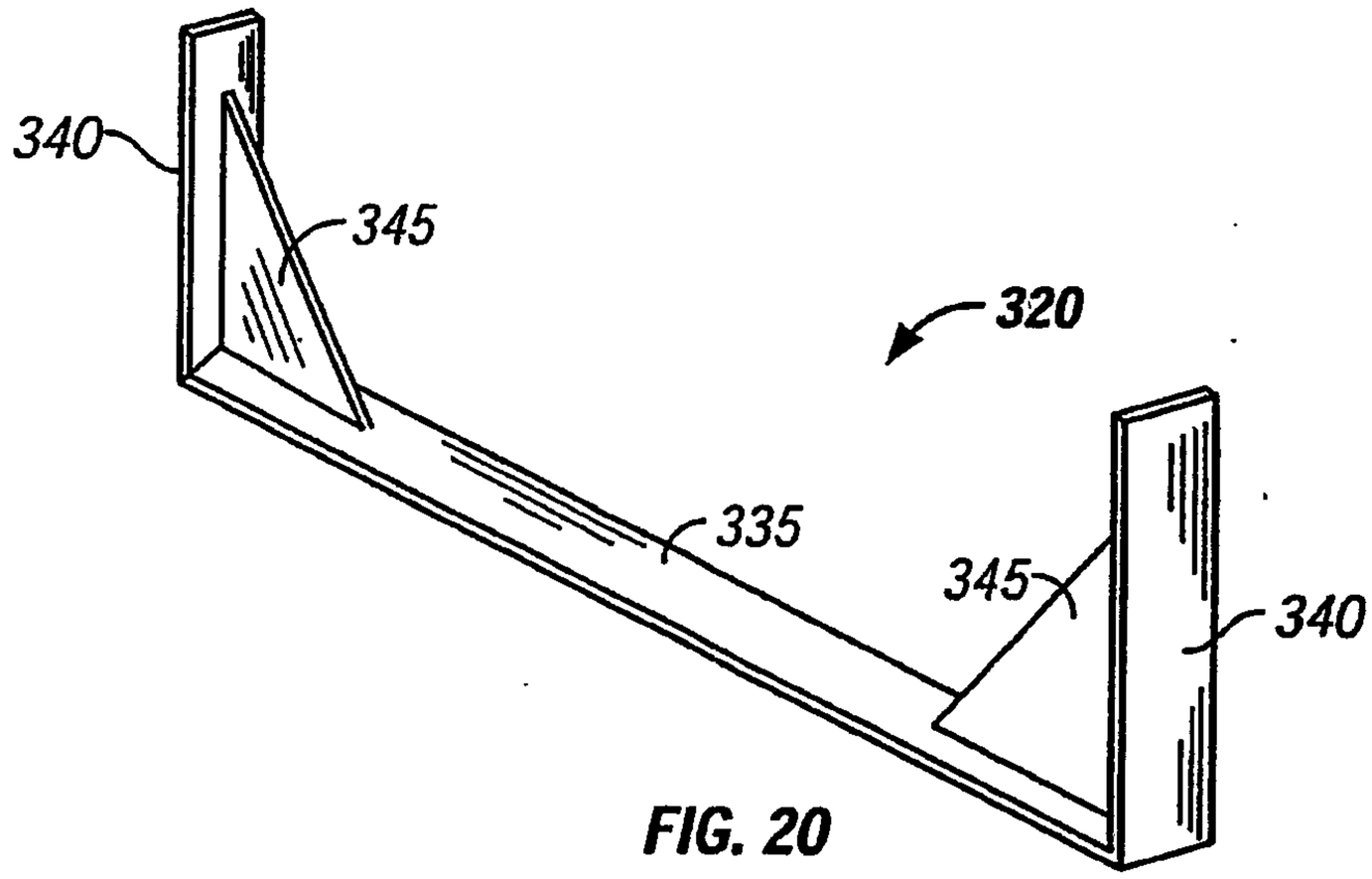


FIG. 20

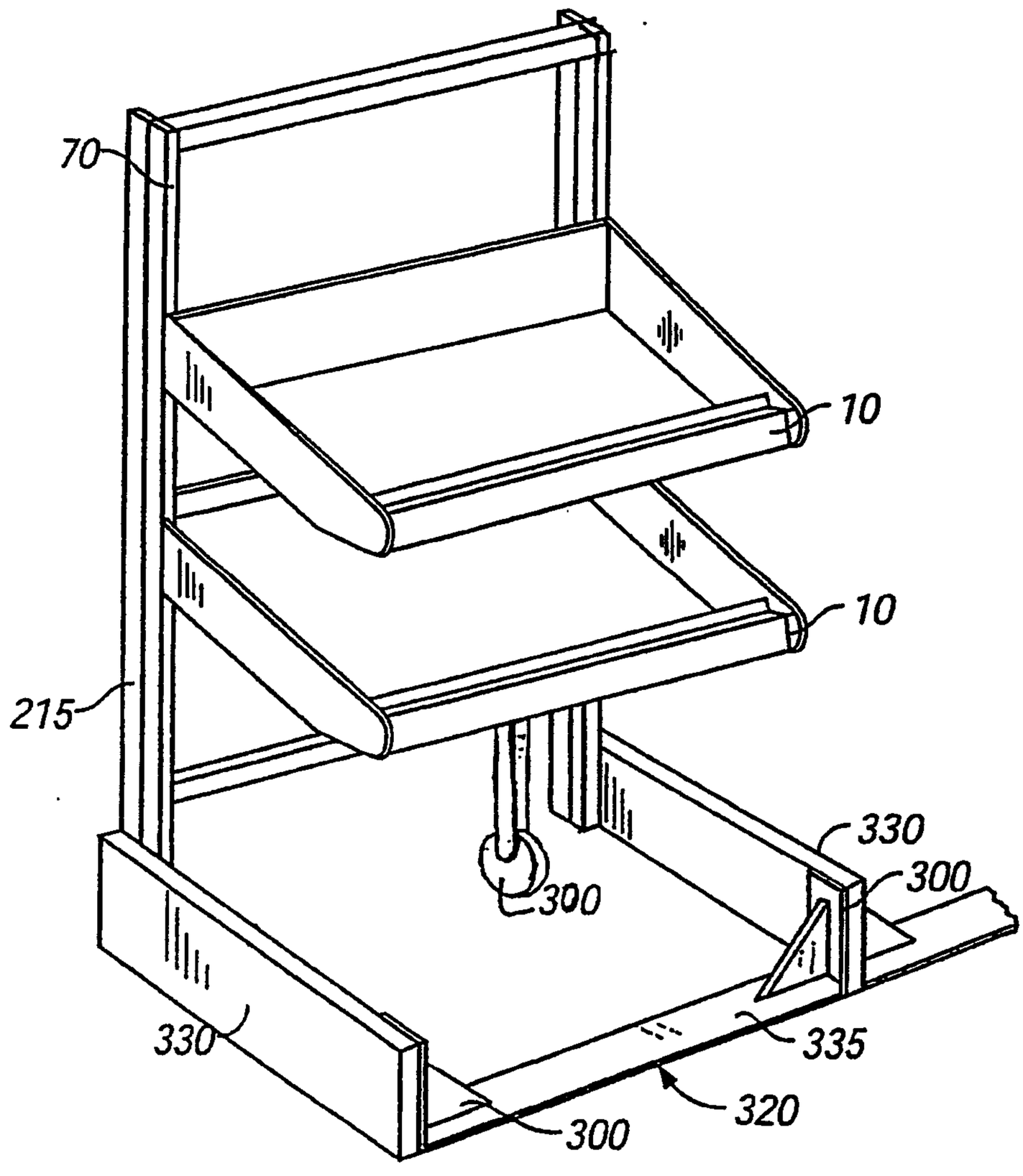


FIG. 21

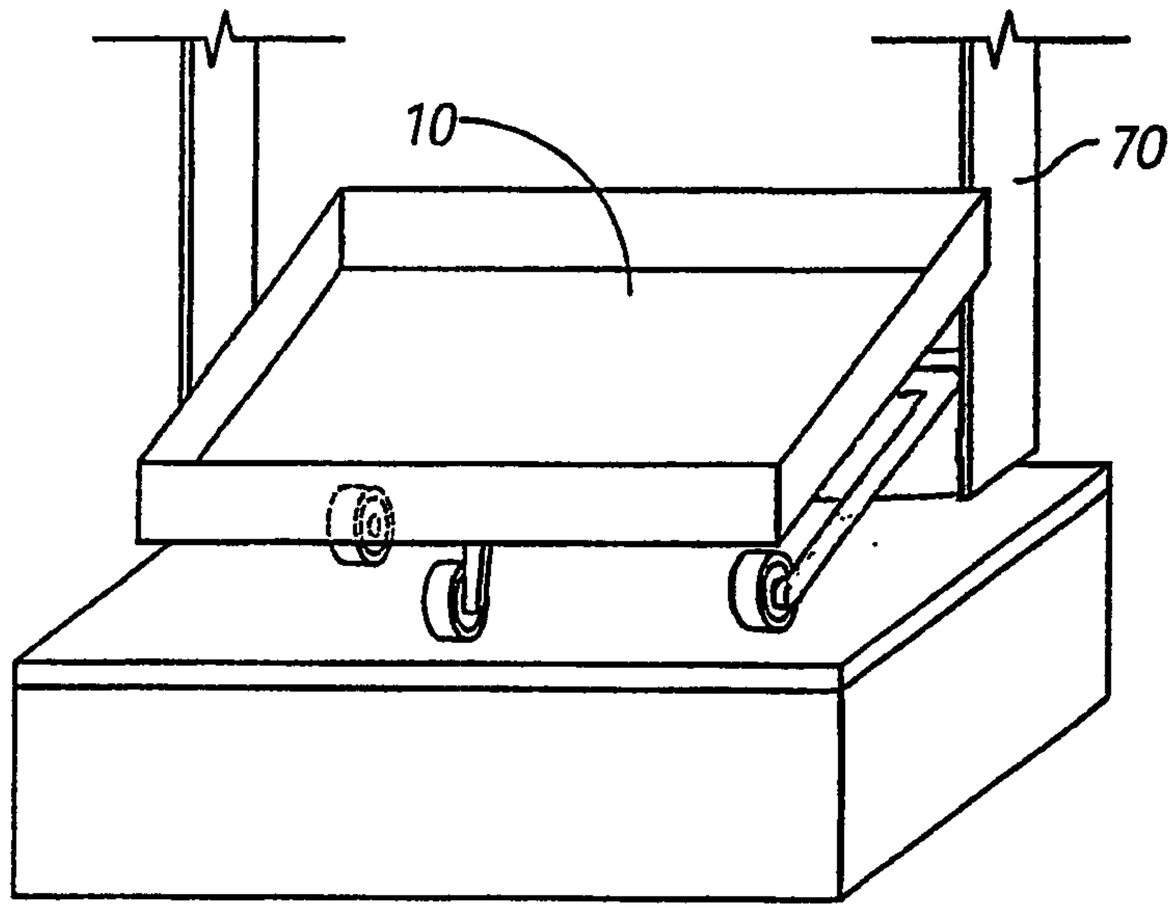


FIG. 22

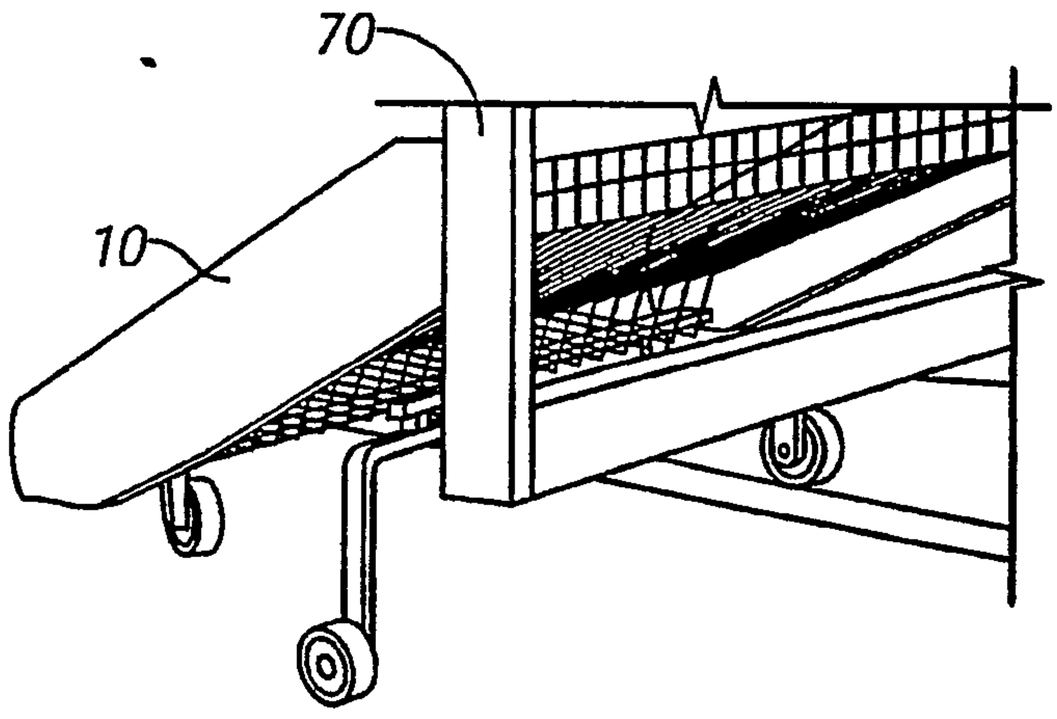


FIG. 23

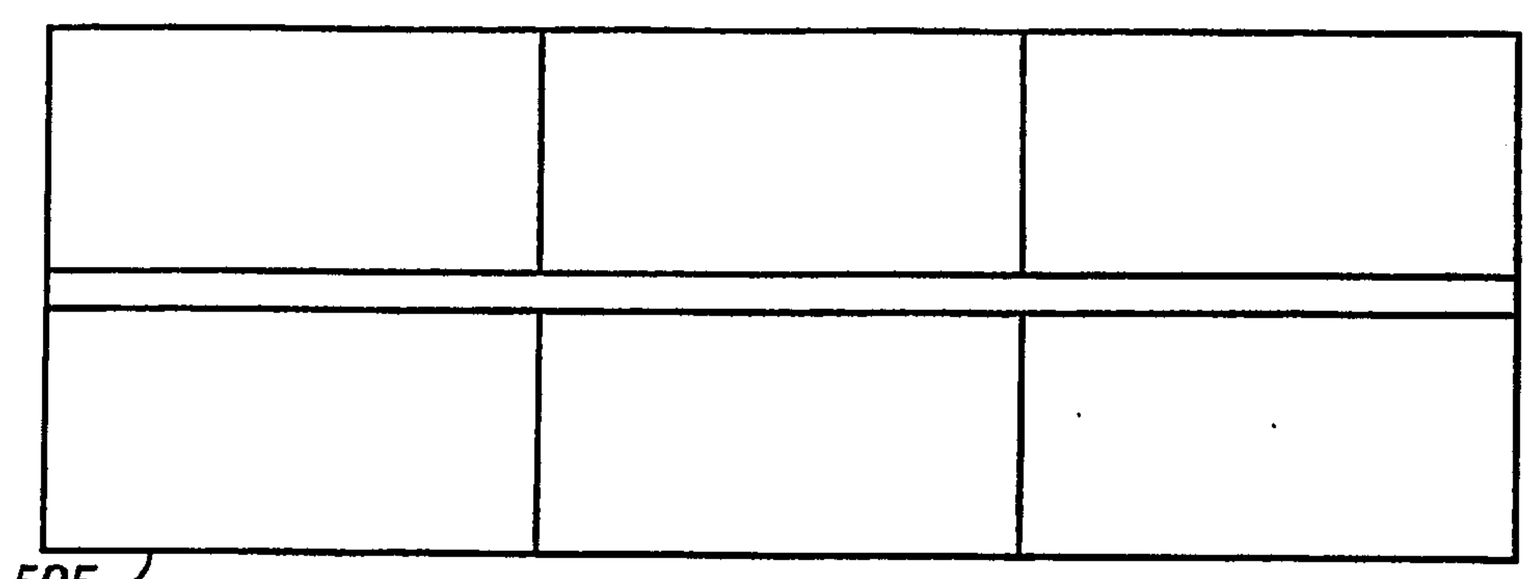


FIG. 24

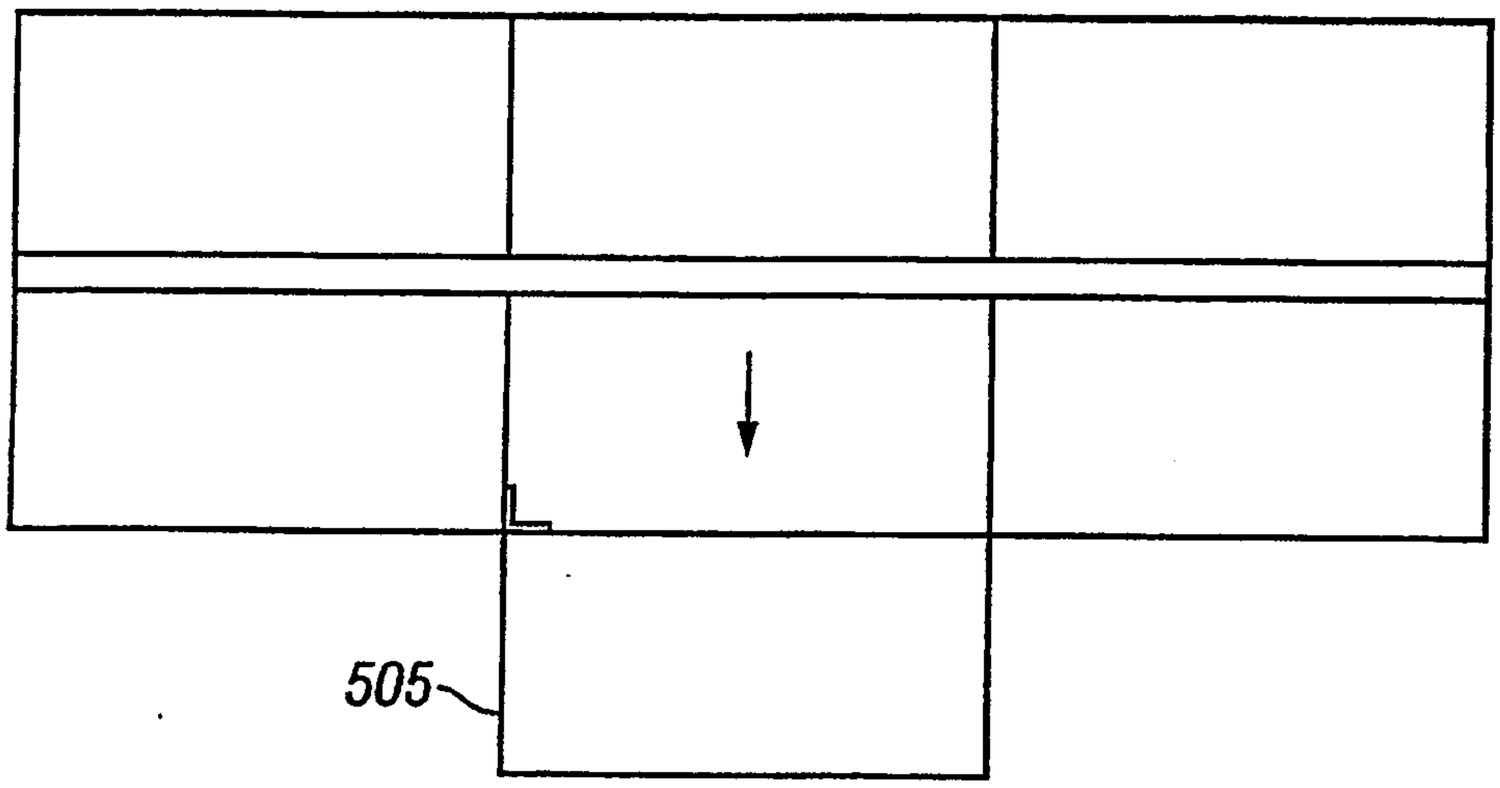


FIG. 25

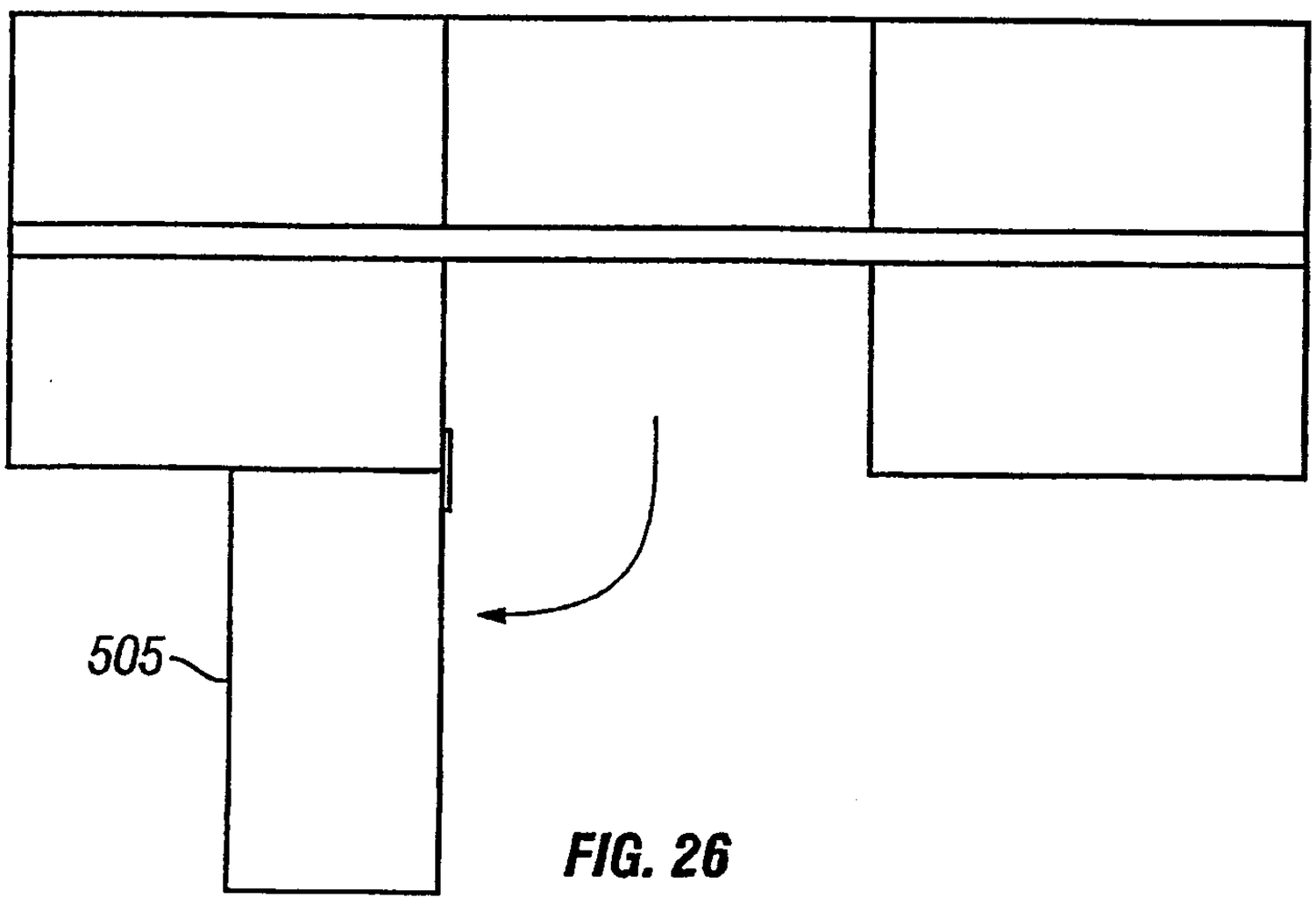


FIG. 26

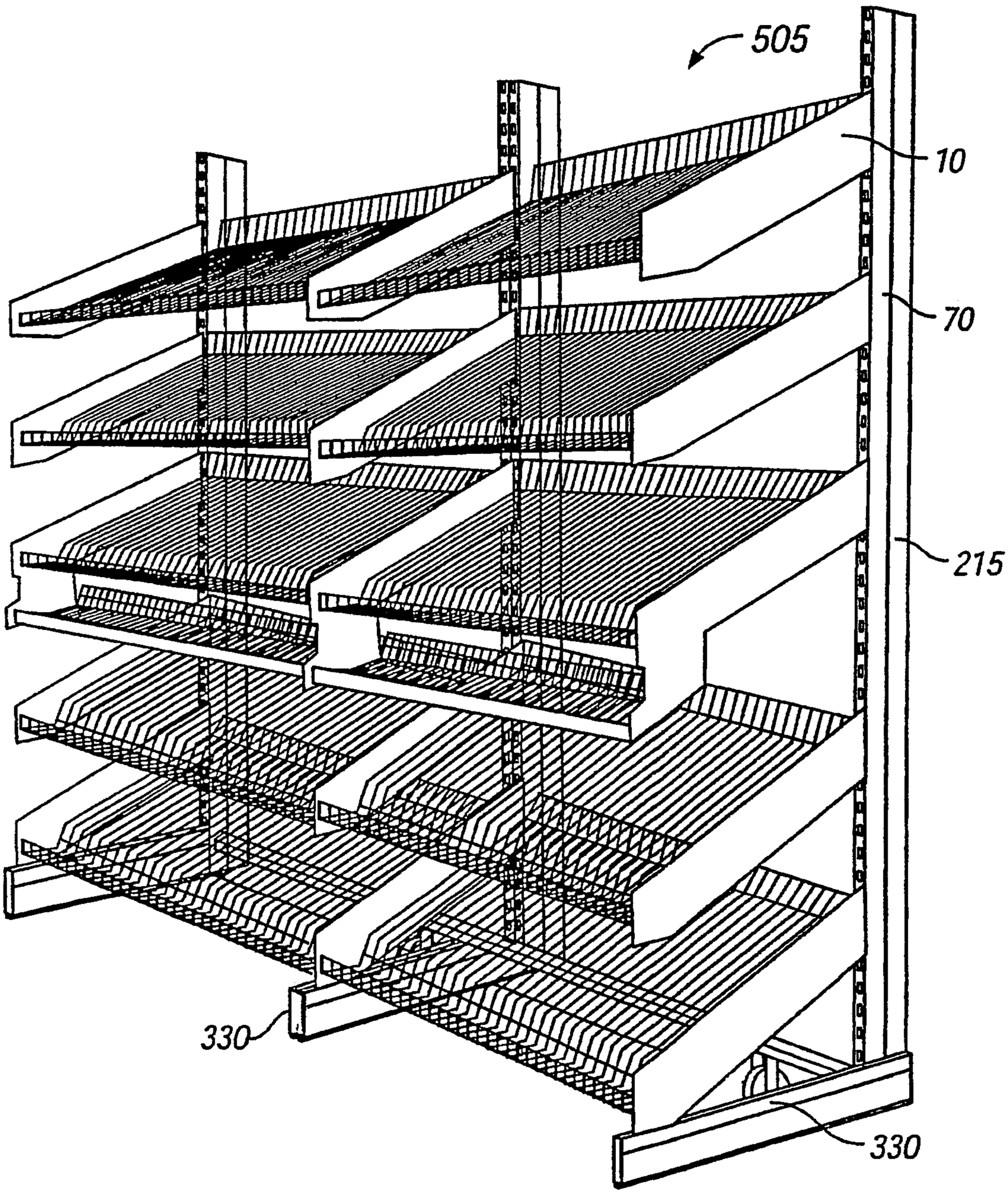


FIG. 27

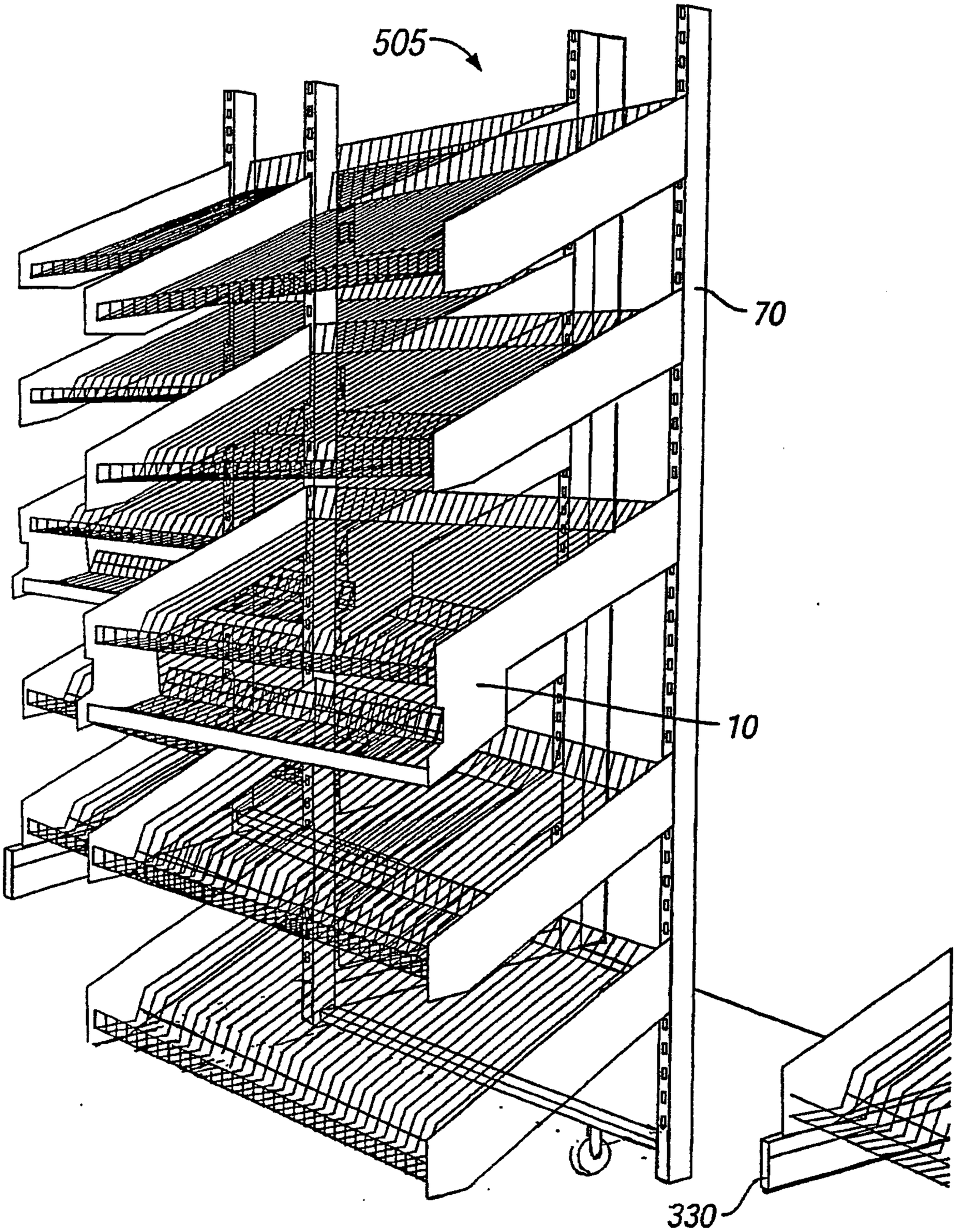


FIG. 28

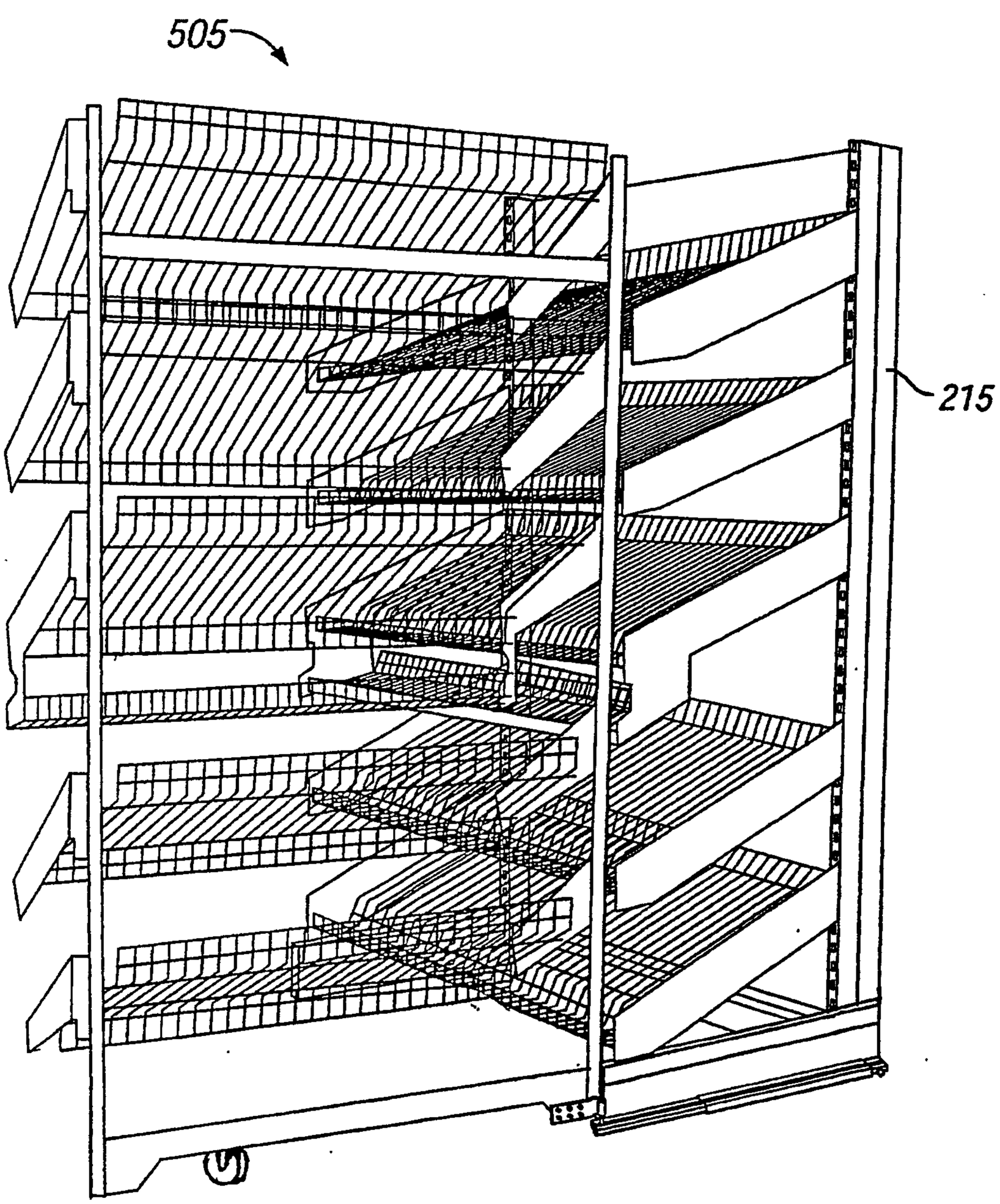


FIG. 29

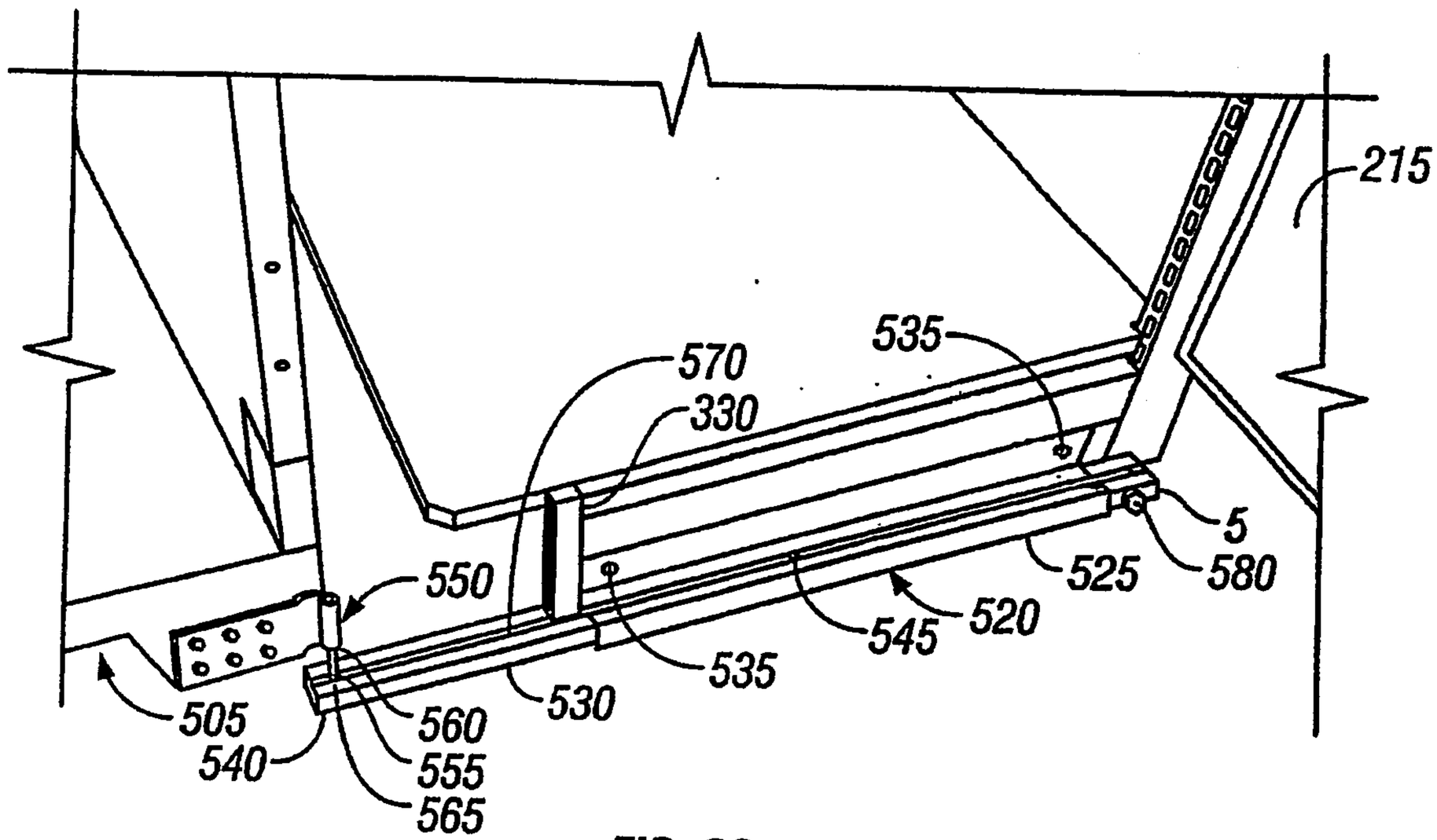


FIG. 30

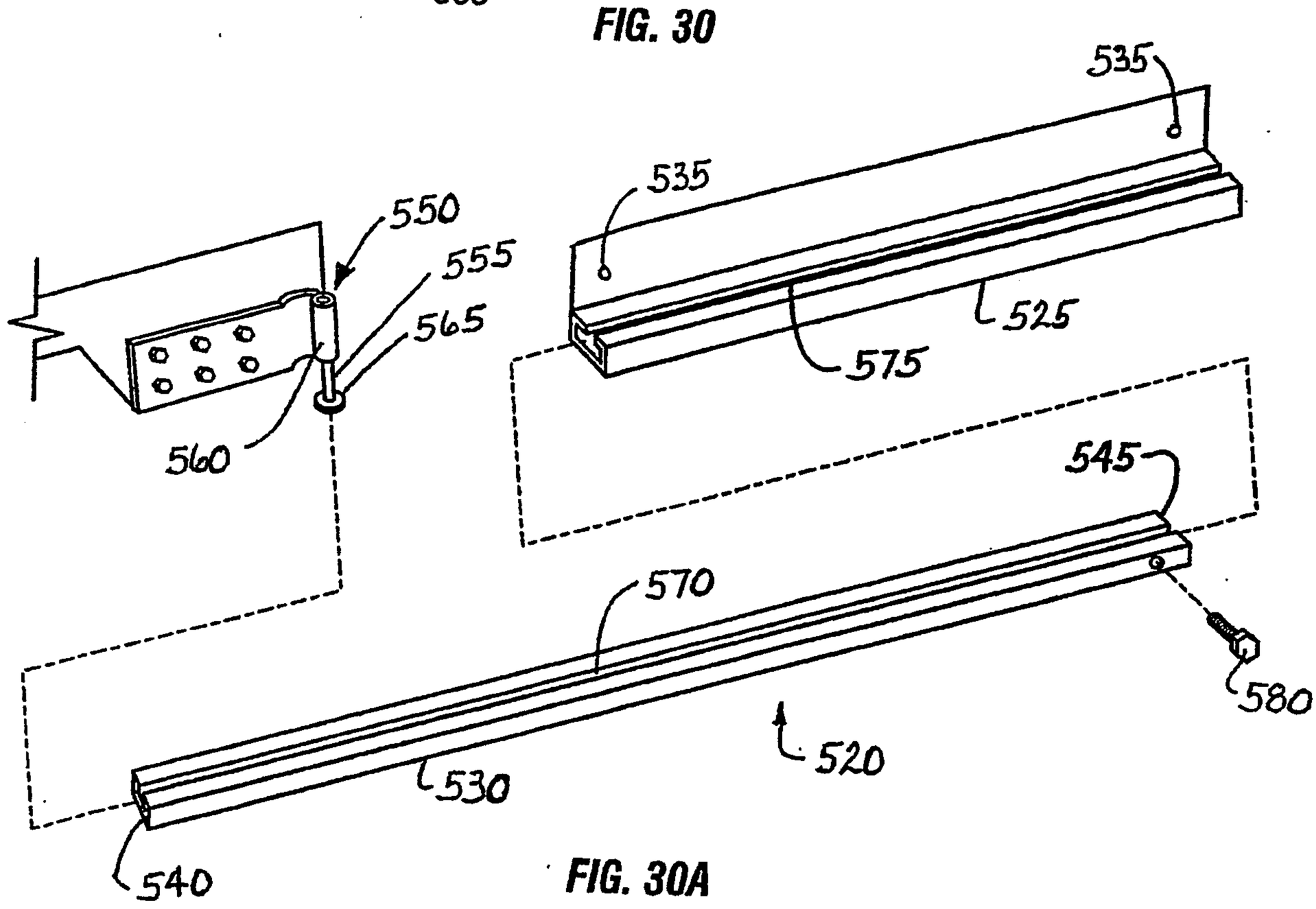


FIG. 30A

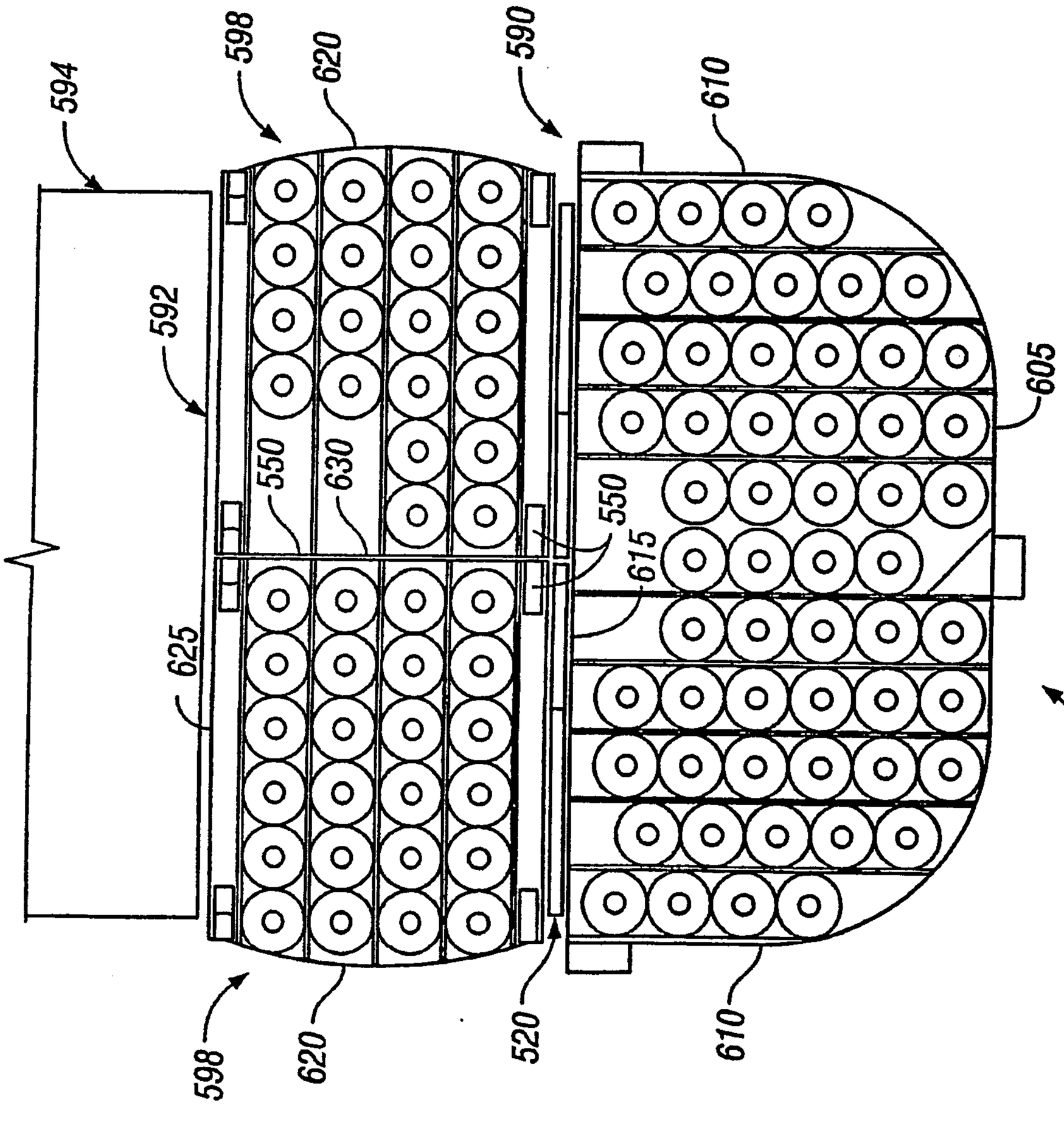

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FIG. 31

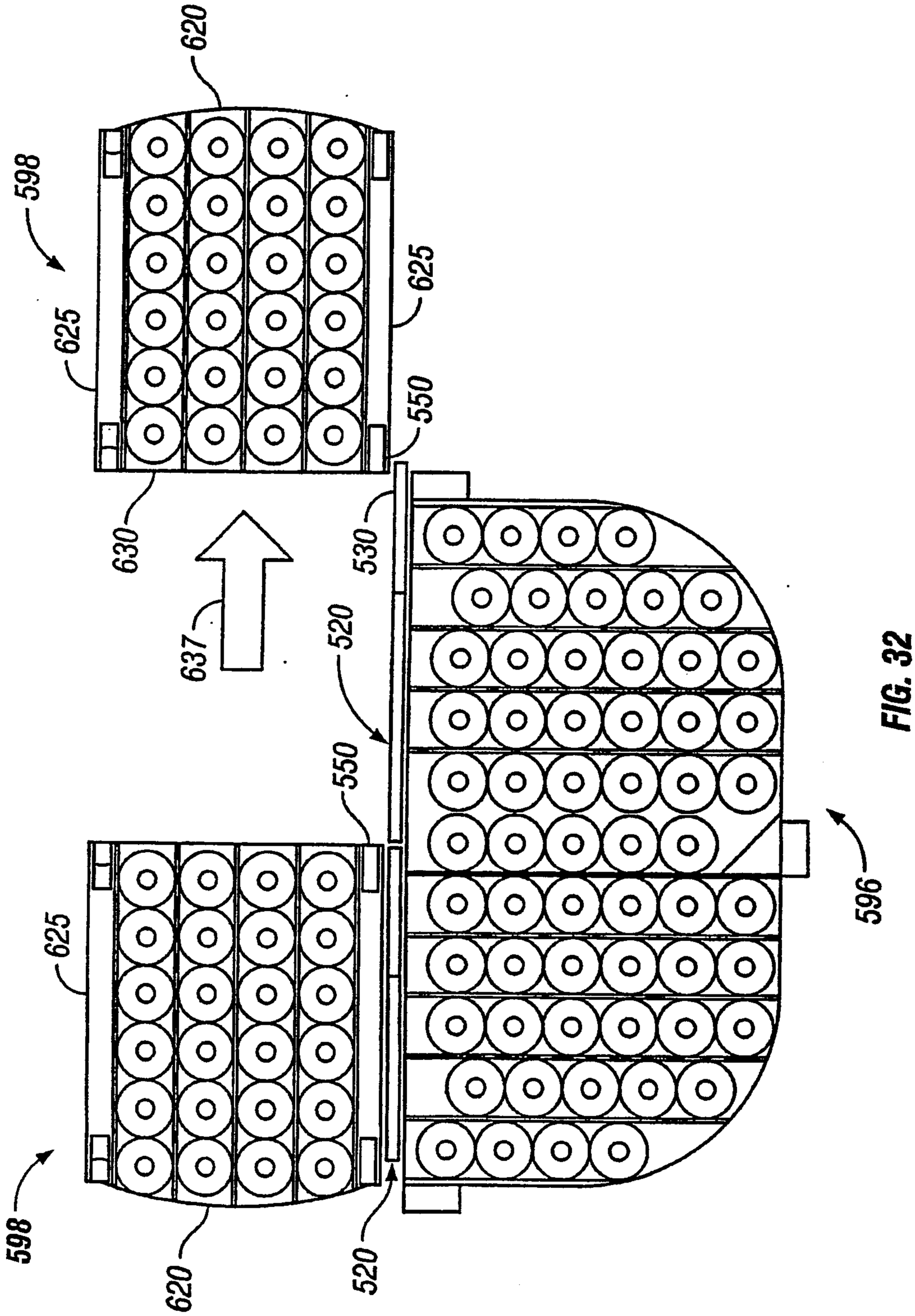


FIG. 32

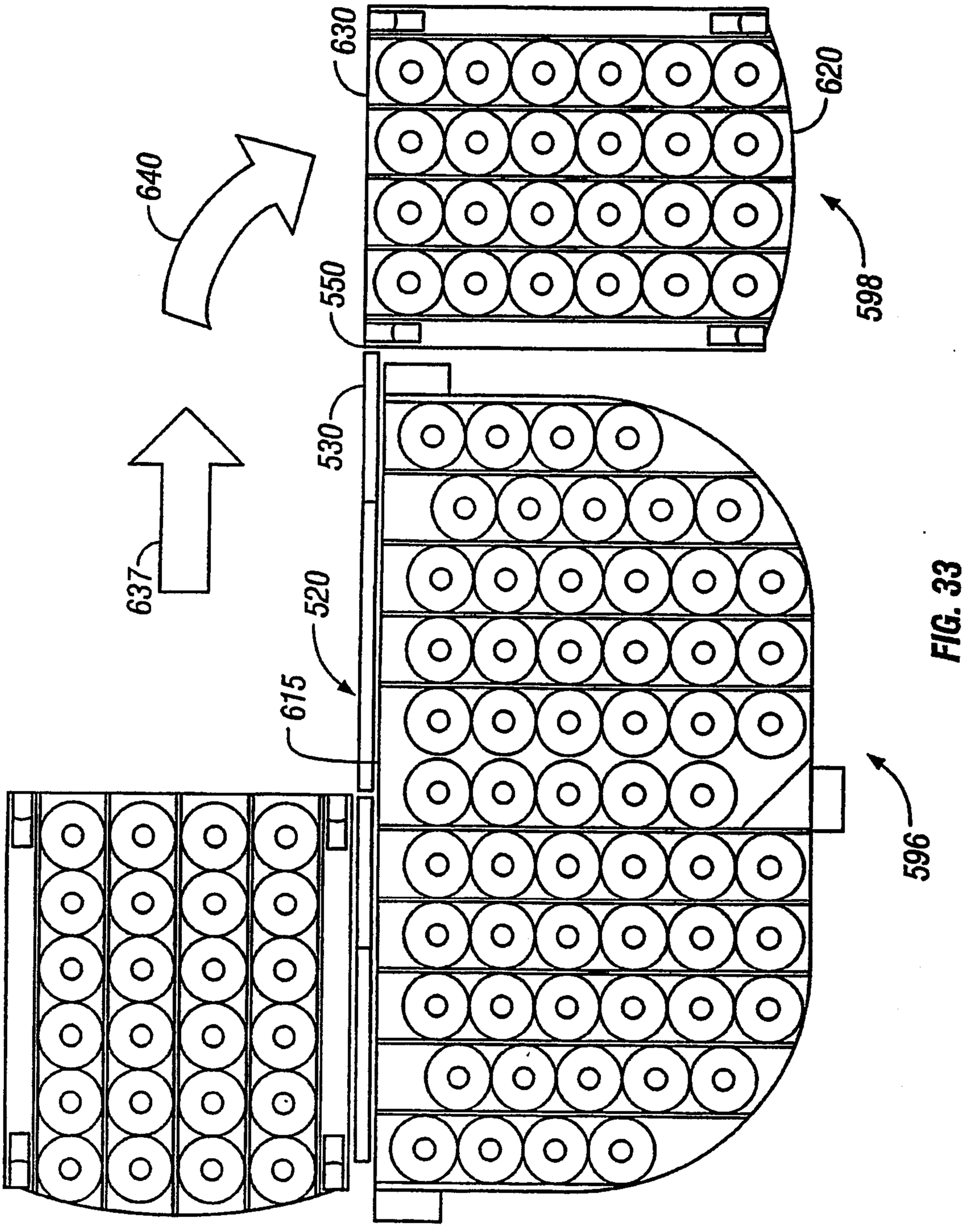


FIG. 33

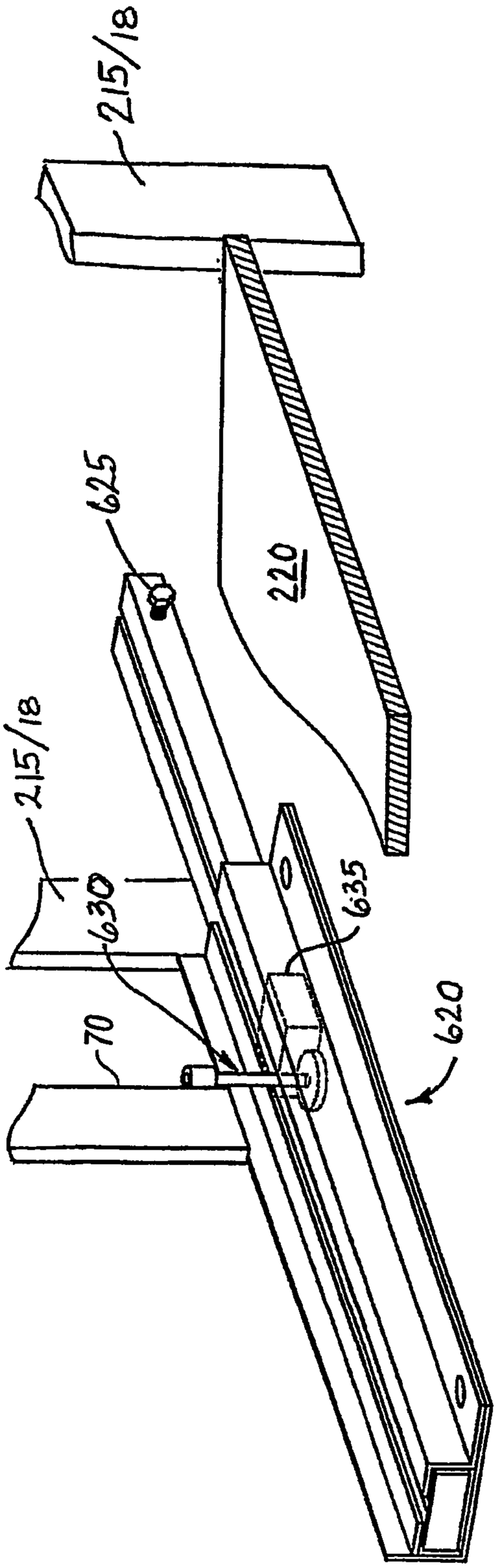

215/18
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FIG. 34

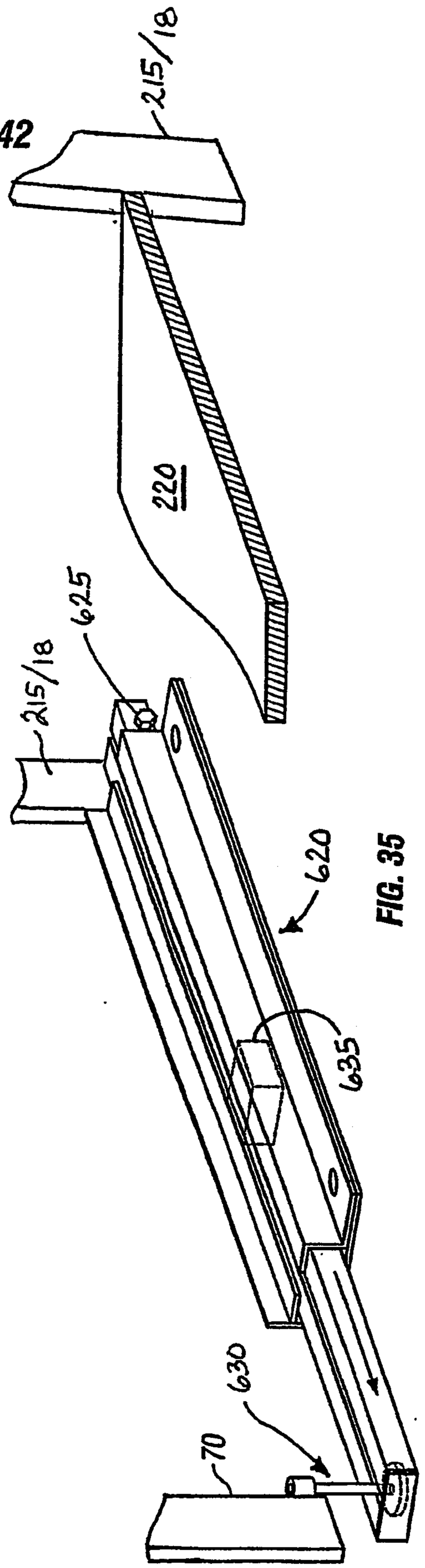

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FIG. 35

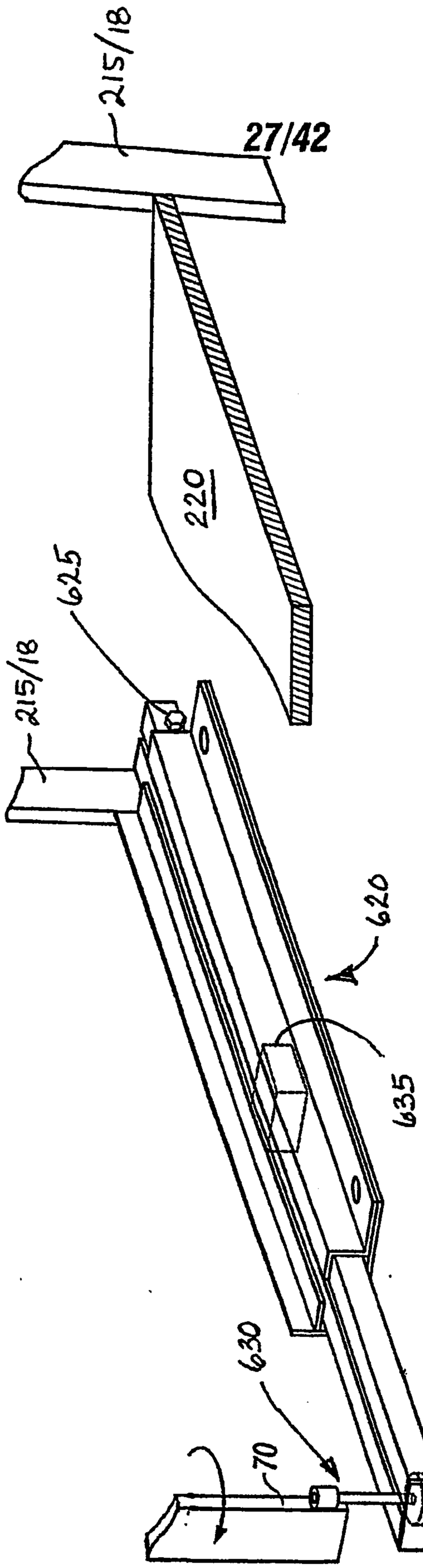


FIG. 36

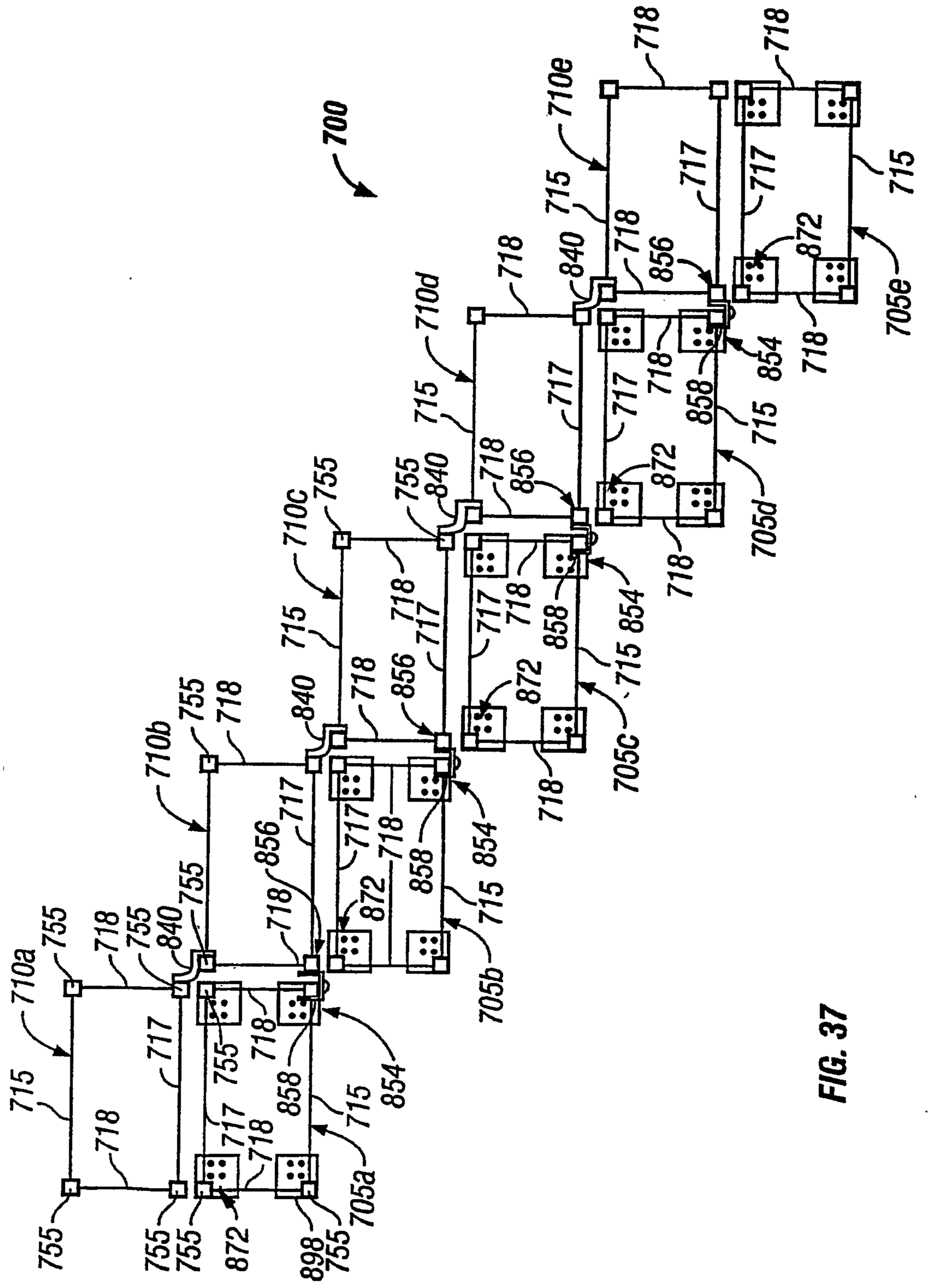

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FIG. 37

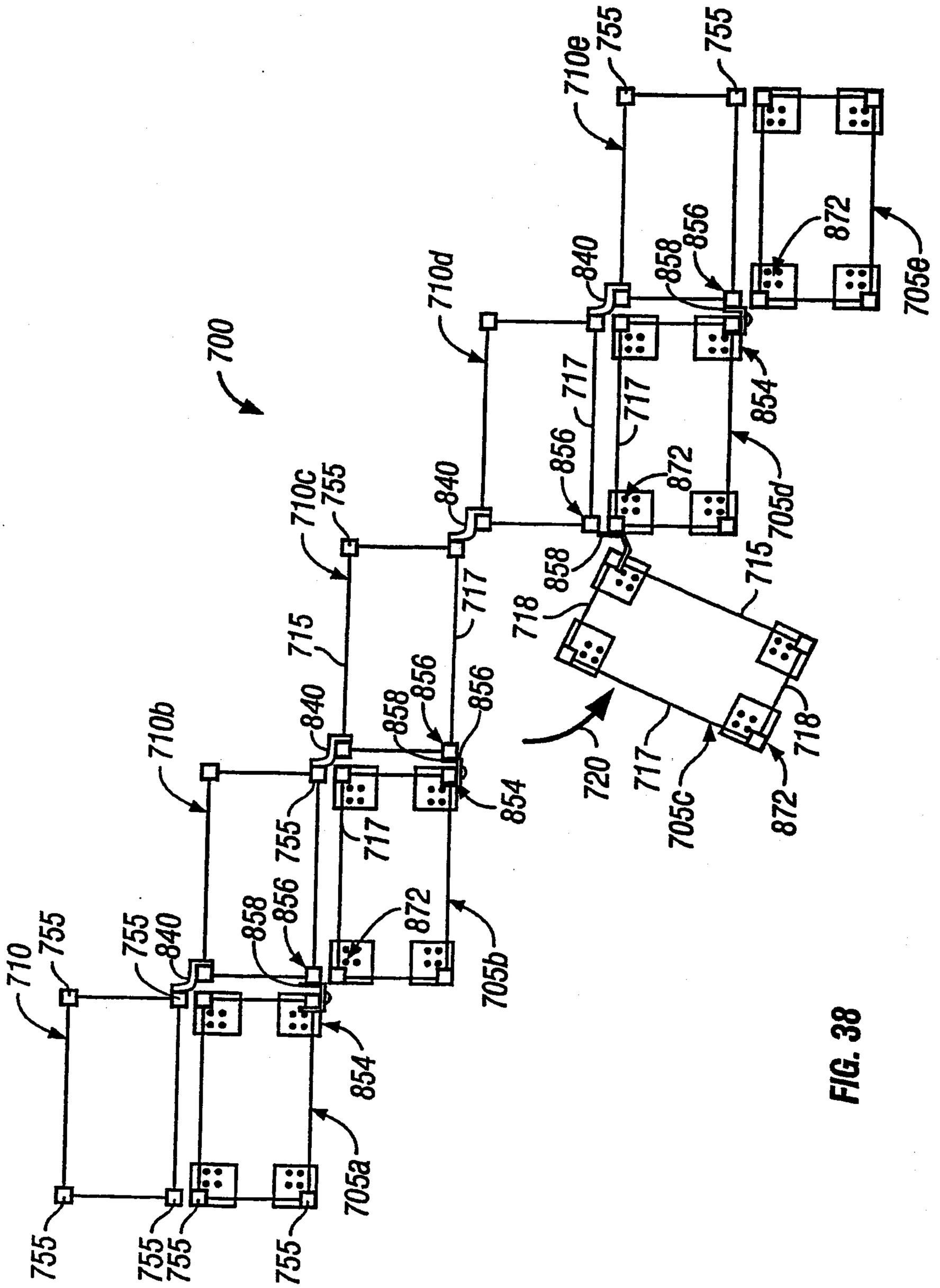

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FIG. 38

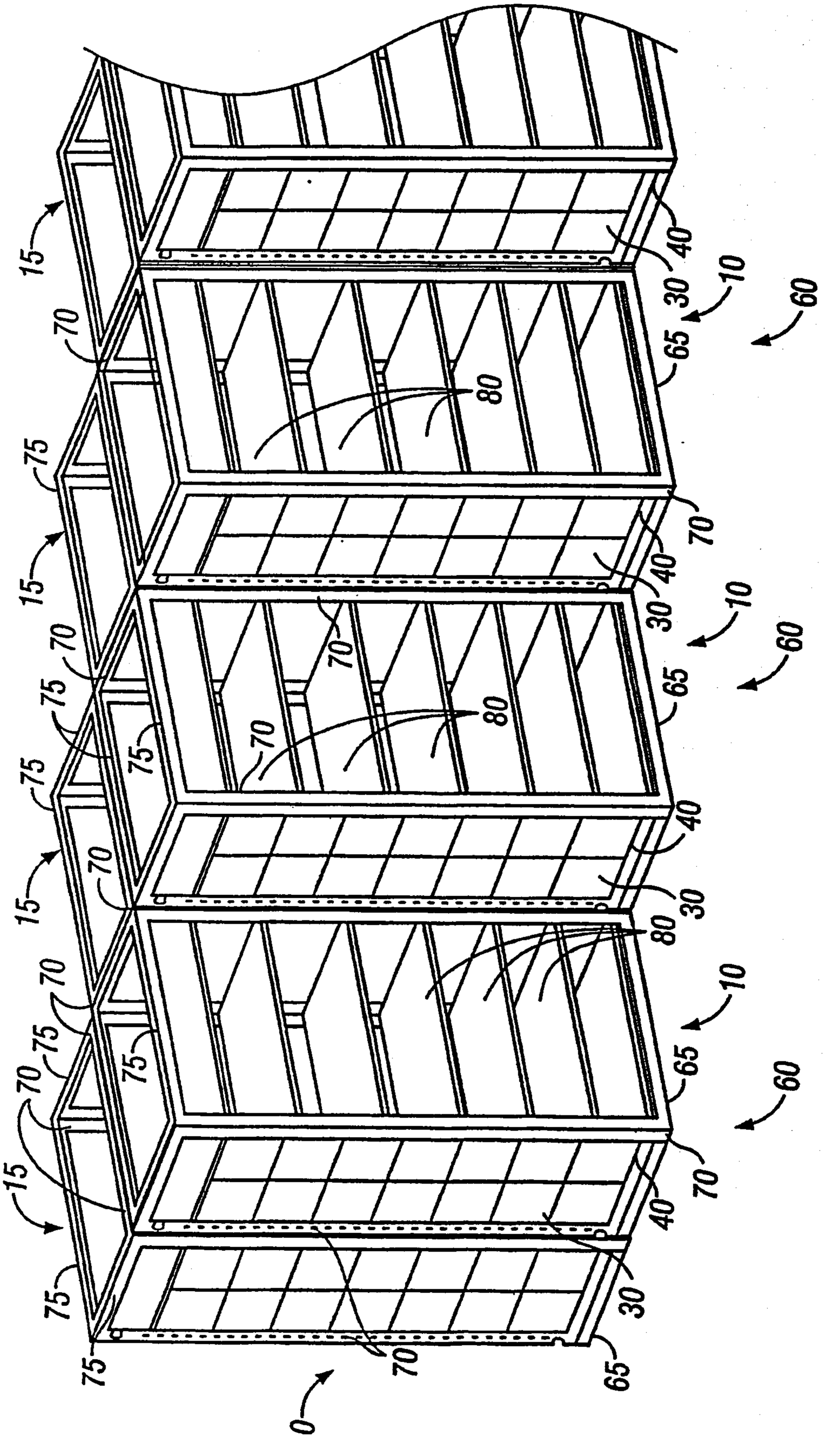


FIG. 39

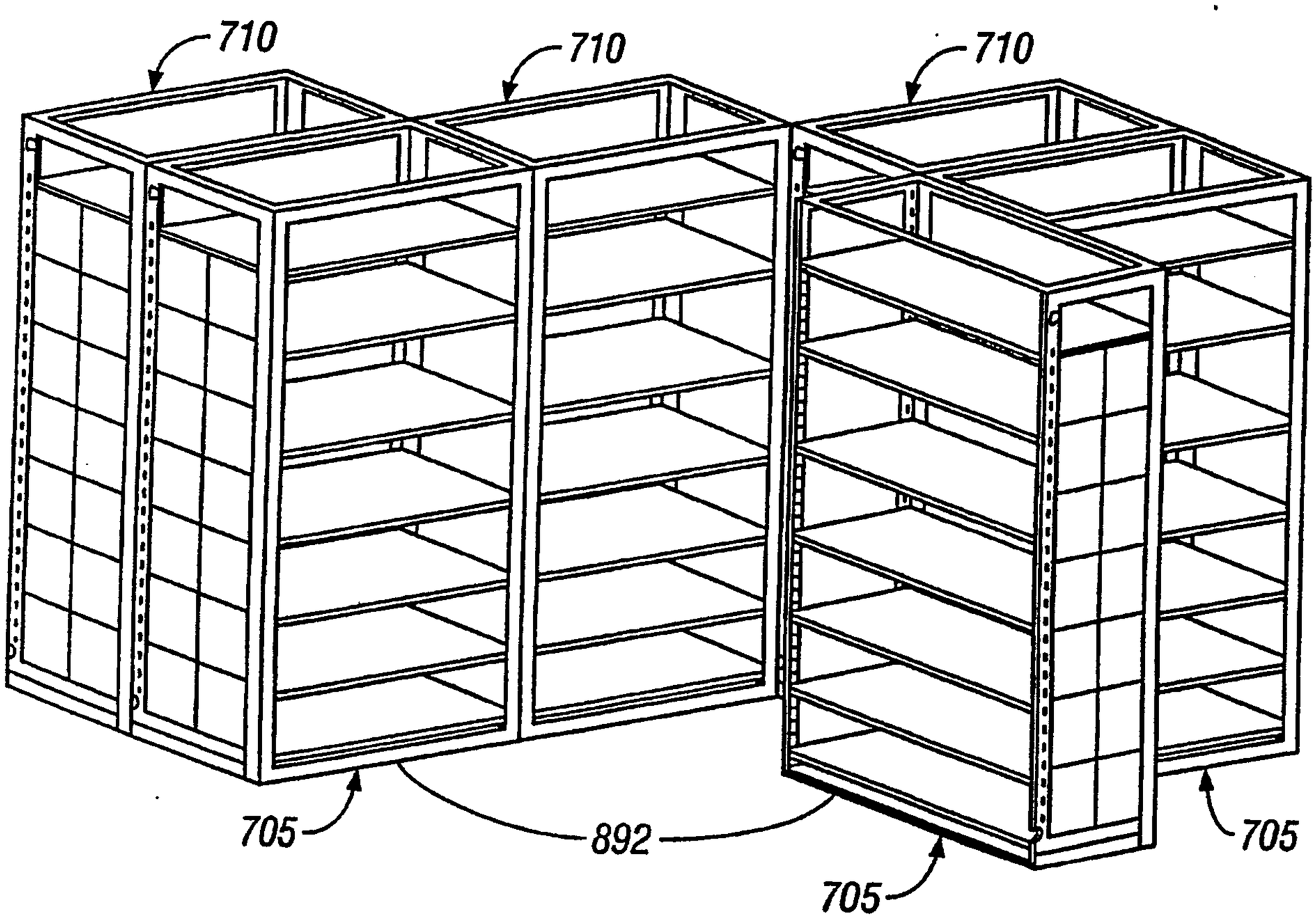


FIG. 40

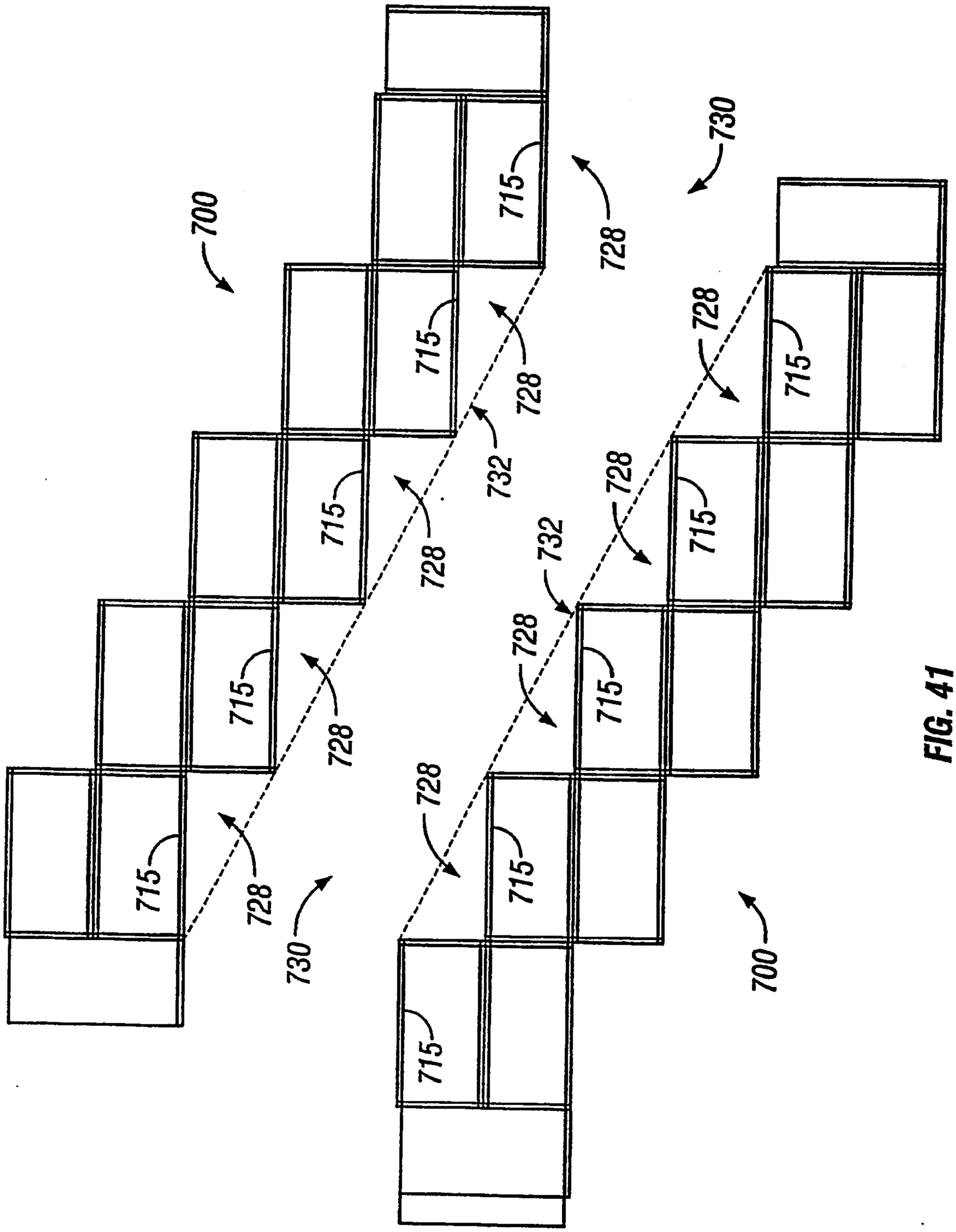


FIG. 41

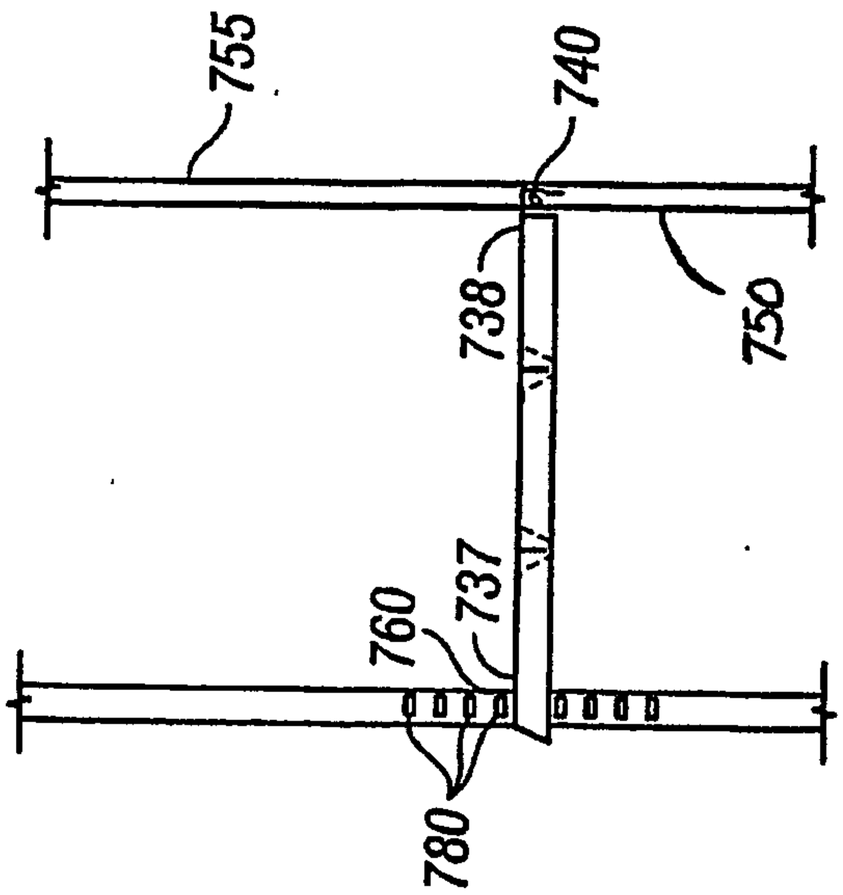

755
740
738
750
737
760
780

FIG. 43

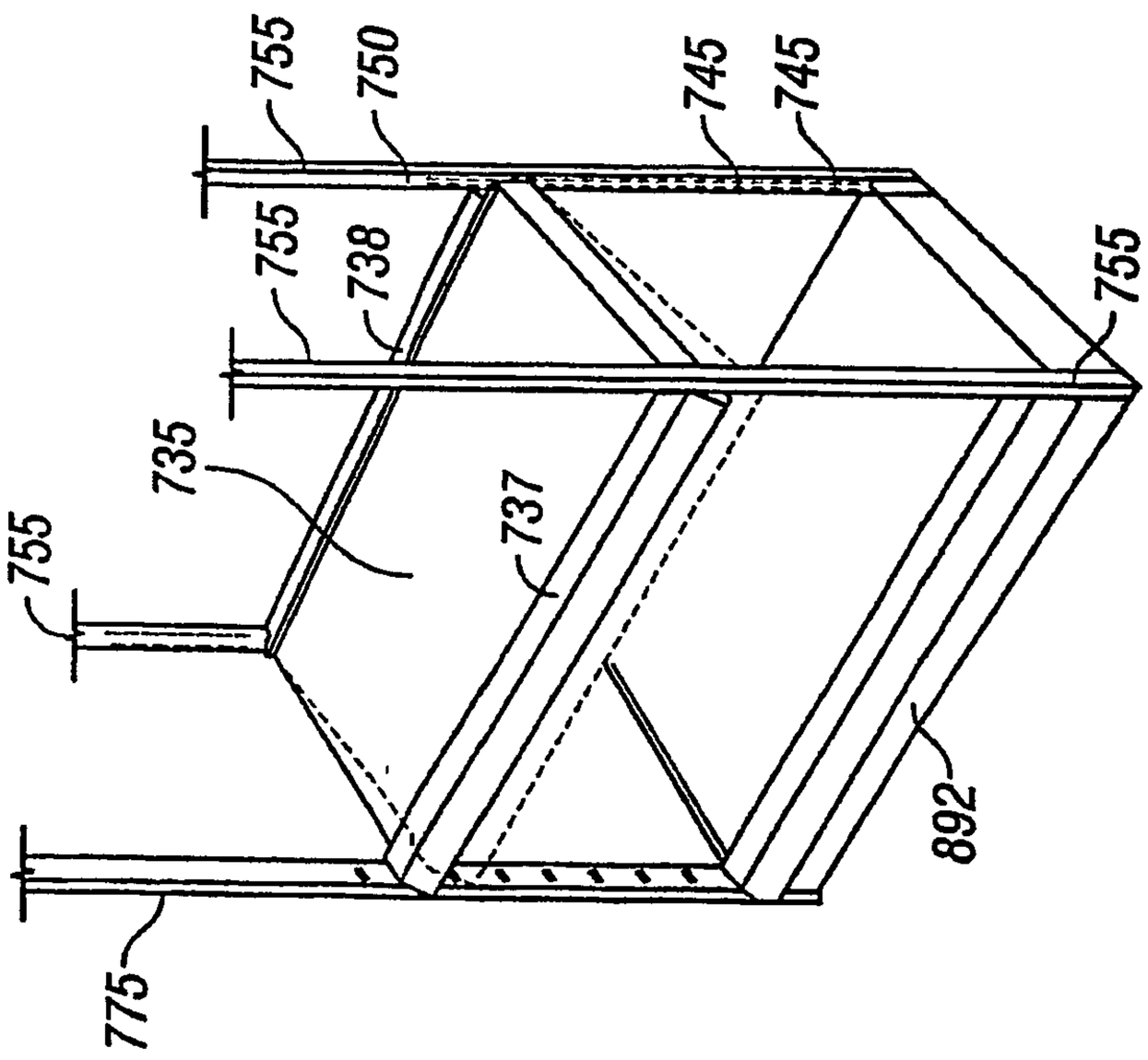

755
750
745
745
755
738
755
735
737
755
892
775

FIG. 42

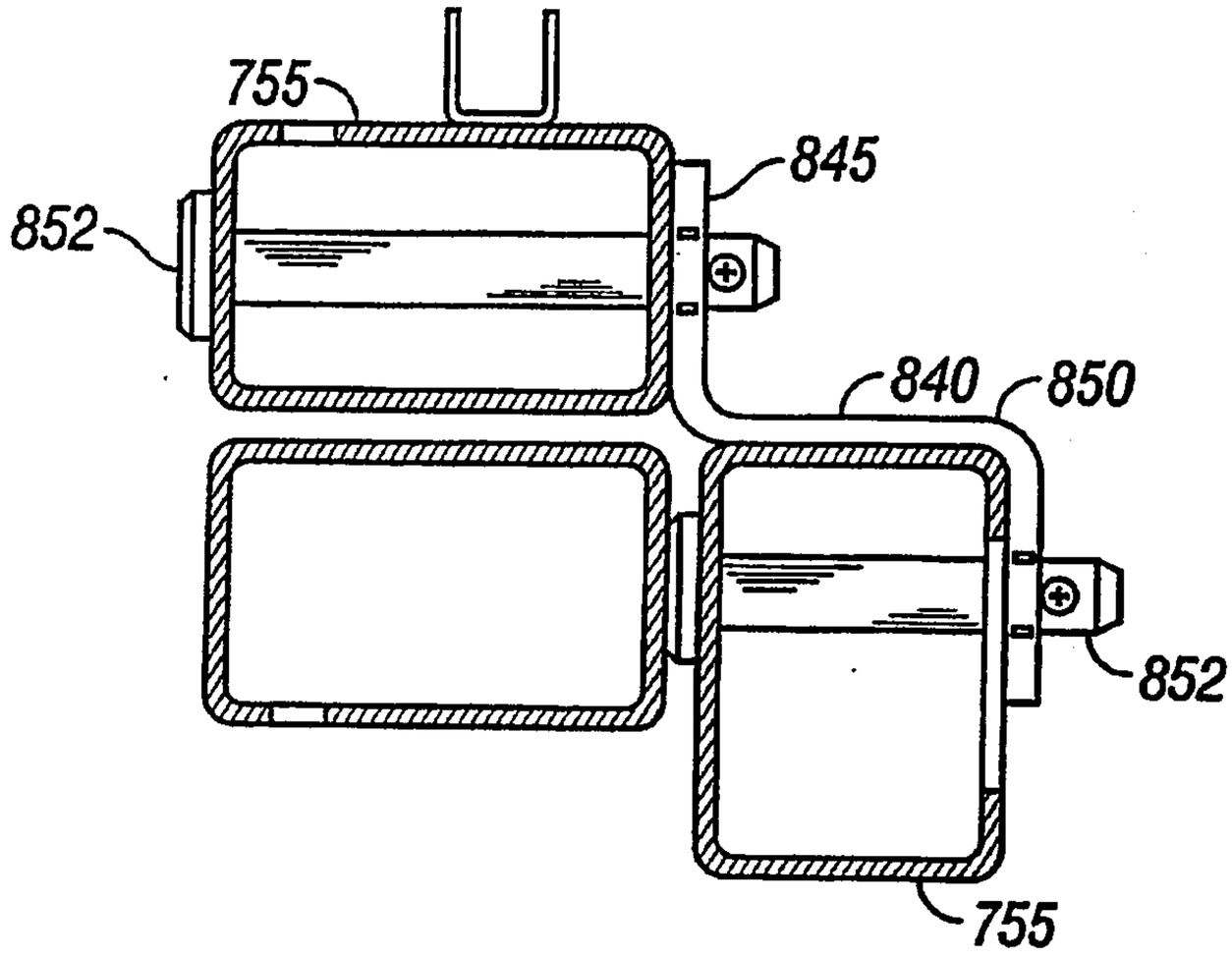

755
845
852
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850
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FIG. 44

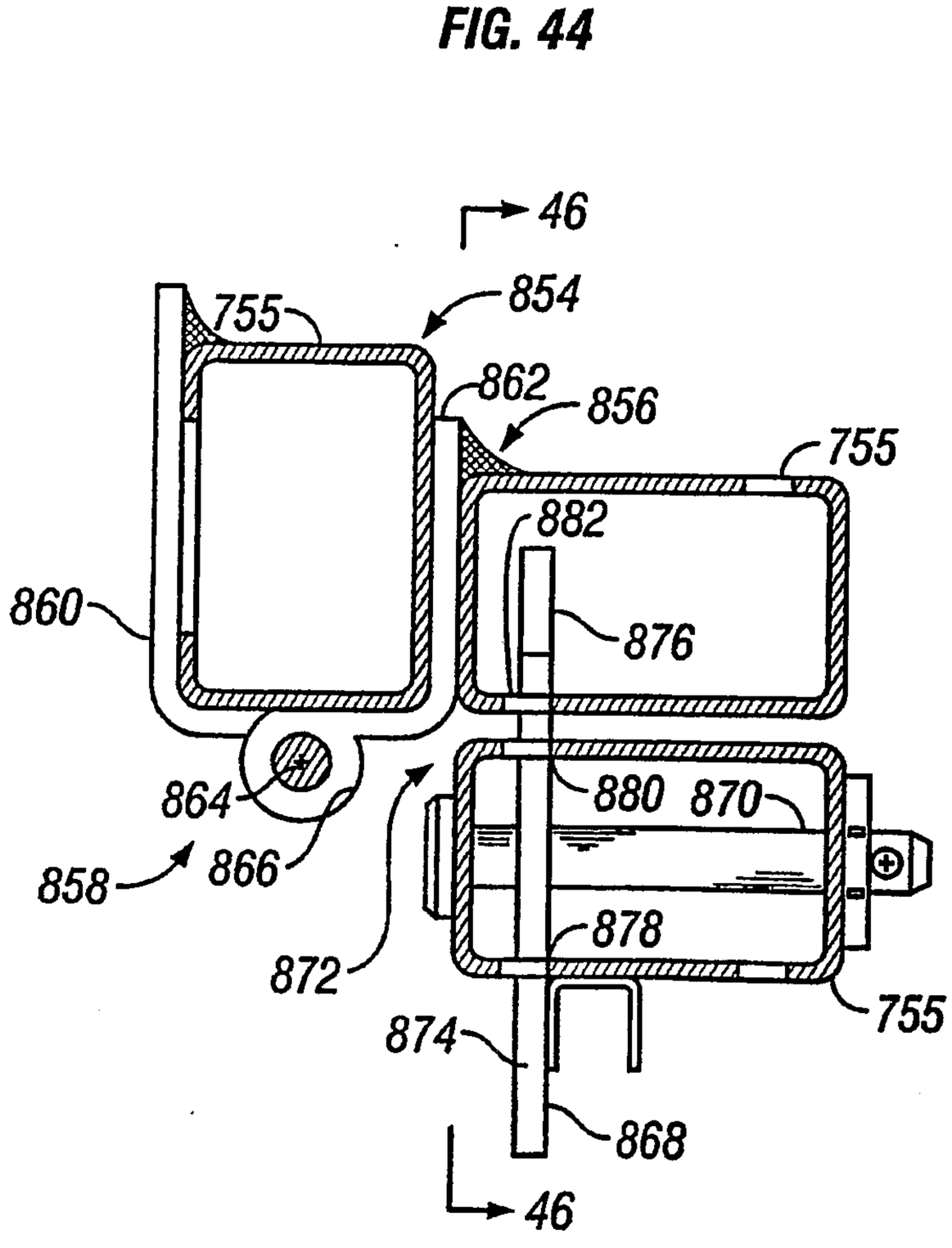

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854
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FIG. 45

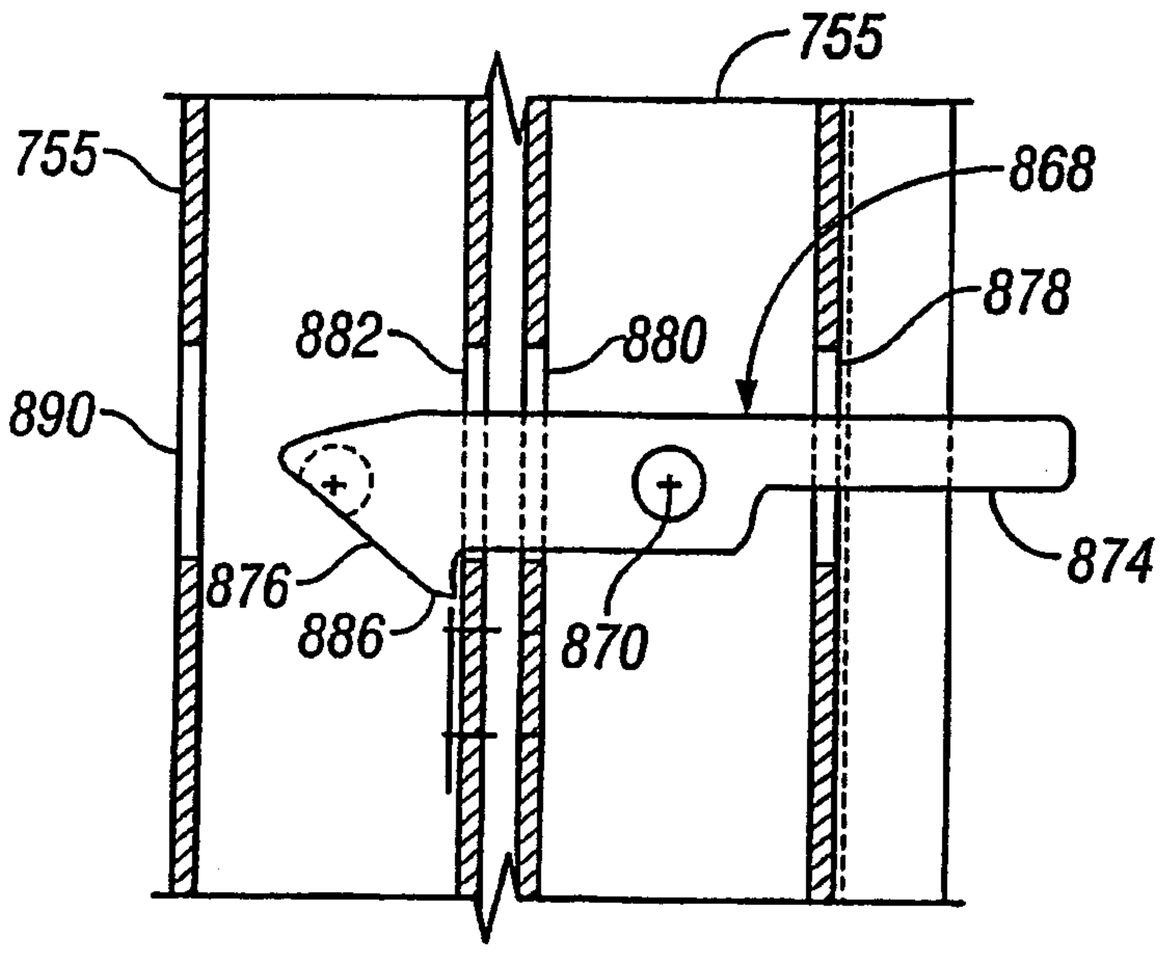

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755
868
878
882
880
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876
886
870
874

FIG. 46

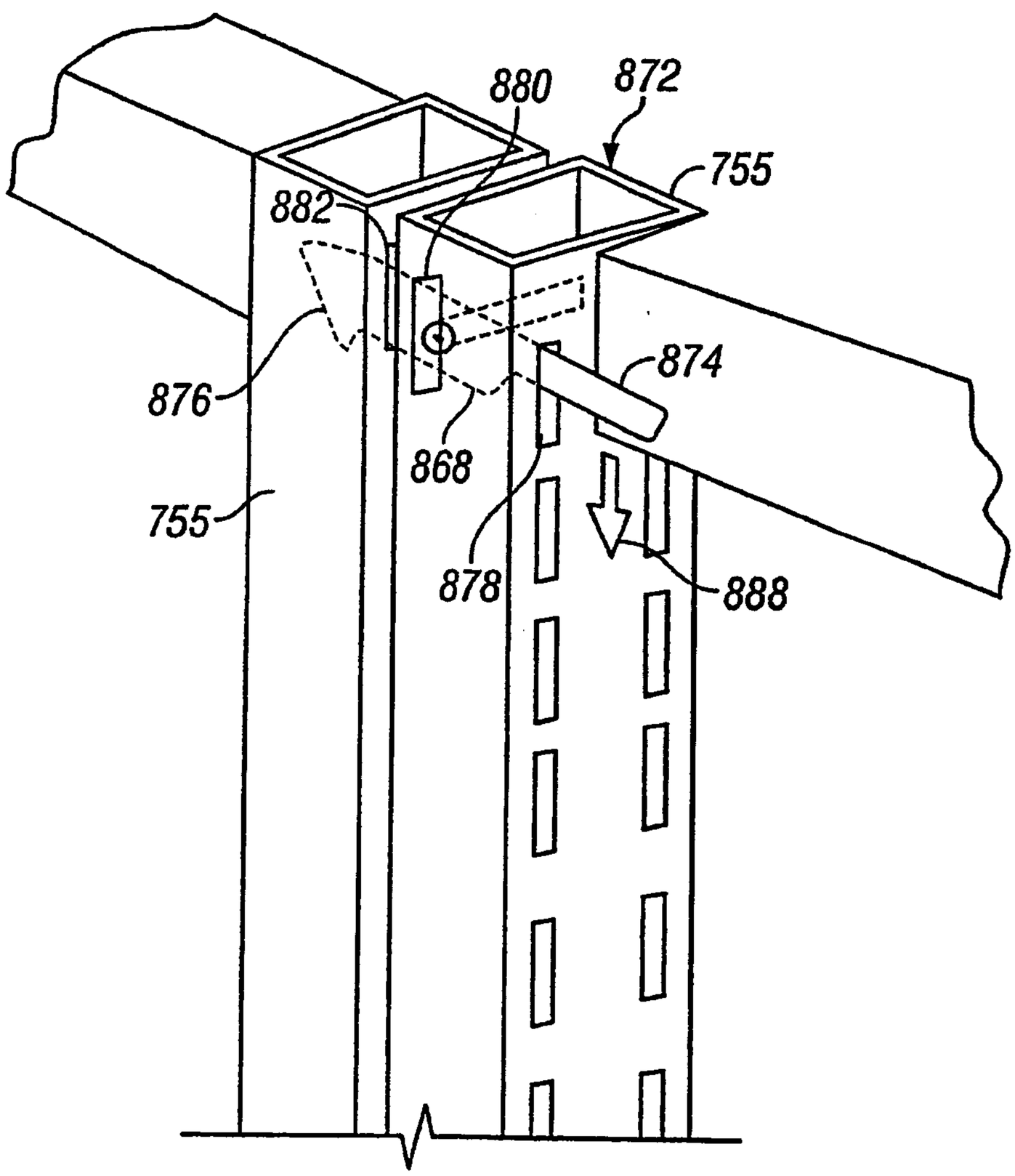

880
872
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888

FIG. 47

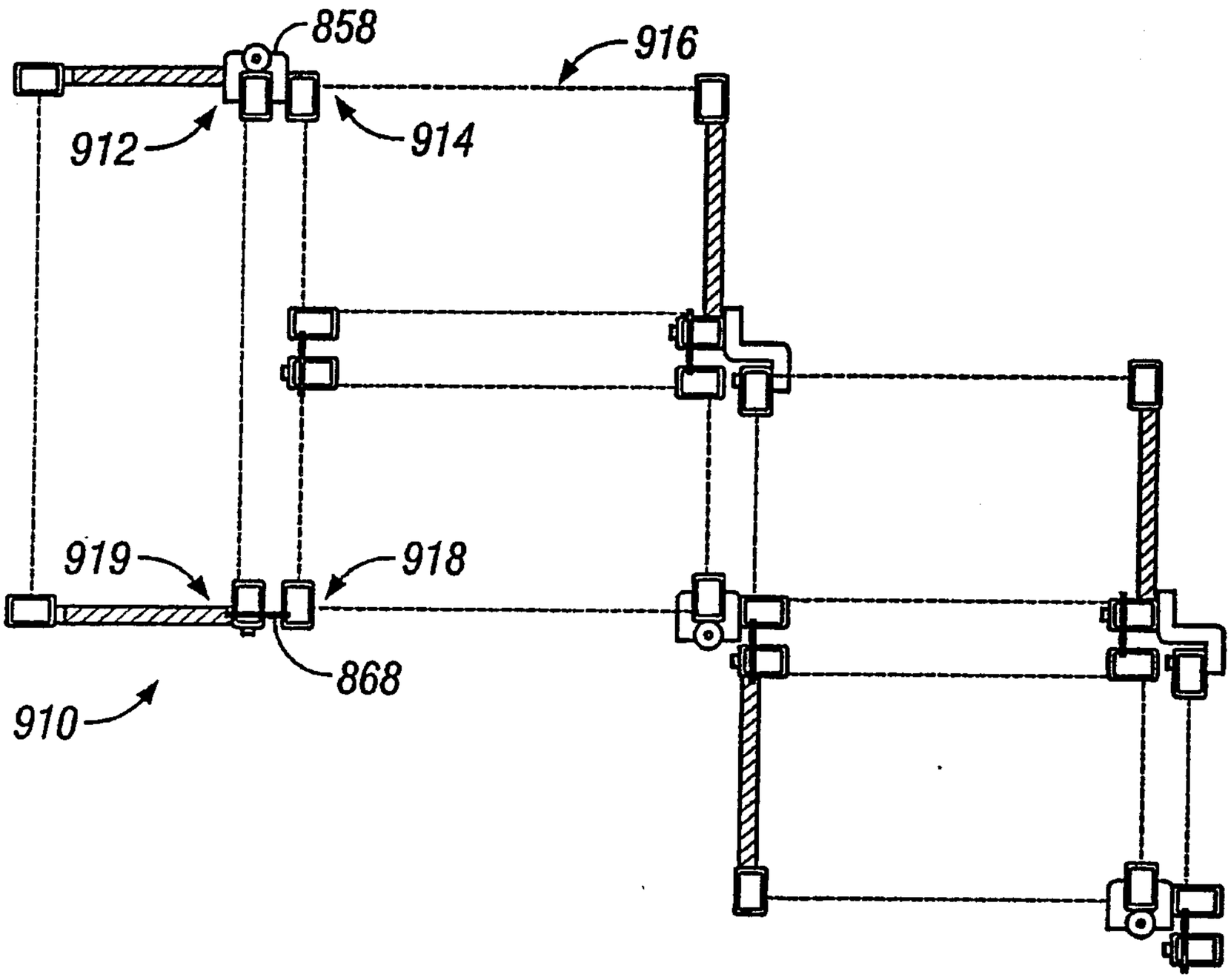

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916
912
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FIG. 48

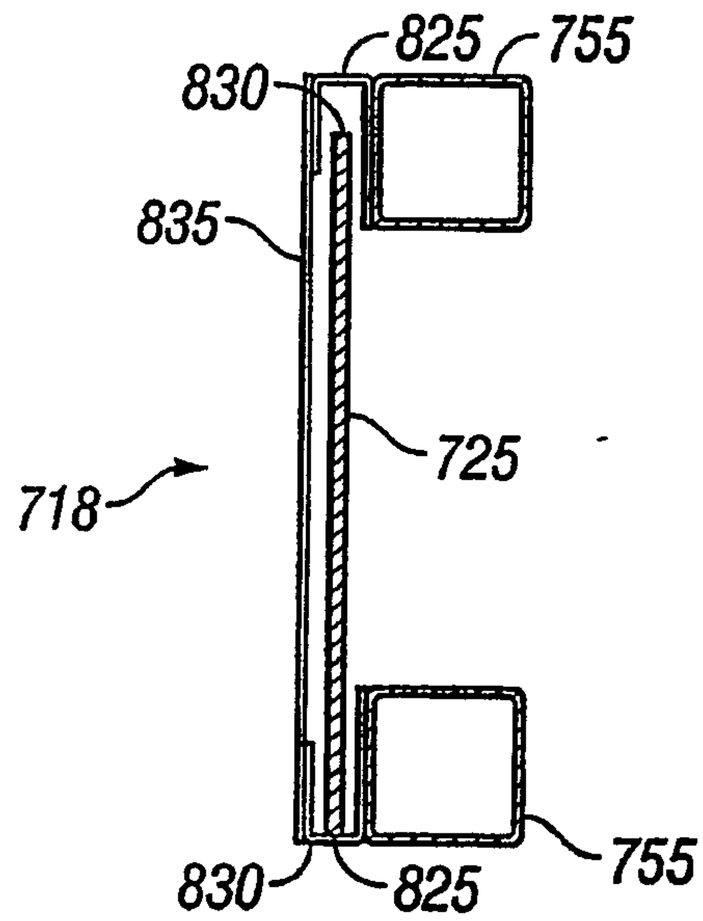

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FIG. 49

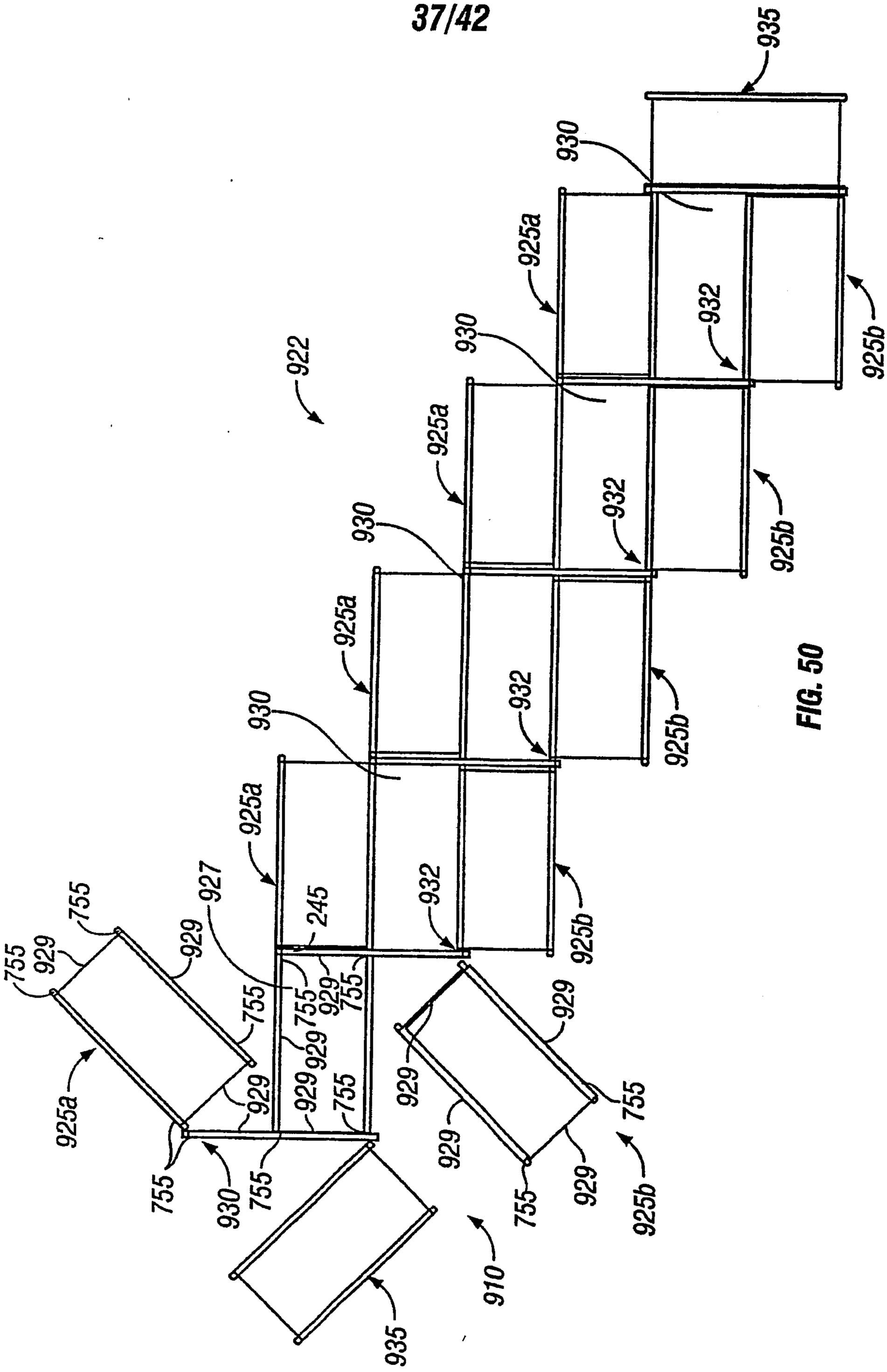


FIG. 50

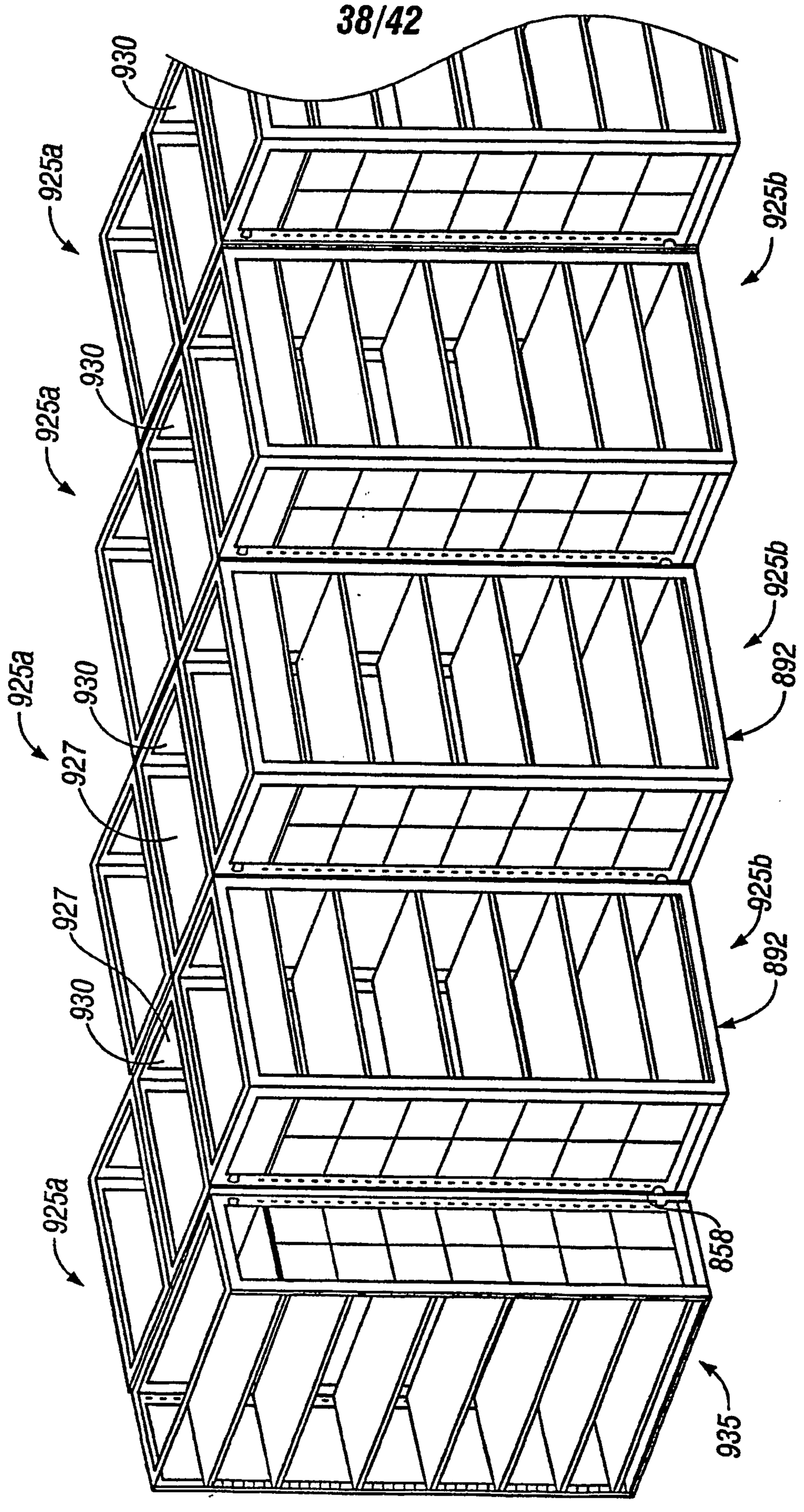

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FIG. 51

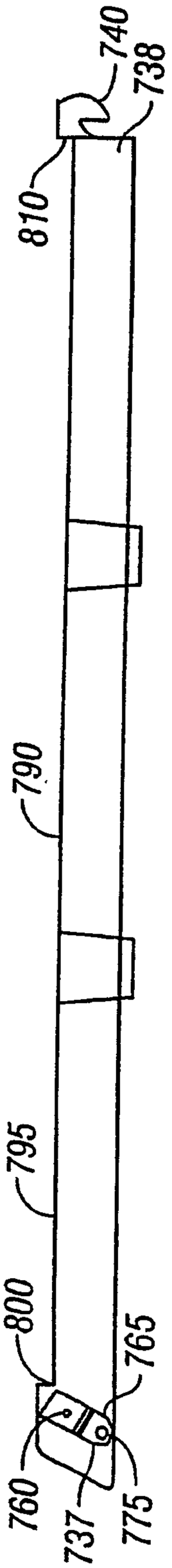

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FIG. 52

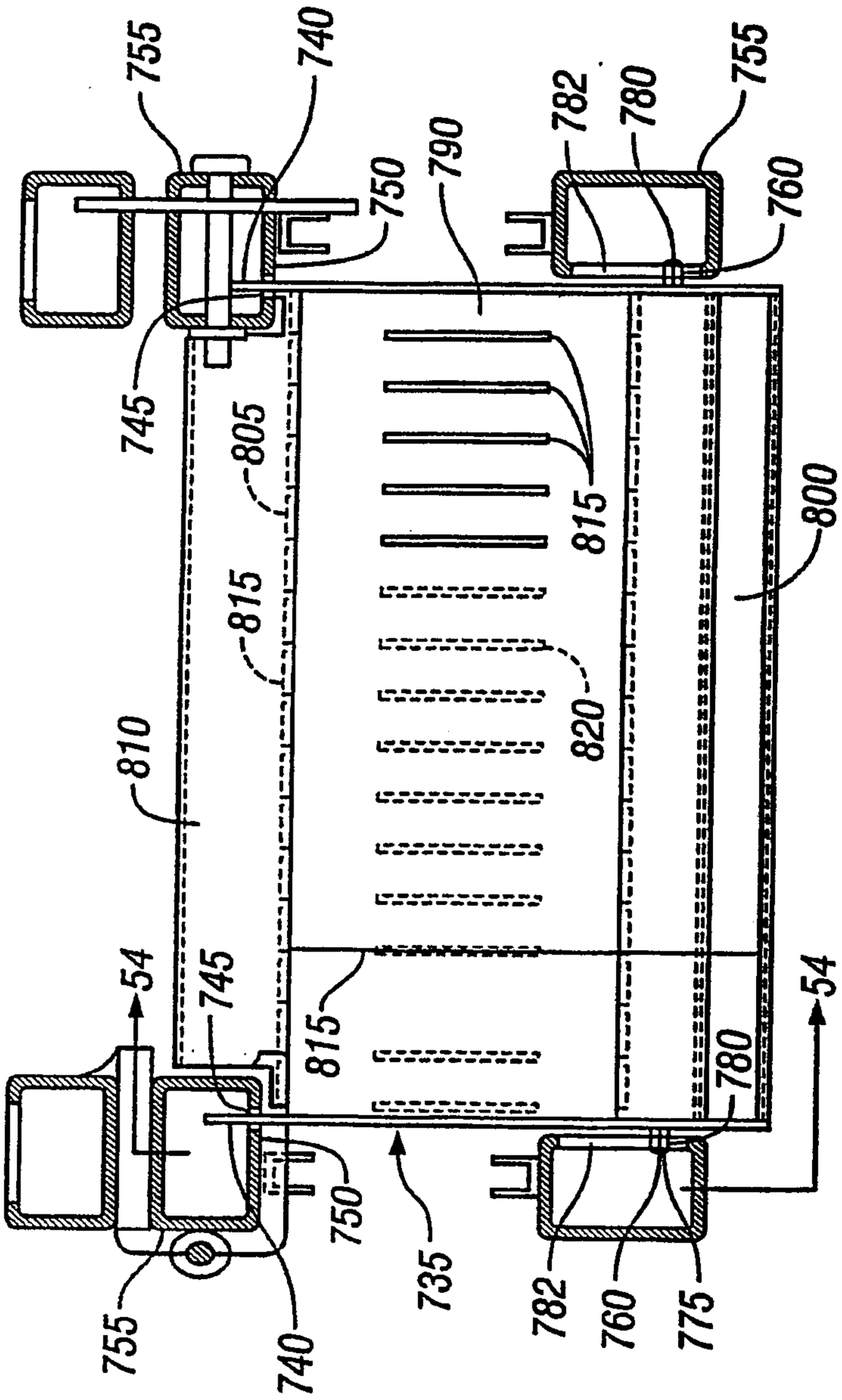

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FIG. 53

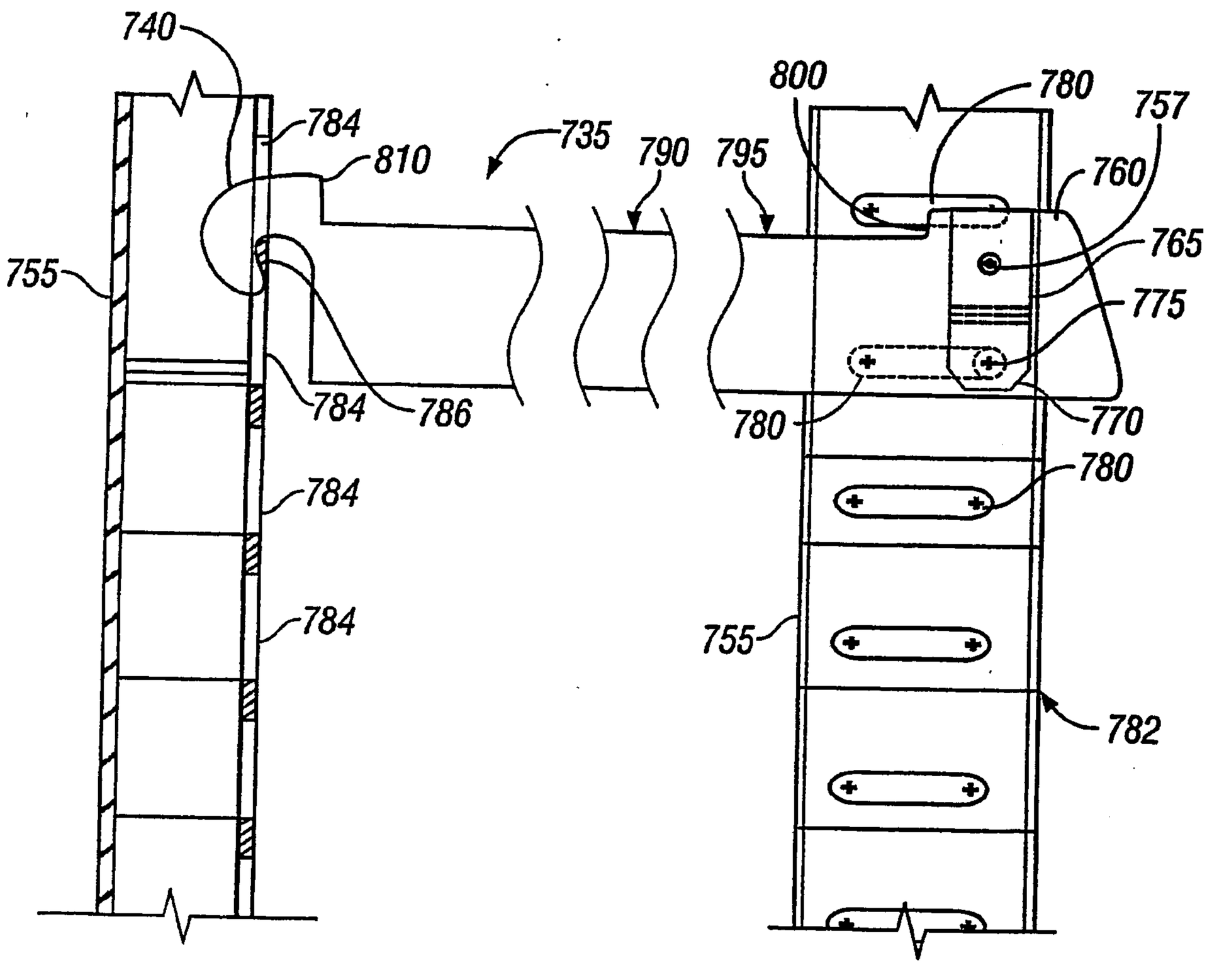

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FIG. 54

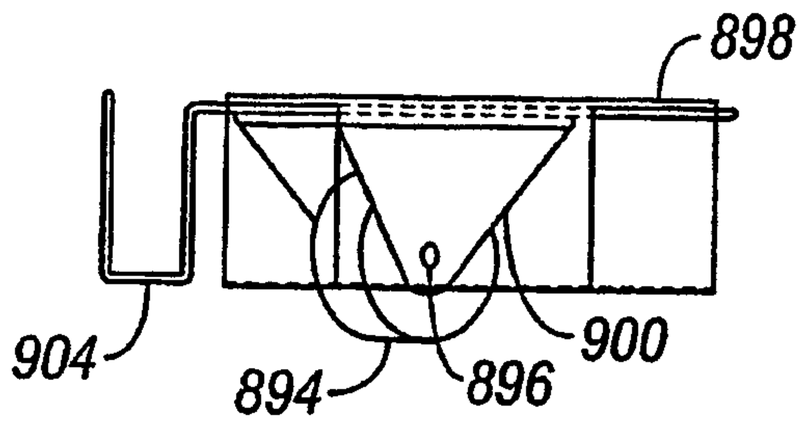


FIG. 55

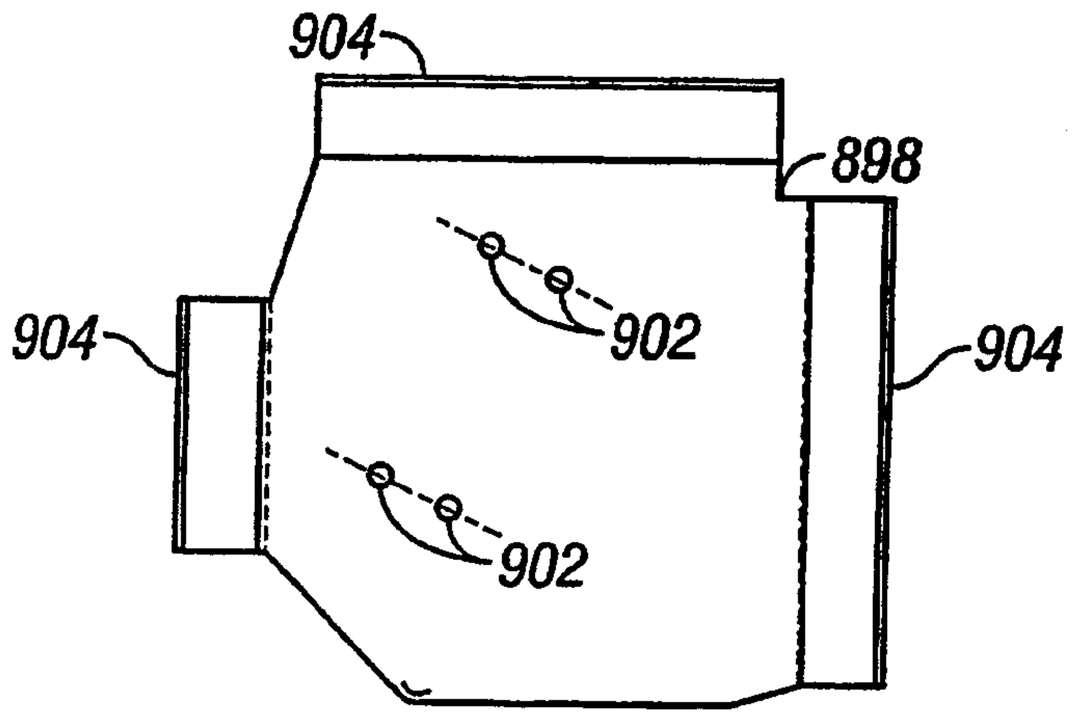


FIG. 56

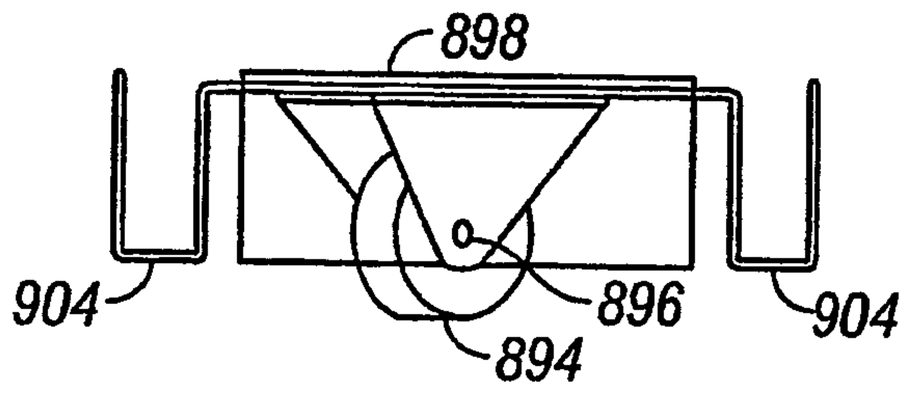


FIG. 57

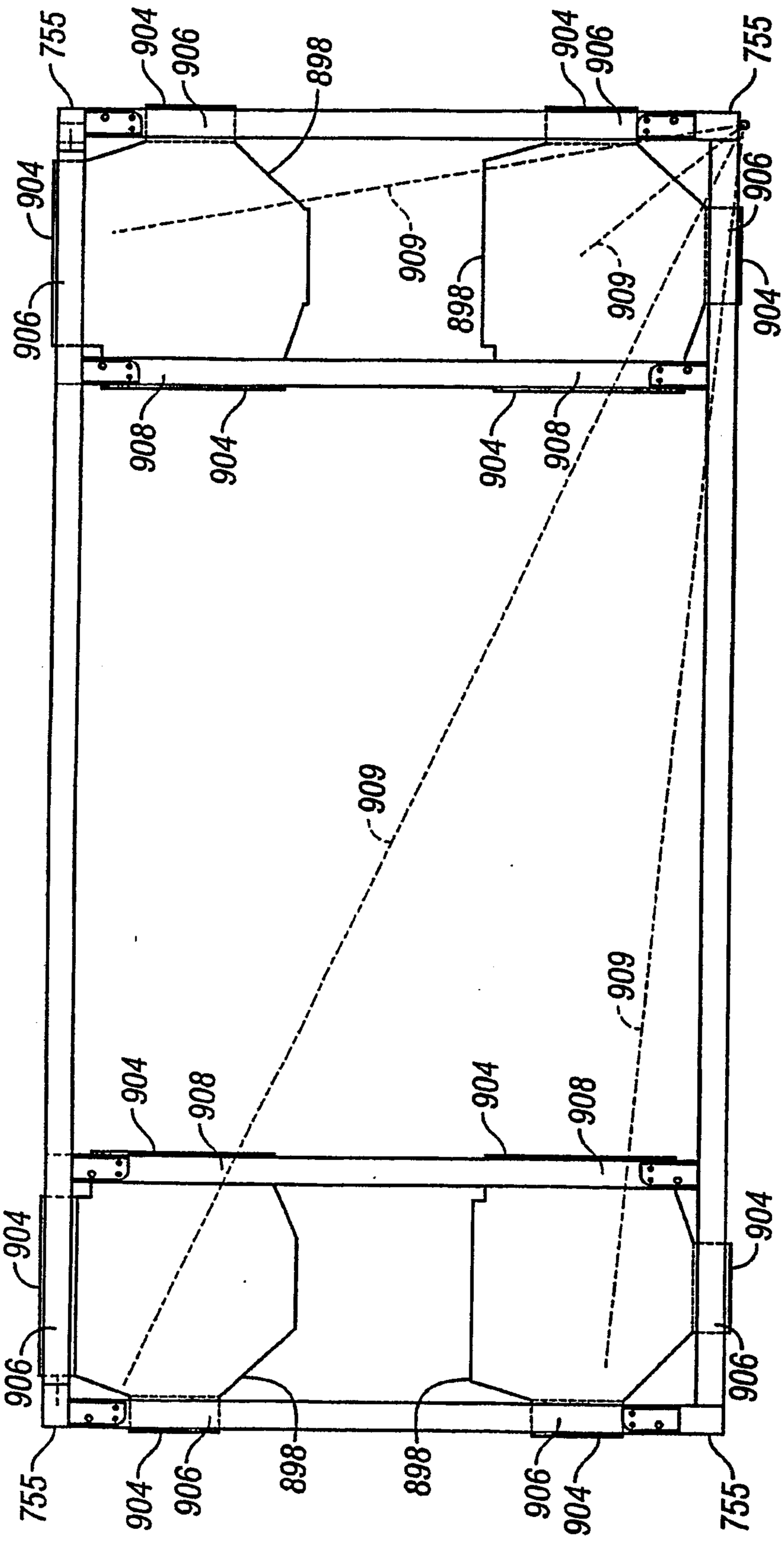
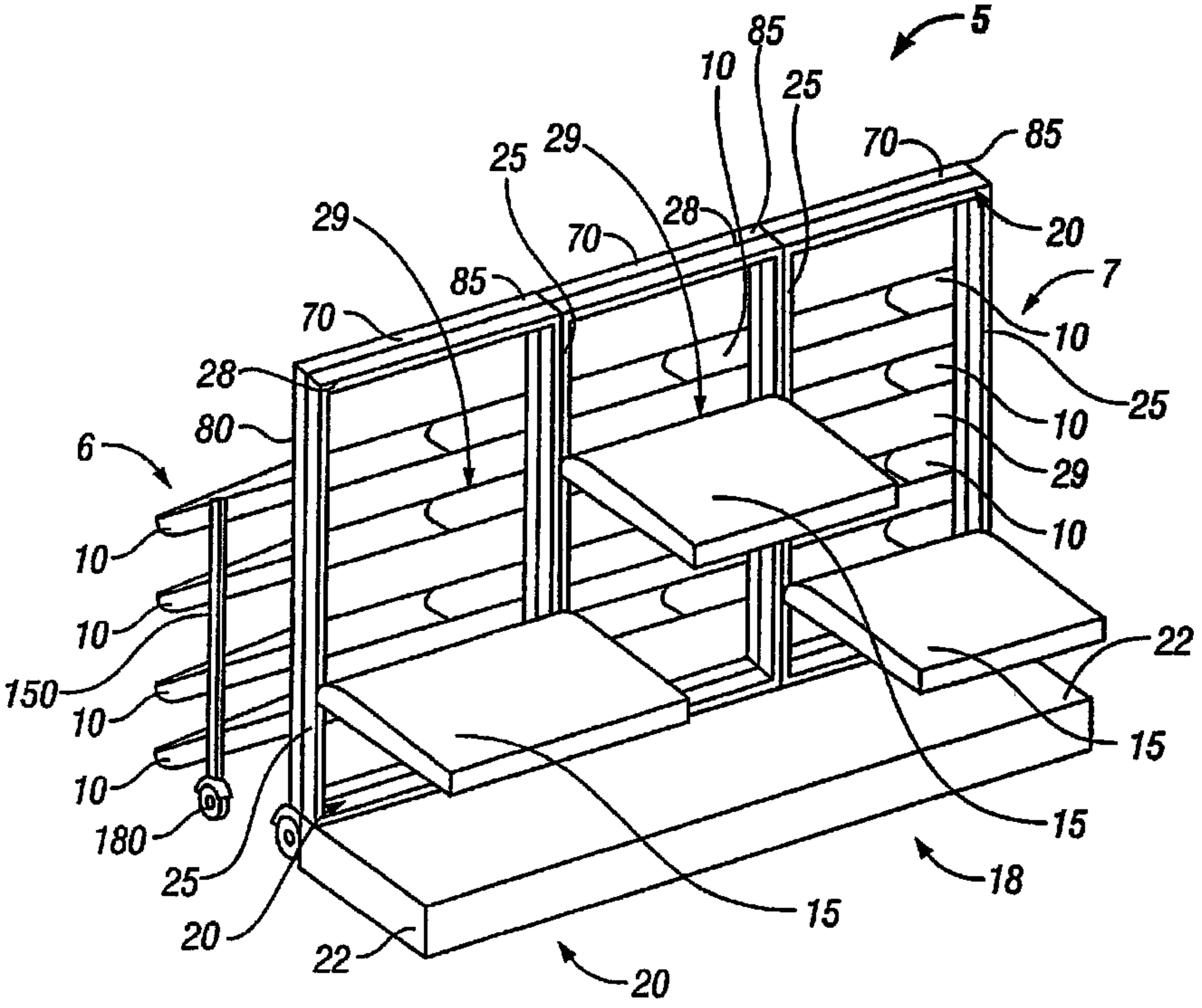

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FIG. 58


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