(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
03 January 2019 (03.01.2019)

WIPO | PCT

(10) International Publication Number
WO 2019/003201 A2

(51) International Patent Classification:
A01G 9/02 (2018.01)

(21) International Application Number:
PCT/IB2018/054857

(22) International Filing Date:
29 June 2018 (29.06.2018)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/527,374 30 June 2017 (30.06.2017) US

(71) Applicant: **PIPP MOBILE STORAGE SYSTEMS, INC.** [US/US]; 2966 Wilson Drive, N.W., Walker, MI 49544 (US).

(72) Inventors: **ROECKER, Zack**; 2280 S. Ogden St., Denver, CO 80210 (US). **FRENCH, Thomas A.**; 941 Waverly Ave., Grand Haven, MI 49417 (US).

(74) Agent: **MATTHEW D. KENDALL** et al.; Gardner, Linn, Burkhart & Ondersma LLP, 2851 Charlevoix Drive, SE, Suite 207, Grand Rapids, MI 49546 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

WO 2019/003201 A2

(54) Title: GROW RACK SYSTEM INCLUDING TRAYS WITH INTEGRATED DRAINAGE

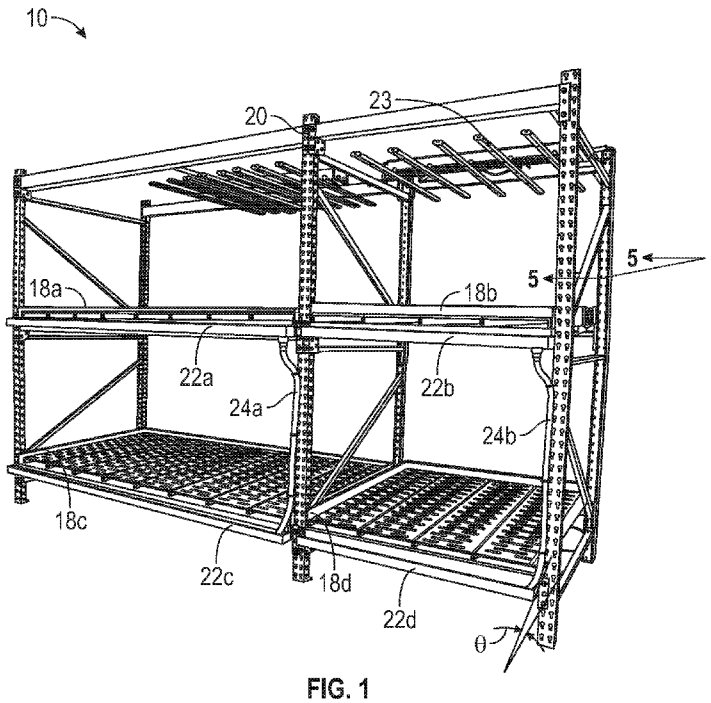

FIG. 1

(57) Abstract: A plant support tray includes a generally planar support surface, a pair of upright side walls and an upright rear wall for directing liquid along the support surface, and a drain trough unitarily formed along one side of the support surface. Optionally, a plant support tray kit includes a plurality of drain bases configured to be positioned side-by-side along the support surface, for supporting a plurality of potted plants at an elevated position above the support surface. A plurality of plant support trays may be supported in stacked arrangement on a framework, such as a movable framework having a plurality of wheels for rolling along a floor- mounted track system.

[Continued on next page]

EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

GROW RACK SYSTEM INCLUDING TRAYS WITH INTEGRATED DRAINAGE

CROSS REFERENCE TO RELATED APPLICATION

The present application claims the filing benefits of U.S. provisional application Ser. No. 62/527,374, filed Jun. 30, 2017, which is hereby incorporated by reference herein in its entirety.

FIELD OF INVENTION

The present invention relates to grow systems for plants, and particularly to scalable indoor grow systems with water drainage capability.

BACKGROUND OF THE INVENTION

Indoor grow space is expensive. Indoor grow facilities require climate control, power for lighting, adequate ventilation, and plumbing. When an indoor grow facility has reached its capacity, expansion requires much modification of the new location, or expanded facility. In an effort to limit costs associated with expansion, growers are turning to vertical grow systems, that improve the growing capacity for a given amount of floor space. This saves money in terms of lease expenses, climate control costs, and even lighting costs. One challenge to vertical grow systems is the handling of excess water that drains from plants situated above, and below, other plants. Another challenge is providing cultivators with space to access plants and growth media during the grow cycle, to inspect and maintain the plants.

SUMMARY OF THE INVENTION

The present invention is a system that provides improved indoor growing yields and canopy density, with efficient handling of excess water by assuring sufficient drainage for plants, especially in a vertical rack system. The system is readily serviced, such as for cleaning the system components or tending to potted plants supported on trays of the system.

According to one form of the present invention, a plant support tray includes a support surface with left and right side portions and front and rear end portions, with a pair of upwardly-extending side flanges at the respective side portions of the support surface, and an upwardly-extending rear flange at the rear end portion of the support surface. A drain trough formed at the front end portion of the support surface. The drain trough includes a runoff panel that extends downwardly from the support surface and is unitarily formed therewith, plus a bottom trough

panel positioned below the front end portion of the support surface and a pair of trough side panels and a front trough flange each extending upwardly from the bottom trough panel. The side flanges and the rear flange cooperate with the support surface to direct runoff water on the support surface to the drain trough.

In one aspect, the support surface, the side flanges, the rear flange, the runoff panel, the bottom trough panel, the trough side panels, and the front trough flange are all unitarily formed from a single metal sheet. Optionally, once the metal sheet has been bent or otherwise formed to the general desired shape, each of the side flanges is welded to a respective opposite end of the rear flange, and each of the trough side panels is welded to a respective opposite end of the runoff panel and a respective opposite end of the front trough flange.

In another aspect, the drain trough extends across a full width of the support surface, from the left side portion to the right side portion.

In yet another aspect, the bottom trough panel is sloped downwardly from one end of the bottom trough panel to an opposite end of the bottom trough panel. Optionally, a drain opening is formed at the opposite end of the bottom trough panel.

In still another aspect, there is at least one drain base positioned along the support surface and configured to support the plurality of potted plants at an elevated position that is spaced above the support surface. Optionally, the drain base has a planar upper surface and a pair of downwardly-extending legs that contact the support surface and are arranged parallel to the side flanges, wherein the planar upper surface defines a plurality of drainage openings. The downwardly-extending legs may be sized so as to position the planar upper surface at an elevation that is below respective top edges of the side flanges and the rear flange.

In a further aspect, the plant support tray includes a plurality of support rails in parallel arrangement, which extend downwardly from an underside of the support surface. The support rails are configured to engage respective elongate supports of a rack system. Optionally, the support rails have extension regions that extend below the bottom trough panel to support the drain trough.

In a still further aspect, the front trough flange extends upwardly to terminate at an elevation corresponding to the front end portion of the support surface. However, according to another aspect, the front trough flange may extend upwardly to terminate at substantially the same elevation as the top edges of the rear flange and side flanges.

According to another form of the present invention, a plant support tray kit includes a planar support surface, a pair of upright side walls and an upright rear wall cooperating to direct liquid along the planar support surface, a drain trough that extends forwardly of a front portion of the planar support surface, and a plurality of drain bases positioned in side-by-side arrangement along the support surface and configured to support the plurality of potted plants at an elevated position spaced above the support surface. Optionally, the drain trough is unitarily formed with the planar support surface, the upright side walls and the upright rear wall.

In one aspect, the planar support surface is devoid of recesses or channels.

In another aspect, a plurality of support rails are disposed along an underside of the planar support surface, in parallel arrangement, and are configured to engage respective elongate supports of a rack system. Optionally, the support rails have extension regions that extend below the bottom trough panel to support the drain trough.

In yet another aspect, the drain trough has a runoff panel extending downwardly from and unitarily formed with the planar support surface, a bottom trough panel positioned below the front portion of the support surface, a pair of trough side panels extending upwardly from opposite ends of the bottom trough panel, and a front trough wall extending upwardly from a forward edge of the bottom trough panel. Optionally, the planar support surface, the side walls, the rear wall, the runoff panel, the bottom trough panel, the trough side panels, and the front trough wall are all unitarily formed from a single metal sheet.

In a further aspect, the bottom trough panel is sloped downwardly from one end of the bottom trough panel to an opposite end of the bottom trough panel, and has a drain opening formed at the opposite end of the bottom trough panel.

Optionally, a movable framework is provided for supporting a plurality of the support surfaces and the drain bases. The movable framework may include a plurality of wheels configured for rolling along a floor-mounted track system, for example.

Thus, the support tray and tray kit of the present invention facilitate a space-efficient indoor growing system for potted plants, in which water drainage is readily accommodated and the system may be partially disassembled for cleaning or other maintenance tasks, and reassembled.

These and other objects, advantages, purposes and features of the present invention will become apparent upon review of the following specification in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a rack system including trays with removable slotted drain bases in accordance with the present invention;

FIG. 2 is a perspective view of a tray with an integrated drain and slotted bases;

FIG. 3 is a perspective view of a tray with an integrated drain;

FIG. 4 is a perspective view of a removable drain base;

FIG. 5 is an end view of the rack of FIG. 1 as seen along the line 5-5;

FIG. 6 is a perspective view of a multiple-rack system mounted with wheels on tracks;

FIG. 7 is an upper perspective view of another tray with integrated drain in accordance with the present invention;

FIG. 8 is a bottom perspective view of the tray of FIG. 7;

FIG. 9 is a front elevation of the tray of FIG. 7;

FIG. 10 is a left side elevation of the tray of FIG. 7;

FIG. 11 is a top plan view of a sheet metal flat pattern with bending guidelines, corresponding to the tray of FIG. 7;

FIG. 12 is an upper perspective view of another tray with integrated drain in accordance with the present invention;

FIG. 13 is a bottom perspective view of the tray of FIG. 12, viewed from front-left;

FIG. 14 is another bottom perspective view of the tray of FIG. 12, viewed from back-right;

FIG. 15 is a front elevation of the tray of FIG. 12; and

FIG. 16 is a left side elevation of the tray of FIG. 12.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and the illustrative embodiments depicted therein, a rack system 10 is configured for supporting multiple trays 18a-d in vertically stacked arrangement (FIG. 1), which provides for efficient space utilization and effective drainage for potted plants (not shown) that can be placed along each tray. The rack system 10 includes rigid posts and cross-bars that cooperate to form a rectangular framework 20, which may be manufactured from structural steel or other sturdy material. Although the framework 20 is shown as being a typical commercially-available frame, such as from Pipp Mobile Storage Systems, Inc. of Walker, Mich., it will be appreciated that there can be numerous frame designs and materials used to

increase the stacking capability or enhance other capabilities of the present invention. It is important that the framework 20 is designed to handle the weight of plants using "solid-state growth media" such as soils, rock wool, coconut husks, and other potted growth media. It will be appreciated that the term "solid state growth media," as used herein, does not include aqueous growth media as would be used in a hydroponic or aquaponics grow system.

Rack system 10 is a vertical system that enables more than one plant to grow directly above another within the same floor space or "footprint". In the illustrated embodiment, rack system 10 provides two parallel planes upon which trays 18a-d are situated to enable plants to grow at two different vertically-spaced heights. The parallel planes are defined by the trays 18a-d, and these parallel planes are at a slight oblique angle Θ with respect to a horizontal plane or floor surface. Lighting 23 is attached to the rack system framework 20, to individually illuminate each level of trays 18a-d. It will be appreciated that, in alternate embodiments, the rack system may include more than two parallel planes, upon which trays are situated and lighting is directed.

The rack system 10 is fitted with a plurality of tray kits, each tray kit including one of the aforementioned trays 18a-d and at least one of the _____. The trays 18a-d are configured to mount on the rack framework 20 and are held in place by gravity, and optionally in a press-fit arrangement and/or being fastened to the rack framework 20 with fasteners such as bolts or welded-type connectors. As shown in FIG. 1, the upper trays 18a-b lie on a common upper plane that is slightly angled with respect to the floor 12 at an angle Θ to enable water on each upper tray 18a-b to flow into respective drain troughs 22a and 22b. Likewise, the lower trays 18c-d lie on a common lower plane that is also slightly angled with respect to the floor 12 at the angle Θ to enable water on each upper tray 18c-d to flow into respective drain troughs 22c and 22d. Preferably, the angle Θ is an acute angle of between 1°-10°, relative to horizontal, which ensures that the trays 18a-d drain towards a front side of the rack system 10. Although the angle Θ of each plane may be substantially identical, it will be appreciated that each plane may be set at a different angle if desired, without departing from the spirit and scope of the present invention. For example, it may be advantageous to increase the rate at which the trays on a first level drain, as compared to the drainage rate of the trays on a different second level, in which case the plane of the first level may be set at a greater angle than the plane of the second level.

As noted above, each tray 18a-d includes a respective integrated drain trough 22a-d, which may be formed with the tray as a single molded unitary structure, or in a flat pattern sheet metal blank that is later formed to the final shape, as will be described below. A unitary molded structure has the advantage of eliminating seams that could leak. Optionally, a bottom portion of each upper level tray 18a-b includes an integral molded female threaded extension to facilitate the attachment of lighting directly to the bottom portion of each upper level tray. This direct attachment of lighting with a threaded engagement eases assembly, maintenance and cleaning of the system 10. It also facilitates use of the system 10 on numerous types of structures, and enables systems having numerous trays stacked vertically to utilize more volume of a given indoor grow space. The ability to stack more than two tray levels, and providing the framework 20 with suitable structural integrity, allows the system 10 to efficiently use the vertical space in an indoor growing environment. For example, systems 10 may be adapted for indoor growing spaces having more than twenty feet of vertical space above a floor or ground surface, thus increasing the productivity and financial return on investment for a given amount of horizontal area.

In the embodiment of FIGS. 1-3, each tray 18a-d is manufactured from powder-coated aluminum alloy to maximize strength, while having a weight that is easily lifted by a single operator. Trays made of powder-coated aluminum have been found to be sufficiently durable, strong and resistant to excessive flexing when supporting plants grown in solid-state growth media, light in weight, corrosion-resistant in wet environments including non-neutral pH environments, and relatively non-porous to facilitate thorough cleaning and to inhibit microbiological growth. Trays 18a-d may be molded of aluminum, stamped from sheet aluminum, or bent and welded into final shape from a flat pattern sheet aluminum.

The structural construction of the trays 18a-d using aluminum alloy may be sufficient to obviate the need for support racks that are often used to support commercially available storage shelving that is commonly sold with rack frames 20. Accordingly, a steel welded wire shelving or other shelving supports are not necessarily required, provided that the aluminum tray design is configured having a geometry and material thickness that sufficiently resists flexion under typical loads of potted plants. Although aluminum alloy is generally considered a preferred material, it will be appreciated that other materials may also be suitable for trays 18a-d, such as stainless steel and resinous plastics, including fiber-reinforced resinous plastics.

The unitary structure of the trays and associated drain troughs enables the drain structure to overhang a cross-bar of the rack system 10, which helps to hold the trays 18a-d in place and prevent undesired sliding in at least a rearward direction. The drain troughs 22a-d also collect liquid such as water from the respective trays 18a-d. This cooperation of structure enables rapid assembly and disassembly of the rack system 10 to facilitate cleaning and sterilization of the trays 18a-d, which may be required to minimize microbiological contamination of the system 10. Minimizing microbiological contamination is especially common in indoor growing environments because potted plants are especially susceptible to pathogenic pests including powdery mildew and various other molds, bacteria, and yeasts when in a humid indoor environment. The integration of the drains with the frames in a molded fashion reduces or eliminates cracks and crevices that can increase the likelihood of microbial contamination.

In the illustrated embodiment of FIG. 1, each tray's integrated drain trough 22a-d is positioned on a front side of the rack system 10. Upper trays 18a and 18b are positioned above lower trays 18c and 18d, respectively, such that a first drain hose 24a can extend downward from a first upper drain trough 22a to a first lower drain trough 22c, while a second drain hose 24b extends downward from a second upper drain trough 22b to a second lower drain trough 22d. Respective drain fittings (not shown in FIGS. 1-3) are positioned at a lower end of each drain trough 22a-d to facilitate a watertight connection for each drain hose 24a, 24b.

As shown in FIG. 2, the first upper tray 18a is fitted with eight drain bases 26a-h positioned upon the top portion of the tray 18a in side-by-side arrangement. The drain bases 26a-h may be held in place loosely by gravity as shown, although with sufficiently tight spacing the drain bases 26a-h may be press-fit into the tray 18a. The tray 18a includes three sides with respective edge flanges 28a-28c extending upwardly from a top surface 30. The right edge flange 28a and left edge flange 28c define respective sides of the tray 18a, and the rear edge flange 28b defines a rear of the tray 18a. The use of flanges 28a-c eases cleaning of the tray 18a by eliminating cracks and crevices that may encourage microbial contamination. The drain trough 22a, positioned at a front of the tray 18a, is opposite the rear flange 28b and receives water draining off of the tray top surface 30. The drain trough 22a includes a rear wall portion that is unitarily formed with the tray top surface 30 and extends downwardly therefrom. In addition, drain trough 22a includes a first end 34 with a depth designated by the dimension d_1 and a second end 36 with a depth designated by the dimension d_2, as shown in FIG. 2. Depth d_1

is less than depth d_2, which causes liquid in the drain trough 22a to flow towards the second end 36 where a drain fitting is typically located.

By integrating the drain troughs 22a-d with the respective trays 18a-d, the drain troughs 22a-d function as structural members and, along with each tray's rear edge flange 28b, provide stiffness against flexion in which the tray's top surface 30 would bend around an axis that is parallel to the side edge flanges 28a, 28c. Optionally, the integrated drain troughs include or define flanges in a cross-hatched pattern to provide additional strength and stiffness. This arrangement enables the system 10 to hold potted plants with a solid-state growth substrate, with little bending or flexion of the system's components, particularly the trays' top surfaces 30 and the drain bases 26a-h supported by each tray top surface 30. It will be appreciated that excessive flexion, over time, could increase the risk of fatigue failure in the system 10, and should therefore be avoided. Accordingly, it is desirable for the trays 18a-d to be light and stiff, which reduces fatigue loads on the rack framework 20 and which may also reduce or minimize the need for extensive shelf supports under each tray 18a-d.

It will be appreciated that although eight drain bases 26a-h are shown in FIG. 2, the trays can support any number of drain bases, depending on the tray dimensions and the drain base dimensions, and whether the entire tray defined between the edge flanges 28a-c is to be covered with one or more drain bases. An advantage of using multiple drain bases is that a subset of drain bases may be removed from a given tray for cleaning, while potted plants are left in place atop the drain bases that are left behind in the tray, and then the cleaned drain bases can be reinstalled and the remaining drain bases removed for their cleaning. The use of multiple drain bases would also permit the removal of just a subset of plants and drain bases at a time, for cleaning or other maintenance tasks. In this way, walkways and other spaces are not entirely obstructed during maintenance and cleaning of the system. Further, the use of numerous drain bases in a single tray eases assembly and disassembly of the system 10, even in tight places.

Each drain base 26a-h includes a flat upper surface 40 and a pair of downwardly-extending parallel leg flanges 42a, 42b at each side of its upper surface 40 (FIG. 4), with the leg flanges 42a, 42b arranged perpendicular to the drain trough 22a as shown in FIG. 2, which is generally in the direction of water flow along the tray top surface 30. The leg flanges 42a, 42b separate the upper surfaces 40 of the drain bases 26a-h from the top surface 30 of the tray 18a (FIG. 3) to enable liquid to freely flow along the top surface 30 and under the drain bases 26a-h

to the drain trough 22a. The leg flanges cooperate with the upper surface 40 and provide the drain bases 26a-h with sufficient structural integrity to support one or more plant pots. The leg flanges 42a, 42b inhibit flexion of the drain bases 26a-h under load from the weight of potted plants. Thus, the drain bases' leg flanges 42a, 42b cooperate with the upper surfaces 40 and the trays' edge flanges 28a-c cooperate with the top surface 30 to enhance the structural integrity of the system 10. The drain bases 26a-h may be made of a durable resinous plastic (polymer) material to resist microbial contamination and to facilitate cleaning.

The drain base's upper surface 40 defines a plurality of elongated drain slots 44a, 44b with rounded ends to enable drainage through the surface 40. In the illustrated embodiment, and as best shown in FIG. 4, the elongated drain slots may have varying lengths, with two shorter slots 44a aligned next to a single longer slot 44b, followed by two more shorter slots 44a on the opposite side of the longer slot 44b, in an alternating fashion along the length of each upper surface 40. This arrangement of slots serves to maintain the structural integrity of each drain base 26a-h while providing good drainage flow-through and ease of manufacture. The rounded ends of each slot present smooth non-pinching edges to facilitate safe and convenient manual handling while reducing the risk of injury or discomfort to operators manually handling or cleaning the drain base 26.

Referring now to FIGS. 1 and 5, the rack framework 20 is provided with lighting 23 spaced above the drain bases' 26 upper surfaces 40. The lighting 23 may be LED full spectrum plant lighting having an adjustable wavelength and spectrum, although substantially any electrical lighting suitable for indoor plant growth may be installed. In the illustrated embodiment, the LED lighting arranged in strips that are positioned substantially parallel to the upper surfaces 40 for even light distribution to the plant canopy.

Optionally, an array of rack systems 10 may be mounted on wheels 50, such as shown in FIG. 6. The floor of a room enclosing the rack system 10 is equipped with tracks 52 that support and guide the wheels 50. Optionally, the tracks are recessed into the floor, although the tracks may also be in the form of rails extending upwardly from the floor to support the wheels 50. By equipping rack systems 10 with wheels 50, the racks can be positioned in close side-by-side proximity to each other, or even in adjacent contact, to increase plant production yields for a given amount of floor area in an indoor growing area. The rack systems 10 can be moved to

create spaces between adjacent rack systems that accommodate operators, and then moved again as the operators are needed to service another rack system 10 or the plants supported thereon.

In addition to the three-sided trays 18a-d described above with reference to FIGS. 1-3, other tray configurations are also contemplated, such as the four-sided tray 100 of FIGS. 7-10 and the similar four-sided tray 200 of FIGS. 12-16, both of which are similar in configuration to the three-sided trays 18a-d described above. Four-sided tray 100 includes a generally planar support panel 102 with right and left edge flanges 104a, 104b extending upwardly from respective right and left side regions 102a, 102b of the support panel 102, and with a rear edge flange 104c extending upwardly from a rear end region 102c of the support panel 102. A drainage trough 106 is formed at a forward end 102d of the support panel 102 and includes a forward flange 104d extending upwardly from a sloped bottom surface 108 (FIGS. 8-11), which is positioned between the forward flange 104d and a runoff panel 110 (FIGS. 10 and 11) that extends downwardly from the forward end 102d of the support panel 102. The left and right sides of trough 106 are closed by respective right and left trough side panels 112a, 112b, which are substantially aligned with the respective right and left edge flanges 104a, 104b. The trough's sloped bottom surface 108 is angled slightly downwardly from left to right as shown in FIG. 9 (according to the width dimension of runoff panel 110 shown in FIG. 11), where the up-slope trough height d_1 is seen to be less than the down-slope trough height d_2. As best shown in FIG. 11, the runoff panel 110 is in the shape of a long trapezoid that establishes the slope angle of the sloped bottom surface. A drain fitting or opening 114 is formed or established or coupled to the trough 106 at the down-slope end of bottom surface 108, to which a drain hose (similar to the drain hoses 24a, 24b of FIG. 1) may be connected.

The various panels and regions of the four-sided tray 100 with integral trough 106 may be cut from a flat pattern metal sheet as shown in FIG. 11, in which broken lines indicate fold or bend regions between adjacent panel sections. The four-sided tray 100 with integral trough 106 can thus be substantially formed by a flat pattern metal sheet that is bent to the finished shape as shown in FIGS. 7 and 8, and welded at all seams to create the finished watertight tray with trough.

Along the bottom of the four-sided tray 100 is a plurality of parallel rails 116a-d that extend from front-to-rear, from the bottom of the trough 106 to the rear end portion 102c of the support panel 102. Rails 116a-d provide additional rigidity to resist flexion of the support panel

along an axis that is parallel to the rear edge flange 104c and the forward flange 104d. In addition, rails 116a-d may be used to facilitate alignment and support of the tray 100 by engaging corresponding rails or channels or other elongate supports (not shown) associated with the rack framework 20. In the illustrated embodiment, the rails 116a-d each have substantially the same height along most of their length, but with the first rail 116a, second rail 116b, and third rail 116c each having a respective forward tongue or extension region 118a-c of varying heights and extending beneath the bottom surface 108 of the trough 106 (FIG. 8). The heights of the extension regions 118a-c decrease from left to right when viewed from the front/trough side as in FIG. 9. The first rail 116a, nearest to the right edge flange 104a, has the greatest height of extension region 118a to support the corresponding (up-slope) end of the trough's bottom surface 108 at a higher elevation than the down-slope end of the trough's bottom surface 108 where the drain fitting 114 is located. The heights of the respective extension regions 118b, 118c of the second rail 116b and the third rail 116c are progressively less than the height of the first rail's extension region 118a, so that the tray support panel 102 and trough 106 are supported substantially front-to-back by the first through third rails 116a-c, and the tray support panel 102 is further supported by the fourth rail 116d. In the illustrated embodiment, the last or fourth rail 116d has no extension region beneath the trough 106, although one could be provided if desired, such as for enhanced support of the down-slope end of the trough 106. The rails 116a-d may be welded to the underside of the tray and trough, or attached with mechanical fasteners or any other suitable means.

The four-sided tray 200 of FIGS. 12-16 is substantially identical to the four-sided tray 100 described above, with the exception of a reduced-height forward flange 204d extending upwardly from a sloped bottom surface 208 of a trough portion 206, which forward flange 204d does not rise to the height of the other upright flanges 204a-c surrounding the support panel 202, such as shown in FIGS. 12, 13, and 15. In all other respects the tray 200 is substantially the same or identical to the tray 100, with corresponding components and regions or portion given like numerals with the addition of 100, such that the features of tray 200 may be understood with reference to the above descriptions. The reduced-height forward flange 204d has a top edge at substantially the same elevation as the support panel 202, as shown in FIG. 15, which provides operators with a better view of the plant pot bases, the drain bases, and any liquid runoff from the

support panel 202, particularly if the tray 200 is at an elevated location, such as at approximately eye-height for an average operator.

Therefore, the rack system with trays provides a space-efficient and readily maintainable system for supporting potted plants in an indoor growing environment, and for collecting runoff water from the plants to reuse. In particular, the trays of the present invention are intended for use with potted plants in which the pots have drain holes for draining excess water from the bottoms thereof. The trays are mounted at an angle to guide water into their respective drain troughs that are integral with the trays. The drain troughs may flow into hoses that deliver the water to a drain trough below, or to another water collection point where the runoff water may be filtered and re-used. The trays with integral drain troughs and removable drain bases to facilitate disassembly, cleaning, and reassembly.

Changes and modifications in the specifically-described embodiments may be carried out without departing from the principles of the present invention, which is intended to be limited only by the scope of the appended claims as interpreted according to the principles of patent law including the doctrine of equivalents.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A plant support tray comprising:

a support surface having left and right side portions and front and rear end portions, said support surface configured to support a plurality of potted plants;

a pair of upwardly-extending side flanges at respective ones of said left and right side portions of said support surface, and an upwardly-extending rear flange at said rear end portion of said support surface; and

a drain trough formed at said front end portion of said support surface, said drain trough comprising a runoff panel extending downwardly from and unitarily formed with said support surface, a bottom trough panel positioned below said front end portion of said support surface, and a pair of trough side panels and a front trough flange each extending upwardly from said bottom trough panel;

wherein said side flanges and said rear flange cooperate with said support surface to direct runoff water on said support surface to said drain trough.

2. The plant support tray of claim 1, wherein said support surface, said side flanges, said rear flange, said runoff panel, said bottom trough panel, said trough side panels, and said front trough flange are all unitarily formed from a single metal sheet.

3. The plant support tray of claim 2, wherein each of said side flanges is welded to a respective opposite end of said rear flange, and each of said trough side panels is welded to a respective opposite end of said runoff panel and a respective opposite end of said front trough flange.

4. The plant support tray of claim 1, wherein said drain trough extends across a full width of said support surface from said left side portion to said right side portion.

5. The plant support tray of claim 4, wherein said bottom trough panel is sloped downwardly from one end of said bottom trough panel to an opposite end of said bottom trough panel.

6. The plant support tray of claim 5, further comprising a drain opening formed at said opposite end of said bottom trough panel.

7. The plant support tray of claim 1, further comprising at least one drain base positioned at said support surface and configured to support the plurality of potted plants at an elevated position spaced above said support surface.

8. The plant support tray of claim 7, wherein said drain base comprises a planar upper surface and a pair of downwardly-extending legs that contact said support surface and are arranged parallel to said side flanges, wherein said planar upper surface defines a plurality of drainage openings.

9. The plant support tray of claim 8, wherein said downwardly-extending legs are sized to position said planar upper surface at an elevation that is below respective top edges of said side flanges and said rear flange.

10. The plant support tray of claim 1, further comprising a plurality of support rails in parallel arrangement and extending downwardly from a downwardly-facing surface of said support surface, wherein said support rails are configured to engage respective elongate supports of a rack system.

11. The plant support tray of claim 10, wherein said support rails comprise extension regions that extend below said bottom trough panel to support said drain trough.

12. The plant support tray of claim 1, wherein said front trough flange extends upwardly to terminate at an elevation corresponding to said front end portion of said support surface.

13. A plant support tray kit comprising:

a planar support surface;

a pair of upright side walls at opposite sides of said planar support surface, and an upright rear wall at a rear portion of said planar support surface, wherein said upright side walls and said upright rear wall cooperate to direct liquid along said planar support surface;

a drain trough unitarily formed with said planar support surface, said upright side walls and said upright rear wall, said drain trough extending forwardly of a front portion of said planar support surface; and

a plurality of drain bases positioned in side-by-side arrangement along said support surface and configured to support the plurality of potted plants at an elevated position spaced above said support surface.

14. The plant support tray kit of claim 13, wherein each of said drain bases comprises a planar upper surface and a pair of downwardly-extending legs that contact said support surface and are arranged parallel to said side walls, wherein said planar upper surface defines a plurality of drainage openings.

15. The plant support tray kit of claim 13, wherein said planar support surface is devoid of recesses or channels.

16. The plant support tray of claim 13, further comprising a plurality of support rails in parallel arrangement and extending downwardly from a downwardly-facing surface of said planar support surface, wherein said support rails are configured to engage respective elongate supports of a rack system, and wherein said support rails comprise extension regions that extend below said bottom trough panel to support said drain trough.

17. The plant support tray kit of claim 13, wherein said drain trough comprises:

a runoff panel extending downwardly from and unitarily formed with said planar support surface;

a bottom trough panel positioned below said front portion of said support surface;

a pair of trough side panels extending upwardly from opposite ends of said bottom trough panel; and

a front trough wall extending upwardly from a forward edge of said bottom trough panel.

18. The plant support tray kit of claim 17, wherein said planar support surface, said side walls, said rear wall, said runoff panel, said bottom trough panel, said trough side panels, and said front trough wall are all unitarily formed from a single metal sheet.

19. The plant support tray kit of claim 17, wherein said bottom trough panel is sloped downwardly from one end of said bottom trough panel to an opposite end of said bottom trough panel, and said bottom trough panel comprises a drain opening formed at said opposite end of said bottom trough panel.

20. The plant support tray kit of claim 17, further comprising a movable framework configured to support a plurality of said support surfaces and said drain bases, wherein said movable framework comprises a plurality of wheels configured for rolling along a floor-mounted track system.

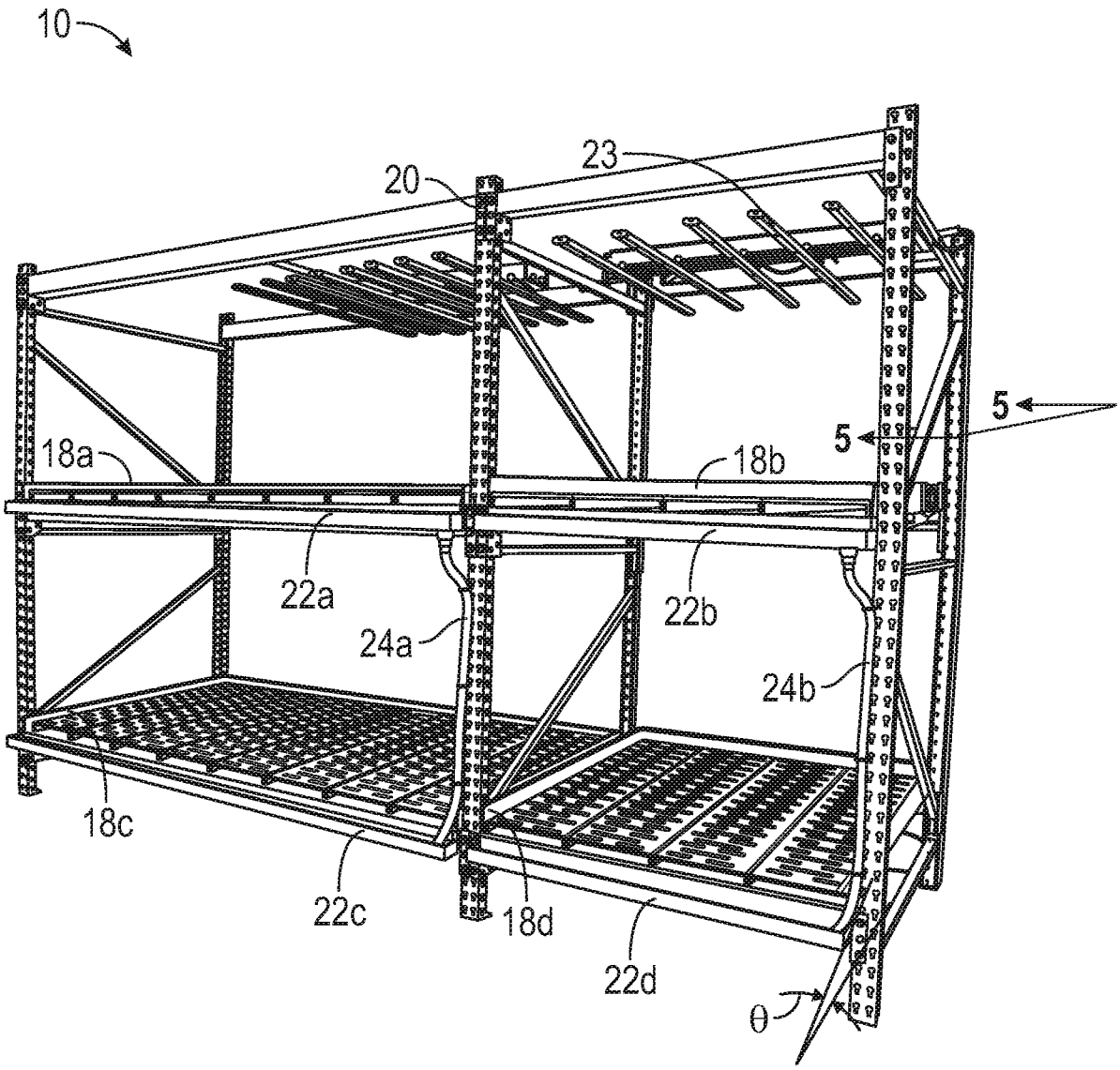

FIG. 1

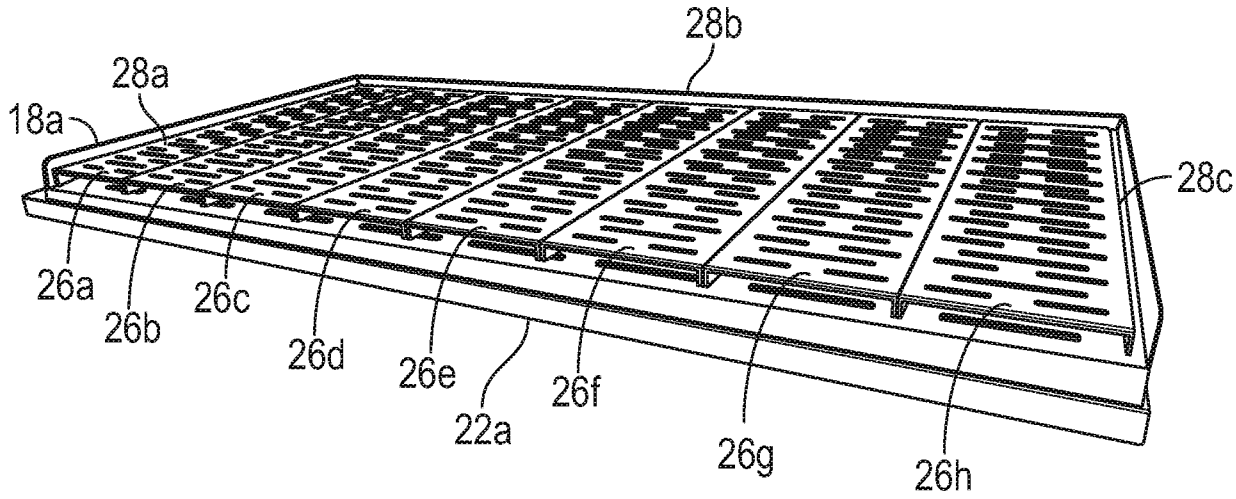
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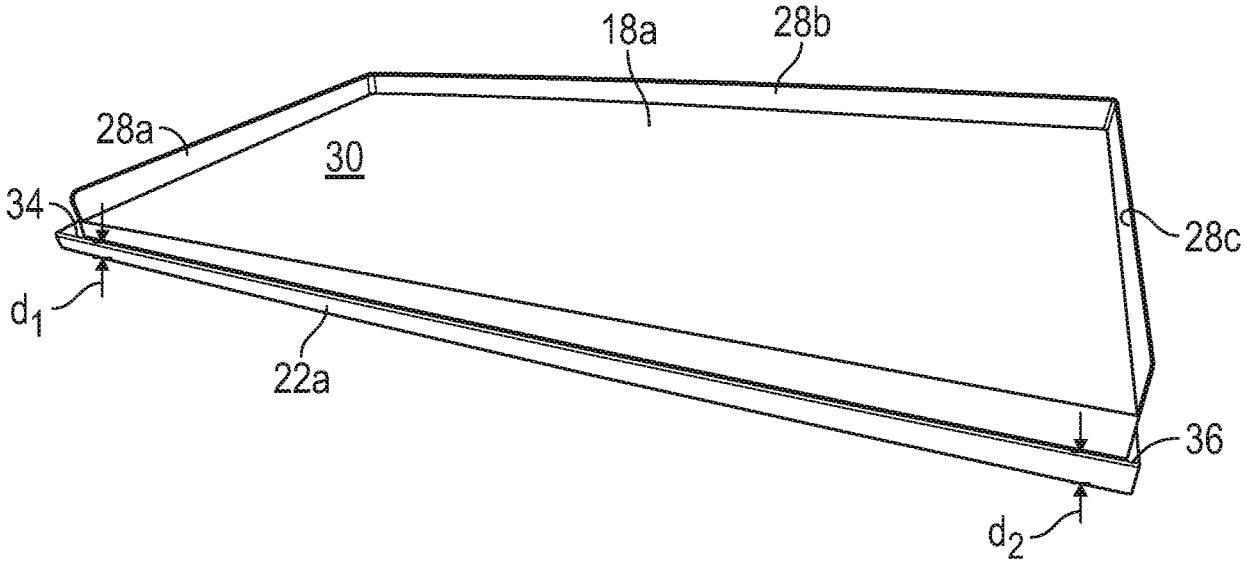
FIG. 2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d_2

FIG. 3

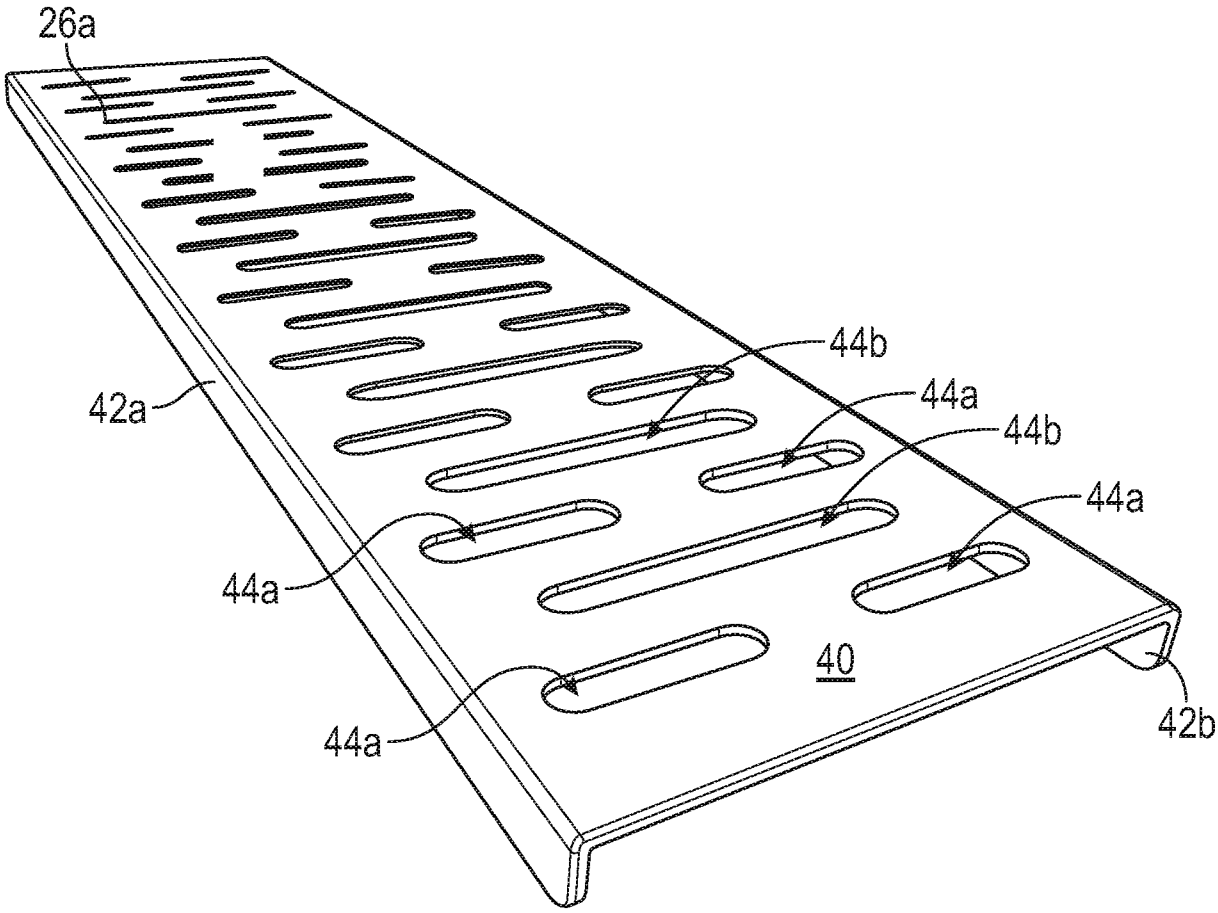

FIG. 4

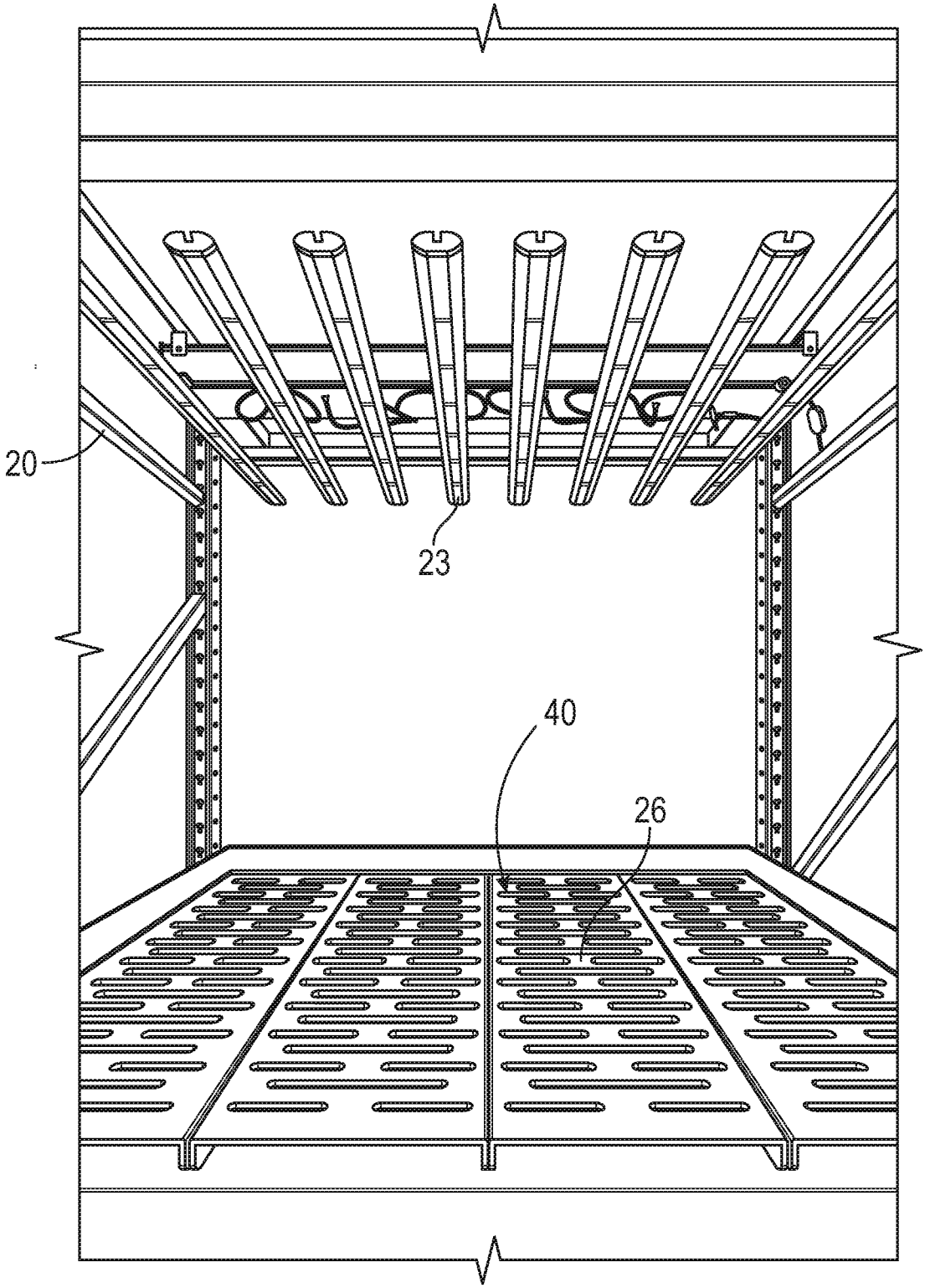

FIG. 5

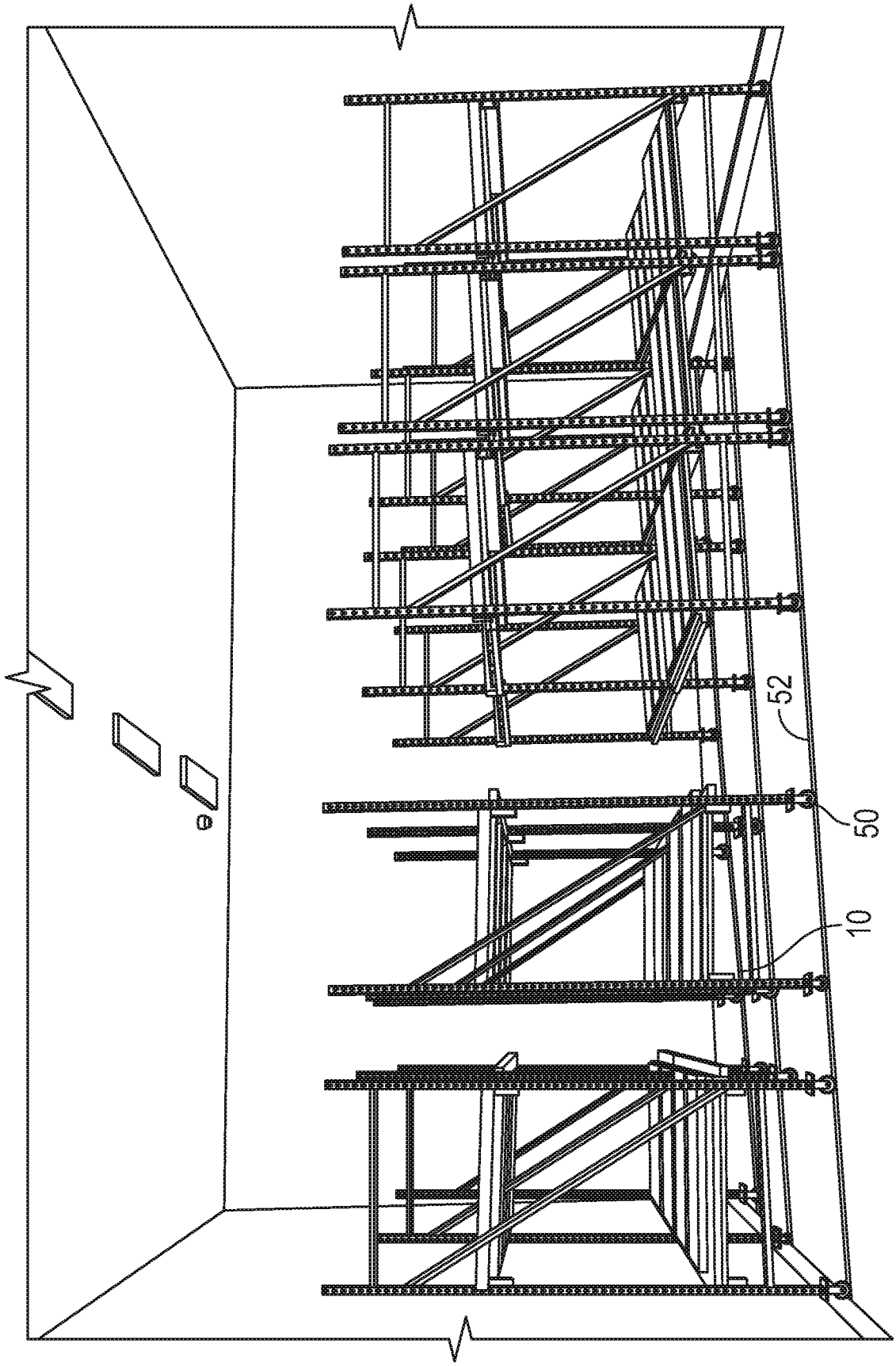

FIG. 6

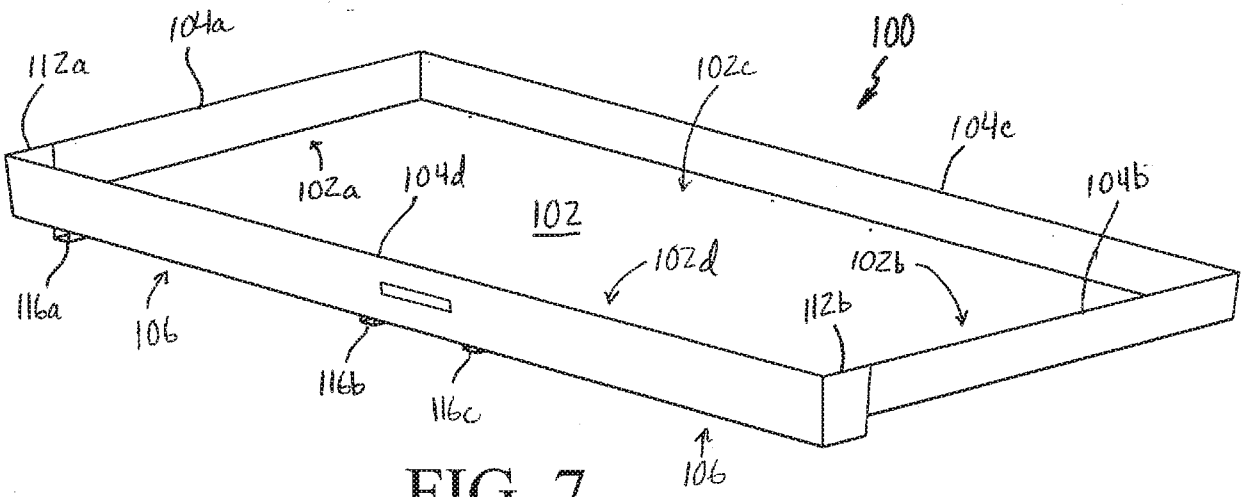
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FIG. 7

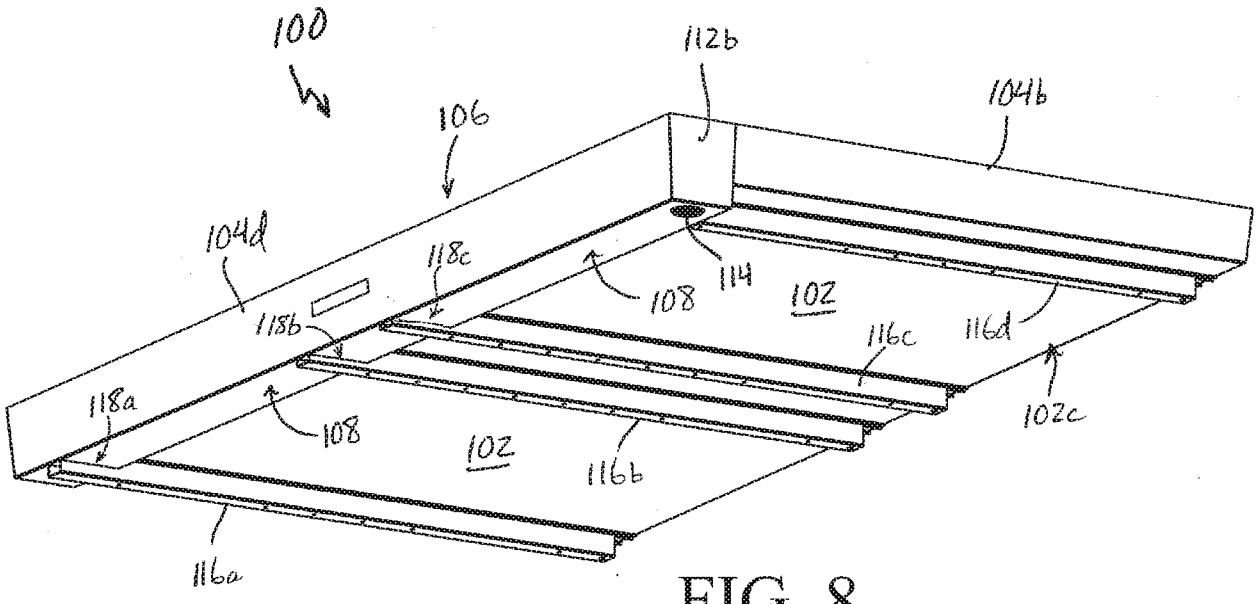
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FIG. 8

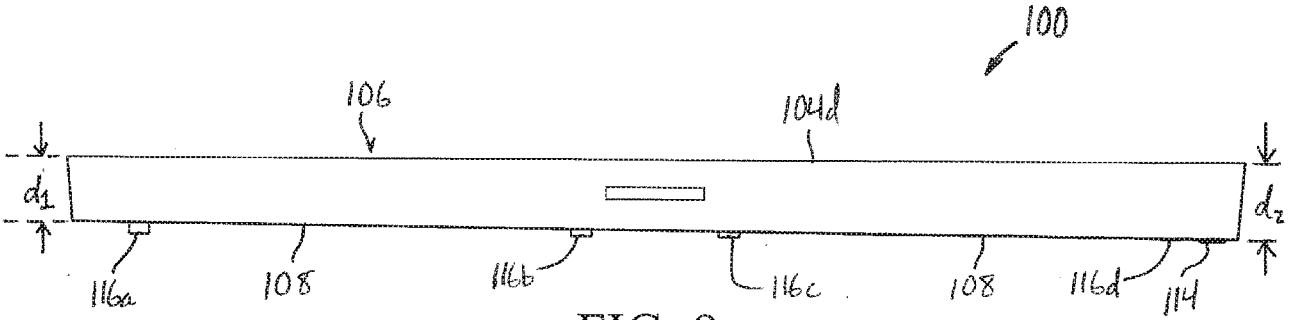

FIG. 9

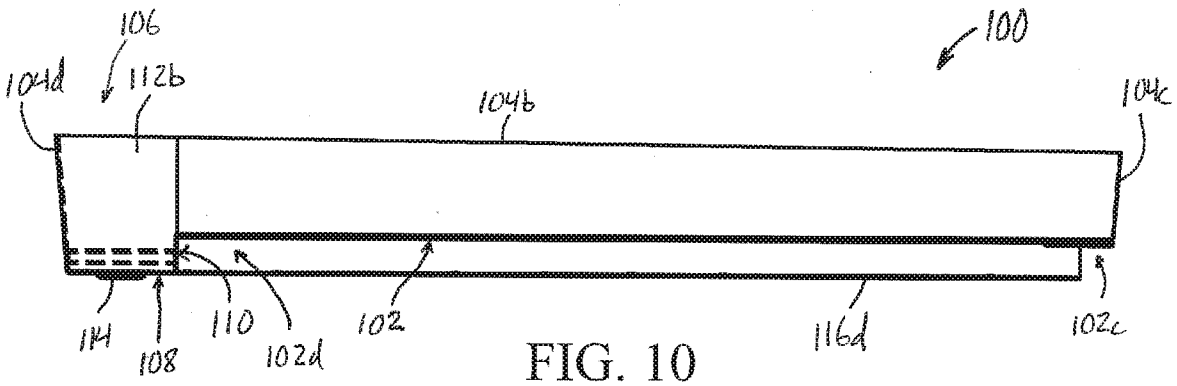

FIG. 10

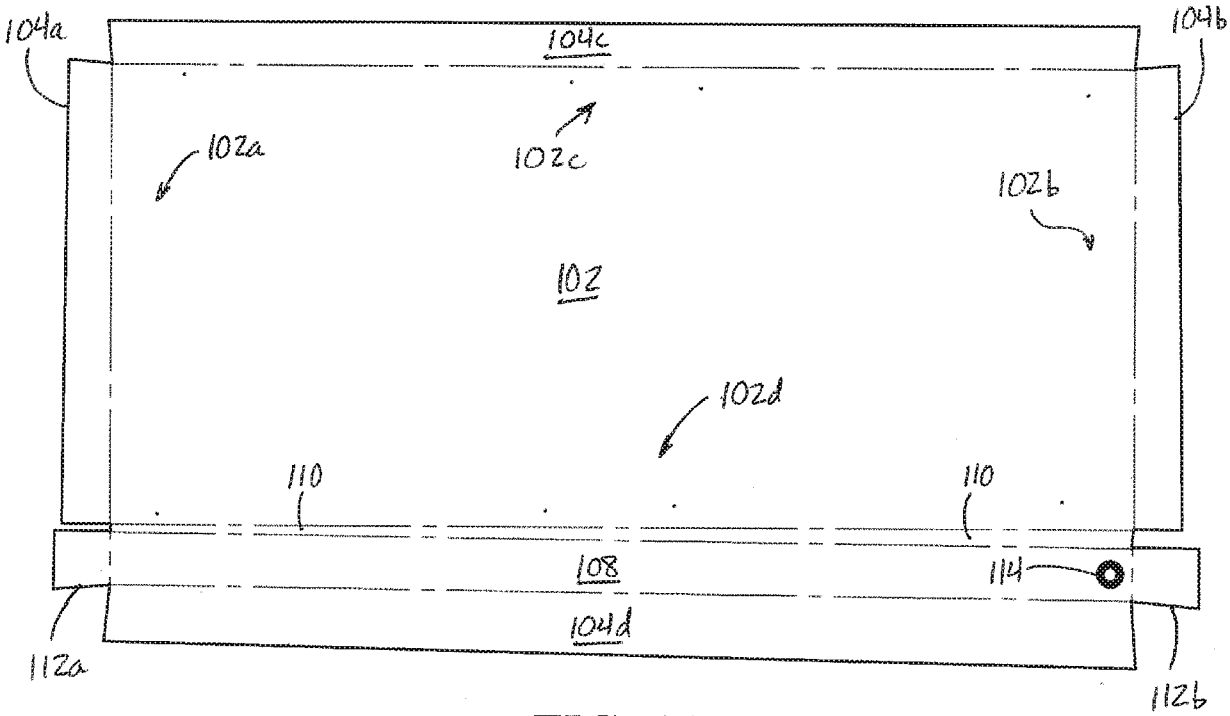

FIG. 11

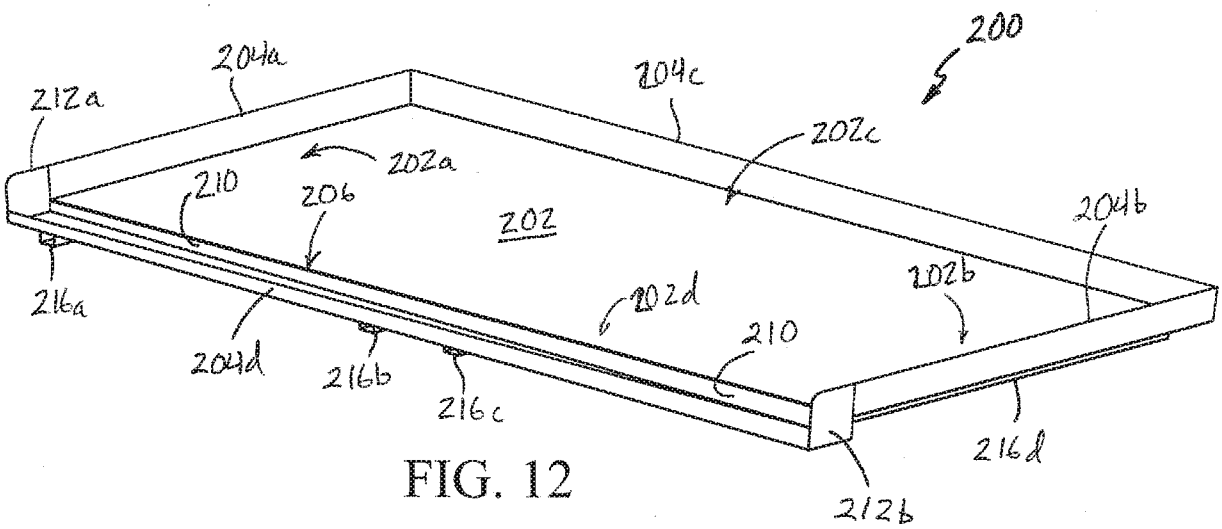
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FIG. 12

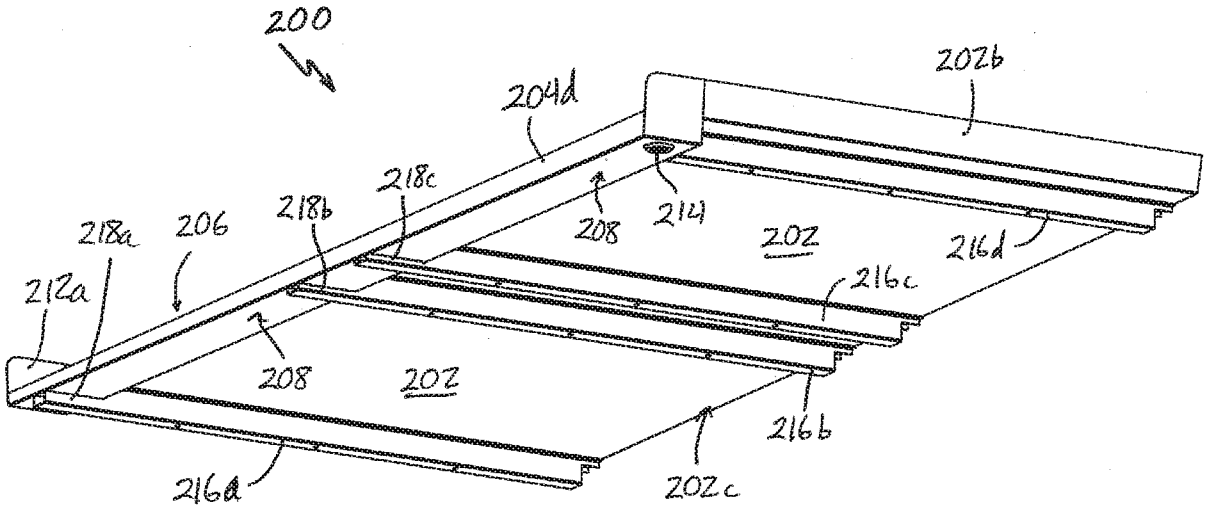
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FIG. 13

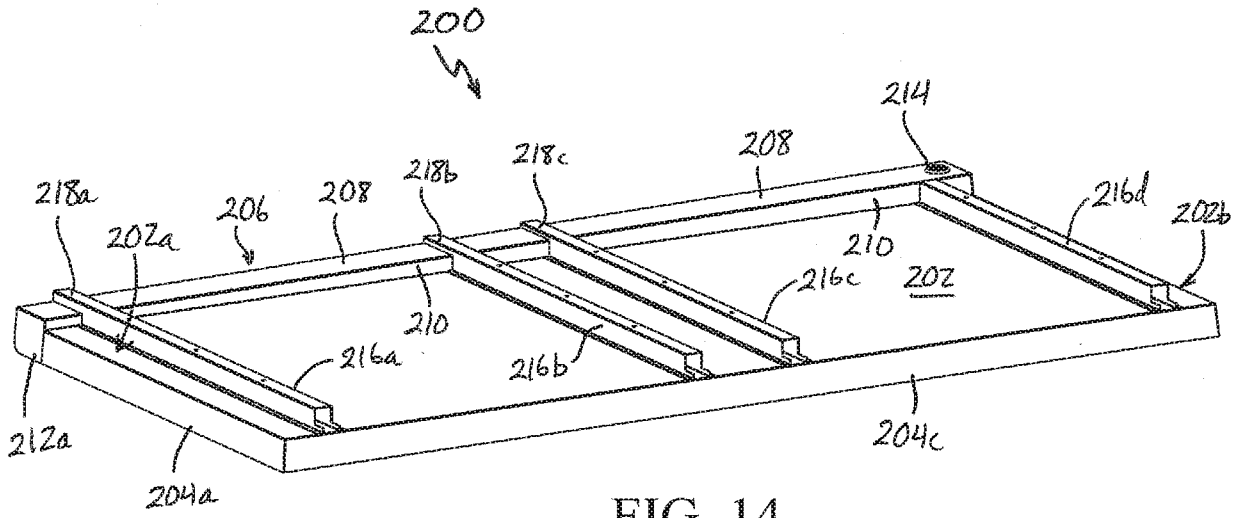

FIG. 14

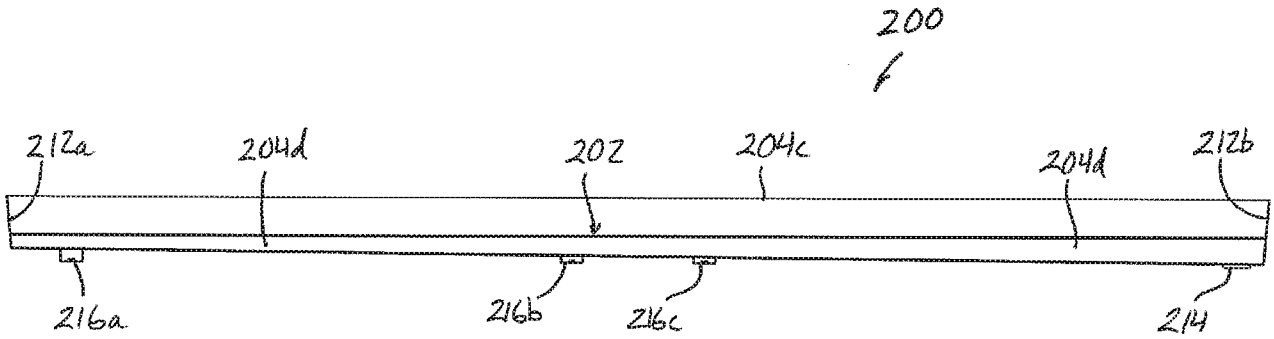

FIG. 15

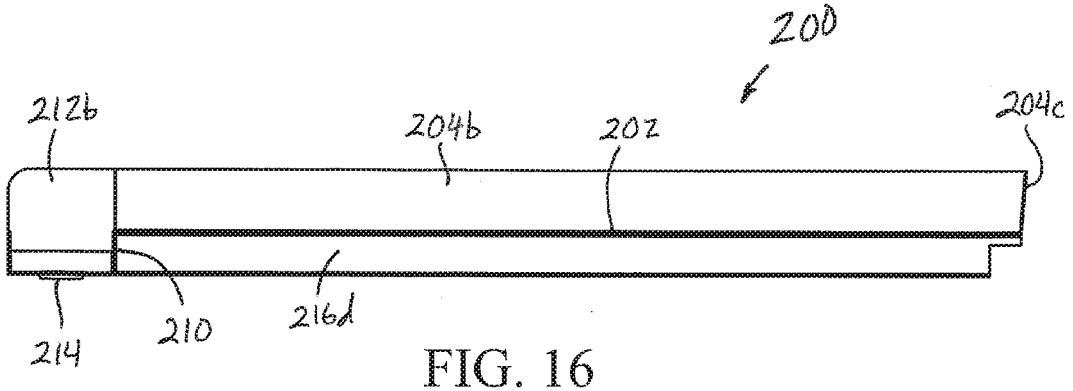

FIG. 16