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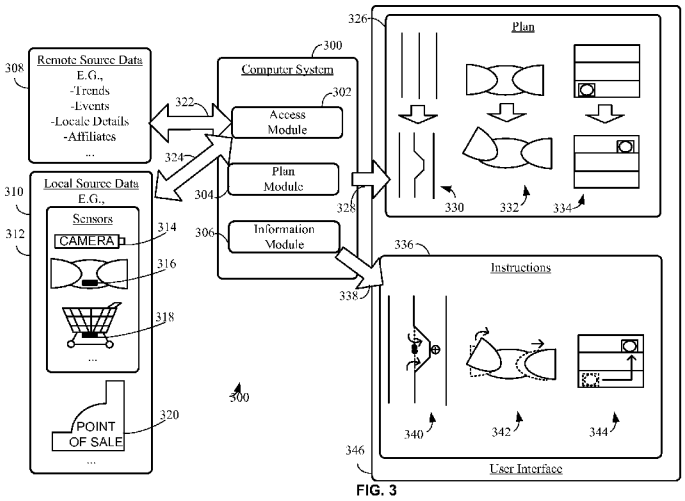


FIG. 3

(57) **Abstract**: A system can access data about items for a store and generate a plan for configuring the store based on the accessed data. The system can further provide, for example, information for configuring reconfigurable shelving units so as to produce the layout of the store according to the plan.

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# ARRANGING A STORE IN ACCORDANCE WITH DATA ANALYTICS

## CROSS-REFERENCES TO RELATED APPLICATIONS

**[0001]** This application claims the benefit of U.S. Provisional Application No. 62/063,903 filed October 14, 2014, the entire contents of which are incorporated by reference in its entirety herein.

## BACKGROUND

**[0002]** Retail stores are increasingly forced to compete with e-commerce, such as Internet vending sites. For example, whereas an Internet vending site can almost instantaneously alter the way in which products are presented to shoppers by changing the appearance of a webpage or navigational path of a website, a physical retail store is constrained by the physical structures in the store. Physically moving product from one position to another in order to change an experience for a customer encountering that product in the store can involve significant time and labor costs. These and other factors can put a physical retail store at a severe disadvantage when competing with e-commerce.

## BRIEF SUMMARY

**[0003]** The following presents a simplified summary of some embodiments of the invention in order to provide a basic understanding of the invention. This summary is not an extensive overview of the invention. It is not intended to identify key/critical elements of the invention or to delineate the scope of the invention. Its sole purpose is to present some embodiments of the invention in a simplified form as a prelude to the more detailed description that is presented later.

**[0004]** Embodiments herein are directed to systems of arranging stores in accordance with, or in response to, acquired data and/or data analytics. For example, a system may include configurable shelving that facilitates rapid changes to a layout of a store. The system can include a variety of data sources and/or analytic models of processing data. For example, the system can include mechanisms or devices to provide data about conditions of the store (such as the physical

location of objects in the store), and/or may include sources of data about conditions apart from the store (such as conditions of a local or broader community available through a medium such as the Internet). The arrangement of the store can be determined or varied based on these sources of data, such as by modifying a layout of the configurable shelving, adjusting levels of product offerings, altering advertising for products, or changing a location of products.

**[0005]** For a fuller understanding of the nature and advantages of the present invention, reference should be made to the ensuing detailed description and accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0006]** These and other features, embodiments, and advantages of the present disclosure are better understood when the following Detailed Description is read with reference to the accompanying drawings.

**[0007]** FIG. 1 is a flow chart representing a process of configuring a store in accordance with various embodiments.

**[0008]** FIG. 2 is a simplified block diagram of an exemplary computer system that can be used in accordance with embodiments described herein.

**[0009]** FIG. 3 is a schematic illustration showing an example system for arranging a store according to data analytics in accordance with various embodiments.

**[0010]** FIG. 4 is a flow chart representing another process of configuring a store in accordance with various embodiments.

**[0011]** FIG. 5 is a flow chart representing an additional process of configuring a store in accordance with various embodiments.

## DETAILED DESCRIPTION

**[0012]** In the following description, various embodiments of the present invention will be described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the embodiments. However, it will also be apparent to one skilled in the art that the present invention may be practiced without the specific details. Furthermore, well-known features may be omitted or simplified in order not to obscure the embodiment being described.

**[0013]** Referring now to the drawings, in which like reference numerals represent like parts throughout the several views, FIG. 1 is flow chart representing a process 100 of configuring a store in accordance with various embodiments. As used herein, a "store" or "retail store" refers to any establishment where goods and/or services are advertised and/or sold. Examples of types and/or locations of stores include, but are not limited to, grocery stores, drugstores, department stores, clothing stores, outlets, malls, restaurants, airports, theaters, and hotels. At 110, a computer system (e.g., the computer system 200 described below with respect to FIG. 2) can access data about items for a store (hereinafter "store item data"). In some aspects, the store item data may relate to a current or prospective product for the store, such as for sale, consumption, or other use during operation of the store. For example, the store item data may include information about a popularity or consumer demand for a product and/or a current or prospective location of the product within the store. In some aspects, the store item data additionally or alternatively may relate to infrastructural objects for the store, such as shelving units, displays, shopping carts, point-of-sale terminals, or other objects that can facilitate a shopping experience or purchase of a product. For example, the store item data may include information about manners in which persons (such as customers or prospective customers) interact with—or move with respect to—such infrastructural objects. Several further examples of store item data are provided below, some of which illustrate that the store item data may include information about conditions at a store and/or conditions apart from a store. In various examples, the store item data is reflective of human behavior associated with items for the store.

**[0014]** At 120, a plan is generated to configure or change the store in accordance with the store item data accessed at 110. In embodiments, the computer system generates a plan for the configuration of the store (hereinafter "store configuration data") based upon the accessed store item data. The plan or store configuration data can be utilized to generate information or instructions provided at 120. Several examples of such instructions are provided below, following the description of FIG. 2.

**[0015]** FIG. 2 is a simplified block diagram of an exemplary computer system 200 that can be used in accordance with embodiments described herein. The computer system 200 typically includes at least one processor 260 which communicates with a number of peripheral devices via a bus subsystem 262. These peripheral devices may include a storage subsystem 264, comprising a memory subsystem 266 and a file storage subsystem 268, user interface input devices 270, user

interface output devices 272, and a network interface subsystem 274. Network interface subsystem 274 provides an interface to a communication network 275 for communication with other systems, computers, databases, or the like.

**[0016]** The processor 260 performs the operation of the computer systems 200 using execution instructions stored in the memory subsystem 266 in conjunction with any data input from an operator. Such data can, for example, be input through user interface input devices 270, such as the graphical user interface. Thus, processor 260 can include an execution area into which execution instructions are loaded from memory. These execution instructions will then cause processor 260 to send commands to the computer system 200, which in turn control the operation of the container control electronics. Although described as a "processor" in this disclosure and throughout the claims, the functions of the processor may be performed by multiple processors in one computer system or distributed over several computers.

**[0017]** User interface input devices 270 may include a keyboard, pointing devices such as a mouse, trackball, touch pad, or graphics tablet, a scanner, foot pedals, a joystick, a touchscreen incorporated into the display, audio input devices such as voice recognition systems, microphones, and other types of input devices. In general, use of the term "input device" is intended to include a variety of conventional and proprietary devices and ways to input information into the computer system. Such input devices will often be used to download a computer system executable code from a computer system network or a tangible storage media embodying steps or programming instructions for any of the methods of the present invention.

**[0018]** User interface output devices 272 may include a display subsystem, a printer, a fax machine, or non-visual displays such as audio output devices. The display subsystem may be a cathode ray tube (CRT), a flat-panel device such as a liquid crystal display (LCD), a projection device, or the like. The display subsystem may also provide non-visual display such as via audio output devices. In general, use of the term "output device" is intended to include a variety of conventional and proprietary devices and ways to output information from the computer system to a user.

**[0019]** Storage subsystem 264 stores the basic programming and data constructs that provide the functionality of the various embodiments. For example, database and modules implementing the functionality of embodiments described herein may be stored in storage subsystem 264. These software modules are generally executed by processor 260. In a distributed environment, the

software modules may be stored in a memory of a plurality of computer systems and executed by processors of the plurality of computer systems. Storage subsystem 264 typically comprises memory subsystem 266 and file storage subsystem 268.

**[0020]** Memory subsystem 266 typically includes a number of memories including a main random access memory (RAM) 276 for storage of instructions and data during program execution and a read only memory (ROM) 278 in which fixed instructions are stored. File storage subsystem 268 provides persistent (non-volatile) storage for program and data files, and may include a hard disk drive, re-writable non-volatile memory chips (such as Flash memory), a floppy disk drive along with associated removable media, a Compact Digital Read Only Memory (CD-ROM) drive, an optical drive, DVD, CD-R, CD-RW, or removable media cartridges or disks. One or more of the drives may be located at remote locations on other connected computers at other sites coupled to the computer system. The databases and modules implementing the functionality of the present invention may also be stored by file storage subsystem 268. The file storage subsystem may have directory and file descriptions for accessing the files, or it may store data without descriptions and rely on the databases and modules of the system to locate the data.

**[0021]** Bus subsystem 262 provides a mechanism for letting the various components and subsystems of the computer system communicate with each other as intended. The various subsystems and components of the computer system need not be at the same physical location but may be distributed at various locations within a distributed network. Although bus subsystem 262 is shown schematically as a single bus, alternate embodiments of the bus subsystem may utilize multiple busses.

**[0022]** The computer system 200 itself can be of varying types including a personal computer, a portable computer, a workstation, a computer system terminal, a network computer, a module in a circuit board, a mainframe, or any other data processing system. Due to the ever-changing nature of computers and networks, the description of the computer system depicted in FIG. 2 is intended only as a specific example for purposes of illustrating one embodiment. Many other configurations of the computer system are possible having more or less components than the computer system depicted in FIG. 2.

**[0023]** Referring again to FIG. 1, in one example, at 120, the computer system can display store configuration data so that a human operator can utilize that information to decide how to

configure the store. Displaying store configuration data for a human operator can include displaying information in a report format. For example, the computer system may provide a user interface by which a user can request and/or view reports. The reports may be generated automatically or in response to requests from the user. Displaying store configuration data for a human operator can also include providing a visualization of present and/or possible arrangements of the store. For example, a "visualizer" of the store may incorporate a virtual representation of the store that may show the configuration and/or layout of physical elements of the store. The virtual representation can show shelving, other fixtures, and/or products and indicate positioning and/or other information. The visualizer may be provided, for example, by the computer system 200 described above with respect to FIG. 2, and/or by the computer system 300 described below with respect to FIG. 3.

**[0024]** The visualizer or other store configuration data may be updated to reflect changes in store item data. The store configuration data and/or the store item data may be updated at any suitable time interval (including continuously, e.g., "real-time"). Frequent updating may provide timely access to information that can allow changes to be made much more quickly than in conventional retail stores lacking systems described herein.

**[0025]** The computer system may be configured to provide store configuration data to several different types of users, either individually or in combination. For example, human operators that may wish to access store configuration data through the computer system may include a corporate director of a chain of stores, a store owner, a local store manager, a product supplier, product delivery personnel, product manufacturing personnel, product sales personnel, consumers, or anyone else associated with a store or a distribution chain for a product. As a specific example, a product supplier or promoter of Consumer Packaged Goods (CPG), may wish to have ready and immediate access available to store configuration data in order to determine how best to spend available funds for promoting his or her product or products in a given store.

**[0026]** In some aspects, at 120, the store configuration data supplied by the computer system may supplement a human operator's decisions for configuring the store. In one example, the store configuration data provided by the computer system may include suggestions for configuring the store based on the store item data accessed at 110. In another example, the store configuration data provided by the computer system may send instructions for moving product

and/or fixtures to change a layout of a store based on the store item data accessed at 110. To this end, the computer system may provide instructions to human operators regarding a manner in which product and/or fixtures are to be moved. Alternatively or additionally, the computer system may send instructions to devices to automatically move the fixtures and/or product within the store so as to change the layout in response to the store configuration data. In some embodiments, the computer system may communicate with a printer, such as to provide information for printing advertising for use by or in the store. The computer system may communicate with the printer automatically and/or in response to a request from a human operator. In some embodiments, the computer system may communicate with one or more digital displays in the store, for example to update advertising displayed on the displays in response to store item data accessed at 110, such as in response to detecting the proximity of a user having a shopping history indicative of a disposition for buying a particular item in the store.

**[0027]** The store may include fixtures that facilitate rapid and/or convenient configuration of a store. For example, the store may include components disclosed in U.S. Patent Application No. 14/341,675, filed January 26, 2012, entitled "Variable Planform Shelving System," (hereinafter the '675 application, Appendix A, attached), and/or any components or layouts described and disclosed in U.S. Patent Application No. 14/475,243, filed September 2, 2014, entitled "Center Store Arrangement for Retail Markets," (hereinafter the '243 application, Appendix B, attached), the entire disclosures of which are herein incorporated by reference. Such components may facilitate configuring a store in accordance with store configuration data. For example, such components may include reconfigurable shelving units having components configured for re-arranging relative to one another so as to change the shelving unit between different configurations. This may permit the shelving units to be readily reconfigured in response to store item data accessed at 110, such as to produce the layout of the store according to the plan or store configuration data generated at 120. In some examples, the reconfigurable shelving units may include multiple frames or other structures that are adjustable relative to one another (e.g., by sliding, pivoting, and/or de-coupling and recoupling) to adjust a length, a curvature, a shape, a footprint, and/or a planform of the shelving unit or a display in the store. Reconfigurable shelving units may be reconfigurable as a result of including components that are configured to be coupled together in a first arrangement to provide a first footprint of the

reconfigurable shelving unit (e.g., with a first length and a first curvature) and also configured to be coupled together in other arrangements (e.g., a second arrangement) to provide other footprints that differ from the first footprint (e.g., a second footprint having a second, different length and/or a second, different curvature). In various aspects, a store may include a plurality of items that are in the store and at least partially contained by a reconfigurable shelving unit, multiple reconfigurable shelving units, and/or other forms of shelving or product display systems.

**[0028]** Store item data accessed at 110 can originate from a variety of sources or combinations thereof. In various aspects, the data can include information about conditions of a store or in the store. Several illustrative examples of possible sources and uses for data about conditions of a store follow.

**[0029]** In a first example, the store may include one or more cameras. Cameras can be used to track a flow of the store, such as movement of persons within the store. A camera may provide store item data about how long persons stop with respect to any given product or fixture (e.g., "loiter time"), or how many people travel past a given product or fixture within a particular time range (e.g., "foot traffic"). Cameras may additionally or alternatively be used in conjunction with facial recognition algorithms, such as to identify emotional responses to items or layouts, or to identify gender, age, or other relevant information that may be useful in determining demographics of customers in a store. The cameras may additionally or alternatively provide information about how persons navigate through different layouts, such as if they avoid certain fixtures or gravitate toward others. Such information can be used to update a store visualizer and/or provide recommendations as to what layouts are effective or ineffective. In some embodiments, a camera in a parking lot may provide store item data about types of cars in the parking lot. For example, an automotive parts store may use such data from stores within a geographic area to determine types of parts to stock in inventory.

**[0030]** In another example, shelves or other fixtures of the store can include tracking components that may provide positioning data that forms part of the store item data accessed at 110. For example, individual shelves may include RFID (radio-frequency identification) tags or other similar technologies (such as Bluetooth receivers, near field communication, WiFi communication, or other wireless or wired communication devices capable of indicating a proximity or position of a sensor) to indicate the position of particular shelves within the store,

which may indicate an overall layout of shelving units in the store. In some aspects, such communication devices may indicate what products are on the shelves and/or conditions of the products. For example, the shelves can include detectors for detecting tags of products located on the shelves. In an illustrative example, a sensor in a carafe for milk in a coffee shop can be detected by a shelf to communicate the temperature of the milk and/or an amount of milk in the carafe, such as may be useful in determining if the milk needs to be refilled and/or replaced. In another example, a tag of an item may be detected to access an expiration date stored for that item, such as may be useful in prompting a change in display, price, advertising, placement, etc. of the item to increase a likelihood of purchase before the expiration date or in prompting removal of the item, e.g., if within a certain threshold of the expiration date. Tracking components can also be used with temporary fixtures, such as wet floor signs, other safety devices, shopping carts, and/or hand baskets. For example, tracking any of these objects may permit the objects to appear in the store visualizer along with other components and/or be included when configuring the store in response to store configuration data. Other forms of tracking can also be used, including, but not limited to, tracking provided via cameras or other optical imaging devices.

**[0031]** Tracking components may permit or facilitate additional gathering of data, such as indicating movement of people, fixtures, or products with respect to the store. For example, such components may provide information about products in a particular shopping cart or basket, such as may be useful for determining trends in how items are collected or purchased together or for providing relevant advertisement based on other items in a shopper's cart or basket. In some embodiments, tracking components may facilitate measures for preventing or reducing shoplifting. For example, if a product is detected as removed from a shelf (e.g., from weight sensors on the shelf registering a decrease in weight corresponding to removal of the item, or from a tag in the item no longer being detected as present at the shelf), and if the item is not detected in a basket or cart or at a point of sale for a particular amount of time, the item may be flagged (e.g., as misplaced or stolen) or tracked separately. In some cases, this may provide a prompt to store personnel, such as instructions to locate the item and determine if it is merely being carried by hand toward checkout or being concealed in an attempt to shoplift.

**[0032]** In a further example, the computer system may have access to information about placement of price tags. Information about placement of price tags in some cases can be used as

a proxy for items corresponding to the price tags. As an illustrative example, if a price tag is placed centrally or at another known relationship to corresponding items, information gathered about the location of the price tag can be extrapolated to identify the location of the corresponding items within the store. This may provide an alternative approach to estimating or determining a location of items in the store (such as for a visualizer) in scenarios in which less than all of the items include individual tracking components such as RFID tags. In some aspects, location of price tags can be altered based on a plan or store configuration data generated at 120, such as by providing instructions to physically move price tags in conformity with the plan, or by prompting changes in digital displays, such as may be capable of displaying price tags at different locations along a length of the display.

**[0033]** In yet another example, the computer system may have access to point-of-sale information as part of the store item data accessed at 110. For example, the registers in a store may be linked with the computer system so that sales data can be aggregated in a central repository for analysis. In some scenarios, the sales data can be used, along with other data described herein, to determine how quickly product is being sold with respect to a particular layout or other factors at work at the store or separate from the store. Another use of sales data may be to determine the zip code or other relevant regional areas associated with shoppers of the store, such as to determine parameters for refining a scope of store item data accessed at 110 about conditions distinct from the store.

**[0034]** Other types of sensors may also be used to provide store item data, such as may be used at 110. For example, a store may include proximity sensors, weight sensors, seismic sensors, and other types of sensors. In an illustrative example, a sensor may detect heart rates of persons near a product display, e.g., providing information for comparing emotional responses of persons to different layouts or configurations.

**[0035]** Store item data accessed at 110 can also include information about conditions distinct from the store. Such conditions may affect a likelihood of a person purchasing a specific item or type of item. Such external conditions may be determinable by access to the Internet or other network of computers. Sources about external conditions can relate to local, national, international or any other geographic region, including zip code. Sources about external conditions can include tax data (such as income tax data, property tax data, or sales tax data), housing data, locale trend data, sports data, seasonal data, event data, government holiday data,

religious holiday data, data about ages living in an area, medical data, income data, stock market data, credit card data, police data, fire data, crime data, disaster data, birthday data, weather data, environmental data, U.S. Census data (or census data from another government or source), demographic data, locale design data, trending data, school data, real estate data, traffic data, social media data, food trends data, and/or product trends data. In the following, a number of illustrative examples are provided regarding how such sources may be utilized; however, many other ultimate uses or effects of such data are possible within the scope of this disclosure beyond the specific examples provided herein.

**[0036]** As a first illustrative example, local trend data (e.g., accessed at 110 as store item data) may reflect publically available information from a ratings organization about local coffee shops in the community where a store is located. In response to this data, the computer system may provide, for example, a recommendation to the store to begin offering coffee from a shop that has recently opened nearby with great reviews. As other examples, the computer system may provide a recommendation to the store to increase the prominence of a display of a coffee from a shop that has recently surged in popularity, or to decrease an inventory of a coffee shop that has recently received a spate of negative reviews. In a related example, a store may poll search engine analytics about coffee shops, such as how many people are requesting driving directions to coffee shops, comments about the shops on review sites, and/or hits on the shops' websites from Internet users within a certain geographic proximity. Such metrics may be used to determine conditions related to other shops in the vicinity of the store to base decisions about products or layouts on those conditions. Access to real-time analytics may allow a store to rapidly reconfigure to capitalize on real-time trends.

**[0037]** As another illustrative example, seasonal information, holidays, or community events on local, national, international, and/or other scales may be accessed as store item data at 110 and analyzed to prioritize product placement within the store or prepare for variations in the traffic through the store due to the special occasions. As a specific example, in response to local event information that a championship high school baseball game is occurring on Saturday afternoon at 2:00 p.m., the system may prompt a movement of displays of team baseball hats from a usual place within a clothing department to more prominent end caps near a front of the store. A supplier of the peanuts, that would not otherwise know about the local baseball game as an improved opportunity for selling more peanuts, may be informed of the information through

this system and provided an opportunity to request better treatment of the peanuts within the layout of the local store. As another specific example, in response to seasonal information that a camping season is coming to a close due to a burn ban slated to start the following week, the system may respond to an anticipated increased interest in last-minute camping delicacies and prompt greater cross-promotion of marshmallows, chocolate, and crackers, such as by prompting placement of the items together, prompting promotional deals for joint purchase of the items, prompting a change in a shape or placement of a display for the items, or prompting other cross-promotional actions.

**[0038]** In a further illustrative example, data from social networks or census data can be accessed as store item data at 110 and analyzed to determine distribution of birthdays in a geographic area, which may prompt promotions and/or additional stocking of birthday-related supplies—such as party favors or birthday cakes—for spans of time with a higher incidence rate of birthdays.

**[0039]** In yet another illustrative example, the store item data accessed at 110 can include weather trend or forecast data. For example, a deli portion of a supermarket may receive a recommendation to prepare additional soup in anticipation of a colder day forecast for the following day. As another example, sweatshirts may be moved to a prominent location (such as a front of a store ) or into another layout based on a cool weather forecast or trend. As a third example, data that the store is located in a geographic area that is currently raining may prompt wet floor signs or extra drying mats or other safety mechanisms to be deployed within the store. As a further example, a nursery may use weather data to determine a watering schedule for plants, which may be stocked in inventory based on other available store item data, such as information about what plants are locally grown or recommended based on a climate of the location of the store and/or the store's anticipated customers.

**[0040]** In one more illustrative example, police and fire data can be can be accessed as store item data at 110 and correlated with sales data of stores situated in areas with similar conditions to determine recommendations for layouts or products to offer in a particular store. Similarly, publicly available aggregated local income data may be used to determine prices or product offerings for a particular population. Such information may also permit and/or encourage compliance with ordinances, both local and general, regarding types of products that must be

offered as a minimum for certain classes of population, such as healthy foods to low income areas.

**[0041]** In another illustrative example, U.S. Census data can be accessed as store item data at 110 and analyzed to determine consumption levels of products, especially when other, more reliable data is not generally available. For example, a total number of shipping containers carrying a certain product can be determined from the U.S. Census data and then, based on that data, a system at 120 may provide store configuration data that includes a recommendation to provide that product in a certain geographic area.

**[0042]** For another illustrative example, data from social media can be accessed as store item data at 110 and utilized to match product promotion in the store with products that are trending on the social media. As a specific example, a pet store may receive recommendations about types of dog food to sell or breeds of dogs to keep in stock based on the prevalence of either the breed of dog or the brand of dog food that is most commonly referenced in social media in the geographic area of interest, such as the city, county, state, or nation.

**[0043]** Store item data accessed at 110 can include data about any characteristic of an item for the store. As specific examples, the store item data accessed at 110 can include purchasing history of an item in the store, data about a purchasing history of an item at locations other than the store, data about a demand for an item, data about a popularity of an item, data about a profitability of an item, or data about revenue streams for an item (e.g., if promotional funds are attributable to the item in addition to margins that may be obtained upon sale of the item). A useful life or expiration date of an item may also be provided in store item data accessed at 110.

**[0044]** As described above, at 120, a plan or store configuration data can be provided to configure the store in accordance with the store item data accessed at 110. Configuring the store can take the form of providing recommendations or directions to human operators for reconfiguring the store. Reconfiguring the store can also, or alternatively, include sending commands to automated components (such as servos or actuators) and/or robots to configure the store in response to the accessed data. For example, as described above, the information for configuring the store may be provided to any party with an interest in the store.

**[0045]** In some aspects, the system can facilitate interaction between interested parties. For example, the system may permit workers in the store to interact with providers of a product or fixtures in order to verify the accuracy of changes made, or to make inquiries about the manner

in which the requested changes are to be implemented. In another example, a product provider, such as a provider of CPG, can interact through the system with a person in control of the store layout. For example, the CPG product provider may be able to submit proposed layout changes to the way that the product is displayed in the store (e.g., different shelving arrangement, different location, different signage, or additional promotions), and the store manager can authorize or validate a price for the interaction. As an alternate example, a store manager may contact a product supplier with an offered configuration and accompanying price to determine if the product supplier wishes to spend the money of the set price to further promote the product supplier's goods.

**[0046]** In some embodiments, permissions may be implemented to govern interactions between users of the system. For example, a corporate director of a supermarket chain may be given full administrative permissions by the provider of the system. The corporate supervisor may then determine which features are going to be made available to others in the process such as general managers of the stores, product suppliers, product deliverers, and/or store customers. In some aspects, a permission may be provided which permits another user to give permission to another subset of users. For example, a corporate director may provide a store manager full access to all features related to the manager's store, but restrict access to details of other stores in the chain. The store manager may then grant some access to a manager of a deli portion of the store, and other access to a manager of a bakery portion of the store, as the store manager deems appropriate for each individual. In some aspects, the permissions also permit a control over what data is accessed at 110 or accessible to another user of the system. For example, a corporate director of a chain of stores may limit a particular store to being able to use weather data and local trend data while preventing the police data or fire data from being accessible to the store manager. In some aspects, the permissions can include allowing customers at the store to see in a visualizer (such as in a mobile application, a web application, a kiosk within the store, and/or some other user interface that includes one or more of the user interface input devices 270 and/or user interface output devices 272 described above with respect to FIG. 2), in real time, the condition of the store, such as the inventory that is presently on the shelf, what items are trending, or what items are suggested, based on others in that region of similar characteristics. In some aspects, the permissions may include allowing or disallowing a product supplier to see sales levels of other product suppliers in the same store.

**[0047]** The system may provide a number of different features in a user interface. For example, the system may provide a visualizer of the store, as discussed earlier. The visualizer may include graphic representations of the fixtures and/or products in the store as they appear in real time. The visualizer may also be utilized to indicate other attributes in addition to position, such as rate of sale, popularity, level of facilitating traffic flow, configurability, costs or revenue associated with a component (such as if a product supplier is paying extra for certain shelf space, layout, or other features), or changes in any metric of interest. For example, the visualizer may provide an indication of a percent increase in space or projected sales that a new layout would be expected to provide. The user interface may provide opportunities to provide reports about products or layouts or components within the store or overall system. The user interface may include an option to view information sorted by products. The user interface may provide access to inventory information that may be updated in real time, based on other information available from the system. The user interface also may provide access to information based on Internet data or in-store data.

**[0048]** The visualizer is not limited to real-time visualization. The store visualizer may also permit visualization of what products would be on the shelf for a new layout. For example, the user interface may include options to evaluate store locations for a new store, potential layouts, product planning, or safety precautions, such as by looking at and/or manipulating a potential layout in the visualizer. In an illustrative example, the user interface can display a potential layout and provide a parts list and/or cost to implement the potential layout. In some aspects, the store design can also be determined and/or modeled by the system, such as to show the overall feel of the store.

**[0049]** Any form of user interface may be provided. The user interface may include any specific one of—or combination of—the user interface input devices 270 and/or user interface output devices 272 described above with respect to FIG. 2. As particular examples, a user interface may be provided in the form of a mobile application, a web application, a computer program on a computer in an office of the store, or in the form of a kiosk in the store. In some aspects, the user interface may include a navigation module, such as to provide a customer, employee, or other user with directions for reaching a particular product or fixture within the store. In some aspects, a user interface may provide push notifications or other forms of information transfer to users, such as providing coupons or advertising for a product to a user's

device, such as based on a proximity of the user or user's device to the product in the store, based on a past shopping history of the user, or based on trends, social media data, or other types of data.

**[0050]** In some aspects, a store location element can be included in the system for aggregating store item data accessed at 110 and providing a recommendation for where to locate a store to sell particular goods based on other information in the system. In some aspects, information that is about conditions separate from a store may include information about another store, i.e., information that is about objects such as products or fixtures in another store, and not the store in question. The system can use any appropriate time horizon for analyzing and/or presenting data about conditions in the store or separate from the store. As illustrative examples, the data may be presented in a manner that is reflective of the last year of available data or of the last second of available data.

**[0051]** FIG. 3 is a schematic illustration showing an example system 300 for arranging a store according to data analytics in accordance with various embodiments. The illustrated system 300 includes a computer system 300. The computer system 300 can be an example of the computer system 200 described above with respect to FIG. 2. The computer system 300 is shown with an access module 302, a plan module 304, and an inform module 306. These example modules are shown in FIG. 3, but functions and embodiments described herein can utilize a subset of the features provided by the modules and/or additional functions can be provided. Additionally, some or all of the process 100 (or any other processes described herein, or variations and/or combinations thereof) may be performed under the control of one or more computer systems configured with executable instructions, such as the modules described herein, and may be implemented as code (e.g., executable instructions, one or more computer programs or one or more applications) executing collectively on one or more processors, by hardware or combinations thereof. The code may be stored on a computer-readable storage medium, for example, in the form of a computer program including a plurality of instructions executable by one or more processors. The computer-readable storage medium may be non-transitory. Moreover, unless indicated otherwise, acts shown in the processes are not necessary performed in the order shown, and/or some acts can be omitted in embodiments.

**[0052]** The computer system 300 is additionally shown with a user interface 346. Although the user interface 346 is shown apart from the modules of computer system 300 for the sake of

clarity, the user interface 346 can be considered part of the computer system 300. The user interface 346 in FIG. 3 is generally depicted as a screen for presenting information from the computer system 300 to a user. However, the user interface 346 may additionally or alternatively include individually or in combination any other of the user interface input devices 270 and/or user interface output devices 272 described above with respect to FIG. 2.

**[0053]** Turning again to the example modules shown in FIG. 3, the access module 302 can access data associated with and/or relevant to items for a store. Such data may correspond , for example, to store item data accessed at 110, such as described elsewhere herein. In FIG. 3, this data includes remote source data 308 and local source data 310 accessed by the access module 302 (e.g., as illustrated respectively by arrows 322 and 324).

**[0054]** The remote source data 308 can include data acquired from sources outside of or apart from the store, such as data about trends, events, locale details (such as demographic details about a locale in which the store is situated or contemplated, and/or details about a locale identified as similar or otherwise relevant to the store), affiliates (such as data from other stores in a chain, data from suppliers for the store, data of a transactional or other nature from product promotors that wish to invest funds in promoting certain products in the store, etc.), or other factors of interest. In embodiments, the remote source data 308 may be provided via the internet or other network connection.

**[0055]** The local source data 310 can include data acquired from sources within the store. For example, the local source data 310 may include data acquired from sensors 310 such as cameras 314, sensors 316 on reconfigurable shelving units (such as may provide data about items on the reconfigurable shelving unit and/or about a configuration in which components of the shelving unit are arranged to provide a particular footprint of the reconfigurable shelving unit), sensors 318 on shopping carts or baskets (such as may provide data about items therein or about movement of persons in the store), or other sensors described elsewhere herein. As another example, the local source data 310 may include data from point of sale equipment 320 (such as electronic or manual cash registers or other terminals), such as may be useful in determining details such as purchase history of items in the store or other trends or metrics. Although some general examples of possible types of the local source data 310 have been described, the local source data 310 may additionally or alternatively include other forms or types of data described herein.

**[0056]** The plan module 304 can generate (e.g., as illustrated by arrow 328) a plan 326 for configuring the store based at least in part upon the data accessed by the access module 302. As a first illustrative example, in response to data from the access module 302 indicating that a product promotor has paid to increase the prominence of a particular product, the plan module 304 may generate a plan (e.g., at 330) of introducing a new row configuration, e.g., a configuration from the '243 application that provides a layout of a row in the store with more prominent sightlines to the promoted product, shifting away from a configuration in which all the rows are parallel and provide undifferentiated sightlines. Other layouts or arrangements besides those disclosed in the '243 application may additionally or alternatively be part of the plan 326 or otherwise used by the system 300. As a second illustrative example, the plan module 304 may generate a plan (e.g., at 332) that involves a layout that calls for a change in a length and/or a change in a curvature of a reconfigurable shelving unit, such as to change an amount of space for the item and/or to change a sightline for the item. As a third illustrative example, the plan module 304 may generate a plan (e.g., at 334) to move an item to a more prominent place, such as a higher shelf in the store.

**[0057]** The information module 304 can provide information (e.g., as illustrated by arrow 338) for implementing the plan 326 generated by the plan module 304. In some aspects, this may include showing the plan in a visualizer, such as presenting information from the plan module 304 and/or the information module 306 via the user interface 346. In some aspects this may include the information module 304 providing (e.g., as illustrated by arrow 338) instructions 336 for implementing portions or all of the plan 326. As a first example, the instructions 336 at 340 are shown as a graphical representation that instruct a worker that an appropriate way to implement the first illustrative example of the plan 326 shown at 330 is to pivot portions of a central row toward an outer row and add an additional portion between the pivoted portions. In some aspects, the implementation may involve a reconfigurable shelving unit with a set of components that can be shifted from one arrangement in which the components are coupled together to another arrangement in which the components are coupled together to provide a different footprint (e.g., different curvature or length) of the reconfigurable shelving unit. Indeed, as a second example, the instructions 336 at 342 are shown as a graphical representation that instruct a worker to pivot a first half-elliptical frame relative to a full-ellipse frame and to slide or otherwise translate a second half-elliptical frame relative to the full-ellipse frame in order

to achieve the curvature and length extension called for in the second illustrative example of the plan 326 shown at 332. Although this illustrative example is illustrated with a reconfigurable shelving unit that is an example from the '675 application, other reconfigurable shelving units may additionally or alternatively be utilized by the system 300. As a third example, the instructions 336 at 344 are shown as a graphical representation that instruct a worker to implement the third illustrative example of the plan 326 shown at 334 by moving an item from an initial position on a bottom shelf to a revised position on a top shelf. Furthermore, although the examples of the instructions are shown in FIG. 3 primarily as graphical representations showing operations that can be performed to implement a plan 326, the information module 306 may provide information for implementing the plan 326 in other ways, including, but not limited to providing instructions to automated components that cause implementation of the plan.

**[0058]** FIG. 4 is a flowchart representing a process that can be executed, for example, by the computer system 300. At 410, the access module 302 may access data associated with item(s) for a store. In some embodiments, the data includes data about the item(s) that is based at least in part on information about customers of the store or persons identified as prospective customers of the store.

**[0059]** In embodiments, the store includes a reconfigurable shelving unit. For example, the reconfigurable shelving unit can include a plurality of components that are configured for re-arranging relative to one another between different configurations so as to change a footprint of the reconfigurable shelving unit by at least one of changing a length of the shelving unit or changing a curvature of the shelving unit. Use of such reconfigurable shelving units may provide increased flexibility for reconfiguring into desired shapes and/or sizes in comparison to other forms of shelving assemblies. Some examples of such reconfigurable shelving units are provided in the '675 application.

**[0060]** At 420, the plan module 304 may generate a plan to configure the store in a layout based at least in part upon the accessed data. In some scenarios, e.g., at 430, the plan may include information for configuring or reconfiguring the reconfigurable shelving unit by at least one of changing a length of the shelving unit or changing a curvature of the shelving unit. For example, this may include information about how to turn or otherwise move elliptical frames relative to one another to obtain a desired length and/or curvature of a shelving unit. As another example, data may indicate low volume sales of a particular item, such as pickles. The

reconfigurable shelving unit for pickles can be pulled outward into a curve, so that a center portion protrudes partially into the aisle, allowing the pickles to be prominently displayed. Additionally or alternatively, data may indicate high lag times in parts of the store, and a shelving unit may be extended to allow more traffic around the high volume items. A shelving unit may also be curved to require a customer to walk past or through low volume items to high volume items, thus providing higher exposure for the low volume items. Data may indicate extremely low traffic or high traffic in some locations, and a shelving unit may be curved, straightened, lengthened, or shortened to fill or open space in the store to account for this data.

**[0061]** Additionally or alternatively, e.g., at 440, the plan may include information for configuring or reconfiguring a layout of the store by advantageously arranging aisles and rows of the store in accordance with the item data. For example, a product display system can be oriented to extend from a break formed in a first row toward a break formed in another row. Some examples of such layouts are provided in the '243 application, along with attendant benefits. Arranging product display systems in such a layout can increase an amount of space in which vendors or other promoters can better display and promote products. For example, such arrangements may increase a number of available end caps by introducing new end caps at breaks formed within rows, may introduce angled shelving units or other product display units (e.g., Center Caps) across an aisle to at least generally face customers as they enter the aisle, may provide openings or cells at angled intersections in which additional product or advertising may be displayed, may use angled shelving units to provide alcoves in which floor stacks of products or other focal point area displays can be placed without interfering with the customers' use of the aisles, or combinations thereof.

**[0062]** In some aspects, the store may additionally or alternatively include modular shelving systems. For example, the plan at 420 or 520 may additionally or alternatively include information about adding or removing sets of elliptical frames (such as in FIG. 37 of the '675 application) and/or mobile product displays (such as in the '243 application) to attain a desired layout.

**[0063]** In embodiments, the data accessed at 410 can be utilized to form the plan at 420 to advantageously arrange the rows, aisles, breaks, or other features of the store in accordance with the item information. As one example, data may indicate that a particular item, such as canned tomatoes, is expected to have a higher likelihood of purchase if seen by customers, for example,

based on information that canned tomatoes are the base of a traditional dish prepared for an upcoming holiday celebrated by customers in the vicinity of the store. The layout may be adjusted to improve a visibility of the canned tomatoes within the aisles and rows of the store, such as by forming a break in a row that is across an aisle from the canned tomatoes and turning a product display system that holds the canned tomatoes display so that it is angled toward the break, e.g., bringing the tomatoes into a sightline of customers entering the aisle and maintaining paths of travel through the break across the aisle. Additionally or alternatively, data may indicate high lag times in parts of the store, and features of the layout (such as breaks in rows and/or orientations of product display systems) may be adjusted to allow more traffic around high volume items. Alcoves may be introduced, such as by angling product display units, and provide a high visibility floor display (or other space proximate the alcove) that may increase customer exposure to low volume items when en route to high volume items on the angled display units forming the alcove. Data may indicate that promotion funds are available for certain products, and a layout may be adjusted to account for this data, such as by adding, removing, or changing a number and/or orientation of end caps, breaks, or product display units to provide more favorable placement of the promoted products in the store.

**[0064]** FIG. 5 is a flowchart representing another process that can be executed, for example, by the computer system 300. At 510, the access module 302 may access data associated with a set of people comprising at least one of customers of a store or persons identified as prospective customers of the store. The store be a store that includes a reconfigurable shelving unit, as described above with respect to FIG. 4. The data may include data about item(s) for the store. At 520, the plan module 304 may generate a plan to configure the store in a layout based at least in part upon the accessed data. Illustrative examples are shown at 530 and 540, similar to the examples of 430 and 440 described above with respect to FIG. 4. For example, data at 510 may indicate a trend or preference from social media among individuals identified as customers or potential customers, and a shelving unit may be curved, straightened, lengthened, or shortened to fill or open space in the store in response to this data. In another example, data may indicate that a pool of relevant people are more or less likely to respond favorably to one layout in a store in comparison to another layout, and the layout in the store may be adjusted to account for this data, such as by adding, removing, or changing a number and/or orientation of end caps, breaks,

product display units, or other features to bring the layout into conformity with the layout preferred by the pool of relevant people.

**[0065]** Other variations are within the spirit of the present invention. Thus, while the invention is susceptible to various modifications and alternative constructions, certain illustrated embodiments thereof are shown in the drawings and have been described above in detail. It should be understood, however, that there is no intention to limit the invention to the specific form or forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention, as defined in the appended claims.

**[0066]** The use of the terms "a" and "an" and "the" and similar referents in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (i.e., meaning "including, but not limited to,") unless otherwise noted. The term "connected" is to be construed as partly or wholly contained within, attached to, or joined together, even if there is something intervening. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (*e.g.*, "such as") provided herein, is intended merely to better illuminate embodiments of the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

**[0067]** Preferred embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter

recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

**[0068]** All references, including publications, patent applications, and patents, cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

# APPENDIX A

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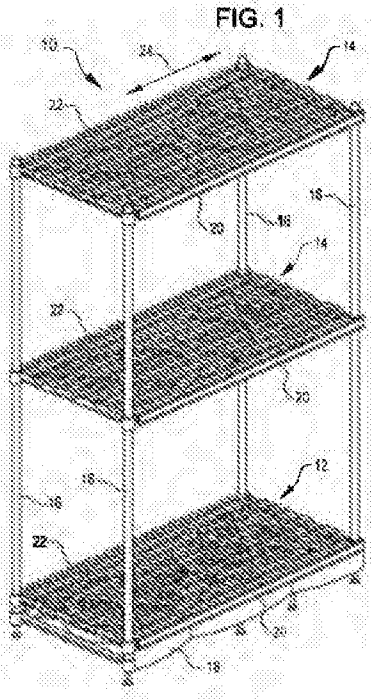
*[Continued on next page]*

(54) Title: VARIABLE PLANFORM SHELVING SYSTEM

(57) Abstract: Variable planform shelving systems include a variable support planform and a support surface assembly that is supported by the variable support platform. The variable support platform includes frames that can be repositioned relative to each other to vary the planform of the variable support platform. The support surface assembly provides a support surface for supported items. The support surface assembly is flexible and/or comprised of a plurality of linked panels so that the support surface provided varies in response to variation in the planform of the variable support platform.

FIG. 1

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# VARIABLE PLANFORM SHELVING SYSTEM

## CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** This application claims priority from and the benefit of U.S. Application No. 13/359,016, entitled "Variable Planform Shelving System," filed January 26, 2012 (Attorney Docket No. 92885-826533), and also claims priority from and the benefit of U.S. Provisional Application No. 61/702,157, entitled "Variable Planform Shelving System," filed September 17, 2012 (Attorney Docket No. 94885-852212), the full disclosures of which are incorporated herein by reference for all purposes.

## BACKGROUND

**[0002]** Shelves are often used for displaying and/or storing items. For example, a retail outlet, such as a grocery store, typically includes multiple rows of shelves separated by aisles. The rows of shelves typically include shelves having differing configurations suitable for the different types of merchandise being displayed and/or stored.

**[0003]** Many existing shelving systems can be customized to some extent for the display and/or storage of particular items. For example, the number of shelves used and/or the vertical spacing between shelves can often be varied. And the size of the shelves used can be selected in advance based on the space available for the shelf. Existing shelving systems, however, may be insufficiently reconfigurable to avoid having to be replaced with new shelves of a different configuration as part of a reconfiguration of a retail outlet or remodeling of a residence.

**[0004]** Accordingly, there is believed to be a need for shelving systems and related items that can be reconfigured to a greater extent than existing shelving systems.

## BRIEF SUMMARY

**[0005]** Shelves, shelving systems, and related items (*e.g.*, tables, clothes racks) having a variable planform are disclosed. The assemblies disclosed herein include a variable support

platform, which can be resized and/or reshaped, and can include a support surface assembly that is supported by the variable support platform. The support surface assembly provides a support surface that is resized and/or reshaped in response to resizing and/or reshaping of the variable support platform. Accordingly, the shelving assemblies and related items disclosed herein have increased flexibility to be reconfigured into desired shapes and/or sizes relative to existing shelving assemblies.

**[0006]** In various embodiments, a variable planform shelving system is provided having at least a shelf having a variable planform. The shelf can comprise two or more frames, and each frame can provide a part of a variable support platform. Each frame can comprise at least one interaction end configured for interacting with another frame, and at least one frame can be coupled with an adjacent frame near an interaction end so that the coupled adjacent frames can move relative to one another to adjust the planform of the shelf.

**[0007]** In many embodiments, a shelf is provided that has a variable planform. The shelf includes a first frame providing a first part of a variable support platform, a second frame providing a second part of the variable support platform, and a support surface assembly that is supported by the variable support platform and provides a support surface for items supported by the shelf. Relative positioning between the first and second frames is variable so as to vary the planform of the variable support platform. The support surface assembly is flexible and/or includes a plurality of linked panels so that the support surface provided varies in response to variation in the planform of the variable support platform. In many embodiments, relative orientation of the first and second frames is variable to vary the shape of the planform of the variable support platform.

**[0008]** In many embodiments, the shelf further includes a third frame providing a third part of the variable support platform. The third frame is disposed between the first and second frames. Relative positioning between the third frame and each of the first and second frames is variable to vary the planform of the variable support platform. For example, the third frame can be slidingly coupled with each of the first and second frames.

**[0009]** In many embodiments, relative orientation between the first and third frames is variable to vary the shape of the planform of the variable support platform. And in many embodiments,

relative orientation between the second and third frames is variable to vary the shape of the planform of the variable support platform.

**[0010]** The first, second, and third frames can have suitable details that contribute to providing the variable support platform. For example, the first frame and/or the second frame can have a slot that receives a portion of the third frame. In many embodiments, each of the first, second, and third frames has an upper surface that interfaces with the support surface assembly with the upper surfaces being coplanar. In many embodiments, the first frame and/or the second frame has a planform shape of half of an ellipse and the third frame has a planform shape of an ellipse. In many embodiments, the third frame includes an elongated aperture. The elongated aperture receives a first coupling pin coupled with the first frame and extending across the first frame slot. The elongated aperture further receives a second coupling pin coupled with the second frame and extending across the second frame slot. In many embodiments, each of the first frame and the second frame includes an end portion adapted to attach to a support at one end of the end portion.

**[0011]** In many embodiments, the shelf support surface assembly is configured such that the planform of the support surface assembly varies in response to variation in the planform of the variable support platform. For example, in many embodiments, the shelf support surface assembly includes a plurality of interconnected vertically-oriented flexible panels. The flexible panels are formed from a suitable material (*e.g.*, polycarbonate). And in many embodiments, the shelf support surface assembly includes a plurality of coupled horizontally-oriented panels. For example, each of the horizontally-oriented panels can have one or more slots receiving connecting pins that couple adjacent panels of the horizontally-oriented panels.

**[0012]** In another aspect, a shelving system having a variable planform is provided. The shelving system includes a first shelf having a variable planform, a second shelf having a variable planform and being elevated above the first shelf, at least one first support column, and at least one second support column. In many embodiments, each of the first and second shelves include first, second, and third frames as described herein. The first support column(s) supports the first frames of the first and second shelves. And the second support column(s) supports the second frames of the first and second shelves. In many embodiments, one or more supplemental support columns are used.

[0013] In many embodiments, the shelving system includes a base. The base can include an upper portion that includes a shelf having a variable planform as describe herein, a lower portion that includes a shelf having a variable planform as described herein, at least one first column member attached to each of the first frames of the upper and lower portions, at least one second column member attached to each of the second frames of the upper and lower portions, and a plurality of third column members, each of the column members being attached to the third frames of the upper and lower portions.

[0014] In many embodiments, the shelving system includes a kick plate assembly attached to the base. The kick plate assembly can include a first kick plate member attached to at least one of the first frames of the upper and lower portions, a second kick plate member attached to at least one of the second frames of the upper and lower portions, and a third kick plate member attached to at least one of the third frames of the upper and lower portions. At least one of the first, second, or third kick plate members can include an extension panel overlapping an adjacent one of the first, second, or third kick plate members for a plurality of planform configurations of the base.

[0015] In many embodiments, the shelving system includes at least one price display assembly attached to at least one of the first and second shelves. The price display assembly can include a first price display segment attached to the first frame and configured to display a price tag, a second price display segment attached to the second frame and configured to display a price tag, and a third price display segment slidably coupled with at least one of the first and second price display segments. The third price display segment is flexible and configured to display a price tag.

[0016] In another aspect, a table having a variable planform is provided. The table includes a first upper frame forming a first part of a variable support platform, a second upper frame forming a second part of the variable support platform, a third upper frame providing a third part of the variable support platform, a support surface assembly providing a support surface for items supported by the table, a first base frame forming part of a variable base that is disposed below the variable support platform, a second base frame forming part of the variable base, a third base frame forming part of the variable base, and a plurality of intermediate members disposed between and attached to the variable base and the variable support platform. The third

upper frame is disposed between the first and second upper frames. Relative positioning and orientation between the third upper frame and each of the first and second upper frames is variable so as to vary the planform of the variable support platform. The support surface assembly is supported by the variable support platform. The support surface assembly can be at least one of flexible or include a plurality of linked panels so that the support surface provided varies in response to variation in the planform of the variable support platform. The third base frame is disposed between the first and second base frames. Relative positioning and orientation between the third base frame and each of the first and second base frames is variable to vary the planform of the variable base.

**[0017]** In many embodiments, the intermediate members include a plurality of first intermediate members, a plurality of second intermediate members, and a plurality of third intermediate members. Each of the first intermediate members is attached to the first upper frame and the first base frame. Each of the second intermediate members is attached to the second upper frame and the second base frame. And each of the third intermediate members is attached to the third upper frame and the third base frame. Any suitable configuration of intermediate member can be used, for example, a column member.

**[0018]** In many embodiments, the table support surface assembly is configured such that the planform of the support surface assembly varies in response to variation in the planform of the variable support platform. For example, in many embodiments, the table support surface assembly includes a plurality of interconnected vertically-oriented flexible panels. As another example, in many embodiments, the table support surface assembly includes a plurality of coupled horizontally-oriented panels having one or more slots receiving coupling pins that couple adjacent panels of the horizontally-oriented panels.

**[0019]** For a fuller understanding of the nature and advantages of the present invention, reference should be made to the ensuing detailed description and accompanying drawings. Other aspects, objects and advantages of the invention will be apparent from the drawings and detailed description that follows.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0020]** **FIG. 1** is a perspective view of a variable-planform shelving system in a compact collapsed configuration, in accordance with many embodiments.

**[0021]** **FIG. 2** is a perspective view of the variable-planform shelving system of **FIG. 1** with support surface assemblies removed to show details of underlying shelf variable support platforms and a variable base.

**[0022]** **FIG. 3** is a perspective view of the variable-planform shelving system of **FIG. 1** in a partially-expanded configuration with the support surface assemblies removed to show details of the underlying shelf variable support platforms and the variable base.

**[0023]** **FIG. 4** is a perspective view of the variable-planform shelving system of **FIG. 1** in a fully-expanded configuration with the support surface assemblies removed to show details of the underlying shelf variable support platforms and the variable base.

**[0024]** **FIG. 5** is perspective view of the variable-planform shelving system of **FIG. 1** in a fully-expanded configuration with the support surface assemblies not removed.

**[0025]** **FIG. 6** is a top view of the variable-planform shelving system of **FIG. 1** in a fully-expanded and curved configuration with the support surface assemblies removed to show details of the underlying shelf variable support platforms and the variable base.

**[0026]** **FIG. 7** is a top view of the variable-planform shelving system of **FIG. 1** in the configuration of **FIG. 6** with the support surface assemblies not removed.

**[0027]** **FIG. 8** is a top view of the variable-planform shelving system of **FIG. 1** in another fully-expanded and curved configuration with the support surface assemblies removed to show details of the underlying shelf variable support platforms and the variable base.

**[0028]** **FIG. 9** is a top view of the variable-planform shelving system of **FIG. 1** in the configuration of **FIG. 8** with the support surface assemblies not removed.

**[0029]** **FIG. 10** is a top view of the variable-planform shelving system of **FIG. 1** in another fully-expanded and curved configuration with the support surface assemblies removed to show details of the underlying shelf variable support platforms and the variable base.

**[0030]** **FIG. 11** is a top view of the variable-planform shelving system of **FIG. 1** in the configuration of **FIG. 10** with the support surface assemblies not removed.

**[0031]** **FIG. 12** is a perspective view of the variable-planform shelving system of **FIG. 1** in another fully-expanded and curved configuration with an additional support member and the support surface assemblies removed to show details of the underlying shelf variable support platforms and the variable base.

**[0032]** **FIG. 13** is a top view of the variable-planform shelving system of **FIG. 1** in the configuration of **FIG. 12** with the support surface assemblies not removed and the additional support member not shown.

**[0033]** **FIG. 14A** is a plan view a variable support platform of the variable-planform shelving system of **FIG. 1**.

**[0034]** **FIG. 14B** is a fragmented, side view of a support post used in the variable-planform shelving system of **FIG. 1**.

**[0035]** **FIG. 14C** is a fragmented, side view of a hanger bracket partially inserted in a first opening of a support post shown in **FIG. 14B**.

**[0036]** **FIG. 14D** is a fragmented, side view of a hanger bracket inserted in the first opening and a second opening of the support post shown in **FIG. 14B** resulting in a variable support platform supporting position.

**[0037]** **FIG. 14E** is a side view of a hanger bracket attached to a support post and supporting a corner of a variable support platform of the variable-planform shelving system of **FIG. 1**.

**[0038]** **FIG. 15** is a plan view of components of frames of the variable support platform of **FIG. 14A**.

**[0039]** **FIG. 16** is a perspective view of a variable base assembly of the variable-planform shelving system of **FIG. 1** in the compact collapsed configuration of **FIG. 1** with the associated support surface assembly removed to show details of the variable base assembly.

**[0040]** **FIG. 17** is a perspective view of a kick plate assembly and a price display assembly of the variable-planform shelving system of **FIG. 1**.

[0041] **FIG. 18** is a perspective view of the kick plate assembly of **FIG. 17** with the price display assembly removed.

[0042] **FIG. 19** is an exploded perspective view of the kick plate assembly of **FIG. 17**.

[0043] **FIG. 20** and **FIG. 21** are perspective views of components of the kick plate assembly of **FIG. 17**.

[0044] **FIG. 22** is a perspective view of the kick plate assembly of **FIG. 17** in an expanded configuration.

[0045] **FIG. 23** through **FIG. 25** are perspective views of the price display assembly of **FIG. 17** in the compact collapsed configuration of **FIG. 1**.

[0046] **FIG. 26** is a perspective view of the price display assembly of **FIG. 17** in an expanded configuration.

[0047] **FIG. 27** and **FIG. 28** are close-up perspective views showing details of the variable-planform shelving system of **FIG. 1** in the compact collapsed configuration of **FIG. 1**.

[0048] **FIG. 29** is a perspective view of a table having a variable planform with a support surface assembly removed to better show underlying details, in accordance with many embodiments.

[0049] **FIG. 30** is a perspective view of another variable-planform shelving system in a compact collapsed configuration with support surface assemblies removed to better show underlying details, in accordance with many embodiments.

[0050] **FIG. 31** is a close-up perspective view showing details of a base support platform of the variable-planform shelving system of **FIG. 30**.

[0051] **FIG. 32** is a close-up perspective view showing details of a support surface assembly of the variable-planform shelving system of **FIG. 30**.

[0052] **FIG. 33** is a close-up perspective view showing details of a variable support platform of the variable-planform shelving system of **FIG. 30**.

[0053] **FIG. 34** is a perspective view of a variable support platform of a wall-mounted variable-planform shelf in a compact collapsed configuration, in accordance with many embodiments.

[0054] **FIG. 35** is a perspective view of the variable support platform of **FIG. 34** in an expanded configuration.

[0055] **FIG. 36** is a perspective view of the variable support platform of **FIG. 34** in an expanded configuration that wraps around an exterior corner of a wall.

[0056] **FIG. 37** is a plan view showing three variable support platforms of **FIG. 34** installed to wrap around two exterior corners of a wall.

[0057] **FIG. 38A** and **FIG. 38B** are perspective views of a variable-length clothes rack having a variable-planform base, in accordance with many embodiments.

[0058] **FIG. 39A** is a plan view of a support surface assembly in an intermediate length configuration, in accordance with many embodiments.

[0059] **FIG. 39B** is a plan view of the support surface assembly of **FIG. 39A** in a collapsed compact length configuration.

[0060] **FIG. 39C** is a close-plan view of the support surface assembly of **FIG. 39A** in an expanded length configuration.

[0061] **FIG. 40** is a plan view of a support surface assembly that includes overlapping coupled panels, in accordance with many embodiments.

[0062] **FIG. 41** is a close-up perspective view of a coupling feature that interfaces with slots in adjacent panels of the support surface assembly of **FIG. 40**.

[0063] **FIG. 42** is shows a perspective view of an alternate embodiment of a support platform.

[0064] **FIG. 43** is an exploded perspective view of the support platform of **FIG. 42**.

[0065] **FIG. 44** is bottom perspective view of the support platform of **FIG. 42**, with support brackets in place.

[0066] **FIG. 45** is an exploded perspective view of a sandwich panel that can be used for a center ellipse for the support platform of **FIG. 42**.

[0067] **FIG. 46** is an exploded perspective view of a sandwich panel that can be used for an outer half ellipse for the support platform of **FIG. 42**.

[0068] **FIG. 47** is an exploded perspective view of a sandwich panel that can be used for a bridge for the support platform of **FIG. 42**.

[0069] **FIGS. 48-53** are top views showing multiple configurations for the support platform of **FIG. 42**.

[0070] **FIG. 54** is a perspective view of a base support platform in accordance with embodiments.

[0071] **FIG. 55** is a perspective view of a shelving system incorporating the support platform of **FIG. 42** and the base support platform of **FIG. 54**.

[0072] **FIG. 56** is a top view of a backing that can be used in the shelving system of **FIG. 55**, in accordance with embodiments.

[0073] **FIG. 57** is a cutaway perspective view of a support surface assembly in accordance with embodiments.

[0074] **FIG. 58** is a cutaway perspective view of a support surface assembly in accordance with additional embodiments.

[0075] **FIG. 59** is a perspective view of an underside of a support platform having lighting attached.

[0076] **FIG. 60** is a perspective detail view of an underside of a support platform with a swiveling light box.

[0077] **FIG. 61** is a perspective view of an underside of a support platform having recessed lighting.

[0078] **FIG. 62** is a rear view of moveable slat that can be used as an adjustable backing in a variable planform shelving system in accordance with various embodiments, such as the system shown in **FIG. 55**.

[0079] **FIG. 63A** is a detail view of a linkage within the moveable slat of **FIG. 62**.

[0080] **FIG. 63B** is a detail view of a link within the moveable slat of **FIG. 62** in accordance with various embodiments.

[0081] **FIG. 64** is a perspective view of a variable-length clothes rack having a variable-planform base and a top rack with interchangeable segment members, in accordance with many embodiments.

[0082] **FIG. 65** shows example interchangeable segment members for use in the top rack with interchangeable segment members of **FIG. 64**, in accordance with many embodiments.

[0083] **FIG. 66** is a partial perspective view of a variable-length clothes rack having a variable-planform base and a top rack with differing interchangeable segment members, in accordance with many embodiments.

[0084] **FIG. 67** shows end details of a third support member for the clothing rack with top rack interchangeable segment members of **FIG. 64**, in accordance with many embodiments.

## DETAILED DESCRIPTION

[0085] In the following description, various embodiments of the present invention will be described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the embodiments. However, it will also be apparent to one skilled in the art that the present invention may be practiced without the specific details. Furthermore, well-known features may be omitted or simplified in order not to obscure the embodiment being described.

[0086] Referring now to the drawings, in which like reference numerals represent like parts throughout the several views, **FIG. 1** shows a variable-planform shelving system 10, in accordance with many embodiments. The shelving system 10 is shown in a compact collapsed configuration. The shelving system 10 includes a variable-planform base 12, variable planform

shelves 14, four support posts 16, a kick plate assembly 18, and price display assemblies 20. Although two variable planform shelves 14 are shown, the variable-planform shelving system 10 can include any suitable number of variable planform shelves 14 (*e.g.*, 1 or more).

[0087] The variable-planform base 12 and each of the variable planform shelves 14 include a support surface assembly 22 that provides a support surface for items supported by the shelving system 10. In the embodiment shown, the support surface assemblies 22 are fabricated from a plurality of vertically-oriented panels that are intermittently bonded together such that a support surface assembly 22 can be expanded in a lengthwise direction 24 (perpendicular to the orientation of the vertically-oriented panels) without any substantial contraction perpendicular to the lengthwise direction 24. In addition to being expandable in the lengthwise direction 24, the support surface assembly 22 is flexible to conform to a variety of curved planforms in which the shelving system 10 can be configured.

**[0088]** **FIG. 2** shows the shelving system 10 in the compact collapsed configuration with the support surface assemblies 22 removed to better show details of a base support platform 26 portion of the variable-planform base 12 and a variable support platform 28 portion of the shelves 14. The base support platform 26 supports a support surface assembly 22. Likewise, each of the variable support platforms 28 support a support surface assembly 22. The base support platform 26 and the variable support platforms 28 are supported by the four support posts 16.

**[0089]** The base support platform 26 and the variable support platforms 28 are reconfigurable into any of a continuous range of different planforms including expanded planforms, a variety of curved planforms, and combinations thereof. Each variable support platform 28 includes a first frame 30, a second frame 32, and a third frame 34. The third frame 34 has an elliptical outer perimeter. Each of the first and second frames 30, 32 have an outer perimeter shape of a half ellipse.

**[0090]** Generally, in mathematician terms, an ellipse in two dimensions is symmetric and defined by a continuous perimeter, a major axis, and a minor axis. The major axis intersects three major reference points of the ellipse: a first point on a perimeter of the ellipse corresponding to a greatest diameter of the ellipse, a second point on the perimeter of the ellipse corresponding to an

opposite end of the greatest diameter of the ellipse, and a center point of the ellipse located equidistant from each of the first point and the second point. The minor axis intersects three pertinent reference points of the ellipse: a third point on a perimeter of the ellipse corresponding to a smallest diameter of the ellipse, a fourth point on the perimeter of the ellipse corresponding to an opposite end of the smallest diameter of the ellipse, and the center of the ellipse, which is also equidistant from each of the third point and the fourth point. However, such a definition fails to convey the full meaning of the terms "ellipse" or "elliptical" for the purposes of this disclosure. Herein, such terms not only includes the mathematician's ellipse, but refers also to any elongate circle, regardless of symmetry, and any portion thereof. Thus a partial ellipse may include any segment of an elliptical perimeter or any area cut out of an ellipse, regardless of how small or large any curved edges may be. Additionally, a reference to an ellipse would include any elongated circular shape having any sides, ends, or edges trimmed off.

**[0091]** A first portion of the third frame 34 can be slidably received within a horizontally-oriented slot in the first frame 30 and a second portion of the third frame 34 is slidably received within a horizontally-oriented slot in the second frame 32. The planform of the variable support platform 28 is selectively varied by repositioning and/or reorienting the third frame 34 relative to the first frame 30 and/or relative to the second frame 32.

**[0092]** In a similar fashion, the planform of the base support platform 26 can be selectively varied. The planform of the base support platform 26 and the planform of each of the variable support platforms 28 can be varied in the same way so that each of the support posts 16 remains vertical. For example, **FIG. 3** shows the shelving system 10 in a partially expanded configuration with the support surface assemblies 22 removed to better show the partially expanded states of the base support platform 26 and the variable support platforms 28.

**[0093]** The base support platform 26 includes an upper portion 36 and a lower portion 38. The upper portion 36 includes a first upper frame 40, a second upper frame 42, and a third upper frame 44 that are configured similar to the first, second, and third frames 30, 32, 34 of the variable support platforms 28. The third upper frame 44 has an elliptical outer perimeter. Each of the first and second upper frames 40, 42 has an outer perimeter in the shape of a half ellipse. A first portion of the third upper frame 44 is slidably received within a horizontally-oriented slot in the first upper frame 40 and a second portion of the third upper frame 44 is slidably received

within a horizontally-oriented slot in the second upper frame 42. Likewise, the lower portion 38 includes a first lower frame 46, a second lower frame 48, and a third lower frame 50 that are configured similar to the first, second, and third frames 30, 32, 34 of the variable support platforms 28. The third lower frame 50 has an elliptical outer perimeter. Each of the first and second lower frames 46, 48 has an outer perimeter in the shape of a half ellipse. A first portion of the third lower frame 50 is slidably received within a horizontally-oriented slot in the first lower frame 46 and a second portion of the third upper frame 50 is slidably received within a horizontally-oriented slot in the second lower frame 48. The planform of the base support platform 26 is selectively varied by repositioning and/or reorienting the third upper and third lower frames 44, 50 relative to the first upper and first lower frames 40, 46 and/or relative to the second upper and second lower frames 42, 48.

**[0094]** Additional details of the shelving system 10 will now be described with reference to **FIG. 4**, which shows the shelving system 10 in a fully expanded in-line configuration. As shown, the third frame 34 of the variable support platforms 28 has an elongated aperture 52 that extends from one end of the third frame 34 to the other. The elongated aperture 52 receives a first coupling pin 54 that is coupled with the first frame 30 and extends across the first frame slot, thereby extending through the elongated aperture 52. The elongated aperture 52 further receives a second coupling pin 56 that is coupled with the second frame 32 and extends across the second frame slot, thereby extending through the elongated aperture 52. In the fully expanded in-line configuration, the coupling pins 54, 56 are disposed at opposing ends of the elongated aperture 52, thereby retaining the ends of the third frame 34 within the first and second frame slots. Additionally, the coupling pins 54, 56 can be configured to clamp the first and second frames 30, 32 onto the third frame, thereby preventing inadvertent reconfiguration of the variable support platform 28 and enhancing the transfer of bending moments from the third frame 34 to the first and second frames 30, 32. In many embodiments, suitable threaded fasteners are used as the coupling pins 54, 56.

**[0095]** The upper and lower portions 36, 38 of the base support platform 26 are connected by intermediate members (*e.g.*, a column members). Adjacent to the support posts 16, the first upper and first lower frames 40, 46 are connected by two column members 58. Likewise, adjacent to the other support posts 16, the second upper and second lower frames 42, 48 are

connected by two column members 60. The third upper and third lower frames 44, 50 are connected by two column members 62 disposed midway along opposing sides of the third upper and third lower frames 44, 50. A column member 64 connects the first upper and first lower frames 40, 46. The column member 64 can also be configured to clamp the first upper and first lower frames 40, 46 onto the third upper and third lower frames 44, 50, respectively, thereby preventing inadvertent reconfiguration of the base support platform 26 and enhancing the transfer of bending moments from the third upper and third lower frames 44, 50 to the first upper and first lower frames 40, 46. For example, a suitable threaded fastener can be used in conjunction with the column member 64 to provide the clamping force. A column member 66 connects the second upper and second lower frames 42, 48. The column member 66 can also be configured to clamp the second upper and second lower frames 42, 48 onto the third upper and third lower frames 44, 50, respectively, thereby preventing inadvertent reconfiguration of the base support platform 26 and enhancing the transfer of bending moments from the third upper and third lower frames 44, 50 to the second upper and second lower frames 42, 48. For example, a suitable threaded fastener can be used in conjunction with the column member 66 to provide the clamping force. A height adjustable support 68 is disposed directly below each of the column members 62 and helps to stabilize the base support platform 26.

**[0096]** **FIG. 5** shows the shelving system 10 in the fully expanded in-line configuration without the support surface assemblies 22 removed. In many embodiments, the support surface assemblies 22 are coupled with the underlying support platforms at suitable locations (*e.g.*, along the ends and at intermediate points along the lengthwise edge) such that the planform of the support surface assemblies is constrained to conform to the planform of the underlying support platforms.

**[0097]** **FIG. 6** shows the shelving system 10 in a fully expanded curved configuration with the support surface assemblies 22 not shown to better illustrate the relative orientations between the frames of the base support platform 26 and the variable support platforms 28. **FIG. 7** shows the same configuration with the support surface assemblies not removed. As shown, the planform of the variable support surface assemblies 22 varies to conform to the planform of the underlying support platforms. **FIG. 8** and **FIG. 9** show the shelving system 10 in another fully expanded

curved configuration. And **FIG. 10** and **FIG. 11** show the shelving system 10 in yet another fully expanded curved configuration.

**[0098]** **FIG. 12** shows the shelving system 10 (with the support surface assemblies 22 not shown) in another fully expanded curved configuration with a removable support column 70 added to provide additional support to the variable support platforms 28. In the configuration of **FIG. 12**, the support posts 16 are substantially aligned. In many embodiments, the connection between the support posts 16 and the variable support platforms 28 is configured to react mainly shear load. Accordingly, the removable support column 70 provides an additional support that is offset from the aligned support posts 16. With shear only connections between the variable support platforms 28 and the aligned support posts 16, the support column 70 provides required additional support to the variable support platforms 28. **FIG. 13** shows the same configuration with the support surface assemblies 22 not removed and the support column 70 not shown. As can be seen, with shear load only type connections between the variable support platforms 28 and the aligned support posts 16, the support column 70 provides necessary offset support to the variable support platforms 28 to balance eccentricity between the items supported by the shelves and the aligned support posts 16.

[0099] **FIG. 14A** shows a plan view of a variable support platform 28 in the compact collapsed configuration. The first frame 30 includes a straight base member 72, a half-elliptical perimeter member 74, and cross members 76. The perimeter member 74 and the cross members 76 are slotted so as to accommodate the illustrated end portion of the third frame 34. Likewise the second frame 32 includes a straight base member 78, a half-elliptical perimeter member 80, and cross members 82. The perimeter member 80 and the cross members 82 are slotted so as to accommodate the illustrated end portion of the third frame 34. At the corners of the first and second frames 30, 32, semi-circular recesses 84 are configured to accommodate the support posts 16. Adjacent to the semi-circular recesses 84, hanger apertures 86 are located to accommodate a portion of a supporting hanger bracket that is removably attached to one of the support posts 16. The hanger apertures 86 extend circumferentially around the recesses 84 for a limited extent so as to accommodate a suitable range of angular orientations of the support post 16 and the attached hanger bracket. The first, second, and third frames 30, 32, 34 include attachment apertures 88 that can be used to attach the price display assembly 20 shown in

**FIG. 1**. And the third frame 34 includes attachment features 90 for the support column 70 shown in **FIG. 12**.

**[0100]** The central aperture 52 of the third frame 34 receives the coupling pins 54, 56, which are coupled with the first and second frames 30, 32 and extend across the slots in the first and second frames 30, 32, thereby extending through the central aperture 52. The central aperture 52 is configured to allow constrained movement of the third frame 34 relative to the first frame 30 and/or relative to the second frame 32, including changes in angular orientation of the third frame 34 relative to the first frame 30 and/or relative to the second frame 32.

**[0101]** The variable support platform 28 includes additional features that allows for its use as either the upper portion 36 of the base support platform 26 or the lower portion 38 of the base support platform 26. For example, the first frame 30 includes circular apertures 92 for the attachment of the column members 58 as shown in **FIG. 4**. The second frame 32 includes circular apertures 94 for the attachment of the column members 60. And the third frame 34 includes circular apertures 96 for the attachment of the column members 62.

**[0102]** **FIG. 14B** through **FIG. 14E** show details of how a variable support platform 28 is supported from one of the support posts 16. **FIG. 14B** shows bracket-receiving slots 98, 100 in the support posts 16. In many embodiments such as the one shown, the support posts 16 have a plurality of bracket-receiving slots at regular intervals, thereby providing for numerous combinations of numbers of shelves and/or spacing of shelves. **FIG. 14C** shows a hanger bracket 102 partially inserted in a first opening 100 of the support post 16. **FIG. 14D** shows the hanger bracket 102 attached to the support post 16. And **FIG. 14E** shows a close-up side view of the hanger bracket 102 attached to one of the support posts 16 and supporting a corner of a variable support platform 28. Additional details of a suitable approach for supporting the variable planform shelves 14 are described in U.S. Patent No. 5,415,302, entitled "MODULAR SHELVING SYSTEM WITH A QUICK-CHANGE SHELF FEATURE," the entire disclosure of which is hereby incorporated by reference herein.

**[0103]** Any suitable fabrication method and material can be used to make the variable support platform 28. For example, in many embodiments, the first, second, and third frames 30, 32, 34 of the variable support platform 28 are made from components cut (*e.g.*, using a water-jet) from

a suitable constant thickness sheet of material. **FIG. 15** shows a plan view of components that can be used to make the first, second, and third frames 30, 32, and 34 of the variable support platform 28. The first frame 30 can be made from a first upper component 104, a first lower component 106, and first spacer components 108. The first spacer components 108 are disposed between the first upper and first lower components 104, 106 so that the outer perimeter and common features of these components are aligned. The first spacer components 108 serve to separate the first upper and first lower components 104, 106 so as to form the slot that receives part of the third frame 34. In the same way, the second frame 32 can be made from a second upper component 110, a second lower component 112, and second spacer components 114. The second spacer components 114 are disposed between the second upper and second lower components 110, 112 so that the outer perimeter and common features of these components are aligned. The second spacer components 114 serve to separate the second upper and second lower components 110, 112 so as to form the slot that receives part of the third frame 34. The third frame 34 can be made from a third frame component 116 and third spacer components 118. The third spacer components 118 are disposed on top of the third frame component so that the outer perimeter and common features of these components are aligned. The third spacer components 118 provide an upper surface to the third frame 34 that is in plane with the upper surfaces of the first and second frames 30, 32. Any suitable method for joining the components can be used (*e.g.*, bonding, welding, brazing, fastening).

**[0104]** Additional details of the variable support base 26 will now be described with references to **FIG. 16**. The variable support base 26 includes two cylindrical sleeves 120 at each corner. The sleeves 120 interface with the support posts 16 and rigidly tie the support posts to the variable support base 16, thereby stiffening the shelving system 10 against lateral deflection of the shelves 14 relative to the variable support base 26.

**[0105]** Details of the kick plate assembly 18 and the price display assembly 20 will now be described with reference to **FIG. 17** through **FIG. 28**. Both the kick plate assembly 18 and the price display assembly 20 are configured to expand and conform to all of the possible planform configurations of the base support platform 26. **FIG. 17** shows the kick plate assembly 18 and the price display assembly 20 attached to the base support platform 26 in the compact collapsed

configuration. **FIG. 18** shows the kick plate assembly 18 attached to the base support platform 26 with the price display assembly 20 not shown.

**[0106]** **FIG. 19** shows an exploded perspective view of the kick plate assembly 18. The kick plate assembly 18 includes a first kick plate segment 122, a second kick plate segment 124, and a third kick plate segment 126. The first kick plate segment 122 attaches to the first upper and first lower frames 40, 46 of the base support platform 26. The second kick plate segment 124 attaches to the second upper and second lower frames 42, 48 of the base support platform 26. And the third kick plate segment 126 attaches to the third upper and third lower frames 44, 50 of the base support platform 26. The first and second kick plate segments 122, 124 have thin rectangular bodies and can be made to be flexible or inflexible. The first and second kick plate segments 122, 124 cover fixed regions of the base support platform 26 corresponding to forward facing exposed edges of the first upper and first lower frames 40, 46 and of the second upper and second lower frames 42, 48, respectively. The third kick plate segment 126 includes a central portion 128 and side extensions 130. The central portion 128 covers a fixed region of the base support platform 26 corresponding to forward facing exposed edges of the third upper and third lower frames 44, 50. When the base support platform 26 is in the compact collapsed configuration (as shown), the side extensions extend behind and are fully covered by the first and second kick plate segments 122, 124. When the base support platform 26 is in an expanded configuration, the side extensions cover forward facing portions of the base support platform 26 disposed between the central portion 128 and each of the first and second kick plate segments 122, 124. The third kick plate segment 126 can be made suitably flexible such that the side extensions are able to conform to all of the various planform configurations of the base support platform 26.

**[0107]** Additional features of the kick plate assembly 18 are shown in **FIG. 20** through **FIG. 22**. **FIG. 20** is a rear perspective view showing a portion of the first kick plate segment 122 and a portion of the third kick plate segment 126. **FIG. 21** is a rear perspective view showing a portion of the second kick plate segment 124 and a portion of the third kick plate segment 126. Each of the first, second, and third kick plate segments 122, 124, 126 have barbed attachment features 132 that extend rearward from the aft face of the segment. The barbed attachment features 132 are sized and configured to be accommodated by and engage with the

attachment apertures 88 (as shown in **FIG. 14A**) in the base support platform 26 so as to attach the kick plate assemblies 122, 124, 126 to the base support platform 26. The attachment features 132 in the first and second kick plate segments 122, 124 are located to accommodate and optionally support the side extensions 130 of the third kick plate segment 126 there between. **FIG. 22** shows the kick plate assembly 18 in an expanded configuration and illustrates the coverage provided by the side extensions 130.

**[0108]** **FIG. 23** through **FIG. 28** show details of the price display assembly 20, in accordance with many embodiments. **FIG. 23** and **FIG. 24** show rear perspective views of an embodiment of the price display assembly 20 that is configured to attach to the attachment apertures 88 (as shown in **FIG. 14A**) in the variable support platform 28. **FIG. 25** shows a front perspective view of the price display assembly 20. The price display assembly 20 includes a first display segment 134, a second display segment 136, and a flexible third display segment 138 that is slidably received through rectangular frame portions 140, 142 of the first and second display segments 134, 136, respectively. The first display segment 134 includes barbed attachment features 144 that extend rearward from the aft face of the first display segment 134. The second display segment 136 includes barbed attachment features 146 that extend rearward from the aft face of the second display segment 136. And the third display segment 138 includes barbed attachment features 148 that extend rearward from the aft face of the third display segment 138. The attachment features 144, 146, 148 are sized and configured to be accommodated by and engage with the attachment apertures 88 (as shown in **FIG. 14A**) in the variable support platform 28 so as to attach the price display assembly 20 to the variable support platform 28. The first display segment 134 is attached to the first frame 30; the second display segment 136 is attached to the second frame 32; and the third display segment 138 is attached to the third frame 34. When the variable support platform 28 is reconfigured, the flexible third display segment 138 slides relative to the first display segment 134 and/or relative to the second display segment 136 through the rectangular frame portions 140, 142 of the first and second display segments 134, 136, while still remaining engaged through at least one of the rectangular frame portions 140, 142 in each of the first and second display segments 134, 136. Any misalignment between the first and second display segments 134, 136 is accommodated by flexure of the flexible third display segment 138. **FIG. 26** shows the price display assembly 20 in an expanded

configuration and illustrates the price display coverage provided by the third display segment 138 between the first and second display segment 134, 136. **FIG. 27** and **FIG. 28** show an embodiment of the price display assembly 20 configured to be mounted to the base support platform 26 via support beams 150 extending from the rectangular frame portions 140, 142.

**[0109]** **FIG. 29** shows a variable planform table 160 with a support surface assembly removed to better show underlying details, in accordance with many embodiments. The table 160 includes a variable support platform 162; a variable base 164; first intermediate members 166, second intermediate members 168 and third intermediate members 170. The variable support platform 162 and the variable base 164 are configured similar to the variable support platform 28 described herein. In many embodiments, the table 160 includes a support surface assembly 22 (not shown) supported by the variable support platform 162. And in many embodiments, the table 160 includes a support surface assembly 22 (not shown) supported by the variable base 164. In similar manner to the variable shelving system 10 described herein, the table 160 can be reconfigured into different planforms having different sizes and shapes.

**[0110]** **FIG. 30** shows another variable-planform shelving system 180, in accordance with many embodiments, in a compact collapsed configuration with support surface assemblies 22 removed to better show details of underlying features. The shelving system 180 includes base support platforms 182 and opposing support columns 184, 186 with variable support platforms 188 supported there from. The base support platforms 182 and the variable support platforms 188 are configured similar to the variable support platforms 28. **FIG. 31** is a close-up perspective view showing connection details between a base support platform 182 and a base beam 190 rigidly attached to each of the support columns 184, 186. End frames of the base support platform 182 includes flanges 192 that are bolted to the base beam 190, thereby rigidly connecting the base support platform to the support columns 184, 186. **FIG. 32** shows a support surface assembly 22 coupled to and supported by one of the base support platforms 182. **FIG. 33** shows a close-up view of an end of one of the variable support platforms 188, which includes an integral end support beam 194. Each of the end support beams 194 is attached to and cantilevered from one of the support columns 184, 186.

**[0111]** **FIG. 34** through **FIG. 36** show a wall-mounted variable-planform shelving system 200, in accordance with many embodiments. The shelving system 200 includes variable support

platforms 202 that are configured similar to the variable support platforms 188. Each of the variable support platforms is attachable to a wall 204 via two or more support beams 206. For example, **FIG. 34** shows a single variable support platform 202 in a compact collapsed configuration attached to the wall 204 via two support beams 206 disposed at opposing ends of the variable support platform 202. **FIG. 35** shows a single variable support platform 202 in a fully-expanded configuration attached to the wall 204 via three support beams 206. **FIG. 36** shows a single variable support platform 202 in a fully-expanded configuration that wraps around a corner of the wall 204. And **FIG. 37** shows three variable support platforms 202 that wrap around two corners of the wall 204. As can be appreciated, the wall-mounted variable-planform shelving system 200 can be used and/or adapted for use with numerous wall configurations having different lengths, external corners, and/or internal corners.

**[0112]** **FIG. 38A** and **FIG. 38B** show a variable-length clothes rack 210 having a variable-planform base 212, in accordance with many embodiments. The variable planform base 212 is configured similar to the variable planform base 12 described herein. Supported from the variable planform base 212 is an extendable top beam 214 from which clothes can be hung. The extendable top beam 214 can be reconfigured to various lengths corresponding to the various possible planforms of the variable planform base 212. The extendable top beam 214 is supported by two support columns 216, which are rigidly connected to opposing ends of the variable planform base 212. The extendable top beam 214 includes two flexible strap members 218, segments of which are held in tension between the tops of the support columns 216. For example, ends of the strap members 218 can be attached to the top of one of the support columns 216 and an intermediate location of each of the strap members 218 can be clamped to the top of the opposing support column 216 to maintain the tension in the strap members 218 between the tops of the support columns 216. As shown, the variable planform base 212 includes a support surface assembly 22 that can be used to support additional items (*e.g.*, shoes, boots, etc.).

**[0113]** **FIGS. 39A**, **39B**, and **39C** show plan views of the support surface assembly 22 in different expanded states. **FIG. 39A** shows the support surface assembly 22 in an intermediate length state corresponding to an intermediate length of the support surface assembly 22. The support surface assembly 22 is made from a plurality of flat panel members that extend vertically

relative to view direction shown and are intermittently bonded together to a flexible and expandable assembly. **FIG. 39B** shows the support surface assembly 22 in a compressed state corresponding to a reduced length of the support surface assembly 22 in which the separation distance between adjacent flat panel members is reduced. And **FIG. 39C** shows the support surface assembly 22 in an expanded state corresponding to a maximum length of the support surface assembly 22. By using a suitable number of flat panel members, the distance between adjacent flat panel members at locations between bonded areas can be kept below a distance suitable for ensuring that the support surface assembly 22 does not contract to a detrimental extent transverse to the expansion direction of the support surface assembly 22 when the support surface assembly 22 is expanded.

**[0114]** Any suitable material can be used to fabricate the support surface assembly 22. For example, the support surface assembly 22 can be made from polycarbonate strips, acrylic strips, and acrylic abrasion resistant strips. In general, the strips are flexible, and have a resiliency to return to their straight configuration. As can be seen in FIGS. **39A-39C**, and in **FIG. 32**, adjacent strips are glued or otherwise attached to each other so that, when the support surface assembly 22 is elongated, the strips each pulled at intermediate connection points into a sine wave shape. To provide this function, first and second adjacent strips are attached at regular intervals along their length. A third strip, on the opposite side of the second strip from the first strip, is attached to the first strip at intermediate connection points to the first strip. These intermediate connection points are between the connection points of the first strip and the second strip, for example half way between the connection points. This pattern is repeated throughout the support surface assembly 22. In this manner, when ends of the support surface assembly 22 are pulled apart, each of the strips is pulled into a sine wave shape.

**[0115]** In addition to being flexible, the strips preferably have enough compressive strength, especially in the height direction, to support objects on the support surface assembly 22 without collapse of individual strips or the overall structure. The above materials are examples of materials that work well for this purpose, and in embodiments, 1/32 inch polycarbonate strips are used and provide this function. Such strips, in an embodiment, are attached so as to form 1.5 inch long diamonds in the pattern. That is, the intermediate connection points on the strips are space 1.5 inches each.

[0116] Any suitable method of manufacturing the support surface assembly 22 can be used. For example, separate strips can be joined via a suitable method (*e.g.*, fusing, liquid welding, gluing). A form can be used to hold separate strips while they are joined. And the support surface assembly 22 can be fabricated by pouring a suitable material into a mold.

[0117] Any suitable fabrication method and material can be used to make the variable-planform shelving systems, tables, and clothes racks described herein. For example, suitable materials include steel, stainless steel, aluminum, galvanized steel, zinc, iron, titanium, and plastics (e.g., polycarbonate, acrylic, ABS, and HDPE). Suitable fabrication methods include, for example, stamping, water jetting, pouring, forming, metal casting, CNC machining, casting, and injection molding.

[0118] **FIG. 40** shows a support surface assembly 220 that can be used in place of the support surface assembly 22. The support surface assembly 220 includes a plurality of slotted panels 222 having slots 224. Each of the slotted panels has a substantially rectangular planform with slightly curved outer edges 226 so as to present a smooth combined edge when the support surface assembly 220 is shaped to have a curved planform such as shown in **FIG. 40**. Each of the slots 224 is shaped to overlap an adjacent slot 224 of an adjacent panel in each of the various planform configurations of the support surface assembly 220. At each of the overlapping locations of the slots 224, a coupling element 230 as shown in **FIG. 41** is used to constrain the adjacent panels relative to each other. As the support surface assembly 220 is reshaped into different planform shapes, the coupling element 230 slides within the slots 224 as dictated by the changing position of the overlapped location between the slots 224. Suitable panels of the slotted panels 222 can be tied to underlying frames of the variable support platform or to the base support platform with intermediate panels being free to adopt positions to provide a smooth transition between panels that are tied to the underlying frames. For example, one end panel of the support surface assembly 220 can be tied to the first frame 30 of the variable support platform 28, the opposite end panel of the support surface assembly 220 can be tied to the second frame 32 of the variable support platform 28, and the center panel of the support surface assembly 220 can be tied to the third frame 34 of the variable support platform 28, thereby leaving all the remaining untied panels to reposition to suitable locations consistent with the

geometry of the slots 224 such that the support surface assembly 220 has a planform with smoothly curved edges.

**[0119]** **FIG. 42** shows an alternate embodiment of a support platform 300. The support platform 300 includes a center ellipse 302 and outer half ellipses 304, 306. Pins 308, 310 attached at distal ends of the outer half ellipses 304, 306 extend through slots 312, 314 on the center ellipse.

**[0120]** In addition to the slots 312, 314, the center ellipse 302 includes distal holes 316, 318 at opposite ends of the ellipse. As further described below, the pins 308, 310 may alternatively connect through either the slots 312, 314 or the holes 316, 318. These two different connections provide a variety of configuration options for the support platform 300.

**[0121]** As shown in **FIG. 43**, each of the outer half ellipses 304, 306 includes a top plate 322, which may be, for example, an aluminum plate, such as 5052 aluminum, 1/32 inch thick. The top plates 322 can include openings 324 to lessen weight of the support platform 300 and/or to add aesthetic appeal.

**[0122]** Wedges 326, 328 are sandwiched between the top plates 322 and bottom plates 330 for the outer half ellipses 304, 306. The wedges 326, 328 can be the same height as the center ellipse 302, thereby spacing the top plates 322 and bottom plates 330, forming slots between the top plate 322 and the bottom plate 330 for slidably receiving the distal ends of the center ellipse 302.

**[0123]** The outer half ellipses 304, 306 include distal holes 332, 334 for receiving the pins 308, 310. As described earlier, the pins 308, 310 can be alternatively attached to the slots 312, 314 or the holes 316, 318 of the center ellipse 302. To this end, the pins 308, 310 can be reattachable structures, such as fasteners, where the support surface can be used in one manner, and later changed to another configuration, or a pin could be a more permanent attachment, such as a rivet, where the support surface is set into a particular configuration and not changed.

**[0124]** As can be seen in **FIG. 44**, the support platform 300 can be supported by outer shelf brackets 340, 342 and a center shelf bracket 344. Other connection and support structures can be used, and some examples are provided with earlier embodiments.

**[0125]** In embodiments, the wedges 326, 328 (detail of a sandwich configuration not shown), the bottom plate 330 (**FIG. 46**), the bridges 320 (**FIG. 47**), and the ellipse 302 (**FIG. 45**) are formed of a sandwich panel configurations. By using sandwich panel configurations, these parts are very strong, but lightweight. The bridges 320 provide further lightweight support and strength for the outer edges of the ellipse 302.

**[0126]** As an example, as shown in **FIG. 45**, the ellipse 302 may include metal top and bottom plates 350, 352, with a center 354 having the same structure as the support surface assembly 22 described above. That is, the center 354 shown in the drawings has a structure that is formed from aligned, flexible, resilient strips where adjacent strips are attached at intervals (preferably regular intervals), and opposite adjacent strips are attached offset to one another so that, as the structure is pulled apart, waveforms (preferably sinusoidal) are formed by each of the individual strips. Thus, adjacent strips are inverted relative to one another. It is believed that such a structure provides a stronger, lighter structure than typical honeycomb sandwich panels. However, honeycomb sandwich panels could also be used.

**[0127]** In a similar manner, the bottom plate 330 (**FIG. 46**) can include a center 364 between metal plates 360, 362, and the bridges 320 (**FIG. 47**) can include a center 370 between metal plates 372, 374. The wedges 326, 328 may have a similar structure, but detail of a sandwich panel is not shown for those parts.

**[0128]** In embodiments, the top and bottom plates of the sandwich panels can be aluminum, such as 1/32 inch 5052 aluminum. The center may be formed, for example, of the strips described above, as an example, of 1/32 inch polycarbonate strips that are 1/8 inches tall. PETG or PET-G (Polyethylene Terephtalate Glycol-modified) can also be used. Eastman Chemical, SK Chemicals, and Artenius Italia are some PETG manufacturers. PETG is a clear amorphous thermoplastic that can be injection molded or sheet extruded.

**[0129]** The connection structure of the support platform 300 provides a number of different arrangements. Examples are shown in **FIGS. 48-53**. The slots 312, 314 are wider in locations than in others, permitting the pins 308, 310, which are connected to the distal ends of the half ellipses 304, 306 via the distal holes 332, 334, to move not only along a length of the slots, but also laterally from side to side in the variable width of the slots. In embodiments, such as is

shown in **FIG. 42**, the slots 312, 314 include arced sides to as to provide smooth movement of the pints 308, 310 along the edges of the slots.

**[0130]** **FIG. 48** shows a first arrangement of the support platform 300 where the half ellipses 304, 306 are pushed fully inward relative to the ellipse 302, providing a short, straight support. This support may be, for example, 3 feet in length. **FIG. 49** shows a second arrangement where the half ellipse 304 is pulled outward relative to the ellipse 302, adding length to the support platform, but with the support platform still being straight. This arrangement may be, for example, 4 feet in length.

**[0131]** **FIG. 50** is another arrangement where both half ellipses 304, 306 are pulled about half way out. This arrangement may also be, for example, 4 feet in length. **FIG. 51** shows yet another arrangement where the half ellipses 304, 306 are pulled fully outward. This arrangement may permit support for a 5 foot shelf, for example.

**[0132]** The elliptical shape of the ellipse 302 and the half ellipses 304, 306 balances the goals of maximizing the amount of turning radius permitted between the ellipse and the half ellipses while providing maximum surface area support by the half ellipses to the ellipse. Moreover, the ellipse 302 and the half ellipses 304, 306 permit the outer edges of the support surface 300 to be rounded, regardless of the orientation, and thus the support surface assemblies 22 can provide a smoothly contoured shelf regardless of orientation of the ellipse 302 and the half ellipses 304, 306.

**[0133]** As an example, **FIG. 53** shows the half ellipses 304, 306 each rotated about 45 degrees, forming a snake pattern. The rounded corners of the half ellipses 304, 306 and the ellipse 302 permit the support surface assembly 22 (not shown in the figure) to extend around the dramatic turns formed by the bent support surface 300 and provide smooth, rounded transitions.

**[0134]** **FIG. 52** shows an alternate arrangement where the pins are attached to the ellipse 302 at the distal holes 316, 318 instead of the slots 312, 314. In this arrangement, the half ellipses 304, 306 can turn up to 90 degrees relative to the ellipse 302, and the elliptical shape of the slots in the half ellipses 304, 306 provides sufficient surface area to support the ellipse 302, without permitting its rotation. In addition, the rounded outer surfaces of the ellipse 302 and the half ellipses 304, 306 permit the support surface assemblies 22 to form around the dramatic turns.

[0135] **FIG. 54** shows an embodiment of a base support platform 380 having two structures similar to the support platform 300 separated by brackets 382, 384, and 386. The base support platform 380 can be arranged similar to the base support platform 380.

[0136] As can be seen in **FIG. 55**, the base support platform 380 and the support platform 300 can be attached to a series of posts 390 to form a shelving system. Additional support platforms 300 may be added as desired, and the ellipses and half ellipses of the base support platform 380 and the support platform 300 can be arranged to a desired shape for the shelves, and then be covered by the support surface assemblies 22. In embodiments, the posts 390 are free standing so that the ellipses and half ellipses of the base support platform 380 and the support platform 300 can be arranged to a desired shape and the posts can be moved accordingly.

[0137] **FIG. 56** shows a flexible plastic backing 400 that may be used as a backing for the shelving system shown in **FIG. 55**. Because the size of the shelving and therefore the width of the backing is based on the configuration of the base support platform 380 and the support platform(s) 300, a backing of a fixed width would not fit many configurations. To address this issue, the backing 400 is configured to attach to one of the posts 390, in this particular embodiment, via tabs 402 that insert into slots (not shown) on the posts. A second backing 401 (**FIG. 55**) is attached to a second, adjacent post 390, and the two backing overlap. The amount of overlap is sufficient so that the two backings can fill the space between the two posts 390, regardless of the configuration of the shelving.

[0138] The two backings 400, 401 may be held together using a variety of methods, including more permanent methods, such as glue, rivets, or fasteners. In the embodiment shown in **FIG. 55**, a long magnet strip 404, which is hinged at a top and includes opposite polarity strips on two sides, is arranged so that the two strips extend along opposite sides of the two backings. The long magnet strip 404 can be easily removed or adjusted to set the backings 400, 401 to a desired combined width. Although only one set of backings 400, 401 is shown on for the left side of the shelving in **FIG. 55**, a similar set can be provided for the right side of the shelving.

[0139] The base support platform 380 and the support platform(s) 300 can be covered by support surface assemblies, such as the support surface assemblies 22 described above, to provide a planform shelving system. In addition, in accordance with embodiments, as shown in

**FIG. 57**, a support surface assembly 422 can include a front plate 424 that extends across a front of the base support platform 380 and the support platform(s) 300. **FIG. 57** shows such a front plate 424 for the support surface assembly 422, with the front plate for fitting across the front of the support platform 300, and **FIG. 58** shows a front plate 426 for a support surface assembly 522, with the front plate for fitting across the front of the base support platform 380.

**[0140]** Front plates, such as the front plates 424, 426, can take any configuration, but in embodiments are configurable with (i.e., stretch or bend with) the support surface assemblies 422, 522, and provide an aesthetically pleasing front edge for the support surface assemblies 422, 522. The front plates also provide a structure that can hook over and lock onto the front edge of the ellipse and the half ellipses. In the embodiments shown in **FIGS. 57** and **58**, the front plates 424, 426 are made of the same opposing strips of flexible, resilient material as the top surface of the support surface assemblies 22, 422, and 522. The front plate 424 shown in **FIG. 57** extends at a right angle to the top surface, without transition. The front plate 426 shown in **FIG. 58** includes a transition area 428, stepping to the front plate, with each creating an angle of about 45 degrees with the adjacent piece.

**[0141]** In embodiments, the front plates 424, 426 provide a location for the mounting of price tags or other signage, and in the case of the base support platform 380, can receive a kick plate. To this end, a slot, groove, or other structure can be provided for receiving a kick plate or price tag plate. Also, in alternate embodiments, a separate structure (not shown) can be mounted on the front plates 424 and/or 426 for receiving the strips. Like the backing, two or more plates can be received in the groove, slot, or other structure so that the plates may stretch to cover the support surface assemblies 422, 522 regardless of the configuration of the base support platform 380 and the support platform(s) 300.

**[0142]** The kick plates or price tag plates can be formed of any suitable material, but in embodiments is a flexible plastic that can conform to the front edge of the support surface assembly 422, 522. In addition, in embodiments, the kick plates or price tag plates can be paperboard or another material on which signage or decoration can be printed.

**[0143]** As an example, as shown in **FIG. 58**, a kick plate 430 is mounted in a groove 432 formed in the front edge of the front plate 426. The groove 432 is formed by tabs 434, 436 at

upper and lower extremities of the groove. The tabs hold the kick plate 430 in place. Although not shown, as discussed above, multiple kick plates 430 may be mounted in the groove 432 and may overlap at ends. The multiple kick plates permit an installer to arrange the kick plates 430 to cover the entire front of the support surface assembly 522, regardless of its length or configuration.

**[0144]** A planform shelving system having at least a second shelf support platform 300 elevated over an additional shelf support platform 300 or base support platform 380 may be provided (see e.g., **FIG. 55**). In various embodiments, an underside of the second shelf 300 comprises at least one light source. For example, **FIG. 59** is a perspective view of an underside of a support platform 300 having a light source 590 attached. In embodiments, the light source 590 is a strip of light emitting diodes. Light source 590 can be attached directly to shelf 300, directly to a shelf bracket such as shelf brackets 340, 342 and 344, directly to any other feature disposed below or on an underside of shelf 300, or to some combination thereof.

**[0145]** **FIG. 60** is a perspective detail view of an underside of a support platform 300 with a swiveling light box. In embodiments, the light source 590 is mounted in a light box 600, which is coupled to the underside of support platform 300 by a swivel mount 601. Swivel mount 601 can be attached directly to shelf 300, directly to a shelf bracket such as shelf brackets 340, 342 and 344, directly to any other feature disposed below or on an underside of shelf 300, or to some combination thereof. The swivel mount 601 allows the light box 600 to swivel or pivot in order to adjust the direction of light emitted from the light source 590 and adjust the lighting of objects below the frame of support platform 300.

**[0146]** **FIG. 61** is a perspective view of an underside of a support platform 300 having recessed lighting. In embodiments, one of the frames of the second shelf 300 comprises a machined recess 610 on the underside of the second shelf 300 for receiving at least one light source 590. In embodiments, the machined recess allows for a lighting source 590 to be included without protruding from the underside of the frame of the second shelf 300, allowing the second shelf 300 with a light source 590 to be used with the same supports 340, 342, 344, etc. used for a support platform 300 without light sources 590.

**[0147]** **FIG. 62** is a rear view of moveable slat 620 that can be used as an adjustable backing in a variable planform shelving system in accordance with various embodiments, such as the system shown in **FIG. 55**. **FIG. 63A** is a detail view of a linkage 630 within the moveable slat 620 of **FIG. 62**.

**[0148]** In embodiments, a movable slat 620 is provided as an adjustable backing between adjacent support columns 390 of a planform shelving system. In some embodiments, the movable slat 620 comprises a plurality of slot links 631, a plurality of solid links 632, and a plurality of long pin members 633. Each of the plurality of slot links 631 comprises a vertical slot 634 through a height of the slot link 631. This slot 634 is configured to receive at least one long pin member 633 for at least horizontal sliding of the pin member 633 along a length of the slot 634. Each of the plurality of solid links 632 comprises a through-hole 635 at each of two ends of a body of the solid link 632, and each through-hole 635 is configured to receive one long pin member 633. To construct the slat 620, a subset of each of the plurality of slot links 631 and the plurality of solid links 632 are disposed in an alternating stacked pattern so that slots 634 and through-holes 635 are aligned in a stack. A long pin member 633 is passed vertically alternately through the solid links 632 and slot links 631 in the stack to form a joint in the movable slat 620, the joint made up of solid links 632 and slot links 631 coupled by the pin 633. In this configuration, the solid links 632 constrain the pin 633 in place but allow the coupled slot links 631 to slide and pivot relative to the pin 633. The slot links 631 provide spaces between consecutive solid links 632. Another subset of slot links 631 can be placed into these spaces such that slots 634 in the newly added slot links 631 align with the unoccupied through-holes 635 in second ends of the coupled solid links 632, providing a path for the insertion of another long pin member 633 to form another joint in the slat 620. Thus, as shown in **FIG. 63A**, each solid link 632 constrains two pins 633 for coupling slot links 631 to either end of the solid link 632. The coupled slot members 631 are free to slide and rotate relative to the pin 633. When the coupled slot links 631 are additionally coupled to another subset of solid links 632 within a larger backing assembly of slat 620, they provide a sliding and pivoting interface which allows a variability in stretching and contouring of the slat 620 which is very suitable for following the dramatic changes of length and shape possible with the variable planform shelving system.

**[0149]** In embodiments, the movable slat comprises a plurality of first links 621, a plurality of second links 632, and a plurality of long pin members 633. Each of the plurality of first links 621 includes a vertical opening 634 through a height of the link 621, and the opening is configured to receive at least one long pin member 633 to align the link 621 with other links. The plurality of first links 621 is aligned into columns 623 of vertically aligned first links 621. Each of the plurality of second links 622 comprises at least one vertical opening 634 through a height of the link 622, and each opening 634 is configured to receive at least one long pin member 633 to align the link 622 with other links. The plurality of second links 622 is aligned into columns 624 of vertically aligned second links 622. Each column 624 of second links 622 is disposed between adjacent columns 623 of first links 621 so that the columns 623 of first links 621 and the columns 624 of second links 622 are disposed in an alternating pattern. Each pin 633 in the plurality of long pin members 633 passes through at least some first links 621 in a first link column 623 and passes through at least some second links 622 in an adjacent second link column 624. The result is that the first link column 623 is joined to the adjacent second link column 624 by a common pin 633, providing a joint within a movable slat 620. In some embodiments, in at least one of the columns 623 of first links 621 in the movable slat 620, the first links 621 in the column are disposed so that gaps exist between at least some vertically consecutive first links 621, and at least one second link 622 that is part of an adjacent second link column 624 is disposed between vertically consecutive first links 621 and has a height which determines the size of at least one gap.

**[0150]** **FIG. 63B** is a detail view of a link within the moveable slat of **FIG. 62** in accordance with various embodiments. As shown in **FIG. 63B**, in various embodiments, link 638 can include at least one groove 636 configured to receive a hanger 637. Hanger 637 can be any type of hardware configured for use as accessories in a slat wall system as known in the art, including but not limited to prongs, bars, hooks, posts, brackets, clips, arms, plates, faceouts, holders, racks, tubing, fixtures, shelves, and baskets. In some embodiments, link 638 is an add-on component to a link already in the slat 620 (such as any of links 621, 622, 631, and 632). In some embodiments, link 638 is modified to include at least one vertical opening (such as either of 634 and 635) for use as a link in the slat 620 (such as any of links 621, 622, 631, and 632).

**[0151]** **FIG. 64** shows a perspective view of a variable-length clothes rack 640 having a variable-planform base 380 and a top rack 641 with interchangeable segment members 642, in accordance with many embodiments. In embodiments, the top rack 641 comprises a plurality of shaped interchangeable members 642 which together form a shape of the top rack 641. In order to vary the shape of the top rack 641, at least some of the shaped interchangeable members 642 may be replaced with other shaped interchangeable members 642. **FIG. 65** shows example interchangeable segment members 642 for use in the top rack 641 of **FIG. 64**, in accordance with many embodiments. By replacing interchangeable members 642 of one shape for interchangeable members of another shape, the top rack 641 may be varied according to preference or design criteria. For example, as shown in **FIG. 64**, all shaped interchangeable members 642 are curved members 647. However, by replacing several of curved members 647 with a combination of S-members 644, Z-members 645, and straight-members 646 shown in **FIG. 65**, a shape of top rack 641 shown in **FIG. 64** can be converted to a shape of top rack 641 shown in **FIG. 66**. Other shapes of interchangeable segment members 642 may be provided in addition to those example shapes shown in **FIG. 65**. Since interchangeable segment members 642 are not limited to the example shapes shown in **FIG. 65**, any number of variations on the shape of top rack 641 are possible in various embodiments.

**[0152]** Clothesrack 640 can be configured for use with standardized clothes hangers. In many embodiments, the diameter or shape of interchangeable segment members 642 is selected to accommodate such standardized clothes hangers. In some embodiments, as shown in **FIG. 64**, at least one interchangeable segment member 642 has at least one nub 648A and/or at least one notch 648B which can function to keep such clothes hangers in place on top rack 641. The ability to keep clothing hangers in place can be particularly useful for maintaining an organized or visually appealing display of clothing when the risk of the hangers becoming bunched together is high, such as when the racks are to be moved or experience high volumes of customer perusal.

**[0153]** In accordance with many embodiments, **FIG. 67** shows end details of a third support member 650 for use in the adjustable clothing rack 640 with top rack 641 with interchangeable segment members 642 shown in **FIG. 65**. In some embodiments, a variable-length clothes rack 640 with top rack 641 of differing interchangeable segment members 642 can also include a third support column 650 to supplement support provided to top rack 641 by end support columns

649. Third column 650 is supported by center ellipse 302. In some embodiments, third column 650 can be telescoping in order to change size to support top rack 641 regardless of how interchangeable segment members 642 vary a position of top rack 641 up or down. In embodiments third column 650 can comprise a mount 651 located at a top end of the third support column 650. Mount 651 can be configured to conform to a common cross section of the shaped interchangeable members 642 to provide a secure coupling between the third support column 650 and the top rack 641. Mount 651 can also comprise a magnet to achieve this secure coupling when the interchangeable members 642 are either made of metal or also fitted with magnetic attachment points. In embodiments, the third support column 650 comprises at least one prong 652 at a base 653 of the third support column 650 to be received by a slot 312 or 314 in the elliptical third frame 302 for attaching the third support column 150 to the elliptical third frame 302.

**[0154]** Other variations are within the spirit of the present invention. Thus, while the invention is susceptible to various modifications and alternative constructions, certain illustrated embodiments thereof are shown in the drawings and have been described above in detail. It should be understood, however, that there is no intention to limit the invention to the specific form or forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention, as defined in the appended claims.

**[0155]** The use of the terms "a" and "an" and "the" and similar referents in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (i.e., meaning "including, but not limited to,") unless otherwise noted. The term "connected" is to be construed as partly or wholly contained within, attached to, or joined together, even if there is something intervening. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or

otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (*e.g.*, "such as") provided herein, is intended merely to better illuminate embodiments of the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

**[0156]** Preferred embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

**[0157]** All references, including publications, patent applications, and patents, cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

WHAT IS CLAIMED IS:

1. A variable planform shelving system comprising a shelf having a variable planform, the shelf comprising:

two or more frames, each frame providing a part of a variable support platform and each frame comprising at least one interaction end configured for interacting with another frame, and wherein at least one frame is coupled with an adjacent frame near an interaction end so that the coupled adjacent frames can move relative to one another to adjust the planform of the shelf.

2. The variable planform shelving system of claim 1, wherein side edges of at least one of the interaction ends in the shelf are contoured so that, when the coupled adjacent frames are not aligned with one another, a smooth transition is formed along adjacent side edges of the coupled adjacent frames.

3. The variable planform shelving system of claim 2, wherein the side edges of at least one of the contoured interaction ends in the shelf is curved.

4. The variable planform shelving system of claim 3, wherein at least one curved interaction end is rounded.

5. The variable planform shelving system of claim 4, wherein at least one rounded interaction end has a shape corresponding to a curved perimeter of at least a partial ellipse.

6. The variable planform shelving system of claim 5, the shelf comprising:

a first frame providing a first part of a variable support platform and having a planform shape including an interaction end with a curved perimeter of a partial ellipse;

a second frame providing a second part of the variable support platform and having a planform shape including an interaction end with a curved perimeter of a partial ellipse, wherein the first frame is coupled with the second frame so that relative positioning between the first frame and the second frame is variable to vary the planform of the variable support platform.

7. The variable planform shelving system of claim 5, the shelf further comprising:

a first frame having a planform shape of one end of an ellipse and providing a first part of a variable support platform;

a second frame having a planform shape of one end of an ellipse and providing a second part of the variable support platform;

a third frame having a planform shape of an ellipse and providing a third part of the variable support platform, the third frame being disposed between the first and second frames, relative positioning between the third frame and each of the first and second frames being variable to vary the planform of the variable support platform.

8. The variable planform shelving system of claim 7, wherein the third frame is configurable to be at least one of slidingly coupled with the first frame, pivotally coupled with the first frame, slidingly coupled with the second frame, and pivotally coupled with the second frame.

9. The variable planform shelving system of claim 8, wherein at least one of the first and second frames comprises a coupling pin coupled with the frame for coupling the frame with the third frame.

10. The variable planform shelving system of claim 9, wherein the at least one of the first and second frames further comprises a slot in the frame that receives a portion of the third frame and wherein the coupling pin coupled with the frame extends across the frame slot and through an opening in the third frame.

11. The variable planform shelving system of claim 9, wherein the third frame comprises one or two shaped apertures, each shaped aperture having a length and a variable width and configurable for receiving the coupling pin of the first or the second frame for axial movement along the length of the aperture and lateral movement within the variable width.

12. The variable planform shelving system of claim 11, wherein at least one shaped aperture includes at least one arced side so as to provide smooth movement of the pin along the side of the aperture.

13. The variable planform shelving system of claim 9, wherein the third frame includes one or two distal holes, each distal hole configured to receive the coupling pin of the first or the second frame for pivotal movement of the frame about the distal hole.

14. The variable planform shelving system of claim 9, wherein the third frame is configured in a first configuration to be slidingly coupled with one of the first frame and the second frame and configured in a second configuration to be pivotally coupled with the one of the first frame and the second frame, and wherein the coupling pin of the one of the first frame and the second frame may be removed and replaced to change the third frame from the first configuration to the second configuration.

15. The variable planform shelving system of claim 9, wherein at least one of the coupling pins of one of the first frame and the second frame is configurable to clamp the one of the first frame and the second frame to the third frame and inhibit movement of the one of the first frame and the second frame relative to the third frame.

16. The variable planform shelving system of claim 10, wherein the first or the second frame comprises:

a top plate having a planform shape of one end of an ellipse;

a bottom plate having a planform shape of one end of an ellipse and aligned relative to the top plate so that the outer perimeter of the bottom plate is aligned with the outer perimeter of the top plate; and

a spacer, wherein the spacer is disposed between and joined to each of the top plate and the bottom plate, and the space between the top plate and the bottom plate defines the slot for receiving the third frame.

17. The variable planform shelving system of claim 7, wherein the third frame comprises:

a base plate in the shape of an ellipse;

a spacer joined to the base plate and aligned with the base plate so that common features of the spacer and the base plate are aligned, wherein the spacer provides an upper

surface to the third frame that is in plane with a top surface of the first frame and a top surface of the second frame.

18. The variable planform shelving system of claim 7, the shelf further comprising a support surface assembly comprising:

a plurality of slotted panels, each having curved slots, arranged so each of the plurality of slotted panels overlaps adjacent panels, wherein each of the slotted panels has a rectangular planform with slightly curved outer edges configured to present a smooth combined edge of the support surface assembly when the variable planform shelf is configured to a curved planform configuration, and wherein each of the slots in the plurality of slotted panels is shaped to overlap an adjacent slot of an adjacent panel; and

a plurality of coupling elements, wherein the plurality of coupling elements are disposed so that at each of the overlapping locations of the slots, a coupling element is disposed to constrain the adjacent panels relative to each other.

19. The variable planform shelving system of claim 18 wherein at least some of the plurality of slotted panels are attached to underlying frames of the variable support platform.

20. The variable planform shelving system of claim 7, wherein at least one of the first frame, the second frame, and the third frame further comprise features for attachment of at least one of one or more support surface assemblies, one or more support posts, one or more kick plates, one or more price displays, one or more hanger hooks, one or more height adjustable feet, and one or more additional variable planform platform frames.

21. The variable planform shelving system of claim 5 further comprising:

a second shelf being elevated above the first shelf, each shelf further comprising:

a first frame having a planform shape of one end of an ellipse and providing a first part of a variable support platform.

a second frame having a planform shape of one end of an ellipse and providing a second part of the variable support platform, and

a third frame having a planform shape of an ellipse and providing a third part of the variable support platform, the third frame being disposed between the first and second

frames, relative positioning between the third frame and each of the first and second frames being variable to vary the planform of the variable support platform;

at least one first support column supporting the first frames of the first and second shelves; and

at least one second support column supporting the second frames of the first and second shelves.

22. The variable planform shelving system of claim 21, wherein an underside of the second shelf further comprises at least one light source.

23. The variable planform shelving system of claim 22, wherein at least one light source comprises at least one strip of light emitting diodes.

24. The variable planform shelving system of claim 22, wherein one of the frames of the second shelf further comprises a machined recess on the underside for receiving the at least one light source.

25. The variable planform shelving system of claim 22, wherein the at least one light source comprises a swiveling light source, and one of the frames of the second shelf further comprises a mount on the underside for the swiveling light source.

26. The variable planform shelving system of claim 21 further comprising a plurality of backing panels, each panel configured to attach to one of the support columns and to overlap with another of the backing panels, wherein the another of the backing panels is attached to another of the support columns and located adjacent to the panel so that the space between the support columns is covered by the overlapping panels.

27. The variable planform shelving system of claim 26, further comprising a long magnet strip comprising:

a first length of magnetic material having a first oriented magnetic polarity;

a second length of magnetic material having a second oriented magnetic polarity; and

a hinge between the first length and the second length, wherein the first oriented magnetic polarity and the second oriented magnetic polarity are configured so that when the first length of magnetic material is placed along a back side of a pair of overlapping backing panels

and the long magnet strip is bent at the hinge so that the second length extends along a front side of the pair of overlapping backing panels, the first oriented magnetic polarity and the second oriented magnetic polarity will align and create a force to resist the movement of the pair of backing panels relative to one another.

28. The variable planform shelving system of claim 21, further comprising a movable slat as an adjustable backing between adjacent support columns, the movable slat comprising:

a plurality of slot links, each of the plurality of slot links comprising a vertical slot through a height of the slot link, the slot configured to receive at least one long pin member for at least horizontal sliding of the at least one long pin member along a length of the slot;

a plurality of solid links, each of the plurality of solid links comprising a through-hole at each of two ends of a body of the link, each through-hole configured to receive one long pin member; and

a plurality of long pin members, wherein the plurality of slot links and the plurality of solid links are disposed in an alternating stacked pattern so that each long pin member in the plurality of long pin members vertically passes alternately through solid links and slot links to form a joint in the movable slat.

29. The variable planform shelving system of claim 21, further comprising a movable slat as an adjustable backing between adjacent support columns, the movable slat comprising:

a plurality of first links, each of the plurality of first links comprising a vertical opening through a height of the link, the opening configured to receive at least one long pin member to align the link with other links, wherein the plurality of first links is aligned into columns of vertically aligned first links;

a plurality of second links, each of the plurality of second links comprising at least one vertical opening through a height of the link, each opening configured to receive at least one long pin member to align the link with other links, wherein the plurality of second links is aligned into columns of vertically aligned second links, and wherein each column of second links is disposed between adjacent columns of first links so that the columns of first links and the columns of second links are disposed in an alternating pattern;

a plurality of long pin members, each pin passing through at least some first links in a first link column and passing through at least some second links in an adjacent second link column so that the first link column is joined to the adjacent second link column by a common pin.

30. The variable planform shelving system of claim 29, wherein, in at least one of the columns of first links in the movable slat, the first links in the column are disposed so that gaps exist between at least some vertically consecutive first links, wherein the size of at least one gap is determined by a height of at least one second link disposed between vertically consecutive first links, wherein the second link is part of an adjacent second link column.

31. The variable planform shelving system of claim 5 further comprising:

a base comprising at least one variable planform shelf, each shelf comprising:

a first frame having a planform shape of one end of an ellipse and providing a first part of a variable support platform,

a second frame having a planform shape of one end of an ellipse and providing a second part of the variable support platform, and

a third frame having a planform shape of an ellipse and providing a third part of the variable support platform, the third frame being disposed between the first and second frames, relative positioning between the third frame and each of the first and second frames being variable to vary the planform of the variable support platform;

at least one first support column supported by the first frame of the at least one variable planform shelf;

at least one second support column supported by the second frame of the at least one variable planform shelf; and

a top beam from which clothes can be hung, the top beam supported at least by the first and the second support columns.

32. The variable planform shelving system of claim 31, wherein the top beam is extendable and comprises at least one flexible strap member held in tension between at least two tops of the support columns.

33. The variable planform shelving system of claim 31, wherein the top rack comprises a plurality of shaped interchangeable members which together form a shape of the top

rack, and at least some of the shaped interchangeable members may be replaced with other shaped interchangeable members to vary the shape of the top rack.

34. The variable planform shelving system of claim 33, further comprising a third support column supported by the third frame of at the least one variable planform shelf and configured for supporting the top rack.

35. The variable planform shelving system of claim 34, wherein the third support column comprises at least one of a mount located at a top end of the third support column configured to conform to a common cross section of the shaped interchangeable members and a magnet configured for securing metal shaped interchangeable members to the third support column.

36. The variable planform shelving system of claim 34, wherein the third support column comprises at least one prong at a base of the third support column to be received by a slot in the third frame for attaching the third support column to the third frame.

37. The variable planform shelving system of claim 34, wherein the third support column comprises a telescoping body for height adjustment of the third support column.

38. The variable planform shelving system of claim 1, further comprising a support surface assembly for use with a variable planform shelf having a variable support platform, the support surface assembly comprising a plurality of interconnected vertically-oriented flexible panels so that the support surface varies in response to variation in the planform of the variable support platform, wherein the support surface assembly is supported by the variable support platform and provides a support surface for items supported by the variable planform shelf.

39. The variable planform shelving system with a support surface of claim 38, wherein the support surface assembly can be expanded in a lengthwise direction perpendicular to the vertical direction of the vertically-oriented panels without any substantial contraction in the support surface assembly in a width-wise direction transverse to the lengthwise direction.

40. The variable planform shelving system with a support surface of claim 38, wherein the plurality of interconnected vertically-oriented flexible panels are intermittently bonded to each other to provide a sinusoidal pattern.

41. The variable planform shelving system with a support surface of claim 40, wherein the intermittent bonding is at a regular interval.

42. The variable planform shelving system with a support surface of claim 41, wherein the regular interval is 3.8 centimeters (1.5 inches).

43. The variable planform shelving system with a support surface of claim 40, wherein the variable support platform comprises a suitable number of interconnected vertically-oriented flexible members such that distances between adjacent vertically-oriented flexible members at locations between bonded areas can be maintained below distances suitable for ensuring that the support surface assembly does not contract to a substantial extent transverse to an expansion direction of the support surface assembly when the support surface assembly is expanded.

44. The variable planform shelving system with a support surface of claim 38, wherein the plurality of interconnected vertically-oriented flexible panels comprise at least one of polycarbonate strips, acrylic strips, and acrylic abrasion resistant strips.

45. The variable planform shelving system with a support surface of claim 38, wherein the support surface is fabricated on a mold.

46. The variable planform shelving system with a support surface of claim 38, wherein the support surface assembly further comprises a front plate assembly affixed to a front surface of the support surface and disposed at an angle relative to a top of the support surface, wherein the front plate assembly comprises a plurality of interconnected vertically-oriented flexible panels.

47. The variable planform shelving system with a support surface of claim 46 wherein the angle is approximately 90°.

48. The variable planform shelving system with a support surface of claim 46 wherein the front plate assembly further comprises:

a step down portion disposed at the angle at which the front plate assembly is disposed relative to the support assembly; and

a vertical portion disposed approximately perpendicular to a top of the support surface.

49. The variable planform shelving system with a support surface of claim 48 wherein the angle is approximately 45°.

50. The variable planform shelving system of claim 1, further comprising a component for use in a variable planform shelf, the component constructed as a sandwich panel comprising:

a top metal layer;

a bottom metal layer;

a middle layer sandwiched between the top and bottom metal layers, the middle layer comprising a plurality of interconnected vertically-oriented parallel flexible panels.

51. The variable planform shelving system with a sandwich panel shelf component of claim 50, wherein the plurality of interconnected vertically-oriented flexible panels are intermittently bonded to each other to provide a sinusoidal pattern.

52. A shelf having a variable planform, the shelf comprising:

a first frame providing a first part of a variable support platform;

a second frame providing a second part of the variable support platform, relative positioning of the first and second frames being variable so as to vary the planform of the variable support platform; and

a support surface assembly that is supported by the variable support platform and provides a support surface for items supported by the shelf, the support surface assembly being at least one of flexible or comprised of a plurality of linked panels so that the support surface provided varies in response to variation in the planform of the variable support platform.

53. The shelf of claim 52, wherein relative orientation of the first and second frames is variable to vary the shape of the planform of the variable support platform.

54. The shelf of claim 52, further comprising a third frame providing a third part of the variable support platform, the third frame being disposed between the first and second frames, relative positioning between the third frame and each of the first and second frames being variable to vary the planform of the variable support platform.

55. The shelf of claim 54, wherein third frame is slidingly coupled with each of the first and second frames.

56. The shelf of claim 55, wherein:

relative orientation of the first and third frames is variable to vary the shape of the planform of the variable support platform; and

relative orientation of the second and third frames is variable to vary the shape of the planform of the variable support platform.

57. The shelf of claim 56, wherein:

each of the first and second frames has a slot that receives a portion of the third frame; and

each of the first, second, and third frames has an upper surface that interfaces with the support surface assembly; the upper surfaces of the first, second, and third frames being coplanar.

58. The shelf of claim 57, wherein:

each of the first and second frames has a planform shape of half of an ellipse; and

the third frame has a planform shape of an ellipse.

59. The shelf of claim 57, wherein:

the third frame includes an elongated aperture, the elongated aperture receiving a first coupling pin coupled with the first frame and extending across the first frame slot, the elongated aperture further receiving a second coupling pin coupled with the second frame and extending across the second frame slot.

60. The shelf of claim 57, wherein each of the first frame and the second frame includes an end portion adapted to attach to a support at one end of the end portion.

61. The shelf of claim 52, wherein the support surface assembly comprises a plurality of interconnected vertically-oriented flexible panels.

62. The shelf of claim 61, wherein the flexible panels comprise polycarbonate.

63. The shelf of claim 52, wherein the support surface assembly comprises a plurality of coupled horizontally-oriented panels, each of the horizontally-oriented panels having one or more slots receiving connecting pins that couple adjacent panels of the horizontally-oriented panels.

64. A shelving system having a variable planform, the shelving system comprising:

a first shelf in accordance with claim 57;

a second shelf in accordance with claim 57, the second shelf being elevated above the first shelf;

at least one first support column supporting the first frames of the first and second shelves; and

at least one second support column supporting the second frames of the first and second shelves.

65. The shelving system of claim 64, further comprising a base including:

an upper portion including a shelf in accordance with claim 57;

a lower portion including a shelf in accordance with claim 57;

at least one first column member attached to each of the first frames of the upper and lower portions;

at least one second column member attached to each of the second frames of the upper and lower portions; and

a plurality of third column members, each of the column members being attached to the third frames of the upper and lower portions.

66. The shelving system of claim 65, further comprising a kick plate assembly attached to the base, the kick plate assembly including:

a first kick plate member attached to at least one of the first frames of the upper and lower portions;

a second kick plate member attached to at least one of the second frames of the upper and lower portions; and

a third kick plate member attached to at least one of the third frames of the upper and lower portions; at least one of the first, second, or third kick plate members including an extension panel overlapping an adjacent one of the first, second, or third kick plate members for a plurality of planform configurations of the base.

67. The shelving system of claim 64, further comprising at least one price display assembly attached to at least one of the first and second shelves, the price display assembly including:

a first price display segment attached to the first frame and configured to display a price tag;

a second price display segment attached to the second frame and configured to display a price tag; and

a third price display segment slidably coupled with at least one of the first and second price display segments, the third price display segment being flexible and configured to display a price tag.

68. A table having a variable planform, the table comprising:

a first upper frame forming a first part of a variable support platform;

a second upper frame forming a second part of the variable support platform;

a third upper frame forming a third part of the variable support platform, the third upper frame being disposed between the first and second upper frames, relative positioning and orientation between the third upper frame and each of the first and second upper frames being variable so as to vary the planform of the variable support platform;

a support surface assembly providing a support surface for items supported by the table, the support surface assembly being supported by the variable support platform and at least one of flexible or comprise a plurality of linked panels so that the support surface provided varies in response to variation in the planform of the variable support platform;

a first base frame forming part of a variable base that is disposed below the variable support platform;

a second base frame forming part of the variable base;

a third base frame forming part of the variable base, the third base frame being disposed between the first and second base frames, relative positioning and orientation between the third base frame and each of the first and second base frames being variable to vary the planform of the variable base; and

a plurality of intermediate members disposed between and attached to the variable base and the variable support platform.

69. The table of claim 68, wherein the intermediate members comprise:

a plurality of first intermediate members, each first intermediate member being attached to the first upper frame and the first base frame;

a plurality of second intermediate members, each second intermediate member being attached to the second upper frame and the second base frame; and

a plurality of third intermediate members, each third intermediate member being attached to the third upper frame and the third base frame.

70. The table of claim 68, wherein the support surface comprises a plurality of interconnected vertically-oriented flexible panels.

71. The table of claim 68, wherein the support surface assembly comprises a plurality of coupled horizontally-oriented panels, each of the horizontally-oriented panels having one or more slots receiving coupling pins that couple adjacent panels of the horizontally-oriented panels.

FIG. 1

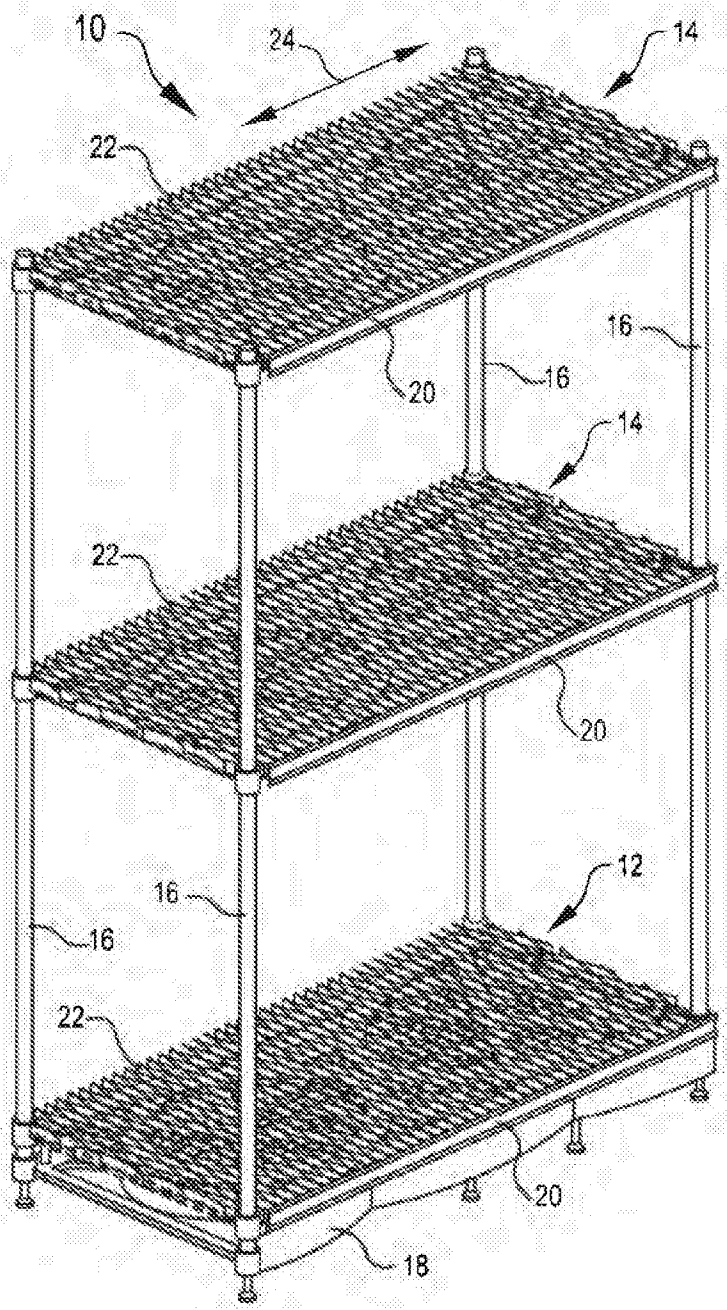

FIG. 2

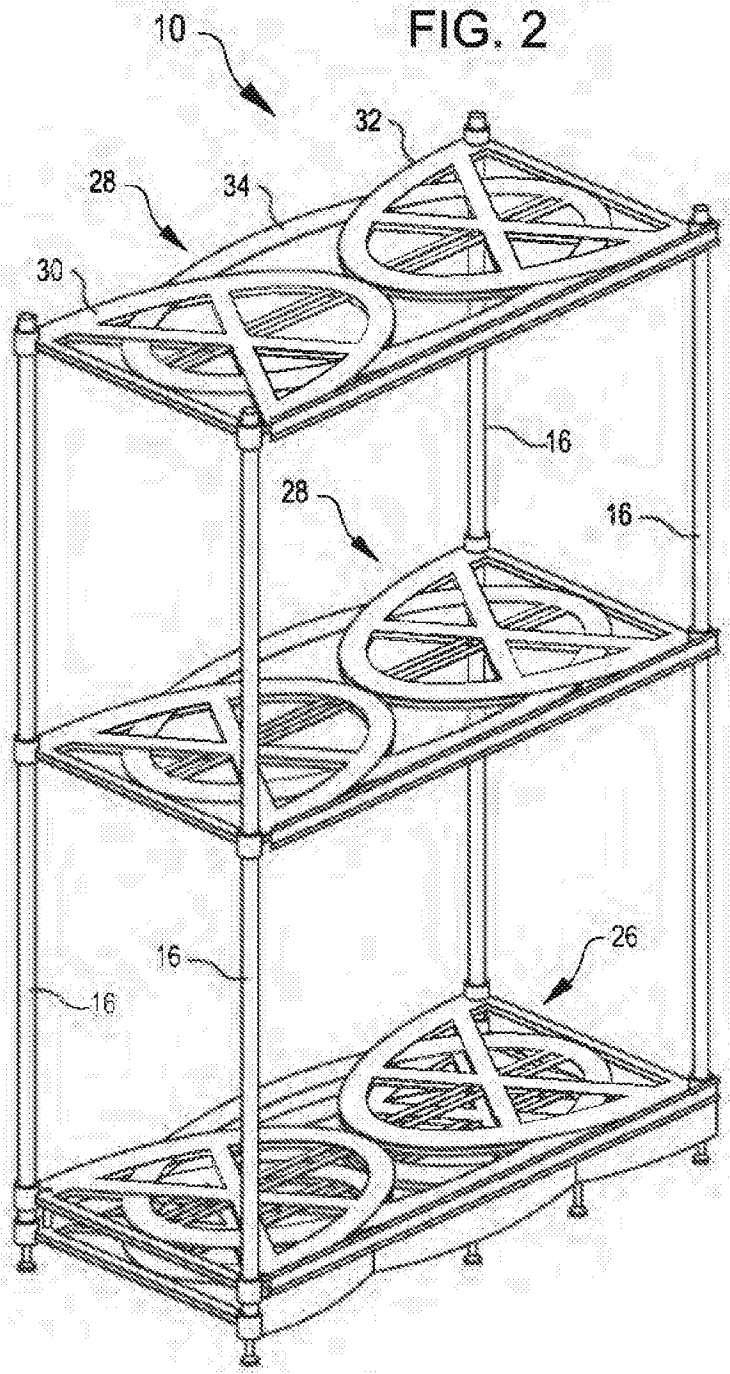

FIG. 3

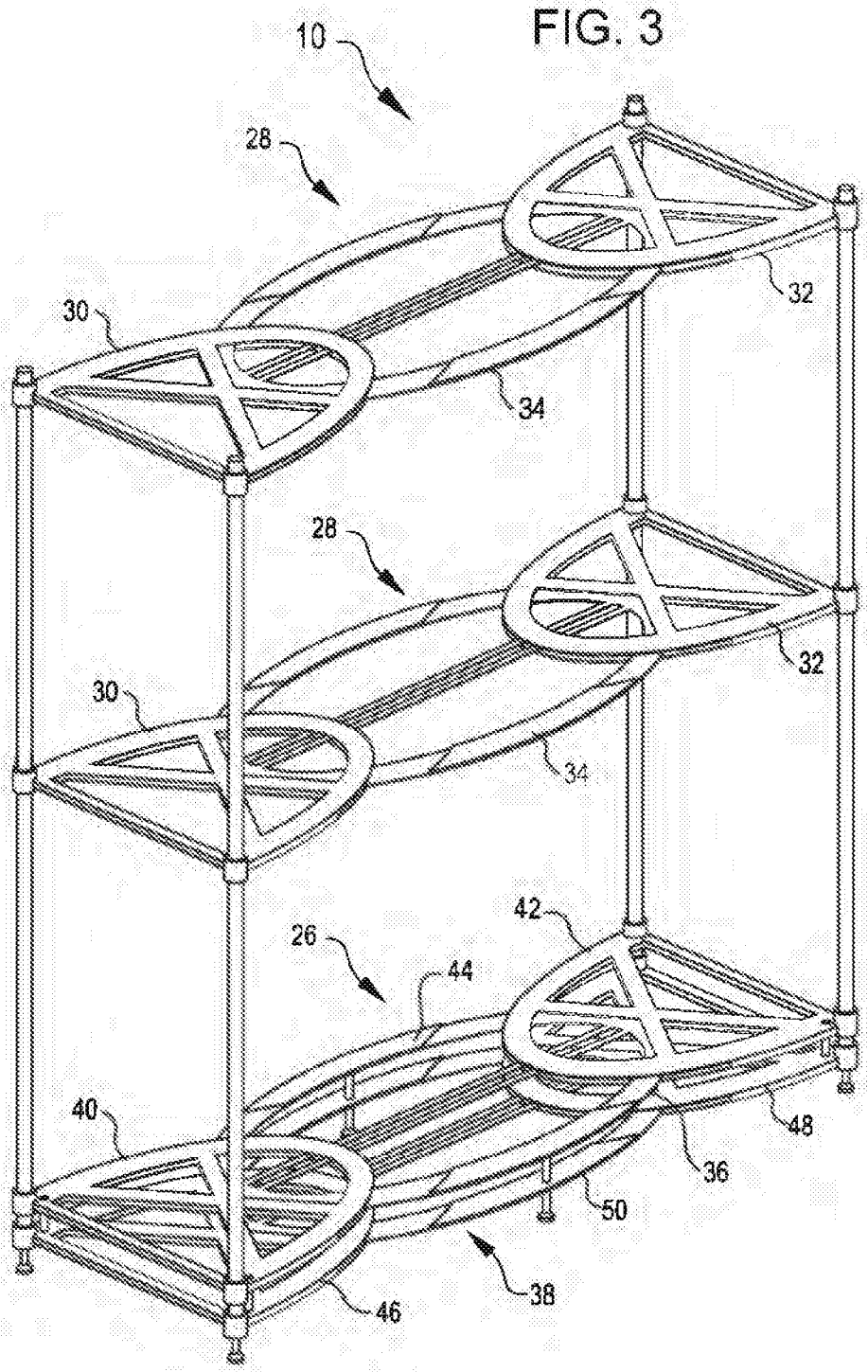

FIG. 4

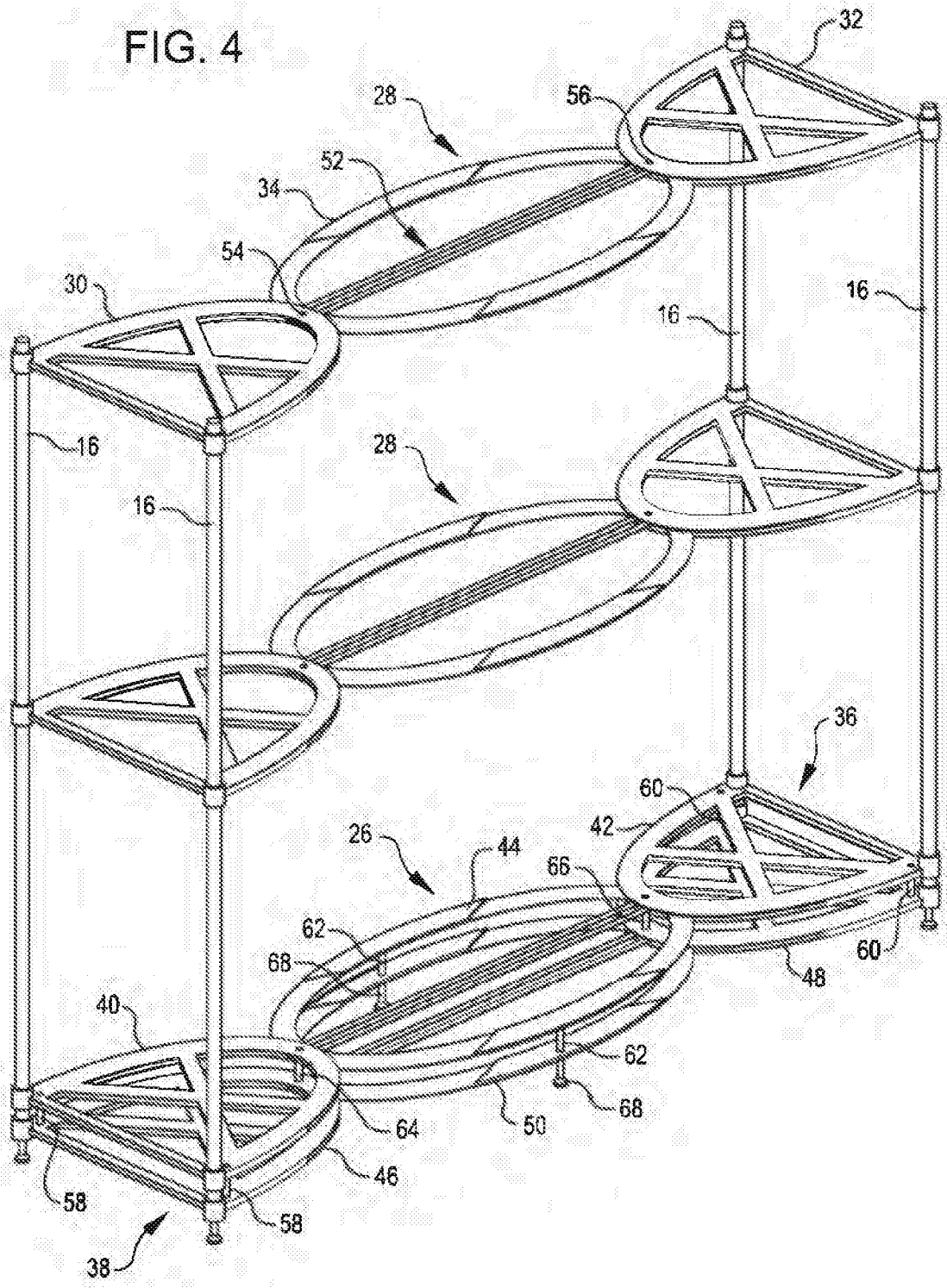
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FIG. 5

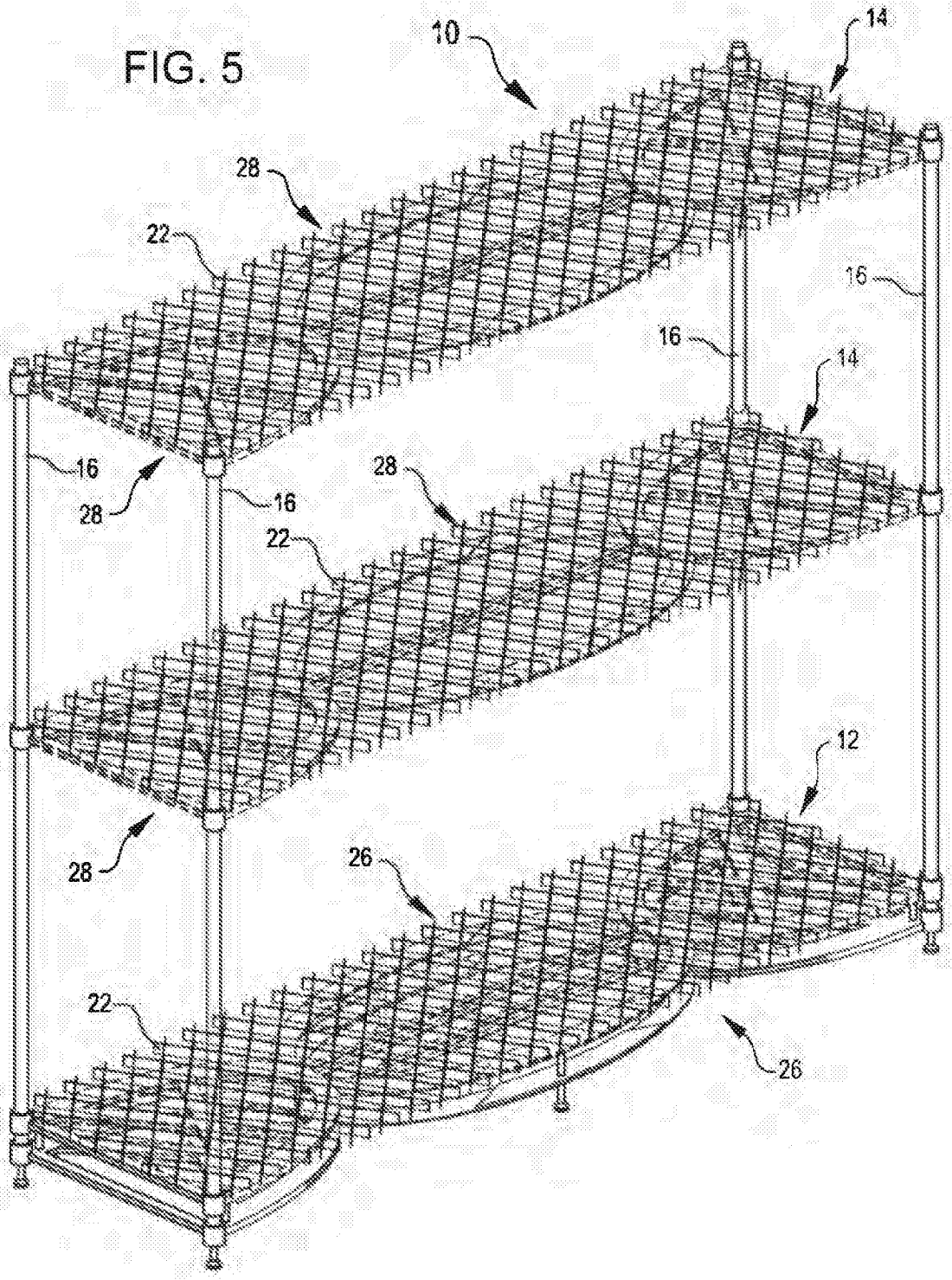


FIG. 6

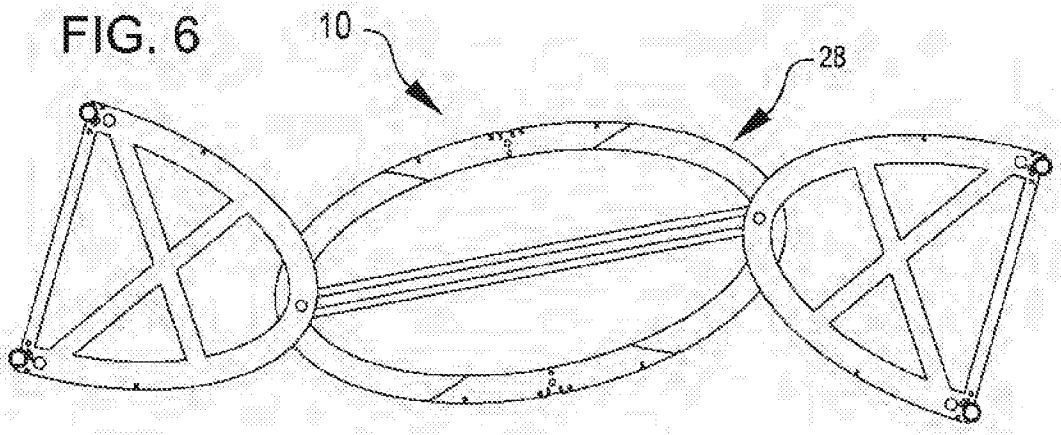



FIG. 7

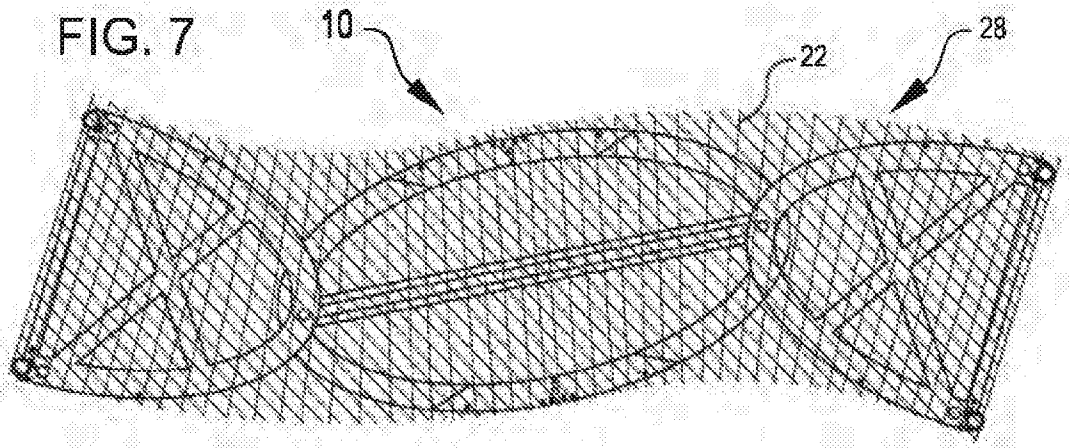



FIG. 8

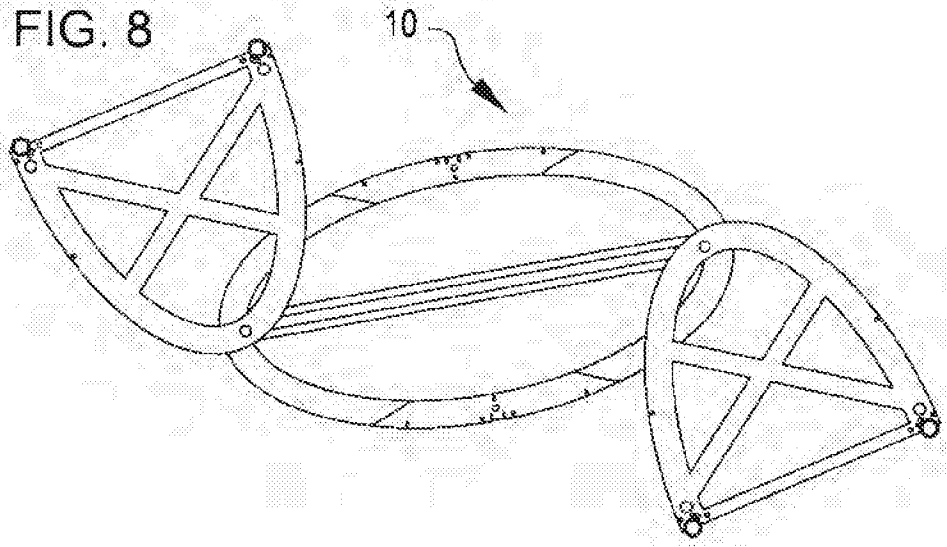


FIG. 9

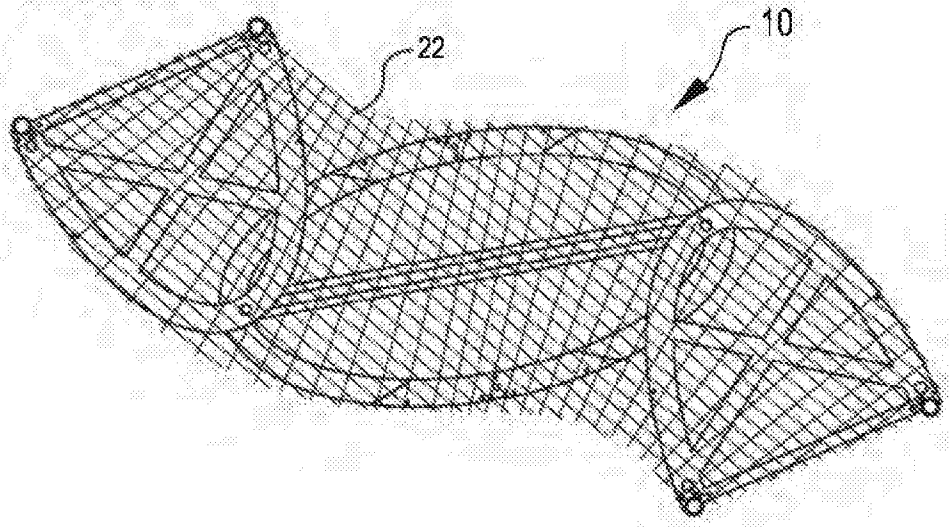



FIG. 10

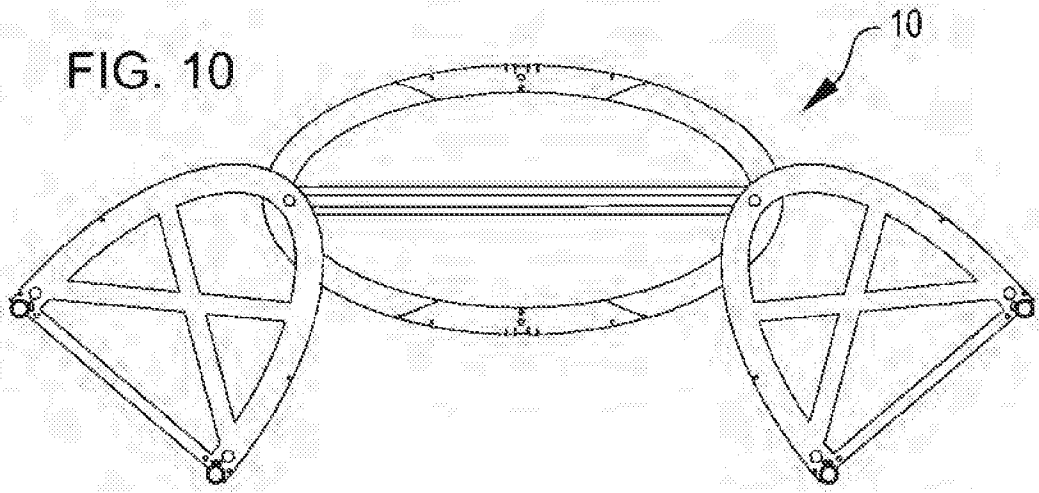



FIG. 11

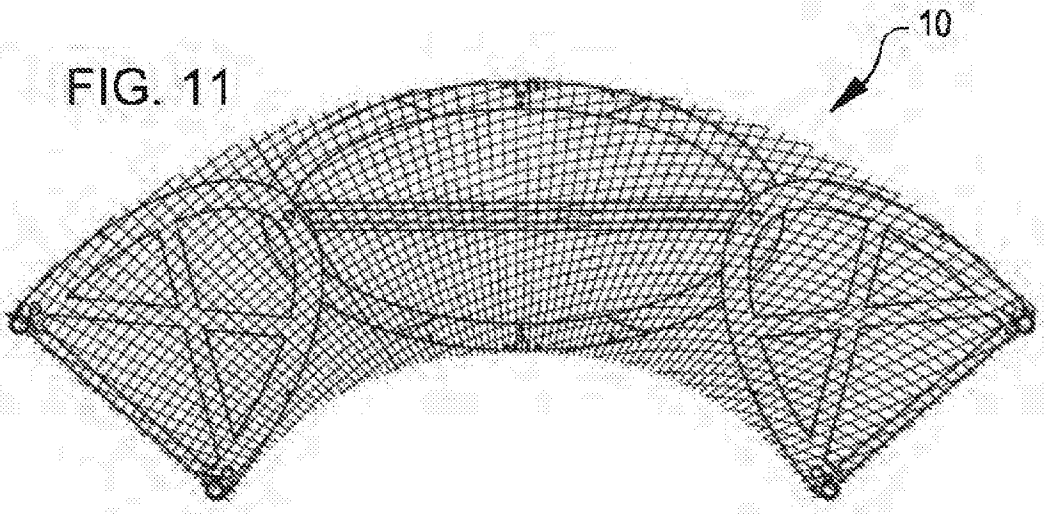


FIG. 12

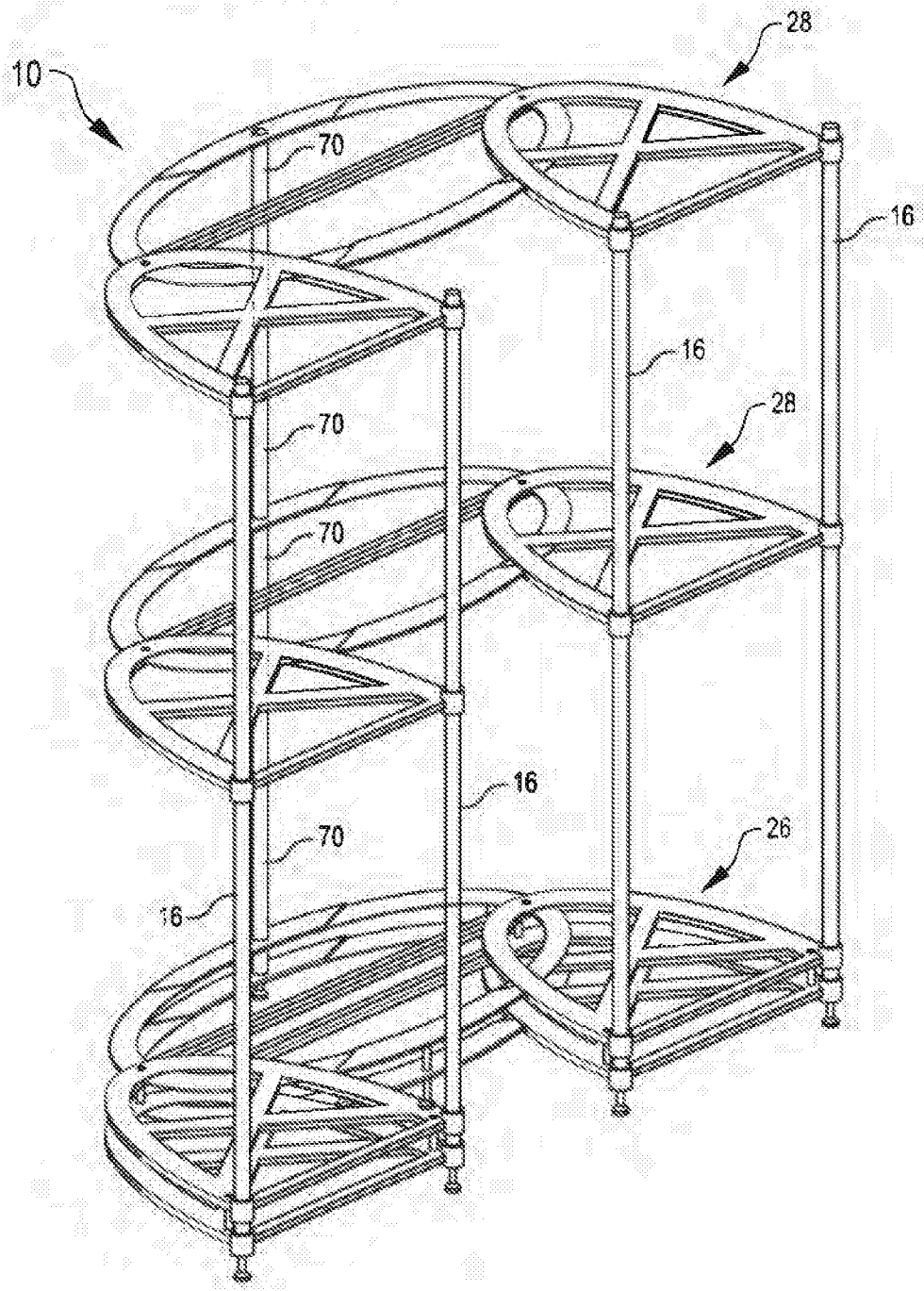
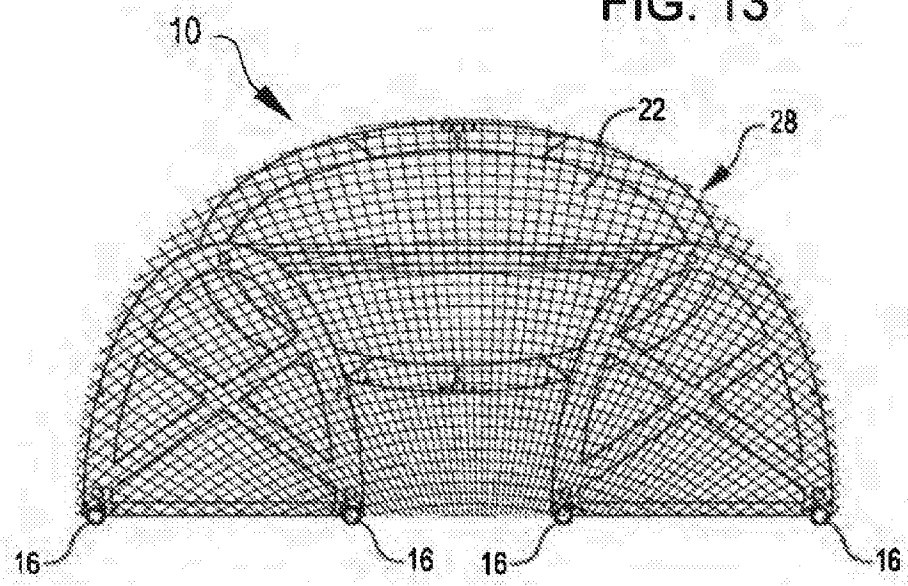


FIG. 13



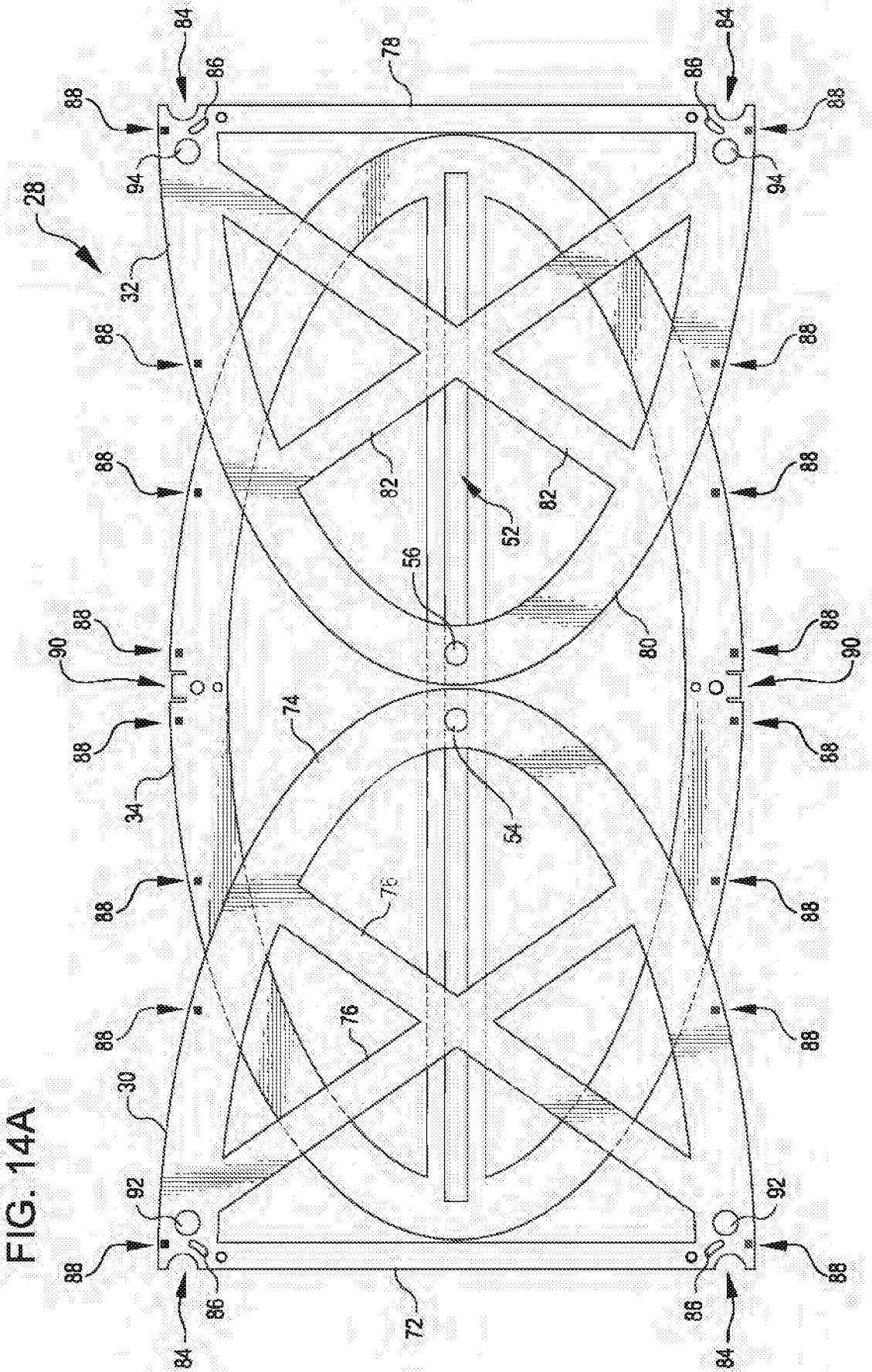



FIG. 14A

FIG. 14B

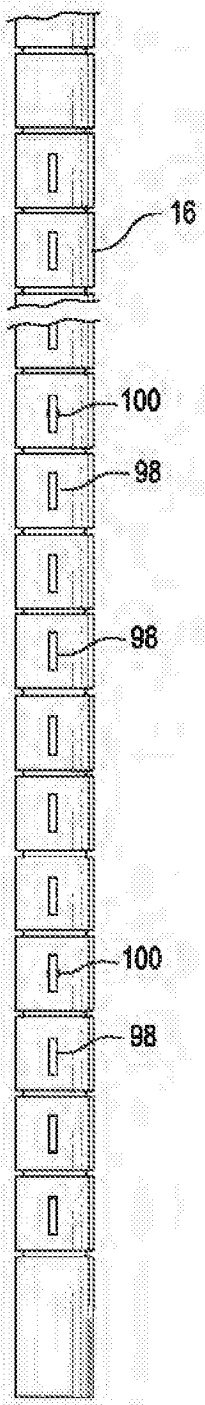



FIG. 14C

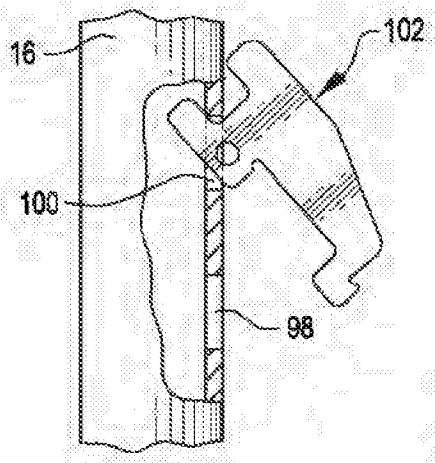



FIG. 14D

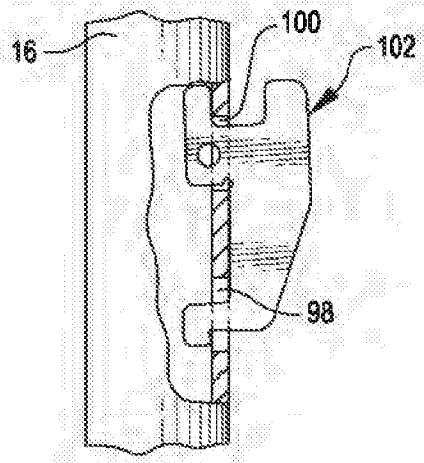



FIG. 14E

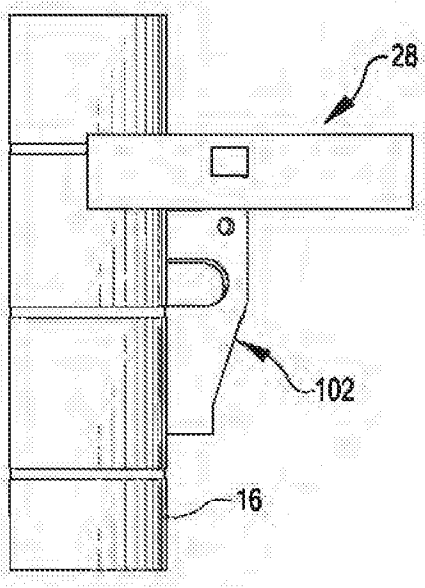


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FIG. 15

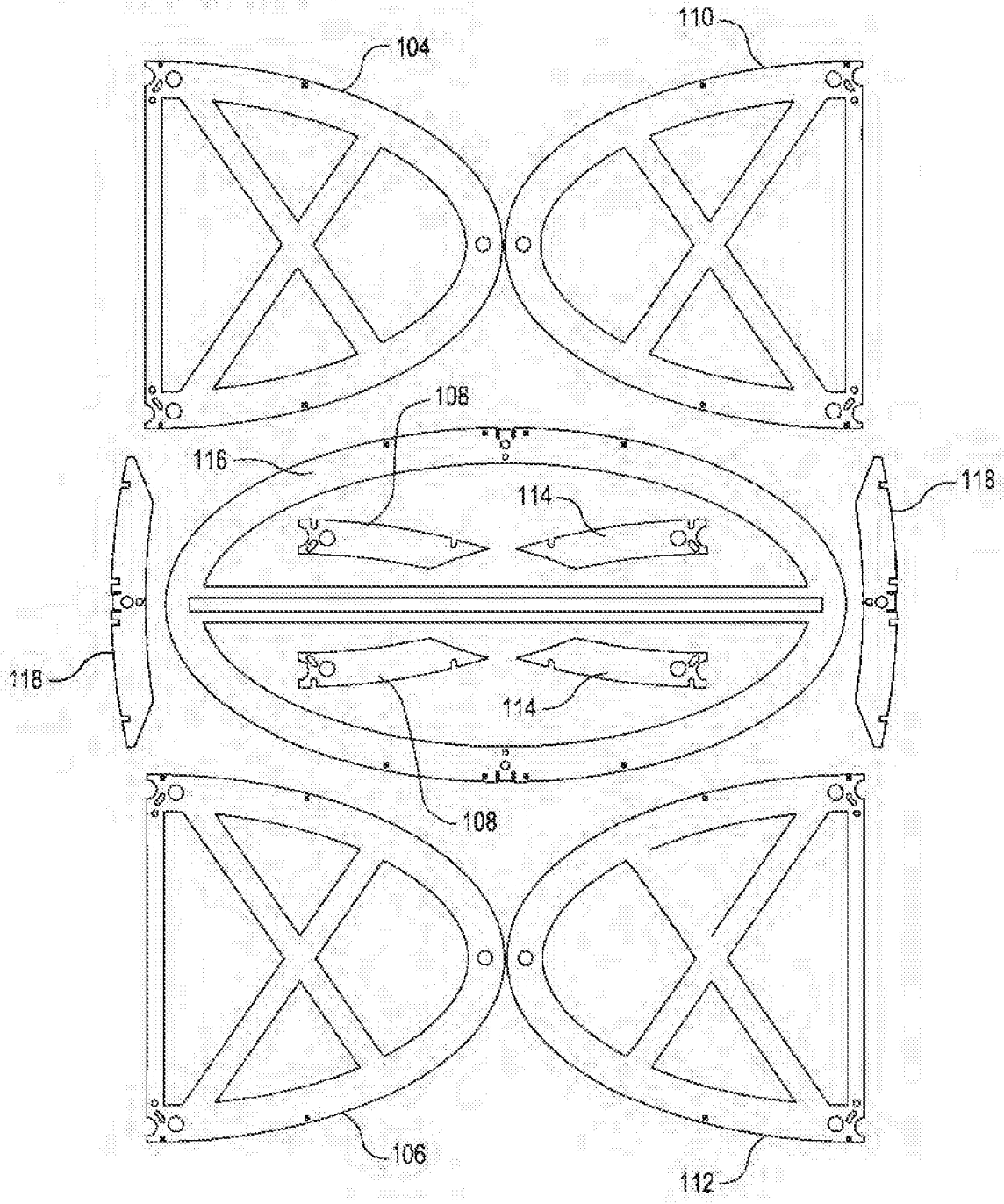


FIG. 16

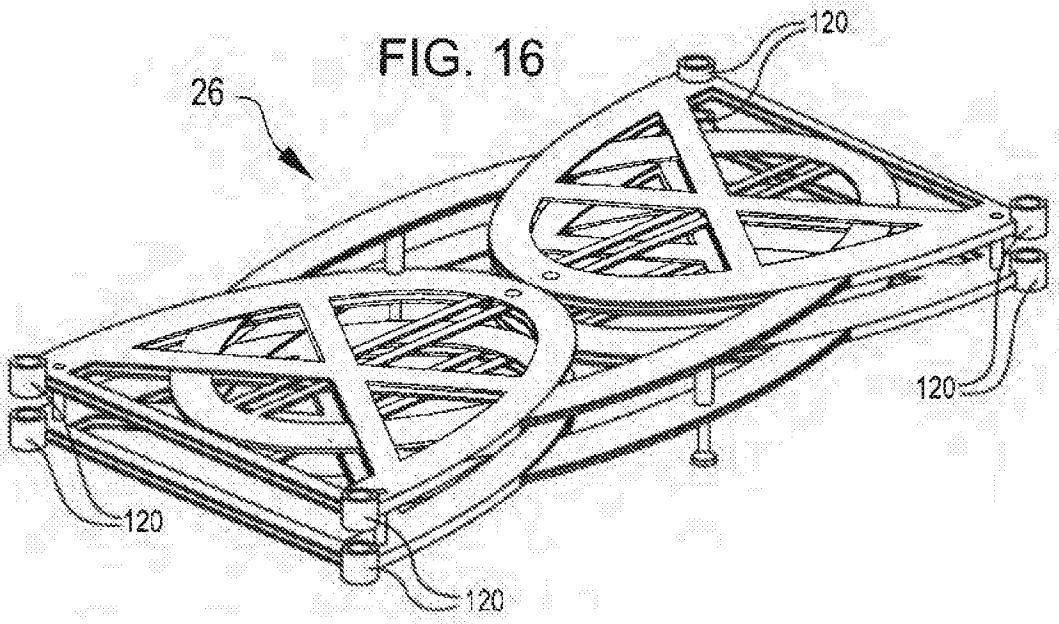



FIG. 17

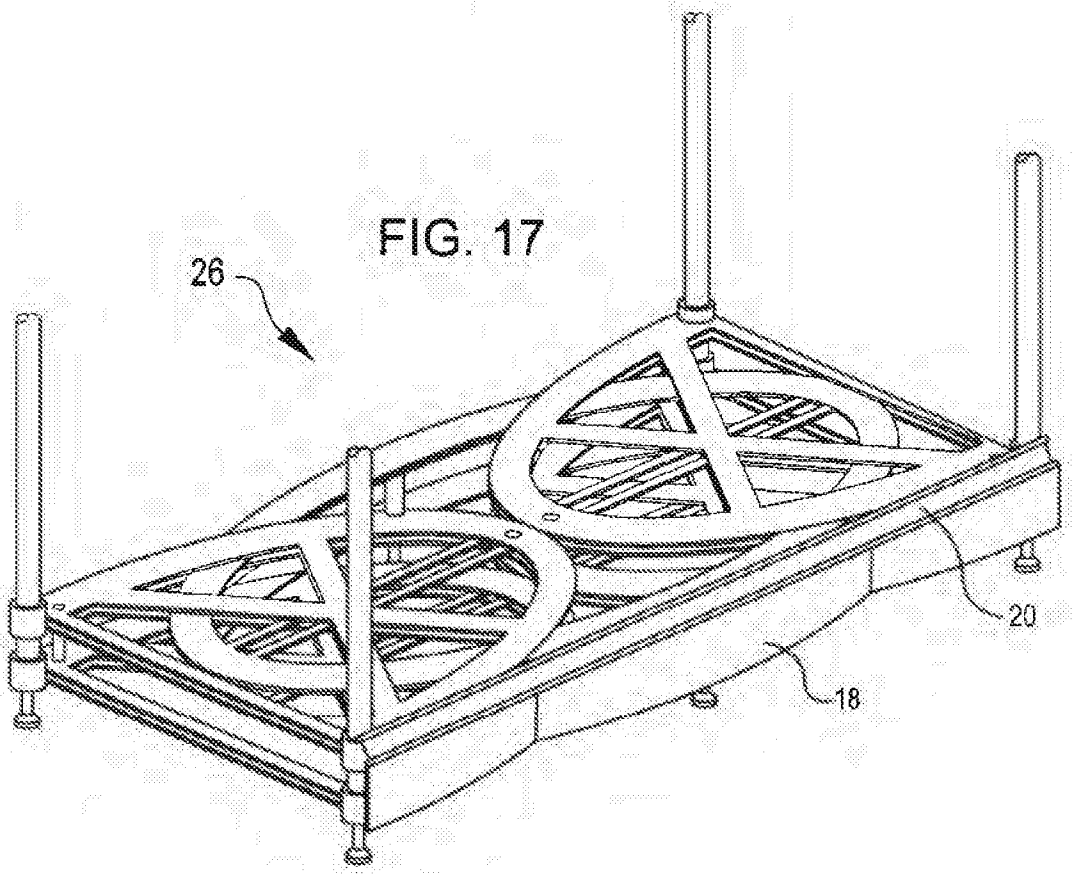


FIG. 18

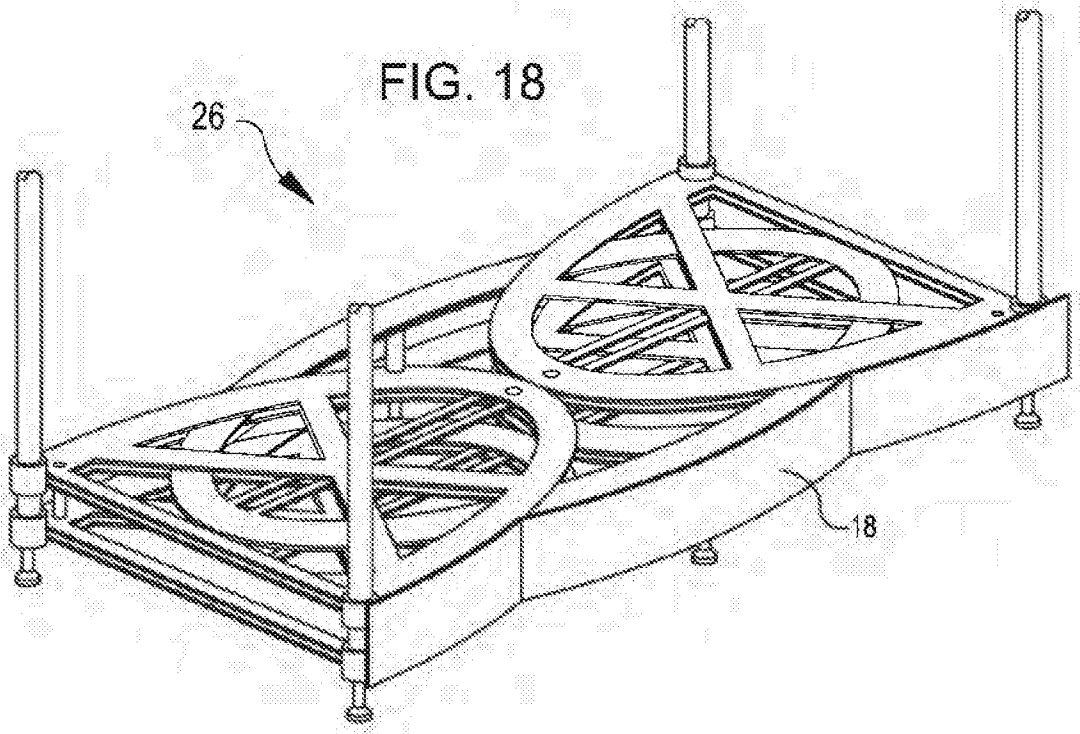



FIG. 19

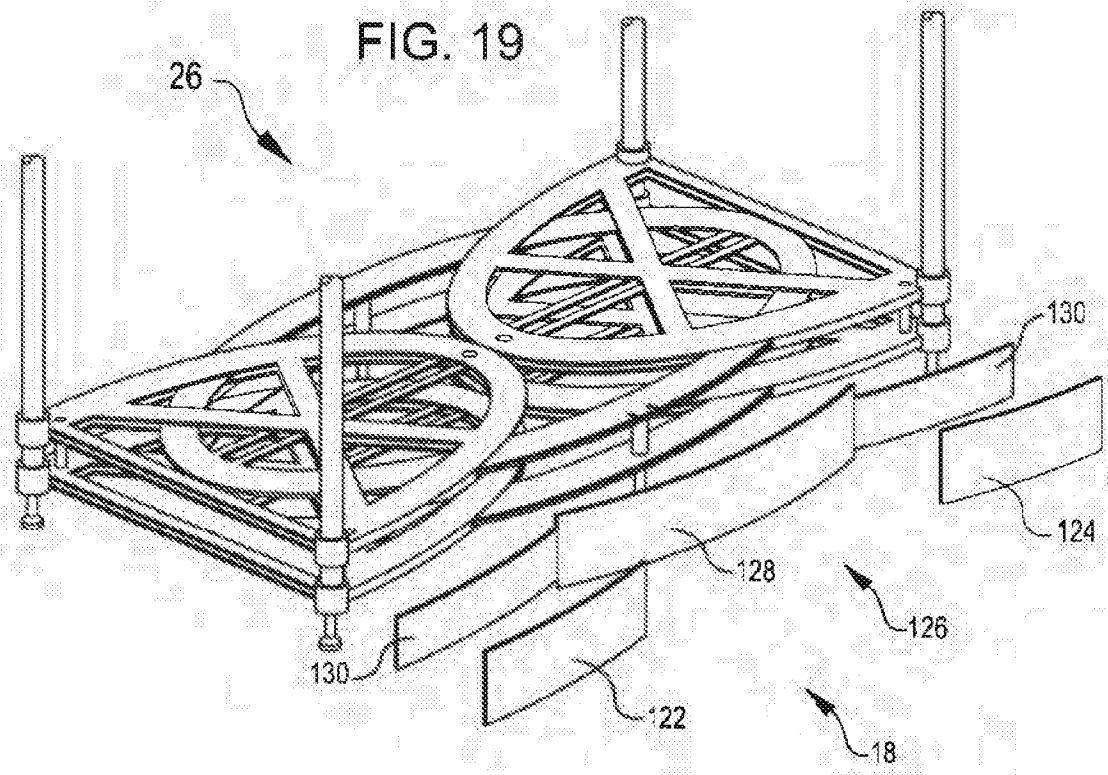
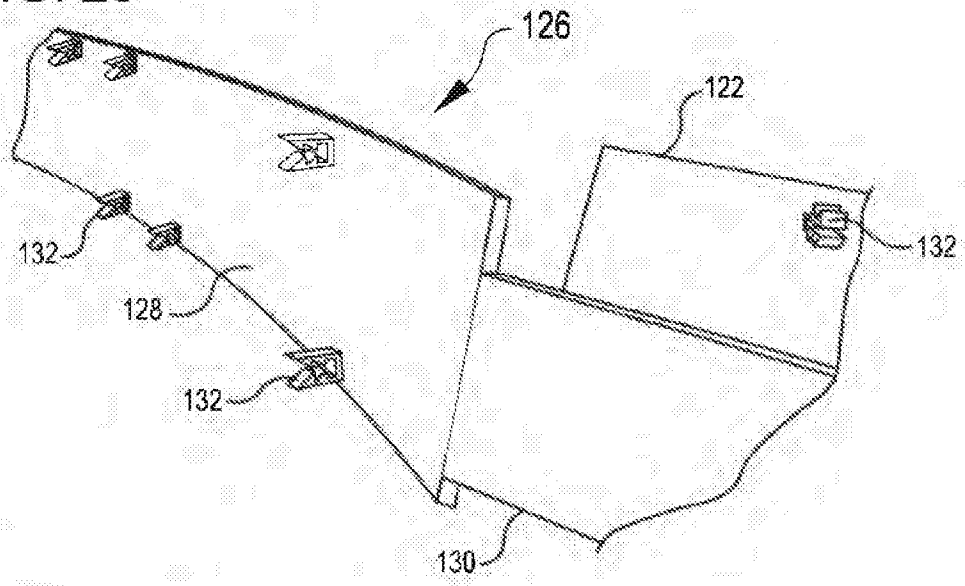


FIG. 20



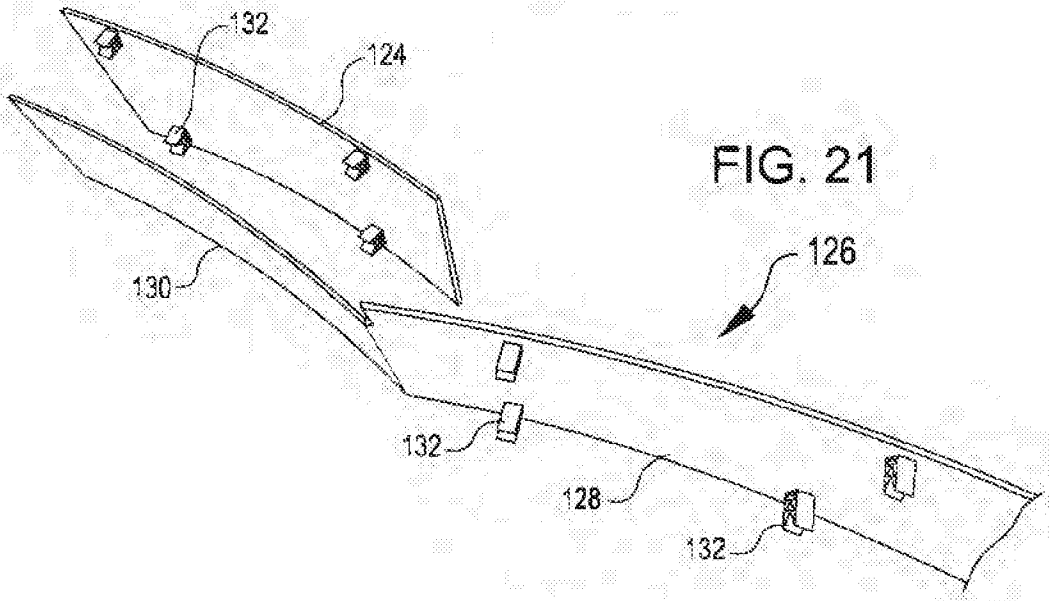




FIG. 21

FIG. 22

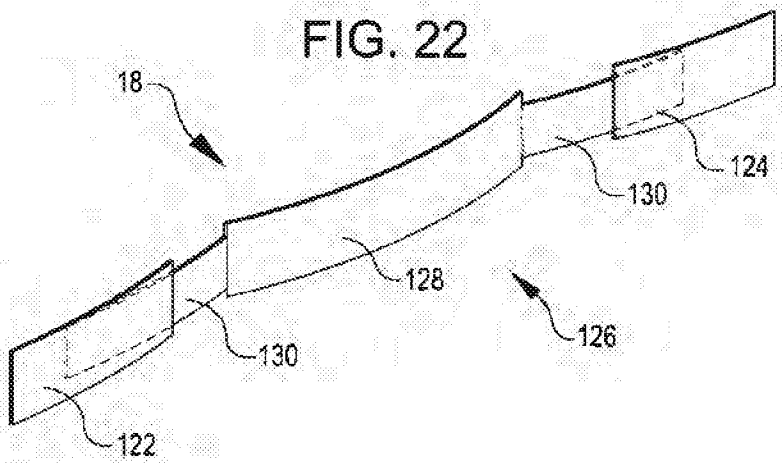


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FIG. 23

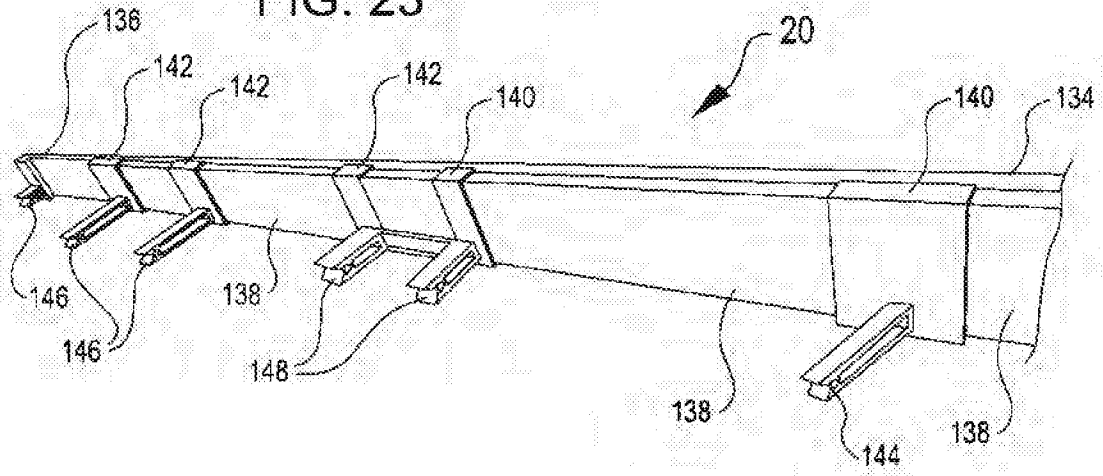


FIG. 24

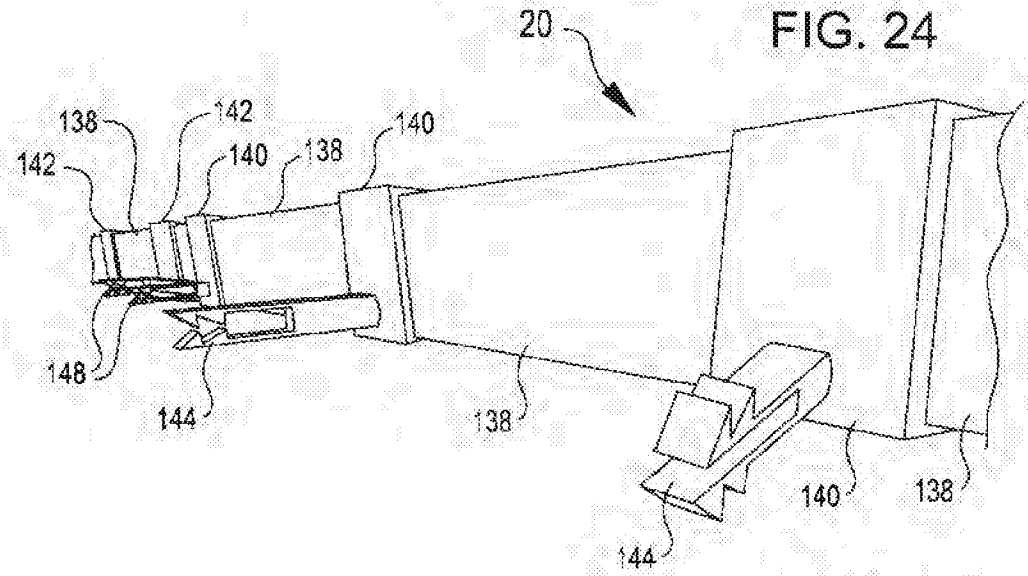


FIG. 25

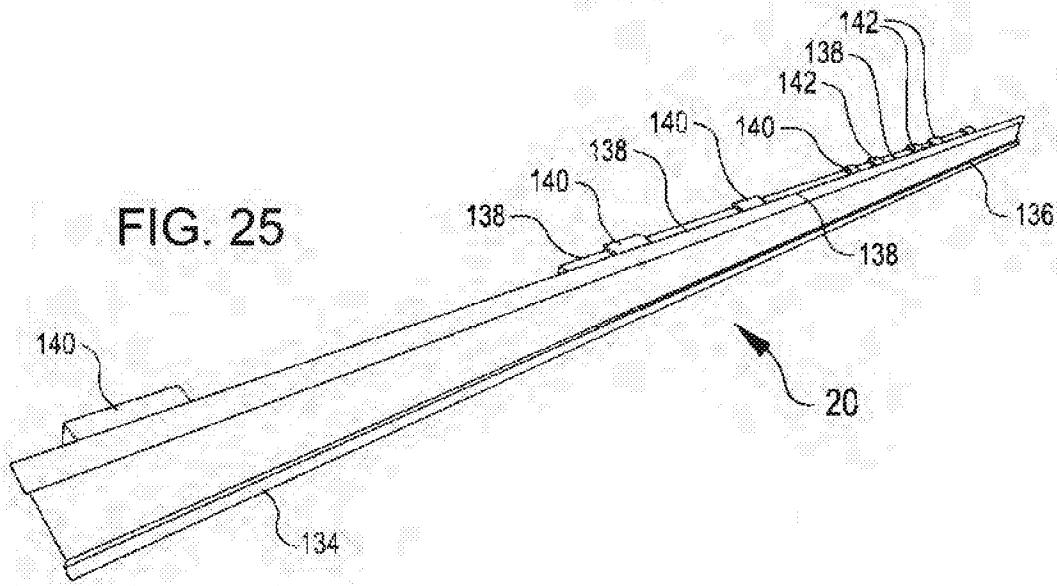

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FIG. 26

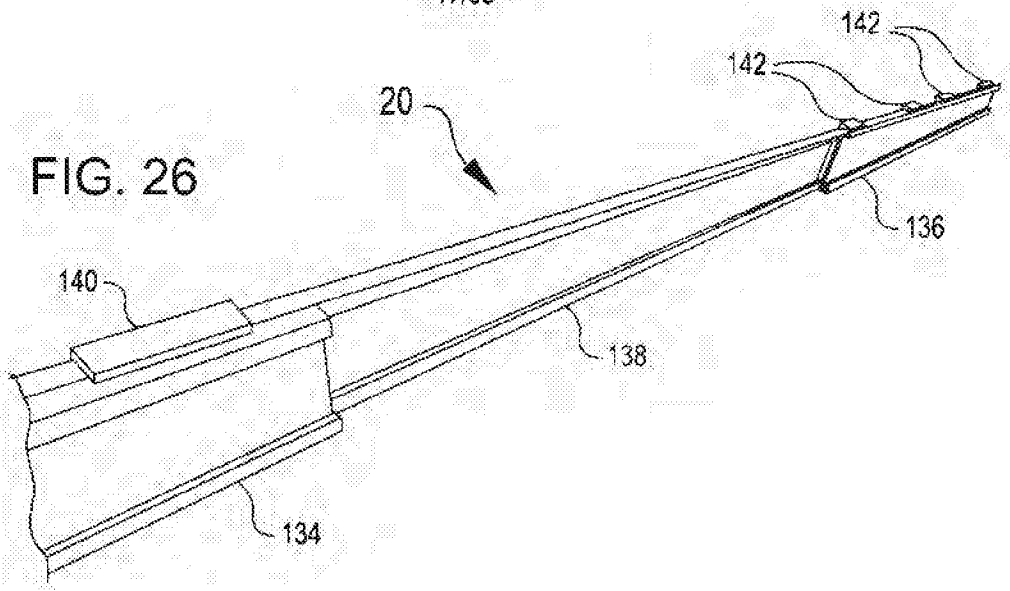


FIG. 27

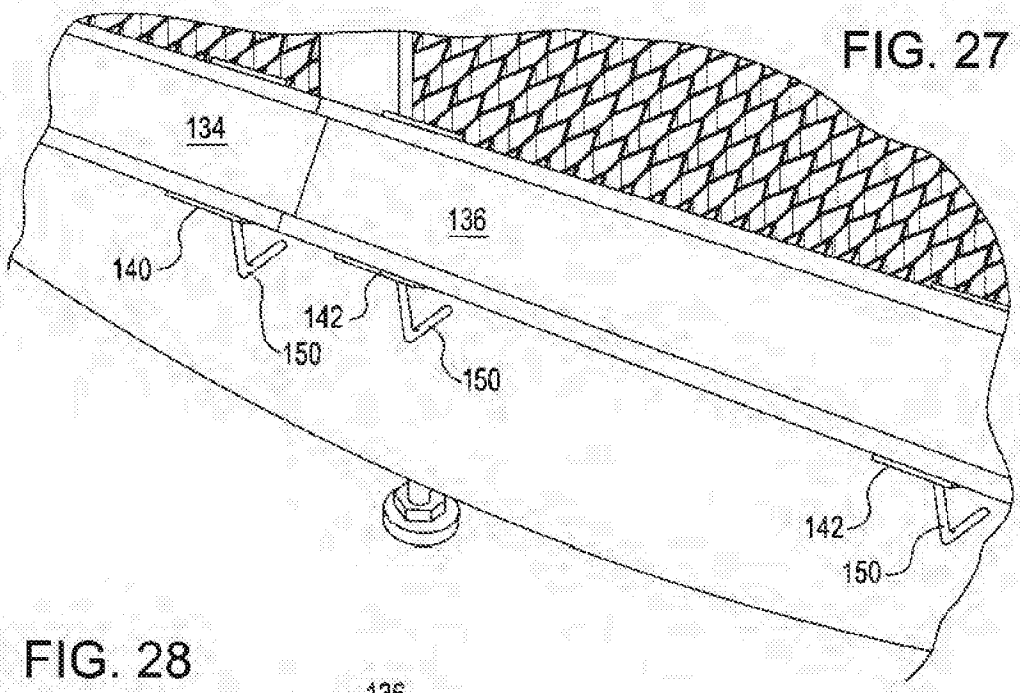


FIG. 28

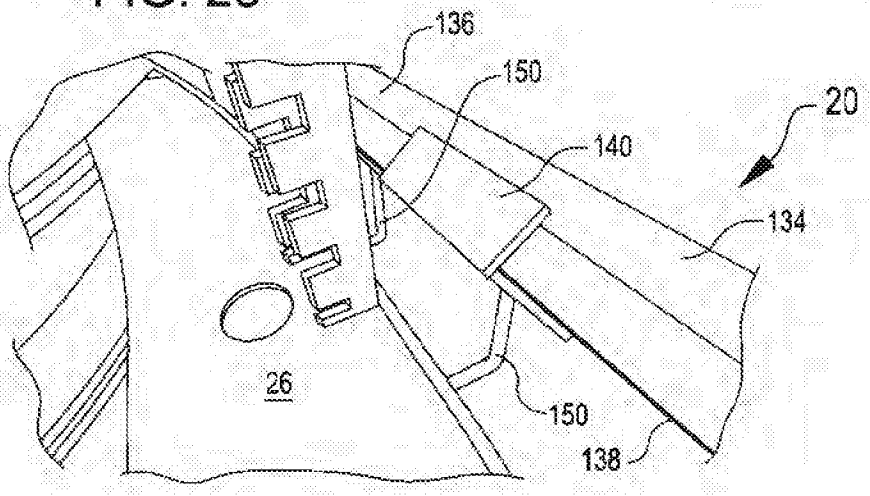

FIG. 30

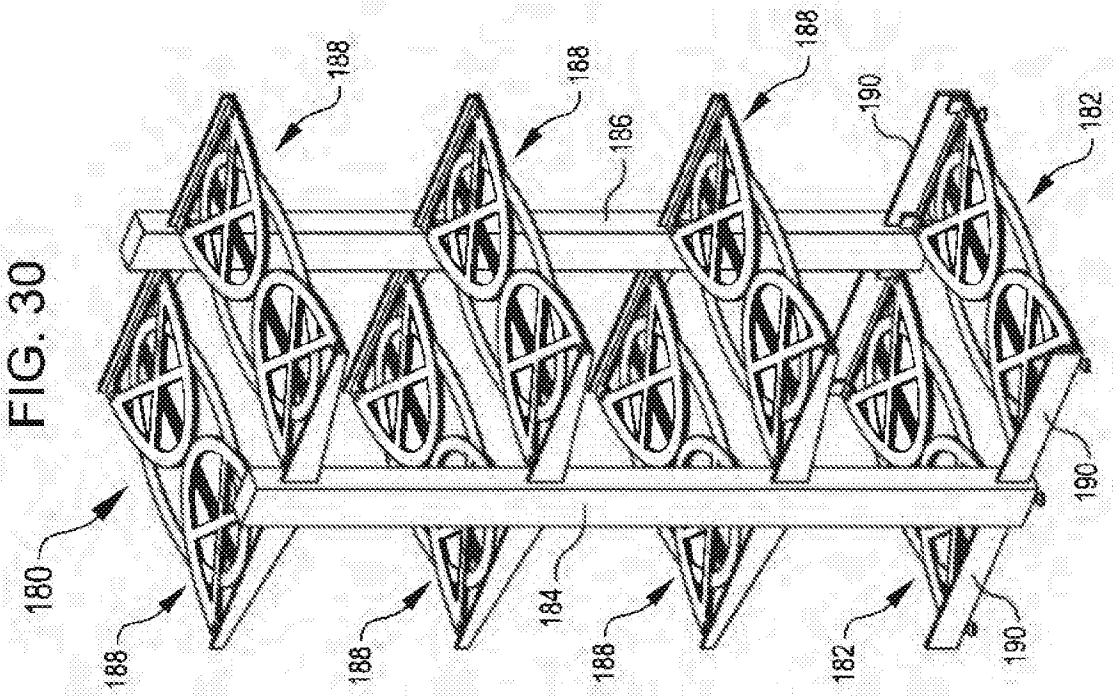
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FIG. 29

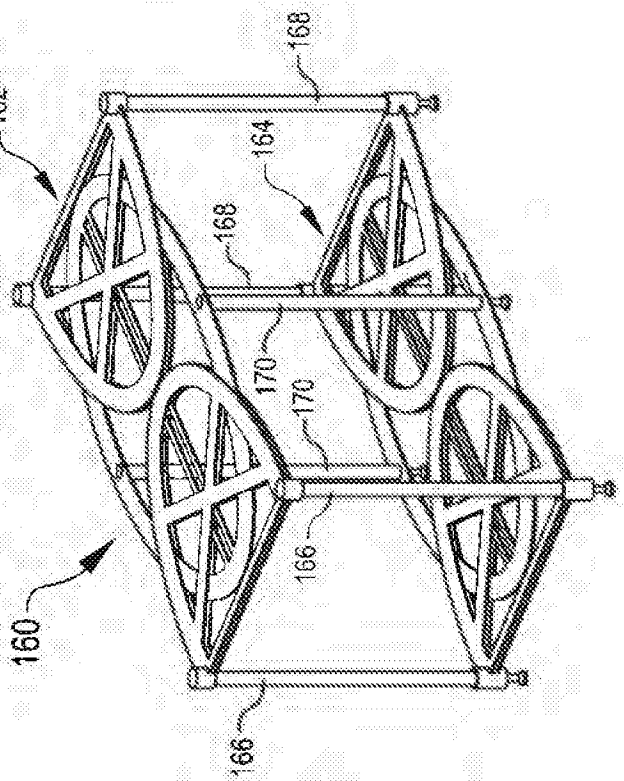
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FIG. 31

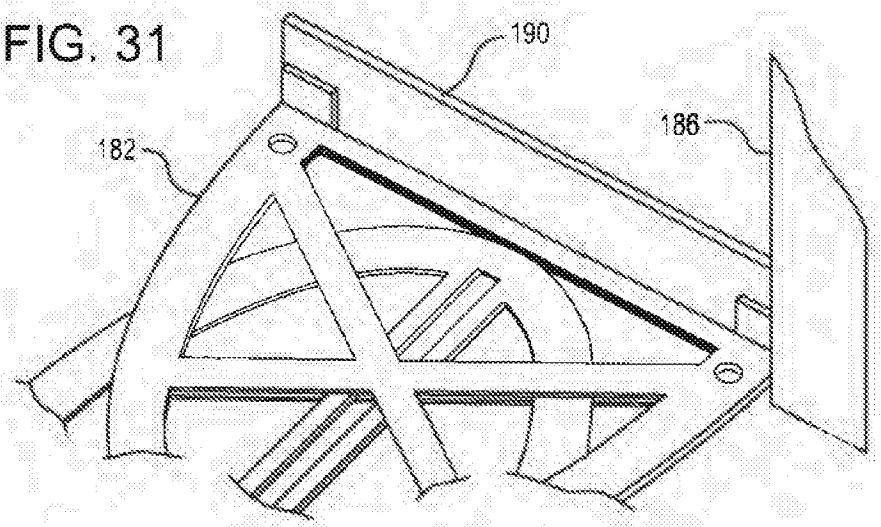



FIG. 32

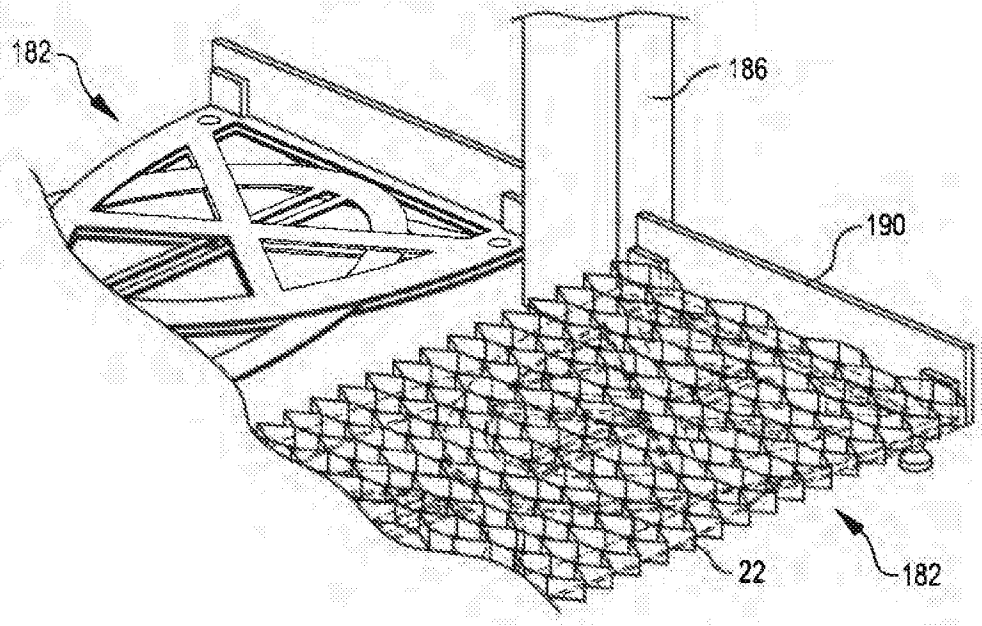


FIG. 33

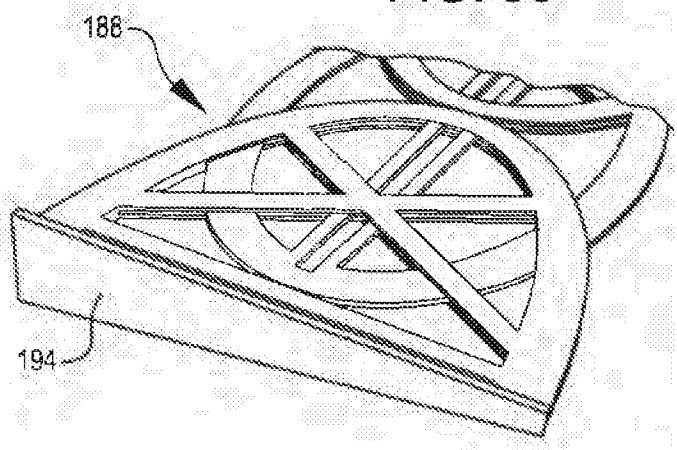



FIG. 34

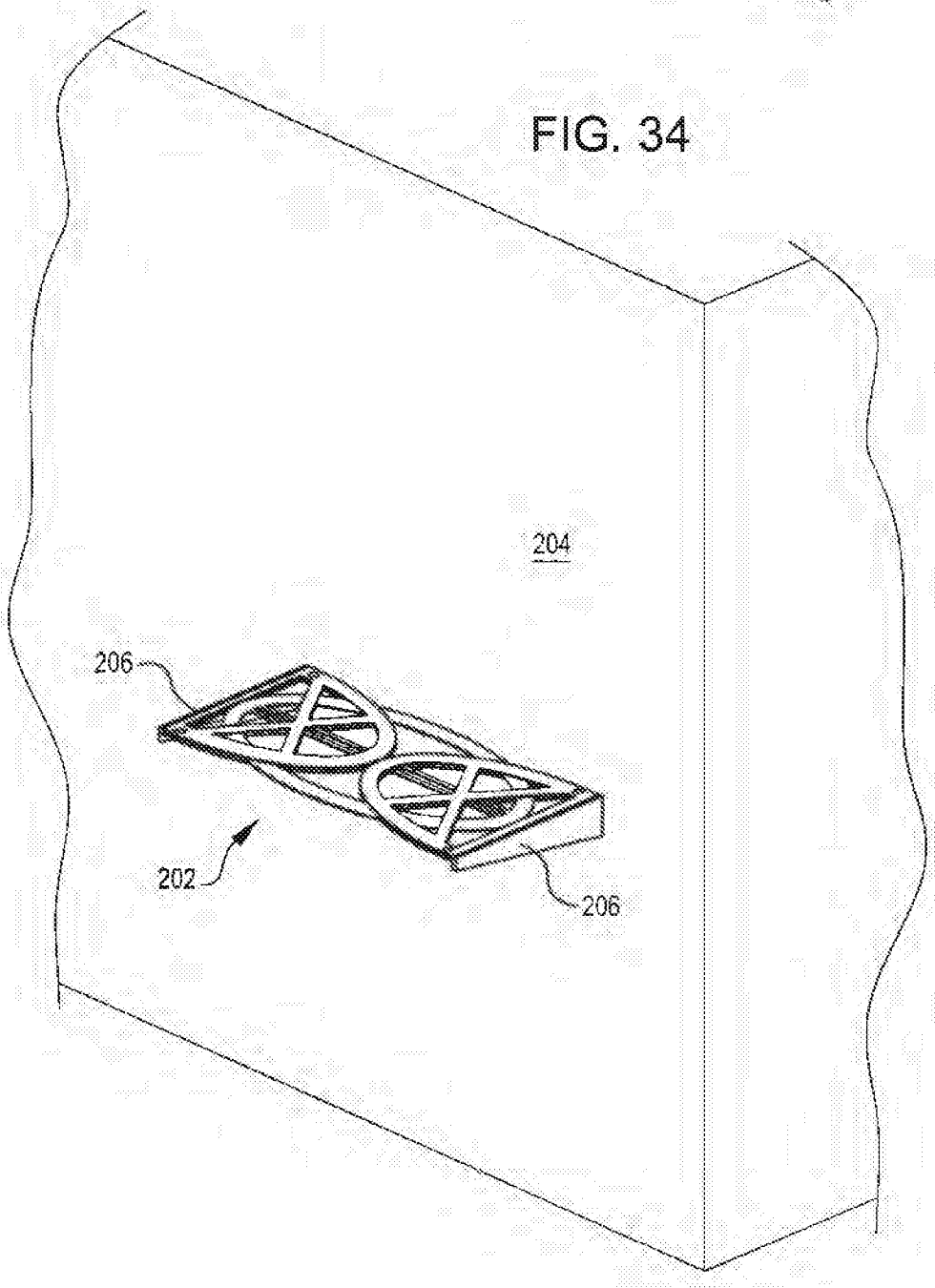


FIG. 35

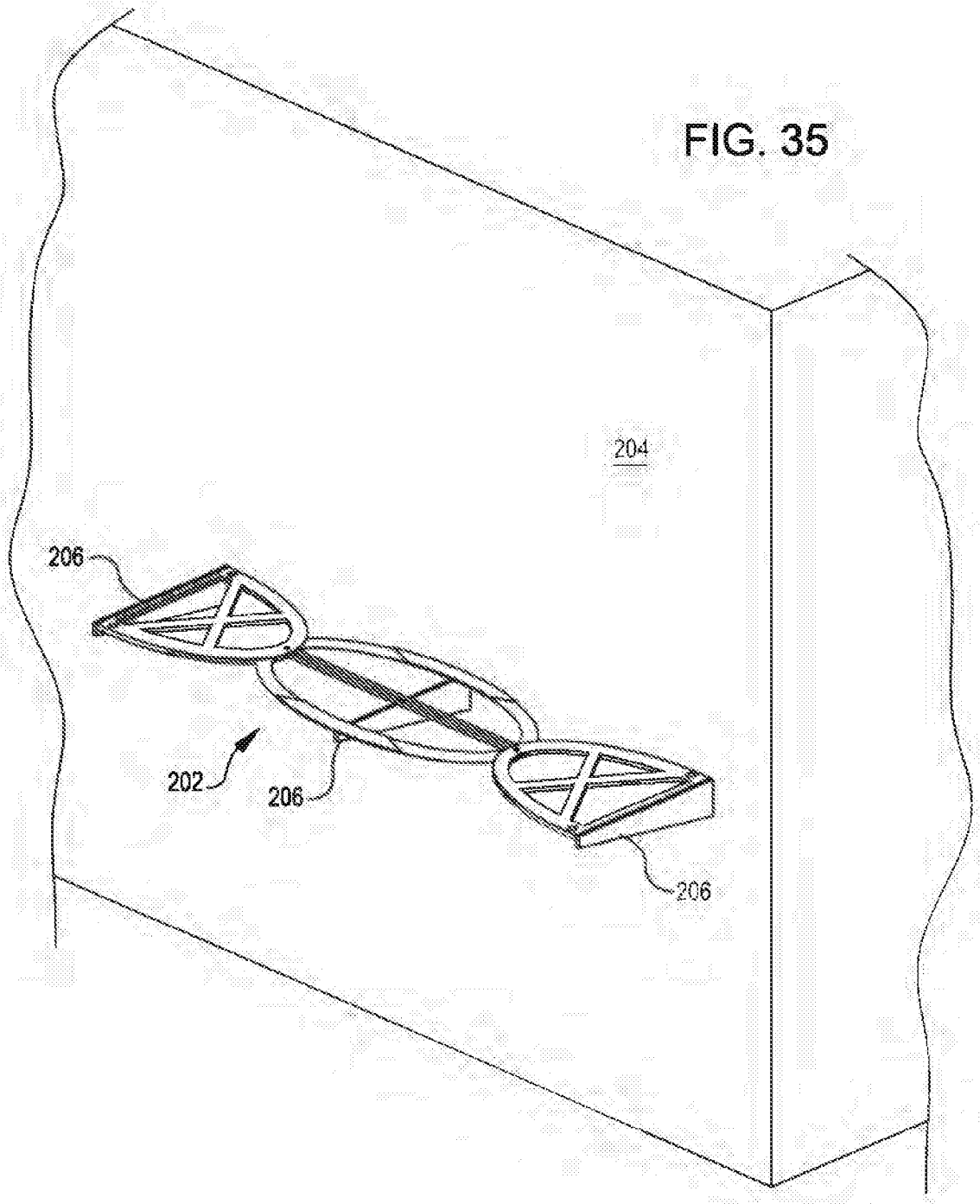
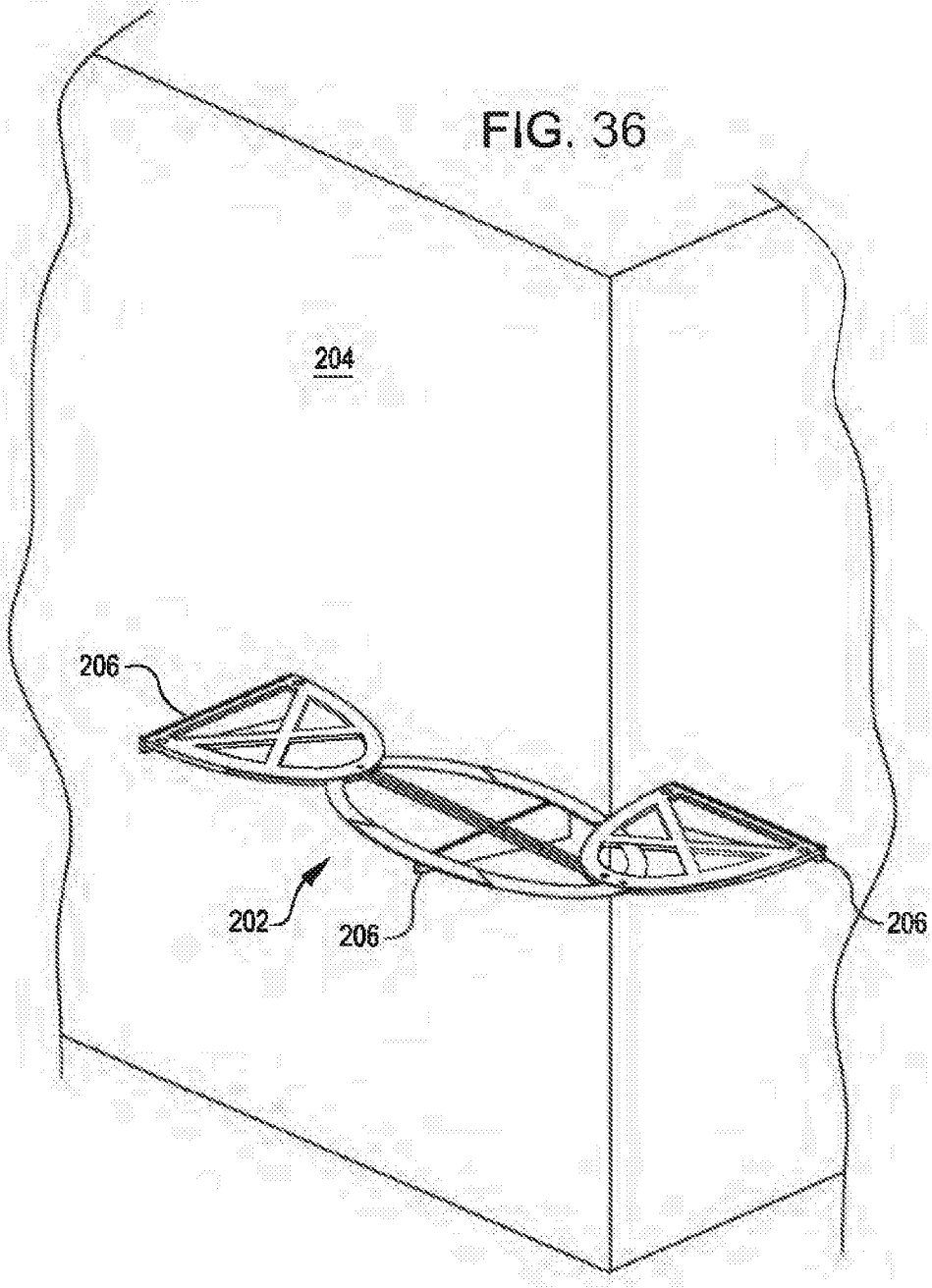


FIG. 36



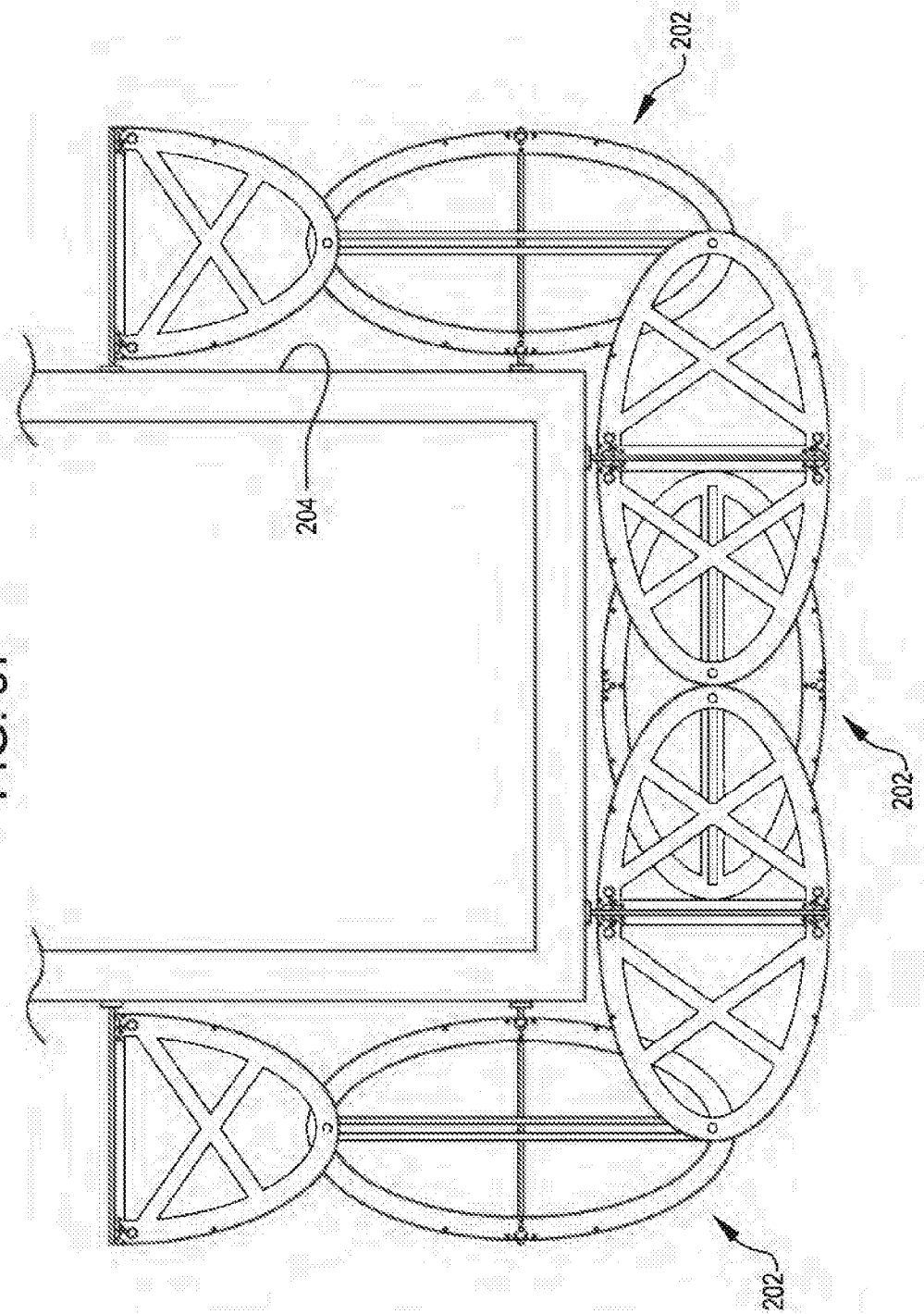



FIG. 37

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FIG. 38A

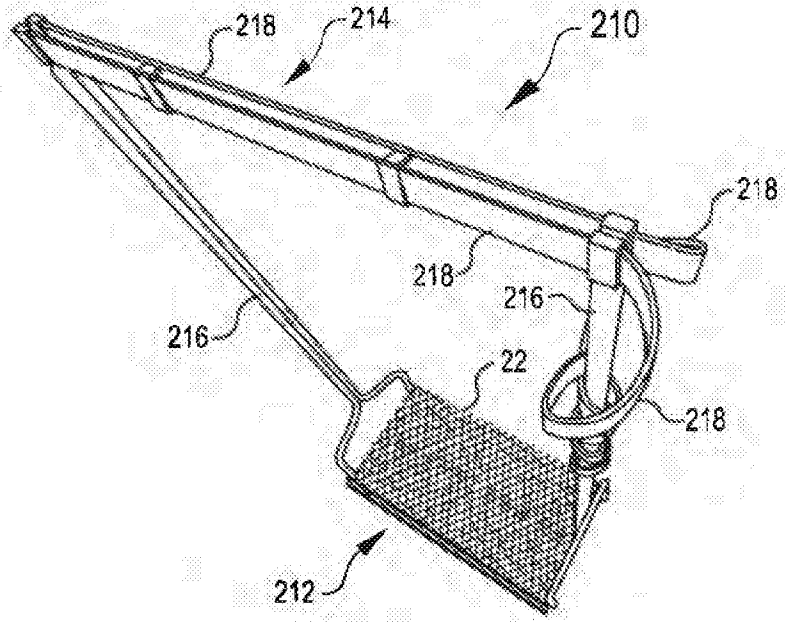



FIG. 38B

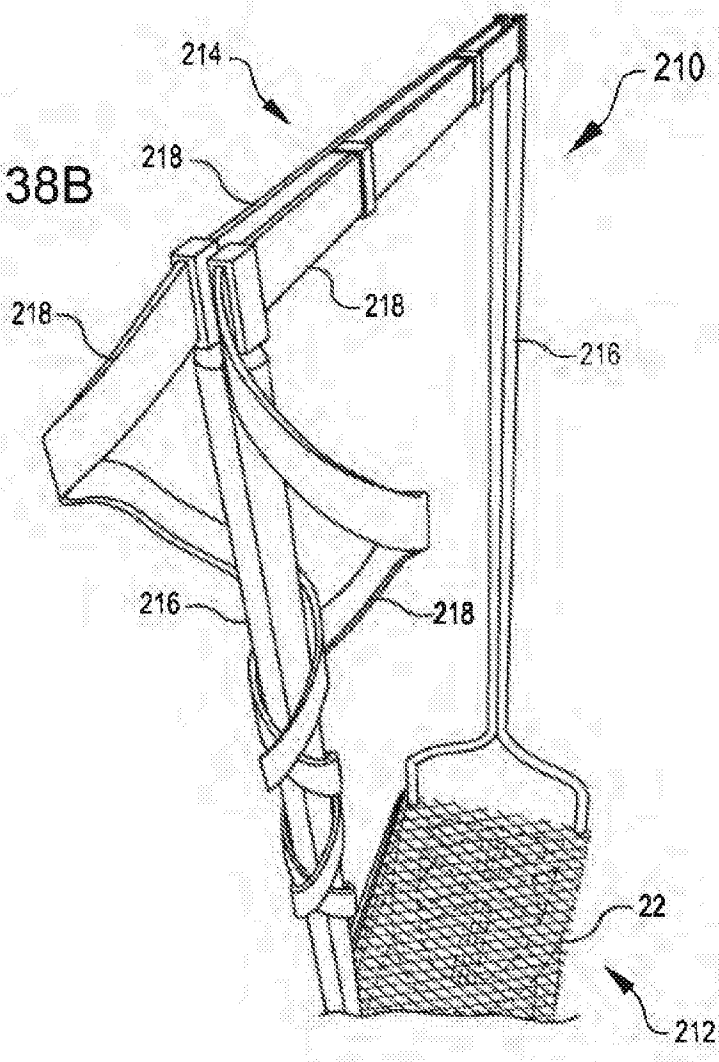


FIG. 39A

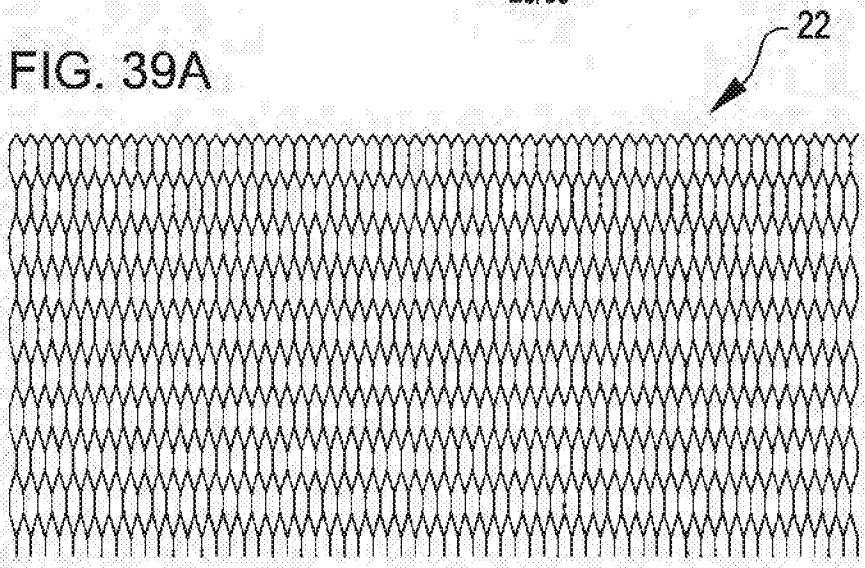



FIG. 39B

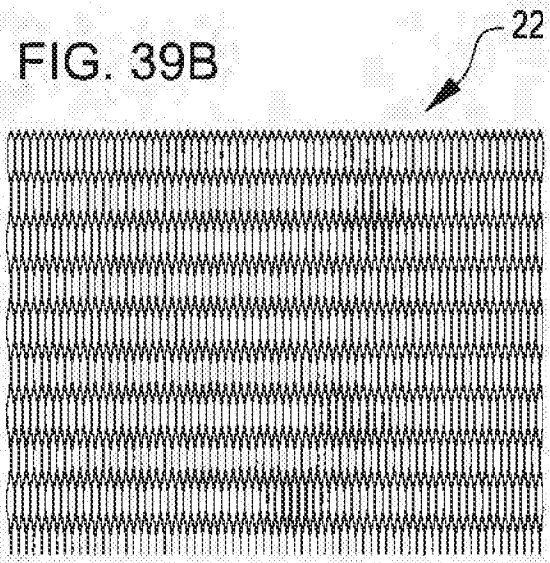



FIG. 39C

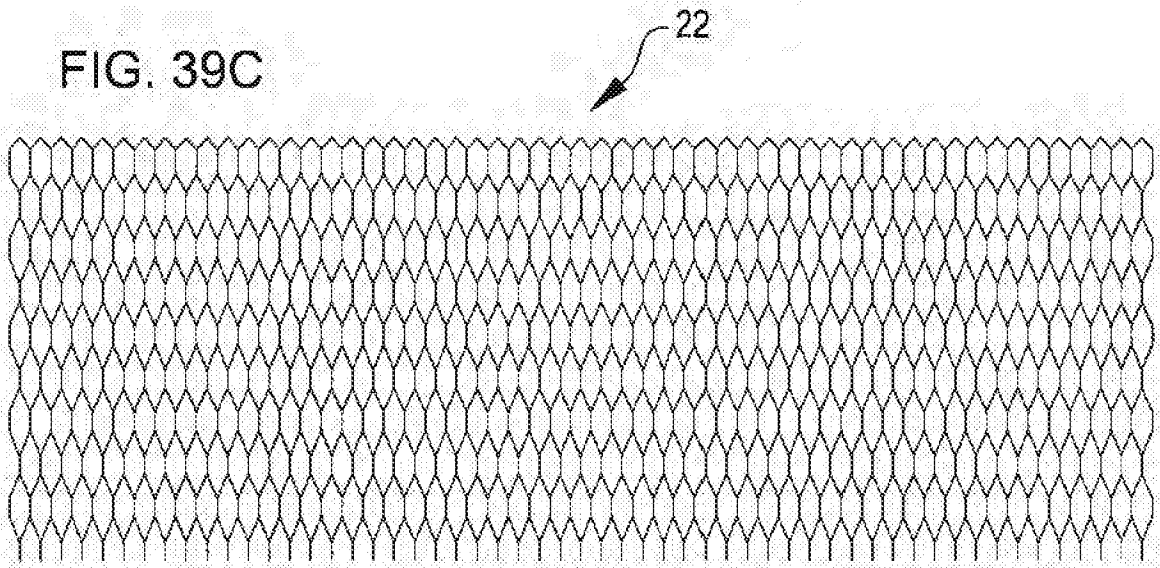


FIG. 40

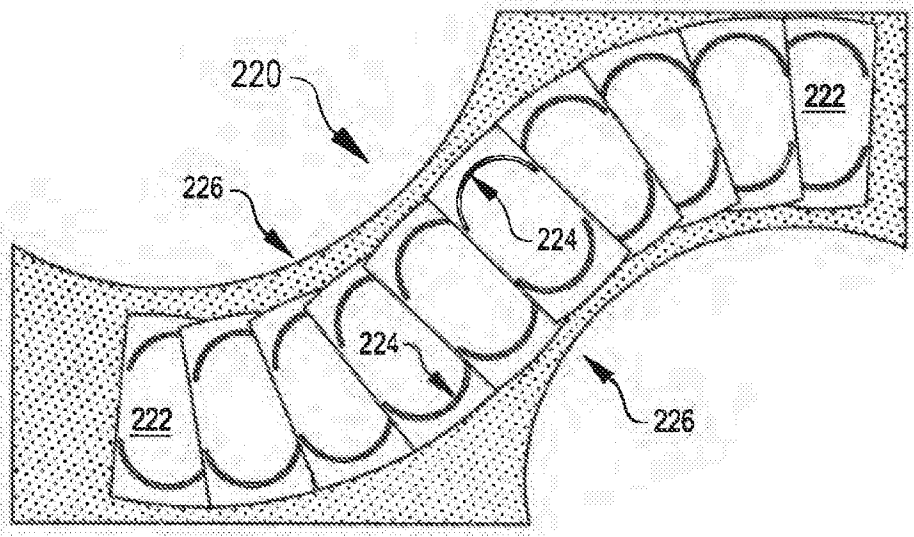



FIG. 41

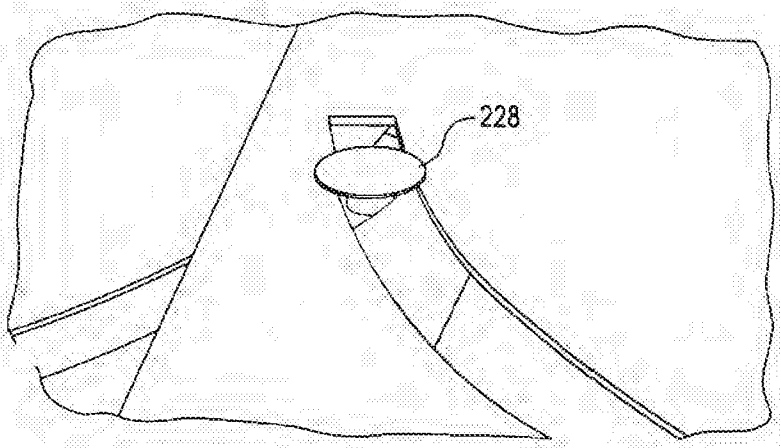



FIG. 42

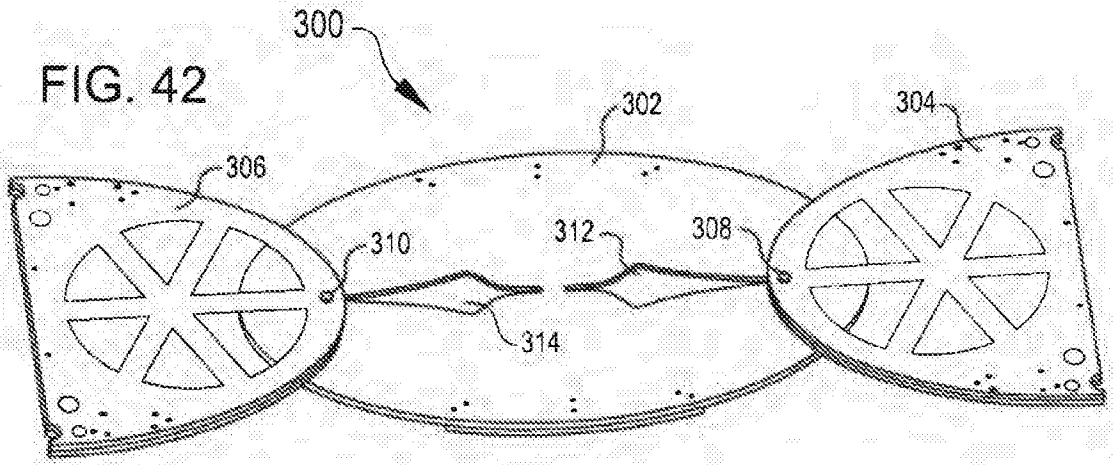


FIG. 43

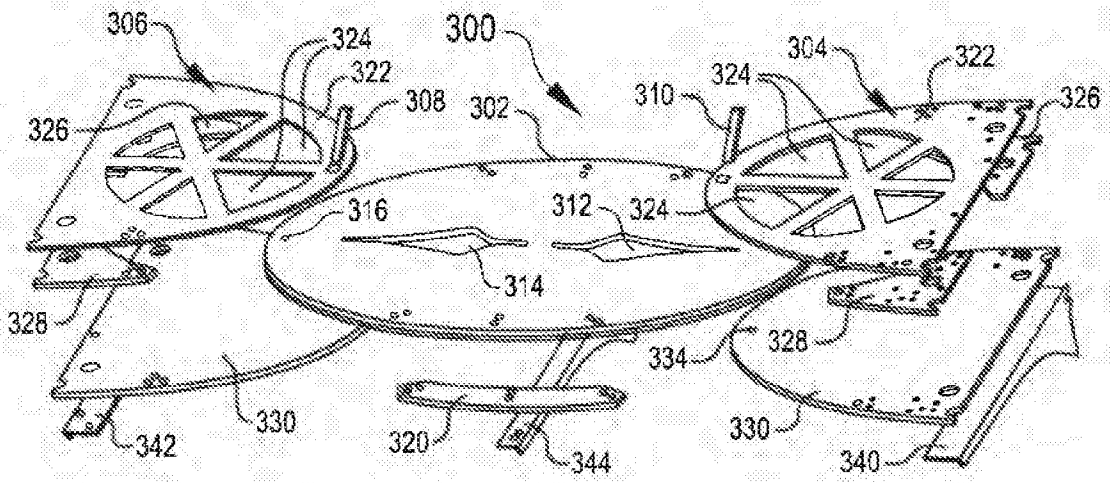



FIG. 44

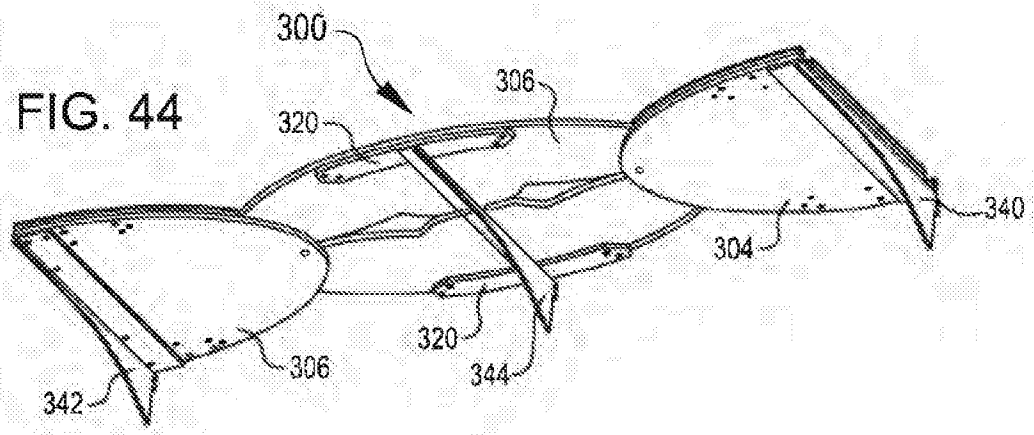



FIG. 45

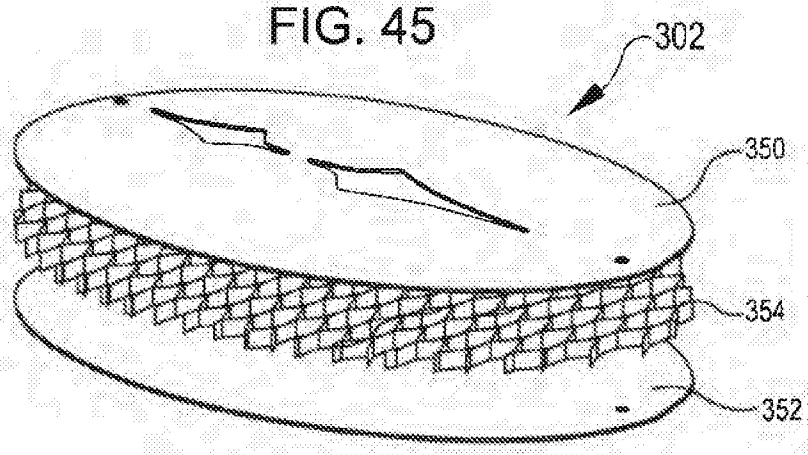


FIG. 46

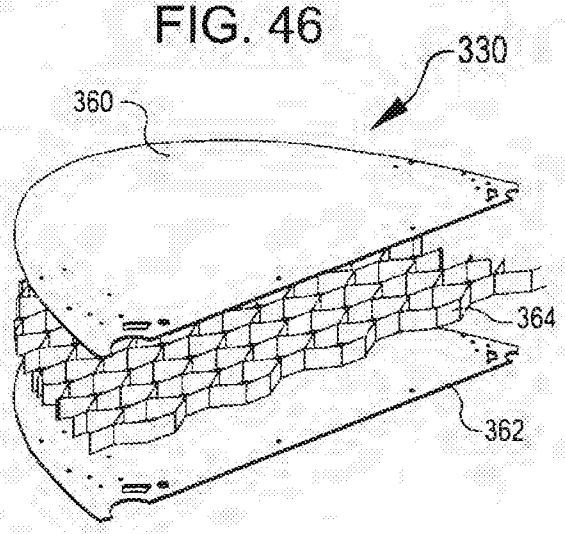



FIG. 47

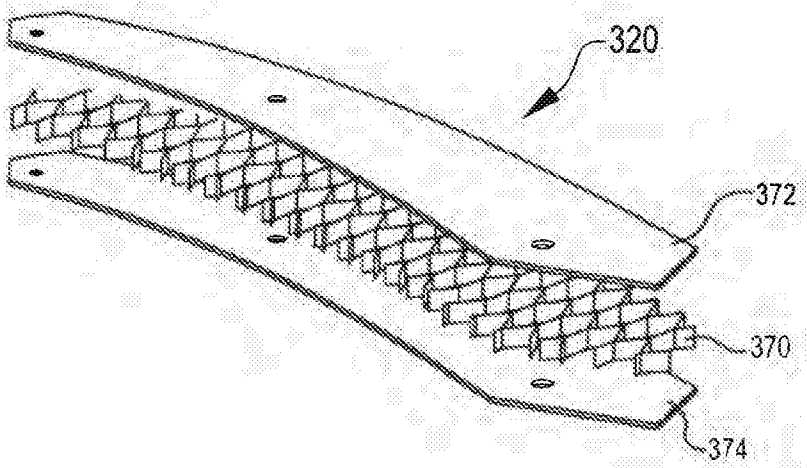



FIG. 48

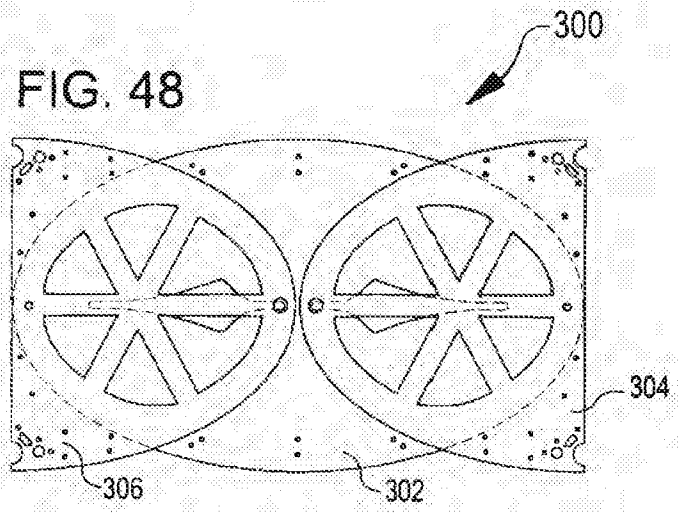


FIG. 49

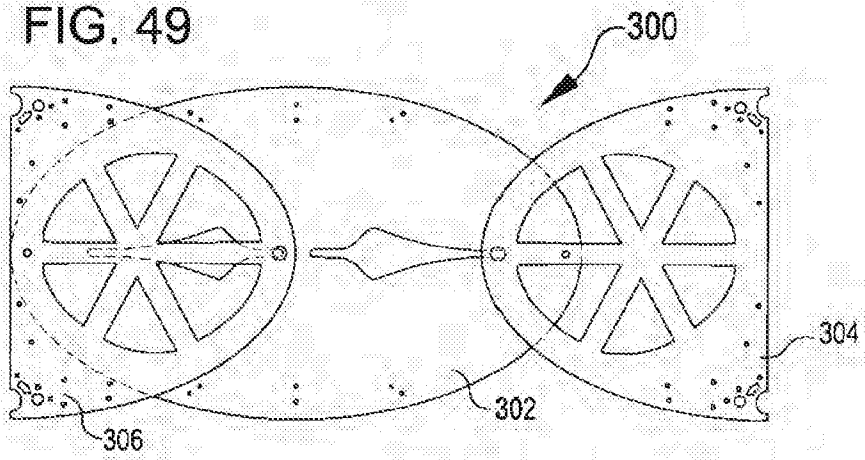



FIG. 50

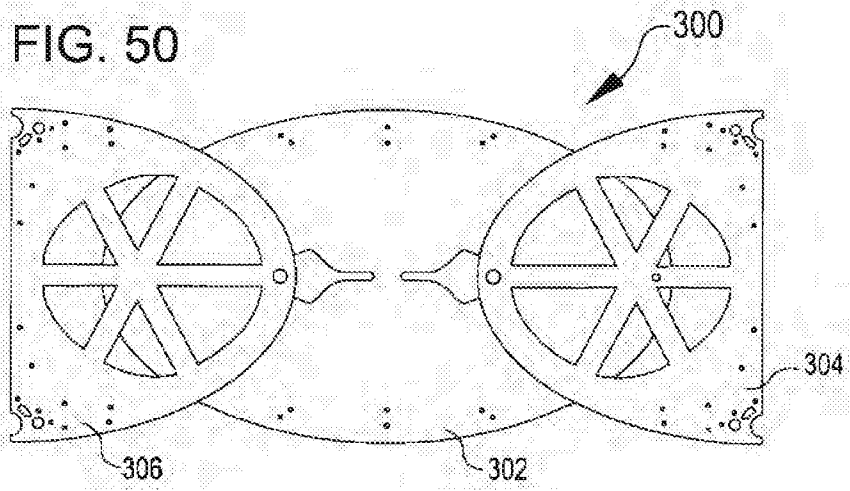



FIG. 51

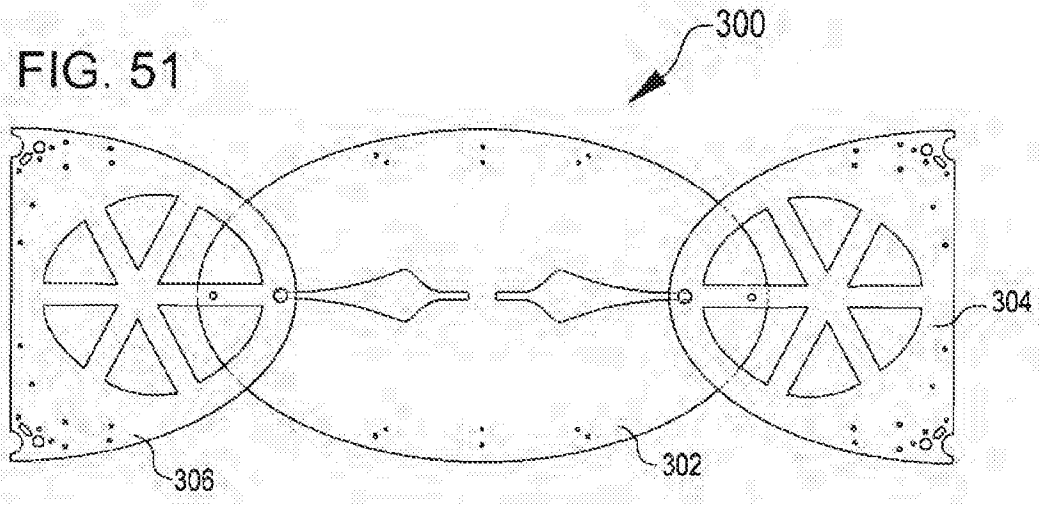
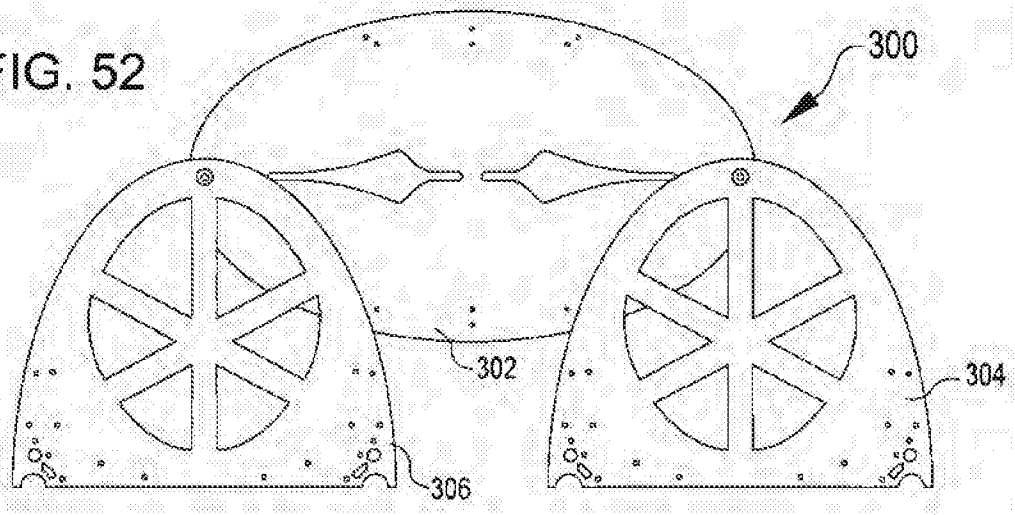


FIG. 52



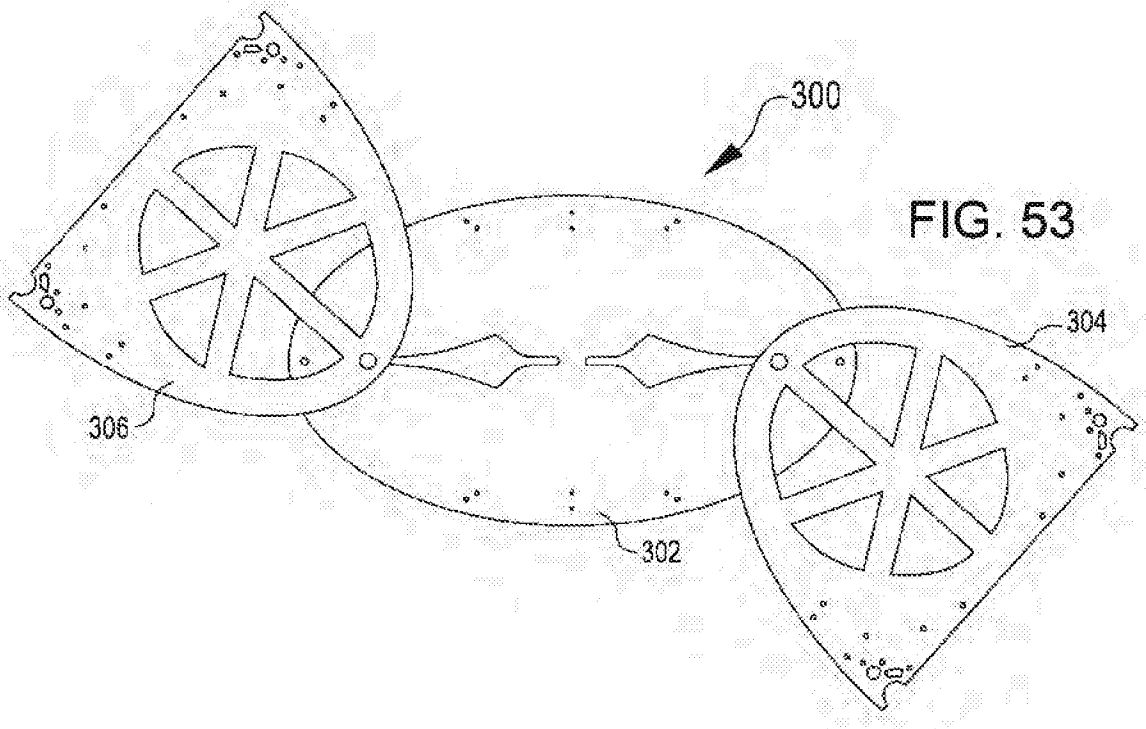




FIG. 53

FIG. 54

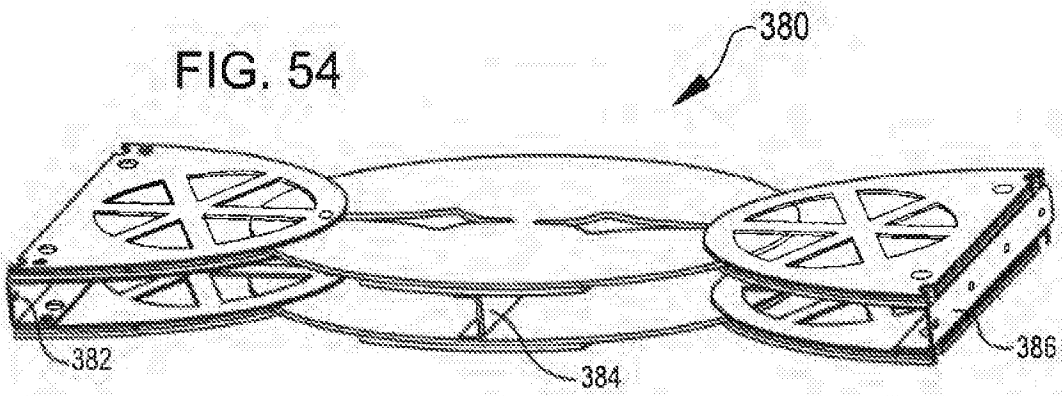



FIG. 55

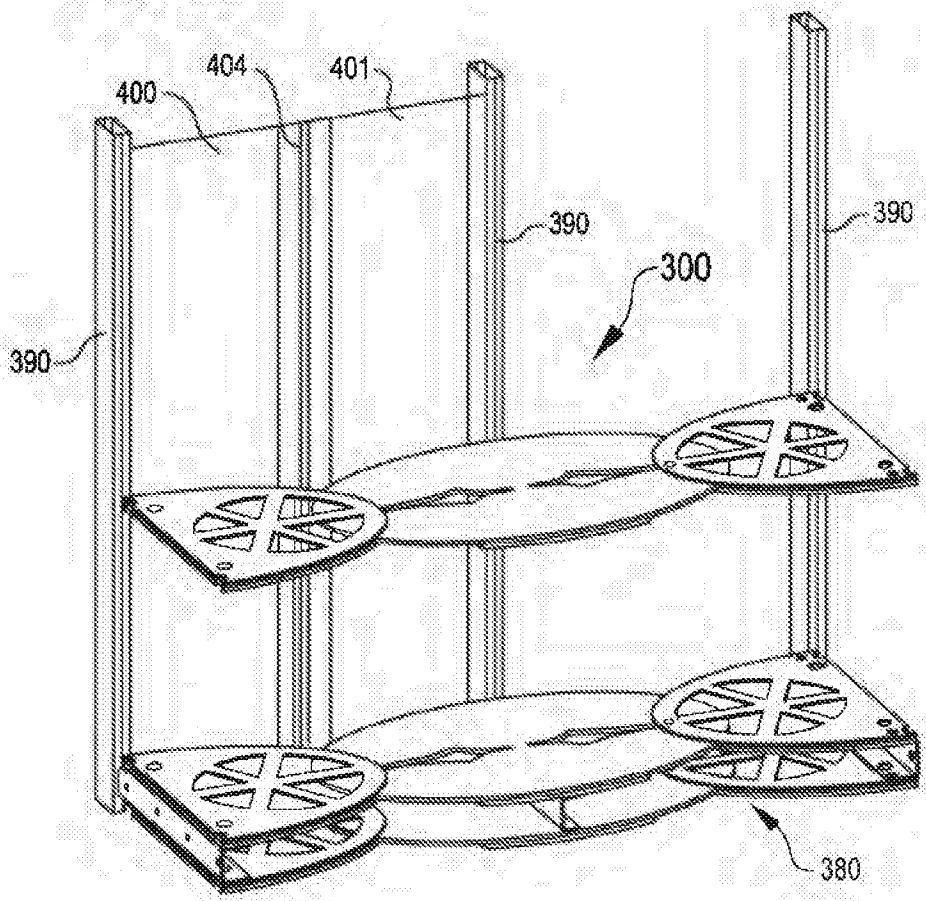


FIG. 56

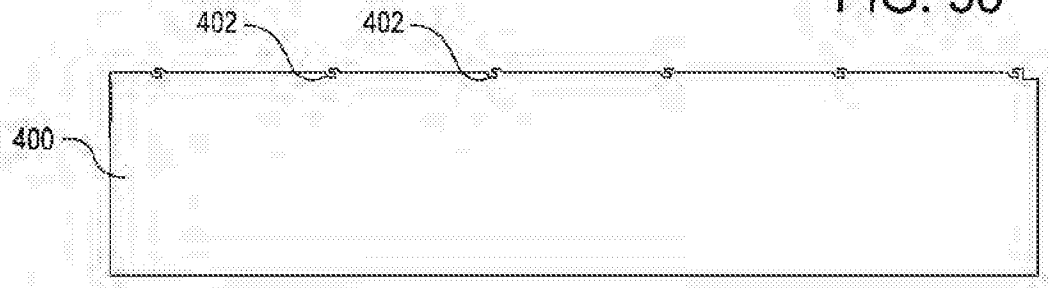



FIG. 57

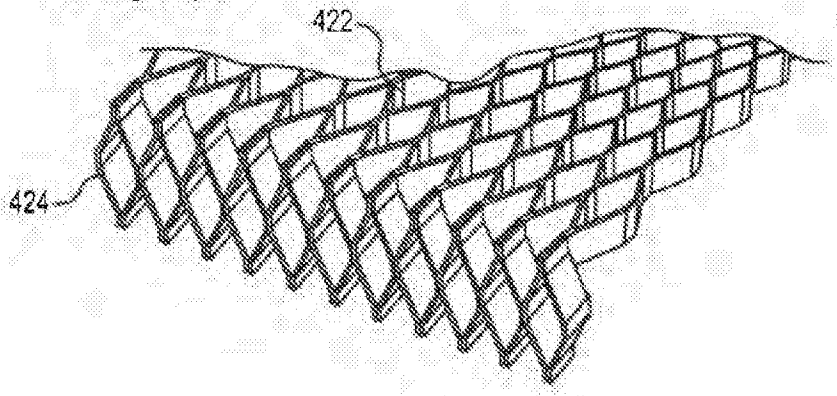



FIG. 58

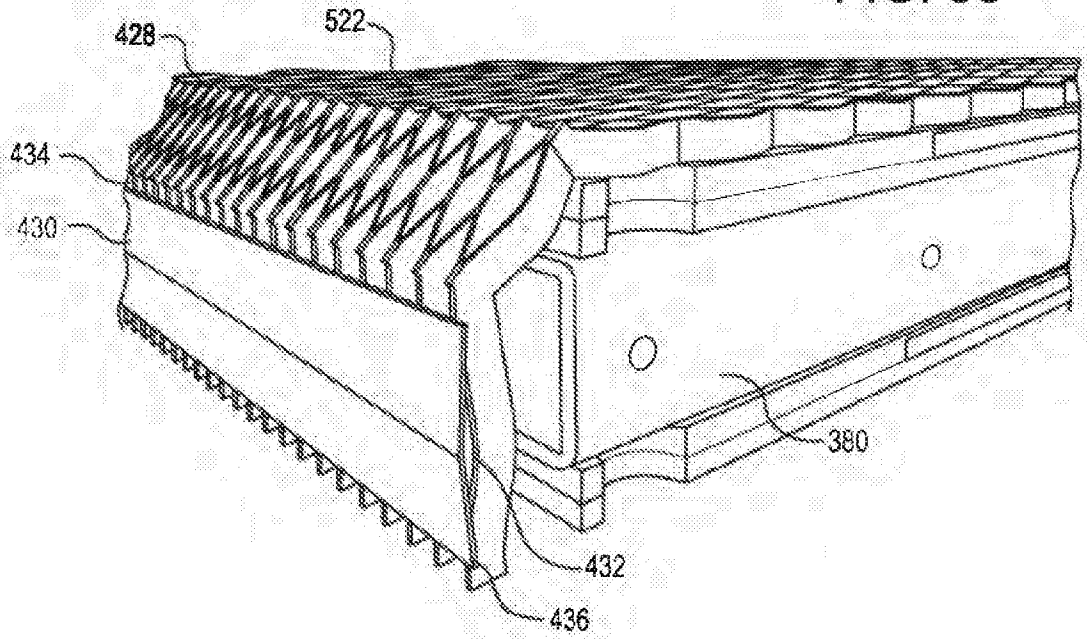


FIG. 59

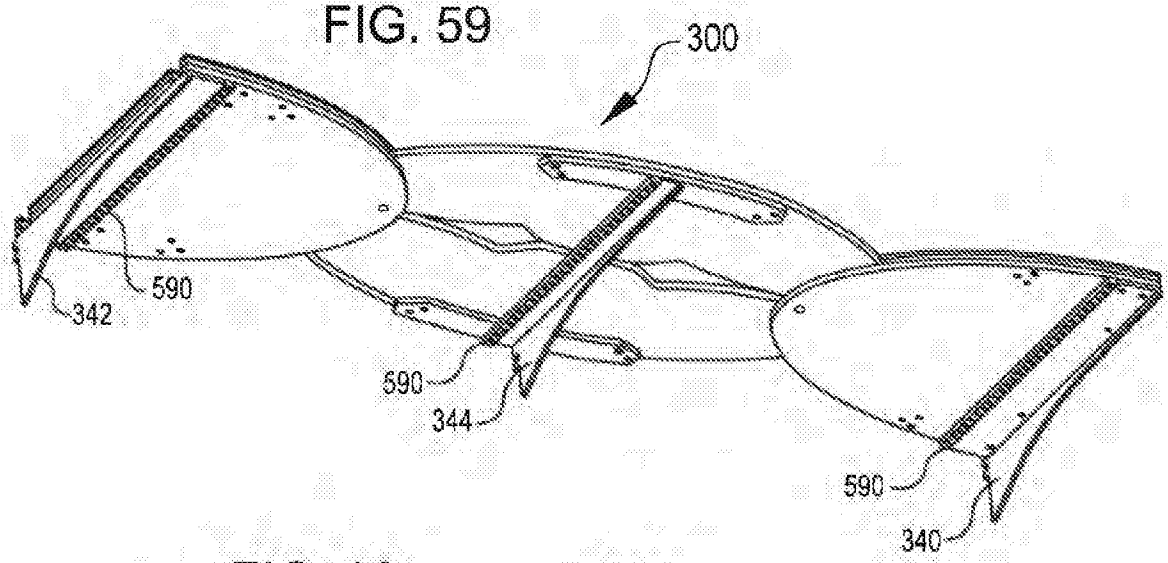



FIG. 60

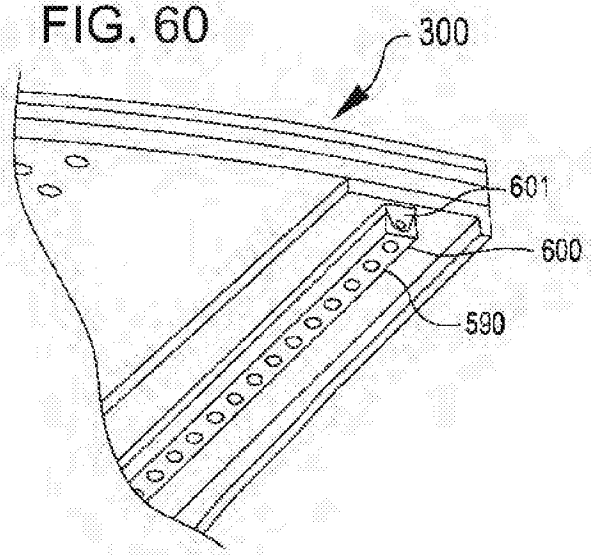



FIG. 61

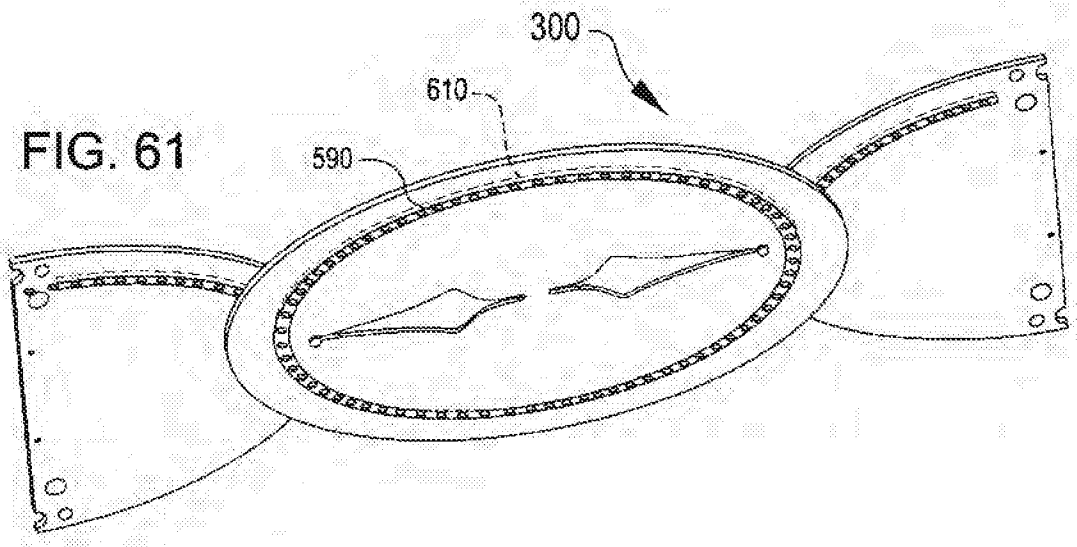


FIG. 62



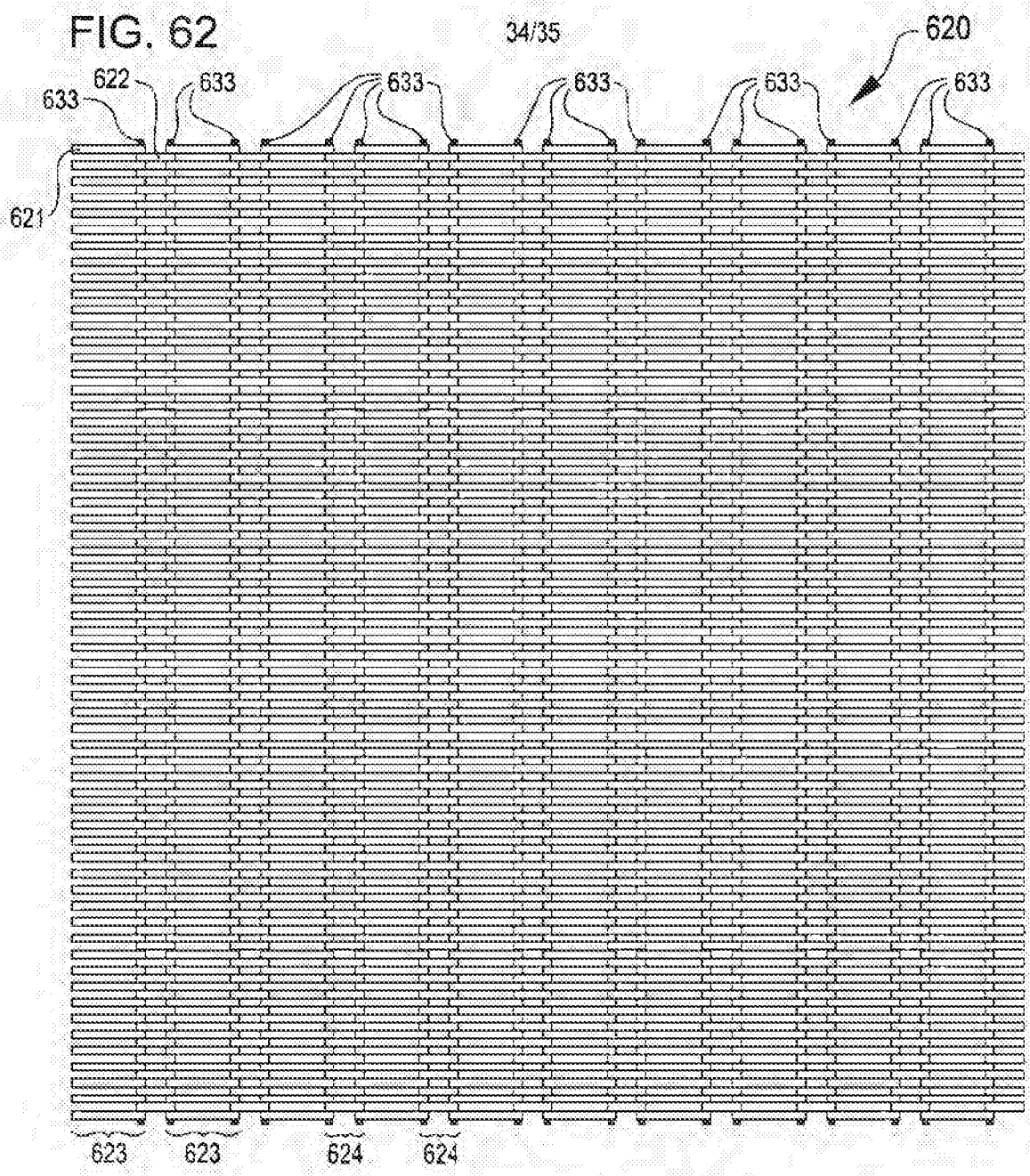



FIG. 63A

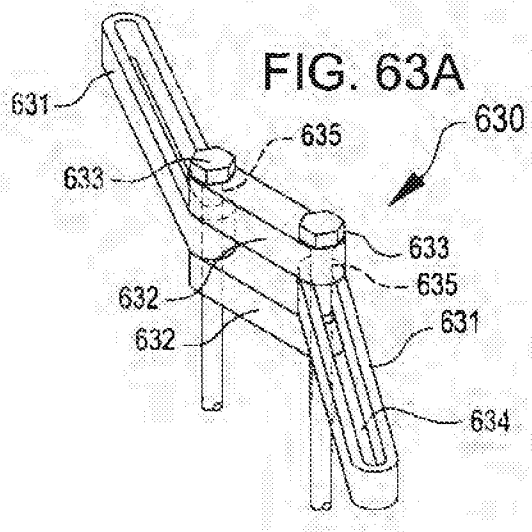



FIG. 63B

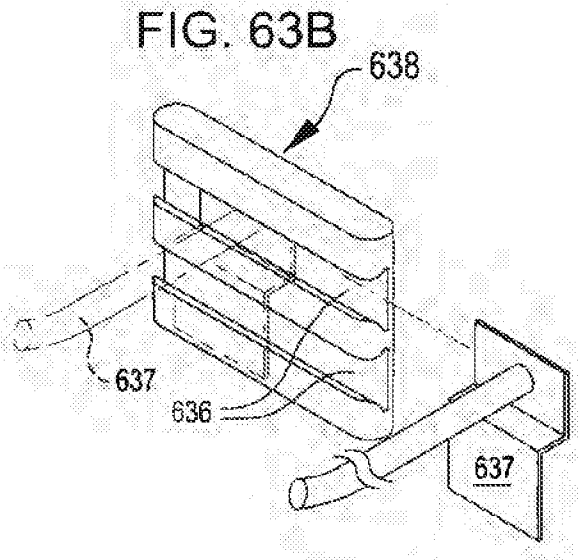


FIG. 64

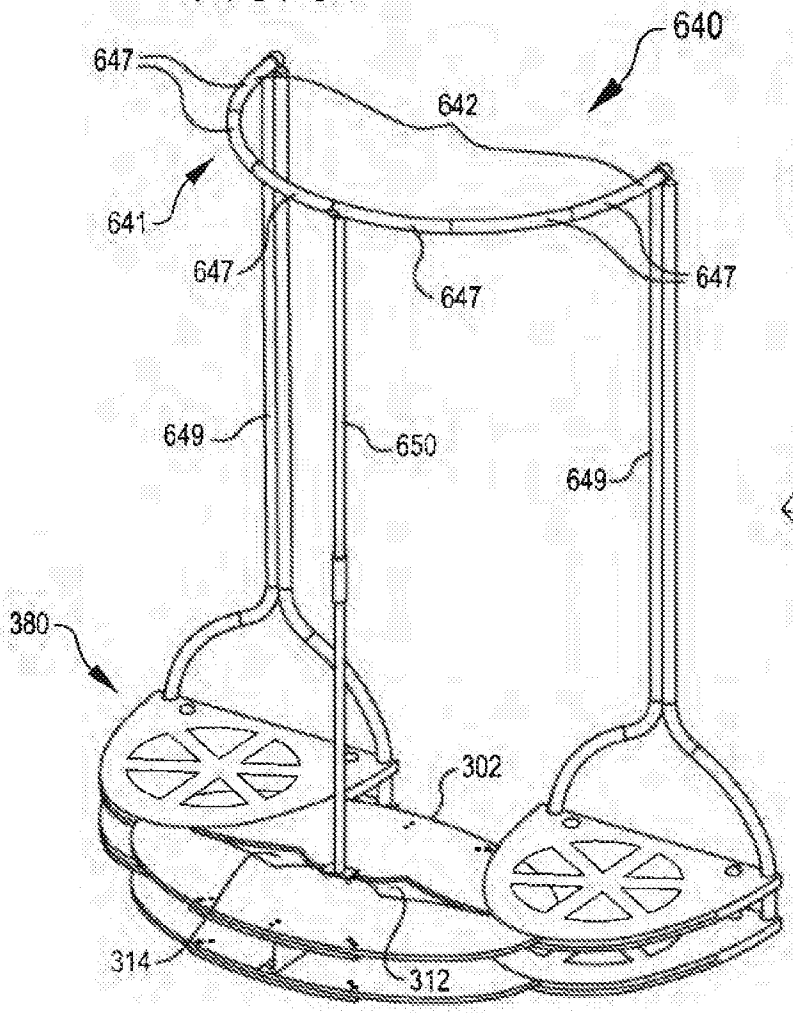



FIG. 65

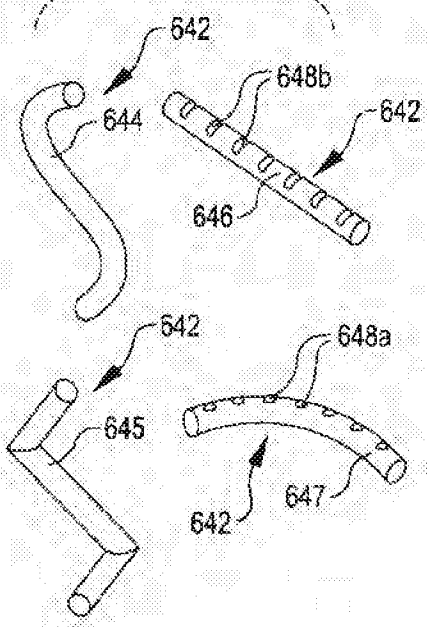



FIG. 66

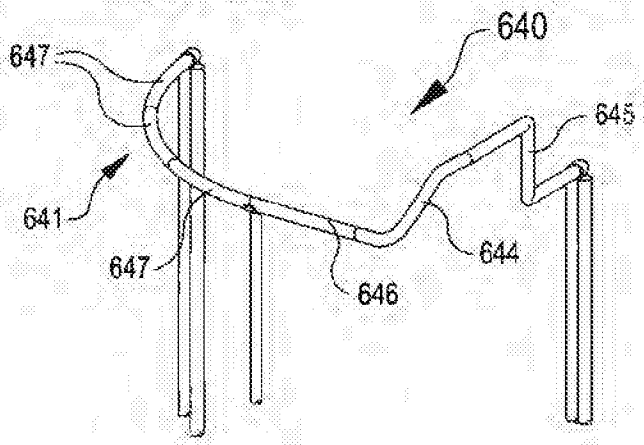
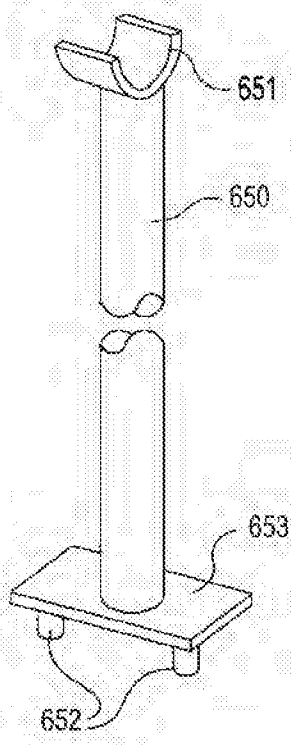



FIG. 67



(Appx. A)

**Claims entered in U.S. Application No. 14/341,576**

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A variable planform shelving system comprising a shelf having a variable planform, the shelf comprising:

a first frame having a planform shape corresponding to at least a portion of one end of an ellipse and providing a first part of a variable support platform;

a second frame having a planform shape corresponding to at least a portion of one end of an ellipse and providing a second part of the variable support platform;

a third frame having a planform shape of an ellipse and providing a third part of the variable support platform, the third frame being disposed between the first and second frames, the third frame coupled with the first and second frames so that relative positioning between the third frame and each of the first and second frames is variable to vary the planform of the variable support platform,

wherein the third frame is configurable to be ~~at least one of~~ (i) slidingly coupled with the first frame for translation of the first frame relative to the third frame along at least one of a length or a width of the third frame, (ii) pivotally coupled with the first frame, (iii) slidingly coupled with the second frame for translation of the second frame relative to the third frame along at least one of the length or the width of the third frame, ~~and~~ (iv) pivotally coupled with the second frame, and (v) combinations thereof.

2. (Original) The variable planform shelving system of claim 1, wherein at least one of the first and second frames comprises a coupling pin coupled with the frame for coupling the frame with the third frame; and

wherein the at least one of the first and second frames further comprises a slot in the frame that receives a portion of the third frame and wherein the coupling pin coupled with the frame extends across the frame slot and through an opening in the third frame.

3. (Original) The variable planform shelving system of claim 2, wherein the first or the second frame comprises:

a top plate having a planform shape of one end of an ellipse;

a bottom plate having a planform shape of one end of an ellipse and aligned relative to the top plate so that the outer perimeter of the bottom plate is aligned with the outer perimeter of the top plate; and

a spacer, wherein the spacer is disposed between and joined to each of the top plate and the bottom plate, and the space between the top plate and the bottom plate defines the slot for receiving the third frame.

4. (Original) The variable planform shelving system of claim 1, wherein at least one of the first and second frames comprises a coupling pin coupled with the frame for coupling the frame with the third frame; and

wherein the third frame comprises one or two shaped apertures, each shaped aperture having a length and a variable width and configurable for receiving the coupling pin of the first or the second frame for axial movement along the length of the aperture and lateral movement within the variable width.

5. (Original) The variable planform shelving system of claim 4, wherein the third frame includes one or two distal holes, each distal hole configured to receive the coupling pin of the first or the second frame for pivotal movement of the frame about the distal hole; and

wherein the third frame is configured in a first configuration to be slidingly coupled with one of the first frame and the second frame and configured in a second configuration to be pivotally coupled with the one of the first frame and the second frame, and wherein the coupling pin of the one of the first frame and the second frame may be removed and replaced to change the third frame from the first configuration to the second configuration.

6. (Currently Amended) The variable planform shelving system of claim 1, wherein at least one of the first and second frames comprises a coupling pin coupled with the frame for coupling the frame with the third frame; and

wherein at least one of the coupling pins of one of the first frame and the second frame is configurable to clamp the one of the first frame and the second frame to the third frame

and inhibit movement of the one of the first frame and the second frame relative to the third frame.

7. (Currently Amended) The variable planform shelving system of claim 1, wherein the third frame comprises:

a base plate in the shape of an ellipse;

a spacer joined to the base plate and aligned with the base plate so that ~~common~~ features in common of the spacer and the base plate are aligned, wherein the spacer provides an upper surface to the third frame that is in plane with a top surface of the first frame and a top surface of the second frame.

8. (Withdrawn) The variable planform shelving system of claim 1 further comprising:

a second shelf being elevated above the first shelf, each shelf further comprising:

a first frame having a planform shape of one end of an ellipse and providing a first part of a variable support platform,

a second frame having a planform shape of one end of an ellipse and providing a second part of the variable support platform, and

a third frame having a planform shape of an ellipse and providing a third part of the variable support platform, the third frame being disposed between the first and second frames, relative positioning between the third frame and each of the first and second frames being variable to vary the planform of the variable support platform;

at least one first support column supporting the first frames of the first and second shelves; and

at least one second support column supporting the second frames of the first and second shelves.

9. (Withdrawn) The variable planform shelving system of claim 8, wherein an underside of the second shelf further comprises at least one light source.

10. (Withdrawn) The variable planform shelving system of claim 8 further comprising a plurality of backing panels, each panel configured to attach to one of the support columns and to overlap with another of the backing panels, wherein the another of the backing

panels is attached to another of the support columns and located adjacent to the panel so that the space between the support columns is covered by the overlapping panels.

11. (Withdrawn) The variable planform shelving system of claim 8, further comprising a movable slat as an adjustable backing between adjacent support columns, the movable slat comprising:

a plurality of first links, each of the plurality of first links comprising a vertical opening through a height of the link, the opening configured to receive at least one long pin member to align the link with other links, wherein the plurality of first links is aligned into columns of vertically aligned first links;

a plurality of second links, each of the plurality of second links comprising at least one vertical opening through a height of the link, each opening configured to receive at least one long pin member to align the link with other links, wherein the plurality of second links is aligned into columns of vertically aligned second links, and wherein each column of second links is disposed between adjacent columns of first links so that the columns of first links and the columns of second links are disposed in an alternating pattern;

a plurality of long pin members, each pin passing through at least some first links in a first link column and passing through at least some second links in an adjacent second link column so that the first link column is joined to the adjacent second link column by a common pin.

12. (Withdrawn) The variable planform shelving system of claim 1 further comprising:

a base comprising at least one variable planform shelf, each shelf comprising:

a first frame having a planform shape of one end of an ellipse and providing a first part of a variable support platform,

a second frame having a planform shape of one end of an ellipse and providing a second part of the variable support platform, and

a third frame having a planform shape of an ellipse and providing a third part of the variable support platform, the third frame being disposed between the first and second

frames, relative positioning between the third frame and each of the first and second frames being variable to vary the planform of the variable support platform;

at least one first support column supported by the first frame of the at least one variable planform shelf;

at least one second support column supported by the second frame of the at least one variable planform shelf; and

a top rack from which clothes can be hung, the top rack supported at least by the first and the second support columns, wherein the top rack comprises a plurality of shaped interchangeable members which together form a shape of the top rack, and at least some of the shaped interchangeable members may be replaced with other shaped interchangeable members to vary the shape of the top rack.

13. (Withdrawn) The variable planform shelving system of claim 1, further comprising a support surface assembly for use with a variable planform shelf having a variable support platform, the support surface assembly comprising a plurality of interconnected vertically-oriented flexible panels so that the support surface varies in response to variation in the planform of the variable support platform, wherein the support surface assembly is supported by the variable support platform and provides a support surface for items supported by the variable planform shelf.

14. (Withdrawn) The variable planform shelving system with a support surface of claim 13, wherein the support surface assembly can be expanded in a lengthwise direction perpendicular to the vertical direction of the vertically-oriented panels without any substantial contraction in the support surface assembly in a width-wise direction transverse to the lengthwise direction.

15. (Withdrawn) The variable planform shelving system with a support surface of claim 13, wherein the plurality of interconnected vertically-oriented flexible panels are intermittently bonded to each other to provide a sinusoidal pattern.

16. (Withdrawn) The variable planform shelving system with a support surface of claim 13, wherein the plurality of interconnected vertically-oriented flexible panels comprise at least one of polycarbonate strips, acrylic strips, or acrylic abrasion resistant strips.

17. (Withdrawn) The variable planform shelving system of claim 1, further comprising a support surface assembly for use with a variable planform shelf having a variable support platform, the support surface assembly comprising a plurality of coupled horizontally-oriented panels, each of the horizontally-oriented panels having one or more slots receiving connecting pins that couple adjacent panels of the horizontally-oriented panels so that the support surface provided varies in response to variation in the planform of the variable support platform, wherein the support surface assembly is supported by the variable support platform and provides a support surface for items supported by the variable planform shelf.

18. (Currently Amended) The variable planform shelving system of claim 1, further comprising a component ~~for use in a~~ included in the variable planform shelf, the component constructed as a sandwich panel comprising:

a top ~~metal~~ layer;

a bottom ~~metal~~ layer;

a middle layer sandwiched between the top and bottom ~~metal~~ layers, the middle layer comprising a plurality of interconnected vertically-oriented parallel flexible panels.

19. (Original) The variable planform shelving system of claim 1, wherein at least one of the first frame, the second frame, and the third frame further comprise features for attachment of at least one of one or more support surface assemblies, one or more support posts, one or more kick plates, one or more price displays, one or more hanger hooks, one or more height adjustable feet, or one or more additional variable planform platform frames.

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20. (New) A variable planform shelving system comprising a shelf having a variable planform, the shelf comprising:

a first frame having a planform shape corresponding to at least a portion of one end of an ellipse and providing a first part of a variable support platform;

a second frame having a planform shape corresponding to at least a portion of one end of an ellipse and providing a second part of the variable support platform;

a third frame having a planform shape of an ellipse and providing a third part of the variable support platform, the third frame being disposed between the first and second frames;

a first coupling pin coupling the first frame with the third frame so that relative positioning between the third frame and the first frame is variable to vary the planform of the variable support platform by the first frame and the third frame being pivotable relative one another about the first coupling pin and the first coupling pin being slidable along at least one of a longitudinal direction or a lateral direction of the third frame; and

a second coupling pin coupling the second frame with the third frame so that relative positioning between the third frame and the second frame is variable to vary the planform of the variable support platform by the second frame and the third frame being pivotable relative one another about the second coupling pin and the second coupling pin being slidable along at least one of the longitudinal direction or the lateral direction of the third frame.

# APPENDIX B

[0001]. Title

[0002]. IMPROVED CENTER STORE DESIGN, METHOD AND ARRANGEMENT FOR RETAIL MARKETS

[0003]. Background of the Invention

[0004] The present invention relates generally to retail store interior design, and more specifically to a novel and improved layout of the shelving and other means for holding and displaying goods for sale in a PrimeZone portion of the central space of the store.

[0005]. The present invention has broad applicability to many types of retail establishments in which a wide variety of goods have historically been placed on long rows of parallel racks or shelves orderly arranged most often within a central portion of a large open room defined by exterior walls. In most cases, special purpose rooms or areas are positioned around the central space and proximate the surrounding walls. Grocery stores selling packaged comestibles, household goods and other products are an example of such establishment, but many other types of retail stores follow a similar pattern and as will be apparent to the reader, the present invention has broad applicability...

[0006]. As generally illustrated in FIG. 1 of the present Drawing, a typical grocery store, schematically represented at 10, is usually configured to include four basic components, namely, a "Backroom" area 12 that is usually at the back of the store and used for the receiving and storage of product prior to its movement out to the display area; a "Front End" area 14, usually located at the front of the store close to the front doors 16 and often the area in which cash registers or other check out facilities are positioned; a "Perimeter" area 18 that is sometimes called the perishable perimeter because it typically includes the meat,

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seafood, produce, dairy, deli, floral, and bakery departments; and a "Center Store" area 20 in the center of the store and which typically includes long rows of parallel shelving systems 22 wherein grocery, frozen and refrigerated products, health and beauty Aids, wine, liquor, and bulk items are displayed for sale. The shelving systems 22 are typically comprised of a plurality of movable or non-movable shelving units 23 affixed together back-to-back and in series to form the several rows of double-sided shelves shown in FIG. 1. Shelving units which are intended to be movable are often referred to as "gondolas".

[0007]. Alternatively, there are some retail store configurations that comingle the various departments throughout the store due to store shell format, or for merchandising differentiation from other stores. For example, the produce area normally located in the Perimeter area 16 may be positioned to replace all or part of a normal aisle shelving system and extend down the middle of the center part of the store rather than along the inside perimeter of the store building. But even in such layouts, the produce cases are typically arrayed in linear formats forming straight lines within the center of the store.

[0008]. The Center Store area has traditionally been a difficult and boring area of the store compared to the produce, deli and bakery sections because its long aisles of shelving usually do not stimulate the consumer to purchase other or more product than he or she came to buy.

[0009]. The aisle spaces 24 are usually 5 to 7 feet in width, so as to allow shopping carts to pass, and the shelving systems can be as high as 86". Most contemporary shelving systems include 7 or 8 shelves aligned and tied together in a row. Long rows of canned foods, packaged goods and glass doors with product in frozen and refrigerated cases normally do not stimulate consumers to spend more of their money in the store than they would normally spend to accommodate their needs.

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[0010]. Center Store aisles are typically viewed by consumers as shelf-lined walk ways along which consumers can walk to find a product, put it in their shopping cart or basket, and then move on to the next aisle to select the next product on their shopping list. The consumer typically does not linger or explore these aisles as they are more likely to do in a specialty cheese or bakery section.

[0011]. When a traditionally configured new Center Store area is planned, the shelving layout is normally designed to incorporate one of the two major brands of linear shelving systems that lead the industry. These systems are typically comprised of a plurality of discrete shelving or other product display units that, once set in place, are almost never moved during the lifespan of the store, unless there is a complete remodel of the establishment. The reasons these shelving systems are almost never moved is because they have historically not been designed to move, and the normal practice of the retail industry has not been to move them. That is why nearly all Center Store shelving systems include shelving units, refrigerated units and product display cabinets are placed in long parallel straight lines creating straight aisles for consumers to walk through.

[0012]. Within the Center Store, a shopper expects to find all of the major product categories including soups, pastas, condiments, paper goods, detergents, beverages, frozen foods, refrigerated foods, specialty and gourmet products, rice, beans, household products, bulk product, coffee, teas, snacks, etc., grouped together by type or category of product.

[0013]. Promotional activity within the Center Store is usually limited to materials making special announcements connected to the shelves of the shelving systems and on-the-shelf promotion which includes tags promoting the product, coupon dispensers, sampling dispensers, advertising signs and shelf talkers.

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[0014]. A consumer, upon entering an aisle with parallel positioned shelving systems extending on both sides thereof, is typically looking for specific items and then moving on to the next aisle, and usually pays little attention to advertising. It is thus a challenge for companies marketing Consumer Product Goods (CPG) to get the attention of the consumer in such linear aisles.

[0015]. Promotional activity within a store sometimes includes signage on the floor at the entrance to an aisle, or perhaps banners extending across the aisle overhead announcing a promotion. But these floor placed signs and overhead banners are usually not particularly effective because they are not directly in the line of sight of the consumer walking through the aisle and thus not well focused on the product offerings on the shelves.

[0016]. The most effective and highly coveted promotional locations within the traditional Center Store are the 3 or 4 foot areas at the end of each aisle in which transversely extending shelving or display cases 26 can be positioned. These shelf end display facilities are called "End Caps" and can readily be seen by consumers from a distance as well as when they enter an adjacent aisle. In fact, it is fair to say that nearly all consumers will see or at least glance at an End Cap product offering of specials and/or promotions by a CPG purveyor, or the store itself in promoting its Private Label brands.

[0017]. In fact, it is not unusual for CPG companies to pay significant sums of money to the store for the right to display their products on an End Cap for a one or two week period. This is usually the case within the larger national chain stores wherein typical Center Store sales, on a national average, represent 66% of the total store sales. This can of course vary depending on the geographical location of the store.

[0018] However, Center Store sales have been declining for traditional grocery store chains over the past 10 years or so, due to the intense competition

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from the large national and international discounters. Supermarkets simply cannot price-wise compete against the discounters on many Center Store items, so have accepted this fact and have tried other concepts to promote their products. For example, many supermarkets have chosen to focus on the store Perimeter area wherein they feel they can compete more favorably with the discounters. But most have experienced little improvement.

[0019]. As discussed above, supermarket design for the Center Store has been the same for as long as there have been supermarkets, i.e., straight aisles with straight rows of gondolas or fixed shelving holding the products, or straight rows of refrigerated or frozen food cases. Although the large vendors will pay for the privilege of having their product displayed at the end of the aisle on End Caps, where their product can be easily seen by most anyone coming into the store, there are very little other areas of the store for these vendors to promote their items other than on the shelves. Only a few large vendors get the larger floor space that allows for big displays to get the consumers attention. But consistent with the old saying "Stack it high and watch it fly", these companies pay dearly to have their products in such spaces.

[0020]. Another concern is that branded vendors have always had to battle with the stores over placement of product competing with the store's Private Label brands. Private Label brands are normally sold for lower prices in the store because most stores usually spend relatively little in marketing the items. But some of the national CPG vendors have significant resources available for marketing and in-store promotion of their competing products, and thus find success even though their products are usually higher in price than the Private Label products.

[0021]. There is thus a need for a completely new and unique layout for the Center Store area of a retail establishment; one that offers a radical departure

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from traditional layouts for the Center Store, and one which creates more desirable space for all concerned to promote their products.

[0022]. There is also a need for a new and unique layout for the Center Store which, through sale of PrimeZone space to the larger vendors, creates an additional profit center for the store.

[0023]. There is in addition a need for a novel Center Store solution which adds flexibility to the shelving design so that the store can configure and reconfigure the shelving layout in a PrimeZone space to accommodate the promotional needs of those vendors who are willing to pay a premium for the privilege.

[0024]. There is yet a further need for a design and layout that offers PrimeZone space for promotional signage within the Center Store which in the past has been limited to off-the-shelf, floor or banners above the aisle signage; such solution providing yet another potential profit center for the store.

[0025]. Still another need in the field of the present invention is the provision of shelving and other display units mounted on glider devices attached to the supporting leg posts of shelving units and the like, which enable movement, leveling and positional fixation for the units.

[0026]. Brief Summary of the Invention

[0027]. The present invention addresses the above stated needs by providing a radically new Center Store design and shelving layout concept which allows selective configuration and reconfiguration of the orientation of certain shelving units and display systems within the central portion of the Center Store; herein referred to as the "PrimeZone", so as to create a new assembly of

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additional End Caps, novel Center Caps, Power Sets, Triangular Corners, Hot Spots and Banner Boards, the combination of which provides an ideal solution for enabling retailers to re-invigorate their Center Store, increase their vendor promotional revenue, and increase their in-store sales due to more favorable consumer response to greater promotional activity and the periodic change of product venues in key areas of the store layout. In addition, novel display unit supporting hardware is provided which enables the convenient reconfiguration of the shelving layout to accommodate vendors desire to change display schemes.

[0028] Brief Description of the Several Figures of the Drawing

[0029]. FIG. 1 is a diagram schematically illustrating in plan view a traditional Center Store shelving layout;

[0030]. FIG. 2 is a diagram schematically illustrating in simplified plan view a novel Center Store shelving system layout creating a PrimeZone in accordance with an embodiment of the present invention;

[0031]. FIGS. 2a-2g are plan and elevational views illustrating the angled intersection of shelving units in a PrimeZone shelving system in accordance with the present invention;

[0032]. FIG. 3 is a perspective view further illustrating the improved Center Store including a PrimeZone in accordance with the embodiment of the present invention generally shown in FIG. 2;

[0033]. FIG. 4 is a perspective view illustrating that which a consumer would see standing at a position 4 as depicted in FIG. 3 and looking in the direction of the associated arrow;

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[0034]. FIG. 5 is a perspective view illustrating that which a consumer would see standing at a position 5 as depicted in FIG. 3 and looking in the direction of the associated arrow;

[0035]. FIG. 6 is a perspective view illustrating that which a consumer would see standing at a position 6 as depicted in FIG. 3 and looking in the direction of the associated arrow;

[0036]. FIG. 7 is a diagram schematically illustrating in plan view further details of the previously illustrated embodiment of a PrimeZone in accordance with the present invention;

[0037]. FIG. 8 is an exploded view showing the component parts of a novel glider device for attachment to the legs of shelving units and other product display systems to enable leveling and movement from one position to another in accordance with the present invention;

[0038]. FIG. 9a and 9b are partially broken axial cross sectional views depicting the assembled glider device of FIG. 8 and illustrating attachment thereof to the lower end of a shelving leg post or the like;

[0039]. FIG. 10 is a simplified perspective view showing the glider device of FIG. 8 affixed to the lower end of a shelving leg or the like in accordance with the present invention;

[0040]. FIGS. 11a and 11b are perspective and cross-sectional views illustrating a positional locking bracket for use with a glider device in accordance with the present invention; and

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[0041]. FIGS. 12-17 are diagrams schematically illustrating in plan view several alternative embodiments of PrimeZones in accordance with the present invention.

[0042]. Detailed Description of embodiments the Invention

[0043]. As pointed out above, and as illustrated in FIG. 1 of the drawing, the traditional Center Store includes a plurality of long parallel rows of shelves and other product display units defining customer walking aisles formed between the rows of product display units.

[0044]. In FIG. 2 of the Drawing, a Center Store arrangement 30 is depicted including an embodiment 32 of a PrimeZone in accordance with the present invention. The PrimeZone 32 is an area within the Center Store in which at least some of the gondolas 41 and other product display units may be mobilized by gliders, disclosed below and affixed to the legs or bottoms thereof, so that the units can be selectively positioned and organized in a designed arrangement, fastened together and locked into position until a new design arrangement is desired, at which time the arrangement can be unlocked and reconfigured without substantial inconvenience and/or cost. It will be understood that the PrimeZone is normally intended to be formed in a central portion of the Center Store, but can be expanded to include any portion thereof.

[0045]. The PrimeZone store layout differs from the traditional Center Store layout in that it offers to CPG (Consumer Packaged Goods) vendors significantly more opportunity to effectively promote their products within the Center Store of a supermarket or other retail establishment. This is accomplished by allowing the store proprietor to work with product vendors to configure arrangements of gondolas (shelving units) and other product display units in ways that enable the vendor to better display and promote its products

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[0046]. The PrimeZone 32 may be generally described as an area normally within a central portion of the Center Store and having an improved arrangement of product display units and/or systems. The improved arrangement is accomplished by (a) providing breaks in at least a first row and an adjacent second row of the usual plurality of long parallel rows of product display units; (b) providing a first elongated product display unit (or system including a plurality of display units) oriented to have one end thereof disposed in engagement with an end of a display unit or system of the first row adjoining one side of the break in the first row, and having the length thereof extending at a first angle relative to the length of the first row and toward the break in the second row; (c) by providing a second elongated product display unit (or system including a plurality of display units) oriented to have one end thereof disposed in engagement with another display unit or system of the first row adjoining the other side of the break in the first row, and having the length thereof extending at a second angle relative to the length of the first row and toward the break in the second row; and (d) by providing means joining the other ends of the first and second elongated display units (or systems) to form a first alcove-like Power Set area within and around which to display products. The joining means can include a simple connection mechanism, a single product display unit or an elongated, multiple unit product display system.

[0047]. In addition, and as will be further discussed below, because of the unique configurability of the aisles and the flexibility of use of the shelving systems of the present invention, the PrimeZone design concept offers the opportunity to create an abundance of promotional areas and features including the availability of additional End Caps 34, Center Caps (described below), Power Set areas 36 and 38, Triangular Corner units and Corner Boards 40 (described below), Banner Boards (described below), and Hot Spots (described below).

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[0048]. The new configuration and flexibility of the display units and aisle configurations, as defined in part by the angled positions of the several movable shelving systems, allows the provision of additional End Caps in the PrimeZone as depicted at 34. The End Caps 34 are typically 3 to 4 feet in width, 21 inches in depth and 7 feet high. An End Cap can be a shelving unit with multiple shelves, a platform that allows the retailer to stack cases of product at the end of a row of shelving units, or a cooler/freezer unit, for example. End Caps are typically provided at both ends of an aisle-defining shelving assembly (see 26, 34), and are used primarily for promotional purposes, but sometimes include a refrigeration unit offering cold drinks, refrigerated foods and/or other types of food products.

[0049]. One of the advantages of a PrimeZone product display configuration, such as that depicted in FIG. 2, is the ability to focus the consumers view on particular products or groups of products as they enter and proceed along an aisle. Instead of merely having only the open remote end of the aisle in their direct view, as in the traditional linear parallel aisles configuration depicted in FIG. 1, the PrimeZone design positions angled shelving units or other product display units 42, herein referred to as Center Caps, to at least generally face customers as they enter an aisle.

[0050]. Center Caps 42 consist of the one or more product display gondolas 41 or other product display units that form part of the systems 43 (shown by dashed lines as an assembly of six rectangles 42 in FIG.2) that are, in accordance with the present invention, positioned in angular relationship relative to the traditional row of aisle-shelving to which they are joined. Thus, as a customer starts walking down the aisle across which the Center Cap shelving angularly extends, he/she will be able to clearly see product and promotional materials that are displayed in, on and around the Center Cap unit.

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[0051] Depending on the size of the store, and as depicted in the examples shown in FIGS. 12-17, there can be multiple product display units angling across an aisle from one traditional row of shelving and extending toward or into and perhaps through a break in an adjacent row of shelving that would otherwise define a long straight aisle of a traditional store layout. An angular relationship (usually of about 60 degrees) of Center Cap systems 43 to a traditional row is offered herein as an example, but it is to be understood that the actual angle of shelving intersection to be chosen for a particular application can be virtually any angle suited to the promotional activity and products to be promoted or displayed. Center Cap systems are typically 4 to 16 feet in length (including one to four pairs of 48" product display gondolas, coolers, etc.) depending on the size of the store and the promotional activity; but they can of course be made larger or smaller.

[0052] As depicted in the plan and elevational views of FIGS. 2a-2c, the angled intersection of the ends E1 and E2 (FIG. 2a) of a shelving system 43 (formed by a plurality of longitudinally aligned product display units 41) with a traditional store row of display units 41' presents a triangular opening or cell within which a Triangular or Trapezoidal Corner unit 40 can be installed. In the illustrated example, the Corner unit 40 is of a trapezoidal configuration including four vertical posts P and associated shelving typically disposed at levels corresponding to the associated adjacent shelving units. In such case a triangular void "V" might be left in the space immediately there behind or it might include additional shelving. Alternatively, a five post Triangular Corner unit such as that illustrated in FIG. 2g could be used.

[0053] As will be described below, a plurality of clamps or other suitable fasteners are used to fasten the Corner unit to the posts of the several adjacent product display units. Furthermore, as will also be described below, vertically adjustable glider devices and positional tie-down brackets may be affixed to the

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lower ends of the vertical posts P to facilitate movement, leveling and tie-down of the gondolas.

[0054]. It will be noted that in addition to providing extra shelf space, the Triangular Corners units can also serve as supports for promotional signage, as depicted in FIGs. 2c, 2e and 2f, or other marketing devices such as video screens, sound equipment, promotional literature, coupon dispensors, etc.

[0055]. In FIGS. 2d-2e an alternative embodiment of a smaller Triangular Corner unit 40' is similarly illustrated for use in the case where the several front and back shelving units are longitudinally staggered relative to each other. In such configuration, the Triangular Corner unit 40' is smaller in frontal dimension than in the previously described embodiment but is functionally similar. This arrangement likewise provides a display opportunity for shelf space and promotional signage, objects and materials.

[0056]. FIG. 2g is a perspective view further illustrating the Triangular Corner unit embodiment of FIGS. 2a-2c, and by extension, the embodiment of FIGS. 2d-2f, The Corner units may include one or more shelves or frames for supporting advertising display boards (Corner Boards) or posters. The Corner units may also include flat panel video display means to permit animated product display, product use demonstrations and consumer interactive information panels or the like.

[0057]. FIG. 2h depicts two vertical support posts P1 and P2 of the type used in many commercially available shelving units, and a clamping style fastening device C used to fasten the two posts together. The device C can take many forms but the illustrated two part clamp consisting of front and back members C1 and C2 secured together by a suitable screw or bolt B is considered ideal for the present application, because when attached to only one set of adjacent shelving unit corner posts, it allows one of the units (or sets of units) to

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be rotated in position relative to the others to assume a different angle of intersection between contiguous shelving systems.

[0058]. As depicted in FIG. 2, the three sided Power Set areas 36 and 38 are formed by the illustrated two sets of shelving systems (including Power Set units 35 and 37, and Center Cap units 44 and 48) angling toward and joined to a third shelving system (including Power Set units 39 and Center Cap units 46) that is disposed to extend parallel to an adjacent aisle on the other side of the third row of shelving units. The Power Set /Center Cap shelving systems can have any of a variety of configurations and can be located anywhere along the length of an aisle, but are usually positioned near the middle of a Center Store and help to define the PrimeZone 32. Other examples are depicted below in FIGs. 12-17 of the drawing.

[0059]. Power Sets create a significant billboard effect partially surrounding and defining the Power Set areas (36, 38) and can be advantageously used to the benefit of a CPG vendor. The ability to effectively promote, within a relatively small common area, several brands or related products owned by or represented by the vendor provides a powerful promotional advantage. The brands marketed within the Power Set area might, for example, include refrigerated products as well as frozen and shelf stable products. Power Sets also allow the vender to display products within the surrounding aisle space in either free standing form or other specific configuration, and to display promotional materials/information on the area-framing pair of Corner units 40.

[0060]. The underlying advantageous marketing concept is that a consumer will be drawn into a Power Set area due to its configuration, and because it represents a "section" of promotional activity. A Power Set can include display frontage as long as 24 feet or so in length including, for example, nine four foot product display sections framed by Corner Boards, but the configuration can be of almost any size, composition and configuration.

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[0061]. Triangular Corner units 40 of the type illustrated do not currently exist in the traditional Center Store areas because the typical shelving system layout is one of linear parallel rows of display units. Moreover, Triangular Corners exist in PrimeZone areas as a consequence of the unique relative positioning of the several shelving systems used to define the PrimeZone. The Triangular Corner units provide great opportunities for Corner Board advertising, sampling, couponing, or a combination of all the three, as well as other possibilities mentioned above.

[0062]. In addition to the angle of intersection of the product display units, the front width of the Corner unit is determined by whether the front and back rows of shelving units are longitudinally aligned or staggered relative to each other. As pointed out above with respect to FIGS 2a-2c which illustrate the aligned gondola example, and FIGS. 2d-2f which depict the staggered gondola configuration, the Triangular Corner units are typically 22" to 44" at the front and reduce to substantially zero inches at the rear as both sides thereof converge on the corner junctions of the adjacent shelving units.

[0063]. Hot Spots are focal point areas (see 50 and 52 in FIG. 7) within the Power Set areas and other open areas and are so called because of the strong response of consumers to displays that are interruptive, large and stacked high. There is a saying in the industry to the effect that if you "Stack it high, it will fly". Traditional positionings of floor stacks are typically found in the perimeter of the store and at aisle ends, but never in Center Store as there is no place in an aisle for such displays. If such displays were used in the current shelving schemes, they would block the aisles and interfere with the customers' use of the aisles. However, in the PrimeZone configuration, Hot Spots do not block an aisle, but do cause the consumer to take notice to a floor stack of products, a manufactured display promoting one or more brands of products, and the products displayed on the surrounding shelves. Hot Spots can be a little as 2 feet square or much

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larger depending on the size of the Power Set area. The height of a Hot Spot is based on the particular product and/or display, but typically would be 4 feet to 8 feet high. Hot Spot units can also be used in other areas as described below with respect to FIGs. 4, 6 and 7.

[0064]. Turning now to FIGs. 3-6, perspective renderings are provided to present the actual look and feel of one embodiment of the present invention. In the overhead view of FIG. 3, the reader can readily identify and appreciate the details of the various components previously described with respect to the plan view of FIG. 2. The various elements and areas of this embodiment are labeled with the same call-out numbers used in FIG. 2. In FIG. 3, Hot Spot units within the Power Set areas 36 and 38 are, for simplicity, depicted as stacks of nested tables but can take any suitable form as pointed out above. Again for simplicity of illustration, the Hot Spots 52 and 54 illustrated in FIGs. 4 and 7 are not depicted in FIG. 3. Also not shown in FIG. 3, are the advantageous locations for placement and display of Banner Boards (60-63 in FIG. 4).

[0065]. FIG. 4 is a lower level view of the PowerZone components that would occupy the visual attention of a customer entering the aisle and looking in the direction of arrow 4 (FIG. 3). Note that the customer's attention will be quickly captured by promotional messages or products displayed on the remotely positioned End Caps 34 and the Triangular Corner units 40. Products displayed on the Center Caps 42 and 48 would then come into full view as he passes along the aisle and through the nearby End Caps 33 on both sides of the aisle. This figure also illustrates 2 Hot Spot units 52 and 54 which are not shown in FIGs. 2 or 3 but which can be positioned in the open spaces formed between the End Caps 33, 34 and the respective pairs of Triangular Corner units 40 as also depicted in FIG. 7. In addition, this view illustrates in dashed lines several positions for placement of the overhead Banner Boards 60-63.

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[0066]. FIG. 5 is a lower level perspective view looking in the direction of the arrow 5 in FIG. 3 and showing the clear visibility of the Center Cap 42, and then the Corner unit 40 as the customer reaches the turn in the aisle.

[0067]. FIG. 6 is a lower level perspective view looking in the direction of the arrow 6 in FIG. 3 and showing the Power Set area 36, the Hot Spot area 50 and the clear visibility of the surrounding shelving systems 35, 37 and 39. It should be kept in mind that any or all of the illustrated shelving systems could instead include refrigeration cabinets or other forms of product display units. Note also that the nested tables 51 occupying the Hot Spot area 50 could alternatively be replaced by any product stack or product display structure.

[0068]. FIG. 7 is a summarizing plan view similar to that of FIG. 2 but including representations of all of the PrimeZone components illustrated and discussed above with respect to FIGs. 2-6.

[0069]. A PrimeZone in accordance with one embodiment of the present invention may be constructed of either proprietary or commercially available shelving units. Current state of the art shelving suitable for use in embodiments of the present invention are typically fabricated of welded stainless steel rod and tubular stock. Although such shelving units are available with casters, the casters utilized are not deemed suitable for the present application because of the large caster wheel size.

[0070]. To render non-wheeled shelving units movable among various design configurations it is desirable that low profile glider devices be provided for attachment to the legs of the display units. Preferably, the glider devices should have a low profile so as to permit maximum use of the available shelf space, must be easily attachable to the shelving, must have a relatively broad footprint so as to avoid damaging the supporting floor, must be adjustable in height to accommodate leveling, and must be durable and capable of supporting the

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expected heavy product loads. In addition, at least some of the glider devices must include means for securing the shelving units to the supporting floor.

[0071]. A new design for a glider device is illustrated in the exploded view of FIG. 8, the axial cross sections of FIGS. 9a and 9b, and the perspective view of FIG. 10. More specifically, the illustrated glider device 70 is comprised of four basic components; namely, a cylindrical outer housing 72, a roller carrying plug-like component 74, a plurality of roller balls 76 and an apertured, ball capture plate 78.

[0072]. In the illustrated embodiment, the outer housing 72 is comprised of a generally cylindrical sleeve-like unit having an internally threaded bore 82 extending axially therethrough, and a knurled or otherwise textured band 80 press fit around its upper end to strengthen that end and facilitate manual rotation thereof about the plug 74. The outer surface may be provided with tool engageable flats 83 to facilitate vertical adjustment (leveling).

[0073]. The plug-like component 74 preferably consists of a metal cylinder 84 having external threads 86 formed on its outer cylindrical surface along at least a mid- portion of its axial length; such threads being adapted to be threadably engaged by the internal threads 82 in the bore of sleeve 72. The axial length of plug 74 is preferably longer than the axial length of the sleeve 72. Extending from the upper end of plug 74 is a threaded stud 75 for use in attaching the device to the lower end of a display unit leg. As an alternative for use with those shelving units having tubular legs, an upwardly extending cylindrical bore, perhaps internally threaded, may be provided in in the top of a lengthened plug for matingly engaging a foot end of a shelving unit vertical post.

[0074]. The lower end surface 90 of plug 74 is planar except for having a plurality of hemispherical bores, molded cavities or sockets 92 provided therein in a circular array, and may include a single, like bore, cavity or socket 91 provided

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in the geometrical center of the array. The diameters of the hemispherical sockets are chosen to be matingly commensurate with the diameter of a plurality of roller balls 76 to be seated therein. A pair of tapped bores 89 are also provided in the end surface 90.

[0075]. The ball capture plate 78 is provided with a plurality of frusto-conical or frusto-hemispherical apertures 93 axially aligned with the sockets 91, 92. Plate 78 also includes at least two small bores 94 for receiving screws or bolts 96 used to lockingly engage tapped bores 89 and secure the plate to the lower end of plug 74 to capture the balls 76 within the respective sockets but allow the lower portions of the balls to extend through the apertures 93 to engage a supporting surface.

[0076]. Referring now to FIGS. 9a, 9b and 10, the assembly of the glider device and its mounting to the end of a leg or post of cylindrical or rectangular transverse cross section will be addressed. As depicted in FIGS. 9a and 9b, after the bearing balls 76 are positioned within the sockets 92 and captured therein by the apertured plate 78 and its screws 96, the assembled plug is affixed to the lower end of the shelf supporting post 100 by screwing the stud 75 into a tapped bore 98. The sleeve 92 is then threaded onto the plug 74 until the roller balls 76 are clear. At this point the glider device is fully functional to glidingly support the leg of the display unit.

[0077]. As illustrated in FIG. 9b, those skilled in the art will appreciate that by rotating the sleeve 72 in a particular direction about the plug 74, the engagement of threads 82 and 86 will cause the sleeve to advance downwardly into engagement with the floor and result in the balls 76 to be lifted from engagement with the floor. Such action will negate the gliding function and may also be useful in lifting the leg to level the supported shelving unit.

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[0078]. It will also be understood by those of skill in the art that with glider devices of the type described above secured to the legs of a shelving unit, the unit may by conveniently moved from one position to another as the balls 76 roll within their sockets. Moreover, in order to level the legs on an uneven supporting surface, the sleeves may be rotated to drive them down the plug 74 and thus accomplish the leveling function.

[0079]. In many jurisdictions, and particularly in those known to experience earthquakes, building codes require that shelving and other heavy objects be anchored to the floor. In accordance with the present invention such anchoring is facilitated by disposing an anchoring bracket 102 (FIG. 11a) between the glider device 70 and the lower end of the shelving leg 100 as depicted in FIG. 11b. In this embodiment, the glider stud 75 is either passed through or threaded through a tapped aperture 104 as the stud is threaded into a tapped bore formed in the end of leg 100. A bolt or lag screw 106 can then be passed through an aperture 108 in the lower flange of the bracket 102 and threaded into a suitable sleeve 110 disposed in a bore formed in the floor. Note that in order that the bracket 102 not interfere with the rolling use of the glider, the lower extremity of the lower flange must be positioned higher than the ball bottoms. A washer of a suitable thickness will allow a secure engagement of the flange to the floor as the bolt 108 is tightened.

[0080]. FIGs 12-17 are examples of alternative configurations of the shelving systems within the PrimeZone. The End Caps, Triangular Corners, Power Sets, Center Caps, Hot Spots, Center Cap Banners, Banner Boards and Corner Boards are identified as indicated in the legends.

[0081]. It is to be understood that although the present invention has been disclosed above with respect to particular exemplary embodiments, it may be embodied in other forms without departing from the spirit, scope or essential characteristics thereof. The present embodiment is therefore to be considered in

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all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced herein.

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WHAT IS CLAIMED IS:

1. A store arrangement comprising:

a plurality of parallel rows of product display systems including shelving or the like for displaying products;

customer walking aisles formed by the rows of product display systems, comprising:

a center store area including a plurality of parallel rows of product display systems;

breaks formed in at least a first row of the plurality of rows and a second row of the plurality of rows and adjacent said first row of the plurality of parallel rows of product display systems;

a first elongated product display system having one end thereof disposed in engagement with a display system forming one side of the break in said first row and extending at a first angle relative to the length of said first row and toward the break in said second row;

a second elongated product display system having one end thereof disposed in engagement with a display system forming the other side of the break in said first row and extending at a second angle relative to the length of said first row and toward the break in said second row; and

first means joining the other ends of said first and second elongated display systems to form a first alcove-like Power Set area within which to display products, said first and second elongated display systems being separated from corresponding sides of the break in said second row to form passageways connecting the customer walking aisle disposed between said first and second rows and the customer walking aisle disposed on an opposite side of the second row.

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## Abstract of the Disclosure

A shelving layout concept which allows selective configuration and reconfiguration of the orientation of certain shelving systems within the central portion of a store to create a PrimeZone area including an assembly of End Caps, Center Caps, Power Sets, Corner Boards, Hot Spots and Banner Boards, the combination of which provides a solution for enabling retailers to re-invigorate their Center Store, increase their vendor promotional revenue, and increase their in-store sales due to more favorable consumer response to greater promotional activity and the continuing change of product venues in key areas of the store layout. The concept also includes novel hardware which enables the reconfiguration of the shelving layout to accommodate vendors' desire to change display schemes.

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(Appx. B)



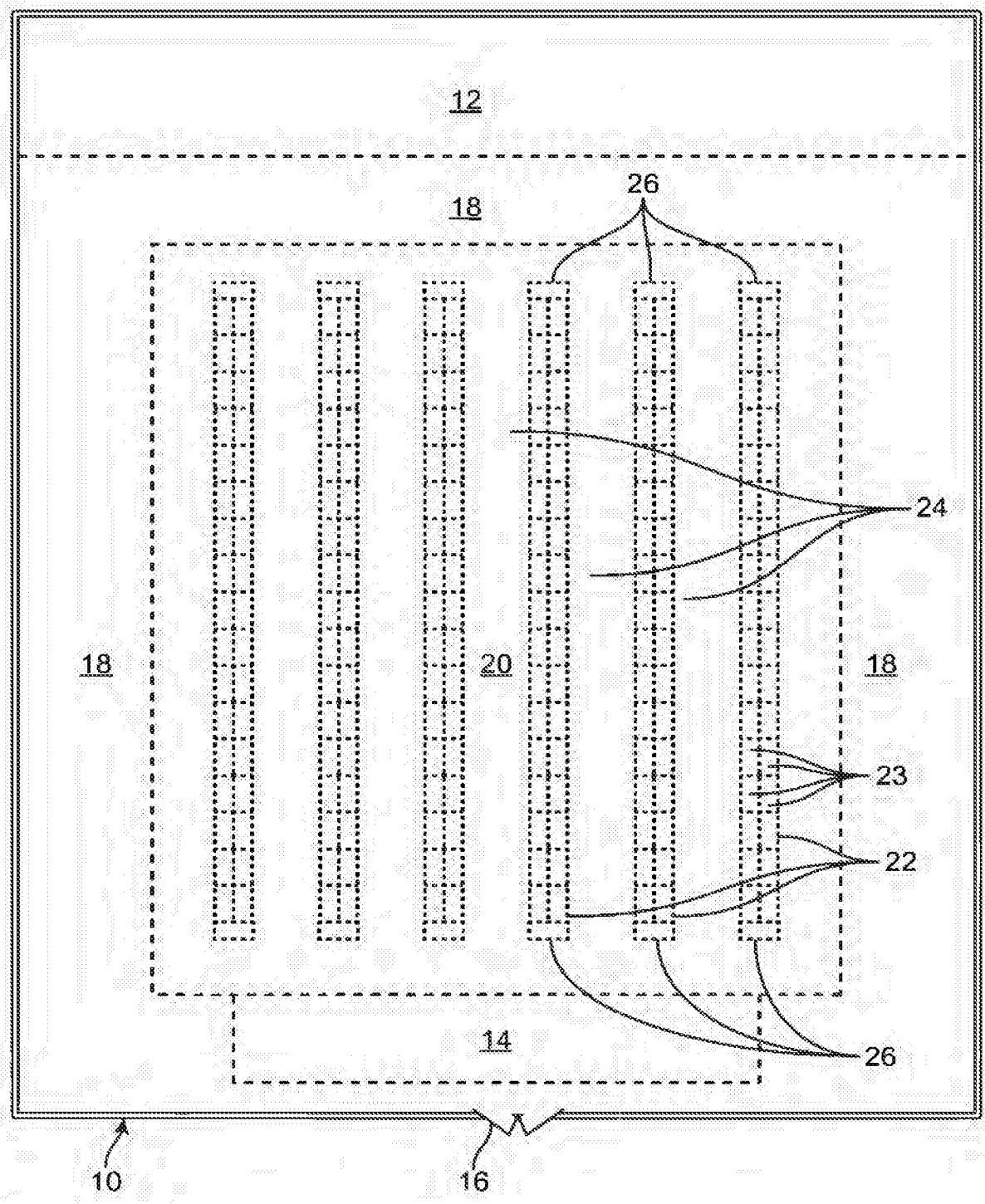


FIG. 1

(Appx. B)



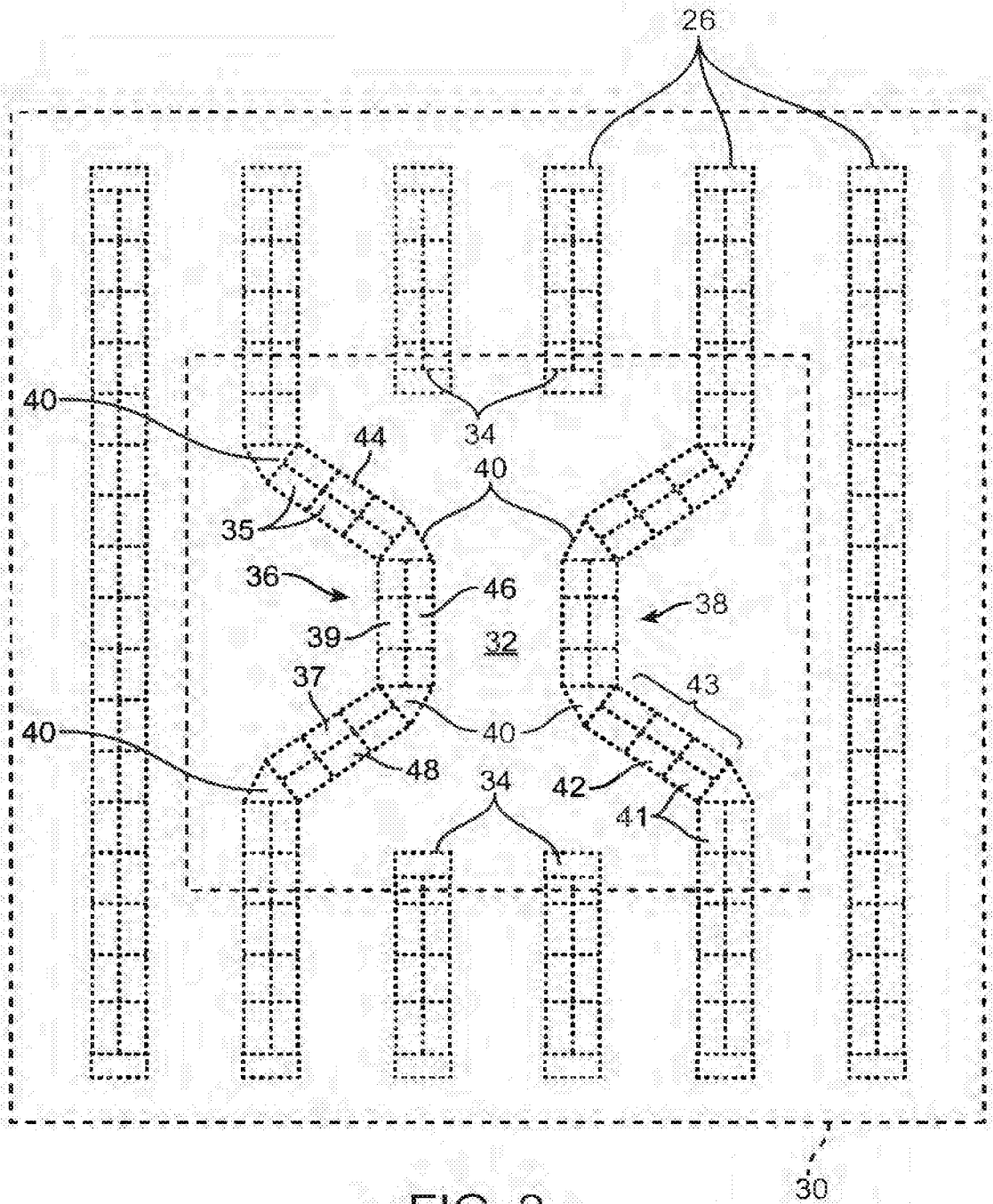


FIG. 2

(Appx. B)



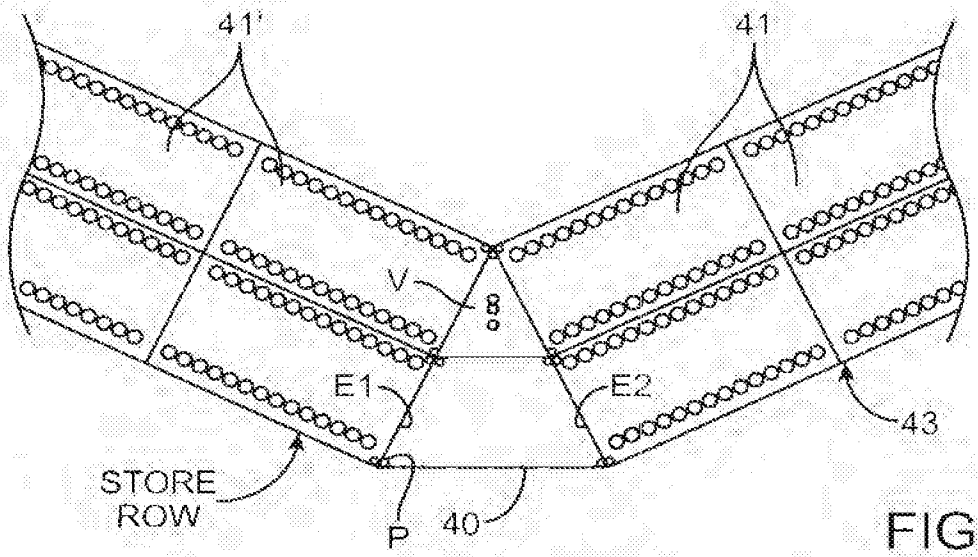


FIG. 2a

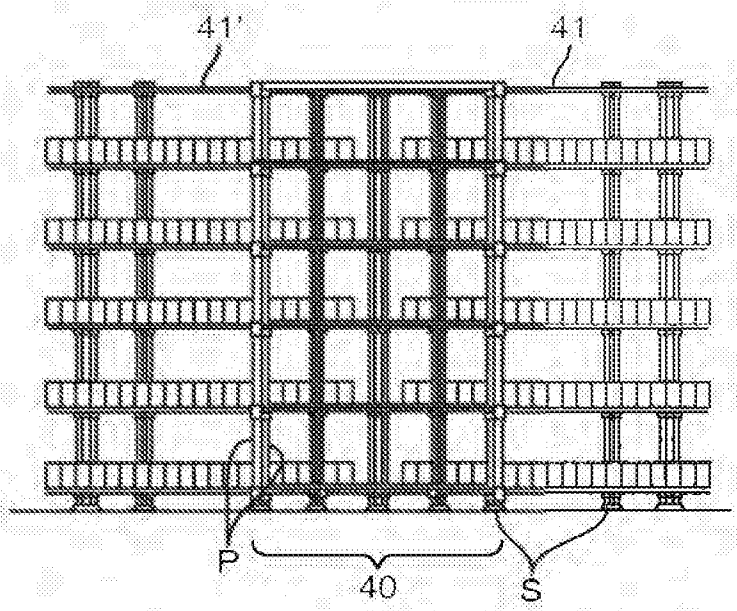


FIG. 2b

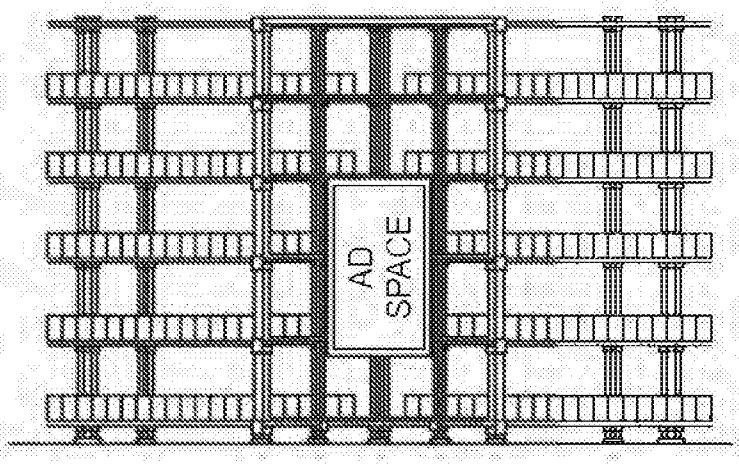


FIG. 2c

(Appx. B)



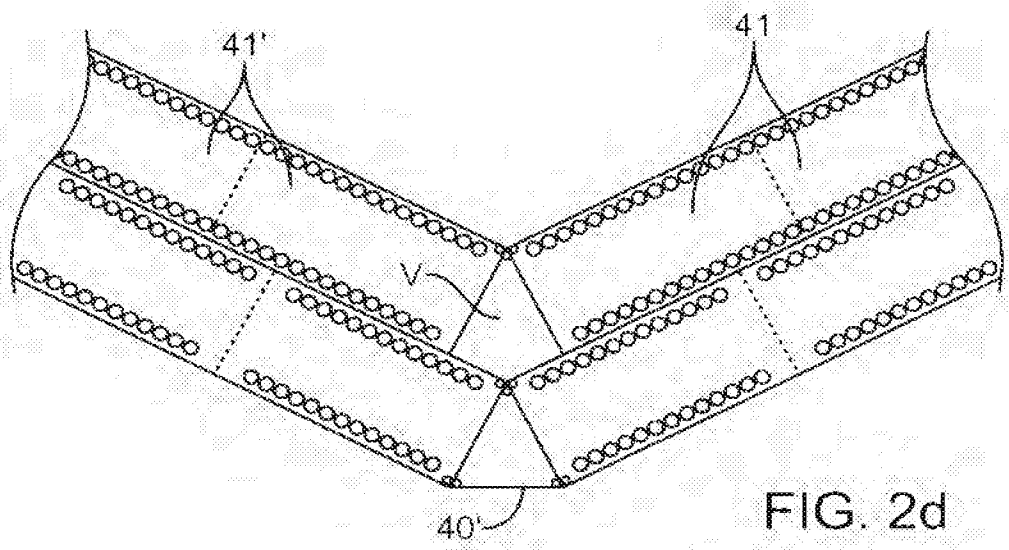


FIG. 2d

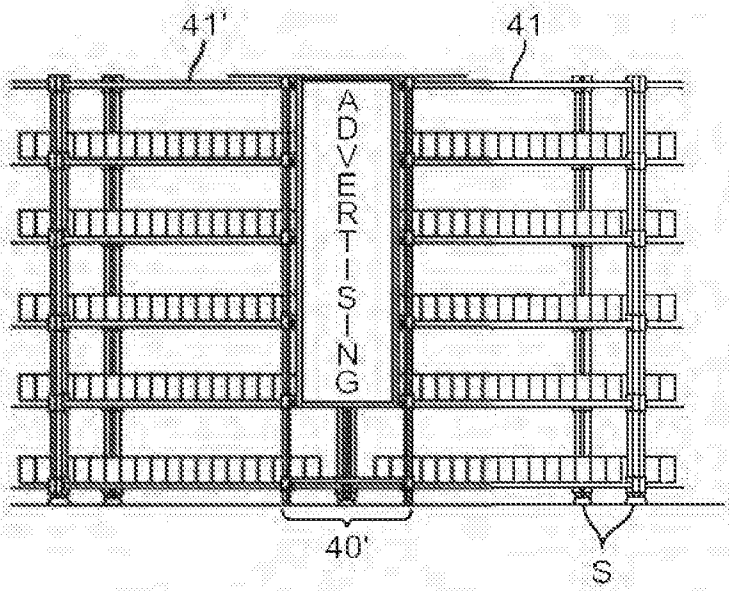


FIG. 2e

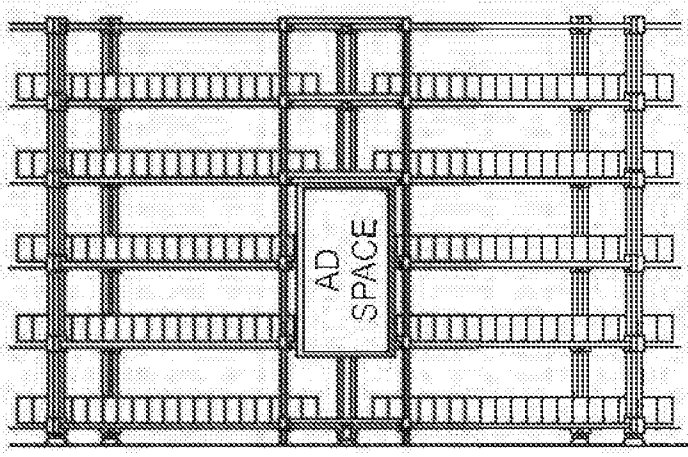


FIG. 2f

(Appx. B)



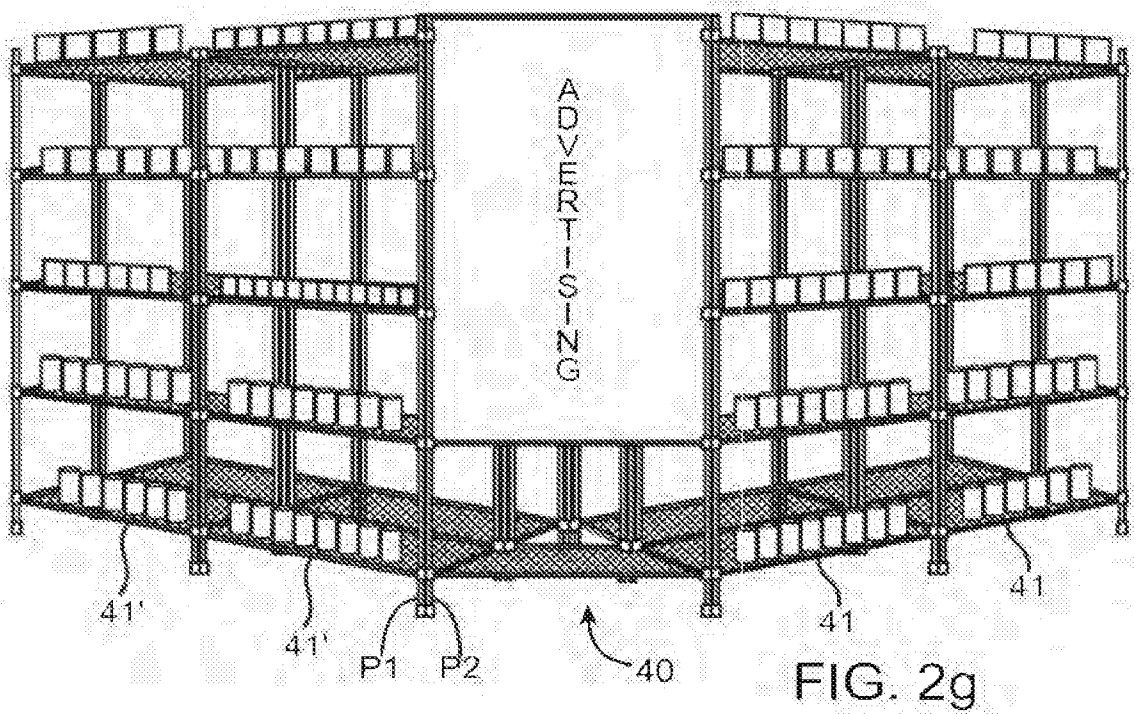


FIG. 2g

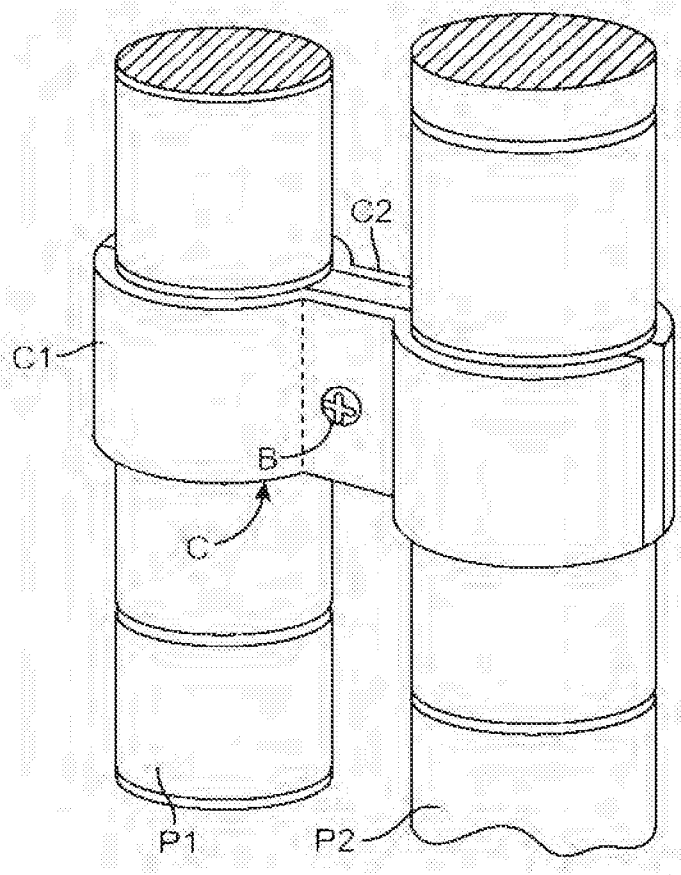


FIG. 2h

(Appx. B)



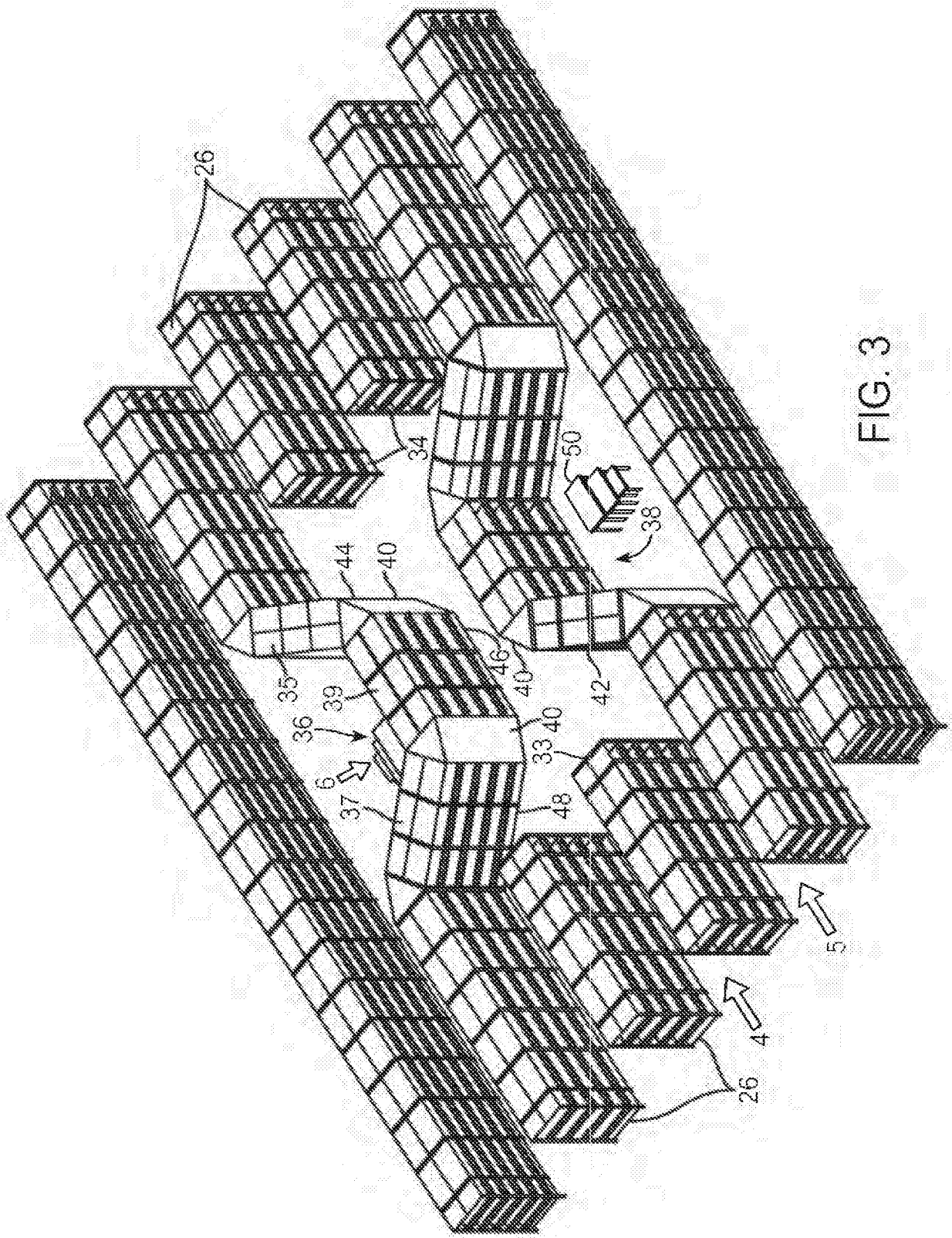


FIG. 3

(Appx. B)



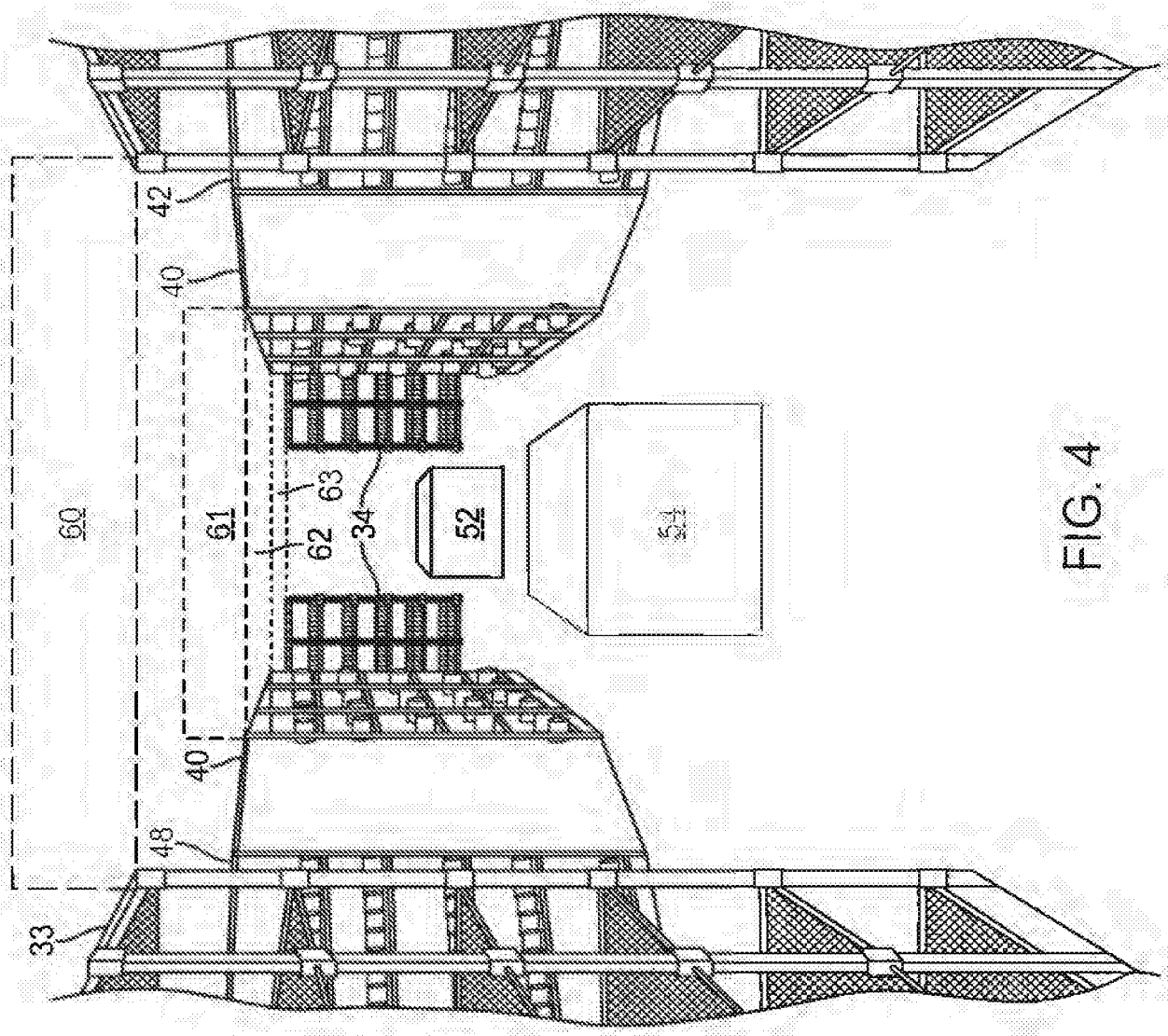


FIG. 4

(Appx. B)



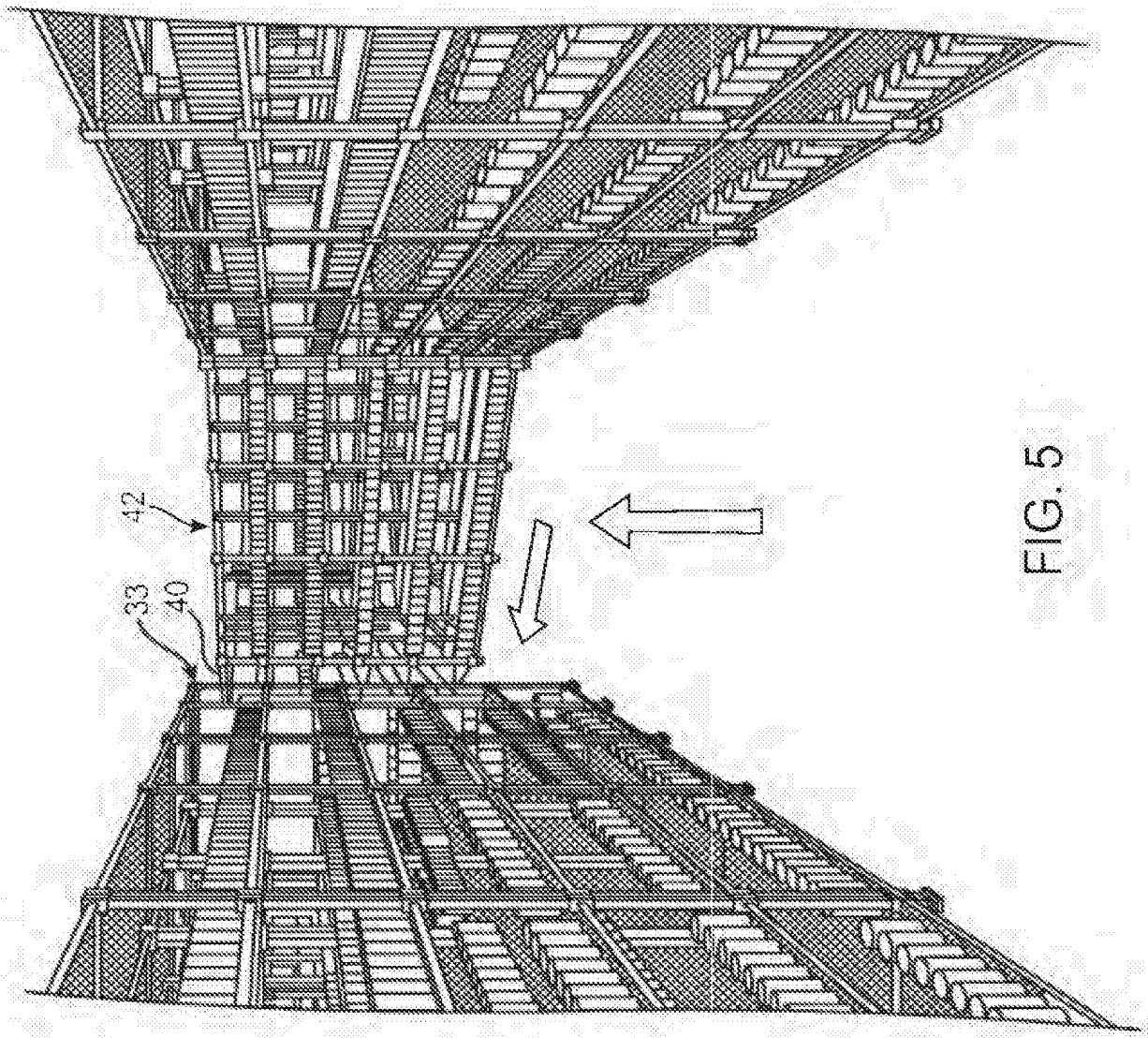


FIG. 5

(Appx. B)



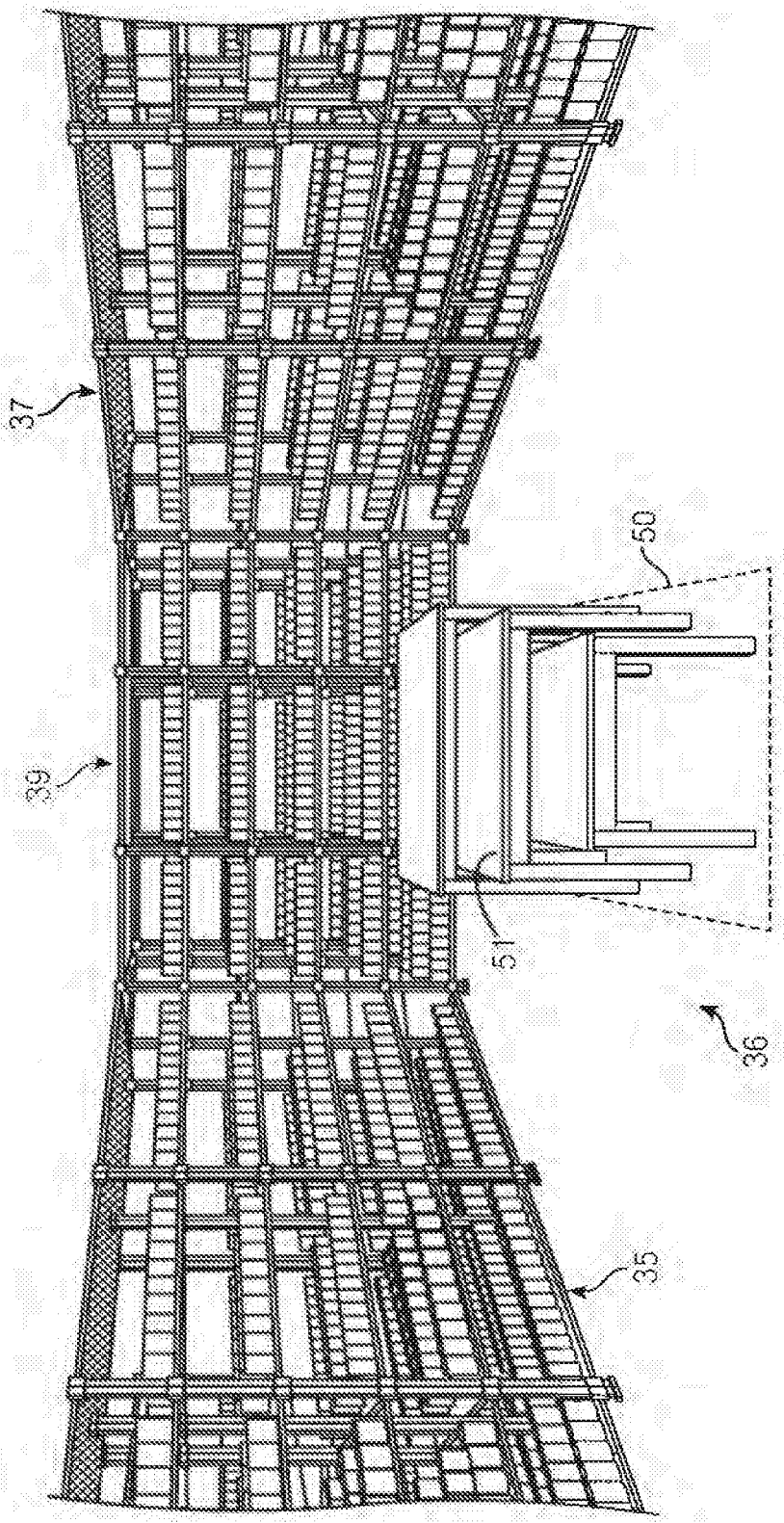


FIG. 6

(Appx. B)



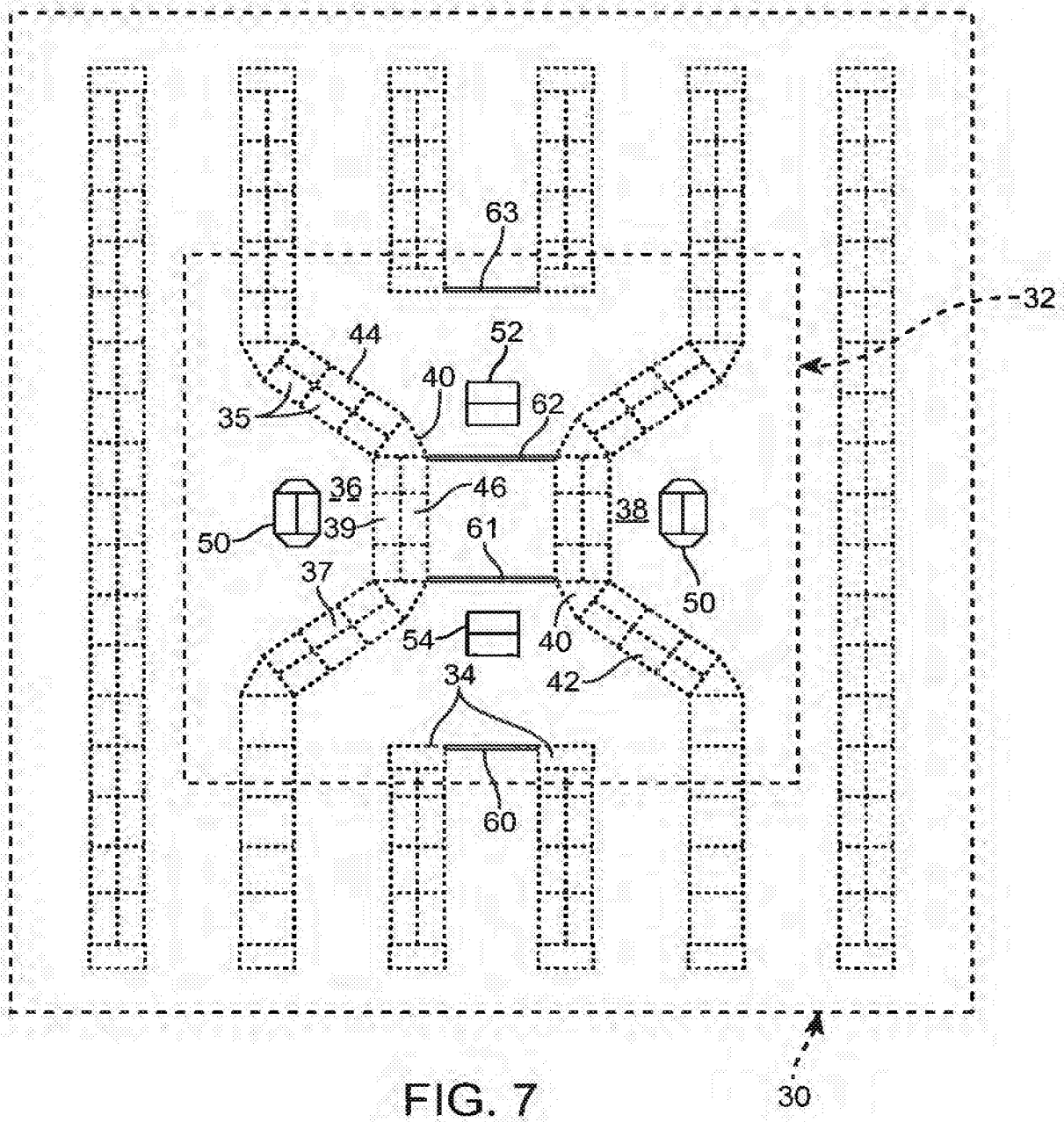


FIG. 7

(Appx. B)



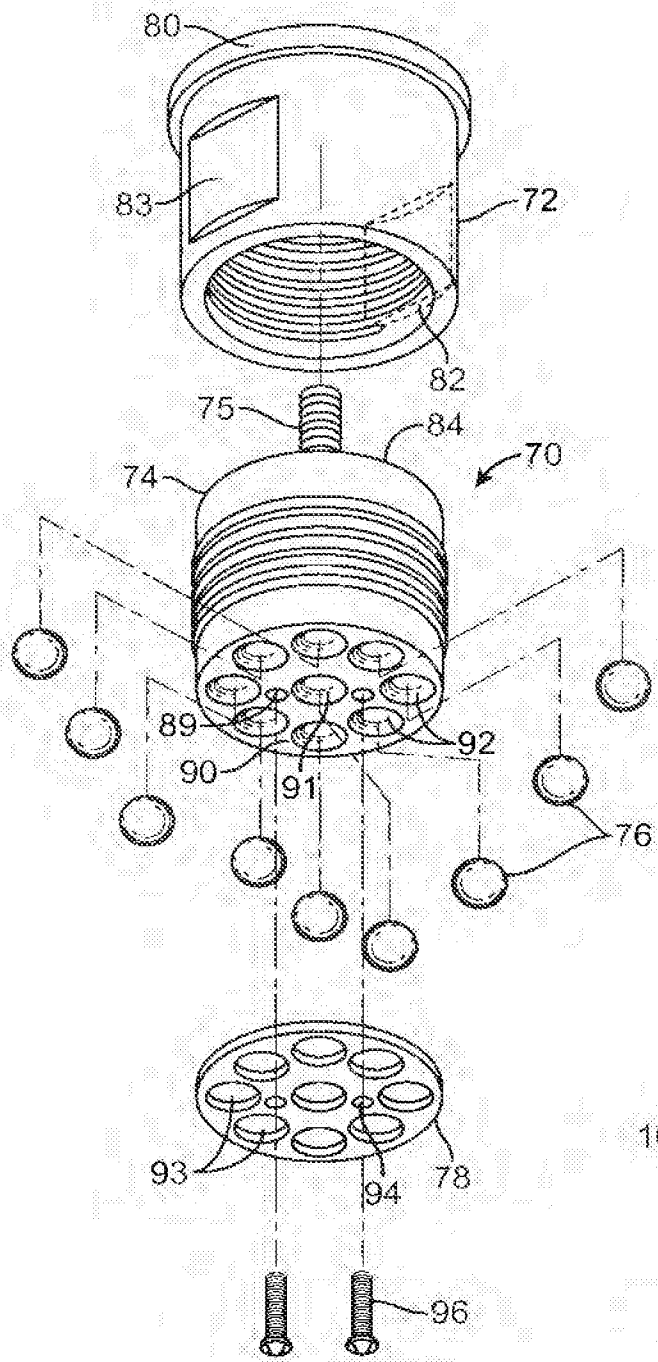


FIG. 8

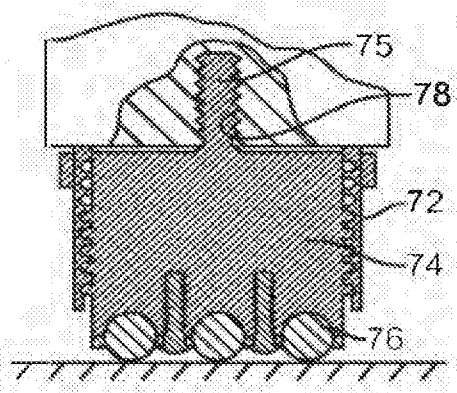


FIG. 9a

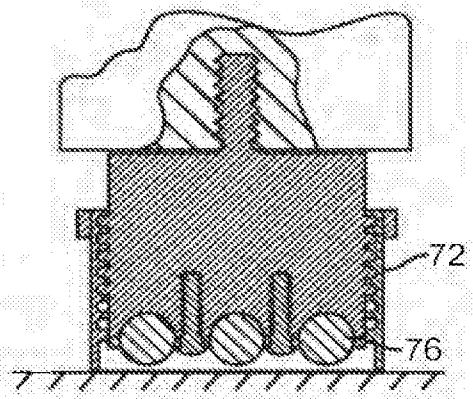


FIG. 9b

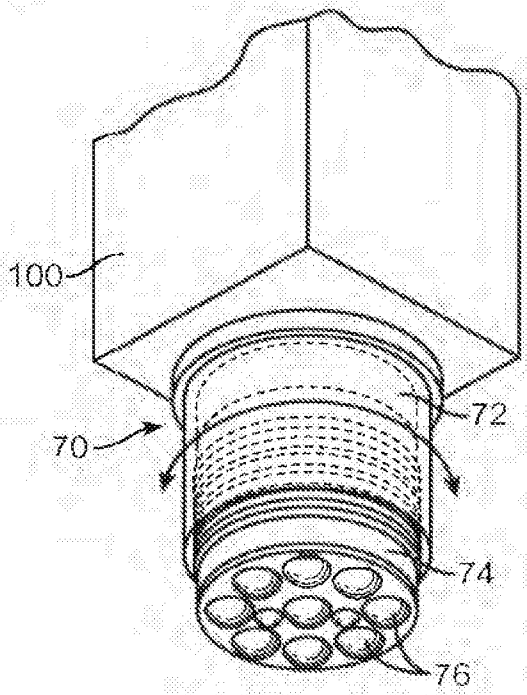


FIG. 10

(Appx. B)



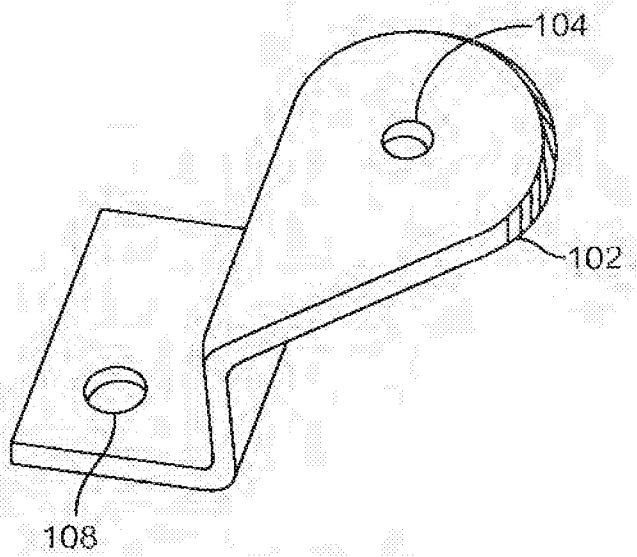


FIG. 11a

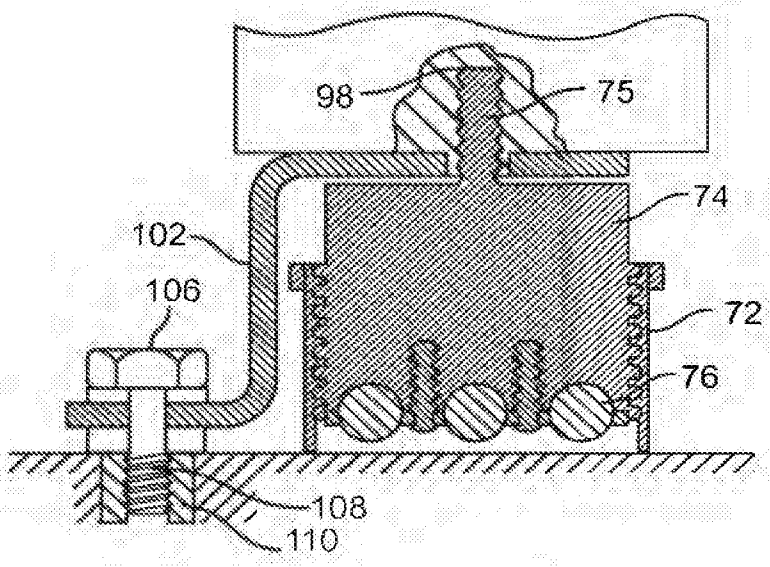


FIG. 11b

(Appx. B)



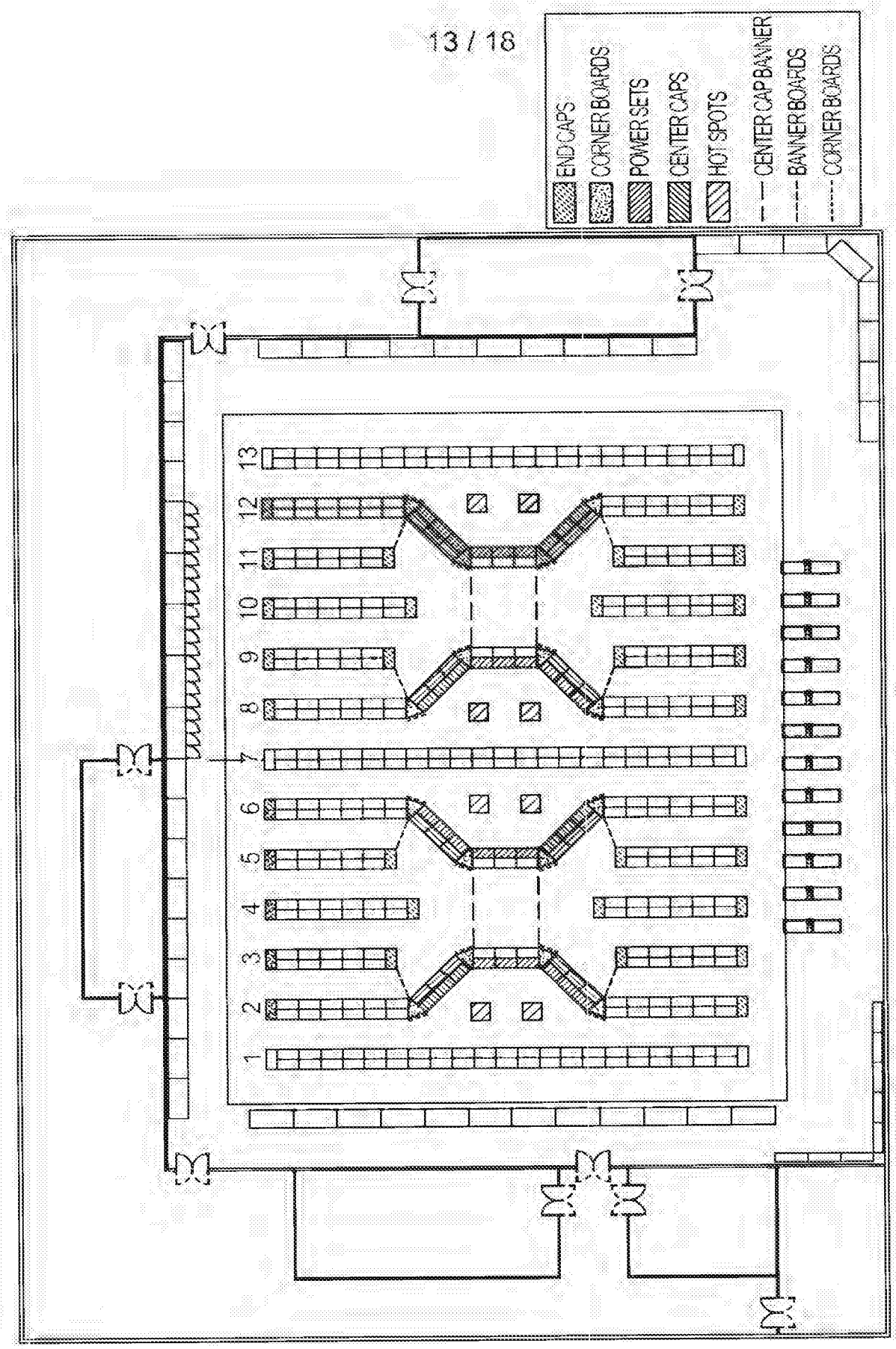
ENDCAPS
CORNER BOARDS
POWER SETS
CENTER CAPS
HOT SPOTS
CENTER CAP BANNER
BANNER BOARDS
CORNER BOARDS
13
12
11
10
9
8
7
6
5
4
3
2
1

FIG. 12

(Appx. B)



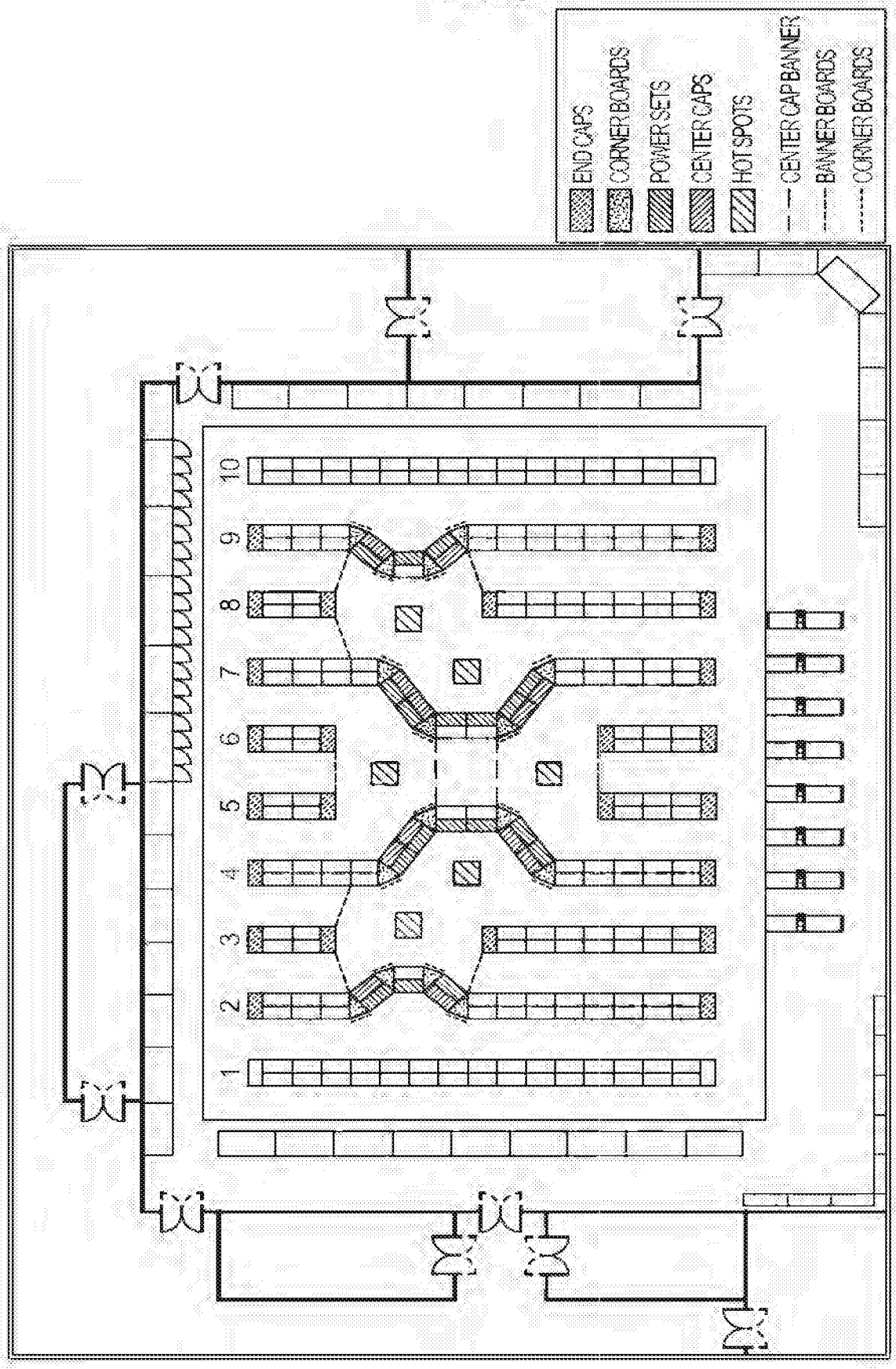
END CAPS
CORNER BOARDS
POWER SETS
CENTER CAPS
HOT SPOTS
CENTER CAP BANNER
BANNER BOARDS
CORNER BOARDS
10
9
8
7
6
5
4
3
2
1

FIG. 13

(Appx. B)



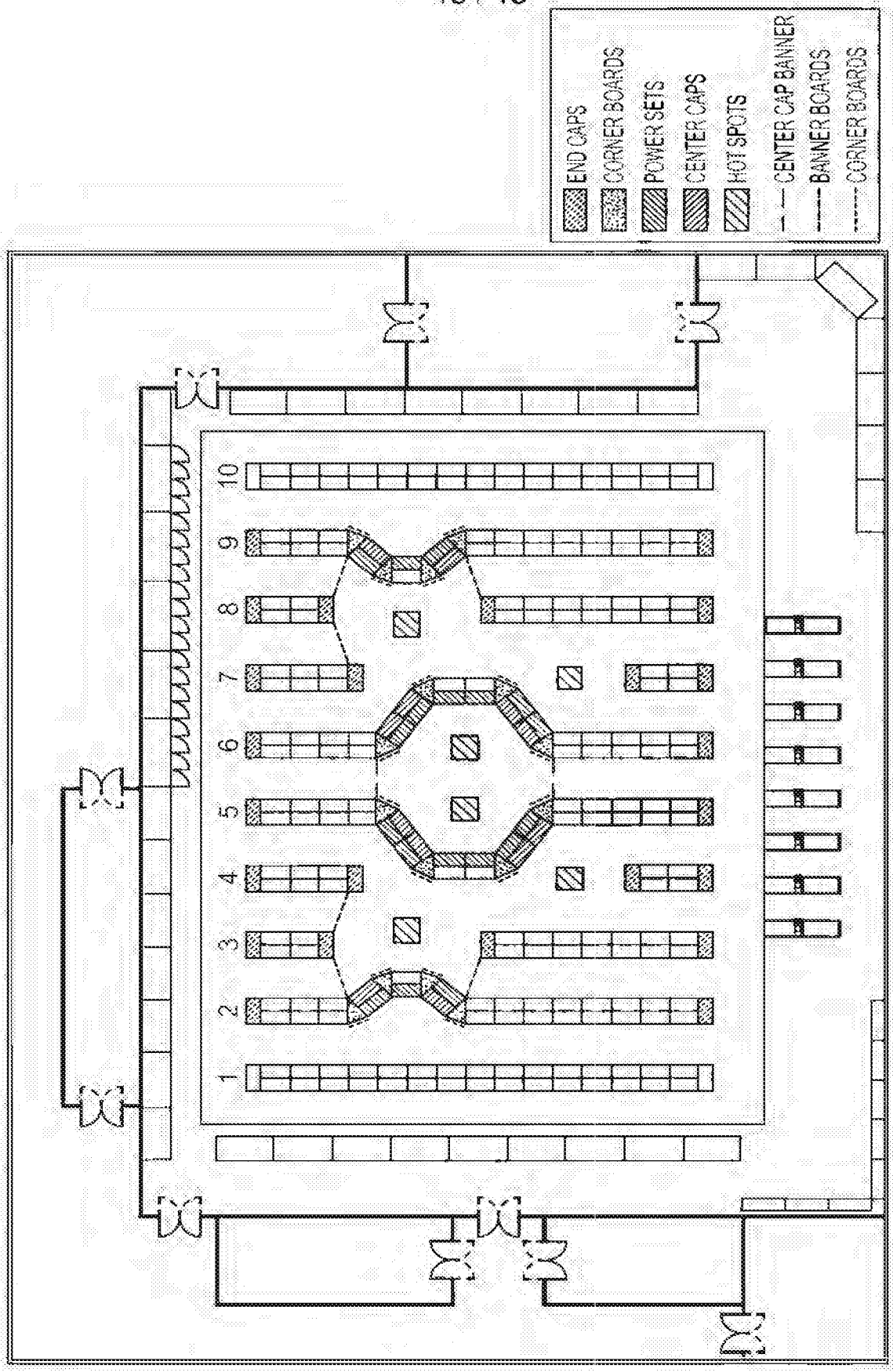
END CAPS
CORNER BOARDS
POWER SETS
CENTER CAPS
HOT SPOTS
CENTER CAP BANNER
BANNER BOARDS
CORNER BOARDS
10
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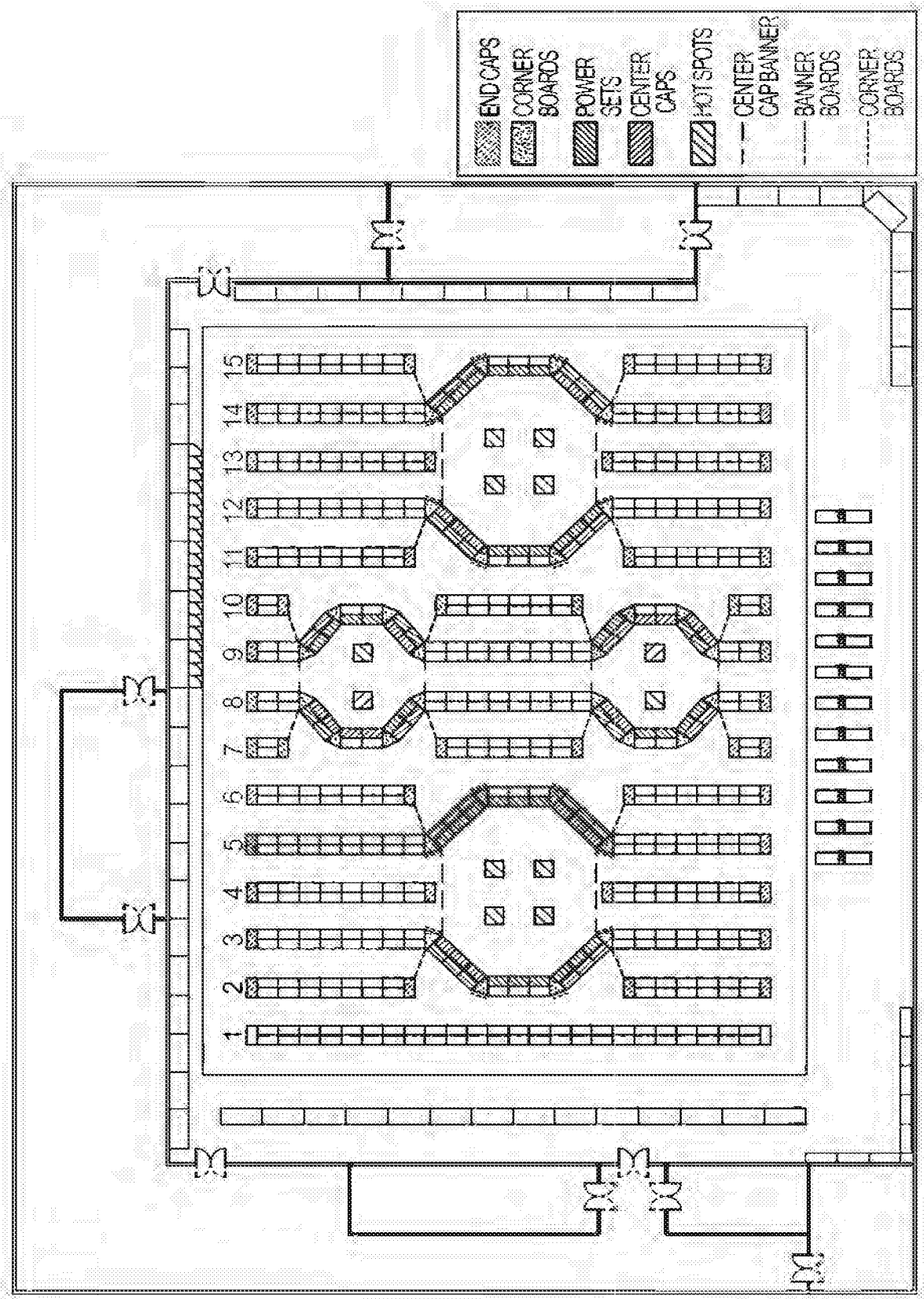
FIG. 14

(Appx. B)




END CAPS
CORNER BOARDS
POWER SETS
CENTER CAPS
HOT SPOTS
CENTER CAP BANNER
BANNER BOARDS
CORNER BOARDS
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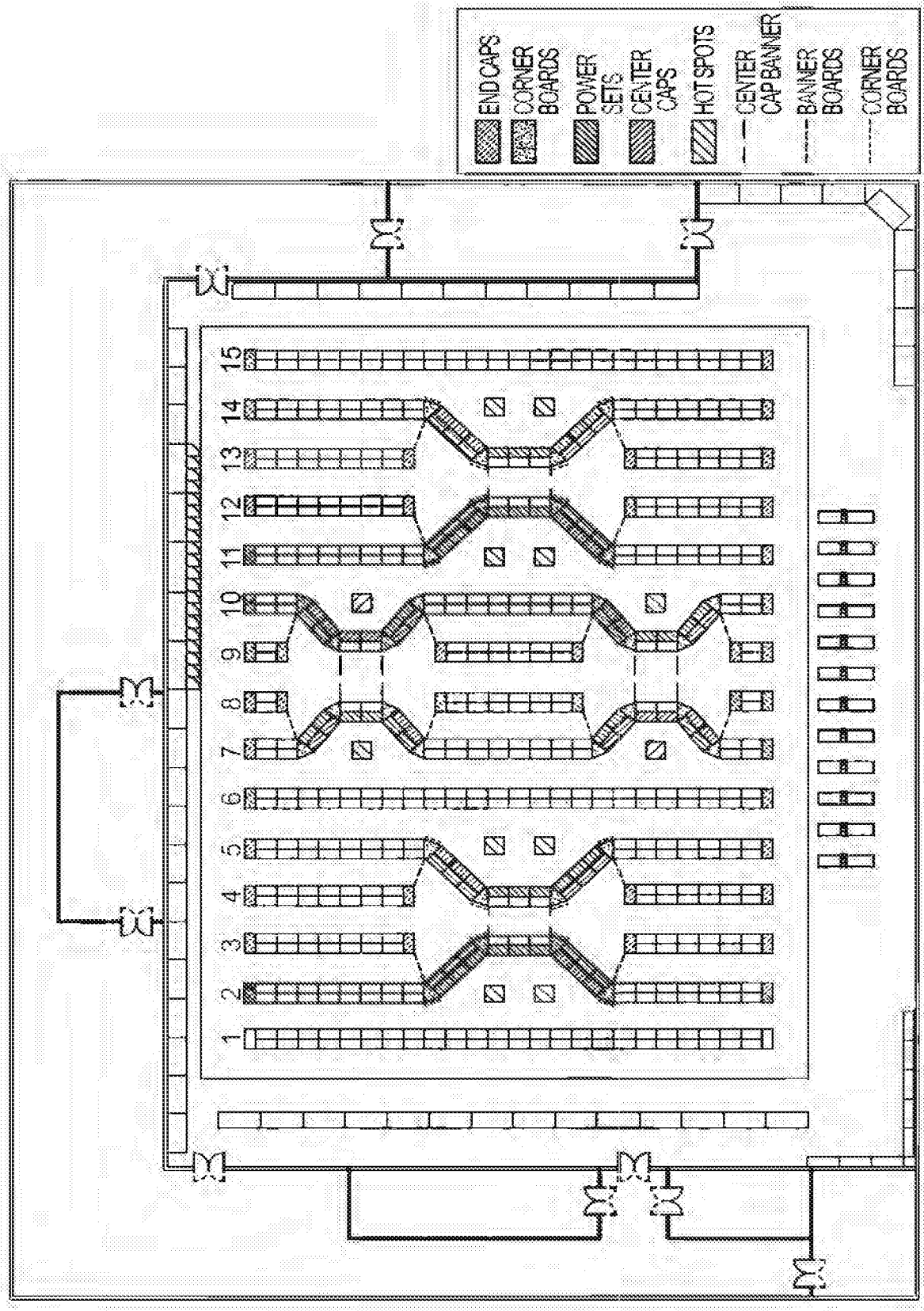
2
1

FIG. 15

(Appx. B)




END CAPS
CORNER BOARDS
POWER SETS
CENTER CAPS
HOT SPOTS
CENTER CAP BANNER
BANNER BOARDS
CORNER BOARDS
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11
10
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FIG. 16

(Appx. B)



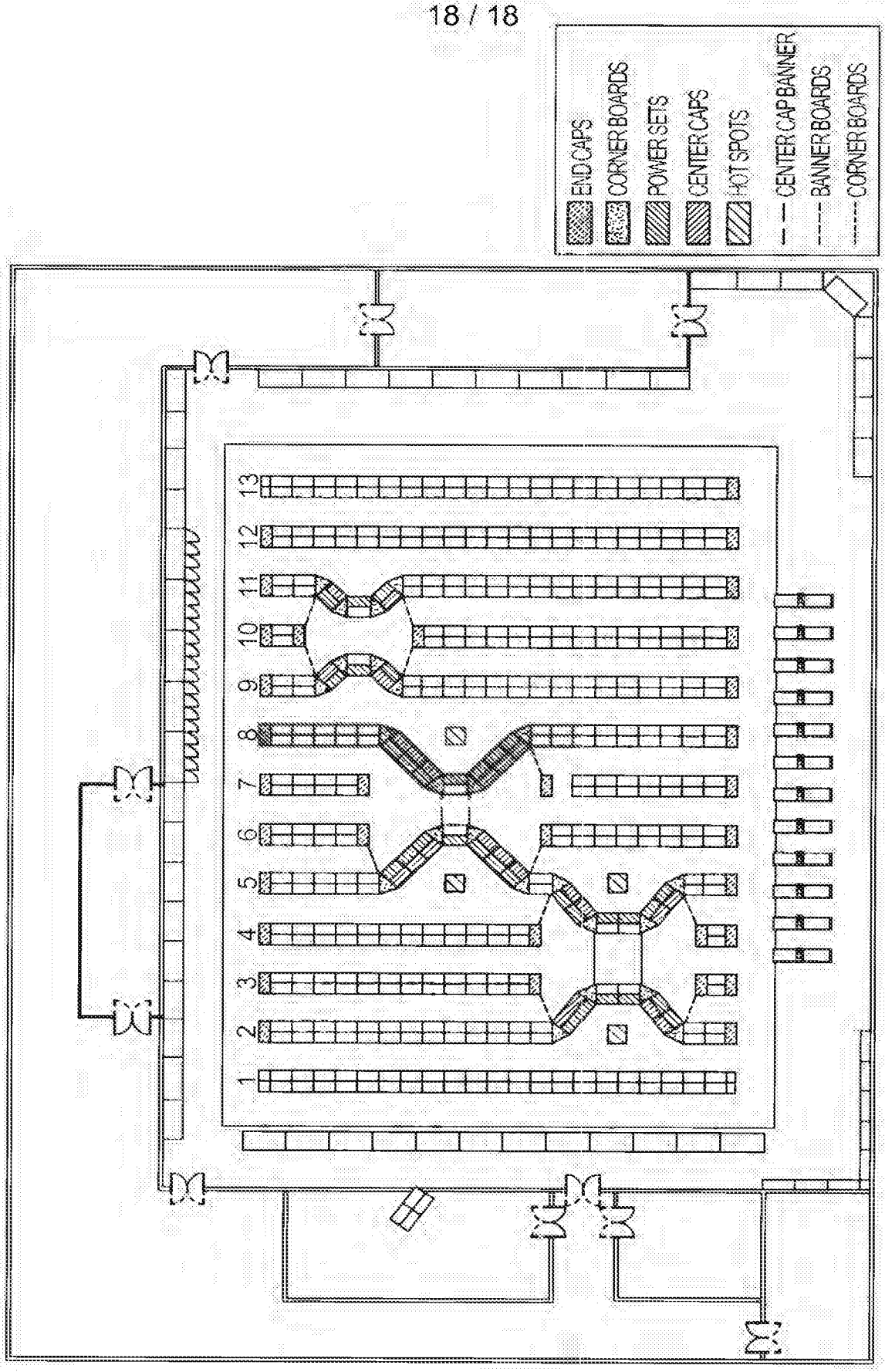
END CAPS
CORNER BOARDS
POWER SETS
CENTER CAPS
HOT SPOTS
CENTER CAP BANNER
BANNER BOARDS
CORNER BOARDS
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FIG. 17

(Appx. B)

**Preliminary Amendment to 14/475,243, which claims priority to Patent No. 8,820,481**

**Amendments to the Specification:**

Please replace paragraphs [0001] and [0002] with the following amended paragraphs:

[0001] Title

CENTER STORE ARRANGEMENT FOR RETAIL MARKETS

[0002] CROSS-REFERENCES TO RELATED APPLICATIONS

This application is a Continuation of U.S. Application No. 13/431,927, filed March 27, 2012, which application claims priority from and the benefit of U.S. Provisional Application No. 61/468,050, filed March 27, 2011, the full disclosures of which are incorporated herein by reference for all purposes.

(Appx. B)

**Preliminary Amendment to 14/475,243, which claims priority to Patent No. 8,820,481**

## Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

## Listing of Claims:

I claim:

1. (Cancelled)

2. (New) A store arrangement comprising:

a plurality of parallel rows of product display systems including shelving or other structures for displaying products, the plurality of parallel rows including at least a first row having a first break therein, a second row having a second break therein, and a third row having a third break therein, the second row between the first row and the third row;

customer walking aisles formed by the rows of product display systems;

a first product display system having a first proximal end disposed at an end of the first break in said first row, the first product display system having a first distal end extending at a first angle relative to a length of said first row and toward the second break in said second row; and

a third product display system having a third proximal end disposed at an end of the third break in said third row, the third product display system having a third distal end extending at a third angle relative to a length of said third row and toward the second break in said second row.

(Appx. B)

3. (New) A store arrangement comprising:

a plurality of parallel rows of product display systems including shelving or other structures for displaying products;

customer walking aisles formed by the rows of product display systems;

a first break formed in a first row of the plurality of rows, the first break having a first near end and a first far end from a perspective of a customer entering a walking aisle adjacent the first row;

a second break formed in a second row of the plurality of rows, the second break having a second near end and a second far end; and

a first near product display system having a proximal end disposed at the first near end of the first break in said first row, the first product display system extending at a first near angle relative to a length of said first row and toward the second break in said second row.

4. (New) The store arrangement of claim 3, wherein said first near product display systems is separated from a corresponding end of the second break in said second row to form a passageway connecting a customer walking aisle disposed between said first and second rows and a customer walking aisle disposed on an opposite side of the second row.

5. (New) The store arrangement of claim 3, wherein the first near product display system is disposed so as to form a first center cap and/or so as to display at least some products displayed by the first near product display system so as to generally face customers entering a customer walking aisle between the first and second rows.

6. (New) The store arrangement of claim 3, further comprising:

a first far product display system having a proximal end disposed at the first far end of the first break in said first row, the first far product display system extending at a first far angle relative to the length of said first row and toward the second break in said second row.

7. (New) The store arrangement of claim 6, wherein the first near product display system comprises a distal end opposite the proximal end thereof, wherein the first far product display system comprises a distal end opposite the proximal end thereof, and wherein the store arrangement further comprises a first structure joining the distal ends of said first near and first far product display systems.

8. (New) The store arrangement of claim 7, wherein the first structure comprises a first joining product display system having one end thereof joined to the distal end

of the first near product display system and an opposite end thereof joined to the distal end of the first far product display system.

9. (New) The store arrangement of claim 7, wherein the first structure is arranged with the first near and first far display systems so as to form an alcove within which to display products and/or so as to form a power set area within which to display products.

10. (New) The store arrangement of claim 9, wherein said first near product display system is disposed so as to (i) form, on a side of the first near product display system opposite a side facing said Power Set area and/or said alcove, a first center cap, and/or (ii) display, on the side of the first near product display system opposite the side facing said Power Set area and/or said alcove, at least some products displayed by the first near product display system so as to generally face customers entering a customer walking aisle between the first and second rows.

11. (New) The store arrangement of claim 3, further comprising an end cap disposed at the second near end of the second break and another end cap disposed at the second far end of the second break.

12. (New) The store arrangement of claim 3, further comprising an end cap disposed at the second near end of the second break, said end cap being separated from said first near product display system by a distance at least as wide as a width of at least one of the customer walking aisles.

13. (New) The store arrangement of claim 3, further comprising a first near corner unit comprising a first side in engagement with the first near product display system, a second side in engagement with the first near end of the first break in the first row, and a third side facing away from the second break.

14. (New) The store arrangement of claim 7, further comprising:

a first near joining corner unit comprising a first side in engagement with the first means joining the distal ends of the first near and first far product display systems, a second side in engagement with the first near product display system, and a third side facing away from the first break; and

a first far joining corner unit comprising a first side in engagement with the first means joining the distal ends of the first near and first far product display systems, a second side

in engagement with the first far product display system, and a third side facing away from the first break.

15. (New) The store arrangement of claim 9, further comprising: (i) a hot spot display unit disposed within a central portion of said power set area and/or alcove, and/or (ii) a product display system disposed between the first near end and the first far end of the first break and/or disposed within the central portion of said power set area and/or alcove.

16. (New) The store arrangement of claim 3, further comprising at least one banner board extending across a customer walking aisle that is positioned between the first and the second rows.

17. (New) The store arrangement of claim 3, further comprising:

a third break formed in a third row of the plurality of rows, the third break having a third near end and a third far end;

a fourth break formed in a fourth row of the plurality of rows, the fourth break having a fourth near end and a fourth far end; and

a fourth near product display system having a proximal end disposed at the fourth near end of the fourth break in said fourth row, the fourth product display system extending at a fourth near angle relative to a length of said fourth row and toward the third break in said third row.

18. (New) The store arrangement of claim 17, wherein the third row comprises the second row, the third break comprises the second break, the third near end comprises the second near end, and the third far end comprises the second far end.

19. (New) The store arrangement of claim 17, wherein the third row is different from the second row, the third break is different from the second break, the third near end is different from the second near end, and the third far end is different from the second far end.

20. (New) The store arrangement of claim 19, wherein (i) the second and third rows are between the first and fourth rows; (ii) the first and fourth rows are between the second and third rows; or (iii) the second, third, and fourth rows are all on a same side of the first row.

21. (New) A store arrangement comprising:

a plurality of rows of shelving or other structures for displaying products;

a plurality of customer walking aisles formed by the rows;

(Appx. B)

a first row of the plurality of rows;

a first customer walking aisle of the plurality of customer walking aisles, the first customer walking aisle adjacent the first row;

a hot spot display or island positioned in the first customer walking aisle;

a second row of the plurality of rows, the second row also adjacent the first customer walking aisle, the second row including a first product display system, a second product display system, a third product display system, and a fourth product display system arranged so that:

the second product display system and the third product display system are positioned between the first product display system and the fourth product display system;

the first product display system and the fourth product display system generally face the first row;

the second product display system is angled away from the first row so as to at least partially face the hot spot display or island; and

the third product display system is angled away from the first row and toward the second product display system so as to at least partially face the second product display system and at least partially face the hot spot display or island.

The invention claimed is:

1. A store arrangement of product display units defining a PrimeZone sub-area within a Center Store area of a store design of the type including a Center Store area having a plurality of long parallel rows of product display units respectively separated by customer walking aisles, the arrangement being implemented by a process comprising:

providing a first break in a portion of a first row of the Center Store, and a second break in a corresponding portion of an adjacent second row of the plurality of long parallel rows of product display units of the Center Store area;

providing a first Center Cap having an elongated product display system including a plurality of display units and having one end thereof disposed in engagement with an end of a first display unit of the first row and bordering one side of said first break, said first Center Cap being oriented to have the length thereof extending at a first angle relative to the length of the first row and toward said second break;

providing a second Center Cap having one end thereof disposed in engagement with a second display unit of the first row and bordering the other side of the break in the first row, said second Center Cap being oriented to have the length thereof extending at a second angle relative to the length of the first row and toward said second break; and providing first means joining the other ends of the first and second Center Caps to form a first alcove-like Power Set area within and around which to display products;

wherein products disposed on one side of said first Center Cap generally face customers entering the aisle between the first and second rows from one side of the store, and products disposed on one side of said second Center Cap generally face customers entering the aisle between the first and second rows from the opposite side of the store; and

wherein one side of said second break in said second row, is bordered by a first End Cap positioned no closer to said first Center Cap than the width of the aisle between said first and second rows, and the other side of said second break is bordered by a second End Cap positioned no closer to said second Center Cap than the width of the aisle between said first and second rows, thereby providing pathways joining said first aisle to said second aisle;

providing breaks in a third row adjacent said second row and in a fourth row adjacent said third row of the plurality of long parallel rows of product display systems in the Center Store area;

providing a third elongated product display system having one end thereof disposed in engagement with a display system forming one side of the break in said fourth row and extending at a first angle relative to the length of the fourth row and toward the break in said third row;

providing a fourth elongated product display system having one end thereof disposed in engagement with a display system forming the other side of the break in said fourth row and extending at a third angle relative to the length of said fourth row and toward the break in the said third row; and

providing second means joining the other ends of said third and fourth elongated display systems to form a second alcove-like Power Set area within which to display products, said third and fourth elongated display systems being separated from corresponding sides of the break in said third row to form passageways connecting the customer walking aisle disposed between said third and fourth rows and the customer walking aisle disposed on an opposite side of the third row.

2. A store arrangement implemented by a process as recited in claim 1 wherein said Center Caps are comprised of a plurality of moveable gondolas rigidly linked together.

3. A store arrangement as recited in claim 2 wherein at least some of said movable gondolas are rendered movable by a plurality of supporting glider devices each comprising:

a cylindrical plug having threads formed on its outer cylindrical surface, means formed on one axial end thereof for facilitating attachment to a lower extremity of the gondola to be supported thereby above a supporting surface, and a plurality of roller means affixed to the opposite axial end thereof; and

a sleeve having a threaded bore extending axially therethrough and adapted to threadably receive said plug, said sleeve being rotatable about said plug to advance from a retracted position on said plug allowing said rollers to support the gondola to an extended position on said plug raising said roller means out of engagement with the gondola supporting surface.

4. A store arrangement as recited in claim 3 wherein the opposite axial end of said plug includes a plurality of sockets, and said roller means includes a plurality of spherically shaped roller balls disposed in said sockets.

5. A process for providing a PrimeZone sub-area within a Center Store area of a retail establishment, the Center Store area having a plurality of product display systems aligned in a plurality of long parallel rows defining customer walkways therebetween; the process comprising:

providing a first break in a first row of said plurality of long parallel rows of said Center Store area and a corresponding second break in a second row of said plurality of long parallel rows of said Center Store area adjacent said first break;

providing in said first break a first elongated product display system fitted with glider devices adapted to facilitate movement thereof from one position to another, said first product display system having one end thereof disposed in engagement with another display system defining one side of the first break-in said first row;

rotating said first elongated product display system into a position having its length extending at an angle relative to the length of said first row and toward said second break in said second row;

providing in said first break a second elongated product display system fitted with glider devices adapted to facilitate movement thereof from one position to another, said second product display system having one end thereof disposed in engagement with a display system defining the other side of the first break in said first row, said first elongated product display system having

its length extending at an angle relative to the length of said first row and toward the second break in said second row;

providing a first means joining the other ends of said first and second elongated display systems to form a first alcove-like Power Set area within which to display products, wherein said first and second elongated display systems are separated from corresponding sides of the second break in said second row to form passageways connecting the customer walking aisle disposed between said first and second rows and the customer walking aisle disposed on an opposite side of the second row;

providing a third break in a third row of said plurality of long parallel rows of said Center Store area adjacent said second row, and a corresponding fourth break in a fourth row of said plurality of long parallel rows of said Center Store area adjacent said third break;

providing in said fourth break a third elongated product display system fitted with glider devices adapted to facilitate movement thereof from one position to another, said third product display system having one end thereof disposed in engagement with another display system defining one side of the fourth break in said fourth row;

rotating said fourth elongated product display system into a position having its length extending at an angle relative to the length of said fourth row and toward said third break in said third row;

providing in said fourth break a fourth elongated product display system fitted with glider devices adapted to facilitate movement thereof from one position to another, said fourth product display system having one end thereof disposed in engagement with a display system defining the other side of the fourth break in said fourth row, said fourth elongated product display system having its length extending at an angle relative to the length of said fourth row and toward the third break in said third row; and

providing a second means joining the other ends of said third and fourth elongated display systems to form a second alcove-like Power Set area within which to display products, wherein said third and fourth elongated display systems are separated from corresponding sides of the third break in said third row to form passageways connecting the customer walking aisle disposed between said third and fourth rows and the customer walking aisle disposed on an opposite side of the third row.

**6**. A store arrangement as recited in claim **5** and further comprising at least one Banner Board extending across the aisle separating said second and third rows.

**7**. A process as recited in claim **5** wherein said first means includes a fifth elongated display system having one end thereof joined to the other end of said first elongated display system and having a second end thereof joined to the other end of said second elongated display system.

**8**. A store arrangement of product display units defining a Primezone sub-area within a Center Store area of a store design of the type including a Center Store area having a plurality of long parallel rows of product display units respectively separated by customer walking aisles, the arrangement being implemented by a process comprising:

providing a first break in a portion of a first row of the Center Store, and a second break in a corresponding portion of an adjacent second row of the plurality of long parallel rows of product display units of the Center Store area;

providing a first Center Cap having an elongated product display system including a plurality of display units and having one end thereof disposed in engagement with an end of a first display unit of the first row and bordering one side of the first break, said first Center Cap being oriented to have the length thereof extending at a first angle relative to the length of the first row and toward said second break;

providing a second Center Cap having one end thereof disposed in engagement with a second display unit of the first row and bordering the other side of the break in the first row, said second Center Cap being oriented to have the length thereof extending at a second angle relative to the length of the first row and toward said second break; and

providing first means joining the other ends of the first and second Center Caps to form a first alcove-like Power Set area within and around which to display products;

wherein products disposed on one side of said first Center Cap generally face customers entering the aisle between the first and second rows from one side of the store, and products disposed on one side of said second Center Cap generally face customers entering the aisle between the first and second rows from the opposite side of the store; and

wherein one side of said second break, in said second row, is bordered by a first End Cap positioned no closer to said first Center Cap than the width of the aisle between said first and second rows, and the other side of said second break is bordered by a second End Cap positioned no closer to said second Center Cap than the width of the aisle between said first and second rows, thereby providing pathways joining said first aisle to an aisle on the opposite side of said second row;

providing a third break in a third one of said plurality of long parallel rows of product display units of the Center Store area adjacent said first row, and a fourth break in an adjacent fourth one of said rows of the plurality of long parallel rows of product display units of the Center Store area;

providing a third Center Cap having one end thereof disposed in engagement with a first display unit of the third row and bordering one side of said third break, said third Center Cap being oriented to have the length thereof extending at a third angle relative to the length of the third row and toward said fourth break;

providing a fourth Center Cap having one end thereof disposed in engagement with a second display unit of the third row and bordering the other side of the break in the third row, said fourth Center Cap being oriented to have the length thereof extending at a fourth angle relative to the length of the third row and toward said fourth break; and

providing second means joining the other ends of the third and fourth Center Caps to form a second alcove-like Power Set area within and around which to display products;

wherein products disposed on one side of said third Center Caps generally face customers entering a third aisle between the third and fourth rows from one side of the store, and products disposed on one side of said fourth Center Cap generally face customers entering the third aisle from the opposite side of the store; and

wherein one side of said fourth break is bordered by a third End Cap positioned no closer to said third Center Cap than the width of the third aisle, and the other side of said fourth break is bordered by a fourth End Cap positioned no closer to said fourth Center Cap than the width of the third aisle, thereby providing pathways joining said third aisle to an aisle on the opposite side of said fourth row.

**9**. A store arrangement as recited in claim **8** wherein said first means includes a fifth Center Cap having one end thereof joined to the other end of said first Center Cap and a second end thereof joined to the other end of said second Center Cap.

**10**. A store arrangement as recited in claim **8** and further including means forming a Hot Spot display unit disposed within a central portion of said first Power Set area.

**11**. A store arrangement as recited in claim **8** wherein said first Center Cap has a generally rectangular plan form and includes product display units on both sides thereof, and wherein the engagement between said one end of said first Center Cap and said first display unit forming one side of the break in said first row provides a space for accommodating the positioning of a first Corner unit between the facing ends of said first Center Cap and said first display unit.

**12**. A store arrangement as recited in claim **11** wherein the engagement between said one end of said second Center Cap and said second display unit forming the other side of the break in said first row provides a space for accommodating the positioning of a second Corner unit between the facing ends of said second Center Cap and said second display unit.

**13**. A store arrangement as recited in claim **12** wherein said first means includes a third Center Cap having one end thereof joined to the other end of said first Center Cap and providing a space for accommodating a third Corner unit, and another end thereof joined to the other end of said second Center Cap and providing a space for accommodating a fourth Corner unit.

**14**. A store arrangement implemented by a process as recited in claim **13** wherein at least some of said Center Caps are comprised of two rows of moveable gondolas rigidly linked together in parallel to form an elongated display unit accessible from opposite sides thereof.

**15**. A store arrangement as recited in claim **8** wherein at least said first Center Cap and said second Center Cap are fitted with glider devices adapted to facilitate movement of the product display units from one position to another.

**16**. A store arrangement as recited in claim **15** wherein said glider devices include:

a cylindrical plug having threads formed on its outer cylindrical surface, attachment means formed on one axial end thereof for fixed engagement with a lower part of the product display system, and a plurality of roller means disposed on the opposite axial end thereof for rollingly engaging a surface supporting the display system; and

a sleeve having a threaded bore extending axially therethrough and adapted to threadably receive said plug, whereby said sleeve may be advanced from a retracted position on said plug to an extended position engaging the supporting surface and raising said roller means out of engagement with the supporting surface thereby leveling and/or fixing the system in position relative to the surface.

**17**. A store arrangement as recited in claim **16** wherein said roller means are spherical in shape and said opposite axial end of said plug is provided with sockets for matingly receiving the spherical roller means.

**18**. A store arrangement as recited in claim **8** and further comprising means disposed within a central portion of said first Power Set area defining a Hot Spot area.

**19**. A store arrangement as recited in claim **8** and further comprising means disposed within central portions of said first and second Power Set areas defining Hot Spot areas.

**20**. A store arrangement implemented by a process as recited in claim **8** and further comprising providing at least one Banner Board extending across the aisle separating said first and fourth rows.

**21**. A store arrangement implemented by a process as recited in claim **8** wherein at least some of said Center Caps are comprised of a plurality of moveable gondolas rigidly linked together.

* * * * *

## Claims

1. A PrimeZone store arrangement for a store design of the type normally including a Center Store area having a plurality of long parallel rows of product display systems including shelving or the like for displaying products along customer walking aisles formed by the rows of product display systems, comprising:

a Center Store area including a plurality of parallel rows of product display systems;

breaks formed in at least a first row and a second row adjacent said first row of the plurality of parallel rows of product display systems;

a first elongated product display system having one end thereof disposed in engagement with a display system forming one side of the break in said first row and extending at a first angle relative to the length of said first row and toward the break in said second row;

a second elongated product display system having one end thereof disposed in engagement with a display system forming the other side of the break in said first row and extending at a second angle relative to the length of said first row and toward the break in said second row; and

first means joining the other ends of said first and second elongated display systems to form a first alcove-like Power Set area within which to display products, said first and second elongated display systems being separated from corresponding sides of the break in said second row to form passageways connecting the customer walking aisle disposed between said first and second rows and the customer walking aisle disposed on an opposite side of the second row.

2. A PrimeZone store arrangement as recited in claim 1 wherein said first means includes a third elongated display system having one end thereof joined to the

other end of said first elongated display system and a second end joined to the other end of said second elongated display system.

3. A PrimeZone store arrangement as recited in claim 1 and further including means forming a Hot Spot display unit disposed within a central portion of said Power Set area.

4. A PrimeZone store arrangement as recited in claim 1 wherein said first elongated product display system includes means forming a first Center Cap on the side thereof opposite the side facing said Power Set area.

5. A PrimeZone store arrangement as recited in claim 4 wherein said second elongated product display system includes means forming a second Center Cap on the side thereof opposite the side facing said Power Set area.

6. A PrimeZone store arrangement as recited in claim 5 wherein said first means includes a third elongated display system having one end thereof joined to the other end of said first elongated display system and a second end joined to the other end of said second elongated display system, and wherein said third elongated product display system includes means forming a third Center Cap on the side thereof opposite the side facing said Power Set area.

7. A PrimeZone store arrangement as recited in claim 6 and further including means forming a Hot Spot display unit disposed within a central portion of said Power Set area.

8. A PrimeZone store arrangement as recited in claim 1 wherein said product display systems have a generally rectangular plan form and include product

display units on both sides, and wherein the engagement between said one end of said first elongated product display system and said display system forming one side of the break in said first row accommodates the positioning of a first Corner unit between the facing ends of the corresponding engaged display systems.

9. A PrimeZone store arrangement as recited in claim 8 wherein the engagement between said one end of said second elongated product display system and said display system forming the other side of the break in said first row accommodates the positioning of a second Corner unit between the facing ends of the corresponding engaged display systems.

10. A PrimeZone store arrangement as recited in claim 9 wherein said first means includes a third elongated display system having one end thereof joined to the other end of said first elongated display system by a third Corner unit and another end thereof joined to the other end of said second elongated display system by a fourth Corner unit.

11. A PrimeZone store arrangement as recited in claim 1 and further comprising:

breaks formed in a third row adjacent said second row and in a fourth row adjacent said third row of the plurality of long parallel rows of product display systems in the Center Store area;

a third elongated product display system having one end thereof disposed in engagement with a display system forming one side of the break in said third row and extending at a first angle relative to the length of said third row and toward the break in said fourth row;

a fourth elongated product display system having one end thereof disposed in engagement with a display system forming the other side of the break in said

third row and extending at a third angle relative to the length of said third row and toward the break in said fourth row; and

second means joining the other ends of said third and fourth elongated display systems to form a second alcove-like Power Set area within which to display products, said third and fourth elongated display systems being separated from corresponding sides of the break in said third row to form passageways connecting the customer walking aisle disposed between said third and fourth rows and the customer walking aisle disposed on an opposite side of the third row.

12. A PrimeZone store arrangement as recited in claim 11 wherein said third row is adjacent said second row.

13. A PrimeZone store arrangement as recited in claim 11 wherein said fourth row is adjacent said first row.

14. A PrimeZone store arrangement as recited in claim 1 wherein at least said first elongated product display system and said second elongated product display system are fitted with glider devices adapted to facilitate movement of the product display systems from one position to another.

15. A PrimeZone store arrangement as recited in claim 14 wherein said glider devices include:

a cylindrical plug having threads formed on its outer cylindrical surface, attachment means formed on one axial end thereof for fixed engagement with a lower part of the product display system, and a pluraility of roller means disposed on the opposite axial end thereof for rollingly engaging a surface supporting the display system; and

a sleeve having a threaded bore extending axially therethrough and adapted to threadably receive said plug, whereby said sleeve may be advanced from a

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retracted position on said plug to an extended position engaging the supporting surface and raising said roller means out of engagement with the supporting surface thereby leveling and/or fixing the system in position relative to the surface.

16. A PrimeZone store arrangement as recited in claim 15 wherein said roller means are spherical in shape and said opposite axial end of said plug is provided with sockets for matingly receiving the spherical roller means.

17. A PrimeZone store arrangement as recited in claim 1 and further comprising means disposed within a central portion of said first Power Set area defining a Hot Spot area.

18. A PrimeZone store arrangement as recited in claim 12 and further comprising means disposed within central portions of said first and second Power Set areas defining Hot Spot areas.

19. A PrimeZone store arrangement as recited in claim 1 and further comprising means forming a first End Cap affixed to one side of the break in said second row, said first End Cap being separated from said first elongated product display system by a distance at least as wide as the separation between said first and second rows of the plurality of long parallel rows of product display systems.

20. A PrimeZone store arrangement as recited in claim 11 and further comprising at least one Banner Board extending across the aisle separating said second and third rows.

21. A process for providing a PrimeZone area in a Center Store of a retail establishment, comprising:

providing a plurality of product display systems aligned in a plurality of long parallel rows defining customer walkways therebetween;

providing breaks in at least a first row and a second row adjacent said first row of the plurality of long parallel rows;

providing a first elongated product display system having one end thereof disposed in engagement with a display system forming one side of the break in said first row and extending at an angle relative to the length of said first row and toward the break in said second row;

providing a second elongated product display system having one end thereof disposed in engagement with a display system forming the other side of the break in said first row and extending at an angle relative to the length of said first row and toward the break in said second row; and

providing a first means joining the other ends of said first and second elongated display systems to form a first alcove-like Power Set area within which to display products, wherein said first and second elongated display systems are separated from corresponding sides of the break in said second row to form passageways connecting the customer walking aisle disposed between said first and second rows and the customer walking aisle disposed on an opposite side of the second row.

22. A process as recited in claim 21 wherein said first means includes a third elongated display system having one end thereof joined to the other end of said first elongated display system and a second end thereof joined to the other end of said second elongated display system.

23. A glider device, comprising:

a cylindrical plug having threads formed on its outer cylindrical surface, means formed on one axial end thereof for facilitating attachment to an object to be supported above a supporting surface by the glider device, and a plurality of roller means affixed to the opposite axial end thereof;

a sleeve having a threaded bore extending axially therethrough and adapted to threadably receive said plug, said sleeve being rotatable about said plug to

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advance from a retracted position on said plug to an extended position raising said roller means out of engagement with the object supporting surface.

24. A glider device as recited in claim 23 wherein the opposite axial end of said plug includes a plurality of sockets, and said roller means includes a plurality of spherically shaped roller balls disposed in said sockets.

WHAT IS CLAIMED IS:

1. A computer system comprising:

one or more processors; and

a non-transitory computer-readable storage medium having stored therein instructions that, when executed by the one or more processors of the computer system, cause the computer system to at least:

access data associated with one or more items for a store, the store comprising a reconfigurable shelving unit, the reconfigurable shelving unit comprising a plurality of components that are configured for re-arranging relative to one another between different configurations so as to change a footprint of the reconfigurable shelving unit by at least one of changing a length of the shelving unit or changing a curvature of the shelving unit;

generate a plan for configuring the store in a layout based at least in part upon the data, the plan including information for configuring or reconfiguring the reconfigurable shelving unit by at least one of changing a length of the shelving unit or changing a curvature of the shelving unit.

2. The computer system of claim 1, wherein the data comprises data about the one or more items that is based at least in part on data about a set of people comprising at least one of customers of the store or persons identified as prospective customers of the store.

3. The computer system of claim 1, wherein the data comprises data about the one or more items that is based at least in part on data about a set of people comprising customers of the store.

4. The computer system of claim 1, wherein the data comprises data about the one or more items that is based at least in part on data about a set of people comprising persons identified as prospective customers of the store.

5. The computer system of claim 1, wherein the data comprises data about the one or more items that is based at least in part on data about a set of people comprising customers of the store and persons identified as prospective customers of the store.

6. The computer system of any of the preceding claims, wherein the data comprises data about a fixture of the store.

7. The computer system of any of the preceding claims, wherein the data comprises data about a product of the store.

8. The computer system of any of the preceding claims, wherein the data comprises data about a purchasing history of the one or more items in the store.

9. The computer system of any of the preceding claims, wherein the data comprises data about a purchasing history of the one or more items at locations other than the store.

10. The computer system of any of the preceding claims, wherein the data comprises data about a demand for the one or more items.

11. The computer system of any of the preceding claims, wherein the data comprises data about a popularity of the one or more items.

12. The computer system of any of the preceding claims, wherein the data comprises data about a profitability of the one or more items.

13. The computer system of any of the preceding claims, wherein the data comprises data about revenue streams for the one or more items.

14. The computer system of any of the preceding claims, wherein the data comprises data about a characteristic of the one or more items.

15. The computer system of any of the preceding claims, wherein the data comprises data acquired within the store.

16. The computer system of any of the preceding claims, wherein the data comprises data acquired through cameras positioned within the store.

17. The computer system of any of the preceding claims, wherein the data comprises data acquired by sensors on shelving units positioned within the store.

18. The computer system of any of the preceding claims, wherein the data comprises data acquired by proximity sensors positioned within the store.

19. The computer system of any of the preceding claims, wherein the data comprises data acquired by weight sensors positioned within the store.

20. The computer system of any of the preceding claims, wherein the data comprises data acquired by seismic sensors positioned within the store.

21. The computer system of any of the preceding claims, wherein the data comprises data acquired by wireless sensors positioned within the store.

22. The computer system of any of the preceding claims, wherein the data comprises data acquired by RFID (radio-frequency identification) sensors positioned within the store.

23. The computer system of any of the preceding claims, wherein the data comprises data about foot traffic.

24. The computer system of any of the preceding claims, wherein the data comprises data about loiter time.

25. The computer system of any of the preceding claims, wherein the data comprises data about a location of a product in the store.

26. The computer system of any of the preceding claims, wherein the data comprises data about a position of a fixture in the store.

27. The computer system of any of the preceding claims, wherein the data comprises data about heart a rate of a customer in the store.

28. The computer system of any of the preceding claims, wherein the data comprises data acquired remote from the store.

29. The computer system of any of the preceding claims, wherein the data comprises tax data.

30. The computer system of any of the preceding claims, wherein the data comprises housing data.

31. The computer system of any of the preceding claims, wherein the data comprises locale trend data.

32. The computer system of any of the preceding claims, wherein the data comprises sports data.

33. The computer system of any of the preceding claims, wherein the data comprises event data.

34. The computer system of any of the preceding claims, wherein the data comprises government holiday data.

35. The computer system of any of the preceding claims, wherein the data comprises religious holiday data.

36. The computer system of any of the preceding claims, wherein the data comprises data about ages living in an area.

37. The computer system of any of the preceding claims, wherein the data comprises medical data.

38. The computer system of any of the preceding claims, wherein the data comprises income data.

39. The computer system of any of the preceding claims, wherein the data comprises stock market data.

40. The computer system of any of the preceding claims, wherein the data comprises credit card data.

41. The computer system of any of the preceding claims, wherein the data comprises police data.

42. The computer system of any of the preceding claims, wherein the data comprises fire data.

43. The computer system of any of the preceding claims, wherein the data comprises crime data.

44. The computer system of any of the preceding claims, wherein the data comprises disaster data.

45. The computer system of any of the preceding claims, wherein the data comprises birthday data.

46. The computer system of any of the preceding claims, wherein the data comprises weather data.

47. The computer system of any of the preceding claims, wherein the data comprises environmental data.

48. The computer system of any of the preceding claims, wherein the data comprises census data.

49. The computer system of any of the preceding claims, wherein the data comprises U.S. Census data.

50. The computer system of any of the preceding claims, wherein the data comprises demographic data.

51. The computer system of any of the preceding claims, wherein the data comprises locale design data.

52. The computer system of any of the preceding claims, wherein the data comprises trending data.

53. The computer system of any of the preceding claims, wherein the data comprises school data.

54. The computer system of any of the preceding claims, wherein the data comprises real estate data.

55. The computer system of any of the preceding claims, wherein the data comprises traffic data.

56. The computer system of any of the preceding claims, wherein the data comprises social media data.

57. The computer system of any of the preceding claims, wherein the data comprises food trends data.

58. The computer system of any of the preceding claims, wherein the data comprises product trends data.

59. A computer system comprising:

one or more processors; and

a non-transitory computer-readable storage medium having stored therein instructions that, when executed by the one or more processors of the computer system, cause the computer system to at least:

access data associated with a set of people comprising at least one of customers of a store or persons identified as prospective customers of the store, the store comprising a reconfigurable shelving unit, the reconfigurable shelving unit comprising a plurality of components that are configured for re-arranging relative to one another between different configurations so as to change a footprint of the reconfigurable shelving unit by at least one of changing a length of the shelving unit or changing a curvature of the shelving unit;

generate a plan for configuring the store in a layout based at least in part upon the data, the plan including information for configuring or reconfiguring the reconfigurable shelving unit by at least one of changing a length of the shelving unit or changing a curvature of the shelving unit.

60. The computer system of claim 59, wherein the data comprises data acquired about people within the store.

61. The computer system of claim 60, wherein the data comprises at least one of data acquired through cameras positioned within the store, data acquired by sensors on shelving units positioned within the store, data acquired by proximity sensors positioned within the store, data acquired by weight sensors positioned within the store, data acquired by seismic sensors positioned within the store, data acquired by wireless sensors positioned within the store, or data acquired by RFID (radio-frequency identification) sensors positioned within the store.

62. The computer system of claim 60, wherein the data comprises at least one of data about foot traffic, data about loiter time, or data about a heart a rate of a customer in the store.

63. The computer system of claim 59, wherein the data comprises data acquired remote from the store.

64. The computer system of claim 63, wherein the data comprises at least one of tax data, housing data, locale trend data, sports data, event data, government holiday data, religious holiday data, data about ages living in an area, medical data, income data, stock market data, credit card data, police data, fire data, crime data, disaster data, birthday data, weather data, environmental data, census data, U.S. Census data, demographic data, locale design data, trending data, school data, real estate data, traffic data, social media data, food trends data, or product trends data.

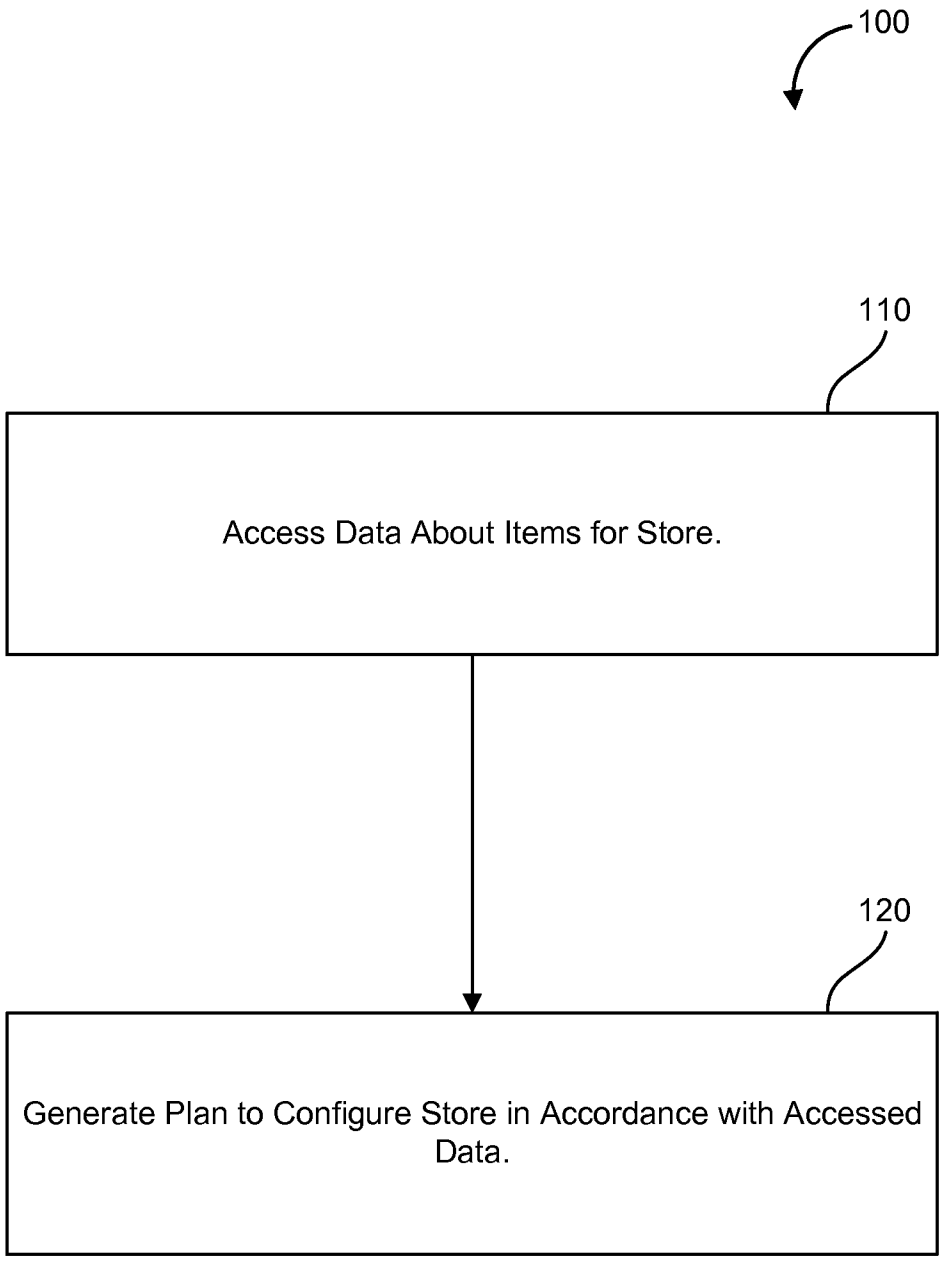

100
110
Access Data About Items for Store.
120
Generate Plan to Configure Store in Accordance with Accessed Data.

FIG. 1

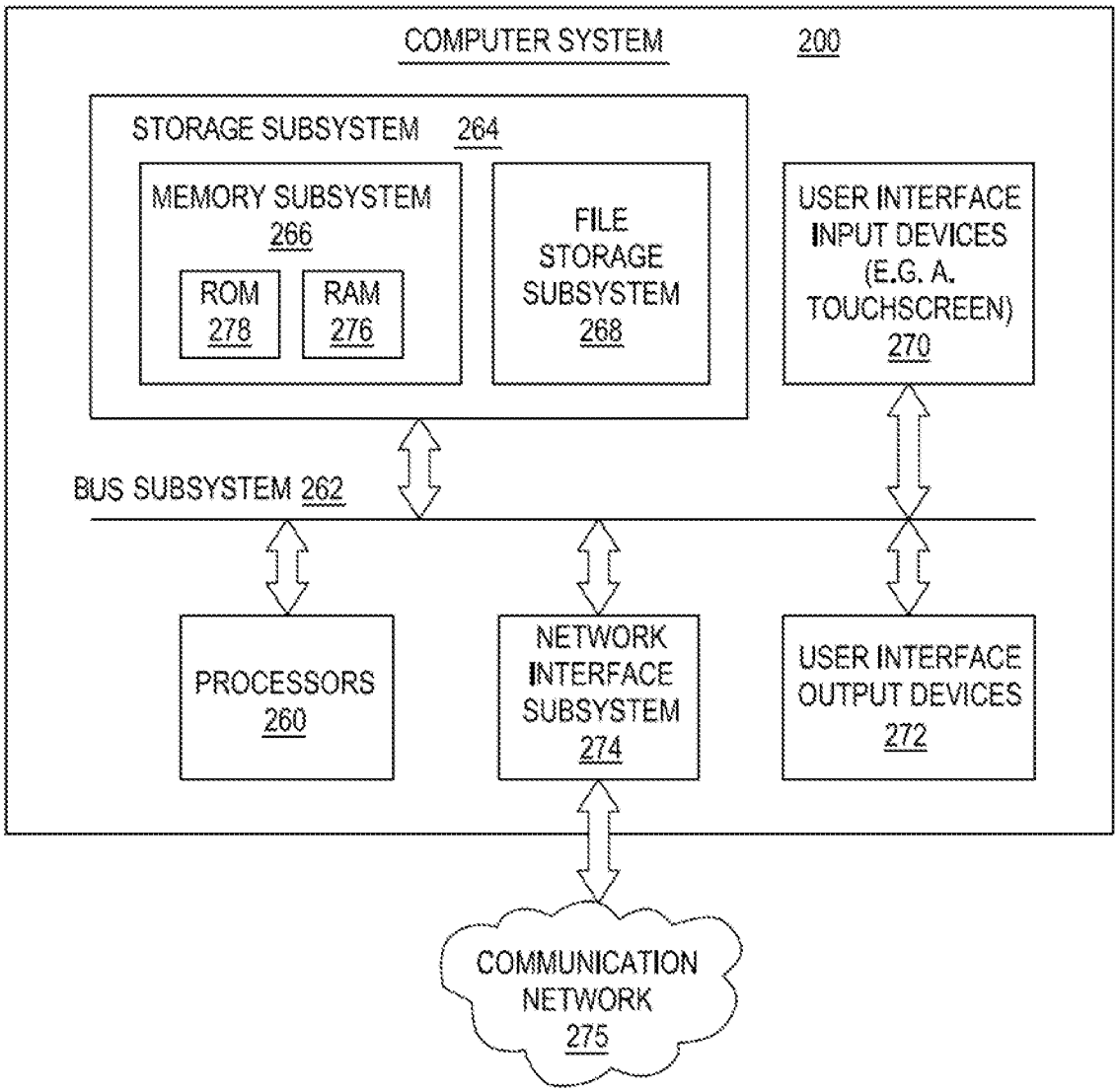
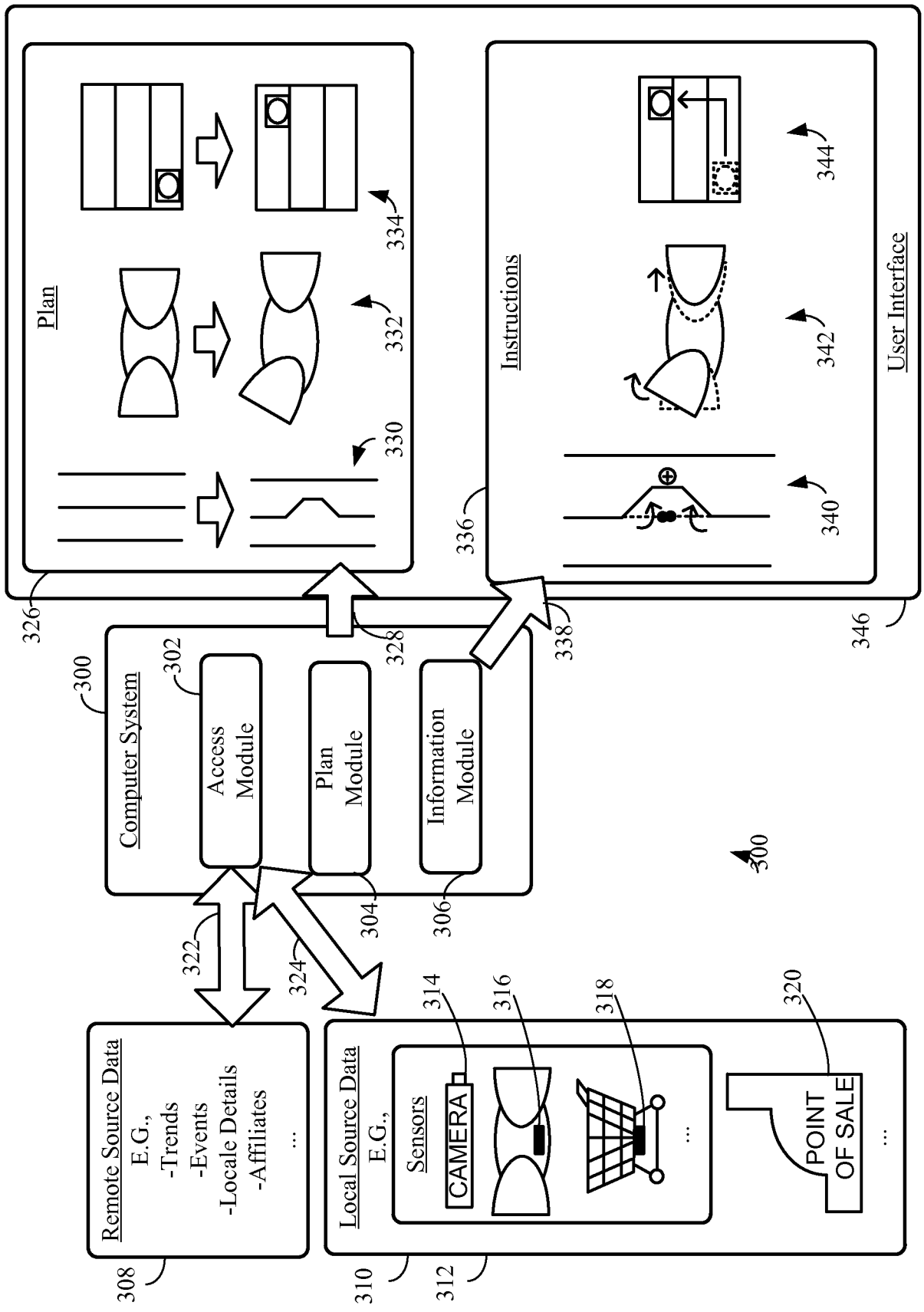

COMPUTER SYSTEM 200
STORAGE SUBSYSTEM 264
MEMORY SUBSYSTEM 266
ROM 278
RAM 276
FILE STORAGE SUBSYSTEM 268
USER INTERFACE INPUT DEVICES (E.G. A. TOUCHSCREEN) 270
BUS SUBSYSTEM 262
PROCESSORS 260
NETWORK INTERFACE SUBSYSTEM 274
USER INTERFACE OUTPUT DEVICES 272
COMMUNICATION NETWORK 275

FIG. 2


Plan
Instructions
User Interface
Computer System
Access Module
Plan Module
Information Module
Remote Source Data
E.G.,
-Trends
-Events
-Locale Details
-Affiliates
...
Local Source Data
E.G.,
Sensors
CAMERA
...
POINT OF SALE
...
300
302
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306
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FIG. 3

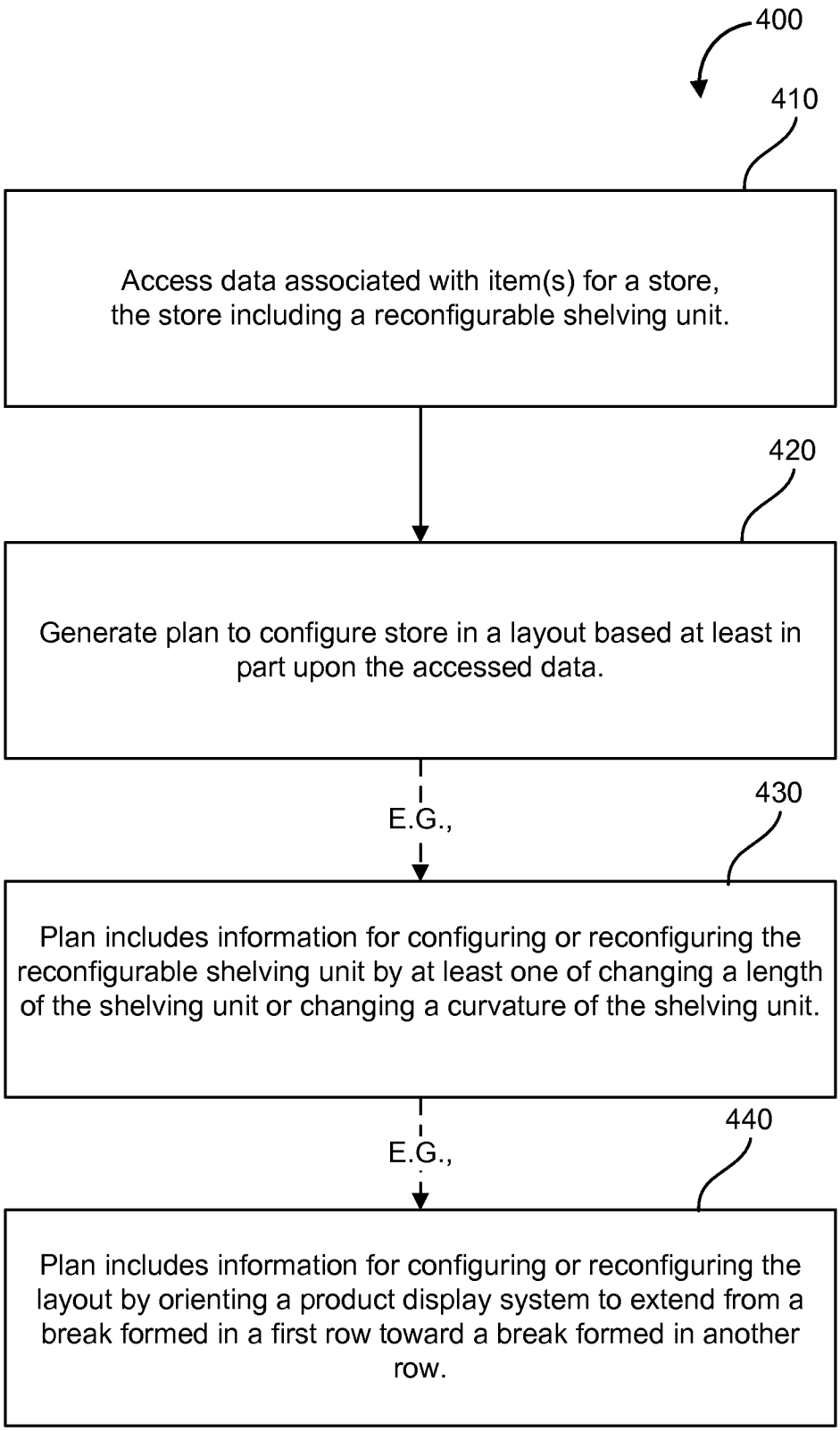
400
410
Access data associated with item(s) for a store, the store including a reconfigurable shelving unit.
420
Generate plan to configure store in a layout based at least in part upon the accessed data.
E.G.,
430
Plan includes information for configuring or reconfiguring the reconfigurable shelving unit by at least one of changing a length of the shelving unit or changing a curvature of the shelving unit.
E.G.,
440
Plan includes information for configuring or reconfiguring the layout by orienting a product display system to extend from a break formed in a first row toward a break formed in another row.

FIG. 4

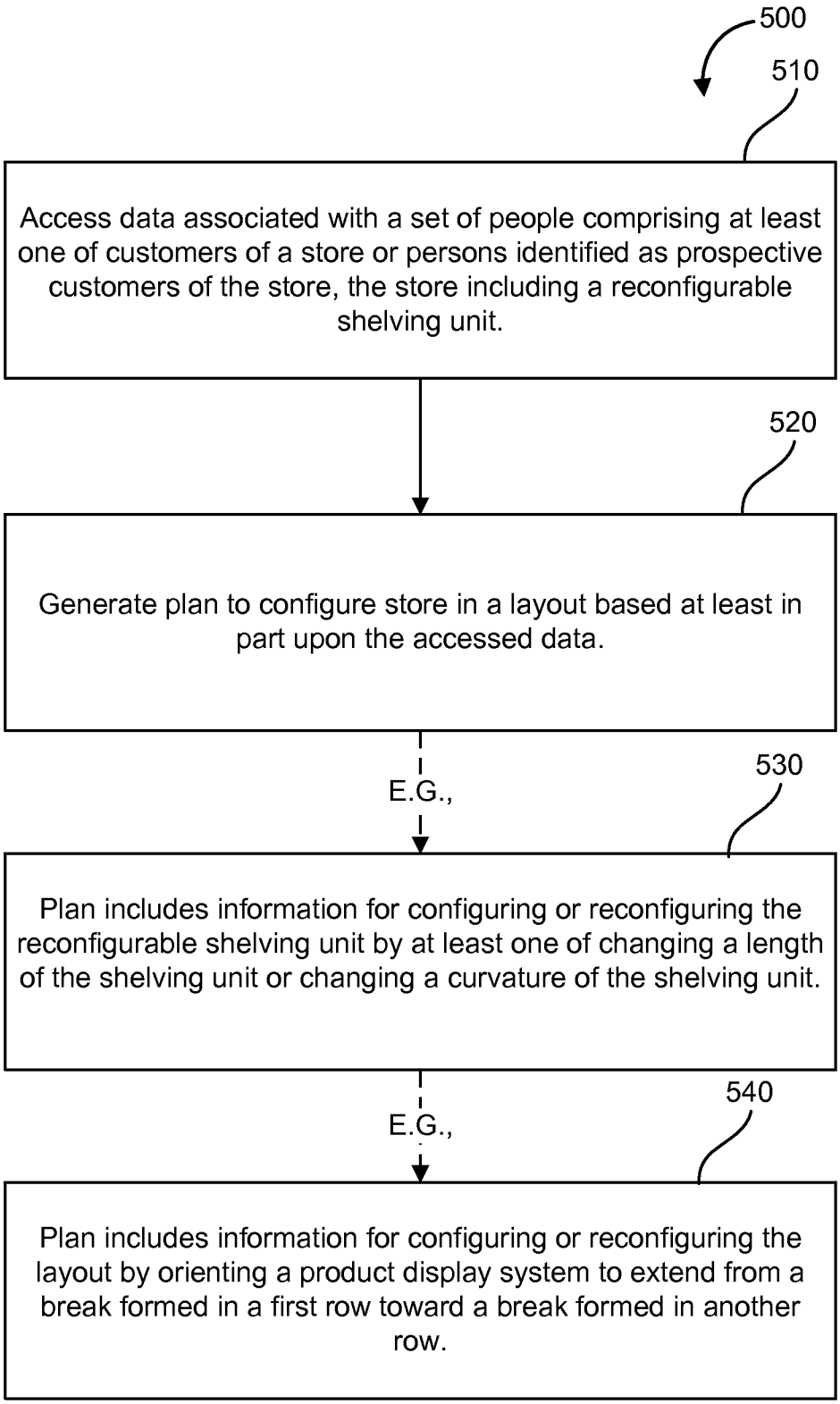
500
510
Access data associated with a set of people comprising at least one of customers of a store or persons identified as prospective customers of the store, the store including a reconfigurable shelving unit.
520
Generate plan to configure store in a layout based at least in part upon the accessed data.
E.G.,
530
Plan includes information for configuring or reconfiguring the reconfigurable shelving unit by at least one of changing a length of the shelving unit or changing a curvature of the shelving unit.
E.G.,
540
Plan includes information for configuring or reconfiguring the layout by orienting a product display system to extend from a break formed in a first row toward a break formed in another row.

FIG. 5

# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/055552

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q30/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G06Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | US 2008/249836 A1 (ANGELL ROBERT LEE [US] ET AL) 9 October 2008 (2008-10-09)<br>paragraph [0076]<br>paragraph [0093]<br>paragraph [0101] - paragraph [0102]<br>paragraph [0106]<br>----- | 1-64 |
| X | US 2009/083122 A1 (ANGELL ROBERT LEE [US] ET AL) 26 March 2009 (2009-03-26)<br>paragraphs [0039] - [0041]<br>paragraph [0052]<br>paragraph [0055]<br>paragraph [0057]<br>----- | 1-64 |
| A | WO 2013/112998 A1 (TECHNI LLC [US])<br>1 August 2013 (2013-08-01)<br>cited in the application<br>the whole document<br>----- | 1-64 |
| | -/-- | |

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 18 January 2016 | 25/01/2016 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016 | Gabriel, Christiaan |

1

Form PCT/ISA/210 (second sheet) (April 2005)

# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/055552

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| A | US 2012/241395 A1 (BRUCIA LAWRENCE J [US])<br>27 September 2012 (2012-09-27)<br>the whole document<br>----- | 1-64 |

1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2015/055552

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
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| US 2009083122 A1 | 26-03-2009 | NONE | |
| WO 2013112998 A1 | 01-08-2013 | AU 2013211836 A1 | 28-08-2014 |
| | | CA 2861087 A1 | 01-08-2013 |
| | | CN 104244771 A | 24-12-2014 |
| | | EP 2806766 A1 | 03-12-2014 |
| | | HK 1204533 A1 | 27-11-2015 |
| | | JP 2015504768 A | 16-02-2015 |
| | | KR 20140125770 A | 29-10-2014 |
| | | WO 2013112998 A1 | 01-08-2013 |
| US 2012241395 A1 | 27-09-2012 | US 2012241395 A1 | 27-09-2012 |
| | | US 2015144431 A1 | 28-05-2015 |