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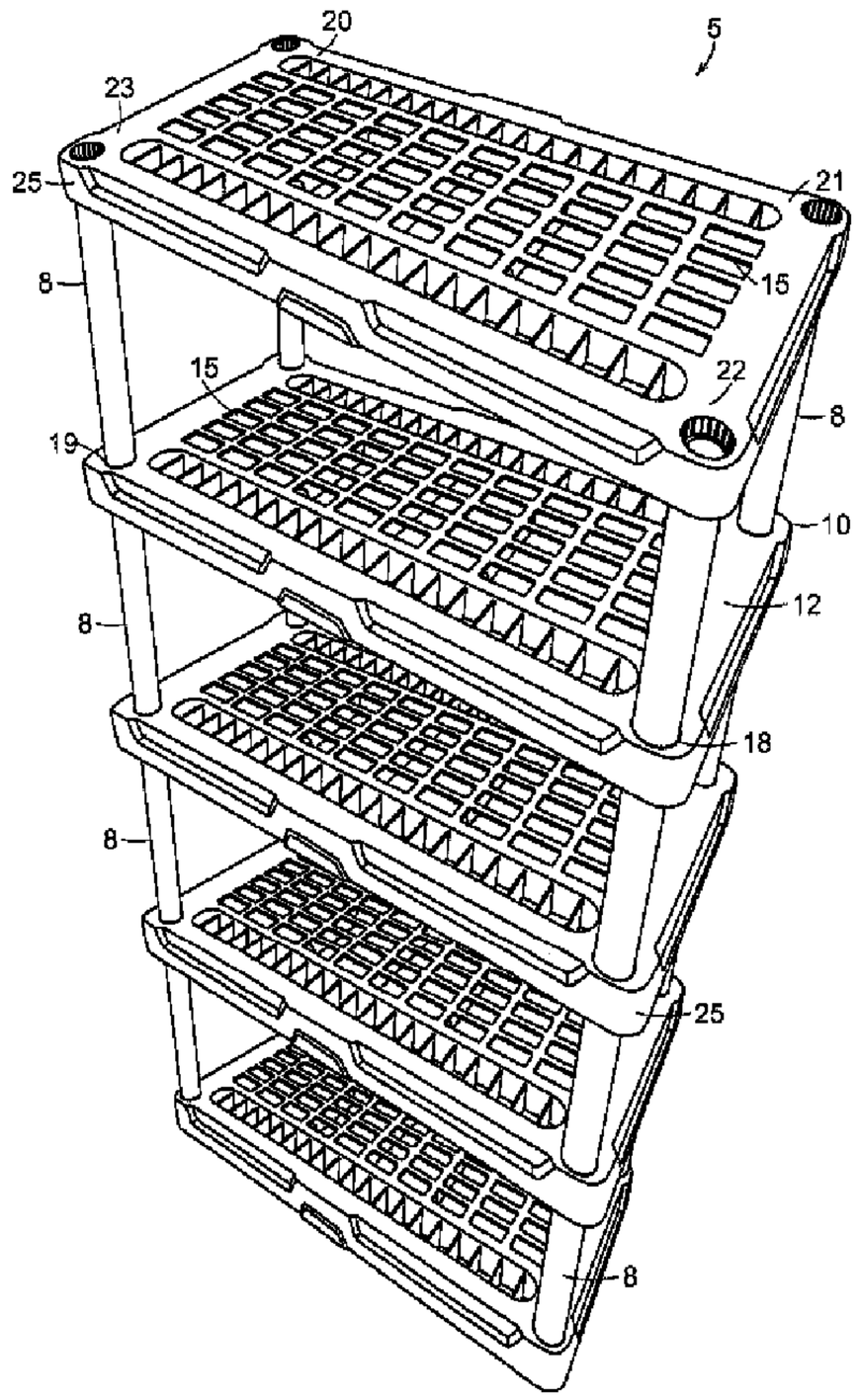
(54) **Titre : SYSTEME DE TABLETTES AMELIORE ET POTEAU DE SOUTIEN AMELIORE POUR CELUI-CI**
(54) **Title: IMPROVED SHELVING SYSTEM AND IMPROVED SUPPORT POST FOR SAME**



(57) **Abrégé/Abstract:**
Improved support posts are disclosed for shelving systems comprising one or more shelves spaced and supported by the support posts. Improved shelving systems comprising such support posts also are disclosed. The disclosed support posts have strengthening ribs extending longitudinally along their inside surface. The improved support posts and shelving systems incorporating the improved support posts have greater strength and rigidity with little added cost or weight of material.

ABSTRACT

Improved support posts are disclosed for shelving systems comprising one or more shelves spaced and supported by the support posts. Improved shelving systems comprising such support posts also are disclosed. The disclosed support posts have strengthening ribs extending longitudinally along their inside surface. The improved support posts and shelving systems incorporating the improved support posts have greater strength and rigidity with little added cost or weight of material.

IMPROVED SHELVING SYSTEM AND IMPROVED SUPPORT POST FOR SAME

BACKGROUND OF THE INVENTION

[01] The present invention relates to improved shelving systems and to improved support posts for such shelving systems.

[02] There is a need for affordable shelving, such as shelving systems that provide good aesthetics, flexibility of use, and good functionality. Some shelving systems require significant assembly, which consumers may not want to or may not be able to undertake. Many consumers, for example, do not have tools or aptitude to assemble wall-mounted shelves.

[03] Freestanding shelving systems are known that can be assembled by hand. Such shelving systems have multiple shelving panels with sockets to receive tubular support posts, typically two to six rectangular shelving panels each having four sockets integrally formed in the corners of the panels. Each successive panel is mounted above the one below by inserting the bottom end of four support posts into the four sockets of the shelf below and the top end of the four posts into the four sockets of the shelf above.

[04] It would be desirable to have shelving systems that are structurally robust and yet that can be packaged compactly for more efficient shipping and storage.

SUMMARY OF THE INVENTION

[05] As best appreciated with reference to the following disclosure and the description of certain embodiments, including the discussion of the particular embodiments shown in the appended drawings, the invention here provides improved support posts for a shelving system as well as shelving systems incorporating such improved support posts.

Optionally, all of the support posts used in a shelving system in accordance with certain embodiments are identical. In general, the shelving systems may have any number and shape of shelves, for example two shelves, three shelves, four shelves or more, and a corresponding number of support posts. For example, for shelving systems wherein each shelf is spaced from the next adjacent shelf by a set of four support posts at the corner areas of the shelves, a 4-shelf shelving assembly will have 12 support posts. It will be appreciated from the following that shelving systems comprising the improved support posts disclosed and discussed have a strength and rigidity improvement with little added cost or weight of material.

[06] In one aspect a shelving assembly is disclosed, comprising multiple shelves and multiple support posts supporting and spacing the shelves from each other. Each of at least some of the shelves has a plurality of sockets, each socket receiving an end of a corresponding one of the support posts. In at least certain embodiments the configuration of the post-receiving sockets corresponds to the cross-sectional configuration of the support posts they receive. Each of at least some of the support posts is an improved support post comprising a tubular post with an outside surface, an inside surface, and multiple, circumferentially spaced, strengthening ribs extending longitudinally along the inside surface of the post. In certain embodiments the shelving assembly, all of the support posts are tubular posts with an outside surface, an inside surface, and multiple, circumferentially spaced, strengthening ribs extending longitudinally along the inside surface of the post.

[07] In certain embodiments of the shelving assemblies disclosed here, the cross-sectional size and shape of each of the improved support posts is uniform along its entire length. The the outside surface of each of the tubular posts optionally is smooth and uniformly circular in cross-sectional shape. Alternatively, the improved support posts may be squaring cross-section or have other suitable configuration. In accordance with certain embodiments, each support post is a unitary (i.e., one piece) extruded plastic tube. The extruded plastic tubes can be produced by cutting desired lengths as the tube is extruded. Suitable plastics for forming the support posts will be apparent to those skilled in the art

given the benefit of this disclosure. Exemplary suitable plastics release some applications of the support post disclosed here include polyethylene, polypropylene etc.

[08] In certain embodiments the strengthening ribs of the improved support posts post extend radially toward the centerline of the post a distance less than the circumferential dimension of the strengthening rib. Alternatively, the strengthening ribs may have a greater radial dimension. Optionally, all of the strengthening ribs of the tubular post may have the same size and configuration and be spaced uniformly around the circumference of the inside surface of the tubular post. In the certain embodiments of the shelving assembly is disclosed here, all of the tubular posts incorporated into the shelving assembly have the same size and shape. Thus, the support posts are interchangeable with each other during assembly.

[09] In accordance with a second aspect, improved support posts as described above are provided for supporting shelves in a shelving assembly comprising multiple shelves and multiple support posts. The improved support posts are tubular with an outside surface, an inside surface, and multiple, circumferentially spaced, strengthening ribs extending longitudinally along the inside surface of the post. In certain embodiments the strengthening ribs extend along the entire length of the support post, e.g., the strengthening ribs extend with a uniform size and shape along the entire length the inside surface of the support post. Optionally, all of the strengthening ribs of a support post in accordance with this disclosure post have the same size and configuration and are spaced uniformly around the circumference of the inside surface of the post. Further, in certain embodiments the cross-sectional size and shape of the support posts are in all respects uniform along the entire length of the support post. For example, the outside surface of the tubular posts may be smooth and uniformly circular in cross-sectional shape. As disclosed above, in certain embodiments each of the strengthening ribs of the support post extends radially toward the centerline of the tubular post a distance less than the circumferential dimension of the strengthening rib, and in other embodiments the strengthening rib may have a larger radio dimension than its circumferential dimension.

[10] An improved support post in accordance with this disclosure may have any suitable number of longitudinally (i.e., axially) extending strengthening ribs. For example, in

certain embodiments the support posts have three strengthening ribs. In other exemplary embodiments the support posts may have four or more strengthening ribs, for example, six to twenty strengthening ribs, e.g., eight, nine or ten strengthening ribs. The particular number, size and configuration of strengthening ribs for an improved support post in accordance with this disclosure will depend, in part, on the material selected for making the support posts, in part on the requirements of the particular application in which the shelving assembly is to be used. It will be within the ability of those skilled in the art, given the benefit of this disclosure, to select a suitable number and configuration of strengthening ribs to achieve improved strength and rigidity consistent with or at least in acceptable compromise with other applicable criteria and factors.

[11] Those skilled in the art of shelving systems will appreciate from this disclosure that there are numerous different embodiments of the shelves and shelving systems of the present invention providing greater efficiency in packaging, shipping and storage, including, for example, various injection molded embodiments providing advantages such as interchangeable and interconnectable components configured for quick and fastener-less assembly, and optionally also configured for adjustability, aesthetics, flexibility of use, and functionality.

BRIEF DESCRIPTION OF THE DRAWINGS

[12] A more complete understanding of the present disclosure and the advantages thereof may be acquired by referring to the following description in consideration of the accompanying drawings, in which like reference numbers indicate like features, and wherein:

[13] FIG. 1 is a perspective view of an assembled shelving system in accordance with the present disclosure, comprising five injection molded plastic shelves improved in

accordance with the present disclosure and corresponding support posts received in sockets of the shelves to support and space the shelves;

[14] FIG. 2 is a top view of any one of the improved shelves of the shelving system of FIG. 1;

[15] FIG. 3 is an enlarged view of one of the corner areas of a shelf of FIG. 1; and

[16] FIG. 4 is an enlarged perspective view of one of the support posts of the shelving system of FIG. 1.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS OF THE INVENTION

[17] Various different examples and embodiments of the inventive subject matter disclosed here are possible and will be apparent to the person of ordinary skill in the art, given the benefit of this disclosure. In this disclosure reference to "some embodiments," "certain embodiments," "certain exemplary embodiments" and similar phrases each means that those embodiments are merely non-limiting examples of the inventive subject matter, and there are alternative embodiments which are not excluded. Unless otherwise indicated or unless otherwise clear from the context in which it is described, alternative and optional elements or features in any of the disclosed embodiments and examples are interchangeable with each other. That is, an element described in one embodiment or example should be understood to be interchangeable or substitutable for one or more corresponding but different elements in another described example or embodiment and, likewise, an optional feature of one embodiment or example may optionally also be used in other embodiments and examples. More generally, the elements and features of any disclosed example or embodiment should be understood to be disclosed generally for use with other aspects and other examples and embodiments. A reference to a component being operative or configured to perform one or more specified functions, tasks, and/or operations or the like, is intended to mean that it can perform such function(s), task(s), and/or operation(s) in at least certain embodiments, and may well be able to perform one or more other functions, tasks, and/or operations. While this disclosure mentions specific examples and embodiments, those skilled in the art will appreciate that there are

numerous variations and modifications within the scope of the invention as set forth in the appended claims. Each word and phrase used in the claims is intended to include all its dictionary meanings consistent with its usage in this disclosure and/or with its technical and industry usage in any relevant technology area. Indefinite articles, such as "a," and "an" and the definite article "the" and other such words and phrases are used in the claims in the usual and traditional way in patents, to mean "at least one" or "one or more." The word "comprising" is used in the claims to have its traditional, open-ended meaning, that is, to mean that the product or process defined by the claim may optionally also have additional features, elements, etc. beyond those expressly recited in the claim. The phrase "consisting essentially of" is used to signal that the product or process defined necessarily includes the listed components and is open to unlisted components that do not materially affect the basic and novel properties of the invention.

[18] As used here and in the accompanying claims, directional terms used in describing the shelves and shelving units disclosed here should be understood to have their ordinary meaning with reference to gravity, including, e.g., up, down, over, under, etc. Accordingly, for example, an up-down direction is vertical as that term is commonly used. It should be further understood, however, that directional or positional references to portions of a shelf or shelving system disclosed here refer to the orientation of the shelf or shelving system in ordinary use. Thus, the underside of a shelf is the side normally facing down when the shelf is assembled in a shelving unit in its intended or ordinary configuration. In keeping with that understanding, the primary shelf surface is the upper surface of a shelf as assembled in a shelving unit, i.e., the surface on which items would ordinarily be placed for storage or display on the shelf. The primary shelf surface may be rough or smooth or may have areas of each. It may be continuous or discontinuous, ribbed, waffled, etc. It may optionally have one or more drain holes, have a grate-like configuration or be otherwise perforate. For example, it may have through-holes, i.e. holes that extend entirely through the shelf. Such holes may, for example, be positioned between the elongate elements. Optionally, the primary shelf surface may have recesses or common cavities, such as troughs or pockets.

[19] The shelf underside is below the primary shelf surface and, again, "below" should be understood to refer to the surface that faces downwardly in the gravitational sense as the shelf would typically be oriented in an assembled shelving system. For convenience, the shelf underside is referred to as such even when describing the shelf as part of a shelving system that is not assembled but rather packaged for storage or shipment, notwithstanding that the packaged shelving system may be stacked in any position or orientation. It should be understood that the shelf underside may have an irregular configuration. The elongate elements discussed above and other features of the shelf underside may have any suitable configuration, for example, the form of flanges, support or strengthening rails, fins, etc. Further, the shelf underside may have perforations, hooks, pockets, and other formations.

[20] In certain embodiments of the shelving assemblies disclosed here, the shelves comprise a primary shelf surface, a shelf underside below the primary shelf surface, sockets configured to receive an end of a support post for mounting and spacing the shelves when the shelving system is assembled. The number and location of the sockets will be determined primarily by the design and intended use of the shelving assembly. In certain embodiments the shelves all are generally rectangular with a socket located at each of the four corner areas. The term "corner area" is used here broadly in line with the discussion above regarding the breadth of terms of position and orientation. Thus, a socket located at a corner area is not necessarily at the extreme outer edge of the primary shelf surface, more precisely at the juncture of two sides of the shelf.

[21] It will be within the ability of those skilled in the art to make the shelving systems and improved support post in accordance with the present disclosure. Suitable manufacturing techniques include, for example, injection molding of the shelves as a unitary structure, i.e., as a one-peace unit. Such injection molded embodiments can be formed of any suitable plastic material, for example, polypropylene, polyethylene, etc. Reinforced plastic can be used for greater strength and rigidity. Similarly, reaction injection molding can be used. Optionally, insert molding can be used to wholly or partly embed one or more items into the injection molded plastic shelf, for example, hooks, strengthening

members, aesthetic features, etc. The support posts can be molded, extruded or form by other suitable technique.

[22] In accordance with one aspect of the present disclosure, shelving systems are provided comprising multiple shelves and a corresponding number of support posts for assembling the shelves together into a shelving unit. In certain embodiments all of the shelves of the shelving system are identical to each other and all of the support posts are identical to each other.

[23] Referring now to the appended drawings, FIG. 1 is a perspective view of an assembled shelving system 5 accordance with the present disclosure. The shelving system of FIG. 1 has five injection molded plastic shelves. It will be understood, however, given the benefit of the present disclosure, that a different embodiment of the shelving systems disclosed here may have a different number of shelves. For example, a multi-shelf shelving system in accordance with the present disclosure could have two or more of the illustrated shelves, e.g. four or six such shelves, together with a corresponding number of support posts. In the illustrated embodiment, all five shelves are identical, and for convenience the reference numbers used in the drawings for the various features of the shelves are not repeated for every shelf and post. Rather, only one or a few of the shelves and posts are labeled. Those skilled in the art will understand that the identical features all the shelves could be correspondingly labeled. The shelving system further comprises corresponding support posts 8 received in sockets 16-19 of the shelves to support and space the shelves in the assembly.

[24] The illustrated shelf 10 is a one piece injection molded plastic unit and, as best seen in FIGS. 2-4, is generally planar, having a primary shelf surface 12 and a shelf underside 14 which is below the primary shelf surface 12 in the assembled shelving unit. The primary shelf surface is perforate, with rows of through holes 15 extending through the shelf. The above-mentioned plurality of sockets 16-19 at the corner areas 20-23 of the shelf are seen to have a round cross-section in order to receive the end of tubular support posts 8 of correspondingly round cross-sectional configuration and size. It can be seen that the inner wall of the sockets in the illustrated embodiment each has a plurality of vertically running ribs or ridges 24 extending from the lower edge to the upper edge. The ribs are

evenly spaced circumferentially around the inner wall of the sockets. Advantageously, such ridges can help to tightly receive the end of the support post inserted into the socket. Alternatively, the sockets may be smooth walled. The exterior surface of the support posts at the entrance of the support posts received by the sockets may be smooth or ribbed. In the illustrated embodiment, the outside surface of the support posts are uniformly round in cross-section and smooth. The shelf has a perimeter skirt 25 which also adds strength and rigidity to the shelf as well as an aesthetic value.

[25] The shelf underside 14 is seen to have a pair of rails 30, 32 which are parallel to and spaced from each other. The rails add strength and rigidity to the shelf. In alternative embodiments more or fewer rails may be used and they may be differently positioned or oriented. In the illustrated embodiment the rails have a curved lower surface. Alternatively, in other embodiments such strengthening rails may be flat bottomed or oppositely curved. The strengthening rails 30, 32 each provides a series of storage pockets 34 in the primary shelf surface. Advantageously, each of the storage pockets has a drain hole 36.

[26] The shelf underside 14 optionally may also have longitudinal or lengthwise running ribs, for example, ribs that are parallel to each other or not and that are evenly spaced or not between the rails 30, 32. Similarly, the shelf underside may have lateral or widthwise running ribs. Again, such ribs may be parallel to each other to each other or not, evenly spaced or not. Such ribs can add strength and rigidity to the shelf. Those skilled in the art will recognize that alternative size number configuration and orientation of strengthening ribs and other strengthening elements may be used to meet the requirements of various different intended applications of the shelving units.

[27] Referring now specifically to FIG. 4, a support post 8 in accordance with one embodiment of the present disclosure is seen in a perspective end view looking down the barrel of the support post. The outside surface 61 of support post 8 is seen to have a circular cross-sectional shape. The inside surface 62 is seen to have multiple strengthening ribs 64 extending longitudinally or axially along the inside surface 62. In the illustrated embodiment strengthening ribs are configured as thicker wall sections that alternate with thinner wall sections 66. The thin sections and the thick sections of the

support post wall alternate smoothly such that the end surface 67 of the support post has a scalloped configuration. Alternatively, the strengthening ribs of the support post may be more sharply configured, for example, as a square or rectangular cross-sectional protrusion from the inside surface 62, in which case the end surface 67 of the support post 8 may have a dental molding appearance. It can be seen in FIG. 4 that the strengthening ribs are uniformly spaced circumferentially around the inside surface of the support post, and they extend uniformly along the entire length of the support post.

[28] Although the subject matter has been described with reference to specific embodiments and particular features, it should be understood that the subject matter defined in the appended claims is not necessarily limited to those specific embodiments or features. Rather, the specific embodiments and features described above are disclosed as illustrative of the various aspects of the inventive subject matter.

CLAIMS:

1. A shelving assembly comprising multiple shelves and multiple support posts supporting and spacing the shelves from each other, wherein at least some of the shelves have a plurality of sockets, each socket being configured to receive an end of a corresponding one of the support posts, and wherein at least some of the posts are tubular posts with an outside surface, an inside surface, and multiple, circumferentially spaced, strengthening ribs extending longitudinally along an entire length of the inside surface of the post, wherein the posts and ribs are of unitary one-piece construction of a single piece of material.

2. The shelving assembly of claim 1, wherein each of the support posts is a tubular post with an outside surface, an inside surface, and multiple, circumferentially spaced, strengthening ribs extending longitudinally within the post along the inside surface of the post.

3. The shelving assembly of claim 1, wherein the cross-sectional size and shape of each of the tubular posts is uniform along its entire length.

4. The shelving assembly of claim 1, wherein the outside surface of each of the tubular posts is smooth and uniformly circular in cross-sectional shape.

5. The shelving assembly of claim 1, wherein each of the tubular posts comprises an extruded plastic tube.

6. The shelving assembly of claim 1, wherein each of the strengthening ribs of each tubular post extends radially toward a centerline of the tubular post a distance less than a circumferential dimension of the strengthening rib.

7. The shelving assembly of claim 1, wherein all of the strengthening ribs of each tubular post have the same size and configuration and are spaced uniformly around a circumference of the inside surface of the tubular post.

8. The shelving system of claim 1, wherein all of the tubular posts have the same size and shape.

9. A support post for supporting a shelf in a shelving assembly having multiple shelves and multiple support posts, comprising:

a tubular support post with an outside surface, an inside surface, and multiple, circumferentially spaced, strengthening ribs extending longitudinally along an entire length of the inside surface of the post, wherein the post and the ribs are of unitary one-piece construction of a single piece of material.

10. The support post for supporting a shelf in a shelving assembly in accordance with claim 9, wherein the cross-sectional size and shape of the tubular posts is uniform along its entire length.

11. The support post for supporting a shelf in a shelving assembly in accordance with claim 9, wherein the outside surface of the tubular posts is smooth and uniformly circular in cross-sectional shape.

12. The support post for supporting a shelf in a shelving assembly in accordance with claim 9, wherein the tubular posts comprises an extruded plastic tube.

13. The support post for supporting a shelf in a shelving assembly in accordance with claim 9, wherein each of the strengthening ribs of the tubular post extends radially toward a centerline of the tubular post a distance less than a circumferential dimension of the strengthening rib.

14. The support post for supporting a shelf in a shelving assembly in accordance with claim 9, wherein all of the strengthening ribs of the tubular post have the same size and configuration and are spaced uniformly around a circumference of the inside surface of the tubular post.

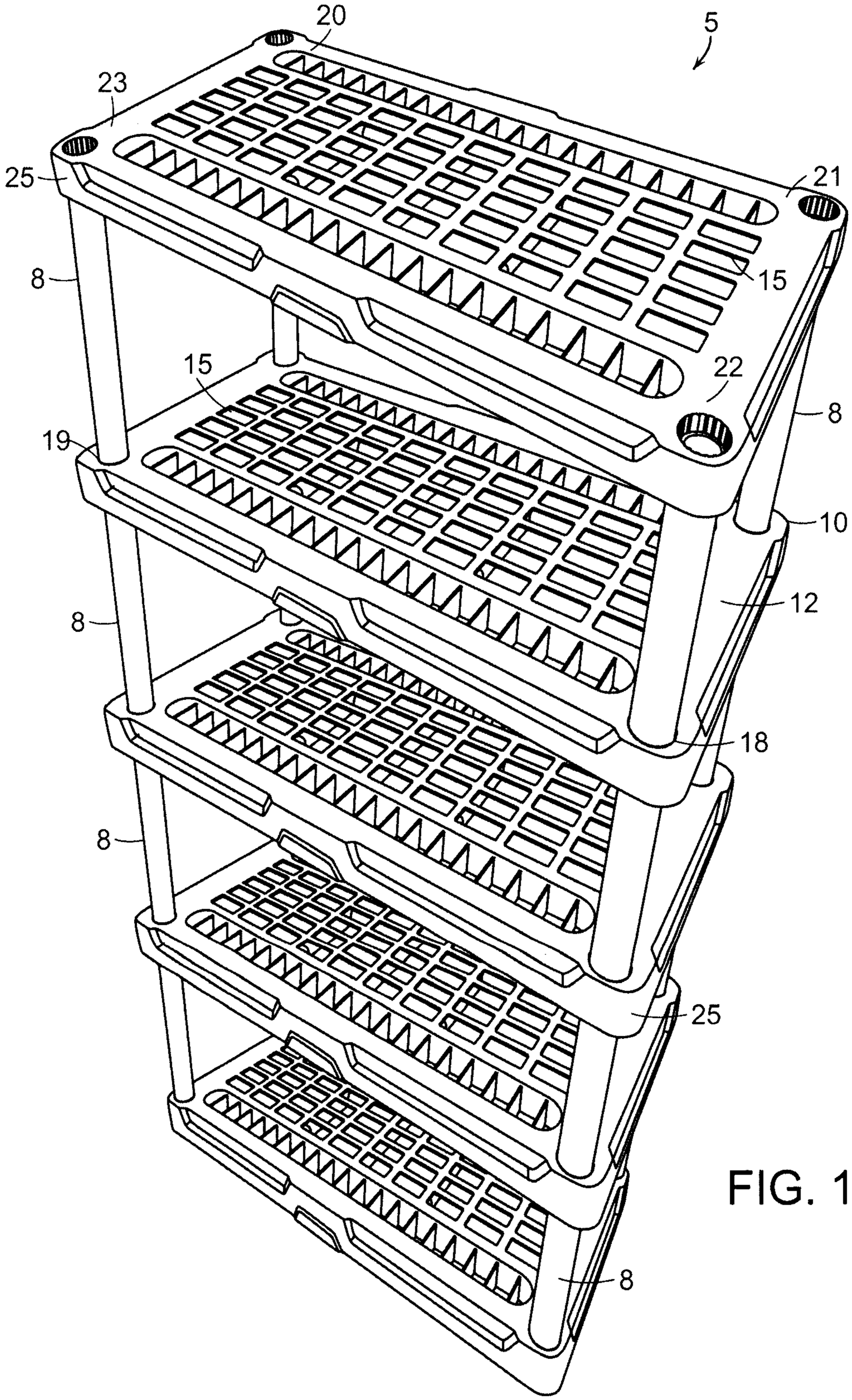


FIG. 1

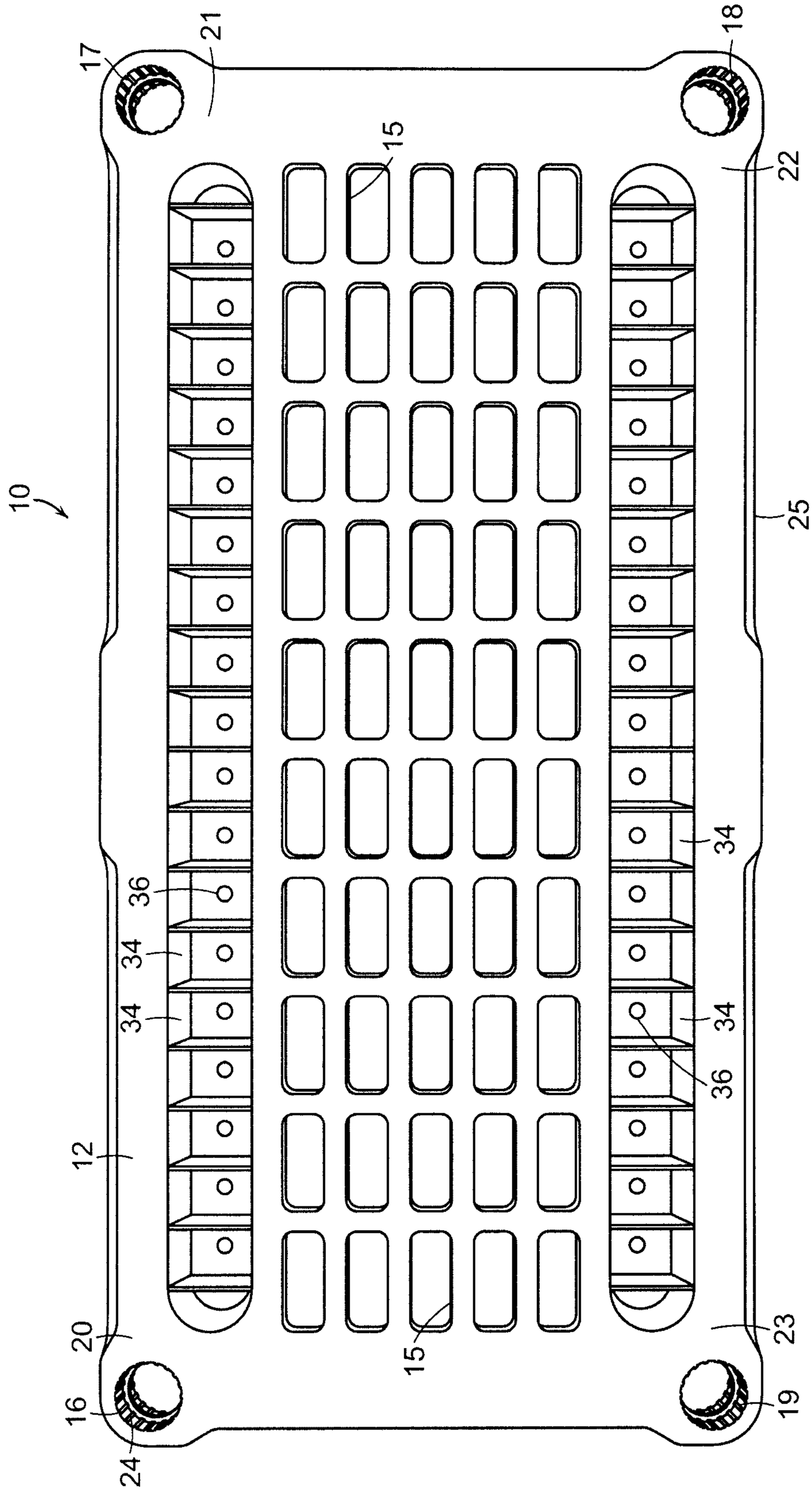


FIG. 2

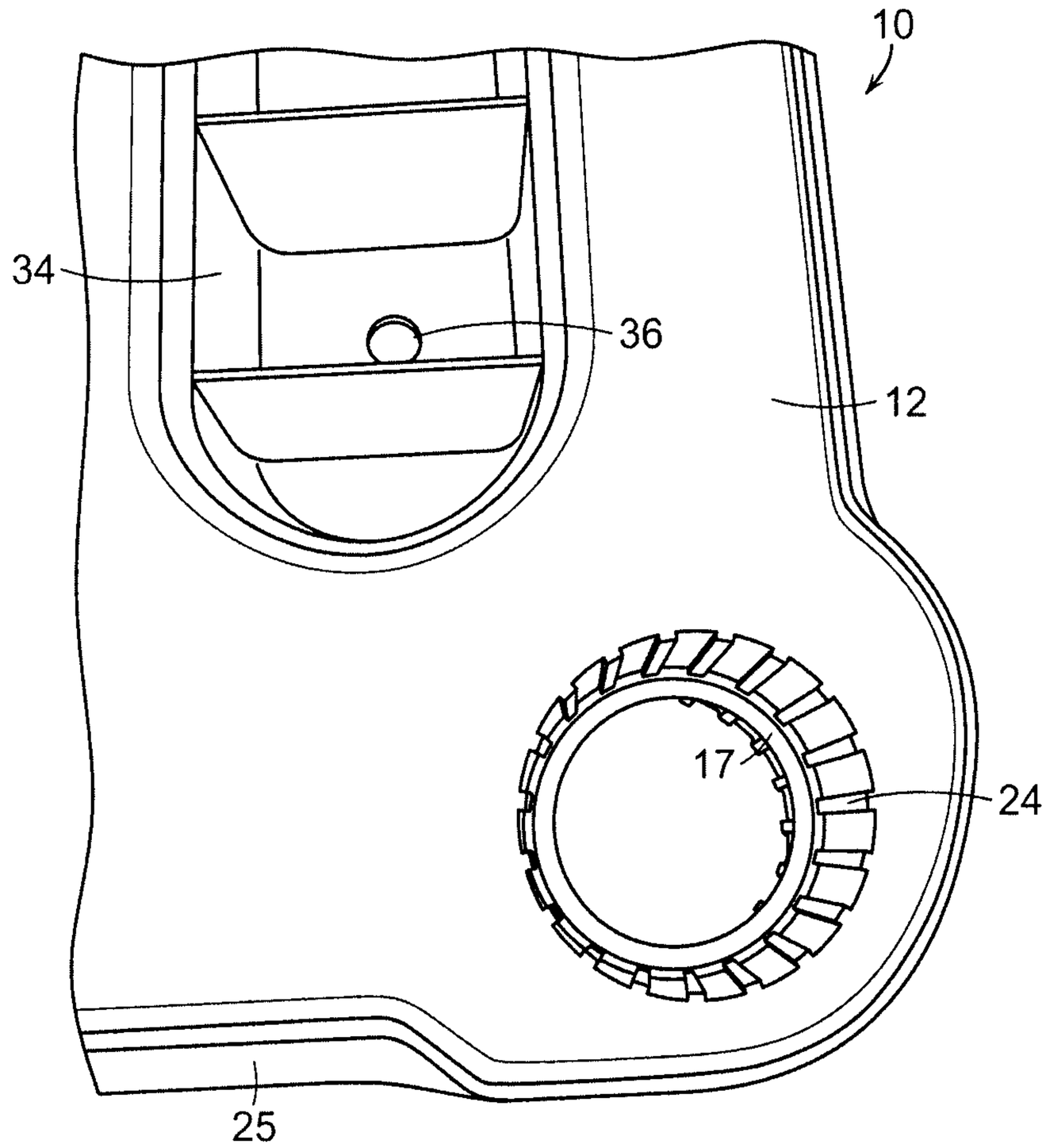


FIG. 3

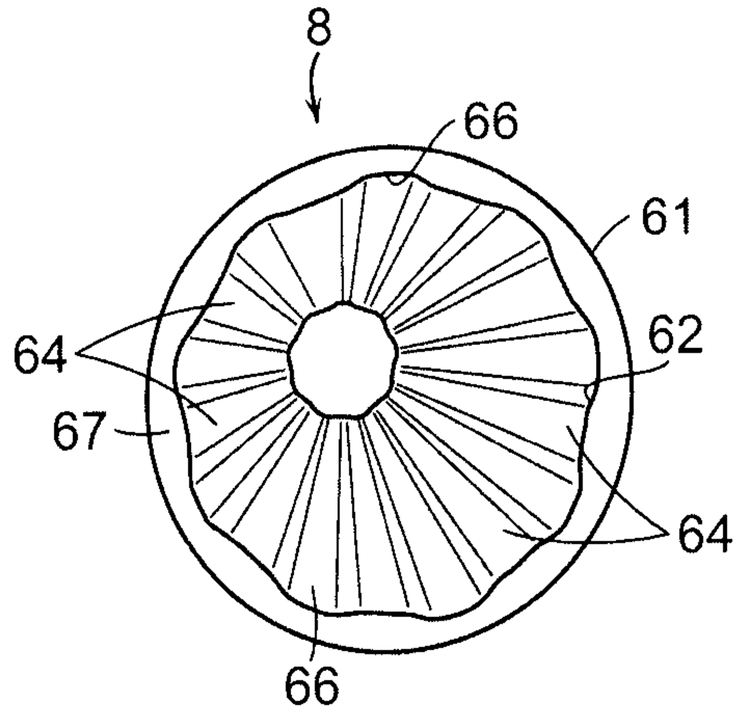
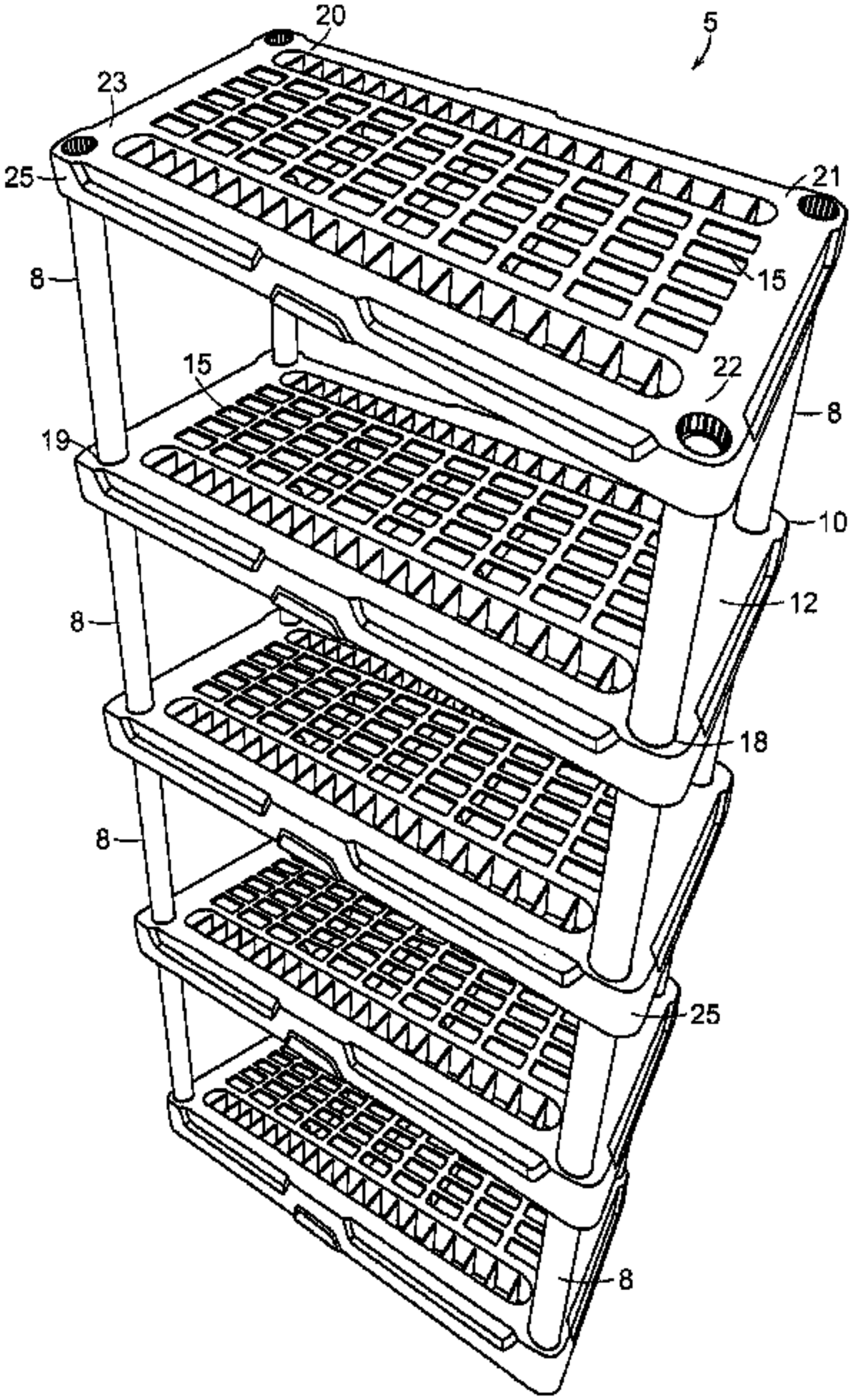


FIG. 4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