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(54) EXPANDABLE MODULAR SHELF SYSTEM

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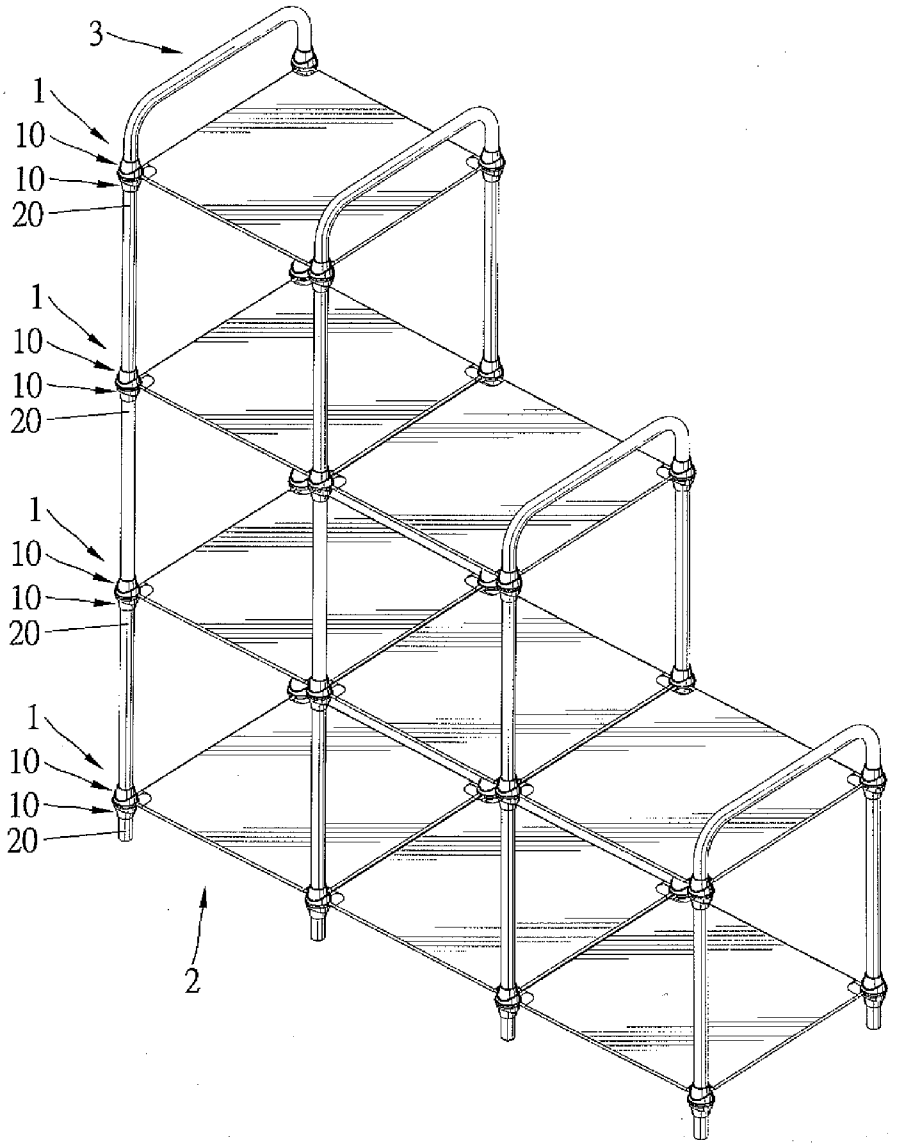
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(57) **ABSTRACT**

An expandable modular shelf system comprises at least one shelf which has a plurality of engaging portions adapted to be engaged with a plurality of joint assemblies correspondingly. Each joint assembly includes two cap members mated together to receive one engaging portion therebetween, a rod connected to one of the cap members, and a connecting member joining the two cap members and the rod in a way to retrain the cap members from detachment. The joint assembly is adapted to further receive at least one shelf, thereby increasing the number of shelves horizontally. The rod is adapted to further receive a joint assembly, whereby the number of shelves can be increased vertically.



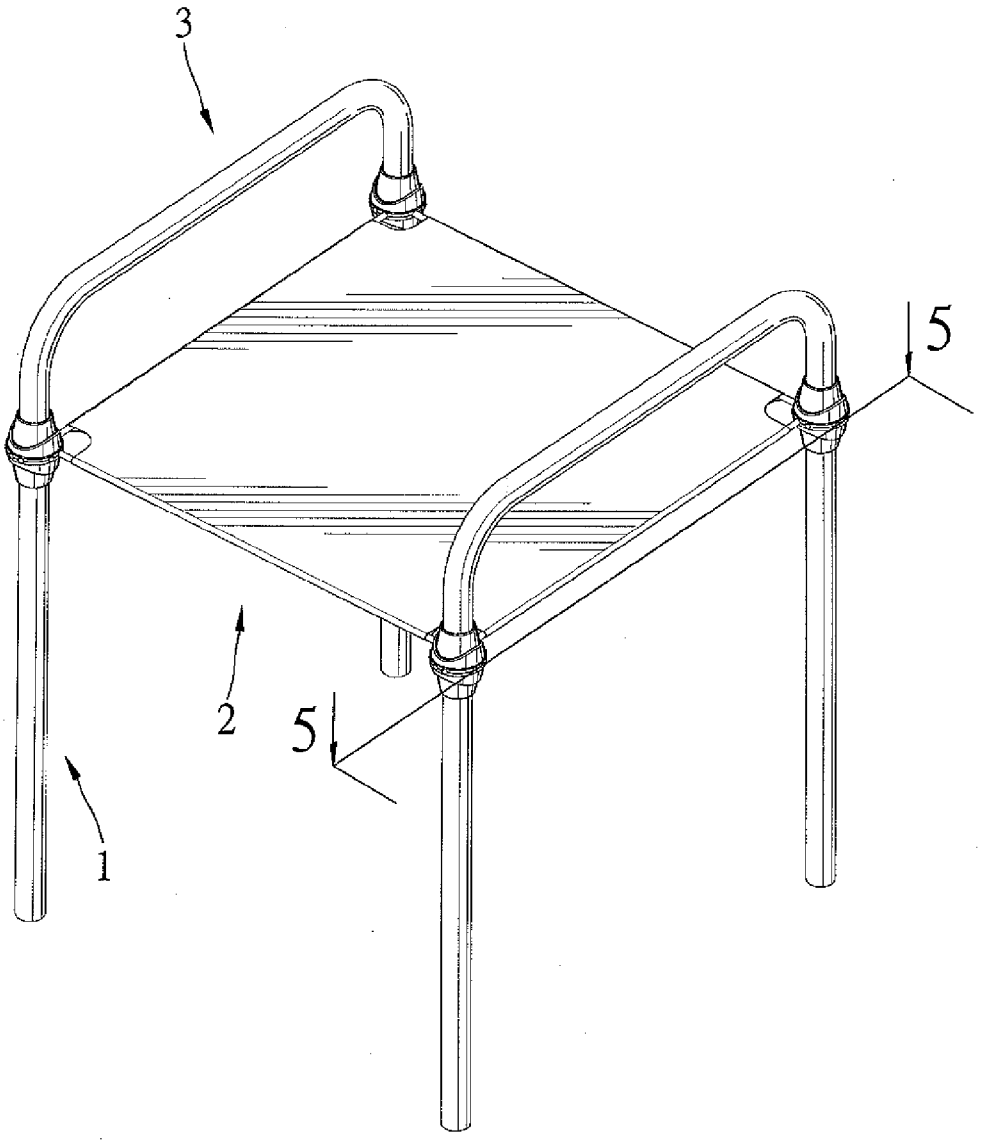


Fig. 1

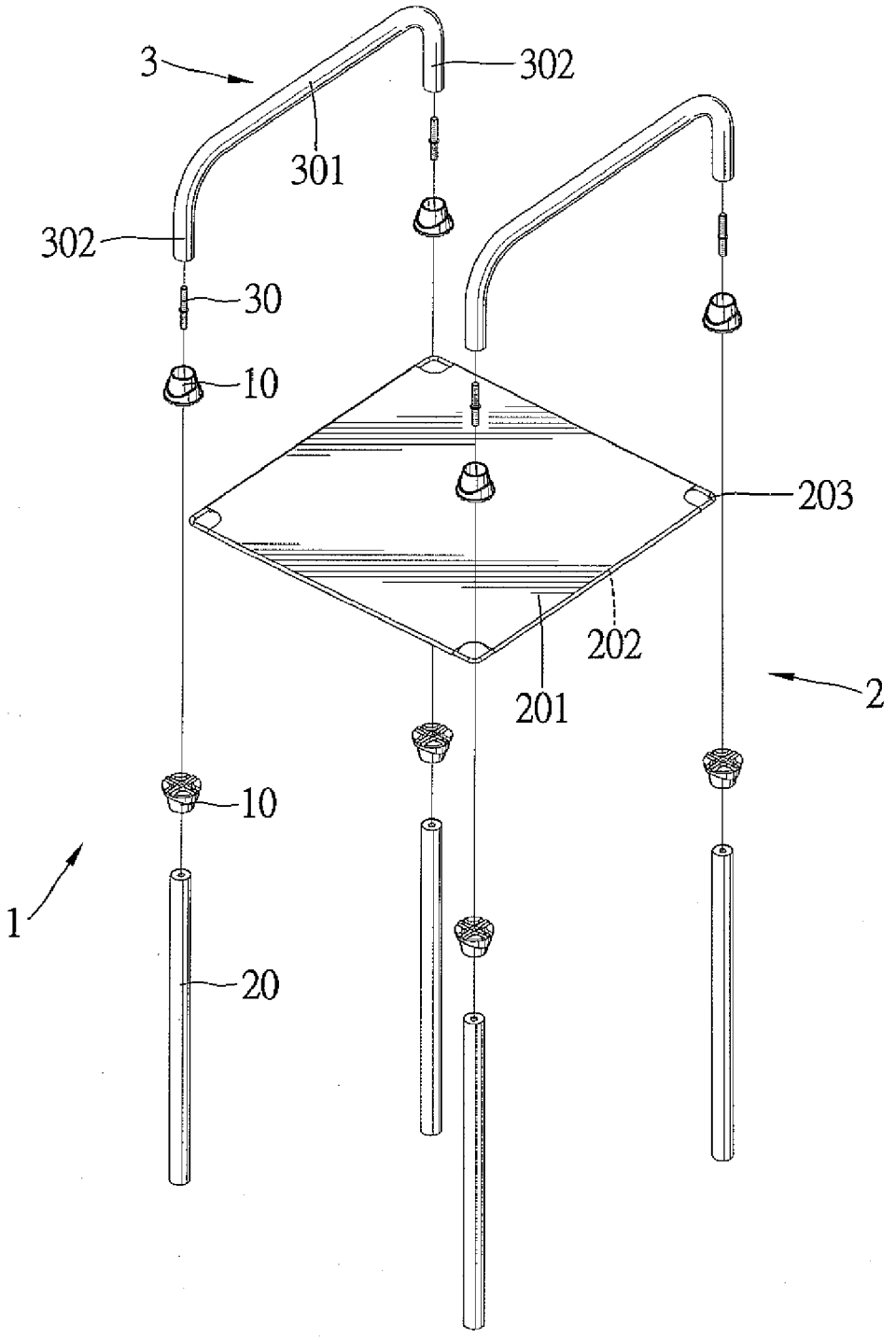


Fig. 2

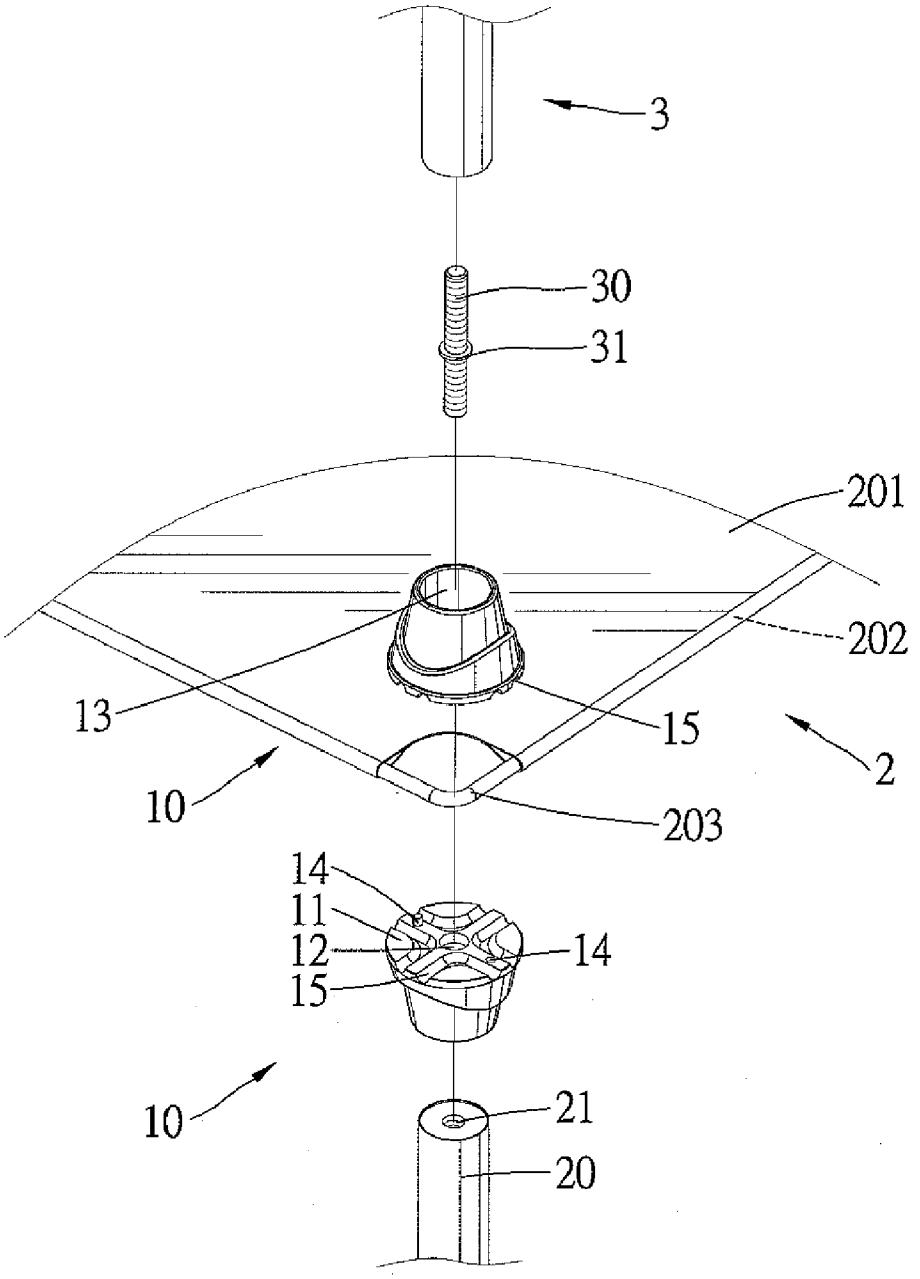


Fig. 3

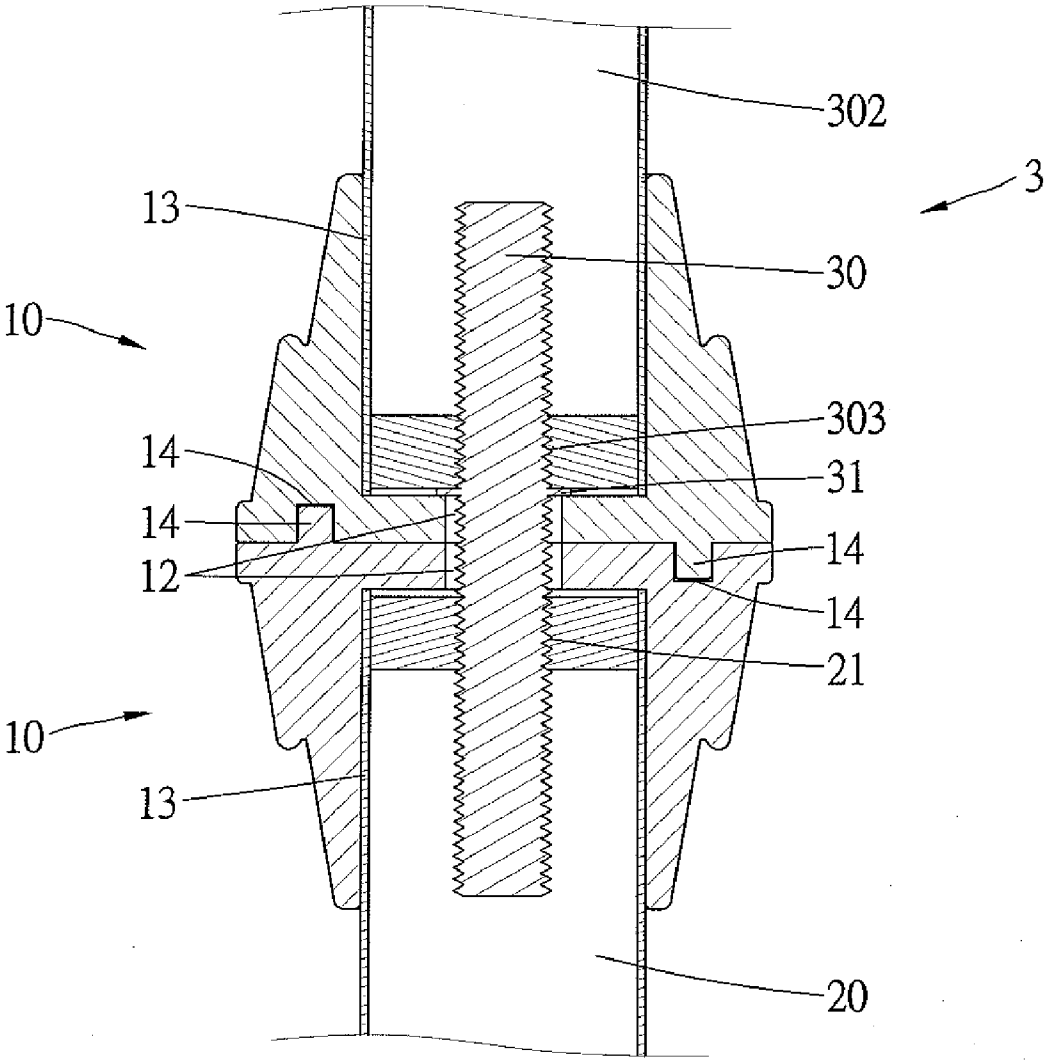


Fig. 4

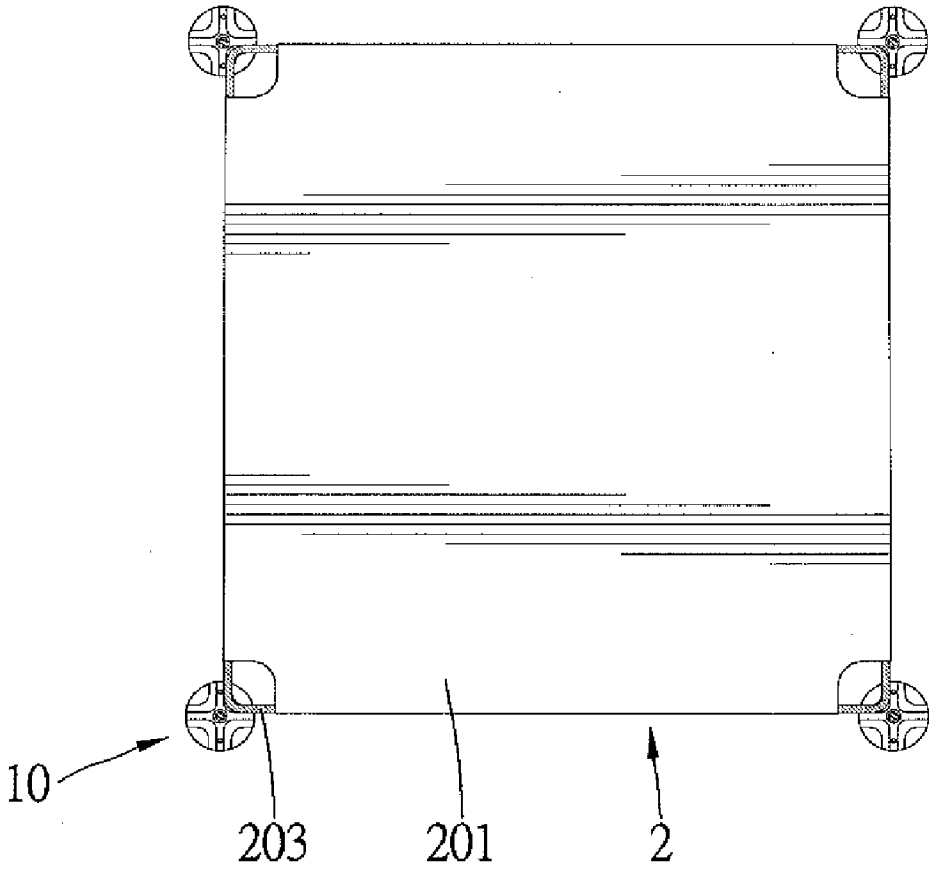


Fig. 5

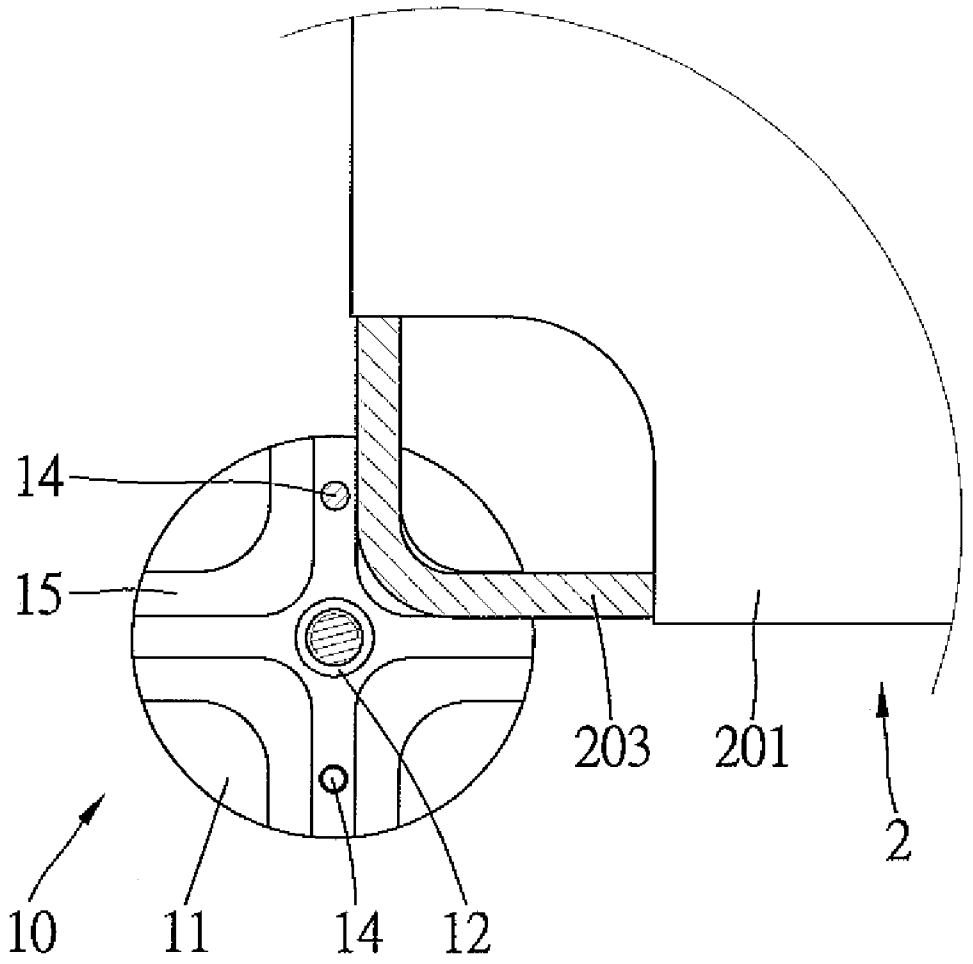


Fig. 6

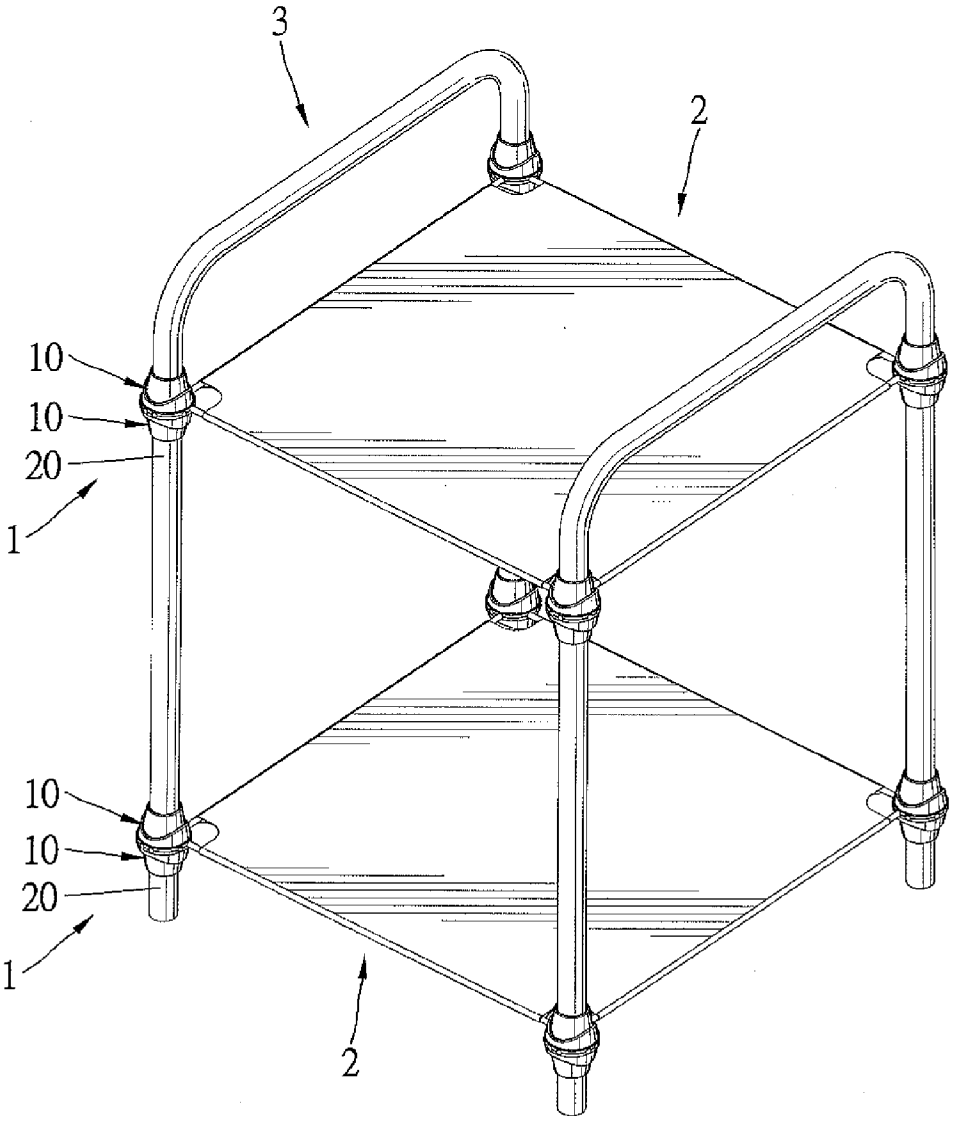


Fig. 7

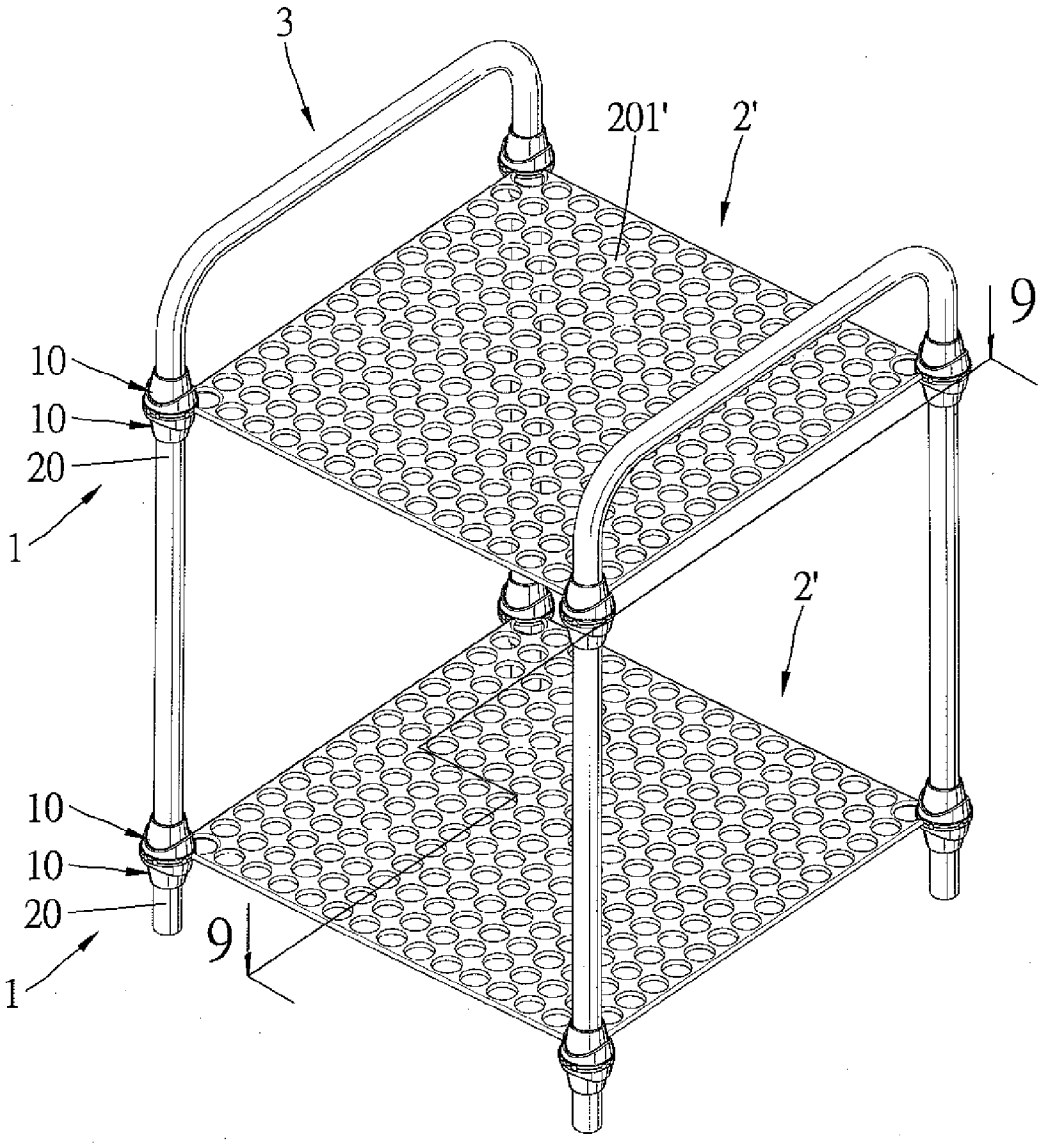


Fig. 8

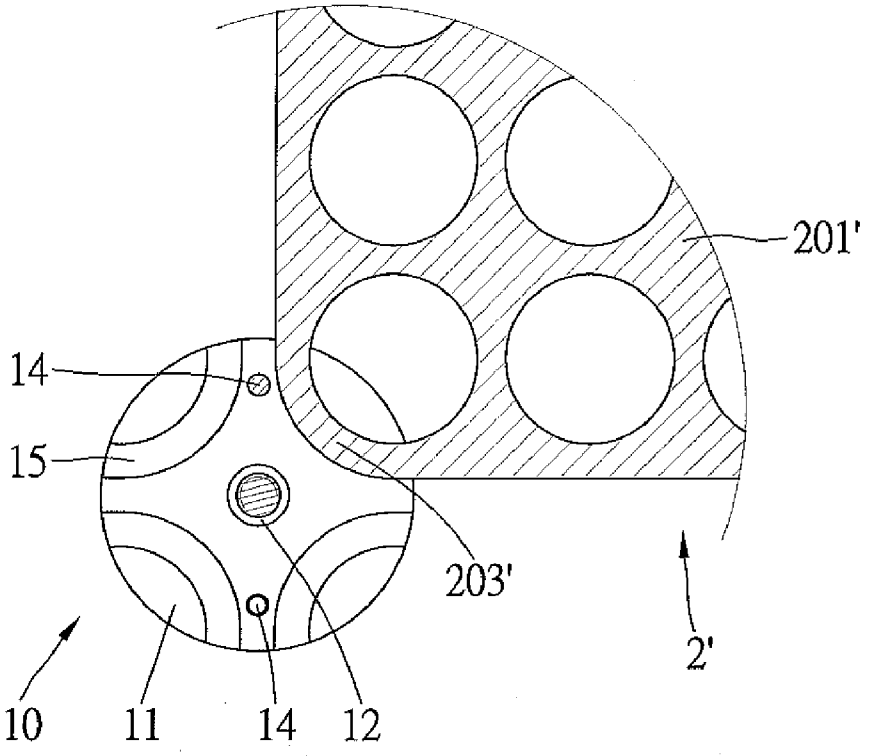


Fig. 9

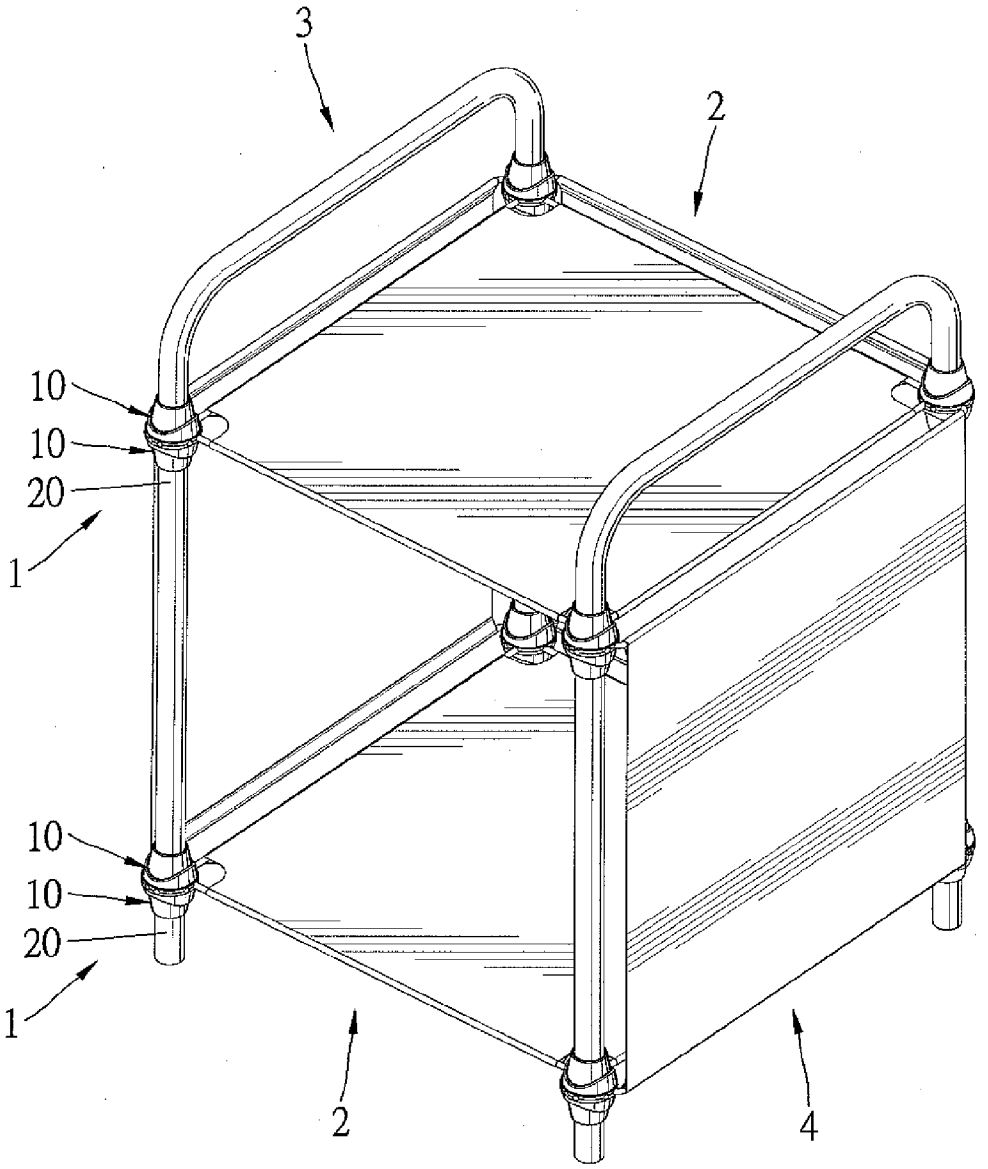


Fig. 10

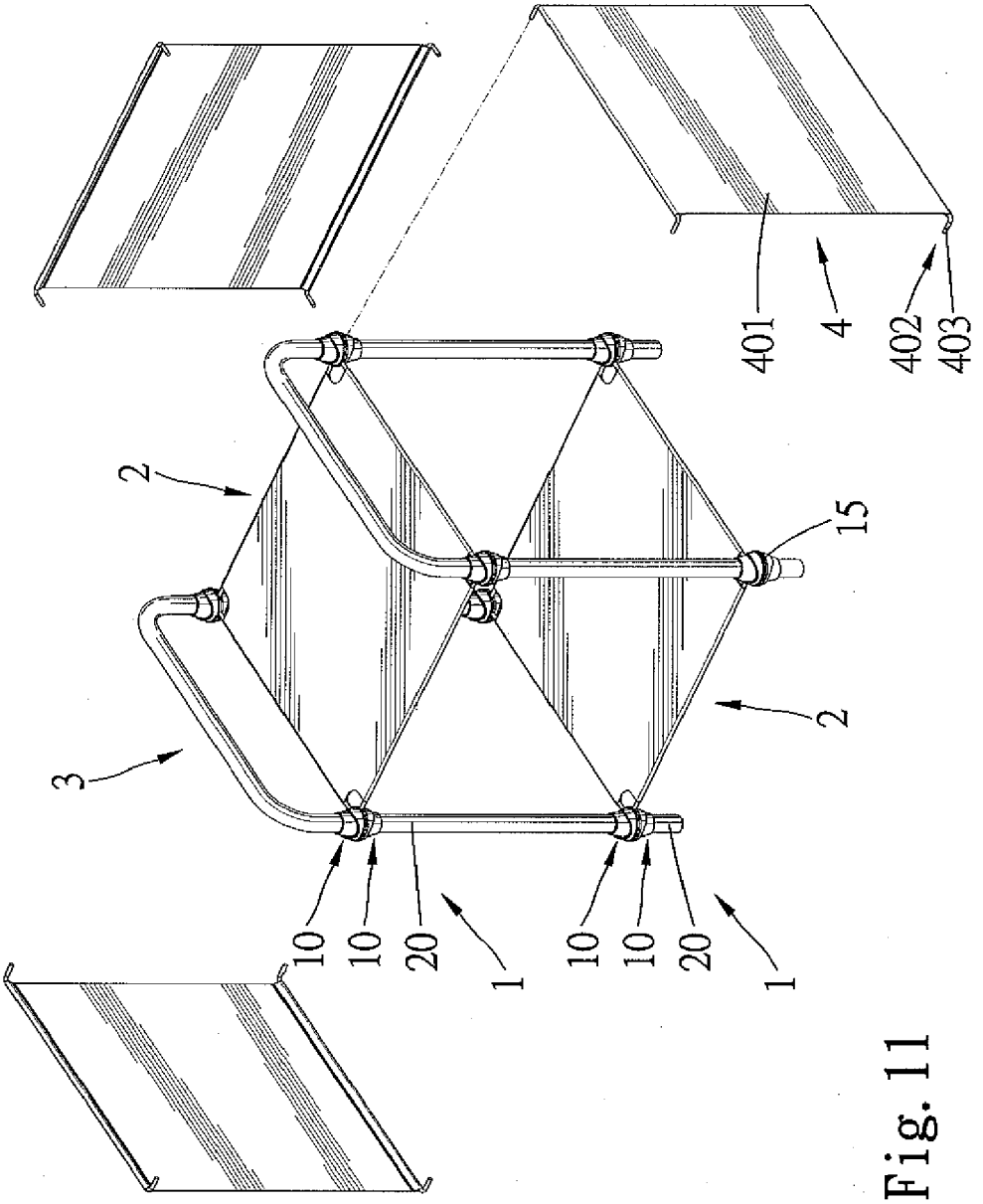


Fig. 11

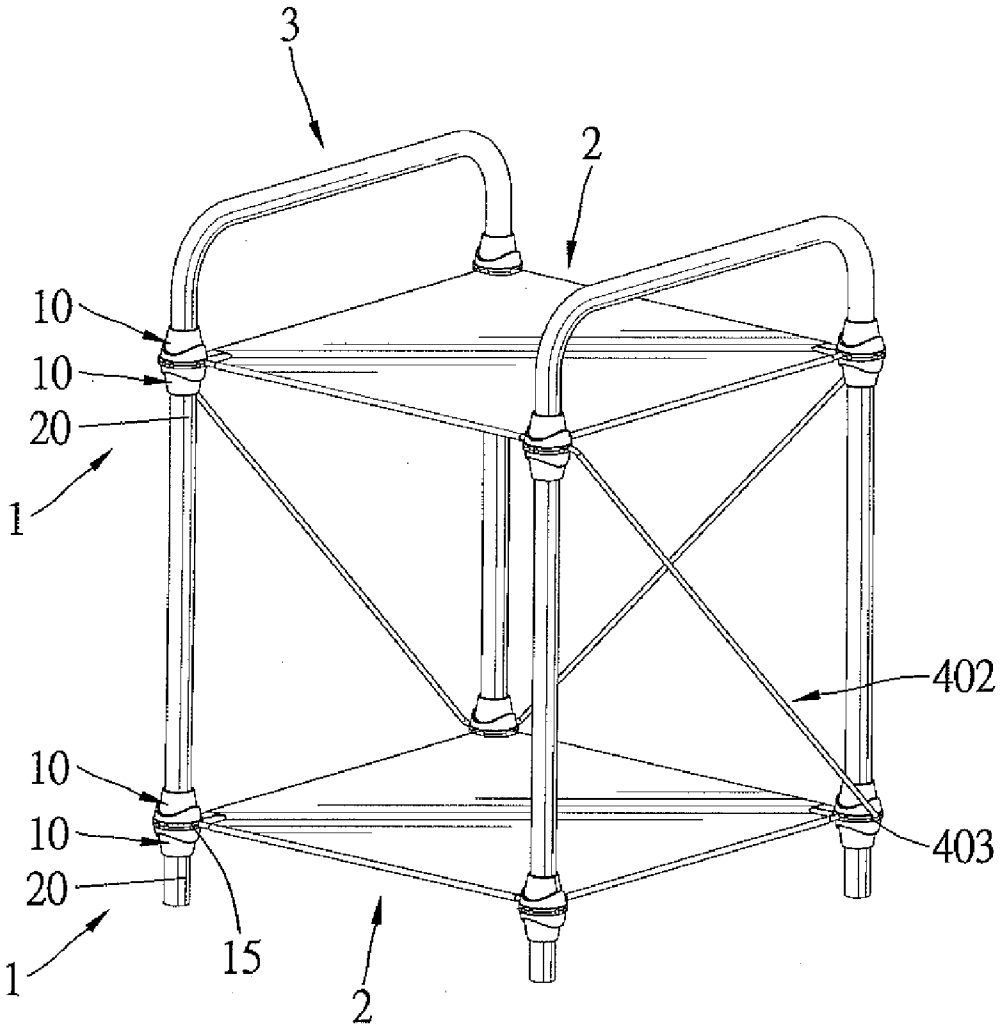


Fig. 12

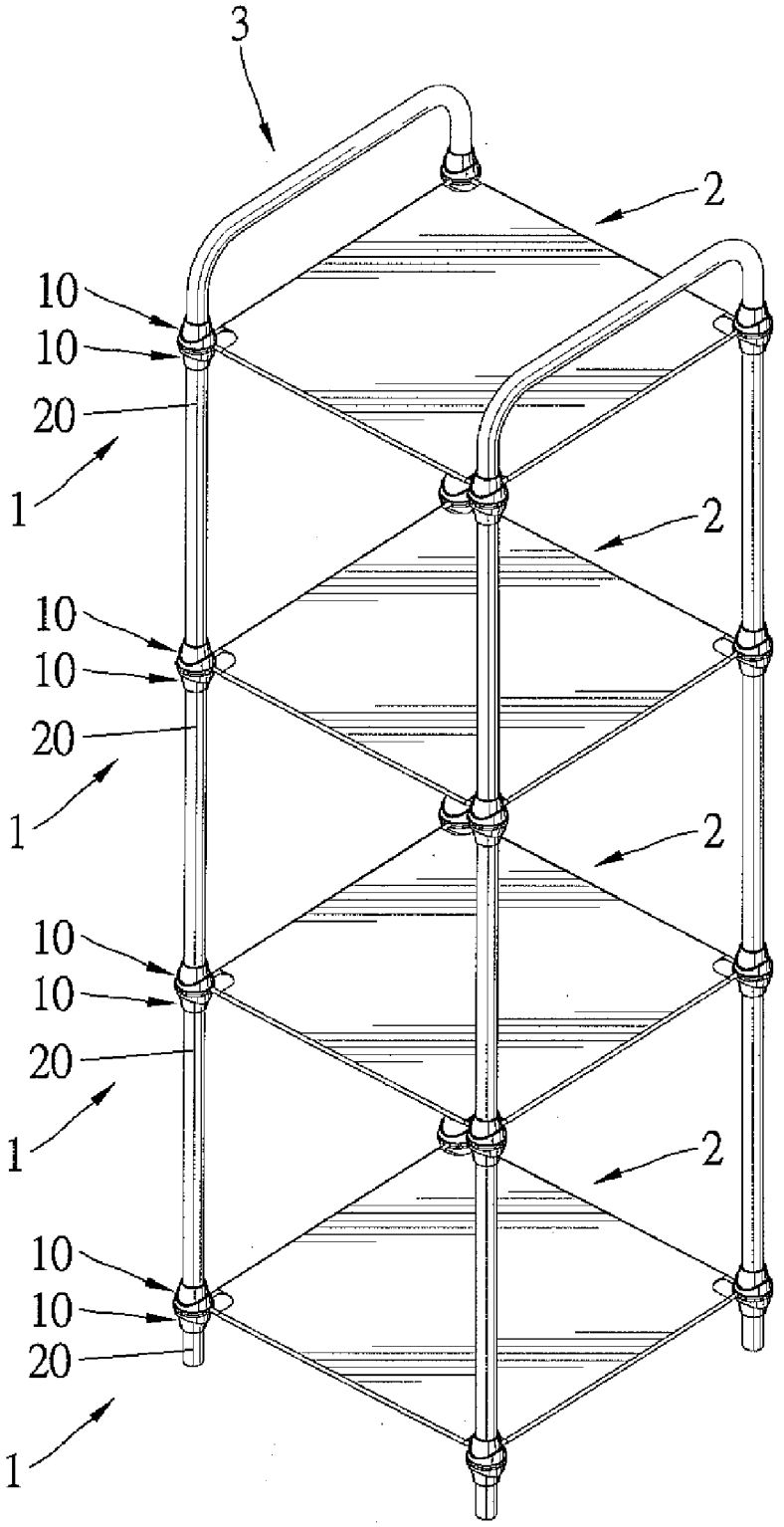


Fig. 13

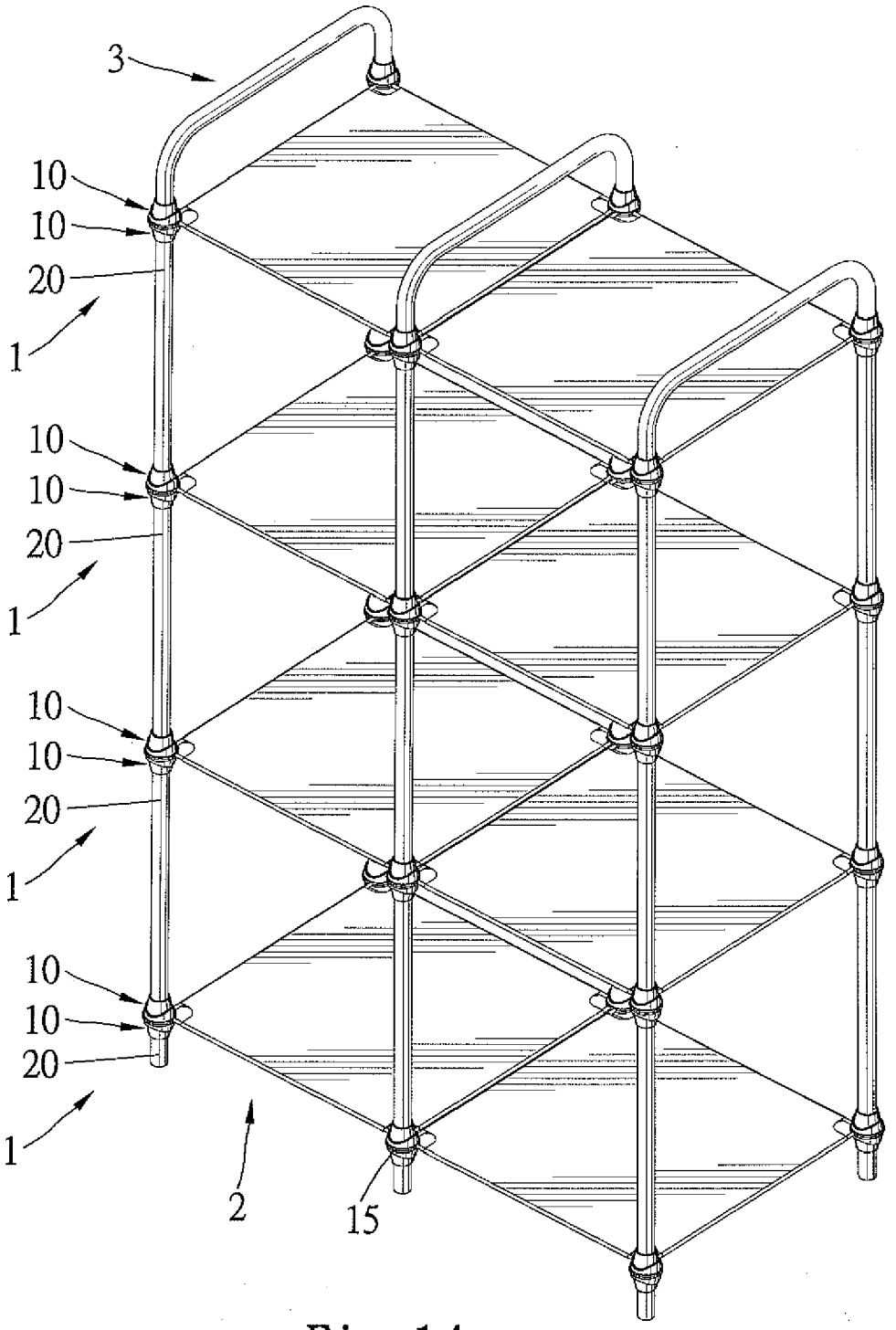


Fig. 14

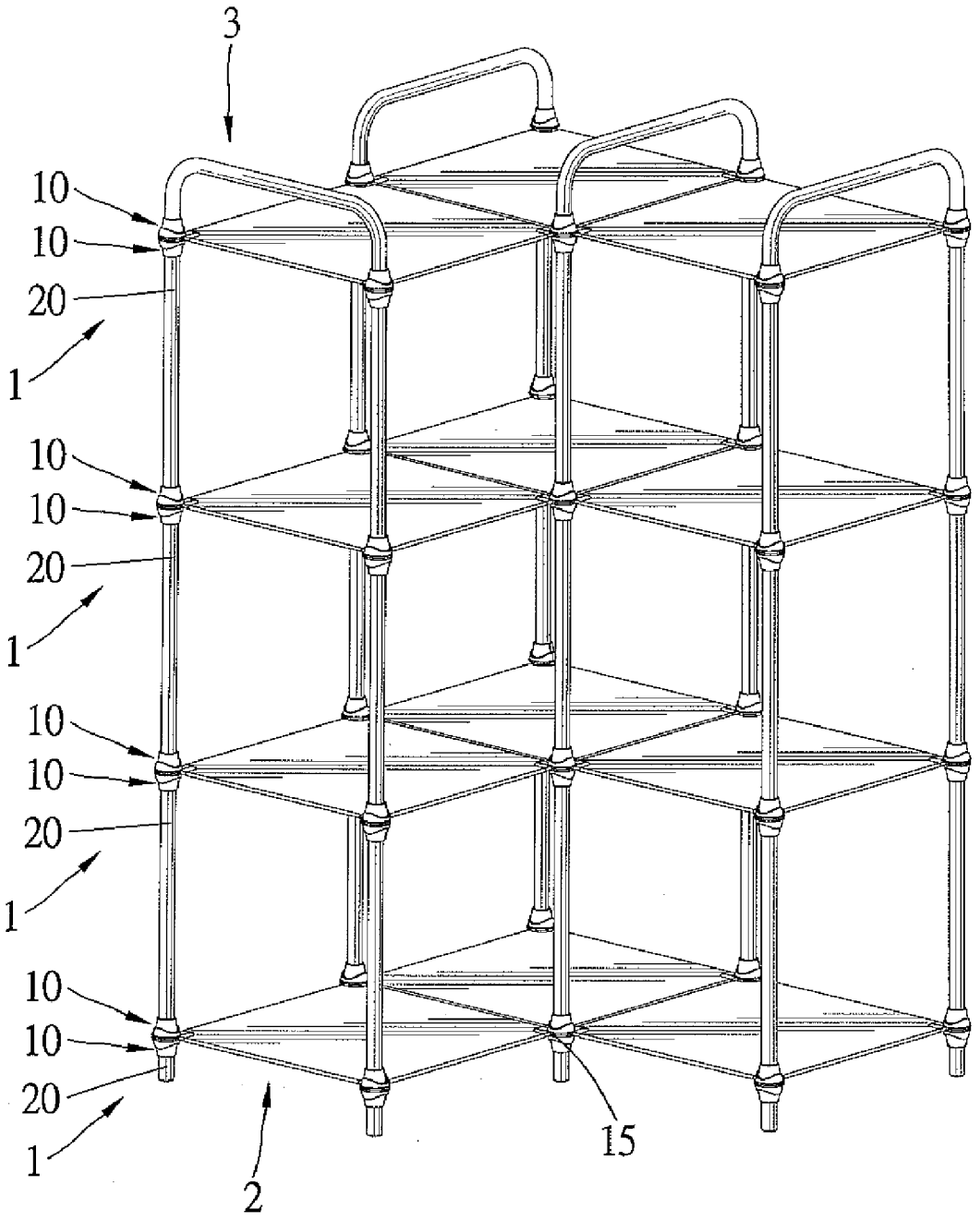


Fig. 15

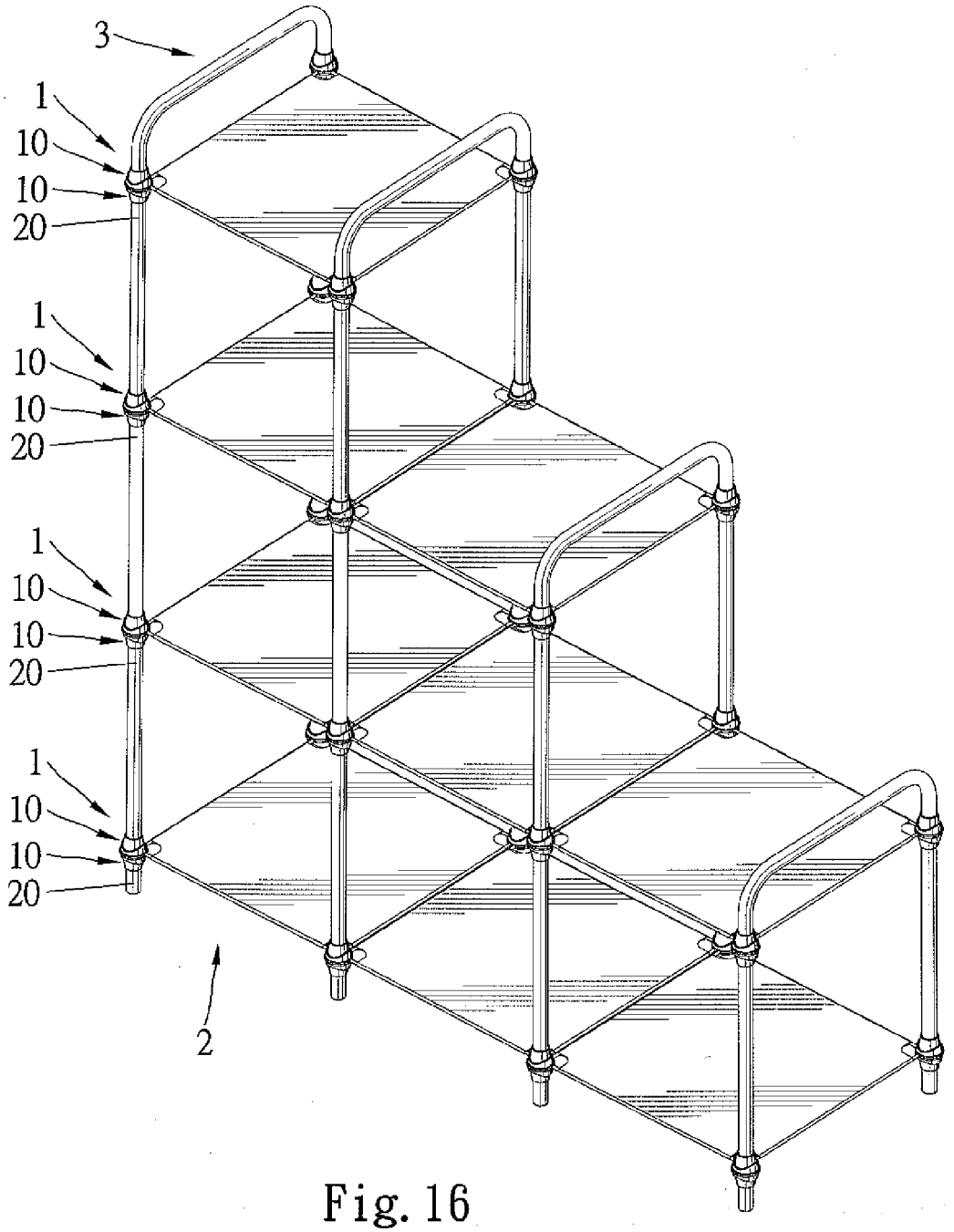


Fig. 16

EXPANDABLE MODULAR SHELF SYSTEM

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a modular shelf system, and in particular, to a modular shelf system including shelves which may be increased as the need arises and assembled without aid of hand tools.

[0003] 2. Description of the Related Art

[0004] Taiwanese Patent No. M302642 discloses a known modular shelf system including a plurality of joints and tubes. Each joint includes a plurality of engaging portions on which the plurality of tubes receive correspondingly, and each engaging portion includes two opposed arcuate plates with one of the arcuate plate having a hole formed thereof for allowing engagement of a threaded rod. The threaded rod is inserted until it touches the inner wall of opposite arcuate plate. When the tube is engaged with the engaging portion of the joint, the thread rod and two arcuate plates will ensure secure attachment therebetween.

[0005] While the modular shelf system provides a sturdy attachments between the joints and the tubes, a problem of such a system is that it requires the aid of hand tools to secure the threaded rod to the arcuate plate, which is cumbersome for a DIY assembler.

[0006] The present invention is, therefore, intended to obviate or at least alleviate the problems encountered in the prior art.

SUMMARY OF THE INVENTION

[0007] It is therefore an object of the present invention to provide an expandable modular shelf system having shelves which may be increased as the need arises.

[0008] It is another object of the present invention to provide an expandable modular shelf system which requires no aid of hand tools in assembly of the system.

[0009] It is yet another object of the present invention to provide an expandable modular shelf system which provides a sturdy structure.

[0010] Accordingly, the present invention discloses an expandable modular shelf system comprises at least one shelf which has a plurality of engaging portions adapted to be engaged with a plurality of joint assemblies correspondingly. Each joint assembly includes two cap members mated together to receive one engaging portion therebetween, a rod connected to one of the cap members, and a connecting member joining the two cap members and the rod in a way to retrain the cap members from detachment. The joint assembly is adapted to further receive at least one shelf, thereby increasing the number of shelves horizontally. The rod is adapted to further receive a joint assembly, whereby the number of shelves can be increased vertically.

[0011] Other objectives, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The aforementioned objects and advantages of the present invention will be more fully understood hereinafter as a result of a detailed description of preferred embodiments thereof, when taken in conjunction with the following drawings in which:

[0013] FIG. **1** is a perspective view of a modular storage rack in accordance with a first embodiment of the present invention.

[0014] FIG. **2** is an exploded perspective view of FIG. **1**.

[0015] FIG. **3** is a partial, enlarged view of FIG. **2**.

[0016] FIG. **4** is a partial, cross-sectional view of FIG. **2**.

[0017] FIG. **5** is a cross-sectional view taken along line **5-5** of FIG. **1**.

[0018] FIG. **6** is a partial, enlarged view of FIG. **5**.

[0019] FIG. **7** shows an alternate arrangement of a modular storage rack of the present invention.

[0020] FIG. **8** shows a modular storage rack of a second embodiment of the present invention.

[0021] FIG. **9** shows a partial, enlarged cross-sectional view taken along line **9-9** of FIG. **8**

[0022] FIG. **10** shows a modular storage rack of a third embodiment of the present invention.

[0023] FIG. **11** is an exploded perspective view of FIG. **9**.

[0024] FIG. **12** shows a modular storage rack of a fourth embodiment of the present invention.

[0025] FIGS. **13-16** show other arrangement of the modular storage rack.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0026] Referring to FIGS. **1** through **6**, an expandable modular shelf system comprises a shelf **2** having a frame **202** with four corners defining four engaging portions **203** correspondingly and a wall **201** extending between the frame **202** but leaving the engaging portions **203** exposed. It is to be understood that the wall **201** may serve as a shelving surface. A joint assembly **1** includes two cap members **10** of the same configuration joined together at namely their mating surfaces **11**. The mating surface **11** includes two connections **14** with one connection **14** formed of a stud and the other formed of a recess, and with the stud-like connection **14** of one cap member **10** is engaged in the recess-like connection **14** of another cap member **10**. The mating surface **11** further includes a plurality of grooves **15** thereon. Each groove **15** of one cap member **10** and the corresponding groove **15** of another cap member **10** are in concert to receive one engaging portion **203**. Additionally, the groove **15** has a curved section close to the center thereof and is substantially L-shaped, and extends outward to the perimeter thereof.

[0027] The joint assembly **1** further includes a rod **20** having a first end received in a cavity **13** of one cap member **10** and a second end. It is to be understood that the rod **20** may serve as a leg with the second end against the supporting surface. A connecting member **30** is provided to join two cap members **10** and the rod **20** in a way to retrain the cap members **10** from detachment. In the preferred embodiment, the connecting member **30** is insertably engaged in through holes **12** of two mated cap members **10** correspondingly and has first section and a second section separated by a flange **31** which extends transversely thereto. The flange **31** is disposed outside the through hole **12** of one cap member **10** and includes a diameter larger than that of the through hole **12**. Additionally, the first end of the rod **20** includes a threaded section **21** threadly engaged with the second section of the connecting member **30**.

[0028] Referring to FIGS. **1** through **4**, the expandable modular shelf system may comprise a rail **3** including a middle portion **301** and two end portions **302** bent with respect thereto received in two horizontally spaced cap mem-

bers **10**. It is to be understood that the middle portion **301** may serve as a handle. The end portion **302** may include a threaded section **303** threadly engaged with the first section of the connecting member **30**.

[0029] Moreover, as best shown in FIG. **7** and FIGS. **13-16**, each rod **20** is adapted to further receive another joint assembly **1** at the second end thereof, whereby the number of shelves can be increased vertically. Also, the joint assembly is adapted to further receive at least one shelf, thereby increasing the number of shelves horizontally.

[0030] FIGS. **8** and **9** show a second embodiment of the present invention. The embodiment shows an alternate type of shelf **2'** being used. The shelf **2'** includes a wall **201'** having an array of holes disposed thereof and defines an engaging portion **203'** between the edge of a corner and the hole adjacent to that corner.

[0031] FIGS. **10** and **11** show a third embodiment of the present invention. In this embodiment, the expandable modular shelf system further includes a panel **4** adapted to be disposed perpendicular to the shelf **2**. The panel **4** has a wall section **401** with edges having bars **402** disposed therealong correspondingly, and each bar **402** has two legs **403** bent with respect thereto receivable by two joint assemblies **1** correspondingly.

[0032] FIG. **12** shows a fourth embodiment of the present invention. The expandable modular shelf is similar to the third embodiment except that the wall section **401** is eliminated.

[0033] While the specific embodiments have been illustrated and described, numerous modifications come to mind without significantly departing from the spirit of invention and the scope of invention is only limited by the scope of accompanying claims.

What is claimed is:

1. An expandable modular shelf system comprising:

at least one shelf which has a plurality of engaging portions adapted to be engaged with a plurality of joint assemblies correspondingly, with each joint assembly including two cap members mated together to receive one engaging portion therebetween, a rod connected to one of the cap members, and a connecting member joining the two cap members and the rod in a way to retrain the cap members from detachment; and

wherein each joint assembly is adapted to further receive at least one shelf, thereby increasing the number of shelves horizontally; and

wherein the rod is adapted to further receive a joint assembly, whereby the number of shelves can be increased vertically.

2. The expandable modular shelf system as claimed in claim **1** wherein each cap member comprises a through hole, and a cavity in communication with the through hole, and wherein the connecting member is insertably engaged in the through holes of the two cap members.

3. The expandable modular shelf system as claimed in claim **1** wherein each cap member comprises a mating surface having two connections formed thereon, with one connection formed of a stud and the other formed of a recess, and with the stud-like connection of one cap member engaged in the recess-like connection of another cap member.

4. The expandable modular shelf system as claimed in claim **1** wherein each cap member comprises a plurality of substantially L-shaped grooves, with the grooves of one cap member joined with corresponding grooves of another cap member to receive engaging portions therebetween.

5. The expandable modular shelf system as claimed in claim **1** wherein the connecting member includes a flange adapted to be received in one cap member, the connecting member includes a first section and a second section separated by the flange, and the second section is threadly engaged with the rod, whereby the rod is securely connected to the cap member.

6. The expandable modular shelf system as claimed in claim **1** further comprises a rail adapted to interconnect between two horizontally spaced joint assemblies, the rail includes two end portions engaged with the horizontally spaced cap members correspondingly.

7. The expandable modular shelf system as claimed in claim **1** further comprises a panel adapted to be disposed perpendicular to the shelf, the panel has a wall section with edges having bars disposed therealong correspondingly, and each bar has two legs receivable by two joint assemblies correspondingly.

8. The expandable modular shelf system as claimed in claim **1** further comprises a bar adapted to be disposed perpendicular to the shelf, the bar has two legs receivable by two joint assemblies correspondingly.

9. The expandable modular shelf system as claimed in claim **1** wherein the shelf comprises a frame having corners serving as engaging portions and a wall serving as a shelving surface, and the wall extends between the frame but leaves the engaging portions exposed.

10. The expandable modular shelf system as claimed in claim **1** wherein the shelf comprises a wall having corners with holes disposed adjacent thereto correspondingly, and the shelf further comprise an engaging portion defined between the edge of the corner and the hole.

* * * * *