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(54) **Pillar insertion combination rack system**

(57) An improved construction pillar insertion combination rack made of metal wire material in a rectangular or polygonal form and in a single layer or multiple layers includes multiple side frames, multiple pillars (3), multiple clamping members, and a top; each limitation corner of the rack being composed of two rings (51A,51B) concentrically arranged with the diameter of the upper ring smaller than that of the lower ring; each side frame (52) including upper (521) and lower (522) support rods, a connection rod (523) usually made in a wave form being

disposed between and soldered to both of the upper and the lower support rods, each pillar containing multiple sections with a circumferential slot (31) being defined by any two abutting sections, the pillar being secured with the clamping member (4) at where it is to be inserted into the limitation corner, and the top usually related to a mesh being placed on the frame of the rack; alternatively, an upper frame with multiple upper rings as the limitation corners and a lower frame with multiple lower rings as the limitation corners may be separately made in continuous form to be spot soldered at where both ends meet.

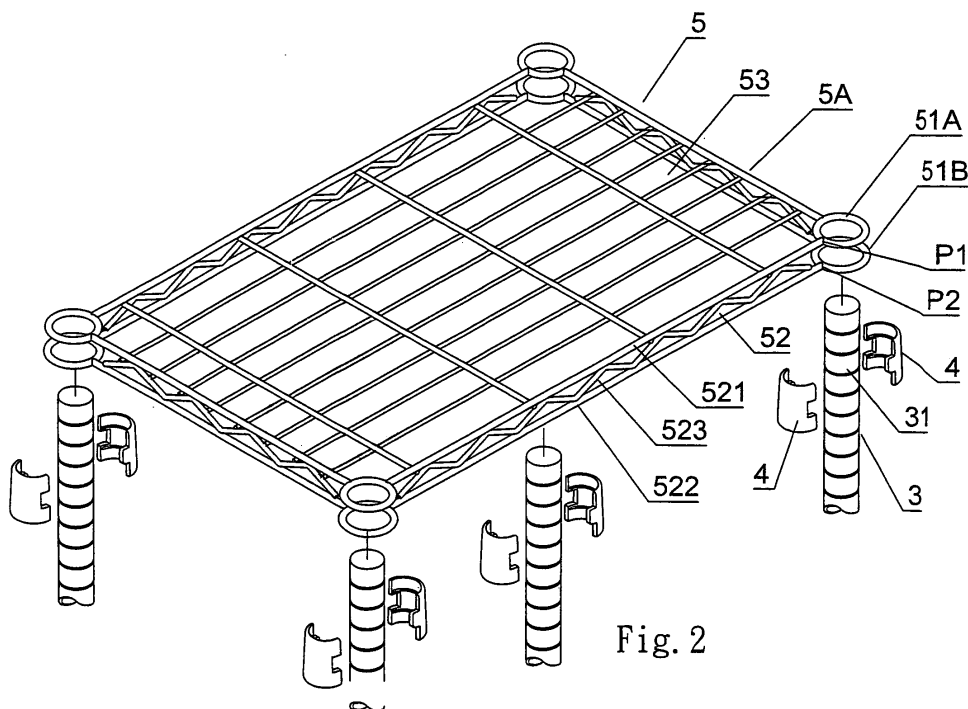


Fig. 2

Description

[0001] The present invention is related to a pillar insertion combination rack system, and more particularly to one allowing fast assembly by having each pillar composed of multiple sections with each section disposed with a circumferential slot to be secured at a given point by means of a pair of clamping members.

[0002] In a conventional pillar insertion combination rack as illustrated in Figs. 1 and 1-A of the accompanying drawing, a rectangular rack 2 is, at its four corners, each inserted with a pillar 3; each pillar includes multiple equally spaced sections with a circumferential slot 31 defined by any two abutting sections for locating purposes; a limitation sleeve 22 is disposed to each of the four corners of the rack 2; at a given location of each pillar 3 where the pillar is to be inserted into its respective limitation sleeve 22 it is secured with a pair of locating clamps 4 by biting two circumference slots; and each pillar is then with its clamped sections inserted into its respective limitation sleeve 22 thus to secure the rack 2 with the four pillars respectively at the four corners of the rack 2. Multiple racks may be assembled on those same four pillars as required. This prior art for allowing convenient disassembly, assembly and location adjustment has been popularly applied for displaying commodities in a shop or for glove compartments at home.

[0003] In the construction of the pillar insertion combination rack as illustrated, each side frame 21 of the rack 2 includes an upper support rod 211 and a lower support rod 212; a connection rod 213 usually made of metal wire material in a wave form is first soldered to both of the upper and the lower support rods 211, 212; the limitation sleeve 22 is related to a hollow cone with a smaller top and larger bottom; each of both ends of each upper support rod 211 and each lower support rod 212 provides a soldering point P for soldering both ends of each side frame 21 to their respectively limitation sleeves 22 to make a frame 2A; and a top 23, usually a mesh, is placed into and confined by the frame 2A to complete the production of the rack 2. However, molding of the limitation sleeve 22 consumes much of cost and material, and as many as sixteen points need the soldering job to connect four limitation sleeves 22 to four side frames 21 for the production of a rectangular rack 2. In addition to minute and complicated soldering processes and high process costs, soldering precision and fastness demands are potent factors contributing to the flaws of higher price, difficulties in manufacturing, and higher nonconformity rate found with the rack 2 of the prior art.

[0004] The primary purpose of the present invention is to provide an improved pillar insertion combination rack that is simple in construction and precise and consistent in dimension to effectively replace the function provided by the limitation cone sleeves of the prior art for delivering better economic benefits and upgrading manufacturing efficiency of the rack.

[0005] Another purpose of the present invention is to

provide an improved pillar insertion combination rack that is capable of reducing soldering requirements in the manufacturing process thus to significantly upgrade manufacturing efficiency and optimize economic benefits by lowering the production costs.

[0006] The invention is defined by the features given in claim 1. A preferred embodiment can be taken from the subclaim.

[0007] According to the invention, each limitation corner of a rectangular or polygonal rack is composed of a lower ring and an upper ring; each pillar is inserted into the limitation corner of the rack; wherein the diameter of the upper ring is smaller than that of the lower ring with both rings disposed concentrically; each side frame of the rack includes an upper support rod and a lower support rod joined to each other with a connection rod; and two abutting side frames of the rack are formed at a right angle to each other and welded or secured with coils of wire at the limitation corner of the rack.

[0008] The invention is further illustrated by the following description and in connection with the drawings.

Fig. 1 is an exploded view of a construction of the prior art.

[0009] Fig. 1A is a sectional view showing a local part of the combination of fastening elements as shown in Fig. 1.

[0010] Fig. 2 is an exploded view of a construction of a first preferred embodiment of the present invention.

[0011] Fig. 2A is a sectional view showing a local part of the combination of fastening elements as shown in Fig. 2.

[0012] Fig. 3 is an exploded view of a construction of a second preferred embodiment of the present invention.

[0013] Fig. 3A is a perspective view of an enlarged local part of the second preferred embodiment of the present invention.

[0014] Fig. 3B is a side view of the combination of the second preferred embodiment of the present invention.

[0015] Fig. 3C is a sectional view of the combination of fastening elements of the second preferred embodiment of the present invention.

[0016] Fig. 4 is an exploded view showing a local part of the second preferred embodiment of the present invention.

[0017] Fig. 5 is a perspective view showing the second preferred embodiment as assembled.

[0018] Referring to Figs. 2 and 2A for a first preferred embodiment of the present invention, a rectangular or a polygonal rack 5 (a rectangular rack in this preferred embodiment) includes four limitation corners, a top 53 usually made in a mesh form, four side frames 52, four pillars 3, and four sets of clamping members 4. Each limitation corner of the rack 5 is composed of an upper ring 51 A and a lower ring 51 B each made of metal wire material; the diameter of the upper ring 51 A is smaller than that of the lower ring 51 B and both rings 51 A, 51 B are concentrically disposed. Each side frame 52 also made of metal wire material includes an upper support rod 521 and a lower support rod 522 parallel with each other, and

a connection rod 523 usually made in a wave form is disposed between and soldered to both support rods 521, 522; each of both ends of the upper support rod 521 defines a soldering point P1, and each of both ends of the lower support rod 522 defines another soldering point P2; both ends of the upper support rod 521 are respectively soldered two upper rings 51A of the limitation corners at points P1, and both ends of the lower support rod 522 are respectively soldered to two lower rings 51B of the limitation corners at points P2; each of the shorter side frames 52 and each of the longer side frames 52 are soldered at right angles to each other to form the frame 5A of the rack 5; and the top 53 is placed in the frame 5A.

[0019] Each pillar 3 contains multiple sections with a circumferential slot 31 defined by any two abutting sections. At a given point of the pillar 3, where it is to be inserted into its respective limitation corner of the frame 5A, it is secured with a set of clamping members 4; each clamping member 4 is composed of two identical halves to secure the pillar 3 by facing each other to bite two circumferential slots 31; and the pillar 3 is inserted with its clamped portion into and secured in the lower ring 51 B and the upper ring 51 A in sequence. The design of the limitation corner of the present invention replaces the larger hollow limitation cone sleeve 22 as illustrated in Fig. 1 of the prior art to effectively reduce production cost for achieving optimal economic benefits.

[0020] Now referring to Figs. 3, 3A, 3B, and 3C, a second preferred embodiment of the present invention related to a pillar insertion combination rack 6 includes an upper frame 6A, a lower frame 6B, four pillars 3, four sets of clamping members 4, and a top 6C. As also illustrated in Fig. 4, a metal wire is continuously coiled and folded in automatic mode to form an upper frame 6A containing four upper rings 61A at each limitation corner and four upper side frames 621 in an integral part; another length of the same metal wire is again continuously coiled and folded in automatic mode to form a lower frame 6B containing four lower rings 61 B at each limitation corner and four lower side frames 622 in an integral part; with each of both of the upper frame 6A and the lower frame 6B a spot soldering is performed at a point P3 where both ends of the metal wire meet. The diameter of the upper ring 61 A is smaller than that of the lower ring 6 1 B.

[0021] A connection rod 623 made of the same wire material is disposed between and soldered to both of the upper side frame 621 and the lower frame 622 respectively from the upper frame 6A and the lower frame 6B. The top 6C, usually a mesh, is placed in the upper frame 6A. Each pillar 3 contains multiple sections with a circumferential slot 31 defined by any two abutting sections. At a given point of the pillar 3 where it is to be inserted into its respective limitation corner of the frame 6A it is secured with a set of clamping members 4; each clamping member 4 is composed of two identical halves to secure the pillar 3 by facing each other to bite two circumferential slots 31; and the pillar 3 is inserted with its

clamped portion into and secured in the lower ring 6 1 B and the upper ring 61 A in sequence. Finally, four pillars 3 are inserted into their respective limitation corners to form the rack 6 as illustrated in Fig. 5.

[0022] Both of the upper and the lower frames 6A, 6B of the rack 6 are each given a single spot soldering to provide the most reinforced and simplest construction for the rack thereby minimizing the demand of soldering job, significantly upgrading manufacturing efficiency and realizing optimal economic benefits by reduction of production cost.

Thus, the present invention provides an improved structure of a pillar insertion combination rack system by two ways: Firstly, each limitation corner of the rack is composed of an upper ring and a lower ring concentrically arranged with the diameter of the upper ring being smaller than that of the lower ring; each pillar is composed of many sections with a circumferential slot defined by any two abutting sections; a clamping member made of two identical halves facing each other secures the pillar at where it is to be inserted into the limitation corner by biting two circumferential slots; and the limitation corner may be continuously molded in an automated process using a metal wire material.

[0023] Secondly, the limitation corner is made of metal wire in continuous fashion and folded automatically before performing spot soldering at where the metal wire ends; an upper frame with multiple upper rings of limitation corners, a lower frame with multiple lower rings of limitation corners, and multiple connection rods each usually made in a wave form are separately processed before soldering the connection rods between and to the upper and the lower frames with each limitation corner containing the upper ring and the lower ring concentrically arranged with the diameter of the upper ring being smaller than that of the lower ring. Accordingly, both of the upper and the lower frames of the rack are each given in a single spot soldering to provide the most reinforced and simplest construction for the rack.

Claims

1. A pillar insertion combination rack made in a rectangular or polygonal form and comprising a single layer or multiple layers including multiple limitation corners, a top usually made in a mesh form, multiple side frames, multiple pillars, and multiple sets of clamping members wherein each limitation corner is composed of an upper ring (51 A) and a lower ring (51 B) made of a metal wire material concentrically arranged with the diameter of the upper ring (51 A) smaller than that of the lower ring (51 B), each side frame (52) is made of the same metal wire material being composed of an upper support rod (521) and a lower support rod (522), each shorter side frame and each longer side frame being disposed at a right angle to each other in case of a rectangular rack (5),

a connection rod (523) made in a wave form is disposed between and soldered to both of the upper (521) and the lower (522) support rods, each pillar (3) containing multiple sections with a circumferential slot (31) defined between any two abutting sections; the clamping member (4) composed of two identical halves facing each other secures the pillar (3) at where the pillar (3) is to be inserted into the limitation corner by biting two circumferential slots (31) of the pillar (3) both ends of the upper support rod (521) being soldered to the upper ring (51 A) of the limitation corner, and both ends of the lower support rod (522) being soldered to the lower ring (51 B) of the limitation corner, each pillar (3) with its clamped portion being inserted into the lower ring (51 B) and the upper ring (51A) in sequence of its respective limitation corner, and the top (53) being placed in the rack (5).

2. A pillar insertion combination rack made in a rectangular or polygonal form and comprising a single layer or multiple layers including an upper frame, a lower frame, a top, multiple pillars, multiple clamping members, and multiple connection rods, wherein with the upper frame (6A) made of a metal wire material in continuous form coiled at each corner to define an upper ring (61 A) and running straight between any two corners a spot soldering is performed at where both ends of the wire meet, with the lower frame (6B) made of a metal wire material in continuous form coiled at each corner to define a lower ring (61B) and running straight between any two corners a spot soldering is performed at where both ends of the wire meet, the diameter of the upper ring (61 A) being smaller than that of the lower ring (61B) and each pillar (3) containing multiple sections with a circumferential slot (31) defined between any two abutting sections, the clamping member (4) being composed of two identical halves facing each other secures the pillar (3) at where the pillar (3) is to be inserted into the limitation corner by biting two circumferential slots (31) of the pillar, the connection rod (623) made of the same metal wire material in a wave form is disposed between and soldered to both of the upper frame (621) and the lower frame (622) with both of the upper ring (61 A) and the lower ring (61B) at each corner being concentrically arranged, each pillar (3) with its clamped portion is inserted into the lower ring (61B) and the upper ring (61 A) in sequence of its respective limitation corner, and the top (6C) is placed in the upper frame (6A) of the rack (6).

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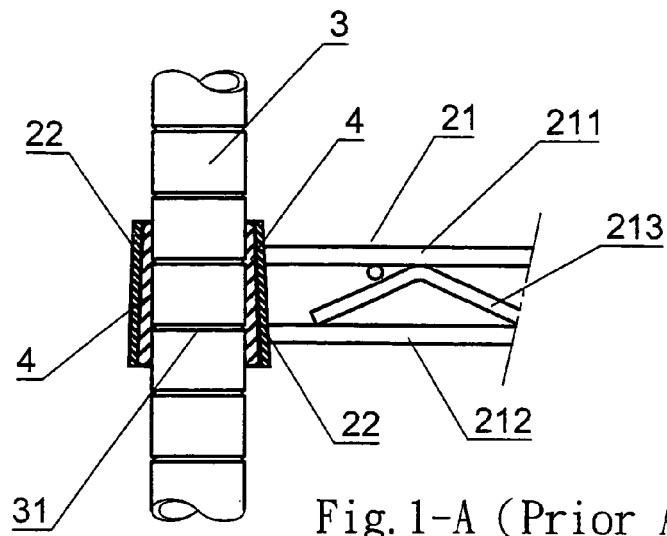


Fig. 1-A (Prior Art)

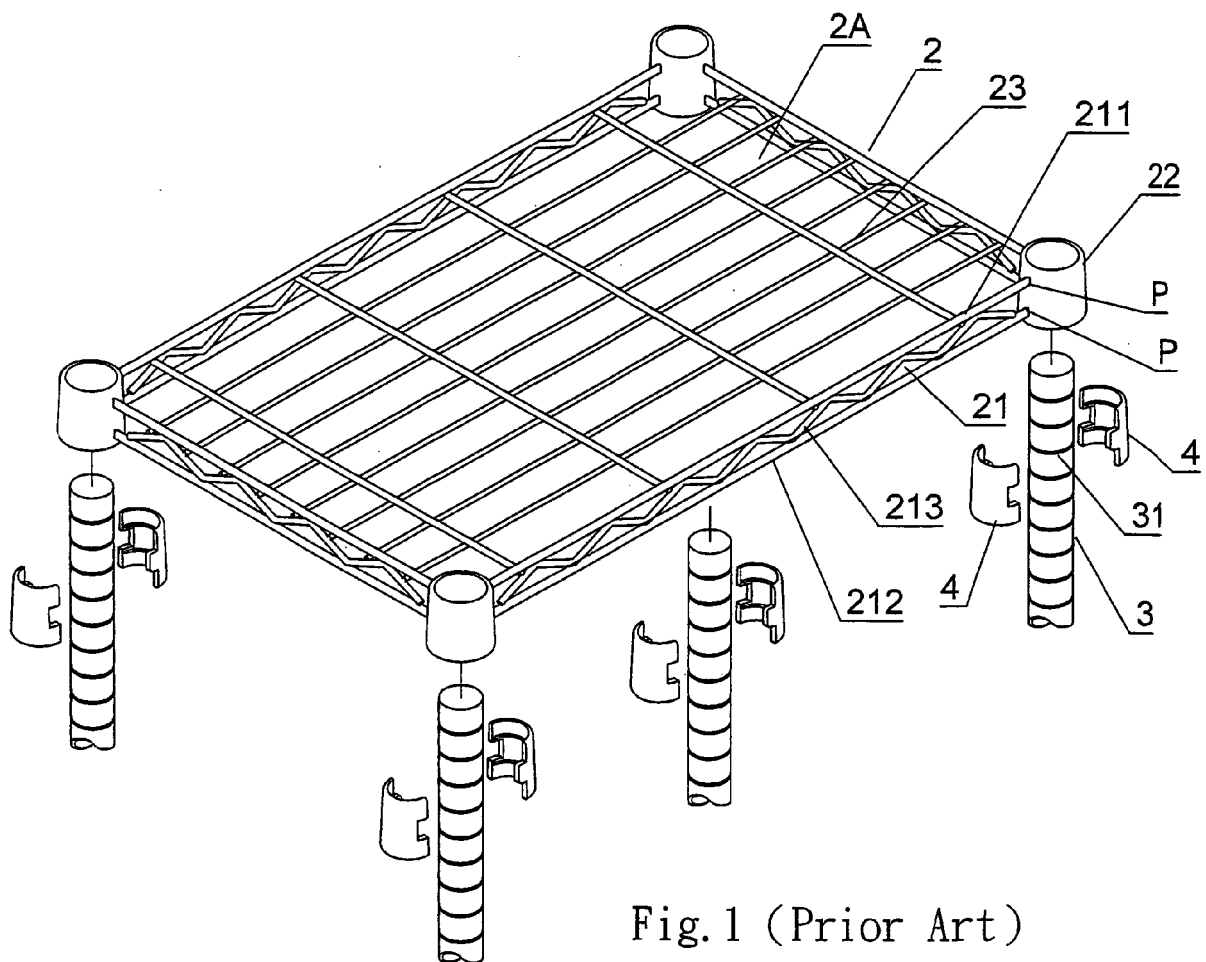
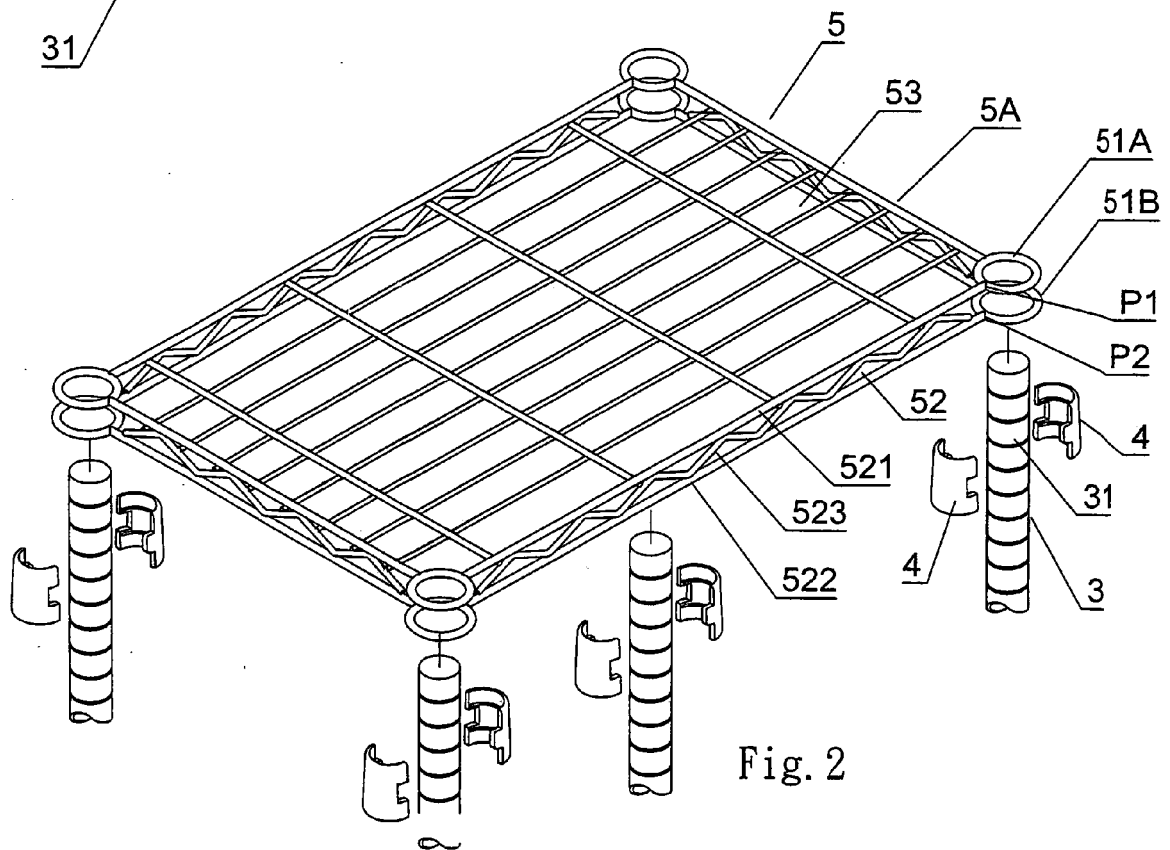
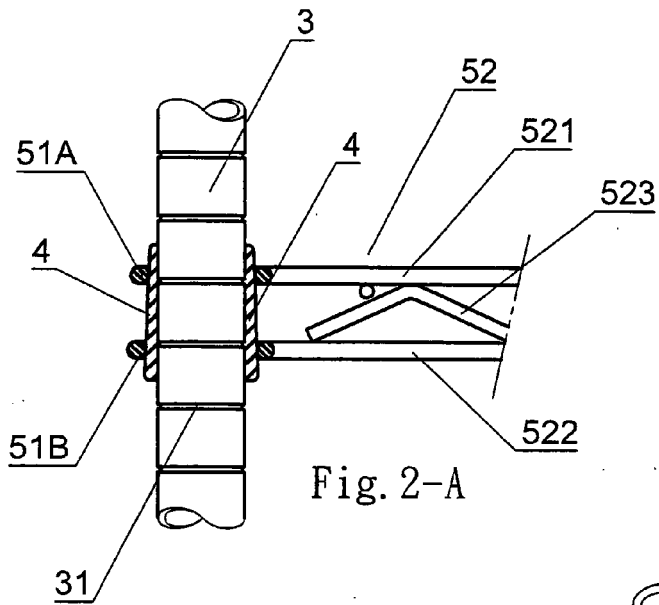


Fig. 1 (Prior Art)



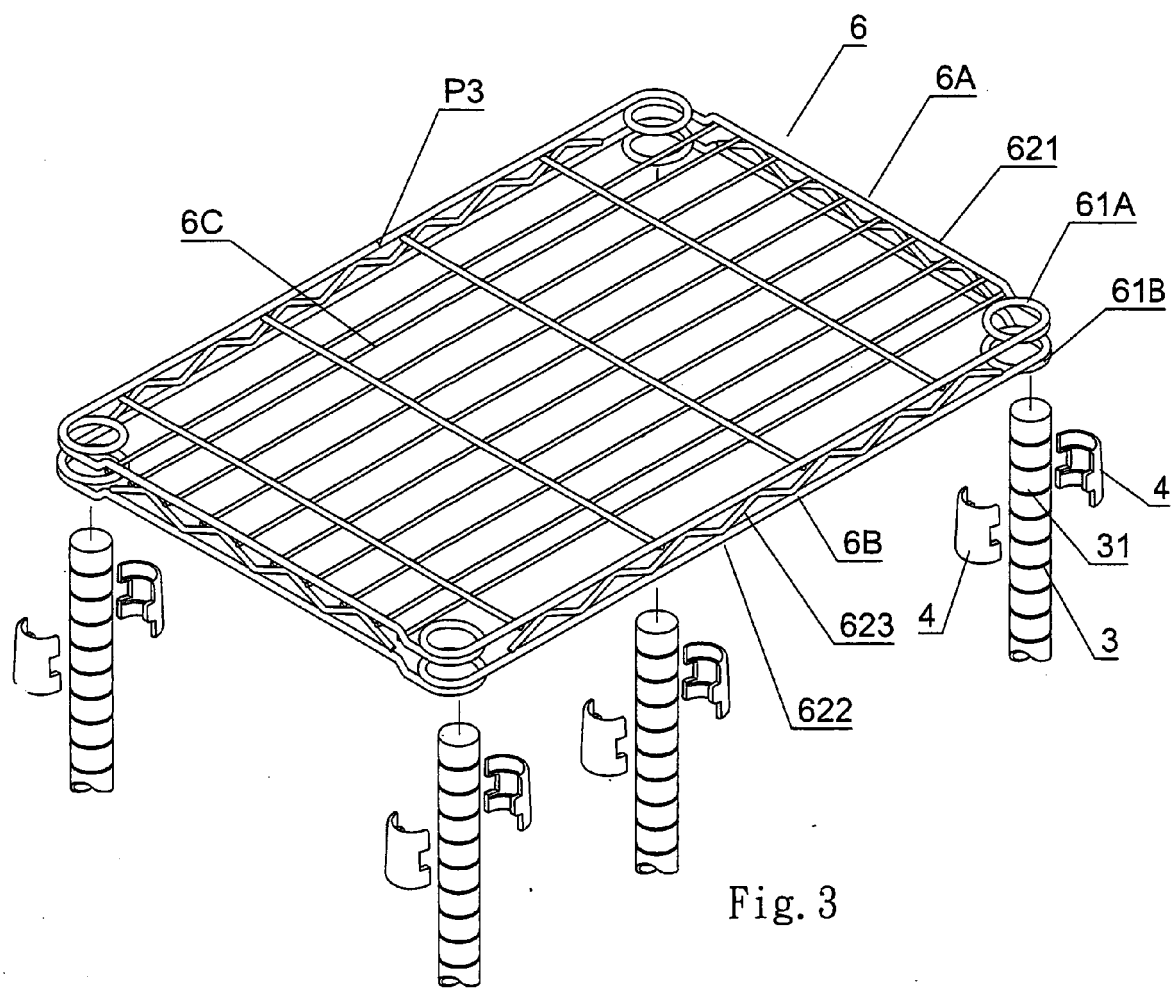
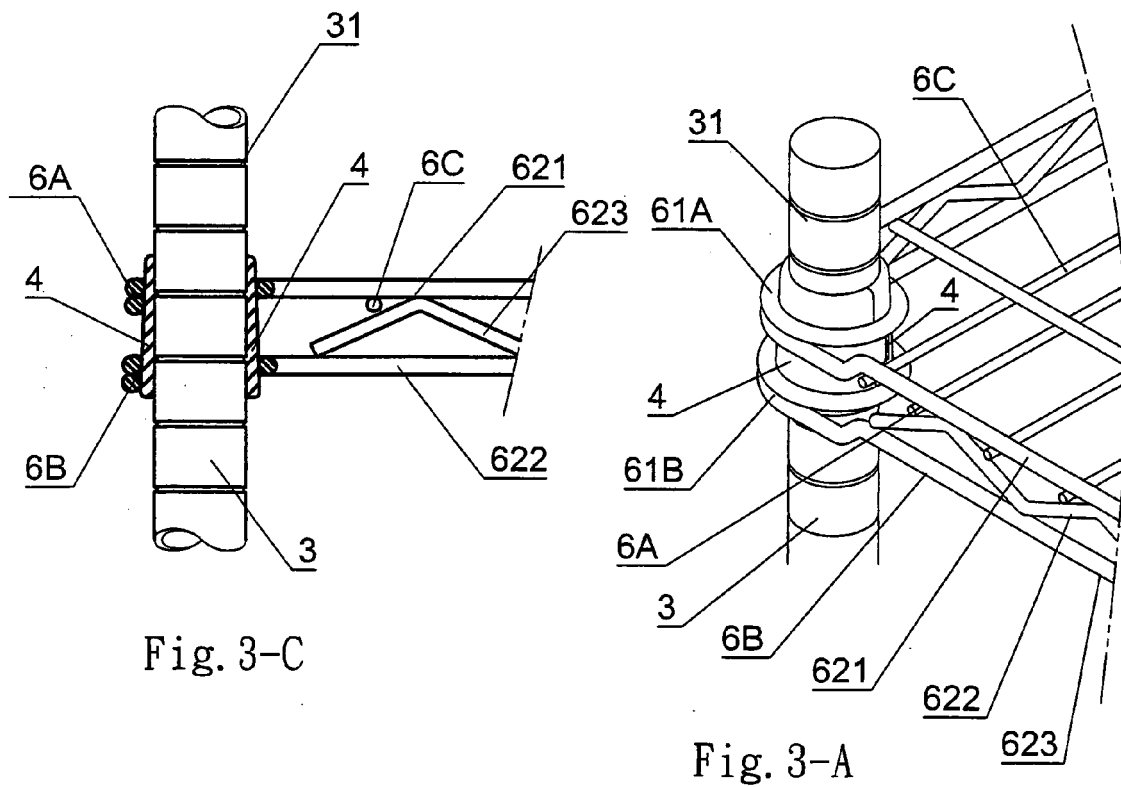
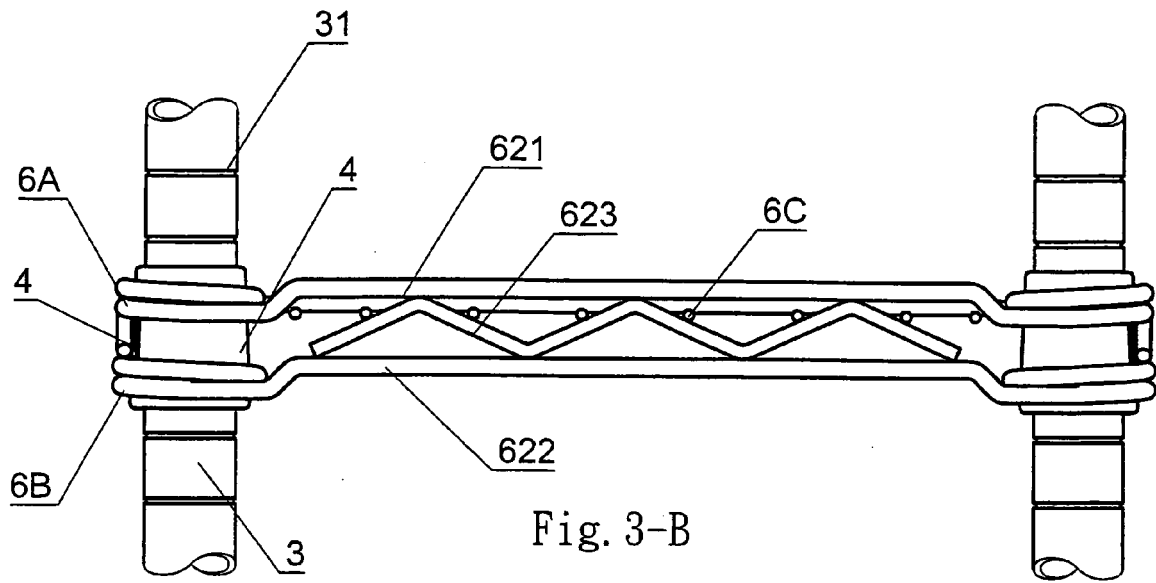
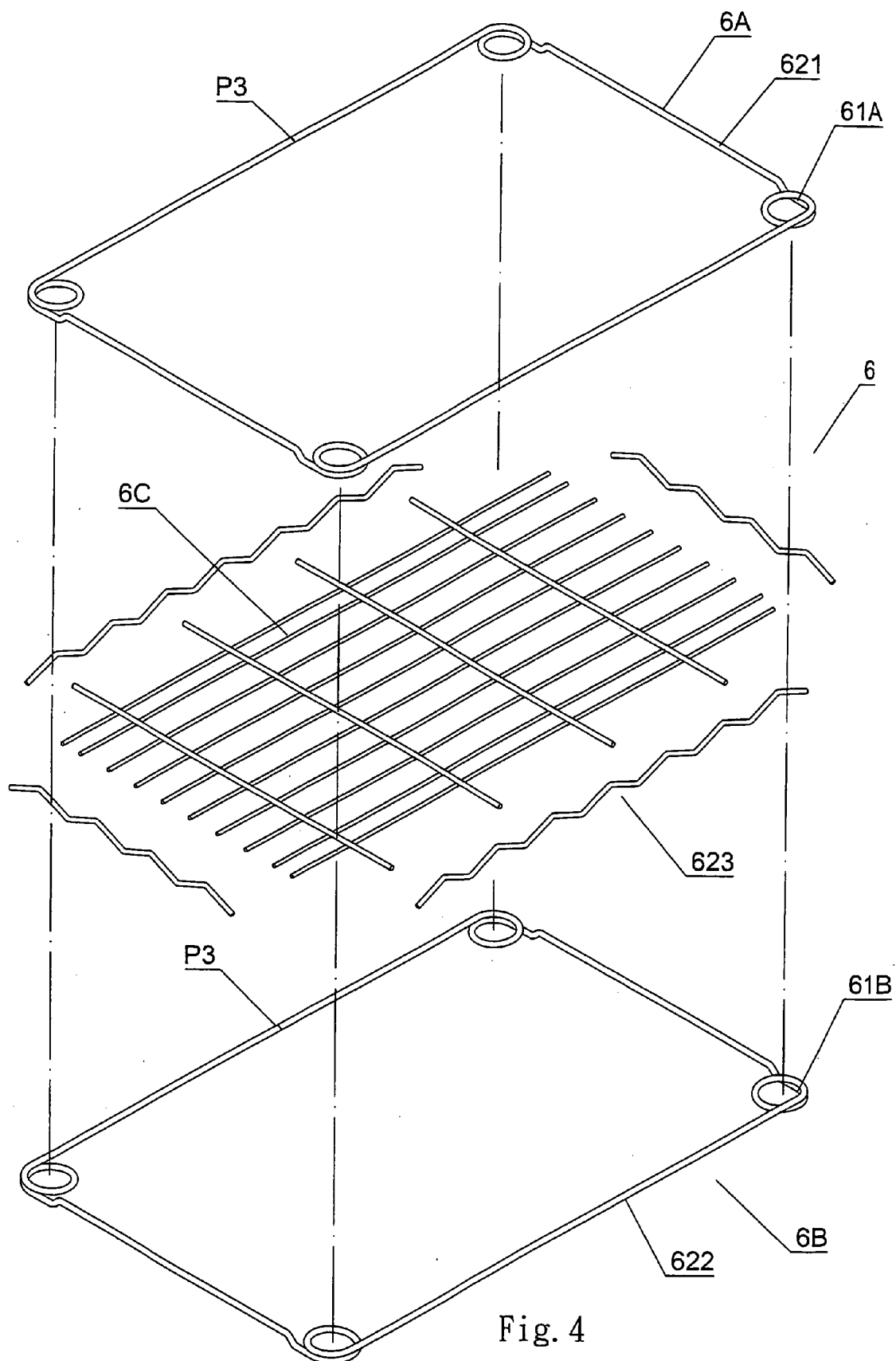


Fig. 3





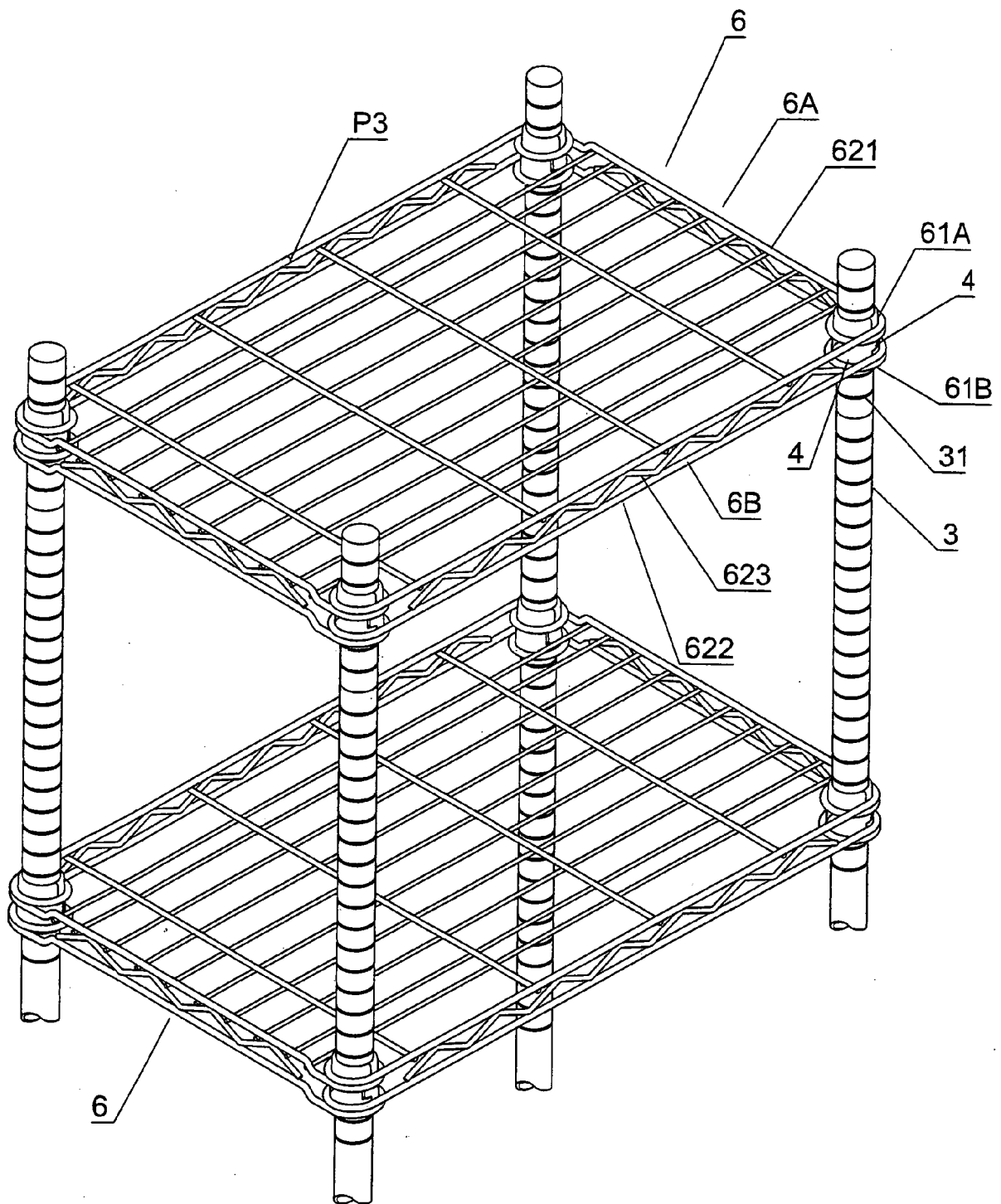


Fig. 5



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 00 4111

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 July 2007	Examiner Klintebäck, Daniel
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 07 00 4111

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