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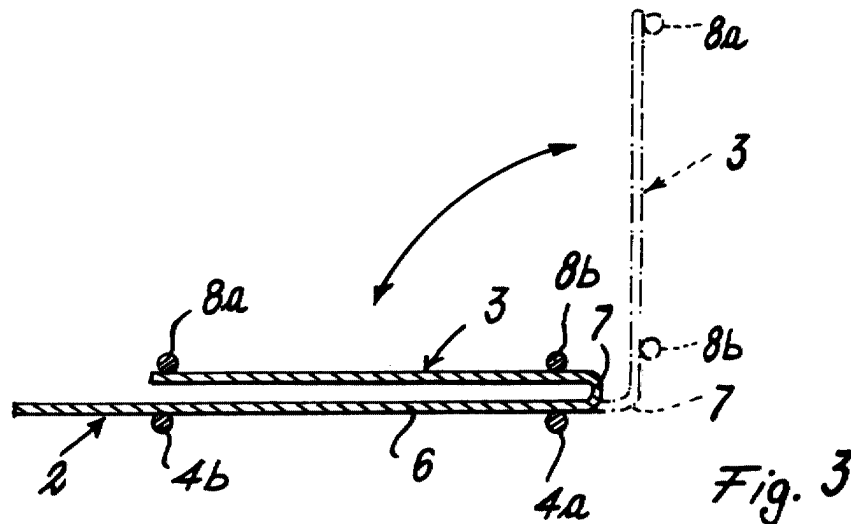
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(54) **Metal wire shelf with collapsible sides, particularly for trolleys and the like**

(57) A shelf comprising a base part (2) and at least one side (3) rigid with said base part, in which to enable the side (3) to be varied in position relative to the base

part (2) and to maintain the position assumed, the side (3) and base part (2) are joined together by at least two deformable elements.



Description

[0001] This invention relates to a collapsible-sided shelf, in particular of metal or non-metal wires, rods and rod-like elements, particularly for trolleys and fixed support devices.

[0002] Shelves of plastic-coated metal wire, rods or rod-like elements are known, to be hooked at different heights to side walls provided or not provided with wheels, to form a trolley or a support device in which these (removable) shelves form a consolidating part of the trolley or device. These shelves comprise a substantially rectangular flat base part plus sides. The sides may form an integral part of the base part, in which case they are rigidly set substantially at 90° to the base part which, with the sides, assumes either a U-configuration, or a tray configuration if bounded by four sides. The overall size of such a shelf is considerable, and negatively affects transport and storage costs.

[0003] To reduce the overall size of such shelves it has already been proposed to provide them with collapsible sides which can be rotated from a substantially flat position lying on the base part to a position rotated through 90° therefrom. For this purpose the sides are provided with a number of rods, wires and rod-like elements shaped approximately as a half-closed hook which by engaging a surrounding rod of the base part enables the sides to be rotated away from and towards this base part.

[0004] Although this solution solves the size problem, it has certain drawbacks: the shelf is unstable and therefore also makes the trolley structure unstable; the shelf is uncomfortable to install between the side walls; and fitting the sides to the base part involves relatively complicated manual operations which cannot be automated.

[0005] An object of this invention is to provide a shelf provided with at least one side which forms one piece with the base part and can be made to manually assume a plurality of stable angular positions relative to said base part.

[0006] A further object of the invention is to provide a trolley or a fixed support structure in which the shelf of the invention is applied.

[0007] These and further objects which will be apparent from the ensuing detailed description are attained by a shelf and a trolley or support structure in accordance with the teachings of the accompanying claims.

[0008] The invention will be more apparent from the detailed description of some preferred embodiments thereof given hereinafter by way of non-limiting example with reference to the accompanying drawings, on which:

Figure 1 is a perspective view of a shelf of the invention provided with two sides shown in their erect position;

Figure 2 is a perspective view of the shelf of the invention with its sides collapsed onto the base part;

Figure 3 is a partial section through the shelf taken

on the line 3-3 of Figure 1;

Figure 4 is a perspective view of a trolley or non-wheeled structure in which a shelf of the invention is mounted;

Figures 5a, b, c, d, e show schematically the different possible positions which the sides can assume relative to the base part; Figures 6a, 6b are two front perspective views of a further variant of a shelf according to the invention.

[0009] In the figures the reference numeral 1 indicates the shelf of the invention overall. It comprises a base part 2 and two sides 3 forming one piece with said base part. Both the base part 2 and the sides 3 are formed from metal or non-metal wires, rods or rod-like elements assembled together and surface-treated.

[0010] In particular, in the illustrated example, the base part 2 comprises three parallel longitudinal rod-like elements 4a, b, c (two side or outer elements 4a, b, bent at 90° at their outer ends at 4d, and one intermediate element 4c) and a series of parallel transverse rod-like elements 5 rigid with the three longitudinal rod-like elements 4a, b, c. The transverse elements 5 and longitudinal elements 4a, b, c involve only the base part 2.

[0011] Spaced between the transverse elements 5 and fixed to the longitudinal elements 4a, b, c of the base part 2, there are provided metal and non-metal elements of strap form, indicated by 6, which are parallel to each other and, in that portion fixed to the base part 2, also parallel to the transverse elements 5.

[0012] According to the invention these straps are prolonged beyond the base part 2 to extend into the sides 3 and form a part of the structure of these latter.

[0013] More specifically, those portions of said straps which extend beyond the base part 2 are fixed, after a certain suitable free spacing distance indicated by 7, to two (rod-like) parallel stringers 8a, b bounding the sides 3, these latter being completed by a series of parallel rod-like elements 9 also fixed to the stringers 8a, b. Advantageously, the outer stringers 8b project outwards at their ends (at 10).

[0014] The base part 2 and sides 3 hence form one piece which can be produced entirely automatically without manual intervention.

[0015] The material of the straps 6 is chosen such that the sides 3 can be made to assume any position relative to the base part 2 by being bent (in the opening or closure direction) manually and without particular force along their free portion 7, their assumed position persisting after the manual intervention ceases. The material is also chosen such that even after the position of the sides has been changed a certain number of times, the straps do not fracture within those free portions 7 in which the repeated bending occurs. Typical materials suitable both for bonding and for changing the position of the sides and their stability in the desired position are metals in general or other materials.

[0016] For example, steel wire covered with a thermo-

setting or thermoplastic plastic can be used.

[0017] The shape of the straps is such as to offer a low resistant moment to change in position of the sides (ie in the direction of side rotation relative to the base part) but to offer considerable resistance to any force exerted transversely to the straps in the direction of the arrows F of Figure 1, so stabilizing not only the structure of the shelf but also, in consequence, the structure of the trolley or non-wheeled support structure to which the shelf is hooked or connected.

[0018] In the case of a trolley or non-wheeled element comprising conventional side walls of inverted U-shape provided at different heights with groups of parallel crosspieces 12 joining together the legs of the U and rigid with them, the shelf 1 of the invention is mounted (either with the sides 3 collapsed onto the base part or with the sides 3 raised) on said crosspieces 12 such that the bent appendices 4d of the base part lie on the outside of the crosspieces and the base part of the shelf rests on these latter. If collapsed, the sides are then rotated to assume a position at approximately 90° to the base part, whereas the projecting parts 10 of the outer stringers 8a of the sides engage the legs of the U to prevent any outward rotation of the sides should an accidental thrust be applied to them.

[0019] The scope of the invention includes different embodiments of the shelf and sides in terms of the number and arrangement of their constituent rods, wires or the like. Instead of having a mesh configuration, the shelf and its sides could be formed with solid flat elements connected together by straps or similar elements. The same applies to the number of straps 6 used, which could be reduced to two. The straps 6 could also be limited in length to just the portion 7 plus short extensions to enable it to be fixed to the sides 3 and to the base part 2.

[0020] As can be seen from Figures 5a, b, c, d, e, the proposed embodiment of the invention enables the sides 3 to be positioned in various spatial arrangements.

[0021] The number of sides could also be limited to one or be such as to totally surround the base part 2 (Figures 5d and 5e).

[0022] Figures 6a, 6b show a variant of the aforedescribed embodiments (those shelf parts in common with the aforedescribed embodiments are indicated by the same reference numerals thereas).

[0023] The shelf 13 of this variant is substantially identical to the lastly described embodiment and also comprises a base part 2 and sides 14 forming one piece with the base part, to which they are connected such as to enable their position to be modified as already described.

[0024] However, the sides 14 also comprise hooking elements 15, preferably provided on the ends of said sides.

[0025] The hooking elements 15 have a vertical part 15A and a hook-bent end part 15B. The hooking elements are preferably formed by prolonging the outside

bars 16A, 16B defining the ends of the sides 14.

[0026] The length L of the hooking elements 15 is such that when the relative side 14 has been folded onto the base part 2 (Figure 6B), said hooking elements 15 lie completely within the base part.

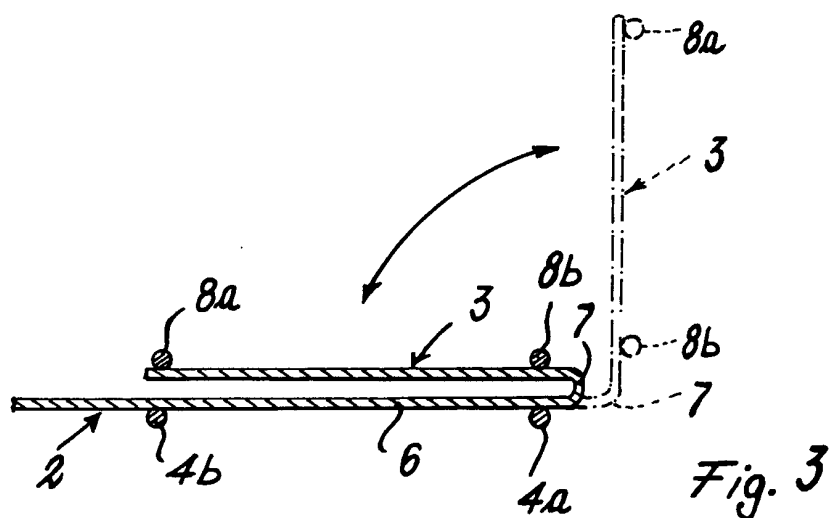
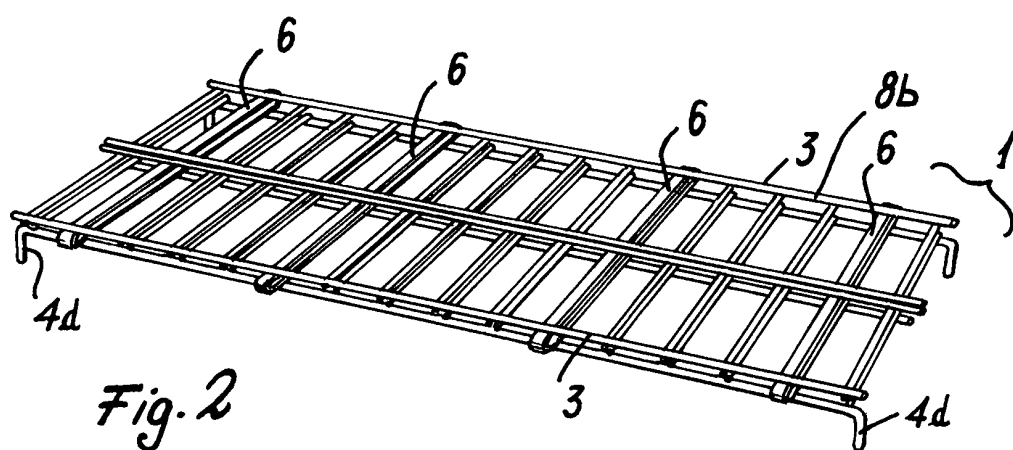
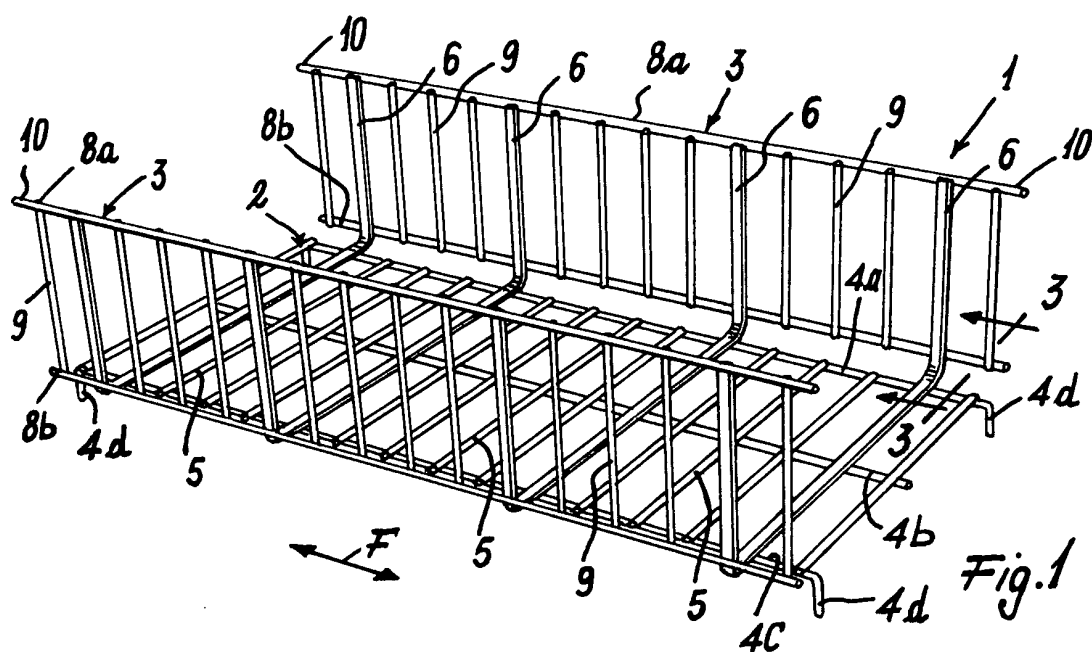
[0027] The hooking elements 15 are arranged to hook onto an overlying shelf by engaging a horizontal rod-like element 16 of a side 14 in the free space between the vertical end bars 16A, 16B of the side and the immediately adjacent vertical bars 16C, D.

[0028] To connect the shelves of this variant to a crosspiece 17, for example provided inside a cupboard or connected to a support structure 18 (partially shown in Figure 6a), preferably also rod-like, comprising bent ends 20 able to cooperate with the bent ends 15B of the hooking elements 15, and a central part bent to straddle the crosspiece 17.

Claims

1. A shelf comprising a base part (2) and at least one side (3) rigid with said base part, characterised in that to enable the side (3) to be varied in position relative to the base part (2) and to maintain the position assumed, the side (3) and base part (2) are joined together by at least two deformable elements.
2. A shelf characterised in that the base part (2) and the side (3) are constructed of metal wires, rods or rod-like elements.
3. A shelf characterised in that the base part (2) and the side (3) are constructed of non-metal wires, rods or rod-like elements.
4. A shelf as claimed in claim 1, wherein the deformable elements (6) are straps.
5. A shelf as claimed in the preceding claim, wherein the straps (6) extend along the base part (2) and the side (3) and include an intermediate deformable part.
6. A shelf as claimed in claim 1, characterised in that the base part (2), the side (3) and the deformable elements (6) are formed in such a manner as to enable the side to be positioned parallel to and in contact with the base part or in any other angular position relative to that edge of said base part to which said side is connected.
7. A shelf as claimed in claim 1, characterised by comprising resting or hooking members (4d; 15) arranged to cooperate with a support structure (11, 12; 17, 18).

8. A shelf as claimed in claim 7, characterised in that the resting members are provided on the base part (2) as hooks (4d) which form an angle of about 90° with the base part. 5
9. A shelf as claimed in claim 7, characterised in that the hooking members (15) are provided on at least two sides (14) positioned on two parallel edges of the shelf (2), said hooking elements being arranged to hook onto an overlying shelf. 10
10. A shelf as claimed in claim 9, characterised in that the hooking members (15) comprise a first straight part (15A) terminating with a terminal part (15B) bent as a hook. 15
11. A shelf as claimed in claim 9, characterised in that the hooking members (15) are the prolongation of end bars (16A, B) laterally bounding each side (14). 20
12. A shelf as claimed in claim 9, characterised in that the length (L) of the hooking members (15) is such that when the relative side (14) has been folded on to the base part (2), said hooking elements (15) lie within said base part (2). 25
13. A shelf as claimed in claim 9, characterised in that the hooking members (15) engage a lower horizontal rod-like element (16) of the sides (14) by passing through the free space provided between the end bars (16A, B) of the side and the bars (16C, 16D) immediately adjacent to these latter. 30
14. A shelf as claimed in claim 9, characterised by comprising at least two support elements (19) for removably connecting the shelves to a crosspiece (17), said support element (19) having end parts (20) shaped to cooperate with the terminal parts (15B) of the hooking elements, and a central part (21) shaped to straddle said crosspiece. 35 40
15. A shelf as claimed in claim 14, characterised in that the support element (19) is rod-like.
16. A shelf as claimed in one of the preceding claims, characterised in that at least the deformable elements (6) are constructed of steel covered with a thermosetting or thermodeformable plastic material. 45 50
17. A trolley or support device provided with at least one shelf conforming to one or more of the preceding claims. 55



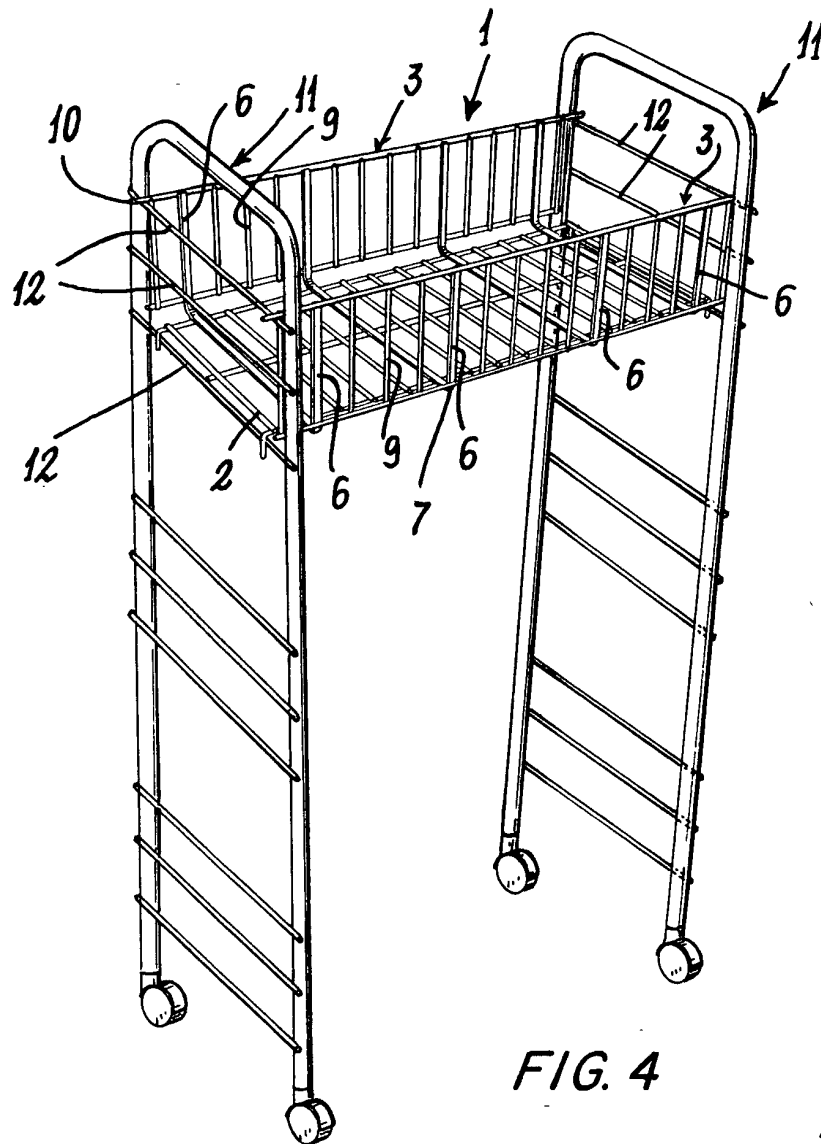


FIG. 4

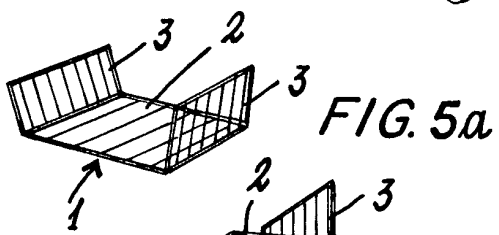


FIG. 5a

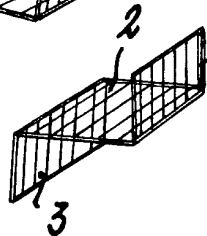


FIG. 5b

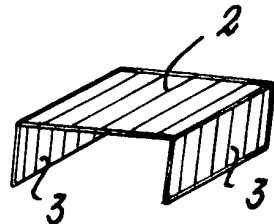


FIG. 5c

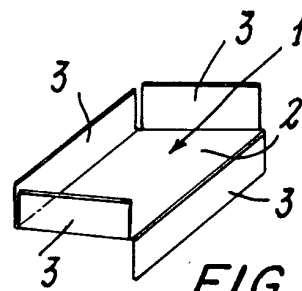


FIG. 5d

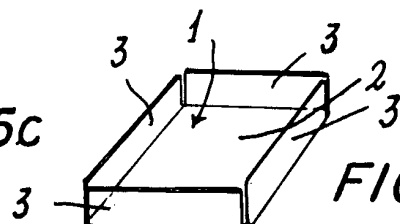


FIG. 5e

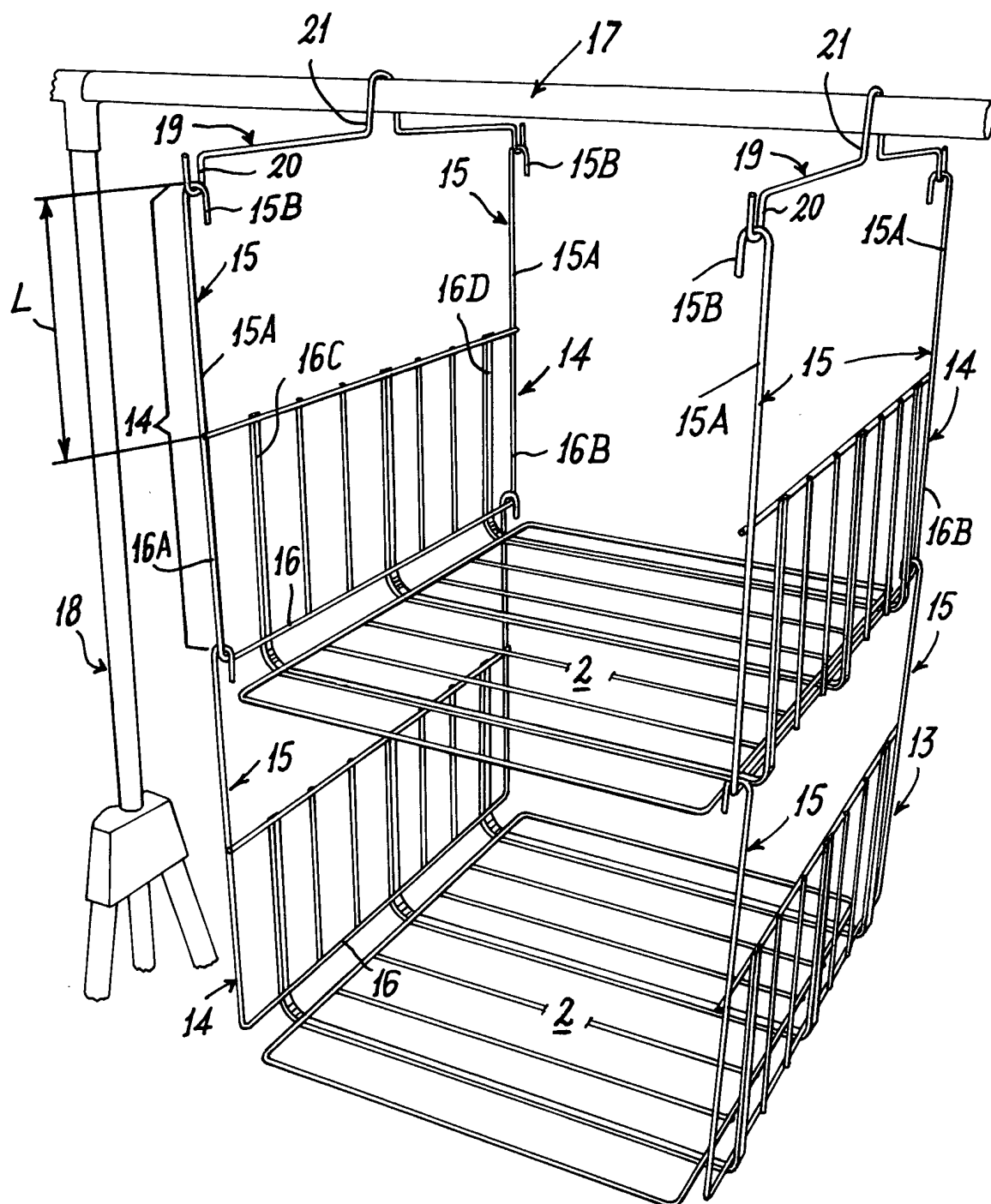


FIG. 6A

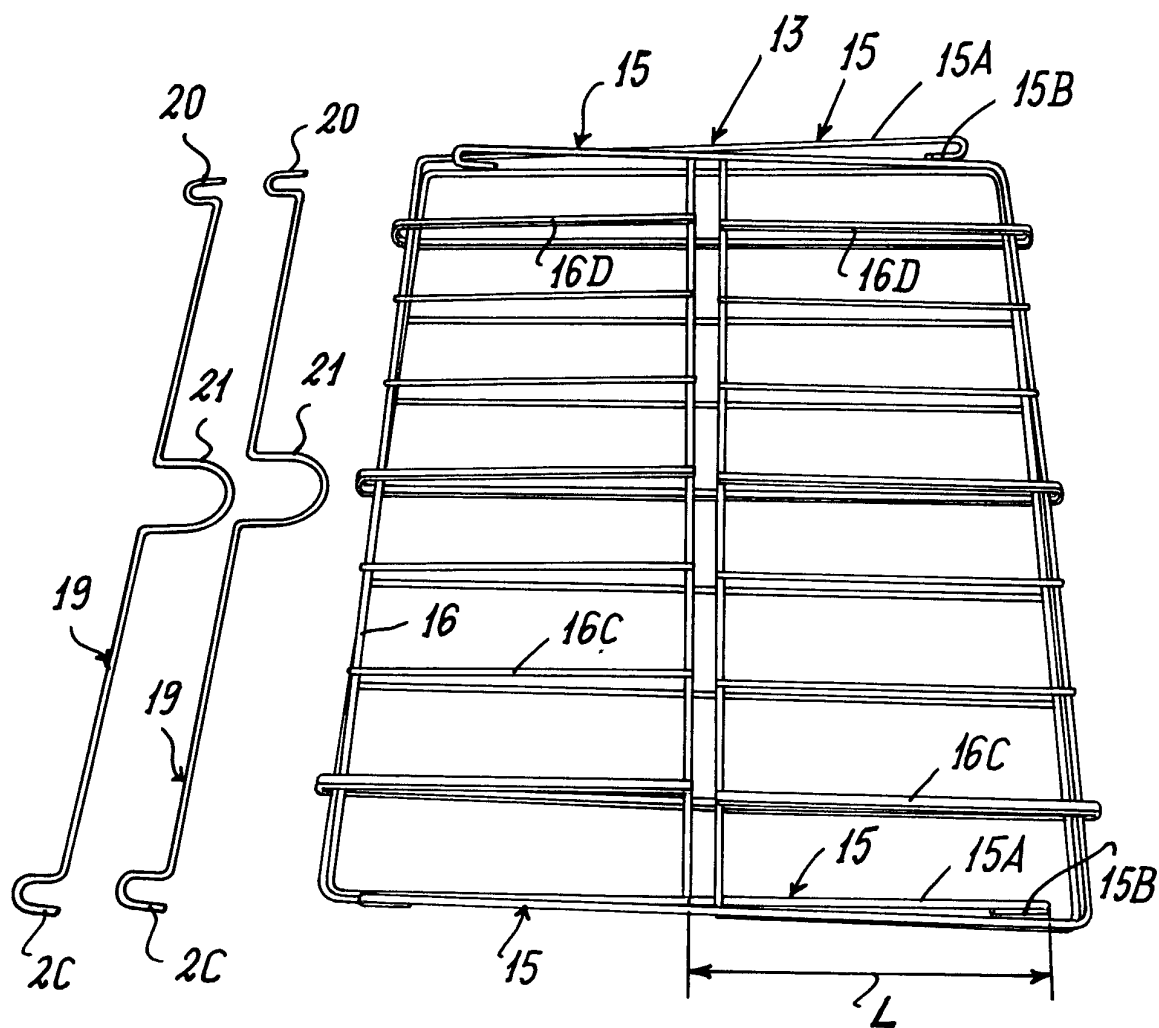


FIG. 6B



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 4409

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	CH 272 645 A (GUHL WILLY) 31 December 1950 (1950-12-31) * page 1, line 38 - page 2, line 26; figures 1-4 *	1, 6	A47B43/00 A47B55/02 A47B96/20
A	FR 2 779 211 A (FARGE ANTOINE) 3 December 1999 (1999-12-03) * page 2, paragraph 4 - page 3, paragraph 4; figures 1-6 *	1, 6	
A	GB 2 222 102 A (EXPRESS METAL FINISHERS) 28 February 1990 (1990-02-28) * abstract; figures 1-4 *	1	
A	GB 415 028 A (SNEAD AND CO) 7 August 1934 (1934-08-07) * claim 1; figures 1-5 *	1	
A	US 2 903 137 A (BROWN) 8 September 1959 (1959-09-08) * the whole document *	6-15	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A47B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		17 May 2001	Jones, C
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 12 4409

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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17-05-2001

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
CH 272645	A	31-12-1950	NONE	
FR 2779211	A	03-12-1999	NONE	
GB 2222102	A	28-02-1990	NONE	
GB 415028	A	07-08-1934	NONE	
US 2903137	A	08-09-1959	NONE	