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(54) SHELVING SYSTEM

(71) We, FRITZ SCHAFER GESELLSCHAFT MIT BESCHRANKTER HAFTUNG, Fabriken fur Lager—und Betriebseinrichtungen, of Fritz-Schafer-Strasse 20, 5908 Neunkirchen, West 5 Germany, a German Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a shelving system consisting of corner posts and first shelving members providing shelving surfaces and having corner stubs projecting at right angles therefrom. To form a shelving unit the shelving members are coupled to the corner posts with the corner stubs fitted into the open ends of the posts.

It is an object of the present invention to 20 provide a shelving system of this type in which the size of the units can be readily varied at a low cost.

It is a further object of the invention to 25 provide a shelving system of this type in which additional shelving members can be arranged with the surfaces of these additional members in the same plane as corresponding first shelving members.

According to the invention a shelving 30 system comprises folded sheet metal members which serve as corner posts and have suspension latches at least adjacent their ends, first shelving members providing shelving surfaces and having corner stubs 35 projecting at right angles therefrom, said first shelving members being connectable to the corner posts with the corner stubs fitted into the open ends of the posts, additional shelving members 40 providing shelving surfaces and having edge portions adapted for engagement with said suspension latches and coupling members for coupling together a first shelving member and an additional shelving member 45 lying side-by-side in the same plane.

As a result of the procedures which have been proposed, there is also obtained the advantage that the first and additional shelving members respectively disposed at

the same plane over the full length of the shelving unit abut tightly against the other and consequently it is possible to avoid the formation of relatively large gaps between their limiting edges which face one another. It is particularly advantageous in this connection if, in accordance with the invention, the suspension latches for the shelving members are designed as projections which project beyond the outside of the corner posts.

Starting from a constructional assembly 50 for a shelving unit, with which a basic shelving unit can be assembled from four corner posts and two first shelving members each carrying four corner stubs, it has been found to be particularly advantageous in accordance with the invention if, in order 55 to form extension shelving units, additional shelving members having two corner stubs are provided, which can be fitted, on the one hand, with their edge portions as rims or engaging claws engaging with the suspension latches on two corner posts of the basic shelving unit and, on the other hand, can be engaged with their corner stubs in two additional corner posts. In this case, in order 60 to form each additional extension shelving unit, it is likewise only necessary to have shelving members with two corner stubs and two additional corner posts, it being possible for the two corner posts to be 65 assembled with the two corner stubs of the additional shelving members and, on the other hand, for them to be supported on the suspension latches of the corner posts on the basic shelving unit.

On the basis of the constructional assembly 70 for basic shelving units as already previously set forth, it is, however, also possible, in accordance with another feature 75 of the invention, for two basic shelving units set up in spaced apart side-by-side relation to be connected by additional shelving members in the same planes as the shelving members of the units and which engage with their frame-like edges or engaging claws on the suspension latched on the corner posts of the basic units.

As regards the push-on couplings which

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serve for the mutual connection of the first and additional shelving members which are in the same planes, it has provided to be particularly desirable for these couplings 5 to consist of clips which are approximately U-shaped in cross-section, which clips are capable of being fitted into coupling slots near the edges of adjacent shelving members. Couplings which are produced in such a 10 manner can in fact be inserted relatively easily and safely after the assembly of the shelving unit has been completed, without the said couplings projecting essentially beyond the supporting surfaces thereof.

15 For the development of shelving units which can take a heavy load or in connection with shelving units having a large storage depth, which are for example accessible from opposite sides, it has also proved to be desirable for the shelving members to be supported at positions between the corner posts by intermediate posts which have projecting tongues arranged on their ends inserted into slots in the shelving members. 20 According to a further development of the invention, these intermediate posts can be provided with suspension latches, at least at their ends and on the outside, but advantageously also over their full length on 25 the outside and inside. These suspension latches not only support the bridging shelving members, but they serve, in association with the suspension latches provided on the corner posts, for supporting intermediate 30 shelving members fitted into the shelving unit.

35 It may also be desirable on many cases if the intermediate posts each consist of two folded sheet metal section members which are U-shaped or C-shaped in cross-section and which, with their open sides facing one another, are connected with a mutual spacing by cross-pieces, at least at their ends. Intermediate posts which are 40 so constructed not only have a high rigidity, but they also make it possible for partitions to be installed in the shelving units when they are required, and even also subsequently. In addition, tensioning bands, 45 which increase the rigidity of the shelving units under load, may also with advantage be provided at this position.

50 The intermediate posts may also be formed in one piece from sheet metal with a section which has an approximately C-shaped cross-section.

55 In order that the invention, may be more readily understood it will now be described, by way of example only, with reference to the accompanying drawings, in which:—

60 Figure 1 is a perspective view of a shelving unit comprising a basic shelving unit and an extension unit.

65 Figure 2 is a perspective elevation of dif-

ferent shelving members used in the basic shelving unit and an extension unit.

70 Figure 3 is a section on the line III—III of Figure 1.

75 Figure 4 is a section corresponding to Figure 3, but through a somewhat modified constructional form of a shelving unit.

80 Figure 5 is a perspective elevation of a push-on coupling member such as serves for connecting shelving members arranged juxtaposed in the same plane.

85 Figure 6 is a front perspective view of that region of an intermediate post which is designated by VI in Figure 1.

90 Figure 7 is a perspective view rear view of that region of an intermediate post which is shown in Figure 6.

95 Figures 8 to 10 are side elevations of an intermediate post with different forms of partitions.

100 Figure 11 is a diagrammatic front elevation of another construction form of the shelving unit according to the invention, and

105 Figure 12 is a partial elevation in perspective of the separate elements of the shelving system for forming a shelving unit according to Figure 11.

110 Illustrated in Figure 1 of the drawing is a shelving system comprising a shelving structure 1, which is formed essentially of a basic shelving unit 2 and an extension unit 3.

115 The shelving system comprises essentially four identical corner posts 4, which consist of folded sheet metal members, and two first shelving members 5¹ and 5¹¹, each of which provide a shelving surface and carries four corner stubs 6¹ and 6¹¹. On the shelving member 5¹, the corner stubs 6¹ project downwardly, while the corner stubs 6¹¹ on the shelving member 5¹¹ are directed upwardly. As regards their sectional form, the corner stubs 6¹ and 6¹¹ of the members 5¹ and 5¹¹ are identical and are so designed that they can be pushed in from above and below, respectively, into the open ends of the corner posts 4.

120 The structural assembly for the extension shelving unit 3, on the other hand, is composed essentially of two corner posts 4 and two additional shelving members 7¹ and 7¹¹, the said members 7¹ and 7¹¹ each providing a shelving surface and carrying two corner stubs 8 and 8¹¹. The corner stubs 8¹ and 8¹¹ are of the same sectional form as the stubs 6¹ and 6¹¹ and are also provided in the same arrangement on the shelving members 7¹ and 7¹¹.

125 All the corner posts 4 of the two construction assemblies have a C-shaped or G-shaped cross-section, as will be apparent from Figures 3 and 4. At the region of their ends, however, the corner posts 4 are so cut away over a length corresponding to the thickness of the members 5¹ or 5¹¹ and 7¹

or 7^{11} that only an approximately L-shaped cross-sectional region is left at these positions. This L-shaped cross-sectional region of the corner posts 4, in each case, engages with its two arms around the corner region of the shelving member fitted with its corner stubs into the corner posts 4, as may be clearly seen from Figure 1.

All corner posts 4, i.e. both those which belong to the constructional assembly for the basic shelving unit 2 and also those which are associated with the constructional assembly for the extension unit 3, are provided on their outer faces with a plurality of suspension latches 9, for example, in the form of upwardly open latching hooks or pockets which project outwardly from the corner posts 4 on which they are located and which are uniformly distributed over the full length of the said posts. Particular importance is attached to a suspension latch 9^1 disposed at the upper end of each corner post 4 at the height of the fitting zone for the shelving members 5^1 and 7^1 , respectively, while a corresponding suspension latch 9^{11} is provided at the bottom end of the corner post 4 at the height of the fitting region for the shelving members 5^{11} and 7^{11} .

As the basic shelving unit 2 is composed of the two shelving members 5^1 and 5^{11} and also of the four corner posts 4, those suspension latches 9^1 and 9^{11} which lie on the outside of the corner posts 4 remain free. If now an extension shelving unit 3 is to be installed on one or other side of the basic shelving unit 2 so as to lengthen the shelving structure 1, then initially the two additional shelving members 7^1 and 7^{11} are to be connected via their corner stubs 8^1 and 8^{11} with the two corner posts 4. It is then only still necessary for the lower member 7^{11} to be suspended in the lower suspension latches 9^{11} and the upper member 7^1 in the upper suspension latches 9^1 of the adjacent corner posts 4 of the basic shelving unit 2 in order to form the extended shelving structure 1.

In order that the additional shelving members 7^1 and 7^{11} may be safely coupled with the suspension latches 9^1 and 9^{11} , they are either provided with an edge bent over downwardly in the manner of a frame or even with separate engaging claws, which engage with a good fit into the suspension latches 9^1 and 9^{11} .

Furthermore, in order to secure the holding connection between the basic shelving unit 2 and the extension unit 3, push-on coupling members are also provided. These are advantageously made in the form of clips 10 having a substantially U-shaped cross-section, one of said clips being illustrated in Figure 5. These clips 10 can be inserted with each of their two limbs 10^1 and 10^{11} from above into slots 11^1 and 11^{11} , which are formed in the shelving members

5^1 and 7^1 , and 5^{11} and 7^{11} , respectively, of the two constructional assemblies and consequently directly connect to one another those members 5^1 and 7^1 , and 5^{11} and 7^{11} , respectively, of the basic shelving unit 2 and extension unit 3 which are on the same plane.

Suspension latches 12 in the form of upwardly directed hooks or pockets are also provided on the inside of each corner post 4, these latches 12 always being situated at the same height as the latches 9 on the outside of the corner posts 4.

As regards the basic shelving unit 2, intermediate shelving members 13 can be fitted at the height actually required in the suspension latches 12 of the four corner posts 4, these intermediate shelves 13 likewise engaging by means of edges which are bent down in the manner of a frame or even with separate engaging claws in the suspension latches 12. However, intermediate shelves 13 can also be arranged at the required height in each shelving unit 3, which shelves may firstly engage with their frame-like edges or fitting claws into the suspension latches 12 on the inside of the two corner posts 4 of the additional unit, and, secondly, in the suspension latches 9 on the outside of the corner posts 4 of the basic shelving unit 2.

It is also to be pointed out that, with shelving units which are under heavy loading or which are particularly deep, the shelving members 5^1 and 5^{11} , or 7^1 and 7^{11} , may be additionally supported relatively to one another by intermediate posts 14. These intermediate posts 14 also have suspension latches 15 on their external sides and corresponding suspension latches 16 on their internal sides. Other suspension latches 15 1 are provided at the top and bottom ends of the intermediate posts 14 on the outside thereof. The suspension latches 15 and 16 serve in their turn for supporting intermediate shelves 13 in the basic unit 2 and unit 3, respectively.

In order to fix the position of the intermediate posts 14 between the members 5^1 and 5^{11} , and 7^1 and 7^{11} , respectively, these members have slots 17, which are engaged by push-in tongues 18, which are provided at the top and bottom ends of the intermediate posts 14, as will be clear from Figures 6 and 7. However, suspension latches 15 1 and 15 11 are also provided at the top and bottom ends of the intermediate posts 14, with which latches the additional shelving members 7^1 and 7^{11} are able to engage in order to produce an additional supporting connection.

It will be seen from Figures 3 and 6 to 10 that each of the intermediate posts 14 may be composed of two folded sheet metal members 19 which are approximately U-shaped

in cross-section, the said members being arranged with their open sides facing one another and being held in spaced relation by cross-pieces 20 of Z-section members.

5 This development of the intermediate posts 14 makes it possible for intermediate walls or partitions also to be incorporated into the shelving units, even after they have been assembled, by the partitions being 10 pushed in sideways through the gaps between the members 19. The partitions in this case can be formed of sheet metal panels 21 which are stiffened, at least at the edges, or consist of wire mesh panels 22, such as indicated in Figure 8. However, 15 they can also be formed from lattice panels 23 or sheet metal box-like members 24, of which several are pushed in one above the other through the intermediate posts 14, as 20 can be seen from Figure 9.

Finally, however, the partitions can also be formed of sheet metal parts 25 which are so shaped that they are capable of being pushed in between super-imposed intermediate plates or shelves 13, as will be apparent from Figure 10.

Finally, however, the possibility is also provided of tensioning bands 26 being arranged in the fitting region of the intermediate posts 14, as illustrated in Figures 1 and 8. The bands 26 extend diagonally from the corners of the shelving and are hinged in pairs to straps which are engaged by an adjustable threaded spindle for tensioning the bands 26. These bands 26 serve to stabilise the assembled shelving structure and they are preferably so arranged that they engage over from the basic shelving unit 2 into the units 3 and possibly also 40 from these latter into the basic shelving unit 2.

If it is established from the outset that the shelving structure 1 has to be equipped in the region of the intermediate posts 14 with partitions, the intermediate posts can also be formed in one piece from sheet metal members which are substantially C-shaped in cross-section, as can be seen from Figure 4.

50 Differing from the shelving structure shown in Figure 1, the structure 31 which is illustrated in Figures 11 and 12 consists of two basic shelving units 32¹ and 32¹¹ and a supplementary unit 33, which is installed 55 between the two basic units 32¹ and 32¹¹.

The constructional assembly for the basic shelving unit 32¹ consists of two groups each of four corner posts 34¹, an upper shelving member 35¹ and a lower shelving member 35¹¹ and an intermediate shelf 35¹¹¹. The upper member 35¹ has four corner stubs 36¹ and the lower member 35¹¹ is fitted with four corresponding corner stubs 36¹¹. In this case, the corner stubs 36¹ and 36¹¹ extend 65 in only one direction from the members 35¹

and 35¹¹, respectively, namely, either downwardly or upwardly. By contrast, the shelf 35¹¹¹ has corner stubs 36¹¹¹, which are directed both upwardly and downwardly.

70 The basic shelving unit 32¹¹ in its turn consists of four corner posts 34¹¹ and also of two shelving members 35¹ and 35¹¹. While the length of each corner post 34¹¹ is twice the length of each corner post 34¹, the members 35¹ and 35¹¹ are of the same shape as the members 35¹ and 35¹¹ of the basic unit 32¹.

75 All that is necessary for forming the supplementary shelving unit 33 between the two basic units 32¹ and 32¹¹ are additional shelving members 37. These additional members 37 are pushed with their frame-like downwardly bent rims or even with separately formed engaging claws into suspension latches 39, which are arranged on the outside of the corner posts 34¹ and 34¹¹. These suspension latches 39 are so provided on the corner posts 34¹ and 34¹¹ that the bridging members 37, after the shelving assembly 31 has been completed, are able to lie in the same planes as the members 35¹, 35¹¹ and 35¹¹¹ and as a result form a shelving surface which is continuous over the entire length of the shelving structure 31. It is obvious that also other suspension latches are 80 provided on the insides and the outsides of the corner posts 34¹ and 34¹¹, into which intermediate plates or shelves can be fitted if required.

85 With the shelving structure 31 according to Figures 11 and 12, the members 37 can also be brought directly into a holding connection with the adjacent members 35¹, 35¹¹ and 35¹¹¹. Once again, U-shaped clips 10 serve as push-in couplings for this purpose, 90 which clips can be fitted with their two limbs 10¹ and 10¹¹ into slots 11¹ and 11¹¹, which are, on the one hand, provided in the bridging members 37 and, on the other hand, in the members 35¹, 35¹¹, 35¹¹¹.

95 In connection with Figures 11 and 12, it only remains to be additionally pointed out that it is also possible here for additional intermediate posts 14 to be fitted if necessary, as is the case with the shelving structure 1 according to Figure 1. The additional fittings such as partitions and tensioning bands, can obviously also be provided if required.

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WHAT WE CLAIM IS:—

1. A shelving system comprising folded sheet metal members which serve as corner posts and have suspension latches at least adjacent their ends, first shelving members 125 providing shelving surfaces and having corner stubs projecting at right angles therefrom, said first shelving members being connectable to the corner posts with the corner stubs fitted into the open ends of the posts, 130

additional shelving members providing shelving surfaces and having edge portions adapted for engagement with said suspension latches, and coupling members for coupling together a first shelving member and an additional shelving member lying side-by-side in the same plane. 45

2. A shelving system as claimed in claim 1, wherein said suspension latches comprise projections projecting outwardly from a face of the corner post. 50

3. A shelving system as claimed in claim 1 or 2, wherein said first shelving members each have four corner stubs and said additional shelving members have two corner stubs. 55

4. A shelving system as claimed in claim 3, comprising a pair of first shelving members connected to four corner posts, a pair of additional shelving members connected to a pair of additional corner posts and each having edge portions engaging suspension latches on a pair of corner posts such that the additional shelving members lie side-by-side and in the same plane as the first shelving members. 60

5. A shelving system as claimed in claim 1 or 2, and comprising a first unit consisting of a pair of first shelving members connected to four corner posts, a second unit consisting of a pair of first shelving members connected to four corner posts, said units being arranged in spaced apart relation and a pair of additional shelving members bridging the gap between the units and engaging with and supported on the suspension latches on corner posts of the first and second units. 65

6. A shelving system as claimed in any preceding claim, wherein said coupling members comprise U-shaped clips having a pair of limbs which are adapted to be fitted into coupling slots positioned near the adjacent edges of a first shelving member and an additional shelving member. 70

7. A shelving system as claimed in any preceding claim, and including intermediate posts having tongues at each end which are adapted to engage with slots formed in the first shelving members. 75

8. A shelving system as claimed in claim 7, in which each intermediate post is a folded sheet metal member of approximately C-shaped cross-section. 50

9. A shelving system as claimed in claim 7, in which each intermediate post comprises two folded sheet metal members each of U- or C-shaped cross-section arranged in spaced apart relation with their open sides facing one another and connected together at their ends by cross-pieces. 55

10. A shelving system as claimed in claim 7, 8 or 9, wherein each intermediate post has suspension latches at least at its ends and preferably spaced apart along its entire length on both its inside and its outside. 60

11. A shelving system as claimed in claim 9 or 10, an dincluding partitions adapted to be fitted in the spaces between the members of each intermediate post so as to extend normal to the planes of the shelving members. 70

12. A shelving system substantially as hereinbefore described with reference to the accompanying drawings. 75

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