

[54] CARREL CONSTRUCTION

[75] Inventor: Alan Carleton Burr, East Norwalk, Conn.

[73] Assignee: Howe Folding Furniture, Incorporated, New York, N.Y.

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[51] Int. Cl. A47b 57/00, F16b 12/00

[58] Field of Search ... 312/108, 111, 140, 196, 257; 108/60, 61, 91, 107, 114, 148; 287/56, 127, 80.36 DT; 211/148, 176, 177; 52/281, 282, 285

[56]

References Cited

UNITED STATES PATENTS

2,503,733	4/1950	Heller	248/243 X
2,972,415	2/1961	Rensch	211/148
3,265,344	8/1966	Ornstein	248/243
3,587,867	6/1971	Fenwick	211/148
3,613,900	10/1971	Chiu	211/148
D219,519	12/1970	Gianfagna	108/60
3,339,502	9/1967	Fyffe	108/60
3,602,159	8/1971	Marschak	108/111
3,346,126	10/1967	Bloom et al.	211/176
3,045,834	7/1962	Seiz	211/177
1,473,817	11/1923	Gorsline	312/108 UX
3,295,695	1/1967	Carmstrom	108/107
2,919,033	12/1959	Lundqvist	108/108

3,517,623	6/1970	Goldstein	108/60
3,513,606	5/1970	Jones	211/177
2,692,055	10/1954	Feiertag	108/111
576,572	2/1897	Gohlke	287/92.7

FOREIGN PATENTS OR APPLICATIONS

604,386	0/1960	Italy	287/20.94
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[57]

ABSTRACT

Carrel system support framework comprising pairs of uprights and interconnecting cross members, is formed by inserting through the uprights pins with circumferentially grooved ends adapted to enter and engage the end of an opposed cross member or members; one or more horizontal planar members are supported in cantilever fashion from a cross member by hook and slot interconnections; backs with laterally protruding headed hanger pins are hung between pairs of uprights the upper ends of which are slotted to receive the hanger pins; side panels each with a headed hanger pin projecting from one end are supported from the uprights respectively by inserting the hanger pins in other slots in the upper ends of the uprights; and shelves with recessed ends are supported by and between spring-wire brackets which are assembled in opposed relation on the opposed faces of a pair of side panels, or a side panel and a back of one carrel which is acting as a side panel of another carrel.

7 Claims, 10 Drawing Figures

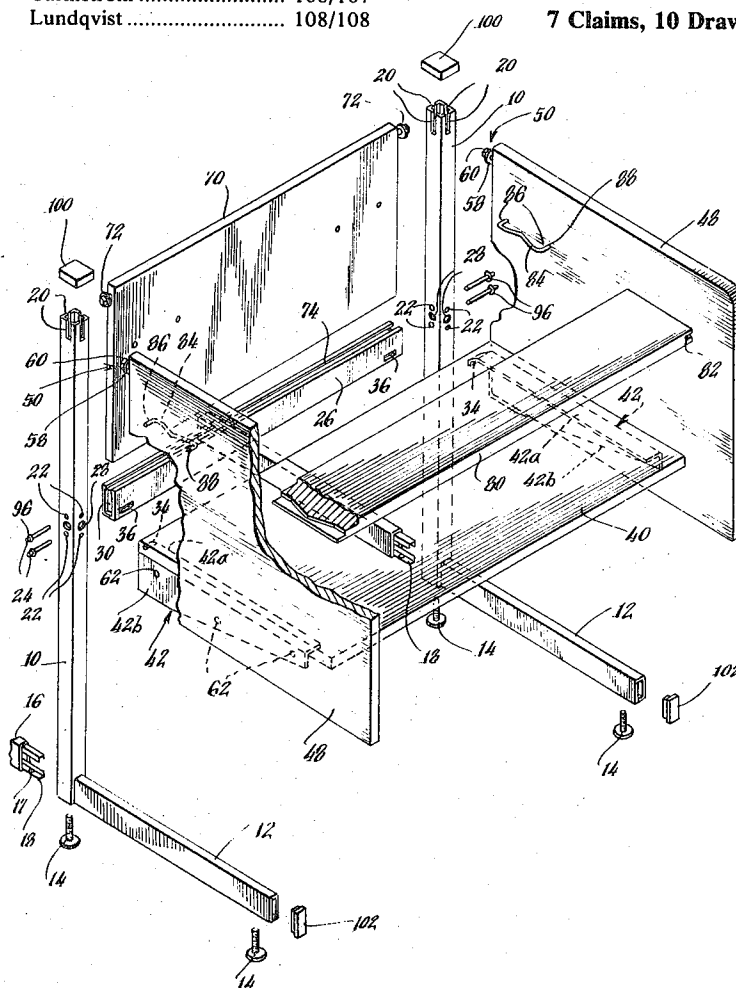
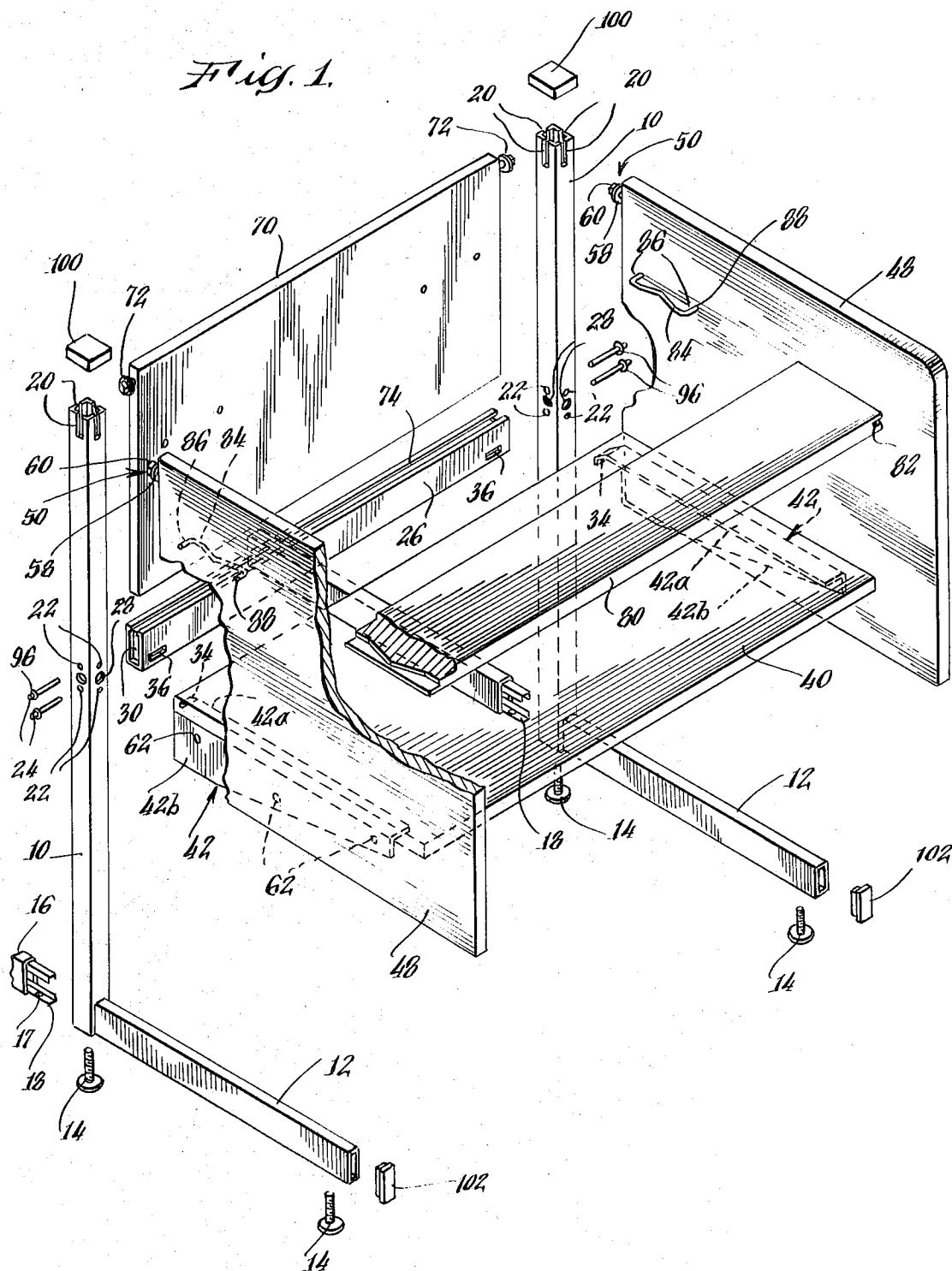


Fig. 1.



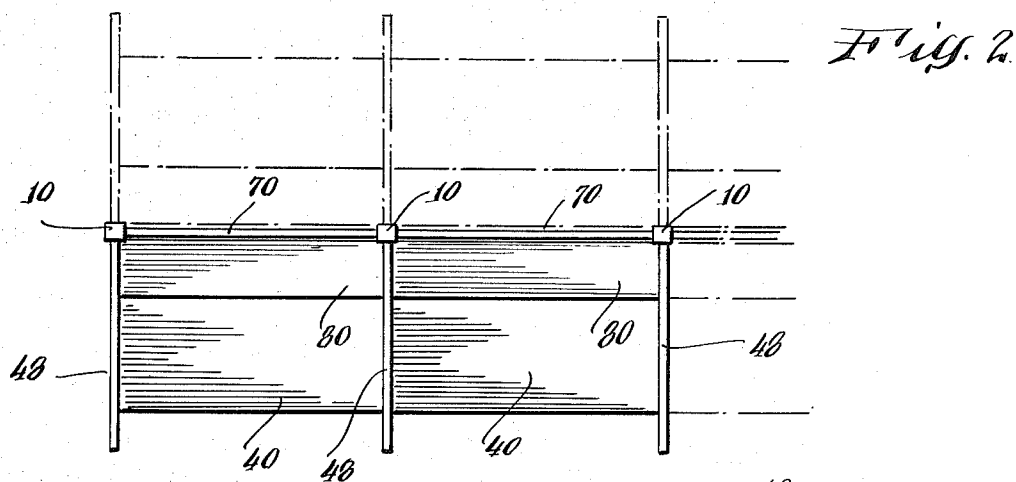


Fig. 3.

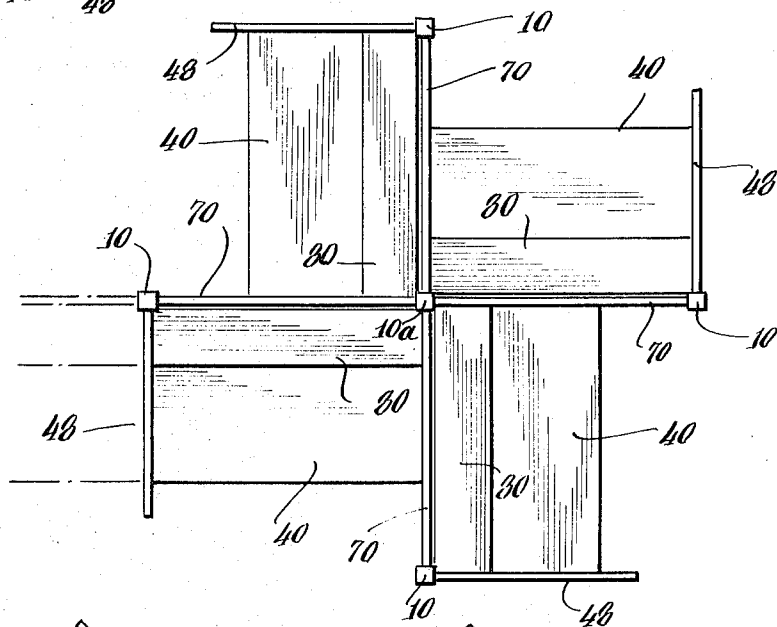


Fig. 4.

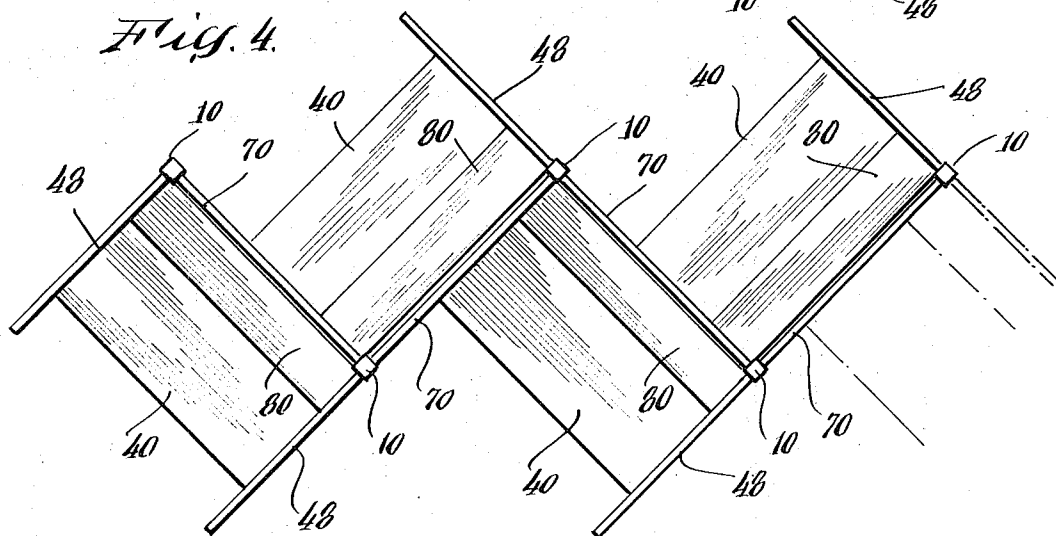


Fig. 5.

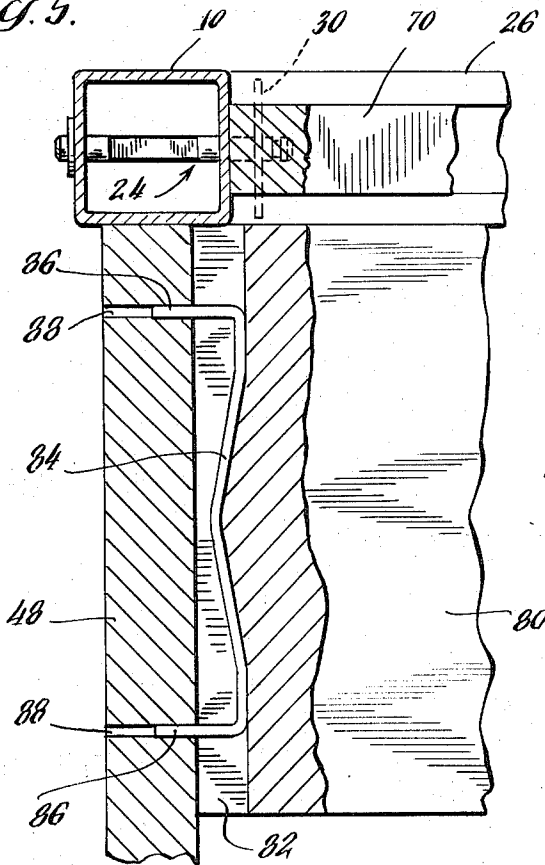


Fig. 6.

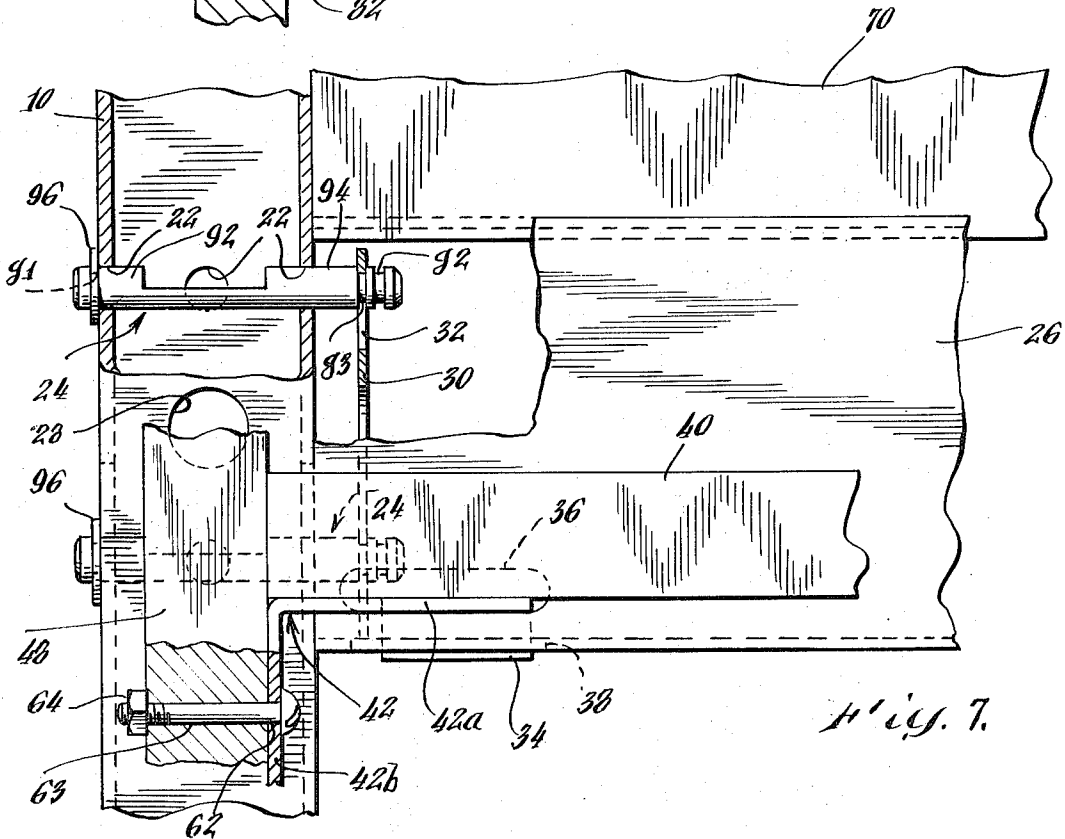
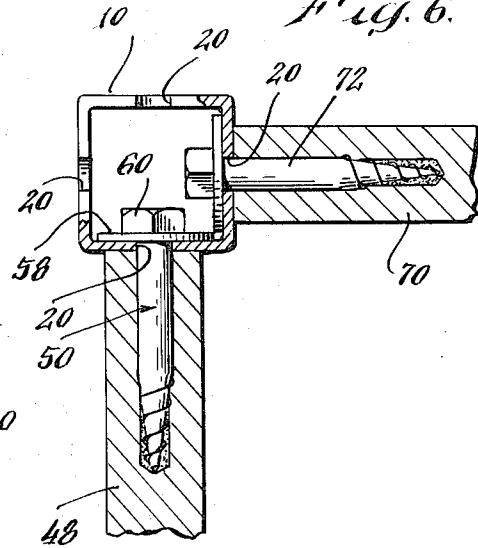


Fig. 9

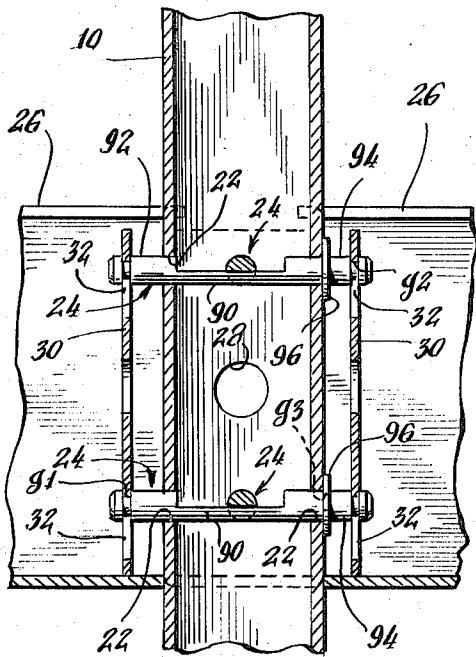


Fig. 8.

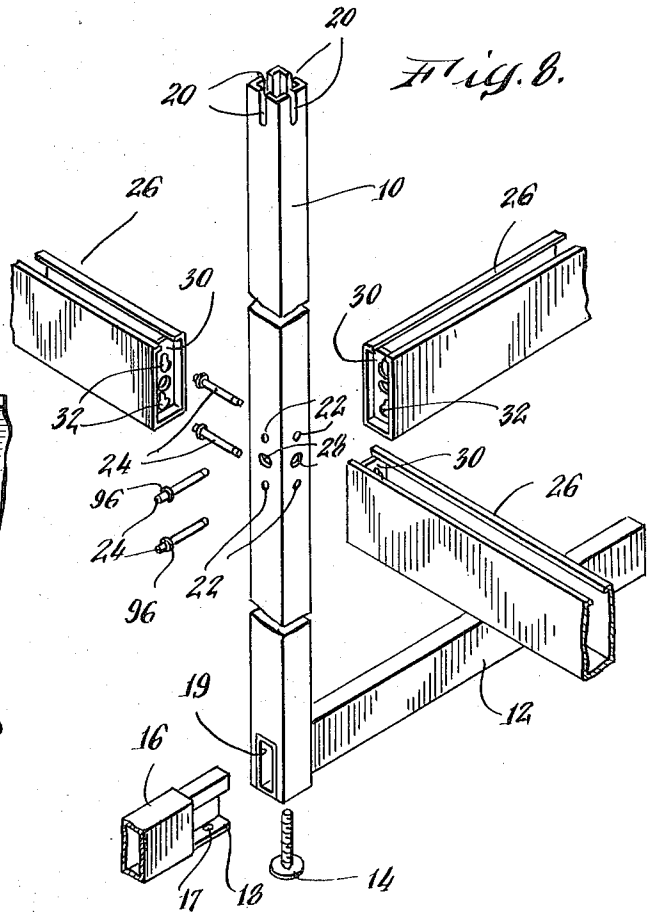
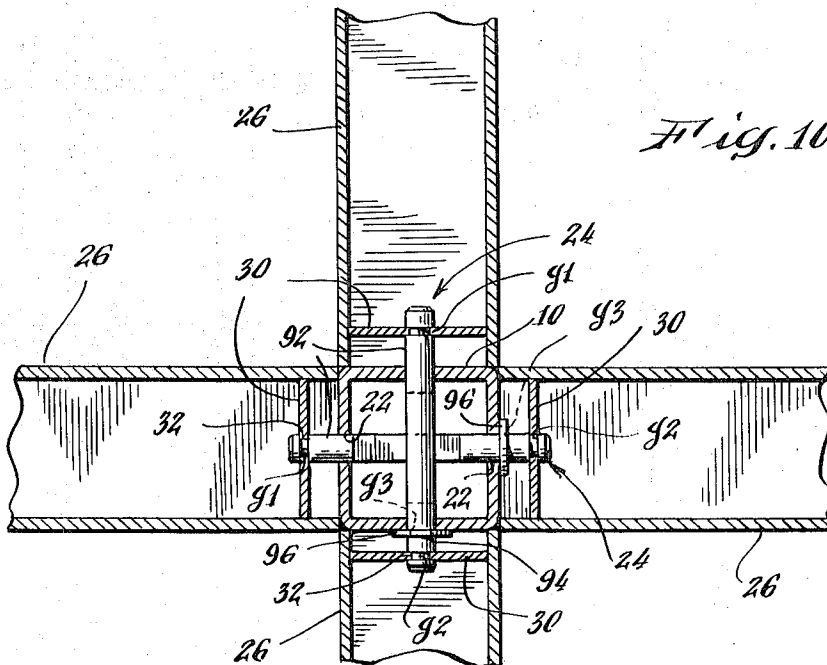


Fig. 10.



CARREL CONSTRUCTION

FIELD OF THE INVENTION

This invention relates to a carrel system and structure comprising parts which are preformed in such a way that a single carrel, and clusters and groupings of carrels may be assembled quickly and easily and with a minimum number of parts. The parts are so preformed that they may be assembled in the same way and without modification regardless of whether they are employed to form carrels arranged side by side, or back to back, or with one carrel disposed at a right angle to another.

In prior art carrel knockdown structure workmen when assembling a cluster of carrels had to prepare parts at the place of assembly to conform to the disposition of the carrels within a cluster, and if a change in design of a cluster was decided upon at least some of the parts had to be reprepared before they could be reassembled in the new design. Thus, for example, in one prior art type of structure hooks for engaging and supporting stretchers were attached at the place of assembly to particular faces of uprights, the particular face or faces depending upon the grouping of carrels which was desired. If two or more carrels were to be assembled side by side the workmen would attach the hooks to particular faces of the uprights, but if carrels were to be assembled back to back some of the hooks would have to be moved to other faces of the uprights.

By the structure disclosed herein the interengagement of the parts of a single carrel assembly and especially of a cluster or grouping of carrels is greatly simplified and the inventory of parts which a school or other user has to have on hand is reduced to a minimum.

This invention will be best understood by reading the following description in connection with the drawings in which,

FIG. 1 is a perspective view of a carrel structure embodying the invention with the parts in exploded relation,

FIG. 2 shows a pair of carrels in full lines in side by side relation, with another pair of carrels, indicated in dotted lines, disposed in back to back relation to them,

FIG. 3 shows an assembly of four carrels with each carrel disposed at a right angle with respect to two of the other carrels, in a pinwheel arrangement,

FIG. 4 shows another arrangement of carrels disposed at a right angle one to another in diagonal rows,

FIG. 5 is a top plan view partly in section showing one end of a cross member or stretcher connected to an upright by a pin and retainer ring assembly, with a side panel projecting from the upright at right angles to the stretcher, and with a spring-wire bracket projecting from its inner face into the recessed edge of a shelf which it is supporting,

FIG. 6 is a top plan view showing the upper end of an upright formed with four downwardly extending slots spaced apart angularly by 90°, with an end of a back panel supported from the upright by means of a hanger pin seated in one of the slots of the uprights with its head disposed on the inside of the upright, and also showing a side panel similarly supported and extending at right angles to the back panel,

FIG. 7 is a front elevation partly broken away showing one end of a stretcher supported from an upright by

means of a pair of interconnecting pins of special design which is the subject of copending application Ser. No. 230,003 filed Feb. 28, 1972 and also showing the stretcher provided with an opening in its face and a slot in its lower edge, and a hook-like attaching bracket which extends rearwardly from a horizontal planar member and is inserted through the opening and the slot in the stretcher and serves to support the horizontal planar in cantilever fashion, and also showing how the horizontal planar when in assembled position may be interconnected with a panel by means of a screw or bolt,

FIG. 8 is an exploded view showing three stretchers disposed in relation to a four-sided tubular upright, each stretcher being formed with end plates which are apertured to receive pins passed through aligned sets of holes in the upright and also showing a foot member adapted to be detachably engaged at the lower end of the upright and extending in the opposite direction from a foot member which may be formed integrally with the upright,

FIG. 9 is a front elevation of a vertical section through the upright showing a pair of stretchers supported from opposite faces of the upright by a pair of interconnecting pins, and showing retainer rings disposed on the interconnecting pins respectively in a manner different from that illustrated in FIG. 7 where the pins are supporting only one stretcher; this figure also shows in cross section a pair of pins extending through the upright at right angles to the pins which are interconnecting the opposed pair of stretchers, with the cross pins, because of the special construction of the pins being disposed at the same levels and in the same horizontal planes as the respective first mentioned pair of pins, and,

FIG. 10 is a top plan view taken on the lines 10—10 of FIG. 9 showing a pair of interconnecting pins disposed at right angles and extending through the upright at the same level, with each end of each pin being connected to a stretcher, so that in this arrangement four stretchers extend from four different faces of an upright thus indicating a disposition of four carrels in a pinwheel cluster such as is shown in FIG. 3.

DESCRIPTION

As shown in the illustrated preferred embodiment of the invention the elements of a single carrel structure made in accordance with the invention comprise two upright support members 10 which are tubular and substantially square in cross section. Extending in one direction from the uprights at their lower ends are the foot members 12 which may be integral with the uprights and may be mounted on adjustable glides 14 by means of which compensation for unevenness in a floor surface may be made. One of the glides is aligned with an upright 10 and may serve for the attachment to the upright of another foot member 16 by being inserted through a hole 17 (FIG. 8) provided in finger means 18 projecting from one end of foot member 16 and received in an opening 19 provided for in the lower end of the uprights.

The horizontal planar and side panels of a single carrel are supported in cantilever fashion and extend in the same direction as the feet 12. The additional feet 16 are employed when a pair of carrels is constructed in back to back relation.

Each of the uprights 10 is formed with slots 20 extending downwardly from the top in all faces of the upright. At a lower level below the slots 20 the uprights are provided with one or more pairs of holes 22 aligned horizontally. Through these pairs of holes pins 24 are inserted to engage and support stretcher members 26 by which a pair of uprights 10 are spaced apart and interconnected.

The stretchers 26 may also serve as wireways through which electrical conduits may be led for attachment for example to electrical apparatus such as a film projector or a sound reproducing device, or to lighting means. It will be noted that in the uprights 10 between upper and lower pin receiving holes 22 larger apertures 28 are provided through which if desired conductors may be led up inside the uprights from their lower ends and may be directed into apertures provided in the ends of the stretcher-wireways 26. The use of cross members or stretchers 26 as wireways is well known and forms no part of this invention.

Within each stretcher member or cross member 26, adjacent to each end but spaced inwardly from the ends, vertical end plates 30 are provided, as is shown in FIGS. 7-10, and each end plate is apertured to receive one or more pins 24 which have been inserted through horizontally aligned holes 22 in an upright 10. Preferably the pin receiving apertures in the end plates 30 take the form of keyhole slots, as shown in FIG. 8. For attachment to an upright 10 an end of a stretcher 26 is brought into alignment with the projecting end of a pin or pins projecting from the upright, and after receiving the projecting end of the pin or pins in the larger portion of an opposed keyhole slot or keyhole slots the stretcher end is lowered allowing the projecting end of the pin or pins to enter the narrow end of the keyhole slot or slots where the edge of the portion of the end plate defining the slot or slots enters a circumferential groove provided in the surface of the opposed pin or pins, thereby interengaging the stretcher with the pin or pins. The plates 30 are spaced inwardly from the ends of a stretcher sufficiently so that when the end plate has become seated in a groove in the projecting pin means the end portion of the stretcher extending beyond the cross plate will extend to, and be in abutting relation with a face of the upright.

After a pair of stretchers has been interconnected to and between a pair of uprights the next step in assembling a carrel is to attach a horizontal planar member and this is done by inserting hook-like means 34, which project rearwardly from each top, into pairs of slots 36 and 38 provided in the face and in the bottom of the stretcher 26. As is best seen in FIG. 1 each horizontal planar member 40 comes equipped with a pair of angle brackets 42 depending from its lower surface adjacent its ends respectively, and the upper, horizontal flanges 42a of these brackets are extended rearwardly and bent downwardly to provide first an inclined portion and then a portion disposed at a right angle to the flange 42a, forming a hook-like member which when inserted through a slot 36 in a face of the cross member 26 and then downwardly into a slot 38 in the bottom of the cross member, serve to position the horizontal planar member 40 in a horizontal plane, extending at a right angle with respect to the stretcher member 26. The horizontal planar member is thus supported in cantilever fashion.

In the assembly the next step is to attach the side panels 48. The side panels are alike in structure and each has extending from one end a hanger pin 50 which may be essentially a lag screw with a washer-like head 58 disposed on the shank of the screw in abutting relation to the polygonal head 60 of the lag screw. For shipment the lag screws may be fully screwed into the side panels respectively but at the time of assembly they are unscrewed slightly to provide a space between the end of the panel and the head 58 to enable the shank of the lag screw to be inserted in a slot 20 in the upright with the enlarged head of the hanger pin disposed inside the upright, in abutting relation to the inner surface of the upright. In this way a pair of side panels are quickly placed in position and are supported in cantilever fashion extending along the ends of the horizontal planar member 40.

Each of the side panels 48, and each of the vertical flanges of brackets 42 depending from the horizontal planar member 40, are formed with holes which, when the top and side panels are in place, come into alignment, and bolts 64 may be inserted through the pairs of aligne holes to tighten the assembly.

The backs 70 are next assembled. They are provided with hanger bolts 72, projecting from each end of the back. The hanger bolts 72 may be similar to the hanger bolts 56 which project from an end of each side panel and are described above. The back is quickly placed in position by dropping the hanger bolts 72 into the slots 20 of opposed pairs of uprights. The upper edges 74 of the stretchers are channel shaped and when a back 70 is lowered into position by insertion of the hanger pins into opposed slots 20 in an opposed pair of uprights 10, the lower edge portion of the back is aligned with the upper edge of the stretcher and enters the channel 74, thus giving further support and stability to the lower end of the back.

A basic carrel is now assembled. However a shelf is usually desired as part of a carrel assembly and shelves 80 are provided the ends of which are recessed with recesses 82 shaped to conform to the contour of opposed spring wire brackets 84 which are bail shaped and are mounted on the opposed faces of opposed pairs of side panels by inserting the bent over end portions 86 of the brackets in preformed holes 88 provided in the side panels respectively. The holes 86 are deep enough so that a bracket 84 may be mounted on each face of a side panel, as for example when a pair of carrels are assembled in side by side relation, in which case the intermediate side panel will be common to both of the carrels.

After a pair of spring wire brackets are positioned a shelf may be quickly placed in position by holding the shelf in horizontal position and moving it against the forward ends of the supporting brackets which enter and become engaged in the sculptured ends of the shelf providing a firm support for the shelf.

In some carrel assemblies, such for example as shown in FIG. 3 and 4, a back panel of one carrel may be employed as a side panel of an adjoining carrel and for this reason holes 88 for mounting brackets 84 are also provided extending through the back panels. These holes are not visible in an assembled carrel as they are hidden by a shelf.

When two carrels are arranged in back to back position there is a back panel and a cross member or stretcher which are common to two carrels. In order to

be available for this use stretchers may be made so that they are similarly apertured in both faces and also provided with two sets of slots in its lower edge to receive the hook-like members projecting rearwardly from the tops and support the tops projecting from it in opposite directions. Of course when carrels are disposed in back to back position the detachable foot members 16 are attached to the uprights and extend in the same directions as one of the horizontal planar members.

Difficulty is often encountered in inserting a screw member such as the hanger pins 50 and 72 in the edges of panels made of plastic, powdered wood and the like without expanding and splitting the panel and accordingly in preparing the side panels and the back panels of this assembly the hanger pins are preferably inserted in the manner described and claimed in copending patent application Ser. No. 230,002 filed Feb. 28, 1972.

For some carrel clusters such for example as those shown in FIG. 3, the middle upright 10a may support the abutting ends of four stretchers projecting outwardly from the four faces of the upright and therefore spaced from one another by rotary angles of ninety degrees. For supporting three or four stretcher ends from the same upright and at the same level preferably pins are employed of the kind described and claimed in my copending patent application, Ser. No. 230,003 filed Feb. 28, 1972. Such pins are indicated in FIGS. 8, 9 and 10. They are not only grooved circumferentially at each end to engage edge portions of the end plates of opposed stretchers, but the pins are also formed so that one pin may be crossed over another and inserted through an upright at right angles to the other pin and in the same plane. To accomplish this each pin 24 is provided with a portion 90 of reduced diameter, of predetermined length and disposed between the ends of the pin so as to provide a short end portion 92 of full diameter and a longer end portion 94 of full diameter. When two pins are to be inserted through an upright at the same level one pin is first inserted through a pair of horizontally aligned holes 22 with the longer end portion 94 of the pin as the leading end. The other pin is then inserted through a set of cross holes 22 which are disposed at right angles to the set of holes through which the first pin is inserted, with the short end portion 92 of the pin as the leading end. The provision of a short end portion 92 followed by a long reduced portion 90 enables the second pin to be inserted into the upright at an angle and moved forward at the angle until the short end passes over the reduced portion 90 of the first inserted pin, after which the second pin may be lowered to a straight line position so that its leading end portion 92 can be aligned with, and inserted through, the opposed hole 22 in the far side of the upright, since, after the end portion 92 of the second pin passes over the first pin, its reduced portion 90 will be disposed against and slide over the reduced portion 90 of the other pin, allowing both pins to be disposed in the same plane.

For making a pin 24 adapted when inserted through an upright to engage and support a stretcher from one face of the upright, or from two opposite faces of the upright, the short end portion of the pin is provided with a single groove g-1 and the long end portion 92 is provided with two circumferential and axially spaced grooves g-2 and g-3. When the pin is to be used to support only one stretcher it will be inserted through an

upright 10 to the extent illustrated in FIG. 7, and the inner groove g-3 of the pair of grooves in the end portion 94 is used to engage the slot defining edge portion of the plate 30 in the opposed end of the stretcher, a retainer ring 96 may be placed in groove g-1 in the shorter end portion of the pin, in abutting relation to the outer face of the upright 10, the function of ring g-6 being to hold the pin in the desired position and prevent it from moving axially in the direction of the longer end portion 94, which might result in detachment of the stretcher from the upright.

When stretchers are to be supported from opposite faces of an upright the pins 24 are disposed projecting equal distances beyond the opposed faces of the upright, and the groove g-2 is used to engage the opposed stretcher end plate 30 of one stretcher end, the plate 30 of the oppositely extending stretcher is engaged in groove g-1, and the retaining ring 96 is placed in groove g-3, as is shown in FIG. 7, 9 and 10.

By means of the coacting attachment means provided herein, including the slots 20 from the tops of the upright members and the hanger pins 72 projecting from the ends of the backs; the slots 20 in the uprights and the hanger pins 56 projecting from one edge of the side panels; the interconnecting pins 24 coacting with the slot defining edge portions of the plates 30 at the respective ends of the stretchers; the spring wire brackets, and the means for mounting them on one or both sides of the side panels and in some instances from one face of a back which is serving as a side panel in some of the cluster arrangements, coacting with the shelf members having sculptured ends to receive and interengage with the said spring wire brackets; and the provision of demountable foot members 16 which may be quickly added to help provide carrel clusters of various groupings, the parts needed to form one carrel, or several carrels arranged in clusters of different shapes and designs, may be quickly assembled on the spot where needed with a minimum of time and effort.

If desired the hanger pins of the back and the side panels may be tightened up after they have been dropped into the opposed slots 20 in the upright members and for this a box wrench may be employed. If screws are used to interconnect the side flanges of brackets 42 depending from a top 40 with the opposed side panels, a screw driver, preferably a phillips screw driver, may be employed, and for making sure that the hanger pins of the back and side panels are fully inserted in the grooves 20 in the uprights, and also for making sure that the hook members 34 extending from the tops are fully inserted in the coacting pairs of slots provided in a face and in the bottom of the stretchers, a rubber mallet may be employed. At the most only three tools, a screw driver, a wrench and a rubber mallet are required for assembling the carrels.

It will be apparent that if desired carrels of different sizes can be intermixed in a variety of arrangements.

If desired for improving the appearance of an assembled carrel or carrels, the cap members 100 may be provided for fitting over the grooved tops of the upright member 10, and the caps 102 may be provided on the outer ends of the foot members.

I claim:

1. A system for forming selectively any of a number of differently shaped carrel clusters which comprises, in combination,

at least a plurality of upright tubular support members each having a horizontally extending base member, each of said upright members having two pairs of holes extending through it at the same level, the holes of each pair extending in alignment through opposite faces of the support member, a number of pairs of cross pins each adapted for insertion through a pair of said aligned holes in a support member for intersecting disposition with their ends extending beyond opposed faces of the support, one or more stretcher members each adapted to space apart a pair of upright supports and to cooperate with said pins for interconnection to the pair of upright supports between which it is disposed, means attached to said stretcher members for receiving said cross pins, and means to provide clearance between said cross pins at their intersections, each of said support members having four hanger-bolt receiving slots equally spaced apart around its top and extending downwardly a distance from the top thereof, one or more members adapted to serve either as the back panel or one of the sides of the carrel, each said member having a headed hanger-bolt projecting outwardly from its outer ends, the heads of the hanger-bolts being spaced from the ends of each of said members sufficiently to allow the shank of a hanger-bolt to be dropped into one of the slots in a support member with the head of the hanger-bolt disposed behind the slot, one or more carrel side members similar to the back members and each said side member having a headed hanger-bolt projecting outwardly from only one of its ends in position to be dropped into one of the slots in a support member with the head of the hanger-bolt behind the slot, one or more horizontal planar members each adapted to be disposed in a horizontal plane in front of one of the assembled back members and between two opposed side members, or a side member and a back member which is serving as a side member, each of said stretcher members and each of said horizontal planar members comprising means which are coactive, one with the other, to interengage and support the horizontal planar member in cantilever fashion in a horizontal shelf plane.

2. The system defined in claim 1 including a plurality of spring wire members for interconnecting one or more additional horizontal planar members to side members and/or a back member employed as a side member, each spring wire member having end portions bent so that they extend in the same direction in parallel relation and an intermediate portion curving outwardly from the inner ends of the end portions respectively in the direction of a line joining the outer ends of the said end portions, each side member and each back member being provided with spaced holes to receive the ends of a spring wire member to support the spring

wire members in a horizontal position, the end edges of each said additional horizontal planar member being provided with reentry grooves contoured to correspond to the curvature of the intermediate portion of a spring wire member, whereby, when an additional horizontal planar member is inserted between two side members or a side member and a back member serving as a side member, on a level with opposed spring wire members mounted on said side members, or a side member and a back member serving as a side member, the spring wire members will be first deformed and will then spring into the said reentry grooves in the ends of an additional horizontal planar member and be fully engaged therein.

3. The combination of claim 1 and interchangeable foot members having means adapted to coact with means at the lower end of each upright support member for attachment to the upright support members respectively disposed so as to extend outwardly from the lower ends of upright support members respectively under each cantilever supported shelf.

4. In a system as defined in claim 1 a foot member comprising an elongated bar, a tenion tongue formed on one end of said bar, a mortise opening formed in the lower end of an upright support, and a screw support threadably insertable through said combined mortise and tenion for joining the same while simultaneously serving as a level adjusting foot support.

5. The carrel system defined in claim 1 in which the upper edges of the stretcher members define channels to receive the lower edges of the back panel members respectively and the back panel members are supported above the stretchers respectively and in the same vertical plane, with the lower edges of the back panel members extending down into the channels defined by the stretcher members.

6. The combination claimed in claim 1 in which the upright members are tubular and are formed with one or more pairs of diametrically aligned holes, the ends of the stretcher members define holes, and cross pins are provided for interconnecting the ends of the stretcher members to the upright support members respectively, the pins being of uniform diameter and provided with circumferential grooves adapted respectively to receive and interengage with the walls of the upright members and the ends of the stretcher members respectively.

7. The structure claimed in claim 6 in which the tubular uprights are provided with diametrically opposed holes extending in one vertical plane and other diametrically aligned holes extending in a plane at right angles to the first mentioned plane, and the pins have intermediate portions which are reduced in diameter and are half round so that the intermediate portion of each pin defines a flat face whereby pins may be inserted through the tubular uprights in the same plane and disposed at right angles with the flat face of one pin in abutting relation to the flat face of another pin normal to it.

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