BEST AVAILABLE COPY

June 27, 1972 K. H. TAUT 3,672,739

MODULAR, KNOCK-DOWN FURNITURE

Filed Aug. 6, 1970 4 Sheets-Sheet 1

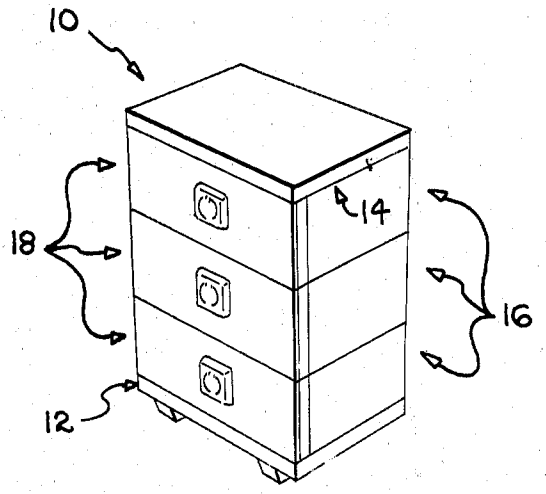


FIG. 1

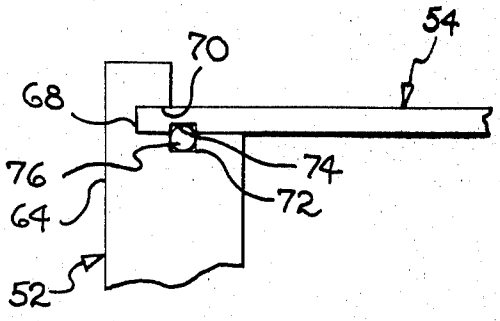


FIG. 3

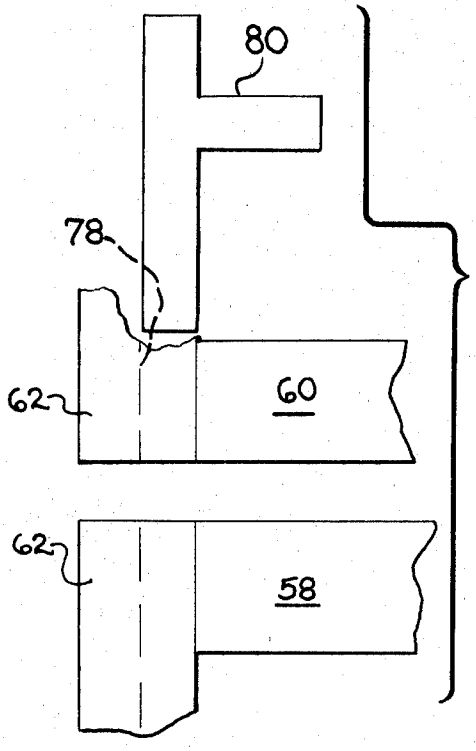


FIG. 4

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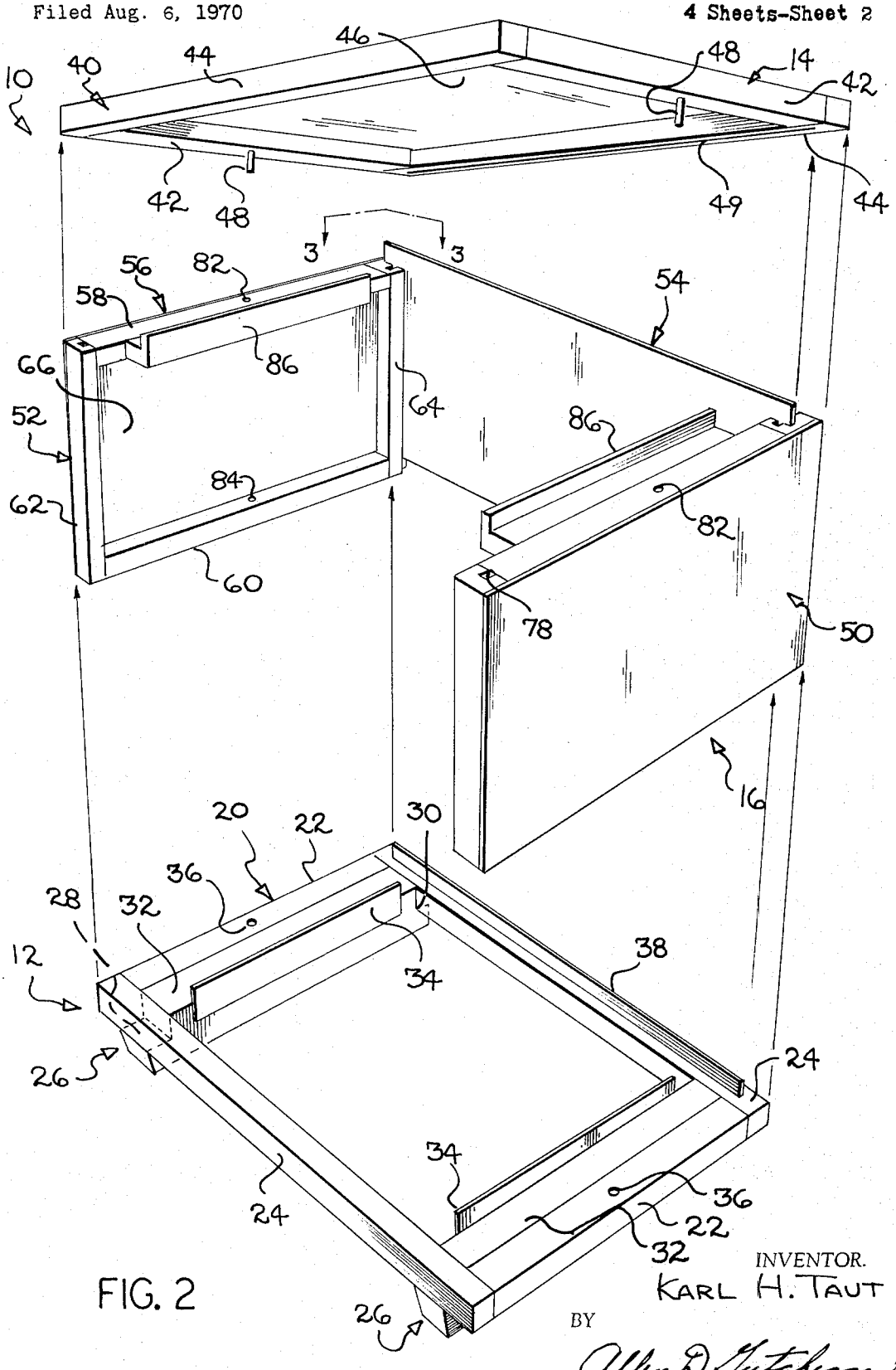


FIG. 2

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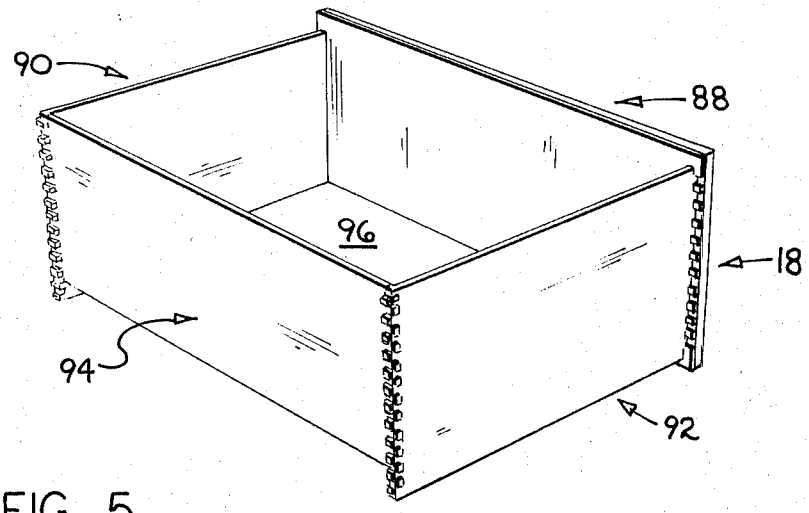


FIG. 5

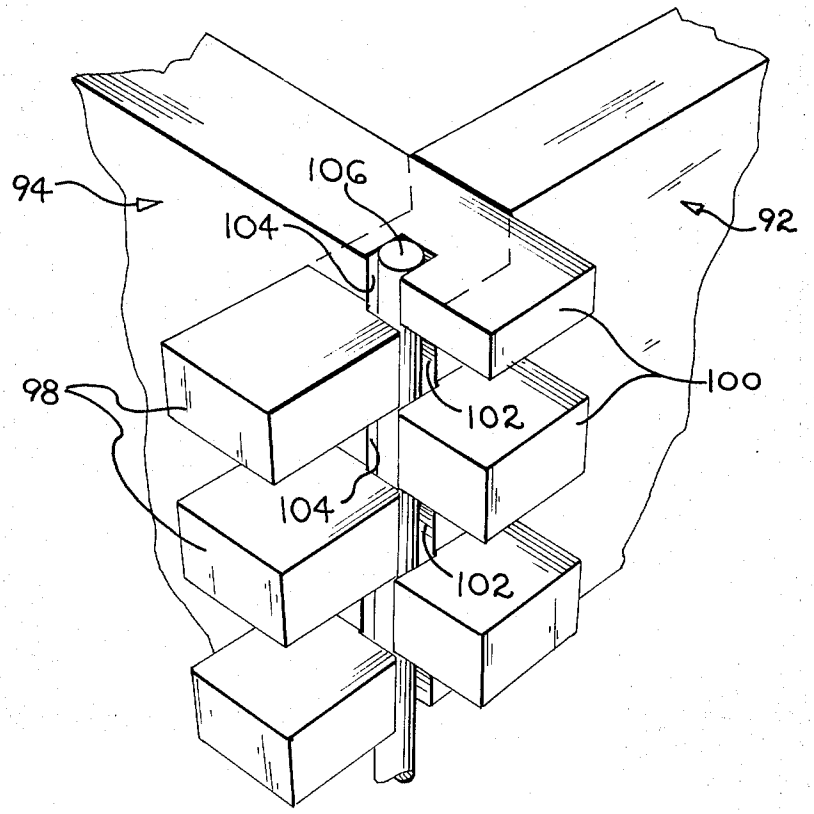


FIG. 6

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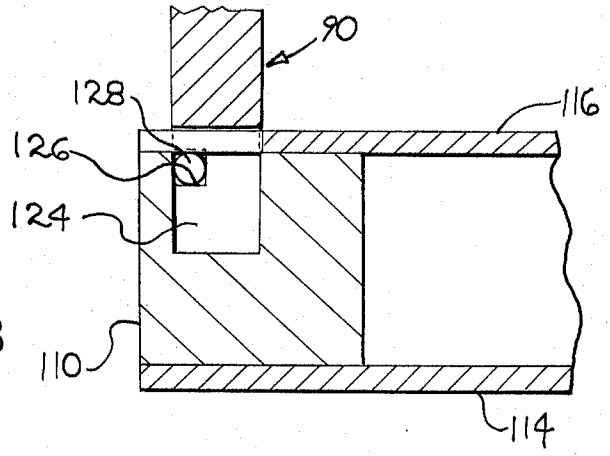


FIG. 8

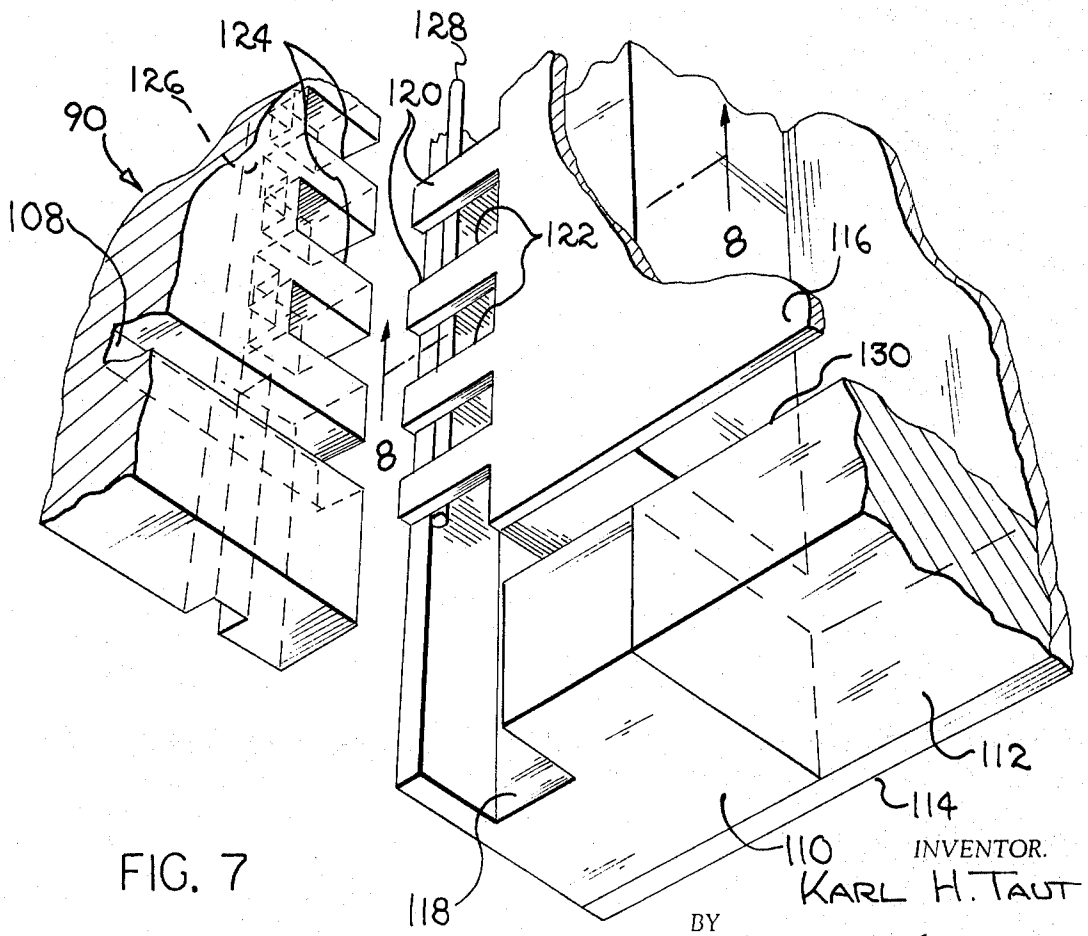


FIG. 7

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3,672,739

MODULAR, KNOCK-DOWN FURNITURE

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Int. Cl. A47b 47/04
U.S. Cl. 312—107 3 Claims

ABSTRACT OF THE DISCLOSURE

Furniture according to the invention involves both a knock-down and a modular construction. When designed for a cabinet or chest, for example, the modular units can be purchased as separate items and subsequently assembled to provide as many drawers or shelves as desired. Additional packages can be purchased at a later time as the need arises for more storage space or drawer space. Also, the individual modular sections can be used for other purposes besides chests or cabinets, such as being combined with a large flat top to produce a desk. The individual modular sections and drawers used therewith are of a knock-down construction, so that they can be shipped in a state occupying only approximately one-fifth the volume of conventional furniture. Storage space also is correspondingly reduced for additional savings. Further, the knock-down units can be assembled with a minimum of skill or tools.

This invention relates to furniture construction and more particularly to knock-down, modular furniture construction.

Knock-down furniture, which can be shipped in a collapsed state and subsequently assembled by the consumer, is known in the art to a limited extent. Such furniture reduces shipping costs substantially since a chest, for example, can be shipped in about one-fifth the space required for a conventional chest. The storage space and handling cost for knock-down furniture are also extensively reduced at all levels, from manufacturer to retailer. However, the knock-down furniture heretofore known required a considerable amount of time on the part of the consumer to assemble and/or required a number of tools and skill to achieve the assembly.

Modular furniture units also have been known in the art in a broad sense, but not with a knock-down type of construction, insofar as is known. Such modular units heretofore have been individually fully assembled when manufactured, and subsequently assembled with one another by the consumer at or near the point of use.

The present invention provides furniture construction involving modular units which are also of a knock-down design. Unlike modular furniture heretofore, the individual modular sections, as well as frames used therewith, are shipped and stored in flat, knocked-down condition and subsequently assembled with minimal skill, time, and tools by the consumer. The modular units or sections according to the invention can be initially purchased in limited quantities and then additional sections added as needed. For example, with a child's chest of drawers, enough sections might be initially purchased to make a three drawer chest, with additional sections and drawers added as the child grows. The individual sections can also be employed for other purposes, such as to provide a base assembly for a desk.

The individual modular units can be readily assembled with a minimum of time or skill. Basically, the joints for two components of the modular unit include a groove for each component which match when assembled to form a passage, with a locking member inserted in the passage to provide an interlocked joint. After individual assembly, the assembled modular units can then be connected together to form the completed furniture product. This assembly again can be achieved by one of minimum skill or talent and with simple tools.

It is, therefore, a principal object of the invention to provide furniture construction involving modular, knock-down sections and drawers.

Another object of the invention is to provide knock-down furniture employing improved joints which are strong and stable, yet easily assembled with a minimum of tools, time, and skill.

A further object of the invention is to provide a modular chest or cabinet which can be increased in size as additional storage space is required.

Other objects and advantages of the invention will be apparent from the following detailed description of preferred embodiments thereof, reference being made to the accompanying drawings in which:

FIG. 1 is a view in perspective of a chest embodying furniture construction according to the invention;

FIG. 2 is an enlarged, exploded view in perspective of part of the chest of FIG. 1, showing a top, a base, and an intermediate section;

FIG. 3 is a detailed, fragmentary view taken along the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary, exploded view in elevation showing part of a connection between two of the intermediate sections, one of which is shown in FIG. 2;

FIG. 5 is a rear view in perspective of a drawer used with the chest of FIG. 1;

FIG. 6 is an enlarged, fragmentary view of a joint of the drawer of FIG. 5;

FIG. 7 is a fragmentary, exploded view of another joint of the drawer of FIG. 5; and

FIG. 8 is a view in transverse cross section taken along the line 8—8 of FIG. 7, but with the components assembled.

Referring to FIGS. 1 and 2, a furniture product in the form of a chest or cabinet embodying the invention is indicated at **10** and includes a bottom or base **12**, a top **14**, intermediate sections **16**, and drawers **18**. While there is one of the drawers **18** shown for each of the intermediate sections **16**, it is not necessary for a drawer to be included for each section, with one or more of the sections employing shelves, rather than drawers, if desired. Also, while three intermediate sections **16** are shown, it will be understood that fewer or more of the sections can be employed as the need arises. For example, a small child may need only two or three of the drawers whereas a teenager may need five or six. The chest **10** can also be employed with a similar chest and a larger top to provide a desk, by way of example.

The various components of the furniture product **10** can be sold in packages to meet varying needs. For example, the base or bottom **12** and the top **14** can be sold as one package. The intermediate section **16** and the drawer **18** can be sold as a single package. Similarly, the intermediate section **16** and a shelf (not shown) can be sold as a single package. For an open cabinet, two full sides and a back can be sold as one package in place of several of the sections **16**. Further, a desk top could be used with two of the products **10** and can be sold as a single package. These package examples are solely for illustration and not limitation, the possibilities of combinations of units being almost unlimited with the furniture construction embodying the invention. In all of the above packages, the various components including the intermediate sections **16** and the drawers **18** can be supplied in an unassembled, flat state, requiring minimum shipping costs and storage expense.

Referring more specifically to FIG. 2 and the details of the furniture units, the base **12** includes a frame **20** made up of side frame members **22** and front and rear

frame members 24. The frame 20 is mounted on two leg supports 26 having forward notches 28 and rear notches 30 which receive the frame members 24 and enable upper surfaces 32 of the supports 26 to be flush with the frame 20 and to provide support for a lower drawer or shelf. Drawer guides 34 are suitably affixed, as by stapling, to the supports 26 and project upwardly therefrom to guide a drawer or aid in holding the frame of a shelf. The side frame members 22 also have intermediate openings 36 therein to receive bolts by means of which the base can be affixed to one of the intermediate sections 16. The rear frame member 24 has a slot or groove therein which receives a back panel strip 38 extending upwardly from the frame member about one-half inch, the purpose of which will be discussed subsequently.

The top 14, which can be sold in a single package with the base 12, includes a frame 40 having side frame members 42 and front and rear frame members 44 to which is affixed a top panel 46. The frame and panel construction provides inexpensive and lightweight furniture which, at the same time, is sturdy and attractive. However, the top 14 can be of solid or of other construction, if desired. The side frame members 42 have hanger bolts 48 affixed thereto and extending downwardly therefrom. These are used to connect with an upper one of the intermediate sections 16. When packaged with the base 12, the bolts 48 are temporarily received in the openings 36 to provide a package of minimum space. The rear frame member 44 also has a longitudinally extending groove 49 therein to receive the upper edge of a back panel.

Each of the intermediate sections 16 includes sides 50 and 52 and a back panel 54. The sides 50 and 52 are symmetrical and each includes a rectangular frame 56 having upper and lower frame members 58 and 60 and front and rear frame members 62 and 64. A side panel 66 extends over the frame 56. Again, the sides 50 and 52 can be of solid or other construction, if desired.

The back panel 54 is relatively thin and can be of one-eighth inch hardboard, by way of example, similar to the panels used for the sides. The back has vertically-extending edges 68 (FIG. 3) which are received in main grooves 70 of the rear frame members 64 with the grooves 70 extending vertically near the back edges of the sides 50 and 52. Additional grooves 72 (FIG. 3) in the rear frame member 64 extend the length of the grooves 70 and grooves 74 extend the full height of the panel 54. The grooves 72 and 74 are positioned to be in alignment when the sides and back panel are assembled so that the grooves 72 and 74 form a passage extending the height of the panel and sides. An elongate locking member or rod 76 is then inserted into the passage to lock the back and sides together. The rod 76 preferably is round while the passage formed by the grooves 72 and 74 is square to provide a certain amount of yield to accommodate expansion and contraction of the components. For this purpose, the rod 76 also preferably is of plastic although it can also be of wood, metal, or other material. A secure, interlocking joint is thereby achieved with a minimum of skills or tools being required.

Because the panel strip 38 is employed with the base 12 and since the height of the sides 50 and 52 is the same as the height of the back panel 54, the back panel 54 will project above the upper frame members 58 about one-half inch. The upper edge of the panel 54 will then extend into the grooves 70 of the superjacent intermediate section 50 to provide alignment and a rear interlock. If the top is the next unit, then the panel 54 will extend into the rear groove 49 in the rear frame member 44.

The front frame members 62 have grooves 78 (FIG. 4) extending longitudinally therethrough in a plane parallel to the sides. When two of the intermediate sections 16 are assembled with the sides 50 and 52 in co-planar relationship, a T-shaped locking member or plate 80 is inserted through the groove 78 of the upper forward frame member 62 and into the groove of the corresponding lower forward frame member, with the shank of the locking member resting on the horizontally-extending lower frame member 60.

The frame members 58 and 60 also have intermediate openings 82 and 84 (FIG. 2) therein with bolts and nuts extending through the opening 84 of the frame member 60 and the opening 82 of the subjacent frame member 58 of a subjacent intermediate section, when assembled. The bolts for the lowest intermediate section extend through the openings 36 in the base 12 to provide a connection therebetween. Further, the hanger bolts 48 are received through the upper openings 82 of the uppermost frame members 58. The bolts for the various sections and top and base are primarily used only to enable the furniture to be more readily picked up and moved about; they are not needed for alignment purposes which is achieved through the front and rear design of the frame members 62 and 64.

The upper frame members 58 also have drawer guides 86 extending upwardly to support and guide a drawer or to receive and support a shelf. The shelf used with the furniture unit 10 can be formed of a frame and a hardboard panel the same as the top and the sides. Since the shelf is flat, it need not be constructed in a knock-down manner. The drawers 18 when used, however, are provided with knock-down joints to enable them to be shipped and packaged flat.

Referring to FIG. 5, the drawer 18 includes a front 88 of hollow-core construction, sides 90 and 92, a back 94, and a bottom panel 96. One of the joints between the side 90 or 92 and the back 94 is shown specifically in FIG. 6. As shown, the side 92 has projections or tongues 98 extending rearwardly while the back 94 has alternate projections or tongues 100 extending to the side. The tongues 100 do not extend sufficiently beyond the drawer sides 90 or 92 to interfere with the chest opening formed between the front frame members 62 of the sides 50 and 52. The tongues 98 have notches 102 formed therein and the tongues 100 have notches 104 therein which provide a discontinuous groove or passage extending the height of the back 94 when the tongues are assembled. An elongate locking member or rod 106 is then inserted through the discontinuous groove or passage formed by the notches to provide a secure, interlocking joint, again with a minimum of skill and tools being required.

As shown in FIG. 5, the back 94 is shorter than the sides 90 and 92 to prevent interference with the drawer guides 86 when the bottom edges of the sides 90 and 92 rest on the upper surfaces of the drawer guides 86. The bottom edge of the back 94 preferably terminates below horizontally extending grooves 108 (FIG. 7) in the sides 90 and 92 which receive edges of the bottom panel 96. The rear edge of the bottom panel 96 can then be received in a similar groove in a lower edge portion of the back 94 when the back is assembled with the sides.

The joint or juncture between the sides 90 and 92 and the front 88 is shown more particularly in FIGS. 7 and 8. The front 88 is of a hollow-core construction with a frame including side frame members 110 and horizontal frames members 112, a front panel 114, and a back panel 116. A wide longitudinally-extending groove 118 is formed in the side frame members 110 over the length thereof, the groove being wide enough to receive the end of the side 90, as shown, or 92. Each of the side edges of the back panel 116 is noticed to form projections or tongues 120, leaving openings 122 therebetween communicating with the grooves 118. The end of the side 90 or 92 has projections or tongues 124 formed thereon similar to the tongues 100. These are received in interlocking relationship with the panel fingers 120 and extend into the groove 118. The tongues 124 have notches 126 therein forming a discontinuous groove or passage behind the tongues 120 when the side and front are assembled. An elongate interlocking member or rod 128 is then inserted in the discontinuous passage to hold the sides and front in interlocked

relationship. When in this position, the grooves **108** to receive edges of the bottom panel **96** are aligned with a gap **130** formed between the lower edge of the back panel **116** and the bottom frame member **112**. The front edge of the bottom is then received in the gap.

From the above, it will be seen that the furniture construction embodying the invention provides a modular, knock-down design having many advantages over knock-down furniture heretofore known.

Various modifications of the above described embodiment of the invention will be apparent to those skilled in the art and it is to be understood that such modifications can be made without departing from the scope of the invention, if they are within the spirit and the tenor of the accompanying claims.

I claim:

1. Knock-down furniture construction comprising a base, a top, at least two modular sections connectable together, one on the top of the other, and to said base and said top, each of said modular sections also being of knock-down construction and comprising two sides and a separate back panel, said sides having vertical grooves near the back edges thereof for receiving substantial portions of the vertical edges of the corresponding back panel, each of said back panels being of substantially the same heighth as the corresponding two sides, a back panel strip much narrower than said back panels and coplanar therewith, said back panel strip thereby placing said back panels out of alignment with the corresponding sides when the modular sections are assembled, to enable the vertical edges of at least one of the back panels to be received in the vertical grooves of said sides of the two modular sections, and additional means for making a connection between the sides of each modular section and the sides of another modular section to hold the connected sides in alignment.

2. Furniture construction according to claim **1** characterized further by each of said top and said base having a horizontally-extending groove located in a common vertical plane in which said back panels and said strip are also located, one of said horizontal grooves receiving a horizontal edge of one of said back panels and the other of said horizontal grooves receiving a horizontal edge of said panel strip.

3. A drawer construction comprising a front, a back, and two sides, each of said sides having rear projections at an end portion thereof, and said back having projections at end portions thereof, said projections of said sides and said back cooperating in nesting relationship when said sides and said back are assembled in proper relationship, said projections of said sides having aligned notches therealong and said projections of said back having aligned notches therealong, said notches being in alignment to form discontinuous passages when said back and sides are assembled, locking members extending through said passages to hold said back and said sides in assembled relationship, said front having a frame and a back panel, said back panel having a plurality of openings formed therein in a row near each of the side edges of said front, said sides having additional projections received in said openings when said sides and said front are assembled, said frame having vertically-extending grooves aligned with the rows of openings, said additional projections of said sides having vertically-aligned notches therein positioned to be behind said back panel when said additional projections are received through said openings, and rods extending through the vertically-aligned notches, said rods being in said frame grooves behind said back panel to lock said sides to said front.

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U.S. Cl. X.R.

312—111, 257 R