

Feb. 25, 1969

W. NEYROUD

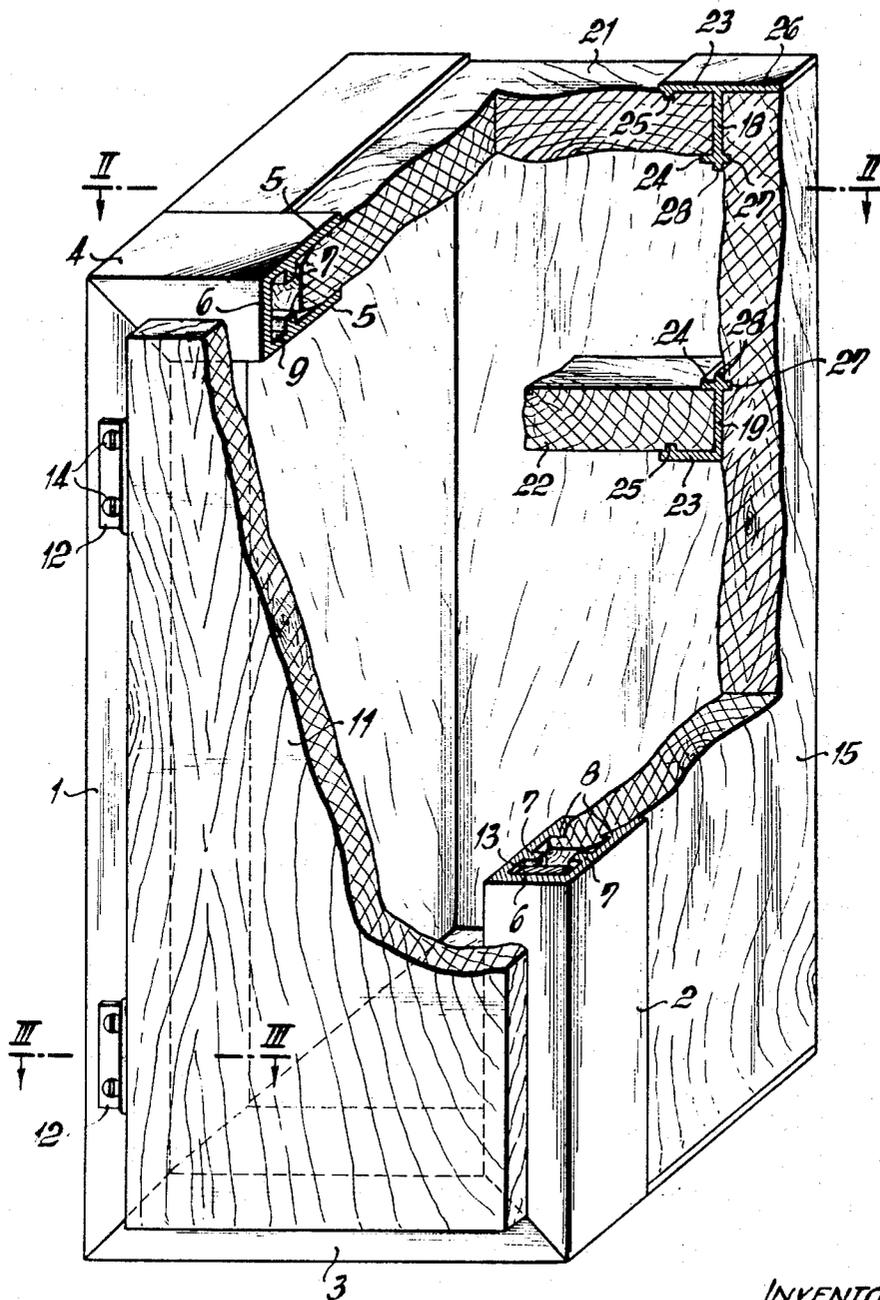
3,429,631

HOME-ASSEMBLED FURNITURE KIT

Filed April 10, 1967

Sheet 1 of 3

FIG. 1



INVENTOR  
WALTER NEYROUD

BY

*Curtis, Morris & Safford*  
ATTORNEYS

Feb. 25, 1969

W. NEYROUD

3,429,631

HOME-ASSEMBLED FURNITURE KIT

Filed April 10, 1967

Sheet 2 of 3

FIG. 2

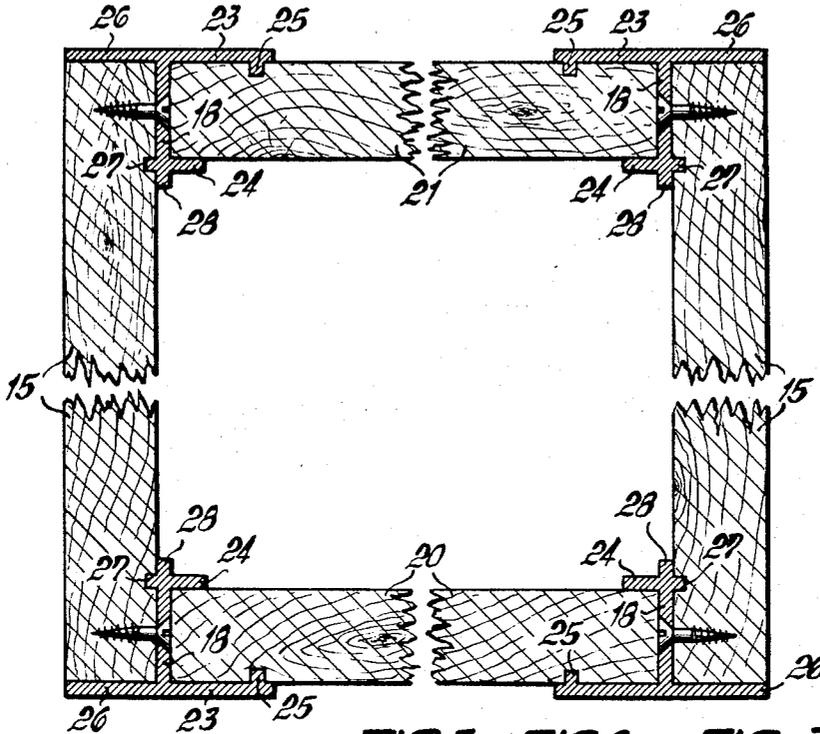


FIG. 4

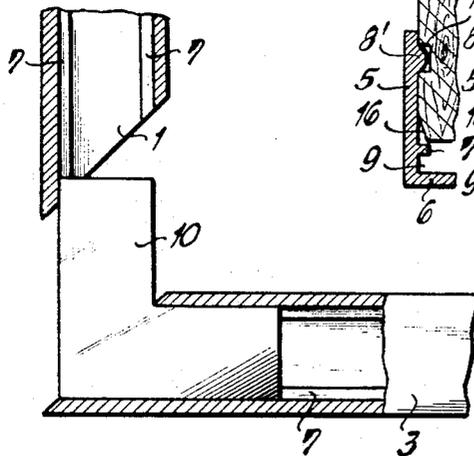
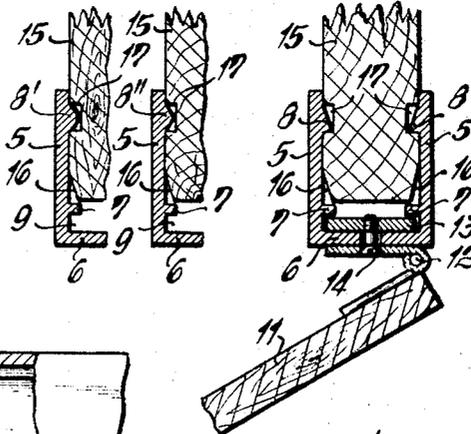


FIG. 5 FIG. 6 FIG. 3



INVENTOR  
WALTER NEYROUD

BY

Curtis, Morris & Safford  
ATTORNEYS

Feb. 25, 1969

W. NEYROUD

3,429,631

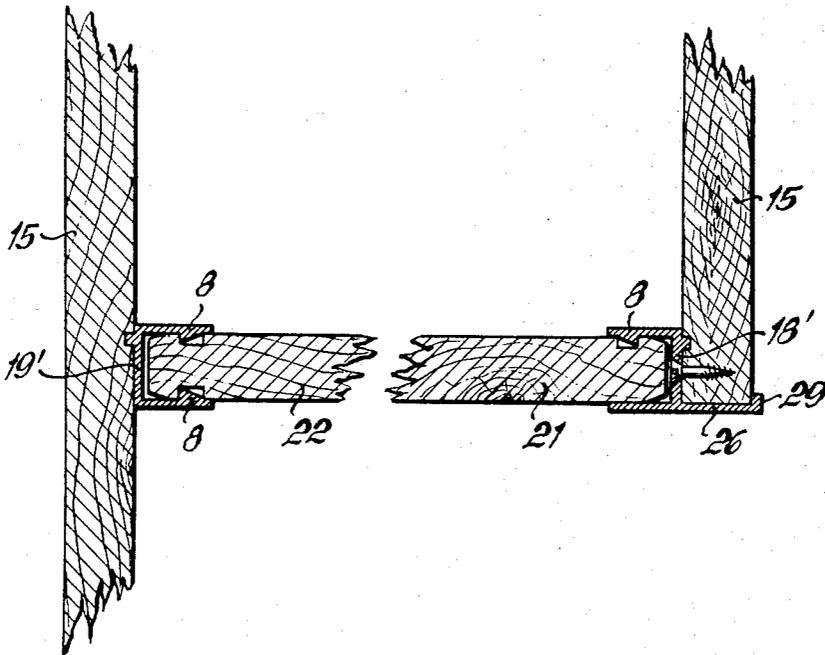
HOME-ASSEMBLED FURNITURE KIT

Filed April 10, 1967

Sheet 3 of 3

FIG. 7

FIG. 8



INVENTOR

WALTER NEYROUD

BY

*Curtis, Morris & Safford*  
ATTORNEYS

1

3,429,631

**HOME-ASSEMBLED FURNITURE KIT**

Walter Neyroud, Zurich, Switzerland, assignor  
to Holzbau-und Finanz-Etablissement, Vaduz,  
Liechtenstein

Filed Apr. 10, 1967, Ser. No. 629,559

Claims priority, application Belgium, Apr. 3, 1966,  
679,441

U.S. Cl. 312—257

8 Claims

Int. Cl. A47b 47/00, 43/00

**ABSTRACT OF THE DISCLOSURE**

The furniture kit of the present invention comprises a skeletal, self-supporting frame having at least four members each of substantially U-shaped cross-section, the limbs of each member being adapted to be forced apart by the insertion of one edge of a panel, in order to grip the panel, at least two parallel members having inwardly-directed ribs projecting from their limbs and adapted to engage in grooves or channels spaced inwardly from the edge of the panel to prevent or inhibit withdrawal of the panel from the respective frame member.

*Background of the invention*

The invention relates to a furniture kit, and particularly one intended to be assembled at home and which is so simplified in its construction that the parts of the piece of furniture in question can be produced in the factory and so prepared that they can be packed flat, despatched and assembled without any difficulty at the place where the furniture is to be used, without any special previous knowledge being required for the operation.

Various home-assembled furniture kits are known, but their components are constructed so that they have to be joined together with additional means such as screws, pins, wedges or other elements, for which the knowledge of a layman is not usually sufficient. These include a kit wherein the wooden panels for the front and back, side walls, top and bottom are framed at all four edges by shaped pieces of metal, and these have to be joined together at the place of assembly by means of angles, hinge members, handle members, etc.

*Summary of the invention*

The invention is based on the idea that all that is required as a supporting and statically important element for making a home-assembled piece of furniture is a skeleton frame, preferably located at the front of the piece of furniture, and having pillar-like side portions with a U-section open to the rear, at least one limb of the U being provided with a projection which engages in a groove in the associated wall panel.

The metal frame at the front, made of U-shaped elements, may serve to carry hinges for mounting a door, which obviously constitutes the most important part of the piece of furniture in the case of a cupboard. When the side portions of the skeleton frame are of U-section with the limbs of the U provided with a projection engaging into a groove in the associated wall panel, it is necessary for the grooved wall panel to be slid into the U-sectioned frame member in question from the side.

This leads to serious disadvantages and severely restricts the field of application. In the case of cupboards six feet in height a six feet long side wall panel must be slid into the six feet long rail, which means that a space of at least 12 feet is required at the place of assembly, a distance which is often prohibitive.

In the home-assembled furniture kit according to the

2

invention, the frame therefore comprises four rigidly-connected shaped bars of a section open towards the rear, of which at least two opposed bars have limbs which yield resiliently when the panel is inserted perpendicularly to the web of the bars in which at least one of the limbs has a rib engaging in a groove in the panel, and in which the side wall panels carry guide rails coplanar with the horizontal bars of the frame.

The function of the skeleton frame according to the invention is accurately to interconnect the side portions and horizontal panels of the piece of furniture, e.g., a cupboard, at the front and to keep them exactly at right angles to one another. Owing to the resilience of the limbs of the bars the panels can be pressed in perpendicularly to the length of the shaped bars instead of parallel with the length thereof; this brings the important advantage that the space required for assembling the furniture is virtually very little more than that taken up by the finished article. It has been found that even large panels, say six feet long, can be pressed or knocked into the bars by hand without any trouble, and that not even a hammer is required for the purpose.

On the other hand the ribs on the shaped bar, which engage in the groove when the panel is inserted, provide a completely secure connection between the two parts, and the connection cannot be released even if great force is applied. For the few cases where this is necessary, however, an opportunity is provided to release the panels from the bars by pulling them out and sliding them along the rail. A pre-requisite for taking this step is a space equal to twice the respective dimension of the piece of furniture.

A further advantage of combining the panel and shaped bar by pressing the panel inwards perpendicularly to the web of the bars is that the grooves in the wooden panel need not be machined so accurately as they would if the panels were to be inserted longitudinally. Even very slight variations in the measurements of the grooves in the wooden panel make it so difficult to insert the panel in a U-shaped bar with a projection engaging in the groove that human power is sometimes inadequate. But with the aid of the resiliently-yielding limbs of the metal section provided with the ribs directed towards the inside, assembly is very simple. Where necessary the frame may of course be forced into the stationary panels instead of the panels being forced into the frame. This possibility is particularly important, for example, if a cupboard is to be used as a room divider or hatch and must be accessible from both sides, i.e. be equipped with doors both at back and front.

The guide rails which according to the invention are mounted on the side wall panels and coplanar with the horizontal bars of the frame need not have any inwardly-directed ribs or the like. They may have a smooth outline and be used for inserting the side edges of the top and bottom towards the shaped rail by means of resilient limbs into which the top and bottom and the side portions are pressed. To provide a particularly firm seating for the side walls, top and bottom, all the shaped bars forming the skeleton frame preferably have resiliently yielding limbs, at least one of which is provided with an inwardly-projecting rib.

The same type of press-in rather than slide-in attachment may be provided for the horizontal components as for the side walls. An advantageous embodiment of the invention therefore uses guide rails for the side panels too; these have resiliently-yielding limbs, at least one of which is provided with a rib engaging in a groove in the side panel. Where such guide rails are used the horizontal components may be pressed into them by their side edges. To elaborate, this embodiment is assembled as follows: the side wall portions of the cupboard are first joined to-

gether by the top and bottom, then the rear wall is slid into position, the open-fronted box thus formed laid on its back and then the front sectional frame, on which the door may already be mounted, is pressed in over all four edge portions. All this can be done virtually without the aid of any implement, purely by knocking vigorously with the fists. The frame cannot be released from the box unless considerable force is used, and this would destroy either the shaped bar or the wooden portions.

The ribs on the U-profiles preferably have a cross section such that the limbs can yield resiliently only when the panel is being inserted, whereas when the panel has been snapped into the groove they prevent it from moving perpendicularly away from the web of the U. An example of a suitable shape for the ribs is a triangular section widening out towards the web of the U-profile. Such a section acts like a barb in making it easy to press the panel into the shaped bar but preventing it from being pulled out again.

If it is thought important for the furniture kit to provide an opportunity of subsequently detaching the wall panels from the skeleton frame, however, it is desirable for the ribs on the limbs of the shaped bars to be of a cross section which permits resilient yielding when the panel is being either inserted or withdrawn. For this purpose the ribs may, for example, have an arcuate section or substantially that of an isosceles triangle. With ribs of this type the panel may of course be slid inwards and outwards longitudinally of the shaped rail if desired.

A special feature of the invention is that the limbs of the U-profile of the rails are extended beyond the ribs which snap into the groove in the panel. The advantage of this is that the groove which receives the rib has its cut surface covered by the extension so that any splintered or uneven parts of the groove are hidden from view. Splintering of this type occurs very frequently when using wood fibre panels or the like which are coated with plastics material.

In another preferred feature of the invention the U-shaped rails have two stops to limit the depth to which the wall panels can be inserted. This prevents the panels from being slid right to the bottom of the U-section. It is desirable for the metal frame also to be used for fixing the hinges for the doors, and assembly is simplified if the doors are mounted before the wall panels are put into position. If the ends of screws, rivets or like fastening members used for fastening the hinges were to project into the cavity in the frame this would make it difficult or impossible to insert the panels. But if the depth of insertion of the panels is limited in accordance with the above feature of the invention, it is possible to house mounting plates for the furniture fittings, preferably containing tapped holes, so that they can move freely in the cavity between the web of the U-profile and the stops. Suitable connecting means such as angles may be fitted in the cavity between the abutting webs, particularly at the corners of the frame, so that the four parts of the front skeleton frame can be joined invisibly from the outside.

According to a further preferred feature of the invention the wall panels are chamfered at the edges adjacent to the grooves. This makes it easier to slide or press the panels into the shaped metal bar, as the panels can be aligned more exactly with the latter. This applies particularly if—in accordance with an equally preferred feature—the ribs on the webs of the U-section have a cross-section widening towards the web of the shaped rail, so that the oblique surfaces of the ribs cooperate with the chamfer on the wall panels when the latter are being slid into position.

In the preferred embodiment of the invention the guide rails for the horizontal panels, which are attached to the side panels, have a U-profile with limbs of different lengths, the longer limb having the rib which is directed towards the inside of the profile and which engages in a corresponding groove in the horizontal panel. This pro-

duces several advantageous effects. The insertion of the appropriately-grooved horizontal and covering panels provides a very satisfactory connection between the wall and side portions. Furthermore, the inserted panels are securely guided within the horizontal U-profile of the frame.

It is further desirable for the guide rails for the top and bottom, which terminates flush with the upper and lower edge of the side wall, to have a third limb overlapping the end of the side wall. The extension of the limb obviates any special treatment such as gluing the ends of the side wall portions. It also provides an additional guide for the rail. Moreover, the edges of the side portions of the cupboard are substantially protected from damage, which is important, particularly during transportation.

Slight splintering may occur during manufacture at the upper or lower cut surface of the side walls, particularly if the panels are wooden ones coated with hard plastics such as Resopal. According to one feature of the invention such blemishes may be covered over if the third limb overlapping the end of the side wall is provided with a flange which lies against the outside of the side wall.

To facilitate installation and adjustment an aligning groove may be cut into each of the side walls, and the guide rails for the horizontal panels may engage into this groove by means of a rib mounted on the outside of the web. This measure enables the guide rails to be mounted with particular accuracy. The guide rails for the horizontal panels should desirably have additional ribs—which may be short ones—to overlap the edges of the grooves in the side walls and/or horizontal components. In this way any splintered or uneven portions which may have been left at the edges of the grooves after manufacture can be completely concealed when the furniture is assembled.

A preferred embodiment of the invention is illustrated in the accompanying drawings by way of example, in the form of a cupboard with a single leaf door. In the drawings:

FIG. 1 is a perspective view of a cupboard according to the invention with the top right hand corner broken away;

FIG. 2 is a section along the line II—II in FIG. 1;

FIG. 3 is a section through the front frame taken at III—III in FIG. 1;

FIG. 4 is a fragmentary view showing the assembly of the shaped bars of the frame;

FIGS. 5 and 6 show two different embodiments of shaped bars for the skeleton frame;

FIG. 7 shows a modified bar shape for a partition, and

FIG. 8 shows a modified embodiment of a shaped bar for the bottom of the cupboard, which may also be used for the top.

A skeleton frame of the cupboard illustrated is made up of four shaped bars 1, 2, 3 and 4, which are mitre-cut and manufactured in known manner from plastics or metal, preferably light metal. The bars have the substantially U-shaped section shown in FIGS. 1 and 3. Limbs or flanges 5 of each bar are joined by a web 6. Each flange has an inwardly-directed rib 7 of rectangular section, and bars 1 and 2 have a rib 8 of triangular section widening towards the web 6. The horizontal bars 3 and 4 have not got the triangular ribs 8.

The four bars may be assembled to form the skeleton frame in any suitable manner, e.g. by soldering or welding; it is preferable, however, for them to be pushed into position so that the frame can be assembled on site. For this purpose corner angles 10 are slid laterally into the cavity 9 bounded by the ribs 7 as illustrated in FIG. 4, the cross-section of the angles 10 being such that they can be secured in the cavity 9 with a squeeze fit. The vertical bars 1 and 2 with their cavities 9 are then pushed onto the vertical limbs of the angles 10. If this method should not provide a firm enough fit owing to the toler-

ances of the bars and angles, the rib 7 may be clamped or punched onto the angle 10 at some points with the aid of a punch or similar implement, as indicated in FIG. 4, after the bars have been pushed onto the angle 10. Another secure fixing method is to use an adhesive to stick the angles 10 into the cavities 9 in the bars 1, 2, 3 and 4. So-called two part adhesives for metals are suitable for this purpose. Corner angles 10 are inserted in the corners of the top bar 4 in the same way and then fitted onto the bars 1 and 2.

A door 11 of the cupboard carries hinges 12 which are attached to the bar 1 in the manner shown in FIG. 3. A metal plate 13 containing holes for fastening screws 14 is placed in the cavity 9 in the bar 1 in the region between the limbs of the angles 10. The metal plate 13 similarly inserted in the bar 2 serves to fasten the catch for closing the door 11.

The side wall panels 15, made e.g. of wood or plastics, are inserted in the thus prepared skeleton frame at the place where the cupboard is to be installed. The thickness of the panels is equal to the distance between the flanges 5 of the shaped bars. As shown in FIG. 3, the end of the panel 15 is chamfered at 16, and grooves 17 are cut into the side surfaces of the panel at a spacing corresponding to the spacing of the triangular ribs 8 from the rectangular ribs 7. This shaping enables the panels 15 to be pushed into the bars 1 and 2 from behind with only a small amount of force, the chamfered portions 16 cooperating with the ribs 8 and making the flange 5 move resiliently apart until the triangular ribs 8 can snap into the grooves 17. As the broad sides of the ribs 8 are placed against the shoulders of the grooves 17 a strong connection is obtained, and the wall portions 15 cannot subsequently be pulled out towards the rear.

It will be seen from the drawing that the triangular ribs 8 are not positioned at the ends of the flanges 5, but instead the flanges extend a short distance beyond the ribs 8 and grooves 17 so that any chipped or otherwise rough edges of the grooves are covered by the flanges 5.

Guide rails 18 for the bottom 20 and top 21, and guide rails 19 for intermediate partitions 22, are screwed onto the side wall panels 15 at the place of manufacture. The rails 18 and 19 are of U-section with flanges 23 and 24 of different lengths. The flange 23 directed towards the inside of the cupboard has a rib 25 facing the horizontal component 20, 21, or 22 and engaging in a corresponding groove in the latter. The guide rails 18 for the top 20 and bottom 21 lie flush with the top or bottom edge of the panel 15 and have a third flange 26 which overlaps the end of the panel 15. This not only gives a pleasing appearance to the assembled cupboard; it also makes it unnecessary to cover the cut surfaces of the panels 15 with plastics or veneer and further provides excellent protection for the edges.

The guide rails 18 and 19 further have a rib 27 on the outside of the web, engaging into a corresponding groove in the side panel 15, and a rib 28 overlapping the edges of the said aligning groove.

When the side wall panels 15 carrying the guide rails 18 and 19 have been forced or knocked into the vertical bars 1 and 2 at the place of assembly, as explained in connection with FIG. 3, the top 20 and bottom 21 are pushed into the rails 18 from behind.

If the ribbed shapes illustrated in FIGS. 7 and 8 are used to support the horizontal components, the shaped rails 18' and 19' are first screwed onto the side wall panels 15 and the top and bottom and any shelves 21 and 22 are pressed into these rails, which have triangular ribs. The rear wall is then slid into grooves (not shown) in the hollow body thus formed. The frame made up of the horizontal and vertical shaped bars 1, 2, 3 and 4 and the associated angles 10, possibly with the door 11 previously attached to it, is then pressed onto the hollow body comprising the side wall, top, bottom and shelves, to

complete assembly. In the example illustrated the bars 3 and 4 have flanges 5 which are smooth except for the abutting ribs 7, and the top and bottom panels 20 and 21 are accordingly not equipped with grooves corresponding to the grooves 17 in the side panels. It has been found that a rigid construction can be obtained merely by rigidly locking the side wall panels 15 by the interaction between their grooves 17 and the triangular ribs 8. This embodiment has the further advantage that the cupboard can, if necessary, be dismantled at the place of assembly. As the top and bottom 20 and 21 are not rigidly locked they can be pulled out of the guide rails 18 if desired. If the horizontal bar 4, which is joined to the bars 1 and 2 only by the squeeze fit of the angles 10, is then pulled out upwardly, the side wall panels 15 can be pushed out of the bars 1 and 2 longitudinally of the latter; for this movement is not prevented but only impeded by the engagement of the triangular ribs 8 in the grooves 17.

To provide for easier dismantling of the cupboard at the place of assembly it is preferable to use for the vertical bars 1 and 2 one of the forms shown in FIGS. 5 and 6 and, if desired, for the horizontal bars 3 and 4. The ribs interacting with the grooves 17 here have an arcuate section 8' or a substantially isosceles triangle section 8''. These sections snap into the rectangular or appropriately-shaped grooves 17, similarly to the ribs 8, but do not prevent the side wall panels 15 from being drawn out away from the web 6.

On the other hand the bars 3 and 4 may of course also have triangular ribs 8 if no provision is to be made for dismantling the cupboard.

Once the top and bottom 20 and 21 have been pushed into the guide rails 18 until they engage in the horizontal bars 4, the shelves 22 are inserted in the guide rails 19. The cupboard is then ready for use.

If the cupboard is to be fixed to the wall of the house it need not have a rear wall of its own; for the construction described above has been found to give sufficient static strength. The side panels 15 are firmly braced together right to the back by the engagement of the ribs 25 on the guide rails 18 and 19 in the horizontal components 20, 21 and 22. If desired, however, the back of the cupboard may be terminated by a rear wall, although this would not have to take on any static functions.

I claim:

1. A knock-down furniture kit for assembly at a location remote from the place where the parts are manufactured, comprising a marginal self-supporting frame of at least four interlocking U-shaped members each having a front web and rearwardly projecting spaced flanges, at least one of said flanges of each member having an inwardly projecting rib intermediate its ends to provide open spaces forwardly and rearwardly of the rib, angle pieces for insertion between the ends of adjacent members and each piece having arms adapted to project into the forward open spaces of the members between the web and rib to hold the members in assembled relationship, a pair of opposed panels each having one edge portion adapted to project into the rearward space of a member between its flanges and engage the inwardly projecting rib constituting a stop member, at least one of the flanges of one of said members having a second inwardly projecting rib for engaging a recess in the edge portion of the panel to lock the panel in the member, the flanges of said members having a second rib being sufficiently resilient to spring apart when the edge portion of a panel is inserted therebetween and then spring back to engage the rib in the recess, a guide rail attached to each opposed panel at the edge at right angles to the edge projecting into the member between the flanges, and a second pair of opposed panels adapted to be supported by said guide rails.

2. A furniture kit in accordance with claim 1 having a supporting plate for fixtures adapted to be inserted into

7

the forward open space in one of said U-shaped members.

3. A furniture kit in accordance with claim 1 in which the second inwardly projecting rib on at least one flange of one member is of triangular shape to form a barb to lock in the recess in the panel.

4. A furniture kit in accordance with claim 1 in which the guide rails attached to the opposed panels have a web and spaced flanges projecting from one side of the web for receiving the edge portion of the second pair of panels therebetween, and at least one of the flanges having an inwardly directed rib for engaging a groove in the panel positioned therebetween.

5. A furniture kit in accordance with claim 4 in which the guide rails attached to the opposite panels each has a flange overlying the edge of the panel to which it is attached to provide a cover for said edge.

6. A furniture kit in accordance with claim 5 in which the flange overlying the edge of the panel on which it is mounted has an edge flange extending at right angles thereto to overlie the side of the panel.

7. A furniture kit in accordance with claim 4 in which an additional flange projects from the side of the web opposite the side from which the spaced flanges project and is adapted to project into a recess in the panel on which it is mounted.

8. A marginal frame for a furniture kit having at least

8

four interlocking members, each of said members having a front web and spaced flanges projecting rearwardly from the web, the spaced flanges of each member having opposed inwardly directed ribs intermediate their ends to provide open spaces forwardly and rearwardly of the ribs, said flanges being sufficiently resilient to spring apart when the edge portion of a panel is inserted therebetween, and at least one of the flanges of one of the members having a triangular shaped rib between the first rib and the rearward edge of the flange to form a forwardly inclined barb.

**References Cited**

**UNITED STATES PATENTS**

2,329,815	9/1943	Attwood.	
2,956,705	10/1960	Clingman.	
3,197,822	8/1965	Herrschaft	312—257
3,284,152	11/1966	Schörghuber	312—257
3,353,888	11/1967	Pritelli	312—257

**FOREIGN PATENTS**

847,960	8/1952	Germany.
---------	--------	----------

JAMES T. McCALL, *Primary Examiner.*

U.S. Cl. X.R.

312—264