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(56) Documents Cited:
US 5275467 A

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(54) Abstract Title: **Joints for wooden furniture**

(57) A joint for wooden furniture is created using laser cutting such that no glue, fasteners or dowels are required for the joint to be secured.

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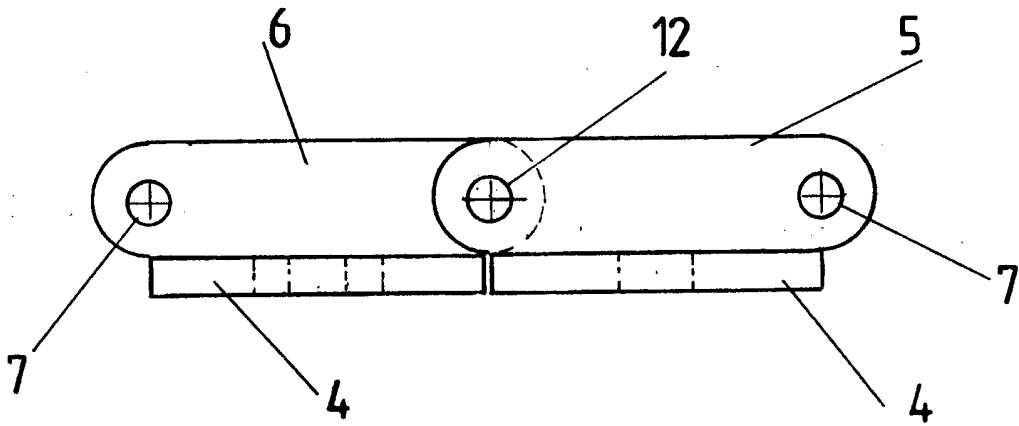


FIG 1

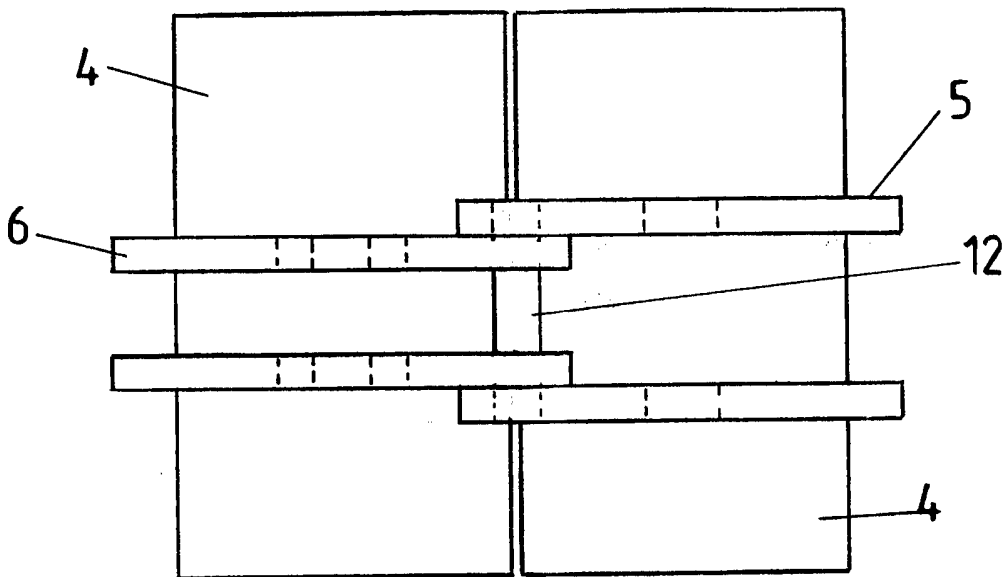


FIG 2

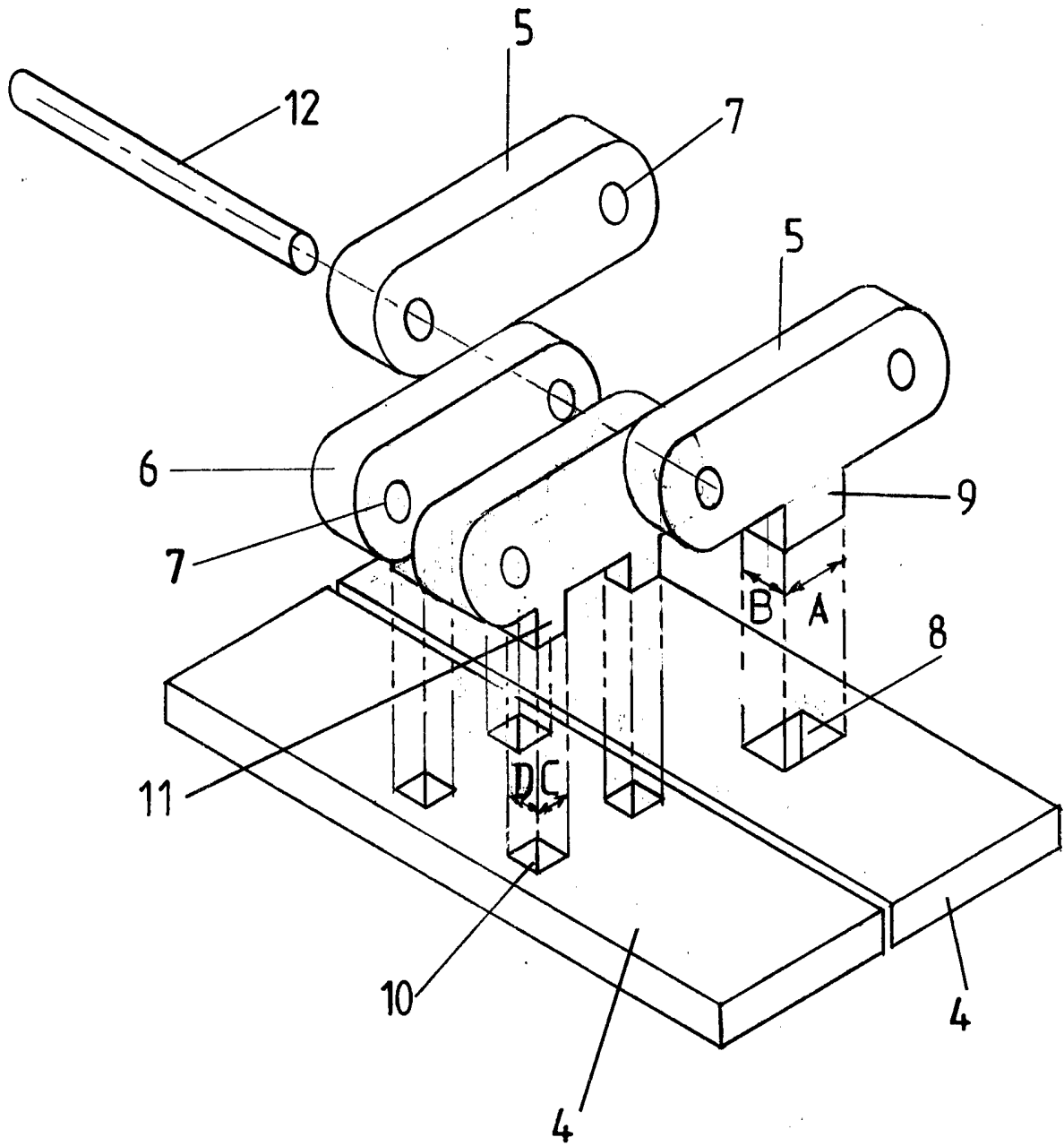
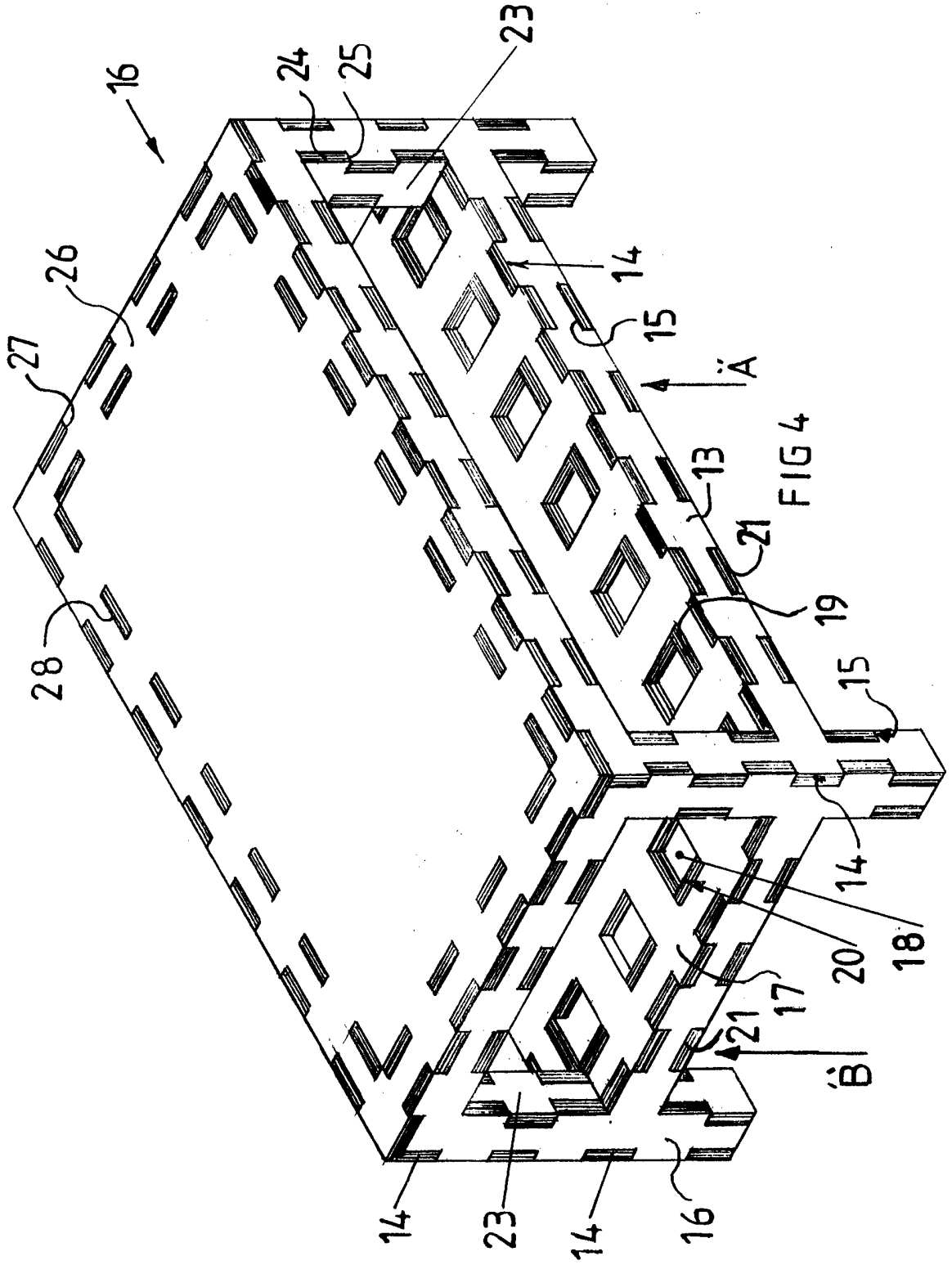


FIG 3



**Improvements in or relating to items manufactured, using
wood for the component parts**

By present conventional methods wood furniture in general, be it for use within lounges, dining rooms and other habitual rooms both domestic and commercial, manufactured from wood of various types.

In the main, the construction although having progressed substantially over centuries, in general consists of joints of one kind or another, or that of dowels and other modern fixing techniques dependent on end use of the finished product. Finishing by way of stains polishing and other aesthetic preparations being the final process.

The invention relates to a new concept in both manufacture and assembly, without the necessity of retaining aids such as dowels, screws, nails and adhesives.

Although the invention would be predominantly intended for furniture the process described could reach over a multiple of other products and uses, one singular area would be that of a large scale working toys for example tractors, cranes and other popular models.

Although the description and drawings do not relate solely to furniture and the like, but that of a scale model 'track' part.

It is intended in essence to provide the various examples of joint - like fixings that can be easily achieved using laser cut plywood.

Expanding on the aforesaid it is possible to achieve accuracy's to one thousandth of an inch, therefore producing resultant parts that can fit tightly / rigidly together to form inert joints (such is required in certain furniture items).

Whereas other joints may need to be 'pivoted' or 'hinged' or loosely fitted to satisfy the design specifications.

In the main the description and drawings will be concentrated on two aspects, which will cover all features of the invention.

Fig 1 side view

Fig 2 plan view

Fig 3 exploded isometric view

Fig 4 isometric view

Item 4 Figs 1, 2 and 3 are represented by rectangular pieces of laser cut plywood parts, which represent the model track.

Links Items 5 and 6 Figs 1 and 2 having protrusions or tabs 9 and 11 which are an integral cut part of the links Items 5 and 6.

Rectangular holes 8 and 10 Fig 3, which are compatible with the tabs 9 and 11.

The dimensions of the holes and tabs are represented by the letters A, B, C and D Fig 3.

Corresponding holes / bores Item 7 Figs 1 and 3 are laser cut within the four links Items 5 and Figs 1, 2 and 3.

It is important to refer at this stage that the classification of fit between the tabs Items 9 and 11 and Fig 3 and their respective locating holes 8 and 10 are solely dependent upon the limits required between 'tabs' and corresponding holes. (For example limits on the dimensions 'A' and 'B' and 'C' and 'D' cut to provide 'light' push fit, 'tight' push fit, or that of light drive or tight drive fit). The class of fit would depend upon the activity of the item parts. The links 5 and 6 and corresponding holes Fig 3 would require a tight drive fit as once in position retention would be an important factor as the links 5 and 6 form a mechanical aspect will require to act as integral parts of the track parts Item 4 Figs 1, 2 and 3.

The track 4 via the links 5 and 6 Figs 1, 2 and 3 are pivotally located together by a wood pin / dowel Item 12 Figs 1, 2 and 3.

Fig 4 is an isometric view of a typical coffee table that can be manufactured easily using the technique as aforesaid described.

Longitudinal side members Items 13 which are identical in size and pattern having 'tongue' and 'groove' profiles 14 and 15 Fig 4, at the outer edges. Two identical end sections Items 16 with 'tongue' and 'groove' profiles compatible to the profile in the side panels 13.

These 'tongue' and 'groove' profiles are 'laser cut' to provide a tight fit to form a rigid joint, thus forming a rigid base structure for the table.

A lower member Item 17 Fig 4 with compatible 'tongue' and 'groove' profiles can now be secured at the lower end of the table captive within the corresponding 'tongue' and 'groove' Items 14 and 15 within the side members 13, and the end members.

Rectangular holes 18 'laser cut' within the lower member Item 17 have two main functions acting as elongated grooves and engagement means for the tongues Items 19 and 20 also reducing the overall weight, giving an additional feature to the overall appearance.

At the lower underside of both the longitudinal sides 13 Fig 4, in the direction of arrow 'A' there are fitted two base members which have tongues Item 21 and grooves (not shown) which are compatible with the 'tongue' and 'grooves' within the side members 13.

Likewise at the two end sections Items 16 base members are fitted in the direction of arrow 'B'

By the 'tongue' 21 and grooves (not shown) within the end sections 16.

Lower 'inner' side members (not shown) are also fitted to both the longitudinal sides 13 and end sections 16, these have 'tongues' Items 19 and 20 Fig 4, compatible with the elongated holes Item 18 in the member Item 17.

Inner upright members Items 23 (eight in total), with 'tongue' and 'grooves' Item 24 and 25 Fig 4. are fitted as aforesaid described which finally form the four legs of the table.

This provides a hollow 'box' section to both the 'legs' and the longitudinal sides and ends.

The upper part of the table structure is almost identical to that of the lower part, as aforesaid described with reference to the formation of hollow box sections at the upper side and end elevations.

The table 'top' Item 26 can now be fixed in position with the 'grooves' Items 27 and the 'tongues' on both the longitudinal side members 13 and the end sections 16. The rectangular laser cut holes Items 28 act as closed 'grooves' for the compatible 'tongues' Items 19 and 20, of the upper inner sides and end members (not shown).

This completes the coffee table to a very accurate and sturdy modular construction using the laser cut 'tongue' and 'groove' method.

By reason that all the parts will be cut by laser this produces a dark brown / burnt - like appearance to all cut edges.

This gives or provides a pleasing aesthetic appearance in contrast to the white / cream colour of the ply surfaces. Therefore other than coating the surfaces with a clear varnish for example (be it matt - satin or gloss).

Additional surface treatment or finish may not be necessary.

The scope of the invention using this modular construction could be used in many adaptations other than toy's and furniture.

Spiral stairways for example, using the modular construction, providing accurate and ease of assembly, ensuring that the structural design accommodates the strength of material used.

Various sizes of 'tongues' and 'grooves' will be used, dependant upon the design specification.

Finally the simplicity of assembly of products using the aforesaid described techniques of the invention, would lend itself readily to 'Flat pack' packaging, in particular to furniture and other products, where the design would permit the technique. This will be of significant value to both mail order and selected retail outlets.

CLAIMS

1. Using the technique of 'laser cutting', 'tongues' and grooves' are profile cut within the outer edges of plywood member-components, enabling sub-assembly of parts by modular construction.
2. A method according to claim 1. comprising of rectangular 'holes' acting as elongated 'grooves' profile cut within the 'inner' surfaces of the component an engageable means for corresponding compatible 'tongues' on the outer edges of associated parts.
3. The selected design tolerance limits set between the engaging 'tongue' and 'groove' will provide a 'close' accuracy of fit as aforesaid described in claims 1 and 2, and will provide a means of a rigid and secure engagement such that additional securing by dowels, screws and other will not be necessary as the joints can be considered as inert.
4. A method according to claims 1, 2 and 3 whereas other jointing means, by example 'pivotably' or 'hinged' to each other (ref component parts 5, 6 and 12 fig 4) substantially as herein before described with reference to the accompanying drawings.
5. Products other than furniture can be effectively produced using the aforesaid techniques. An example of which would be scale working toys and the like, as substantially as herein before described with reference to the accompanying drawings.
6. Additional surface treatment to give a pleasing aesthetic appearance of the finished products may not be necessary, as the component parts have laser cut edges on each 'tongue' and corresponding 'groove' which will have a dark brown / burnt-like appearance contrasting to the white / cream colour of the 'plywood' outer surfaces.
7. The scope of the invention using the aforesaid modular construction could be used for many adaptation other than furniture and toys. Spiral stairways for example could be constructed providing structural strength and stability was taken into account at the design stage.
8. The simplicity of construction and assembly of products using the techniques of the invention would lend the products readily to 'flat-pack' packaging.
9. Employing all the techniques herein before described in claims 1-8 and the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB0423364.9

Examiner: Peter Macey

Claims searched: 1 - 9

Date of search: 23 March 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1 - 8	US 5275467 A (KAWECKI) see figure 1

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

A4L; F2M

Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

F16B

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC