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CONCEALED FIXING DEVICE

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(56) Prior Art Documents
GB 543966
GB 417750
GB 2246407

(57) Claim

1. A concealed fixing device for:

a bed comprising an elongate screw thread male member, a permanently embedded female member suitable in use for fixing within a first member of said bed and co-operating with said elongate screw thread member to hold it in a fixed position,

a preshaped combined washer and nut assembly co-operating in use with said elongate screw thread member and a second member of said bed to provide a secure fixing, such that said combined washer and nut assembly is not externally visible when said bed is assembled, in which in use said fixing device co-operates with said second member of said bed which is provided with a blind cylindrical hole in a major surface thereof, said blind cylindrical hole also being provided with an elongate hole at one side thereof to provide entry for said elongate male member, in which said combined washer and nut assembly is shaped such that the washer shape co-operates with the side of said blind cylindrical hole to secure said second member to said first member, in which said nut is only partially internally threaded and is provided with an enlarged

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internal diameter section to provide a lead in section for prevention of cross threading when fitted onto said elongate male threaded member.

AUSTRALIA

Patents Act 1990

COMPLETE SPECIFICATION

STANDARD PATENT

Applicants:

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Invention Title:

CONCEALED FIXING DEVICE

The following statement is a full description of this invention, including the best method of performing it known to me/us:

CONCEALED FIXING DEVICE

The present invention relates to a concealed fixing device and more particularly to a fixing device suitable for wooden furniture.

Wooden furniture, for example pine frame beds, is now often supplied in a flat pack for assembly at home.

Certain sections such as for example the bed ends, top (headrest) and bottom are often assembled in the factory by gluing and by the use of dowels. These can be neatly assembled without any unsightly fixing members being visible.

A known system for assembling the elongate side members to the head and toe sections is to insert a bolt through each end member and to provide each side member with a suitable bracket through which the bolt can be inserted and tightened with a suitable nut.

Though this results in a satisfactory mechanical fixing, it is aesthetically not pleasing because the end of the bolt is visible.

It is an object of the present invention to provide a concealed fixing device for a bed or similar article which cannot be detected from the outside of the bed.

The present invention provides a concealed fixing device for a bed comprising an elongate screw thread male member, a permanently embedded female member suitable in use for fixing within a first member of said bed and co-operating with said elongate screw thread member to hold it in a fixed position, a preshaped combined washer and nut assembly co-operating in use with said elongate screw

thread member and a second member of said bed to provide a secure fixing, such that said combined washer and nut assembly is not externally visible when said bed is assembled, in which in use said fixing device co-operates with said second member of said bed which is provided with a blind cylindrical hole in a major surface thereof, said blind cylindrical hole also being provided with an elongate hole at one side thereof to provide entry for said elongate male member, in which said combined washer and nut assembly is shaped such that the washer shape co-operates with the side of said blind cylindrical hole to secure said second member to said first member, in which said nut is only partially internally threaded and is provided with an enlarged internal diameter section to provide a lead in section for prevention of cross threading when fitted onto said elongate male threaded member.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 shows a view of part of an article of furniture such as a bed, in end elevation,

Figure 2 shows a part of the article of Figure 1 in side elevation illustrating the concealed fixing device according to the present invention,

Figure 3 shows the part of the article of Figure 2 viewed from the inside of the article,

Figure 4 shows in greater detail the fixing member of Figure 3, and

Figure 5 shows a cross-sectional elevation on line A-A of Figure 3.

With reference to the drawings, Figure 1 shows a portion of an article such as a bed or other item. This is preferably made of wood but could be made from plastics or other suitable material.

For ease of description the term bed will now be used but it is to be understood that this may cover other articles which require to be flat packed.

Similarly, the term wood will be used but it is to be understood that this may cover other materials such as plastics, composites etc.

In figure 1, the head (or foot) end of the bed 10 is shown comprising an upright leg member 100 with an ornamental moulded portion 102. The side members 104, 106 may be fixed to the upright 100 permanently within a factory environment by means for example dowels 108 (shown dotted) and suitable adhesive or mortise and tenon joints.

The end of the post 100 does not show any fixing member for the side member 200 as shown in Figure 2.

With reference to Figure 2, the side member 200 also does not show any fixing member externally. The fixing means for the side member 200 are shown dotted and comprise two dowels 202, 204 which are inserted into the leg member 100 to protrude therefrom, and also the secure fixing device 300 according to the present invention which is shown in more detail in Figure 3.

The concealed fixing device 300 comprises a steel insert 302 which is inserted into a receiving hole 102 in leg member 100 and secured therein by a coarse external wood screw type thread 303 which secures the insert permanently within leg 100.

In a preferred embodiment the steel insert 302 has an external diameter of 16 mm and a core diameter of 11.5 mm the insert being provided with a wood screw type thread at 4.5 mm pitch along its entire length of 40 mm.

A threaded bar 304 (preferably 85 mm long and threaded M8) is screwed into insert 300 which is internally threaded to receive it. The bar 304 is inserted through a longitudinally drilled hole 206 in side member 200 to allow the end of the bar 304 to be accessible to application of a combined nut and washer 310 within an enlarged hole 208 drilled in a sideways direction on the inside of member 200. These sizes could be suitably scaled down to M6 or M4 for smaller sections.

The cross-section of side member 200 on line A-A (with secure fixing device 310 removed) is shown in Figure 5.

The combined nut and shaped washer 310 is shown in greater detail in Figure 4.

The nut 312 is a hexagonal nut (preferably 13 mm A/F 18 mm O/A length) which is threaded (preferably M8 internal) for a defined length (preferably 7 mm) and is bored out on its opposite end (to the left of dotted line B-B) for a defined depth (preferably 12 mm) to a larger diameter (preferably 8.5 mm) to provide a relatively long lead in to ensure that no cross threading occurs during assembly of the nut 312 onto bar

304.

The shaped washer 314 is held on nut 312 by a turned over portion 316 which holds washer 314 and nut 312 together but allows nut 312 to rotate relative to washer 314 but retains it closely enough to ensure that washer 314 rotates freely but without jamming against the tapered portion 318 of nut 312.

Washer 314 is shaped to conform to the internal shape of hole 208 so that when the nut 312 is tightened onto threaded bolt 304 side member 200 is accurately tightened onto leg 100 applying equal pressure onto both dowels 202, 204 and thereby ensuring that side member 200 is firmly secured to the leg 100.

The invention therefore provides a concealed fixing for a bed (as defined) which enables a piece of furniture to be assembled without any part of the fixing device being visible.

The provision of a combined nut and washer ensures that the washer can firstly not be omitted, and secondly that it cannot be misplaced. Often in assembling kits of parts the washers are dropped and then not fitted by workmen who are in a hurry.

Also, the shaped washer cannot be fitted the wrong way round.

The elongate lead-in ensure that cross threading cannot occur. This is particularly important where the structure is held by a single nut and bolt since cross threading will result in a loose joint which with the substantial forces to which furniture is subjected will often result in splitting of the wooden frame or cracking of any plastic frame members.

Thus the combination of the combined nut and washer and elongate lead-in ensures that the structure is easily and correctly assembled and remains so for the life of the furniture. Adjustment is possible if timber movement takes place by simple use of a spanner.

In a practical embodiment the following dimensions are preferred:

D1 (Figure 2)	=	32mm
D2 (Figure 2)	=	32mm
L1 (Figure 2)	=	32mm
L2 (Figure 2)	=	32mm
L3 (Figure 2)	=	42mm
L4 (Figure 3)	=	50mm
D3 (Figure 5)	=	11mm
D4 (Figure 5)	=	23mm
D5 (Figure 5)	=	27.5mm (minimum)
D6 (Figure 3)	=	35mm

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A concealed fixing device for:

a bed comprising an elongate screw thread male member, a permanently embedded female member suitable in use for fixing within a first member of said bed and co-operating with said elongate screw thread member to hold it in a fixed position,

a preshaped combined washer and nut assembly co-operating in use with said elongate screw thread member and a second member of said bed to provide a secure fixing, such that said combined washer and nut assembly is not externally visible when said bed is assembled, in which in use said fixing device co-operates with said second member of said bed which is provided with a blind cylindrical hole in a major surface thereof, said blind cylindrical hole also being provided with an elongate hole at one side thereof to provide entry for said elongate male member, in which said combined washer and nut assembly is shaped such that the washer shape co-operates with the side of said blind cylindrical hole to secure said second member to said first member, in which said nut is only partially internally threaded and is provided with an enlarged internal diameter section to provide a lead in section for prevention of cross threading when fitted onto said elongate male threaded member.

2. A concealed fixing device as claimed in claim 1 in which the washer is of a curved shape.

3. A concealed fixing device as claimed in claim 2 in which the washer is held on said nut by a turned over portion of said nut and is freely rotatable on the nut.

4. A concealed fixing device substantially as described with reference to the accompanying drawings.

Dated this 12th day of December 1997

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ABSTRACT

CONCEALED FIXING DEVICE

A concealed fixing device comprises an insert embedded within a first member, an elongate threaded bar connected to the first member and passing through a second member through a concealed hole to a concealed chamber within the second member. A combined nut and washer assembly applied to the threaded bar tightens the first and second members

Figure 3

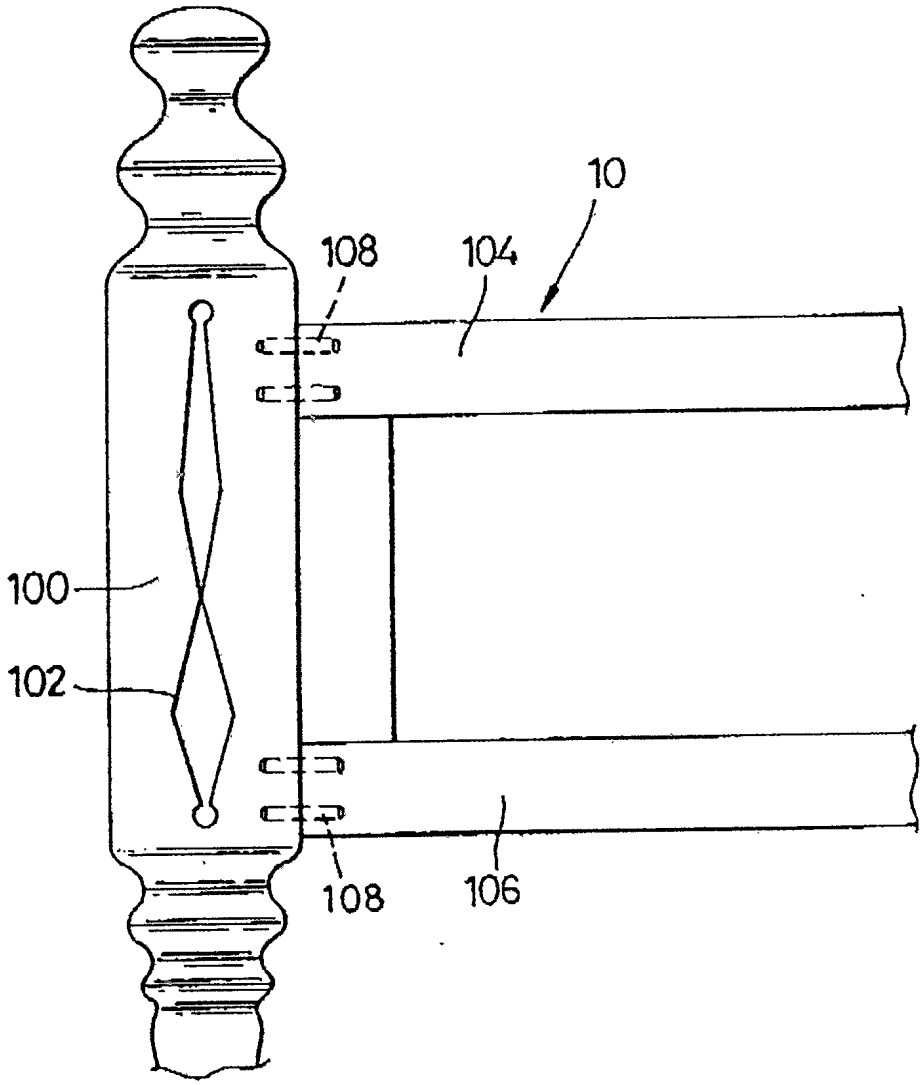

Fig. 1

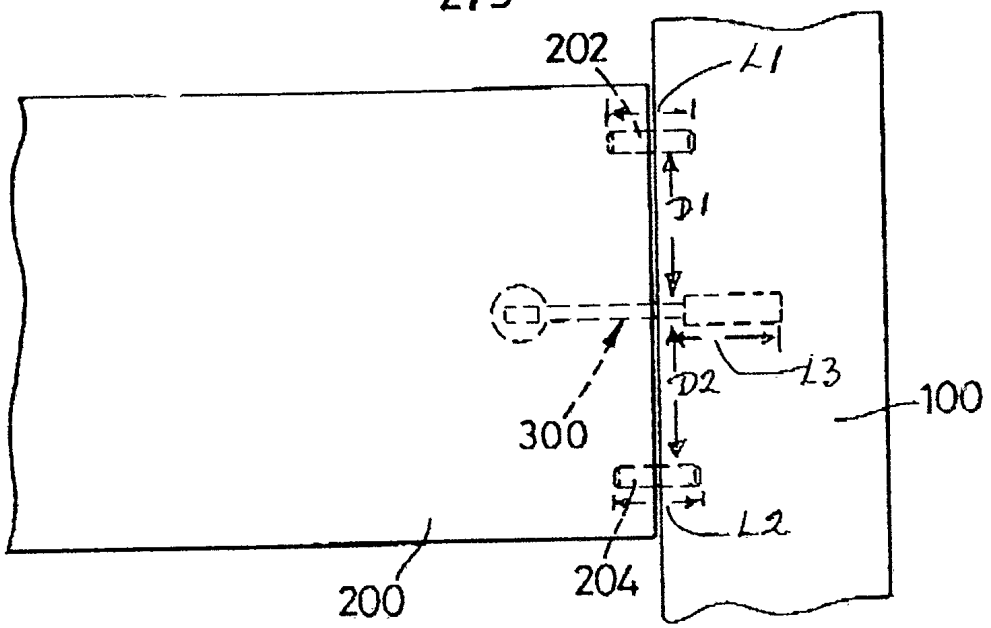
202
L1
D1
D2
L3
100
300
L2
200
204

Fig. 2

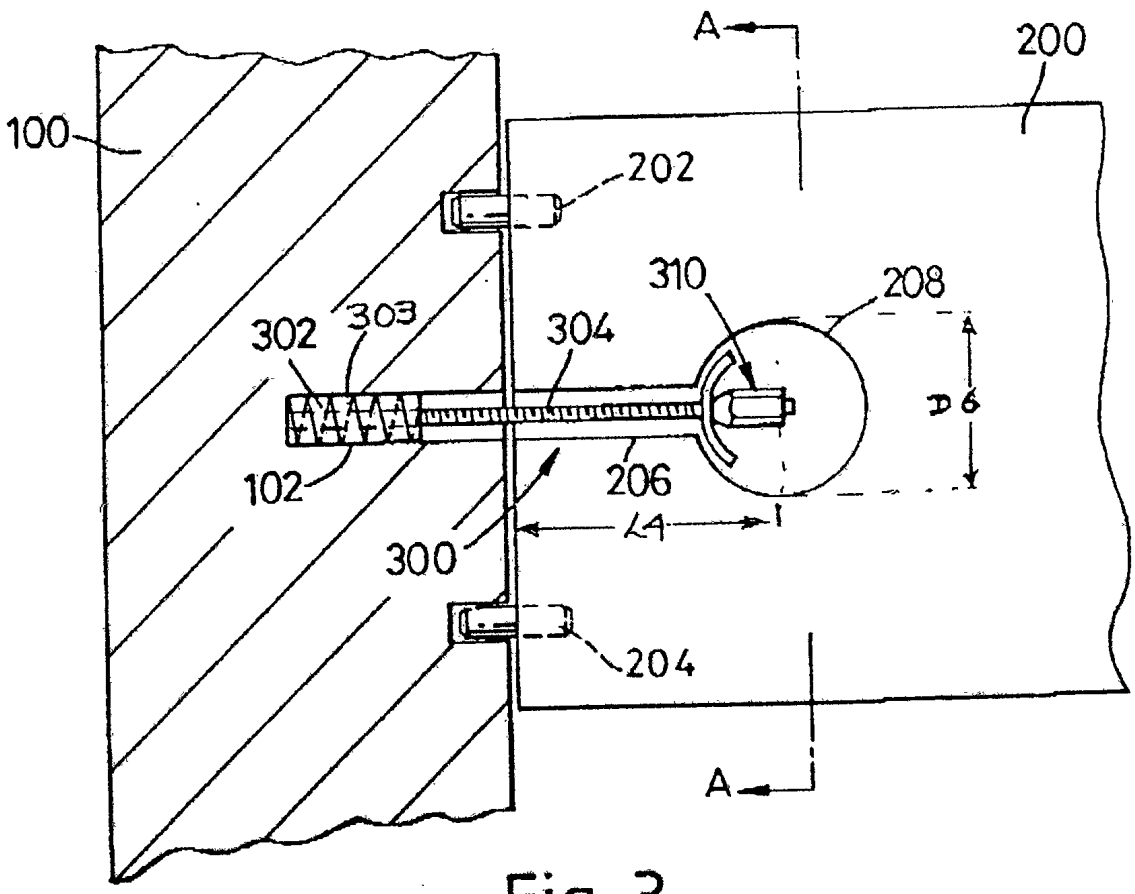
A
200
100
202
310
208
302
303
304
D6
102
206
L4
300
204
A

Fig. 3

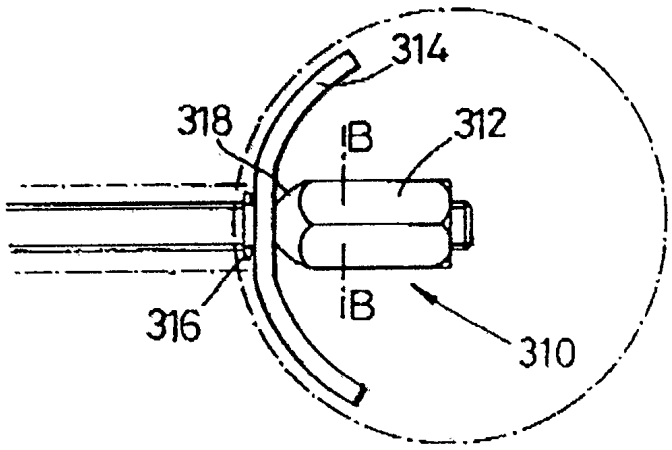

Fig. 4

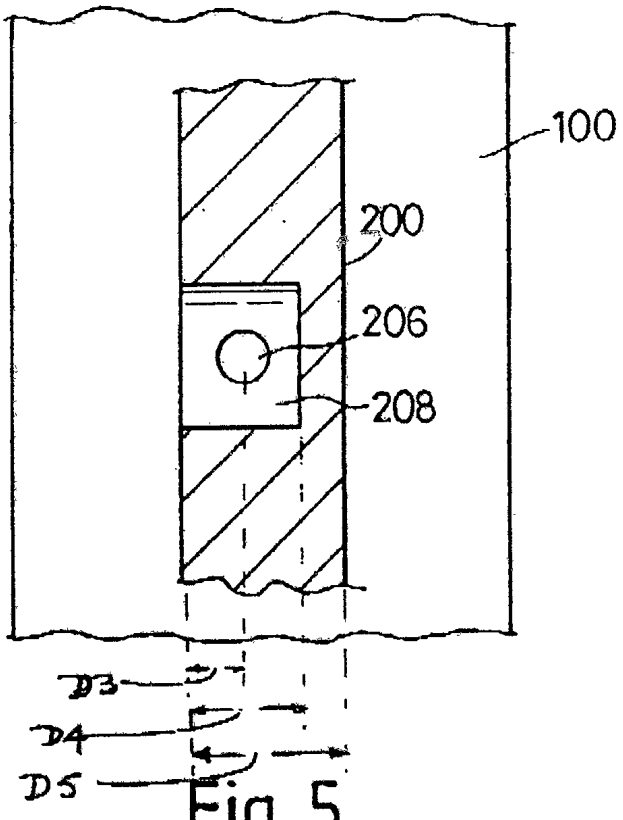

Fig. 5