

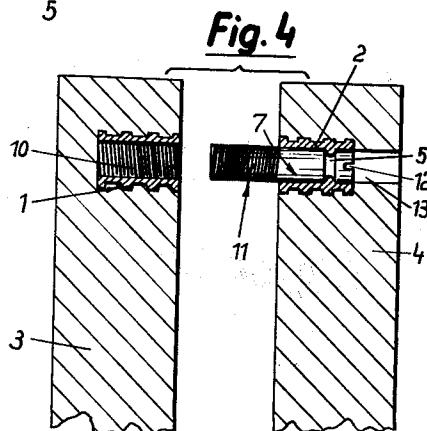
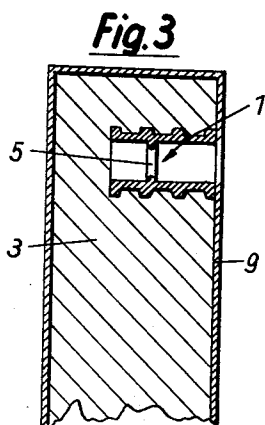
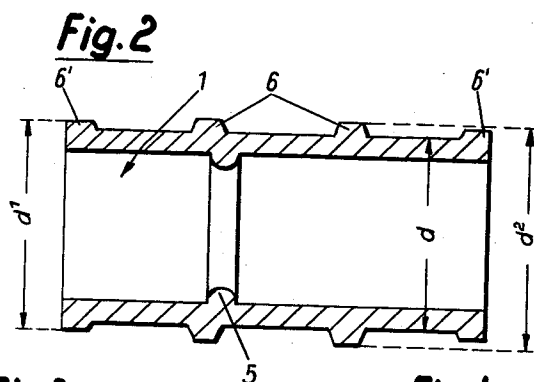
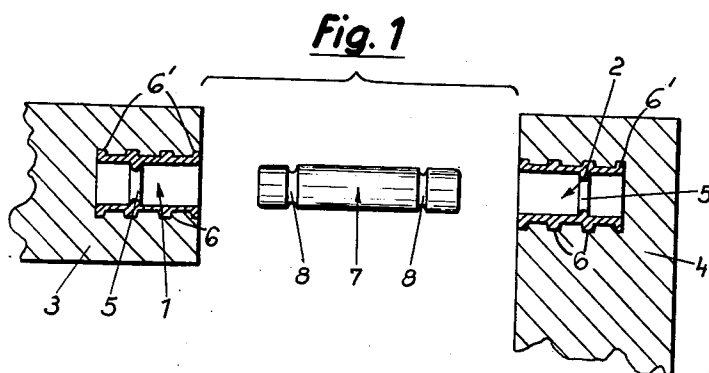
April 21, 1964

E. HENSEL
FITTING FOR DETACHABLY CONNECTING WOODEN
PARTS OF ARTICLES OF FURNITURE

3,129,472

Filed Jan. 22, 1959

3 Sheets-Sheet 1



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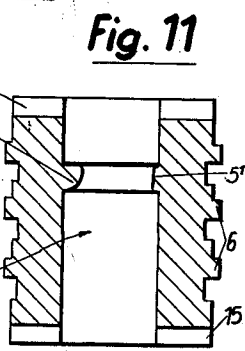
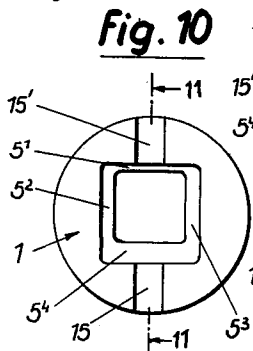
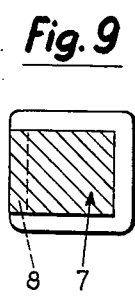
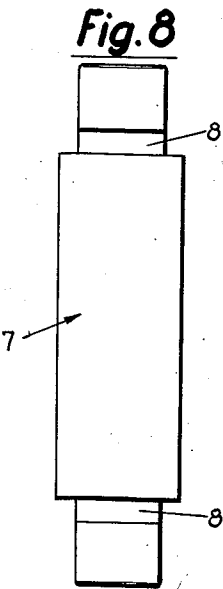
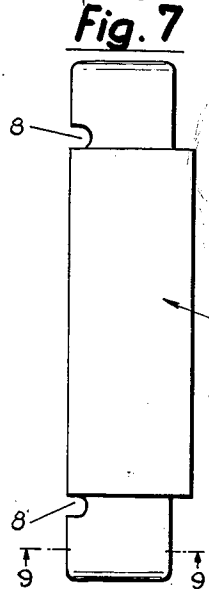
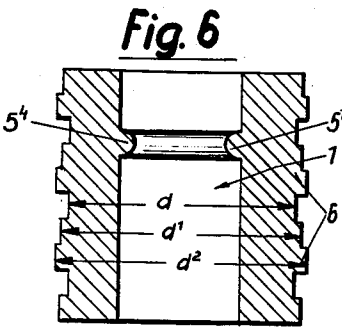
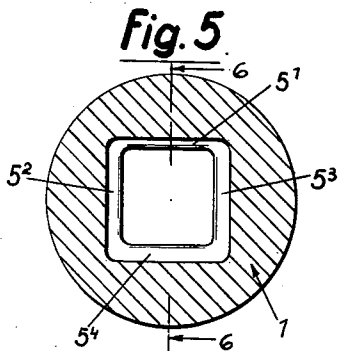
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Fig. 12

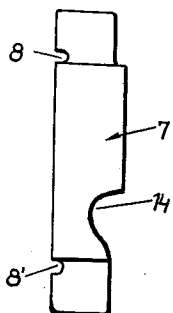


Fig. 13

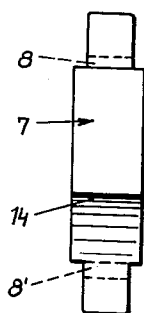


Fig. 14

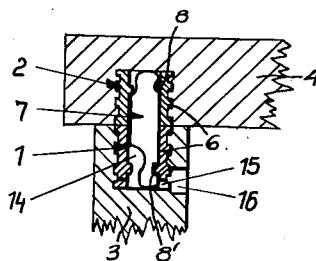


Fig. 15

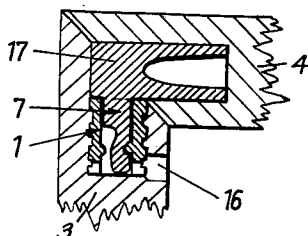


Fig. 16

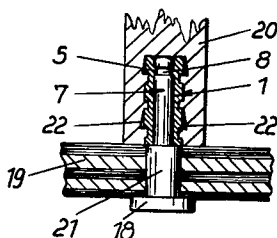


Fig. 17

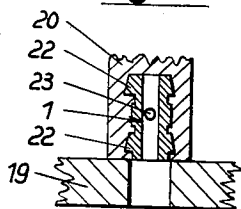


Fig. 18

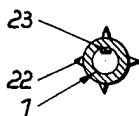
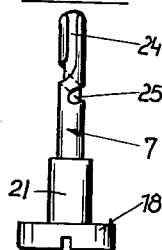


Fig. 19



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FITTING FOR DETACHABLY CONNECTING WOODEN PARTS OF ARTICLES OF FURNITURE

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Claims priority, application Germany Jan. 25, 1958

9 Claims. (Cl. 20—92)

This invention relates to a fitting for detachably and rotatably connecting wooden parts of articles of furniture.

The known metal fittings for connecting such parts are fastened by being screwed in or on and frequently possess troublesome projections which are sensitive to corrosion and externally visible to provide access to a detachable connection. These known fittings can be applied only under certain conditions and usually are employed only for special purposes. Thus, many different types are needed for connecting different parts of wooden furniture.

New furniture designs could often not be carried out owing to the lack of suitable fittings, since existing fittings are unsuited for detachable connections or too conspicuous. The furniture industry was compelled to employ conventional connections, such as gluing with additional dowelling or grooving and spring means. In such constructions the parts were therefore not detachably connected, and their packing and transportation involved considerable costs. Furthermore, such furniture is easily damaged during production because the polished sides and tops thereof, for instance of chests of drawers, kitchen dressers and the like, after their surface treatment is finished, have to pass again through the manufacturing process so as to be glued together. The fully assembled furniture is also liable to be damaged during its transportation. Repolishing or freshening up of glued furniture parts is rendered difficult or not possible at all.

Similar drawbacks occur also when table-tops have to be fastened to their frames, when ledges are fixed to beds or feet or other members have to be secured to cabinets and the like. The usual assembly of furniture parts by gluing requires special devices or clamps or screws, and for polished surfaces also felt parts and the like; curved surfaces frequently need specially made parts and templates.

For furniture of the type permitting the subsequent attachment of parts, no suitable and externally invisible fittings are available at present by means of which an article of furniture could be extended in all directions, and thereby saving at least one transverse bottom or one side.

In certain wooden parts requiring a movable and rotatable connection, as for instance the turning points of reclining chairs, the ledges have to be drilled and thus weakened in order to provide a rotatable connection by means of screws or the like.

It is the object of this invention to eliminate the defects mentioned and to provide a corrosion-resisting low-priced universal fitting which, having small dimensions and being externally invisible, is suited for commercial and other wood sizes and permits new possibilities of construction in the furniture industry. This fitting can be utilized in a simple and convenient manner for many detachable connections of a great variety of furniture parts and also for their rotatable connection.

These new fittings of plastic material can be made by spraying or extrusion and as parts produced on an automatic lathe. To ensure greatest possible resistance to wear and maximum economic efficiency, production from polyamides (e.g., nylon) is advisable on automatic die casting machines.

The essential feature of the invention is that two round sleeves glued into bores of the wooden parts to be con-

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nected and having internal projections are held together by a bolt carrying corresponding grooves which are engaged by projections of the sleeves. The latter have external annular portions of different diameters.

The internal projections of the round sleeves and the grooves of the bolt may be so arranged that after their engagement an intermediate space of at least two veneer thicknesses remains.

In an alternative embodiment, one of the round sleeves has an internal thread, and the bolt fitted with a screw slot is externally threaded.

The bolt holding the round sleeves together may be prismatically edged and is then grooved on one side only, whereas the sleeve possessing a corresponding edged recess has on its inner sides projections of different heights, the highest of which being adapted to the depth of the groove of the bolt.

The invention is illustrated in the accompanying drawings, in which

FIGURE 1 is a sectional view of a set of fittings according to the invention, partly in elevation showing a first embodiment;

FIG. 2, an enlarged longitudinal section of a round sleeve forming part of the fittings;

FIG. 3, a section of a veneered wooden part with an internal round sleeve;

FIG. 4, a section of an altered embodiment;

FIG. 5, a cross-section of a round sleeve of another construction;

FIG. 6, a longitudinal section on the line 6—6 of FIG. 5;

FIGS. 7 and 8 show a bolt suitable for the sleeve of FIGS. 5 and 6 in two side elevational views rotated by 90°;

FIG. 9 is a section on the line 9—9 taken in FIG. 7;

FIG. 10 is a top plan view of a modified embodiment of a sleeve member forming part of a fitting of the invention;

FIG. 11 is a longitudinal sectional view on the line 11—11 of FIG. 10;

FIG. 12 is a side elevational view of a bolt or pin member for use in the sleeve of FIGS. 10 and 11;

FIG. 13 is a side elevational view showing another side of the bolt of FIG. 12 rotated by 90°;

FIG. 14 is a sectional view showing the fitting of FIGS. 10—13 connected to wooden furniture parts;

FIG. 15 is a sectional view of another modified embodiment of the invention;

FIG. 16 is a sectional view of yet another modified embodiment of the invention;

FIG. 17 is a sectional view showing the sleeve for the fitting of the invention in yet another modified form;

FIG. 18 is a transverse section of the sleeve of FIG. 17; and

FIG. 19 is an elevational view of a bolt or pin member for use with the sleeve member of FIGS. 17 and 18.

The fitting according to the first embodiment of the invention consists of two round sleeves 1, 2 bonded or glued into corresponding bores of wooden furniture parts 3, 4 to be united. The sleeves 1, 2 shown in FIGS. 1 to 4 are provided with internal annular projections 5 and with external annular elevations 6, 6'. The sleeves 1, 2 are connected by a bolt 7 provided on its circumference with annular grooves 8.

In FIGS. 1, 3 and 4, the sleeves 1 and 2 are shown, for the sake of easier illustration, as being surrounded entirely by the respective wooden parts 3 and 4. It will be understood by those skilled in the art that the sleeves are insertable in the bores owing to the relative resilience of the plastic material from which they are made, e.g., if the bore diameters are just slightly smaller than the overall diameters of the annular projections 6 or 6'.

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Alternatively, as will be described later in more detail, an appropriate bonding agent or glue may be used which will fill up the annular gaps between the sleeves and the bores while the largest diameter projections may still provide frictional engagement therein.

After the round sleeves 1, 2 have been glued into the wooden parts 3, 4 they are forced onto the bolt 7, and their annular projections 5 engage the annular grooves 8 thereof, whereby a firm yet detachable connection of the wooden parts 3, 4 is provided, which is also rotatable. The fittings are so dimensioned that the gluing of the sleeves 1, 2 in the wooden parts will resist a considerable tractive force, which is greater than the engagement of the sleeves between the annular projections and the annular grooves 8, while the engagement is sufficiently resistant to lateral loads of the furniture. The connection can be disengaged by separating the fittings by means of a wedge or by knocking them off.

The annular elevations 6, 6' of the round sleeves 1, 2 have different diameters. The internal elevations 6 are the highest, and the external elevations 6' are somewhat lower, so that there are three graded diameters d , d^1 and d^2 of the sleeves (FIG. 2). The greatest elevations 6 produce with their diameter d^2 a mechanical pressure in the bore of the wood; the intermediate elevations 6' with their diameter d^1 coincide with the bore of the wood, and the lowest grade d formed by the circumference of the sleeve 1, 2 is smaller than the bore. After hardening of the glue at the grade d , an additional chemical hold is obtained.

FIG. 6 shows an alternate method of forming the annular projections 6 on the sleeve 1, 2 wherein the elevations 6 are each graded in three different diameters d , d^1 , and d^2 . In this manner, the projections 6 are formed within a single annular projection.

The internal projections 5 of the sleeves 1, 2 and the grooves 8 of the bolt 7 may be so arranged that after their engagement there remains an intermediate space of at least two veneer sizes between the sleeves 1, 2. This small space provides, however, sufficient tolerance for different purposes. It makes it possible, for instance, to glue the sleeves 1, 2 in to be flush with the surface of the wood and then made inconspicuous by covering them entirely with veneers 9 (FIG. 3), which may be desirable for extension furniture. If later on the piece of furniture is to be enlarged, the veneer 9 on the sleeve is perforated for putting in the bolt 7.

When furniture parts having each two pairs of sleeves are to be tightly connected, the round sleeves 1, 2 can be knocked into the bores of the wood in a slightly recessed fashion. If only one pair of sleeves is to be used, for instance as a rotatable axial connection for wooden parts on inclining chairs, or if tight fitting of the wooden parts is to be avoided for other reasons, one of the sleeves 1, 2 may be made to project from the bore of the wood.

After the furniture parts are fitted together, the fittings are always invisible. Even polished furniture parts can readily be put together after the surface treatment without any damage by placing the bolt 7 between the sleeves 1, 2; they are then caused to snap in by applying pressure. To save packing costs and transportation space the furniture parts may be assembled on the premises of the customer.

In the construction shown in FIG. 4 only the part 2 is provided with locking means in the form of the projections 5 and the bolt grooves 8. The other sleeve 1 has an internal thread 10, and the bolt 7 is partly provided with an external thread 11. At one end of the bolt 7 a screw slot 12 is accessible through an opening 13 in the wooden part 4. The bolt 7 is held in the part 2 by being knocked in and can be screwed from the rear into the thread 10 of the sleeve 1 for pulling together the furniture parts 3 and 4. Screwing can be performed by means of a screwdriver through the opening 13, which together

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with the borehole for the sleeve 2 is made in one operation.

There are light and heavy pieces of furniture whose wooden parts may require a looser or firmer detachable connection by means of the fitting according to the invention. This can be done by using flatter or deeper grooves 8 on the bolt 7 and correspondingly flatter or higher annular projections 5 in the sleeves 1, 2, which requires of course the making of different models.

FIGS. 5 to 9 show an embodiment by means of which it is possible to obtain different flat or deep interlocks and thus looser or firmer detachable connections with the same fittings. The bolt 7 and the opening of the sleeves 1, 2 are of square shape. The sleeves 1, 2 have four projections 5¹, 5², 5³ and 5⁴ of different heights on their internal faces, and the bolt 7 is provided with the groove 8 only on one side, the depth of this groove corresponding to the highest projection 5⁴. On the remaining three sides the bolt heads are of uniform thickness. As a matter of example, during knocking-in, the two heads of the bolt 7 slide therefore on three sides past the projections 5¹, 5² and 5⁴, while groove 8 engages one of these projections, e.g. projection 5³.

Depending on the insertion of the bolt 7, its groove 8 may engage a flatter or a higher projection, so that selectively four times a looser or firmer connection is achieved between the bolt 7 and the sleeves 1, 2. The two sizes of the oppositely disposed projection pairs 5¹, 5⁴ and 5², 5³ project inwardly the same distance. The stem of the bolt 7 is therefore always centrally guided by the internal faces of the sleeves 1, 2 even at a different engagement with the opposite sleeves 1 and 2.

It may be suitable to provide additional means to prevent unauthorized external knocking-off, for instance of the top of a locked cabinet, and such protection is made possible by an arrangement shown in FIGS. 10 to 14, in which the projections 5⁴ of the sleeve 1 has the form of a nose bevelled on one side. When the bolt 7 is knocked in over the slope of the nose 5⁴ and the latter engages the groove 8', the bolt cannot be freed from the sleeve 1 by knocking or by the use of a wedge, but only by selective application of the members 5¹, 5² and 5³.

It is possible, however, to loosen the nose 5⁴ from within the furniture, and for this purpose the bolt 7 at one end has a recessed portion 14 which imparts springiness to this end. By means of a suitable tool, as a screwdriver, the bolt can be pressed out of the projection 5⁴, so that the other furniture part can be lifted off. The sleeve 1 has on one end a transverse slot 15 through which the springy end of the bolt 7 can be forced back, access thereto being facilitated by the provision of a small borehole 16 on the inside of the respective furniture part (see FIG. 14). This hole 16 is substantially aligned with the lower recessed end of the bolt 7 when inserted into the sleeve 1.

As indicated in FIGS. 10 and 11, the other end of the sleeve 1 may also possess a transverse slot 15' through which the sleeve, if inadvertently rotated around its axis, can be brought into proper position and parallel to the wood by means of a screwdriver. Furthermore, this arrangement permits also regulation of the sleeve after gluing in, if a looser or firmer engagement in the furniture part concerned is desirable.

In the embodiment shown in FIG. 15 the bolt 7 has a rectangularly attached leg 17 which permits the securing or drawing together of 45° mitres on furniture parts. The leg 17 directly enters the bore in the wood and is so reinforced that its diameter corresponds to that of the sleeve 1; it is provided with glue grooves on its circumference and made hollow to save material. The two bores in the wooden part have equal diameters and their insides are filled out by the fitting parts 1 and 17, whereby satisfactory compression of the mitre without any difficulties is ensured. In case of distorted furniture parts

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the mitre fitted only very seldom with the known manner of connection.

As the fitting has a tension effect owing to the engagement of the bolt 7 in the sleeve 1, the use of screw clamps can be dispensed with even for the gluing of mitres. When a non-glued detachable connection is used, no fitting part is visible on the furniture parts, contrary to the known metal fittings, except the small bore 16 on the inside of one of the furniture parts.

It has been found that in mounting and demounting of detachable cabinets having screwed-in back walls, too much working time is required for the repeated screwing in and unscrewing of numerous back-wall screws during the manufacturing process as well as in dealers' shops and also on the part of the final user, e.g., when moving. In the series production of furniture the use of certain grooved devices in which the rear walls were inserted without screws has been discontinued as being too uneconomical in view of the high costs of materials and the excessive wage rates.

FIG. 16 shows an embodiment of the invention which avoids these drawbacks. The sleeve 1 inserted in the wood part and provided with an internal annular projection 5 takes up the grooved bolt 7 at one end of which a knob 18 is formed.

The mounting of back wall on detachable cabinets is thereby greatly simplified. A back wall 19 is bored, as usual, together with a cabinet part 20 according to the thickness of the sleeve 1 to be inserted, which corresponds to an external portion 21 of the bolt 7.

The bolt 7 is knocked into the bore of wall 19, so that its groove 8 is engaged by the projection 5 of the sleeve 1 and thus the back wall 19 is secured. The sleeve 1 is externally provided with resistance members 22 which are mechanically held in the cabinet part 20, and if necessary additional gluing may be applied. The back wall 19 is thus fastened by a few blows of a hammer, and time-consuming screwing on is dispensed with. For loosening the back wall is struck outwardly near the bolt 7 which is released from its engagement at 5, 8 while the sleeve 1 stays in place. As the polyamide parts practically do not wear off, the bolt may be knocked in and loosened countless times.

The fitting can be used for back walls of different thicknesses. If required, the inner shoulder of the outer reinforced portion 21 of the bolt 7 drives the sleeve 1 to the proper depth. Securing and loosening of the back walls takes up only a fraction of the hitherto required working time.

The head 18 of the bolt may be made ornamental and/or colored. Its use is particularly advantageous where corroding and visible wood screws could not be inserted until now, for instance, for fastening of frames on radio casings, on wall panelings and the like.

If for loosening of the back wall 19 counter-striking from within is not desirable, the inner wall of the sleeve 1 may be provided, according to FIGS. 17 and 18, with a short pin 23 and, as indicated in FIG. 19, the bolt 7 may have a bayonet slot 24 with a substantially straight slot portion and a connecting short thread 25. For mounting, the bolt 7 put into the sleeve 1 is knocked into the bore-hole (see FIG. 17), and the last 1 to 2 mm. are drawn in by using a screwdriver, whereby the back wall 19 is pressed upon the cabinet side 20. For loosening the fitting or removing the back wall, the bolt 7 is given a half to one turn in the opposite direction until the pin 23 formed in the sleeve 1 lies again in the straight portion bayonet slot 24 and the bolt 7 can be drawn out.

As has been mentioned before with regard to FIGS. 1, 3 and 4, the embodiments shown in FIGS. 14 through 17 are simplified inasmuch as no gap has been shown between the sleeves and the surrounding wooden furniture parts. This is merely for the sake of easier illustration and is not meant to indicate, for instance, that the wooden parts or panels are molded around the sleeve members.

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The preceding specification relates to preformed bores within the wooden parts into which the sleeves are subsequently inserted, as has been explained in connection with the various preferred embodiments.

I claim:

1. A fitting for detachably connecting wooden parts in knock-down furniture and the like, comprising an elongated sleeve member made of a resilient material and dimensioned at its outer surfaces to be insertable in a hole provided in one of said wooden parts for close association with the wall of said hole, said outer surfaces providing at least one outwardly extending annular elevation for engagement with said wall, a bonding agent being disposed between said wall and said sleeve member to immobilize the latter with respect to said one wooden part against axial torsion forces applied thereto after having been inserted in said one wooden part, said sleeve member being formed with an opening and at least one internal projection, and a prismatic bolt member made of a resilient material disposed in said opening and being formed with a groove therein, said projection having a nose bevelled on one side and engaging said groove so as to resist axial torsion forces applied to said bolt member, said bolt member having a cutaway area on the side thereof opposite said groove, said one wooden part being provided with a slot communicating with said hole in the region of said cutaway area when said bolt member is inserted therein so that extraneous manual force can be applied through said slot on said bolt member to disengage said nose from said groove and make said bolt member removable from said sleeve member.

2. A fitting according to claim 1, further comprising a second sleeve member made of a resilient material and inserted in a second hole provided in another wooden part, said second sleeve member being dimensioned and formed with outer surfaces, elevations and projections similar to those of said first-named sleeve member, said bolt member being formed with a second groove therein and disposed in said second sleeve member, and wherein said projections and said grooves are so dimensioned that a limited space remains between the opposing ends of said sleeves when said bolt member is in engagement therewith.

3. A fitting according to claim 1, wherein said sleeve member is provided with a slot in the peripheral portion in the region of said nose and substantially aligned with said slot of the wooden part for facilitating the removal of said bolt member from said sleeve member.

4. A fitting according to claim 1, wherein said sleeve member has at least two projections of different heights, said groove being formed on one side of said bolt member, the higher projection being adapted to engage said groove when axially and radially aligned therewith.

5. A fitting according to claim 1, wherein said elevation is press-fitted into said wall and said outer surfaces further provide another elevation dimensioned to coincide with the dimension of said wall and still another elevation dimensioned smaller than said wall, said bonding agent substantially surrounding all of said elevations and securing them to said wall.

6. A fitting according to claim 1, wherein said bolt member has its end opposite said cutaway area rectangularly shaped so as to be insertable in a second hole provided in another wooden part for attachment thereof to said one wooden part.

7. A fitting according to claim 6, wherein said opposite end of the bolt member corresponds in diameter to that of said sleeve member, has external annular depressions and is hollow.

8. A fitting according to claim 1, wherein said bolt member has an outer end providing a flat knob.

9. A fitting according to claim 8, wherein the shaft of said bolt member is reinforced at its end close to said

knob to the extent of the external diameter of said sleeve member.

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