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[54] RAIL CONNECTION

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[51] **Int. Cl.** **A47f 5/00**, F16b 7/04

[58] **Field of Search** ..... 211/182, 148; 248/188, 221, 248/224; 287/54 A–54 C, 56, 189.36 D, 23, 51; 285/322, 144, 173; 312/263, 264; 108/111

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[57] **ABSTRACT**

A rail connection arrangement comprising a rail, a support arranged substantially perpendicularly to the rail and comprising a holding device provided with slot means and an exterior thread, the support also comprising a spacer with a portion having an interior thread engaged by said exterior thread, the rail being received in the slot means and fixedly held therein between the holding device and the spacer, the portion of the spacer having the interior thread is made of a material which is harder than that of the remainder of the parts in the above combination.

4 Claims, 4 Drawing Figures

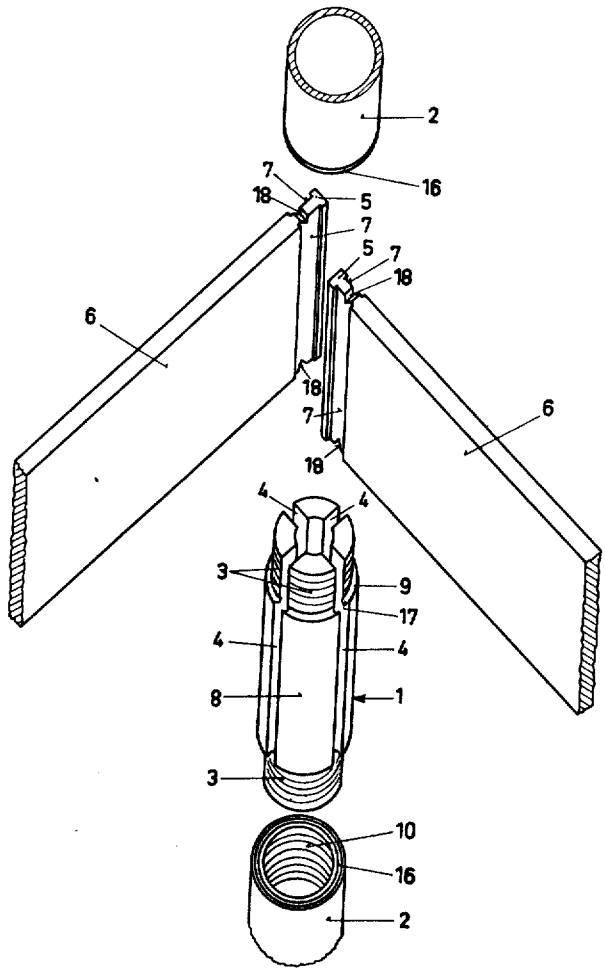


Fig. 1

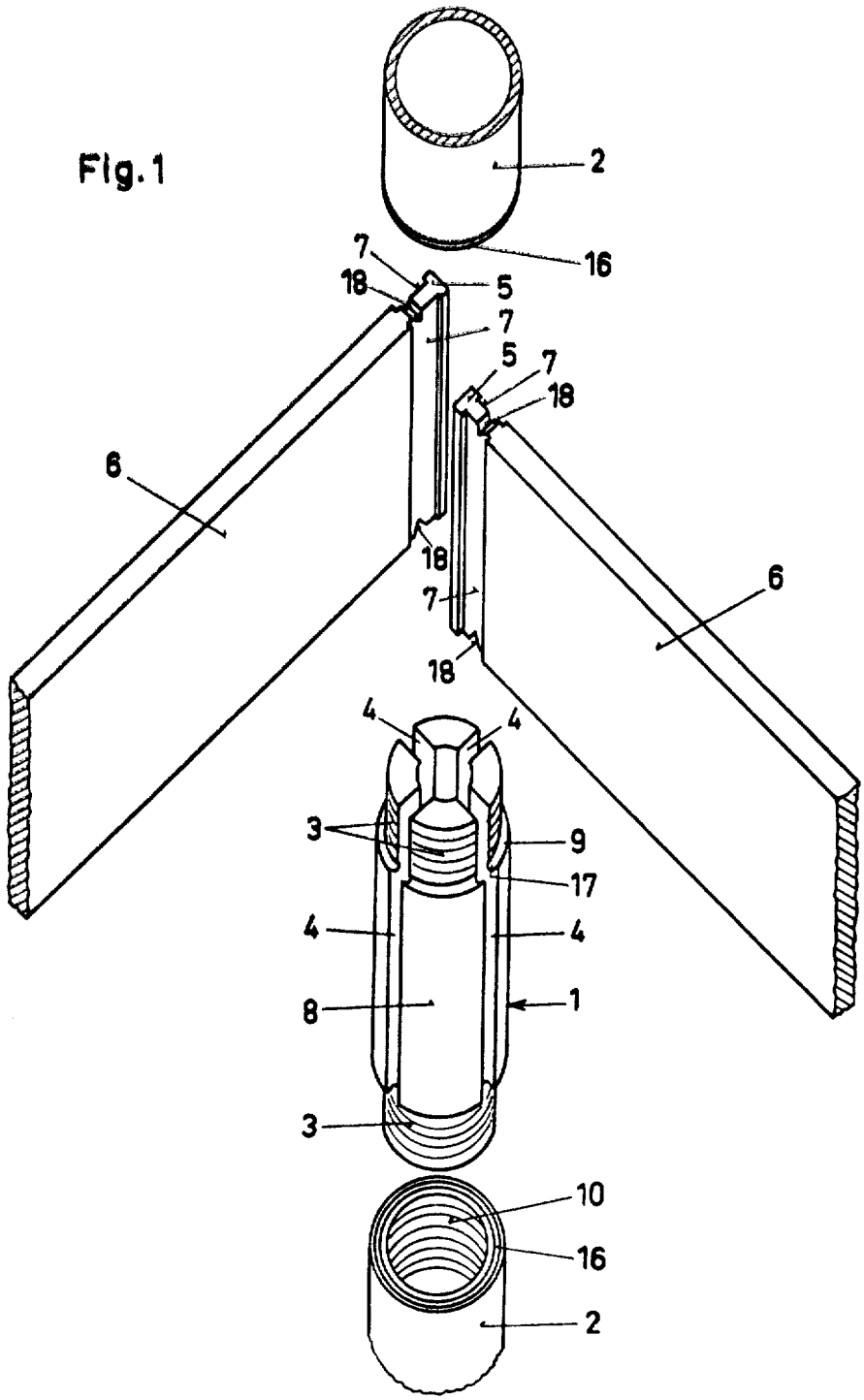


Fig. 2

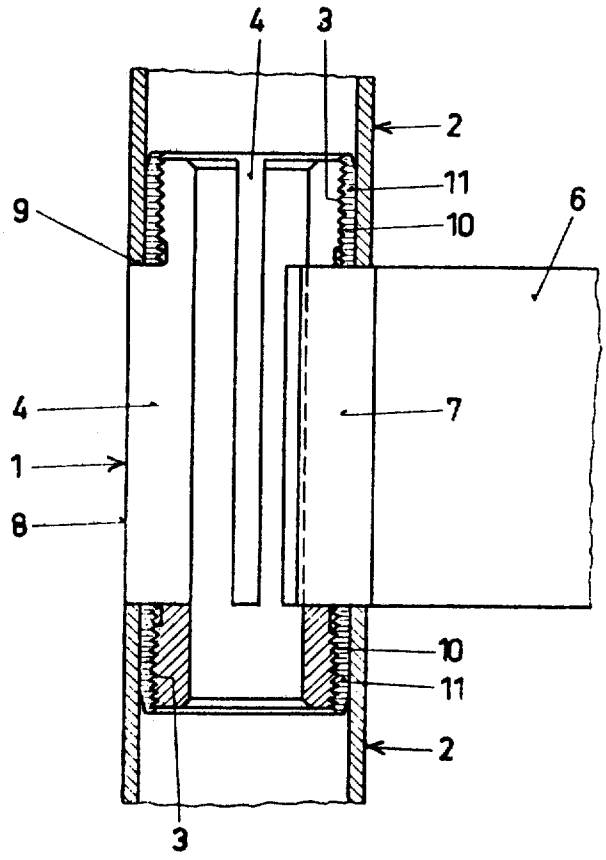


Fig. 3

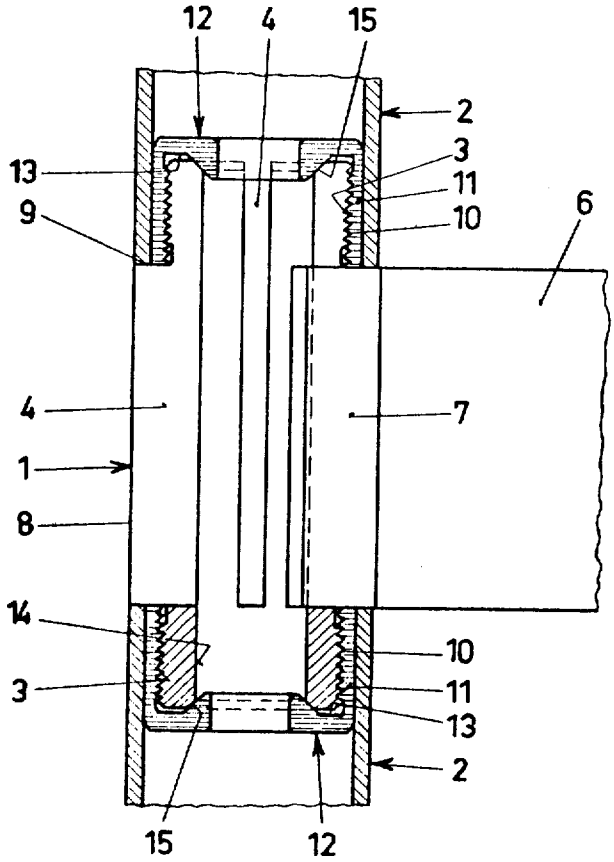
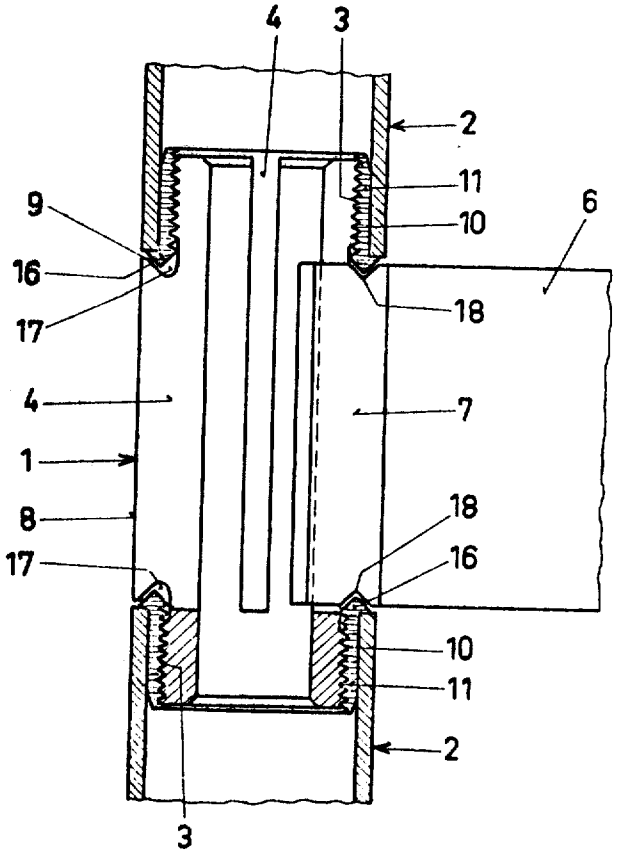


Fig. 4



RAIL CONNECTION

BACKGROUND ON THE INVENTION

The present invention relates to a connection between at least one rail and a supporting column arranged perpendicularly to the rail, in which the rail can be inserted into a slot of a portion of the supporting column which is designed as a holding or supporting bolt. With its slotted end, the holding bolt may be screwed into another portion of the supporting column which forms a spacer member. The rail placed into the supporting column is enclosed between the bottom of the slot in the holding bolt and the spacer member threaded thereinto.

The just-described rail connection may be used in various ways, especially for building up stands, shelves, temporary separating walls, walls used for advertising purposes, but also for desks and similar furniture.

A rail connection of the above-described general type is known, in which the holding bolt has a least in that portion thereof which is slotted a central hollow chamber, while the width of the slot in the holding bolt is smaller than the thickness of the rail. In this arrangement, the rail has at that end thereof which is to be introduced into the slot of the bolt, a narrowed portion corresponding to the width of the slot. This portion is formed by two parallel grooves provided in both broad sides of the rail and extending in the direction of the axis of the supporting column. That end of the rail which is introduced into the holding bolt does not extend to the longitudinal axis of the bolt. Preferably, the entire structure is made from an aluminum alloy.

Experience has shown that this arrangement, while in general quite useful, tends to be unstable because of the relative softness of the material, i.e., the individual members or parts of the structure are subjected to wear and tear and are easily deformed, especially where they engage each other, in the course of frequent assembly and disassembly. The end result is that the individual members are not immovably fixed when assembled but exhibit a certain play, clearance, or looseness. The use of a harder material, for instance steel, for the entire structure cannot be considered a practical solution because of the high cost and weight.

It is, therefore, an object of the present invention to provide a rail connection of the general type described above, which will overcome the disadvantages of heretofore known rail connections.

It is still another object of the invention to provide a rail connection as set forth above, which is stable, while being not too expensive for the intended purposes of the rail connection.

BRIEF SUMMARY OF THE INVENTION

The present invention is characterized in that that portion of the spacer member which carries the inner thread is made from a harder material than the remaining portions of the connection. Preferably, those tubular ends of the spacer member which are to be screwed into the holding bolts have inserted therein steel bushings or sleaves into which the interior thread is cut. However, it is also possible to use a head consisting completely of a harder material and provided with the interior thread and to place the same upon that end of the spacer member which consists of the softer material. A considerable improvement has been achieved by making only one part of the connection from a harder material. The increase in weight is insignificant and the slightly higher costs are more than balanced by the increased stability.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated by way of example in the attached drawings, in which:

FIG. 1 is an exploded perspective view of a rail connection in accordance with the present invention, with two rails and a threaded bushing;

FIG. 2 is a vertical section along the longitudinal axis of the supporting column of the rail connection;

FIG. 3 is a vertical section similar to that of FIG. 2, illustrating a further embodiment of the present invention;

FIG. 4 shows a vertical section through a further embodiment.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The rail connection according to the invention comprises a supporting column which consists of a number of holding bolts 1 (only one being shown) corresponding in number to the desired steps or stories, or shelves, for instance of a supermarket shelf, and of spacer members 2 arranged between the individual shelves. The spacer member at the lower end of the supporting column may, if necessary, be designed as a foot or a supporting plate. Similarly, the upper end of the supporting column will usually be provided with a holding bolt which carries a thread at one end only, whereas the other end is closed and plane. Such end members are not shown in the drawing.

In the embodiment shown in FIG. 1 which represents one of the components in the center of the supporting column, the holding bolt 1 is a relatively thick-walled tubular section carrying an outer thread 3 at each end. This section is also provided with at least one radial slot 4 (four being shown in FIG. 1) extending from the upper end thereof up to the beginning of the lower outer thread 3.

The ends 5 of a pair of rails 6 are introduced from the top into these slots 4. Since the width of the slots 4 is smaller than the thickness of the rails 6, these rails are equipped with narrower or reduced portions 7 so that they can be introduced and held in the slots 4. The portion of the holding bolt 1 between the outer threads 3 is the main body 8 of the bolt, the transition between the main body 8 and the outer threads 3 being formed by a shoulders 9.

After the rails 6 have been introduced into the slots 4, a spacer member 2 is threaded upon the outer thread 3. This spacer member consists of a tubular section, preferably of the same cross-section as the main body 8 of bolt 1, and carries an inner thread 10 at the end or ends to be connected with the holding bolt 1. Also, the lower end of the holding bolt 8 has placed thereupon by threading a spacer member 2 to be followed by a further holding bolt with rails, if necessary, or by the foot of the supporting column.

The arrangement described so far, and including the holding bolt 1, the rails 6 and the spacer members 2 has the disadvantages described above in the introductory portion of the specification. In order to eliminate these disadvantages, according to FIG. 2 a threaded bushing or sleeve 11 is inserted into the end or both ends of the spacer members 2. Sleeve or bushing 11 consists of a material which is harder than that from which the remaining portions of the rail connection are made. If, for instance, the holding bolts, rails and spacer members are made from an aluminum alloy, the threaded bushing 11 should consist of steel.

With arrangements in which there are provided four or less slots in the holding bolt 1, the just-described structure shown in FIG. 2 has a sufficient stability. However, if the holding bolt has to have slots for receiving five or more rails, as they are for instance used for shelves with six or eight rails, the segments carrying the outer thread 3 between adjacent slots become so small and weak that they maybe deformed easily or bent inwardly in assembled condition, under pressure on one of the rails in the direction of the plane of the rail and transversely to the longitudinal axis threof, which corresponds to the normal direction of the load on the rails. Under such conditions, the outer thread 3 of the holding bolt 1 and the inner thread 10 of the spacer member 2 may slide apart on that side which is opposite the rail, under a load in the direction of the longitudinal axis of the supporting column, the supporting column may be bent, or the entire rail connection may fall apart.

This problem can be solved, in accordance with a further feature of the present invention, by designing the threaded sleeve or bushing 11 in accordance with FIG. 3. The bushing or sleeve 11 is to support from within the segments of the holding bolt which carry the outer thread and thereby to prevent an escape and a bending of the segments toward the

interior of the column. Consequently, the threaded bushing 11 is provided with an inwardly directed ring 12, at a distance from the end face of the spacer member 2 which corresponds substantially to the depth of penetration of the holding bolt 1. This ring 12 is provided with a groove 13 on that end face thereof which faces the end face of the spacer member. The width of the groove 13 substantially corresponds to the wall thickness of the portion of the holding bolt 1 carrying the outer thread 3. The dept of the groove 13 is selected such that the end face of the holding bolt in its end position does not touch the bottom of the groove. However, the inner wall 14 of the holding bolt 1 when threaded into position should rest against the inner wall 15 of the groove. In this way, bending of the segments of the holding bolt 1 carrying the outer thread 3 in inward direction is prevented. In order to assure that the inner surface 14 of the holding bolt 1 rests against the inner side wall 15 of the groove, preferably the end of the inner wall 14 of the holding bolt which faces the end face is arranged at an angle and the inner side wall 15 of the groove is inclined similarly. The end of the holding bolt thus engages the groove in the manner of a wedge.

It is to be understood that this safety feature for preventing an inward bending of the threaded segments of the holding bolt is actually needed only where the slots 4 break through the end face of the holding bolt. However, in order to make possible an economic standard manufacture of the members involved and in order to make it unnecessary that particular attention has to be focused on these members during assembly, in other words to watch which end of the spacer member 2 is to be combined with which end of the holding bolt 1, preferably all threaded bushings or sleeves are equipped with the ring 12. This requires that also the inner wall of that end of the holding bolt which is not penetrated by slots, is chamfered at its end.

The arrangement according to FIG. 4 is particularly suitable in instances where the rails are used as consoles, i.e., when they are connected to a supporting column at one end only whereas the other end extends freely from the supporting column. It is to be kept in mind that when the individual elements used in the rail connection in large numbers, a certain variation in the measurements in the individual parts cannot be avoided. Thus, it is for instance not possible to match the width of the narrowed portions 7 of the rails exactly with the wall thickness of the threaded portion 3 of the holding bolt. The same applies to the relationship between the thickness of the rail and the width of the slot in the holding bolt. The end result is that the fit of the rail in the slot of the holding bolt varies, thus accounting for gaps so that the rail is loose and the longitudinal axis of the rail does not extend horizontally but is inclined to a certain extent.

The just described disadvantage is overcome by the arrangement of FIG. 4, showing a special design of the head portion of the spacer member or the threaded bushing or sleeve. At the end of the spacer member 2, the threaded bushing 11 extends beyond the end of member 2 and forms a rib 16 which extend around the end face of the spacer member and which is directed toward the shoulder 9 of the holding bolt 1. This rib is preferably of wedge-shaped cross-section.

In order to create a space for the rib 16 during assembly of the various parts, the shoulder 9 of the adjacent holding bolt 1 is provided with a circumferential depression 17 into which the rib 16 extends. The wall of depression 17 does not have to establish direct contact with the rib 16, but the rib may extent freely into the space formed by the depression. The long narrow sides of the rails 6 are provided with one notch 18 each within the range of the narrowed portion 7, which extends transversely to the longitudinal axis of the rails 6. These notches have to be placed so that the ribs 16 engage therewith during assembly. Preferably, the cross-section of these notches 18 is somewhat smaller than the cross-section of the rib 16. Thus, the rib 16 which consists of a harder material than the rail 6 cuts into the groove or notch 18, and the rail 6 is clamped between the two spacer members associated therewith. A desired stable, and solid support in the slot of the holding bolt is established, and care has been taken that the free end of the rail does not drop but is held in a horizontal position. This is especially important when objects are to be supported by the rails which have to be in a horizontal position, such as dinner trays and the like.

It is of course, to be understood that the above described embodiments can be used in combination; for instance, the arrangement of FIG. 3 can be combined with that of FIG. 4.

While the invention has been explained and described with the aid of particular embodiments thereof, it will be understood that the invention is not limited thereby and that many modifications retaining and utilizing the spirit thereof without departing essentially therefrom will occur to those skilled in the art in applying the invention to specific operating environments and conditions. It is therefore contemplated by the appended claims to cover all such modifications as fall within the scope and spirit of the invention.

We claim:

1. The combination with rail means, rail support means arranged substantially perpendicularly to said rail means and comprising holding means, defining slots and having an exterior thread at the end part thereof, said support means also comprising hollow spacer means, said rail means being received in said slots and fixedly held therein between said holding means and said spacer means,

the end portion of said spacer means terminating flat,

and an insert in said end portion terminating near said flat termination of said end portion and being of a material harder than that of the remainder of said spacer means and carrying an internal thread engaging said exterior thread, said rail means being provided with at least one notch extending transversely to the longitudinal axis of said rail means, and said holding means being provided with an annular depression adjacent its exterior thread, said insert including an annular rib protruding axially towards said holding means and being received in said annular depression and said notch.

2. The combination with rail means, rail support means arranged substantially perpendicularly to said rail means and comprising hollow holding means, defining slots which intersect the end face of an end part thereof, said holding means having an exterior thread at said end part, said support means also comprising hollow spacer means, said rail means being received in said slots and fixedly held therein between said holding means and said spacer means,

the end portion of said spacer means terminating flat,

and an insert in said end portion terminating near said flat termination of said end portion and being of a material harder than that of the remainder of said spacer means and carrying an internal thread engaging said exterior thread, and said insert further comprising means disposed inside said holding means and engaging said end part thereof, thereby restraining the inward radial movements of said end part,

said rail means being provided with at least one notch extending transversely to the longitudinal axis of said rail means, and said holding means being provided with an annular depression adjacent its exterior thread, said insert carrying an annular rib protruding axially toward said holding means and being received in said annular depression and said notch.

3. The combination with rail means, rail support means arranged substantially perpendicularly to said rail means and comprising hollow holding means, defining slots which intersect the end face of an end part thereof, said holding means having an exterior thread at said end part, said support means also comprising hollow spacer means, said rail means being received in said slots and fixedly held therein between said holding means and said spacer means,

the end portion of said spacer means terminating flat,

and an insert in said end portion terminating near said flat termination of said end portion and being of a material

harder than that of the remainder of said spacer means and carrying an internal thread engaging said exterior thread, and said insert further comprising means disposed inside said holding means and engaging said end part, thereby restraining the inward radial movements of said end part.

4. The combination of claim 3, wherein said insert is composed of steel and the remainder of said spacer means composed of aluminum alloy.

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