

# United States Patent

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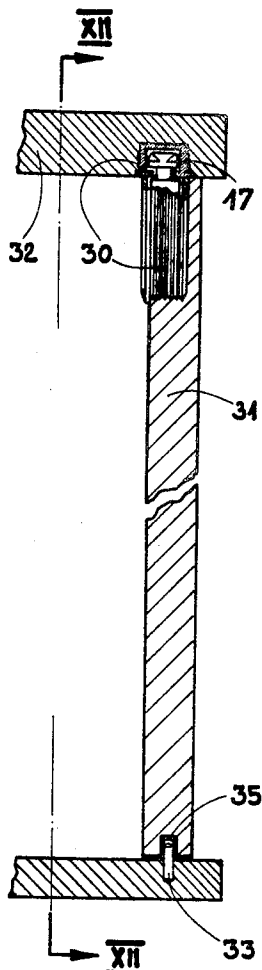
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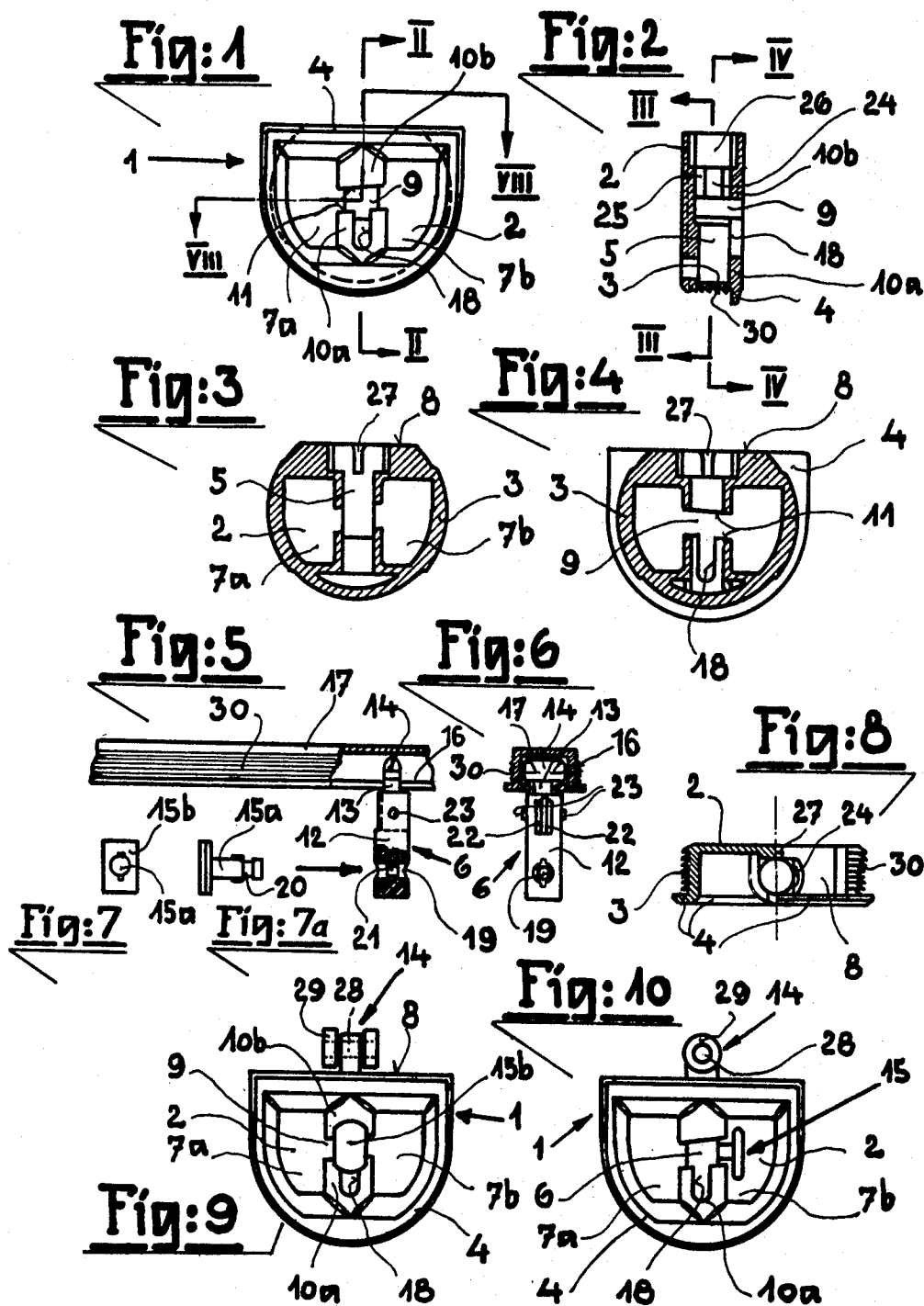
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[54] **SLIDING DOOR FITTING COMPRISING A**  
**CURSOR FOR GUIDING THE DOOR IN A GUIDE**  
**RAIL**  
6 Claims, 13 Drawing Figs.

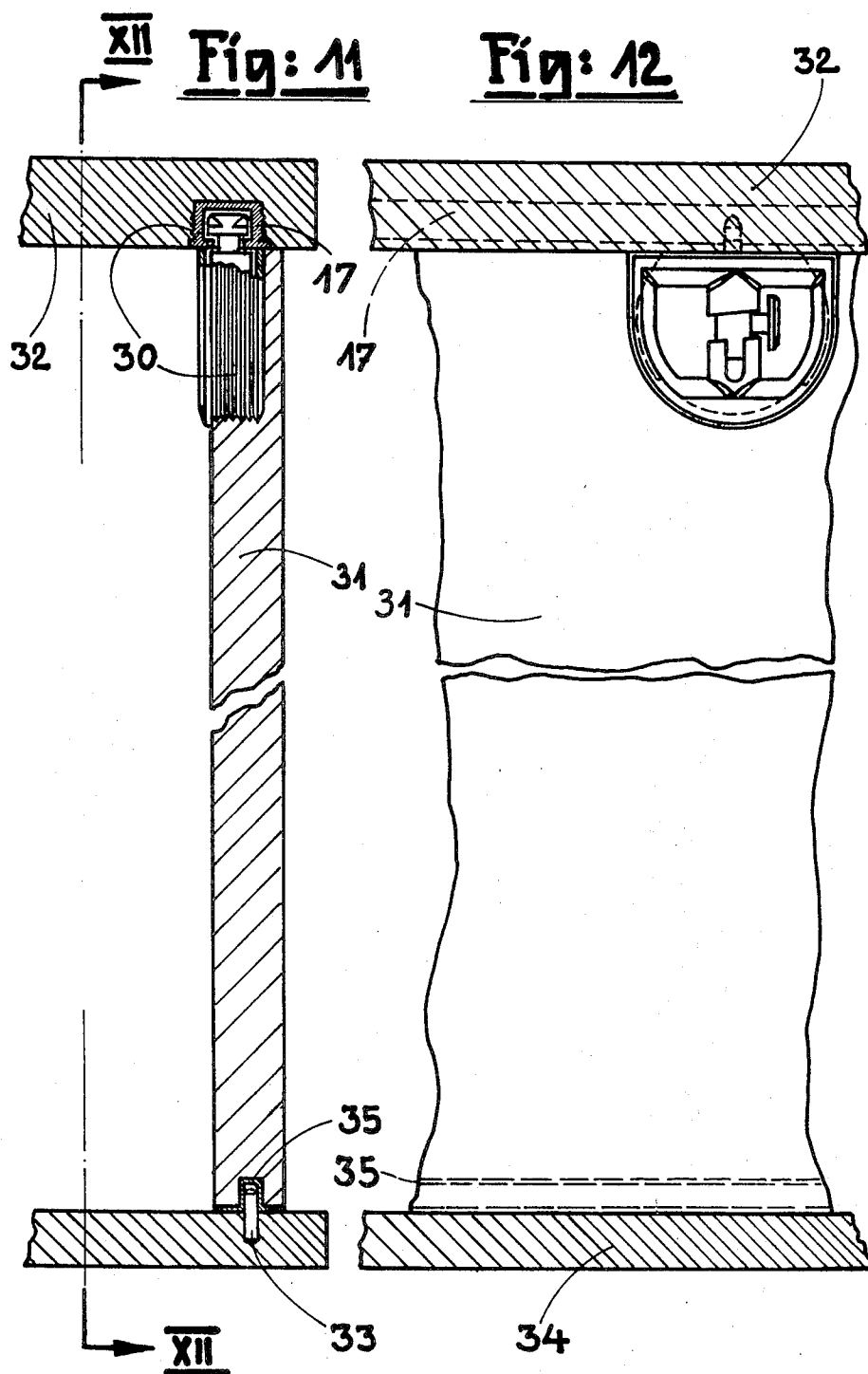
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409, 410, 411, 425; 16/87—105

**ABSTRACT:** A fitting for a sliding door having a cursor for guiding the door parallel to an undercut slot in a guide rail, the cursor comprising a housing securable in the sliding door and a bolt element having a head, the bolt element being rotatable relative to the housing between a first position, in which the bolt head extends from the housing and can be retained by abutment in the undercut slot, and a second position in which the bolt head can be withdrawn from or inserted in the slot.





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# SLIDING DOOR FITTING COMPRISING A CURSOR FOR GUIDING THE DOOR IN A GUIDE RAIL

## BACKGROUND OF THE INVENTION

The invention relates to sliding door fittings comprising a cursor for guiding the door parallel to an undercut slot, for instance in a guide rail.

Sliding door fittings of this nature are preponderantly employed for cupboards or fitted cupboards or wardrobes, as well as in television, radiogram and display cabinets; with maximum ease of displaceability of the sliding door, they are intended to ensure reliable guiding and quiet displacement of the door. The lower edge of the sliding door is usually guided by means of a guiding rail and a pin engaging in the rail, in which case it is appropriate for the rail to be situated in the bottom edge of the sliding door and the pin to be arranged in a concealed manner within the base of the piece of furniture, whereas the upper edge of the sliding door has, at the rear side of the door, a suspension cursor having a head held slidably in a guiding rail situated in the top of the doorway.

In the case of known sliding door fittings of the nature described in the foregoing, the upper guiding rails have a U-shaped profile whereof the flanges which are downwardly directed in the installed position are each endowed in the area of their freestanding extremities with an inwardly directed flange, i.e. two flanges projecting towards each other; these two flanges establish an undercut guiding slot therebetween which forms the sliding surface for the head of the suspension cursor. The portion projecting beyond the upper edge of the body of the suspension cursor and bearing the head supported in the guiding rail is rigidly joined to the base element.

The head, which is a T-section, can only be inserted into the guiding rail at the end thereof when the suspension cursor is fixed in the sliding door. This insertion frequently raises considerable difficulty however, or is completely impossible in particular conditions without special supporting measures, since the suspension cursor secured in the sliding door cannot be displaced freely without difficulty. The fitting and removal of sliding doors equipped with such fittings are quite difficult as a result.

## SUMMARY OF THE INVENTION

According to the invention, there is provided a fitting for a sliding door, the fitting comprising a cursor for guiding the door parallel to an undercut slot, the cursor comprising a housing securable in the sliding door and a bolt element having a head and a shank, the shank being mounted in the housing, with the bolt element being rotatable relative to the housing between a first position, in which the bolt head extends from the housing and can be retained by abutment in the undercut slot, and a second position in which the bolt head extends from the housing and can be withdrawn from or inserted in the slot.

This fitting renders it possible, for installation of the sliding door, to place its edge adjacent the undercut slot of a guiding rail with the bolt elements in the second position, and to insert the bolt heads into the slot. The bolt elements then need merely be rotated into the first position, in which the bolt heads are retained in the guiding rail by abutment against the inner surface of the undercut slot.

The fitting may be used for suspending doors in upper guide rails or for guiding doors in lower guide rails or in vertical guide rails, for example, and is not limited to furniture.

It is possible to dismantle a sliding door equipped with the above described fitting, even if it can no longer be displaced along the guiding rail owing to an obstruction.

It is advantageous for the bolt element to be movable from the second position to a third position, in which the bolt head is retracted into the housing. With this fitting, the sliding door may be suspended or unhooked from an upper guide while its lower guides are in engagement. The possibility of lowering the bolt element into the housing so that it need not project

beyond the top edge of the sliding door with the fitting cursor installed, eliminates the breaking or bending of the projecting bolt portion or bolt head which is frequently observed in the case of the known fittings of this nature, especially if the fittings consist of plastic and if sliding doors equipped with fittings must be conveyed over considerable distances before being installed.

It is convenient for the shank of the bolt element to bear a projecting knob which protrudes from the housing when the bolt element is in the second position and which lies within the housing when the bolt element is in the first position, by means of which knob the bolt element is rotatable.

In a first example of embodiment of the invention, the bolt element consists of a shank, a neck portion and a bolt or retaining head projecting considerably in two directions relative to the neck portion, with its base possessing the counter of a rectangle of very different side lengths. The portions of the bolt head projecting considerably beyond the neck portion form the mating surfaces on their undersides which rest on the sliding surfaces of a guiding rail in the sliding position of the bolt element. In view of the elongated rectangular contour of the bolt head, it is possible by a pivotal displacement through 90° of the bolt element into the second position, to move the widely projecting portions of the bolt portion away from the sliding surfaces of the guiding rail and into the slot situated therebetween, so that the bolt head passes freely between the sliding surfaces of the guiding rail during downward displacement of the bolt element.

In another example of embodiment of the invention, the bolt element consists of a shank and a bolt head whereof the parts resting on the sliding surfaces of a guiding rail are in the form of rollers. The unavoidable frictional resistance occurring during displacement of the door is reduced to a minimum in this manner. To render it possible after transfer of the bolt element into the second position, to lower or extract the bolt head out of the guiding rail, it is merely necessary for the diameters of the rolling elements and of the terminal portion of the bolt head to be smaller than the width of the slot between the sliding surfaces of the guiding rail.

For easier transfer to the different positions during its pivotal displacement, and to secure a definite degree of self-locking action after reaching these positions, it is advantageous for the preferably cylindrical shank of the bolt element to have perforations in its portion adjacent the bolt head, improving its yieldability. If the perforated portion of the shank also has two diametrically opposed projections, the bolt element can be pivoted easily and may be secured against unintentional pivoting in the first and/or second position by locking in corresponding grooves in the housing.

To ensure a compact structure as well as to form two chambers for reception of the knob in the first position of the bolt element, the housing of the cursor may be in the form of a major segment of a circle, with the peripheral wall having an aperture in its straight portion to receive the bolt element.

It is advantageous to equip at least a part of the curved peripheral wall with an elastically deformable external toothing. This effects a substantial simplification of the installing of the cursor and at the same time amounts to a considerable improvement in its operational reliability in the installed condition.

Under appropriate dimensioning of the bore drilled in the door for reception of the cursor, it is possible to knock the housing into the bore by a few light blows only, the teeth of the external toothing being bent over and jamming tight in the bore; the need for any other fastenings such as screws is eliminated which entails a substantial simplification of the assembling operation. In respect of enhanced operational reliability, it is apt to point out that the risk always threatens, in the case of screw-fastened furniture fittings, that the mechanical stresses caused by warping or shrinking of the wood or by displacements of the door loosen and finally release the fastening screws completely. This will not occur if the housing has a resilient external toothing since any changes of the bore cross

section caused by shrinkage or warping of the wood are taken up by the elasticity of the toothing.

The invention will be further described with reference to the accompanying drawings which illustrate two preferred embodiments of the invention given by way of nonlimitative example.

#### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 shows a front view of a suspension cursor housing without a bolt element;

FIG. 2 shows a view in section along the line II-II in FIG. 1;

FIG. 3 shows a view in section along the line III-III in FIG. 2;

FIG. 4 shows a view in section along the line IV-IV in FIG. 2;

FIG. 5 shows a partially sectioned view of a top guiding rail with a bolt element suspended therein in the sliding position, without a latch element;

FIG. 6 shows a view turned through 90° relative to FIG. 5;

FIGS. 7 and 7a show a plan and sideview respectively of the latch element omitted from FIG. 5;

FIG. 8 shows a view in section along the line VIII-VIII in FIG. 1;

FIGS. 9 and 10 show a suspension cursor housing with a bolt element modified as compared to FIGS. 5 and 6, which is situated in the intermediate position in FIG. 9 and in the sliding position in FIG. 10;

FIG. 11 is a fragmentary view partly in elevation and partly in section of a set of sliding door fittings in the installed position, and

FIG. 12 is a view taken along the line XII-XII of FIG. 11.

#### DETAILED DESCRIPTION OF THE INVENTION

A suspension cursor housing 1 according to FIGS. 1, 9 and 10 consists of a rear face 2 possessing the form of a circular area cut off horizontally at the top, with an encircling peripheral wall 3, and the face 2 being extended by a flange 4 having a D-shaped outline.

The rear face 2 of the housing 1 is subdivided by a guiding case 5 into two chambers 7a and 7b.

The guiding case 5 is subdivided into a lower section 10a and an upper section 10b by a guiding slot 9. Edges 11 of the guiding slot 9 are illustrated as rising in front view from the left towards the right (e.g. FIG. 1) in the embodiments shown.

A bolt element 6, consisting of a shank 12, a neck 13 and a bolt head 14, is displaceable in the guiding case 5 by means of a latch element 15. The following intermediate and terminal positions are encountered during displacement of the latch element 15.

FIGS. 5, 6 and 10 illustrate the sliding position of the bolt element 6, in which the bolt head 14 rests on horizontal sliding surfaces 16 within the undercut slot of an upper guiding rail 17 and the latch element 15 is pivoted into one of the chambers 7a, 7b; if the latch element 15 is positioned in the chamber 7a, the bolt head 14 is situated lower and therefore closer to upper horizontal side 8, owing to the edges 11 of the guiding slot 9 dropping down towards this side, than when the latch element 15 is pivoted into the chamber 7b.

FIG. 9 shows the intermediate position of the bolt element 6. If the latch element 15 is then displaced downwards to the end of a branch slot 18 in the lower part 10a of the guiding case 5, the bolt element 6 assumes its basic position (not illustrated) in which the bolt head 14 is below the upper horizontal side 8.

In its middle portion, the shank 12 of the bolt element 6 has a transverse bore 19 in which the latch element 15 is held against rotation by means of a tongue and groove construction. The latch element consists of a shank 15a and a handle element 15b. The shank 15a has an encircling groove 20 which, with a corresponding constriction 21 of the transverse bore 19, locks the shank in the bore.

In its upper part adjacent to the neck 13 of the bolt head 14, the cylindrical shank 12 of the bolt element 6 has several perforations 22 (see FIG. 6) which extend parallel to the transverse bore 19. Projections 23 are formed on the shank 12 and extend at right angles to the perforations 22.

In the basic position of the bolt element 6, the projections 23 are guided in grooves 24 formed in a lower portion 25 of the upper part 10b of the guiding case 5. If the bolt element 6 is transferred into the intermediate position, by upward displacement of its latch element 15 in the slot 18, the projections 23 are displaced into an upper portion 26 of the upper part 10b of the guiding case 5, which is widened relative to the lower portion 25, so that the bolt element 6 can be pivoted without this pivotal displacement being impeded initially by the projections 23.

When the displacement comes close to an angle of 90° however, the projections 23 reach a cross-sectionally reduced part of the upper portion 26, so that the pivotal displacement can be continued only against a definite resistance. The perforations 22 then allow slight elastic yielding of the upper portion of the shank 12, which facilitates the pivotal displacement performed for the purpose of transferring the bolt element 6 into the sliding position. Upon reaching a pivot angle of 90°, i.e. upon arrival of the bolt element 6 in the sliding position, this resistance ceases suddenly however, since the projections 23 have penetrated into grooves 27 formed in the upper portion 26 and displaced through 90° relative to the grooves 24. The projection 23 can be moved out of these grooves 27 only by overcoming a definite resistance, so that the bolt element 6 is secured in the sliding position against unintentional pivotal displacement.

In the example of embodiment according to FIGS. 5 and 6, the bolt head 14 has a base surface possessing the form of a rectangle having sides of considerably different lengths; as is apparent from FIG. 6, considerable areas of this base surface project to the right and left above the neck 13, by means of which the bolt element 6 is supported in the sliding position on the sliding surfaces 16 of the upper guiding rail 17. A sliding movement is thus performed during displacement of the door. After transfer of the bolt element into the intermediate position, its head 14 can pass through the slot between the two sliding surfaces 16.

In the example according to FIGS. 9 and 10, the bolt head 14 possesses two rolling elements 29 arranged on a spindle 28, which are supported and roll on the sliding surfaces 16 of the guiding rail 17 in the sliding position. A rolling movement thus occurs in this case, during displacement of the door.

Both the guiding rail 17 and the peripheral wall 3 is equipped with a toothing 30 on its outer side as is apparent from FIGS. 11 and 12, illustrating a sliding door 31 in the installed condition, and the teeth 30 serve the purpose of fastening the suspension cursor housing 1 and the guiding rail 17 in bores in the rear side of the sliding door 31 and in the bearing recesses of a top 32 of the piece of furniture respectively. A pin 33 concealed in a base 34 of the piece of furniture is intended for guiding the lower edge of the sliding door 31, with the door having a bottom guiding rail 35 for this purpose.

I claim:

1. In a fitting for a sliding door, the fitting comprising a cursor for guiding the door parallel to an undercut slot; the improvement that the cursor comprises a housing securable in the sliding door and a bolt element having a head and a shank, the shank being mounted in the housing, the bolt element being rotatable relative to the housing between a first position, in which the bolt head extends from the housing and can be retained by abutment in the undercut slot, and a second position in which the bolt head extends from the housing and can be withdrawn from or inserted in the slot.

2. A fitting as claimed in claim 1, in which the shank of the bolt element has a projecting knob which protrudes from the housing when the bolt element is in the second position and which lies within the housing when the bolt element is in the first position, by means of which knob the bolt element is rotatable.

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3. A fitting as claimed in claim 1, in which the bolt element is movable from the second position to a third position, in which the bolt head is retracted into the housing.

4. A fitting as claimed in claim 1, in which the bolt head comprises a member having a rectangular base which can abut against an inner surface of the undercut slot when the bolt element is in the first position, the said member being withdrawable from or insertable into the slot when the bolt element is in the second position.

5. A fitting as claimed in claim 1, in which the bolt head comprises rollers for rolling on an inner surface of the undercut slot when the bolt elements is in the first position.

6. A combination comprising a guide rail having an undercut slot and a fitting for a sliding door, the fitting comprising a cursor for guiding the door parallel to the undercut slot, the cursor comprising a housing securable in the sliding door and a bolt element having a head and a shank, the shank being mounted in the housing, the bolt element being rotatable relative to the housing between a first position, in which the bolt head extends from the housing and can be retained by abutment in the undercut slot, and a second position in which the bolt head extends from the housing and can be withdrawn from or inserted in the slot.

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