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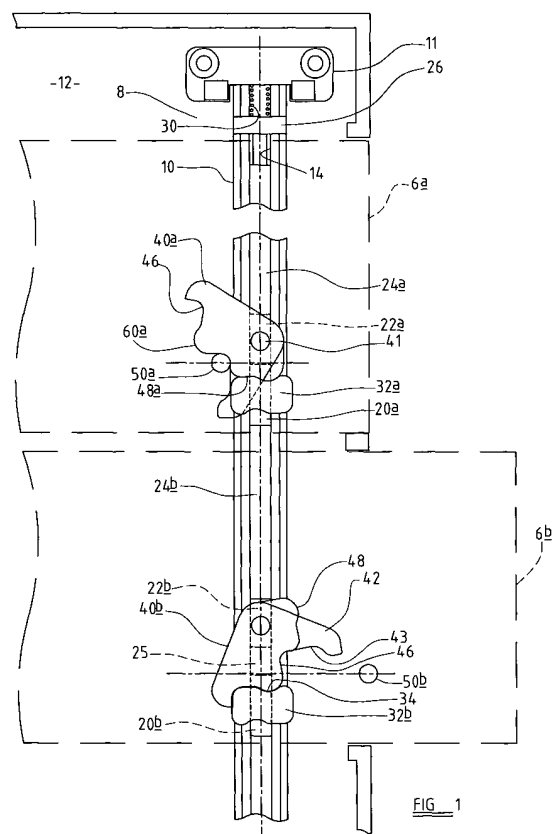
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(54) **Drawer locking mechanism**

(57) A drawer locking mechanism comprises a slide assembly (16) slidably mounted in a slot (14) provided in a guide member adapted to be secured to an inside face of a piece of furniture, such as a filing cabinet. The slide assembly comprises first, second and third slide members (20, 22, 24) for each drawer, and at an upper part of the guide member, a stop (26). The three slide members are separable within the guide member (10), and are urged into engagement by a spring (30) acting downwardly against the stop (26).

Each of the first slide members (20) has fixedly secured thereto an abutment member (32) and each second slide member (22) has pivotally mounted thereon an actuating member (40), comprising a laterally extending arm (42).

On opening movement of a drawer (6), a locking pin (50) projecting from the side face of the drawer engages the arm (42) urging the actuating member (40) in an anti-clockwise direction, causing the abutment member (32) to lift, until engaged with cam surfaces of the actuating member. In this raised position of the abutment member, opening movement of a further drawer is prevented.



Description

[0001] This invention is concerned with improvements relating to drawer locking mechanisms as are used particularly in office furniture, such as filing cabinets, to prevent several vertically superposed drawers from being opened at the same time, thereby preventing the furniture from toppling over. Such locking mechanisms are hereinafter referred to as being of the kind specified.

[0002] There have been numerous designs of drawer locking mechanisms of the kind specified, but currently available designs encounter problems in use.

[0003] A conventional drawer locking mechanism of the kind specified comprises:

a) a slide assembly comprising a plurality of slide members mounted on the carcass of the furniture for sliding movement along a vertical setting line at right angles to the direction of sliding movement of the drawers, for movement between inoperative positions when all the drawers are closed, and an operative position which is adopted when one drawer has been opened;

b) a setting element associated with each slide member and pivotal relative thereto about an axis extending at right angles to said setting line, between a first, drawer closed position and a second, drawer open position; and

c) a control element mounted on each drawer and which on opening of the drawer co-operates with the setting element to cause the setting element to rotate about said pivotal axis from its first to its second position, causing the slide member to be moved from its inoperative to its operative position.

[0004] For example, in GB-A-2296738 there is described a drawer locking mechanism in which each setting element comprises "setting contours" which engage with setting stops on the slide, to retain the setting element either in its first position or in its second position. The setting element also comprises a slot which is engaged by the control element, such that when the drawer is opened, the control element engages one side of the slot to move the setting element into its second position, whilst when the drawer is closed, the control element engages the opposite side of the slot to move the setting element into its first position.

[0005] Conversely, in GB-A-2336394, the setting element is of two-part form, comprising a cam having a curved profile, and a rocker pivotally mounted on the cam. A single setting surface is provided to retain the setting element in its second position when the setting element has been rotated by opening of one of the drawers.

[0006] Problems occur particularly in currently available designs, in ensuring that whilst convenient operation of the drawer locking mechanism is permitted, the

design is sufficiently robust to withstand continued use, and it has been found that certain drawer locking devices presently available are prone to breakage. Under these circumstances it becomes possible, for example, to open a drawer and subsequently be unable to close it (and hence lock it in its closed position subsequently), or to permit the simultaneous opening of two drawers, which could result in the furniture toppling over, resulting in injury to the operator, and an action for compensation against the owners of the furniture.

[0007] According to this invention there is provided a drawer locking mechanism for a piece of furniture having at least two drawers and a control element carried by each drawer, the locking mechanism comprising:

a) an elongate guide member adapted to be secured to a side wall of the piece of furniture in a vertical disposition;

b) a slide assembly mounted in a slot provided by the guide member, the slide assembly carrying a plurality of locking devices, one associated with each drawer;

the construction and arrangement being such that either with the furniture locked to prevent opening movement of the drawers, or with one of the drawers in an open position, the locking mechanism operates to prevent opening of any of the other drawers, wherein

i) the slide assembly comprises a plurality of slide members mounted for limited movement lengthwise of the guide member;

ii) each locking device comprises an abutment member secured to a first slide member, and an actuating member mounted on a second slide member for pivotal movement between a first, drawer closed position and a second, drawer open position; and

iii) means is provided to urge the actuating member and the abutment member into engagement; characterised in that

1) the abutment member and the actuating member are so positioned that the control element of the drawer passes between the first member and the actuating member;

2) movement of the actuating member by the control element produces firstly linear separative movement between the slide members on which the abutment member and the actuating member are mounted, and secondly linear movement of approach therebetween.

[0008] Thus preferably cam faces are provided on the abutment member and the actuating member, which preferably are curved in two directions. Thus, each cam face may comprise a portion which is convex, and an adjacent portion which is concave.

[0009] In this manner the second position of the actuating member may be determined by an extensive double-curved surface which greatly reduces the possibility of its inadvertently being moved to its first position, as may happen if the side of the furniture is hit sharply.

[0010] Preferably the first position of the actuating member is defined as the point at which the control element on the drawer moves from operative engagement with the actuating member. Preferably, when the drawer is moved from one of its two positions, the control element moves into engagement with a face of the actuating member which extends substantially at right angles to the direction of movement of the drawer.

[0011] Preferably movement of the actuating member from its first position to its second position involves rotational movement thereof through an angle greater than 60°, preferably approximately 90°.

[0012] Thus the force applied to the actuating member by the operating member on opening movement of the drawers is significantly reduced, reducing tendency for the actuating member to break.

[0013] This allows the actuating member to be made of a more robust construction, reducing tendency for it to be broken when an attempt is made to open an otherwise locked drawer.

[0014] There will now be given a detailed description, to be read with reference to the accompanying drawings, of a drawer locking mechanism which is a preferred embodiment of this invention, which has been selected for the purposes of illustrating the invention by way of example.

[0015] In the accompanying drawings:

FIGURE 1 is a schematic side elevation of part of a piece of furniture incorporating the present invention;

FIGURE 2 is an enlarged view of part of Figure 1, showing a locking assembly thereof;

FIGURE 3 is a sectional view, taken on the line 3-3 of Figure 2; and

FIGURE 4 is a view showing the relative positions of the various elements during operation of the mechanism.

[0016] The locking mechanism which is the preferred embodiment of this invention is specifically for use in a piece of furniture having a carcass, and comprising a plurality of drawers, only two, 6a, 6b of which are shown, slideably mounted between closed positions, as shown at 6a, and open positions, as shown at 6b. Specifically, the piece of furniture is in the form of a filing cabinet, and comprises a locking mechanism 8 operative to prevent more than one drawer from being opened at the same time, or selectively by the operation of a lock (not shown), to prevent any drawer from being opened.

[0017] The locking mechanism comprises an elongate guide member 10 adapted to be secured to an inner side wall 12 of the piece of furniture in a vertical orientation

between a head bracket 11 and a lower bracket (not shown), the guide member 10 being of extruded aluminium, giving increased rigidity to the system, and providing an elongate slot 14, shown in Figure 3.

[0018] Slideably mounted in the slot 14 is a slide assembly 16 comprising first, second and third slide members 20, 22 and 24 for each drawer and at an upper part of the guide member 10, a stop 26. The three slide members are separable within the guide member 10, and are urged into engagement by a spring 30 acting downwardly against the stop 26.

[0019] Each of the first slide members 20 has fixedly secured thereto an abutment member 32 provided with a double-curved cam surface 34 on its upper edge (Figure 2). Each of the second slide members 22 has pivotally mounted by pivot pin 41 an actuating member 40, comprising a laterally extending arm 42, and a double-curved cam surface 46.

[0020] The arm 42 projects over part only of the width of the actuating member 40, and extending alongside the arm 42 is a second double cam surface 48, also complementary to the cam surface 34 of the abutment member 32.

[0021] The locking device 8 is so located on the side wall 12 of the filing cabinet, that locking pins 50, providing control elements, protrude from the drawers, are so located as to pass between the cam surface 46 of the associated abutment member and the pivot pin 41 of the actuating member 40 (see Figure 2).

[0022] With all the drawers of the filing cabinet in their closed positions, there is no gap between the slide members of the slide assembly, being urged into engagement by the spring 30 acting on the stop 26, (see Figure 4a), to use the slide assembly as a whole downwardly into engagement with a lowermost stop (not shown). In this position, the second cam faces 48 of the actuating members engage the cam surfaces 46 of their respective abutment members 32, as shown in the upper of the two drawers 6a.

[0023] On opening movement of the drawer 6a, the locking pin 50a engages a side face 43 of the arm 42, urging the arm in an anticlockwise direction about the pivot pin 41, producing a momentary lifting of the second slide member 22a as the second cam surface 48 moves from engagement with the cam surface 46, as shown in Figure 4b, which movement on separation of the surfaces 46 and 48 reverses, as the slide member 22a is brought back into engagement with the slide member 20b, under the actions of spring 30, (see Figure 4c).

[0024] Further movement of the drawer 6a towards its open position produces continued rotational movement of the actuating member about the pivot pin 41, bringing the cam surface 46 into engagement with the abutment member, and as a lobe 60 of the cam surface 46 passes into engagement with the abutment member, a significant lifting movement of the second slide member 22b is produced, moving the stop 26 towards the upper mounting head 11, (see Figure 4e). As the locking pin

50 moves out of engagement with the arm 44, the lobe 60 enters into engagement with the major recess 62 of the abutment member 32, as shown in Figure 1 in relation to the position of the drawer 6b, and the actuating member falls slightly into the position shown in Figure 4f.

[0025] Engagement between the cam surface 46 of the actuating member and the cam surface 34 of the abutment member is over both convex and concave portions, retaining the actuating member firmly in its second, drawer open position.

[0026] As shown in Figure 4, such opening movement of the drawer produces a lifting movement of the second slide member 22, resulting in a gap 25 between the first and second slide members, causing the stop 26 to compress the spring 30, moving into closed proximity with the upper mounting head 11. This close proximity between the stop 26 and the mounting head 11 prevents opening movement of any other drawer, since the rotary movement of the actuating member 42 to the extent required to produce significant movement of the drawer is not permitted.

[0027] Additionally, as will be appreciated, with all the drawers closed a key may be operative to prevent upward movement of the stop 26, preventing any of the drawers from being opened.

[0028] On closing movement of the drawer 6b, the locking pin 50b is moved into engagement with a side face 46 of the actuating member 42, extending generally at right angles to the face 43, causing an initial small degree of upward movement of the second slide member 22 as the lobe 60 moves out of engagement with the recess 62, prior to completion of rotation of the actuating member 42 into the position shown in the relation to the drawer 6a. When pin 50 is in the locked position, ie. drawer closed, it is not constrained by a slot in member 40, and therefore can withstand some horizontal and vertical misalignment when the system is fitted to a cabinet.

[0029] It will be appreciated from the detailed description of the preferred embodiment, and the drawings accompanying this application, that with the construction and arrangement devised, movement of the actuating member 42 from its first, drawer closed position, as shown in relation to the actuating member 42a, and the second, drawer open position as shown in relation to the actuating member 42b, involves rotation through a significant angle, preferably in excess of 60°, and preferably approximately 90°, spreading the forces required to produce the required movement of the slide assembly over a significantly larger distance than has heretofore been possible, reducing the unit forces on the actuating member itself.

[0030] With the actuating member 40 in its first position, the locking pin 50 does not impede the vertical movement of the actuating member, as will be caused by a lower drawer being opened.

[0031] By virtue of the double curved cam surface engagement between the actuating member and the abut-

ment member, a high degree of stability of positioning of the locking assembly for each drawer is obtained, making it practically impossible to cause the actuating member to be inadvertently displaced from its supposed position, which could otherwise cause considerable problems.

[0032] Additionally, the actuating member itself may be made significantly more robust than has heretofore been found possible, reducing significantly the possibility of the actuating member being broken by the use of unnecessary force, which could cause the locking device to become ineffective in preventing two drawers from being opened simultaneously.

[0033] In the present specification "comprises" means "includes or consists of and "comprising" means "including or consisting of".

[0034] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

Claims

1. A drawer locking mechanism for a piece of furniture having at least two drawers (6a,6b) and a control element (50) carried by each drawer, the locking mechanism comprising:

- a) an elongate guide member (10) adapted to be secured to a side wall (12) of the piece of furniture in a vertical disposition;
- b) a slide assembly (16) mounted in a slot (14) provided by the guide member, the slide assembly carrying a plurality of locking devices (32,40) one associated with each drawer;

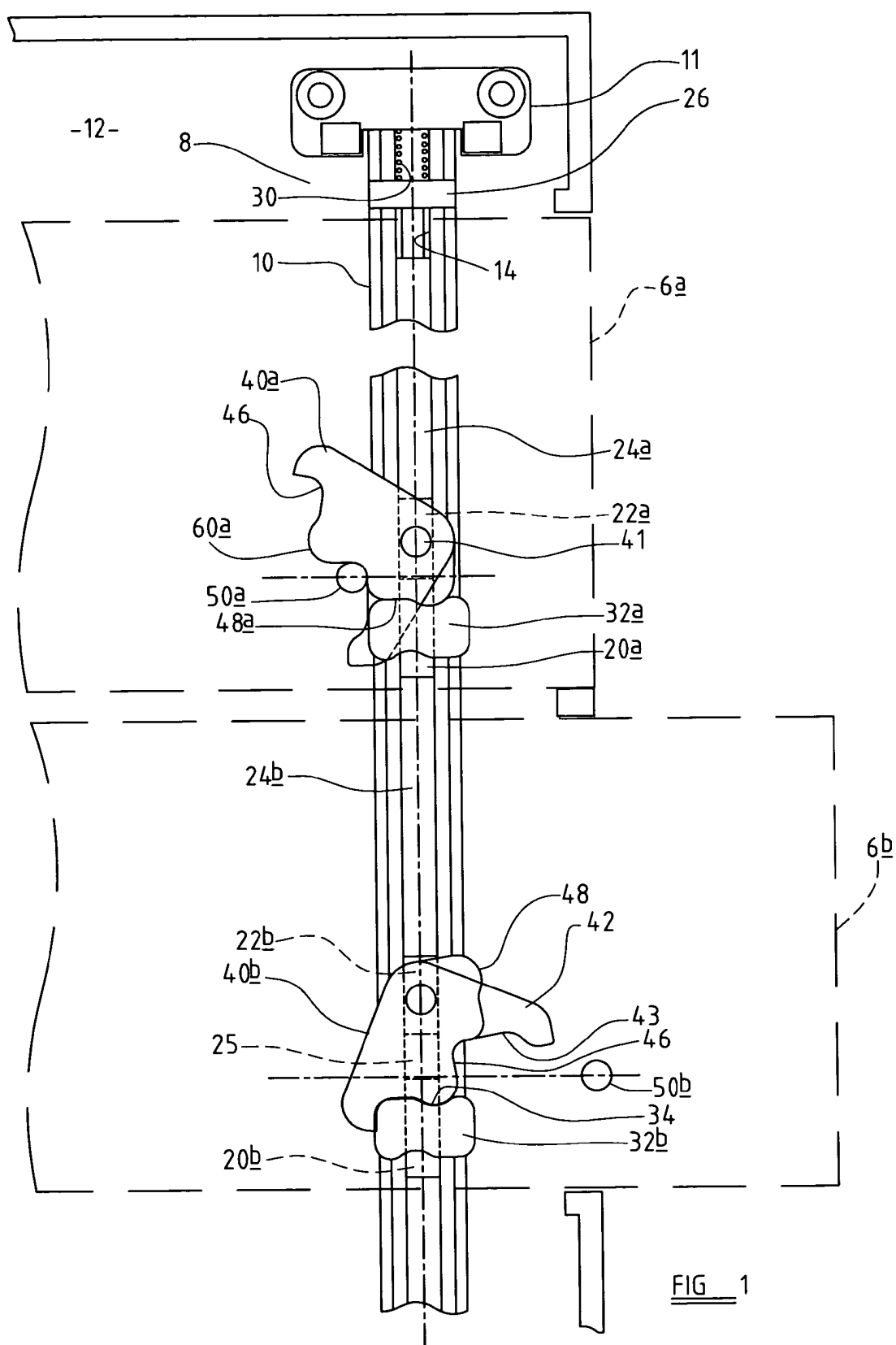
the construction and arrangement being such that either with the furniture locked to prevent opening movement of the drawers, or with one of the drawers in an open position, the locking mechanism operates to prevent opening of any of the other drawers, wherein

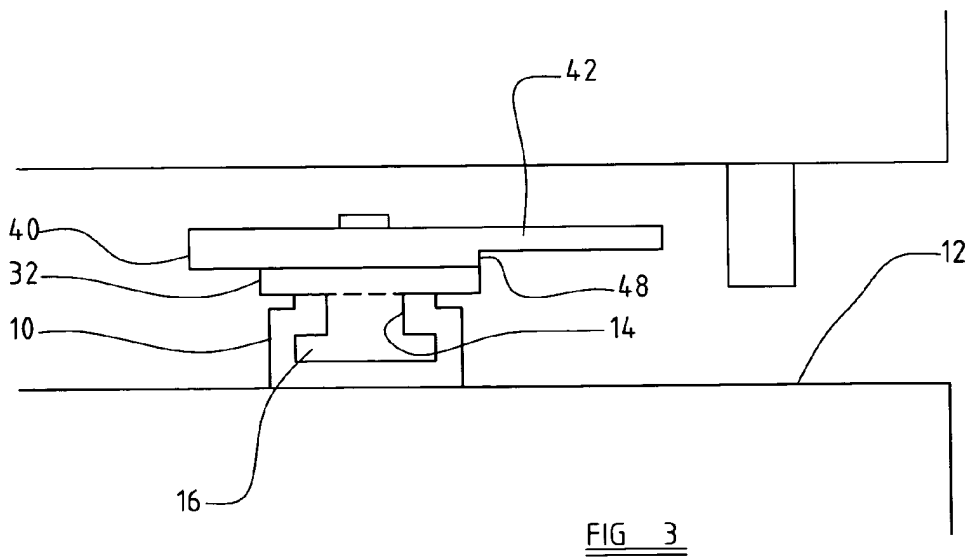
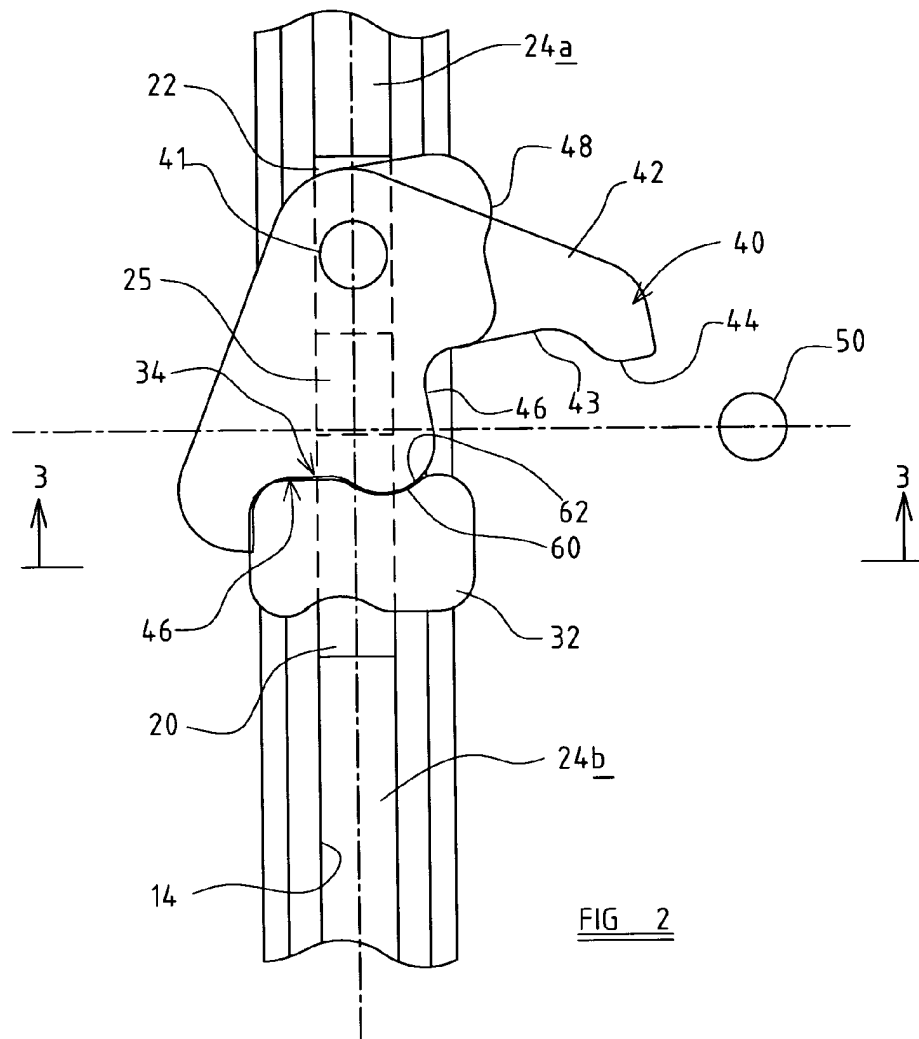
- i) the slide assembly (16) comprises a plurality of slide members (20,22,24) mounted for limited movement lengthwise of the guide member;
- ii) each locking device comprises an abutment member (32) secured to a first slide member (20), and an actuating member (40) mounted on a second slide member (22) for pivotal movement between a first, drawer closed position and a second, drawer open position; and
- iii) means (30) is provided to urge the actuating

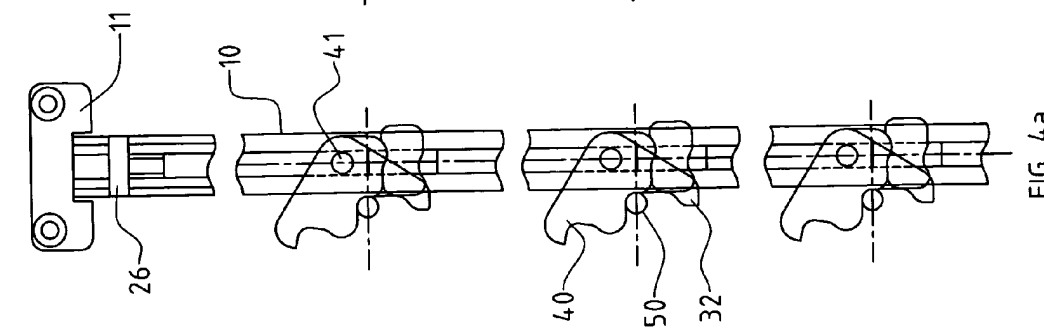
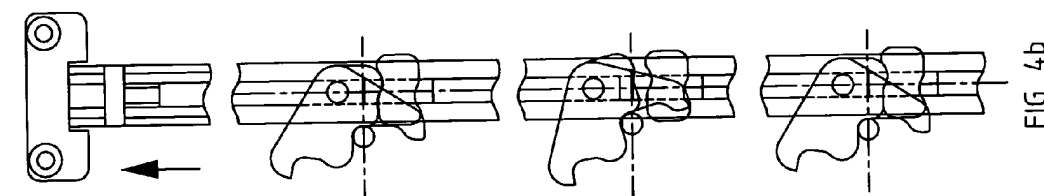
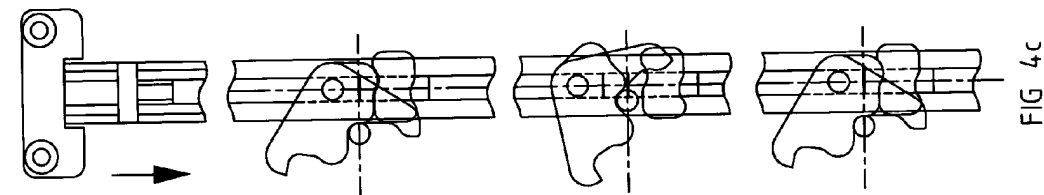
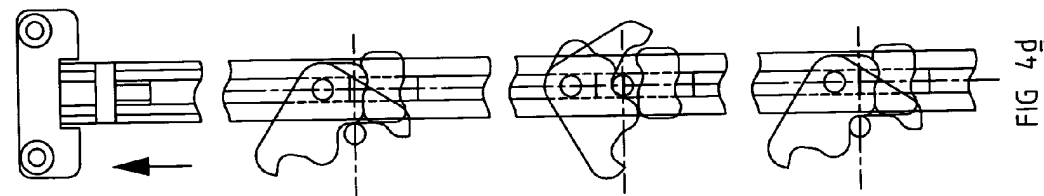
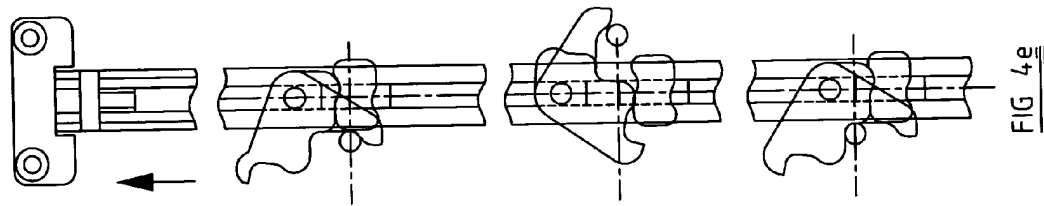
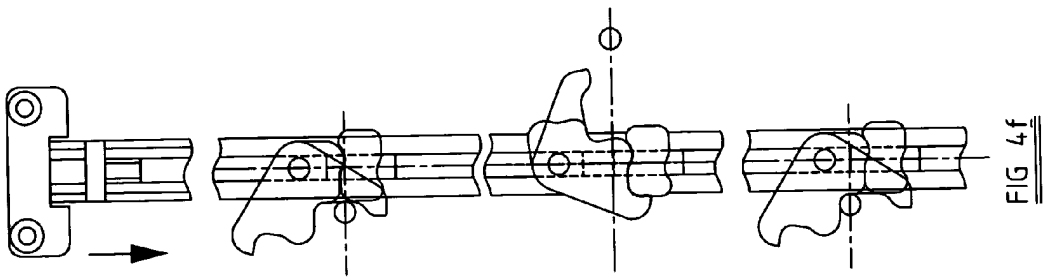
member (40) and the abutment member (32) into engagement; **characterised in that**

- 1) the abutment member (32) and the actuating member (40) are so positioned that the control element (50) of the drawer (6) passes between the abutment member and the actuating member; 5
- 2) movement of the actuating member (40) by the control element produces firstly linear separative movement between the slide members on which the abutment member and the actuating member are mounted, and secondly linear movement of approach therebetween. 10 15
2. A drawer locking mechanism according to Claim 1 wherein cam faces (46,48) are provided on the abutment member and the actuating member. 20
3. A drawer locking mechanism according to Claim 2 wherein each cam (46,48) face comprises a portion which is convex, and an adjacent portion which is concave. 25
4. A drawer locking mechanism according to any one of the preceding claims wherein the first position of the actuating member is defined as the point at which the control element (50) on the drawer moves from operative engagement with the actuating member (40). 30
5. A drawer locking mechanism according to Claim 4 wherein when the drawer is moved from one of its two positions, the control element moves into engagement with a face (43) of the actuating member (40) which extends substantially at right angles to the direction of movement of the drawer. 35
6. A drawer locking mechanism according to Claim 5 wherein movement of the actuating member (40) from its first position to its second position involves rotational movement thereof through an angle greater than 60°, preferably approximately 90°. 40 45
7. A drawer locking mechanism substantially as hereinbefore described with reference to and as shown in the accompanying drawings.
8. Any novel feature or novel combination of features described herein and/or in the accompanying drawings. 50

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EUROPEAN SEARCH REPORT

Application Number
EP 02 02 7776

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Place of search		Date of completion of the search	Examiner
THE HAGUE		17 April 2003	Van Beurden, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 02 02 7776

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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