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(54) **A drawer interlock system.**

(57) A drawer interlock system has, for each drawer, a pair of plungers (7,8) mounted inside the cabinet (1) and a cam-detent block (25) mounted on the drawer for co-operation with the plungers as the drawer is opened and closed. A first set of plungers (7) engage one side of a tilting actuator (4) fitted between the drawer slide mechanisms (19) and the outer wall of the cabinet (1) and the second set of plungers (8) engage the other side of this actuator so that, depending on its tilt, either one set or the other set of plungers projects while the other is retracted. With all the drawers closed, the second set projects, but when any drawer is opened its cam (27) wedges the projecting plunger (8) to the retracted position, tilting the actuator (4) and causing the other set of plungers (7) to project. For all but the opened drawer, these plungers (7) then engage the associated detents (28) and lock those closed drawers. When the opened drawer is closed again, its cam (26) wedges the idle locking plunger (7) to the retracted position, all the other plungers (7,8) switching in consequence. The second set of plungers (8) could be replaced by switches triggering electrical operation of the actuator.

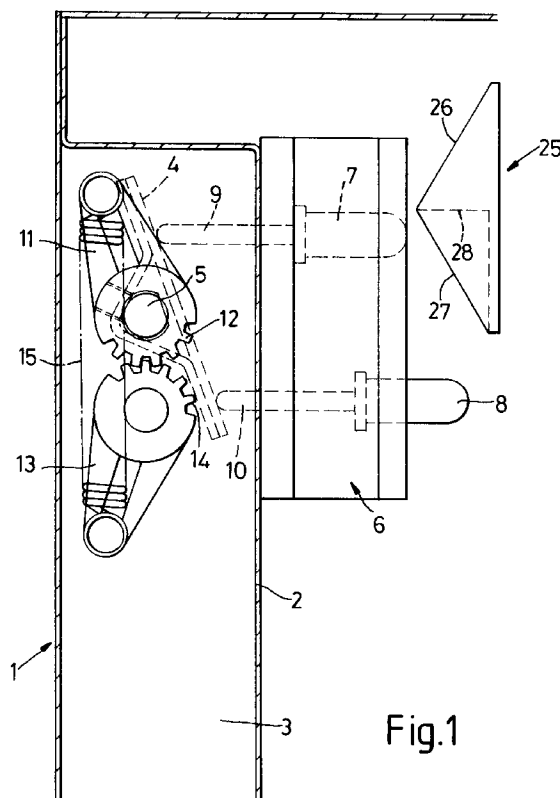


Fig.1

This invention relates to drawer interlock systems such as are commonly found on filing cabinets. In order to prevent toppling forwards, it is arranged that when a drawer is opened, all other drawers are held locked.

The usual arrangement for a drawer slide mechanism is for each side of the drawer to have a horizontal rail fixed to it which is supported, through the intermediary of a runner bar which acts as a cage for ball bearings, on a horizontal rail fixed inside the cabinet. This rail is not secured to the outer skin, which is often of thin sheet metal, since the latter would not be strong enough, the fasteners would be externally visible and spoil the smoothness of the side, and in any event there have to be front corner posts of some width to give the cabinet strength and rigidity and the fixed rails have to project laterally inwards of these to allow the runner bars and drawers to be fitted and to operate. Therefore the cabinet rails are usually fixed to an inner frame or skin at each side. Between this frame or skin and the outer wall of the cabinet there is a void.

The usual way of achieving a drawer interlock is by the provision of a locking bar which is lifted vertically by any drawer when it is moved out from the fully closed position, and the void described above conveniently provides a space in which it fitted. But of course the locking bar has to have pins or protrusions into the drawer space or beyond the fixed rail of the slide mechanism. These virtually determine where the rails must be placed and so it is very difficult to alter them and to reposition drawers in a cabinet. The pins or protrusions then have to be repositioned on the locking bar in exactly the right place to suit the drawers.

It is the aim of this invention to provide a drawer interlock system which does not interfere with the positioning of the rails.

According to the present invention there is provided a drawer interlock system enabling the opening of any drawer of a plurality of drawers in a cabinet while retaining the other drawers locked, the drawers being supported on rail mechanisms spaced from the outer side walls of the cabinet, the system comprising, for each drawer, a detent fast with the drawer, a cabinet mounted stop laterally movable towards and away from the detent for respective engaging and disengaging positions, and tripping means for actuating the stop as the drawer approaches and leaves its closed position, the tripping means of all the drawers co-operating with a common actuator for the stops wholly within the space between one outer side wall and the adjacent rail mechanisms and being arranged to move all the stops to detent engaging positions when any one drawer is moved from its closed position, the detent of that one drawer then escaping engagement by its stop but the other closed drawers being locked, and also being arranged to move all the

stops to detent disengaging positions when said any one drawer is returned to its closed position.

Conveniently, said common actuator is an elongate member spanning the drawers to co-operate with all the stops and tiltable by the tripping means about a longitudinal axis between a locking mode in which the stops project into detent engaging positions and an unlocking mode in which the stops are retracted. Preferably the actuator has associated spring means giving it snap action between said modes. The stops, being independent elements from the actuator, can thus be set at any suitable level and still be operated by the actuator.

The tripping means for each drawer may include a drawer-mounted cam for co-operating with the associated stop as the drawer is closed, the stop being forced to retract thereby and thus tilting the actuator to said unlocking mode.

The tripping means for each drawer may also include a cabinet mounted element co-operating with the actuator to project towards the drawer in the unlocking mode and retract in the locking mode, and a drawer mounted cam which co-operates with said element to force it to retract as the drawer is opened and thereby tilt the actuator to its locking mode.

Conveniently the stops and tripping elements are spring loaded plungers biased towards the retracted positions to be engaged by the actuator. There may be a common housing for the pair of plungers for each drawer, and the plungers for each drawer are preferably at different levels. Each detent may be formed by a step in a member secured to or forming part of the drawer, this member also being formed with the cams of the tripping means.

There are other ways of moving the actuator. It could be done electrically, in which case the tripping means would include switch means operable by the drawers as they open and close to energise and de-energise the electrical circuit for the actuator. Also while a tilting member is currently considered the most convenient embodiment, particularly for the all mechanical interlock, other forms of actuator are possible provided they are fittable within the space beyond the rail mechanism and provide a lateral movement to operate the stops.

For a better understanding of the invention, one embodiment will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a horizontal section through a rear corner of a cabinet of drawers showing an interlock system in one mode,

Figure 2 is an elevation from inside the cabinet, with drawers removed, of part of the interlock system,

Figure 3 is a vertical section, to a smaller scale, on the line III-III of Figure 2, also showing drawer-mounted elements,

Figure 4 is a rear face view of a plunger housing forming part of the interlock system, and

Figure 5 is a perspective view of a cam-detent block also forming part of the system.

It will be assumed that this system is applied to a filing cabinet 1 a rear corner of which is shown in Figure 1. It may, for example, have four drawers in a vertical array. Each side of the cabinet has an inner panel 2 creating a shallow space 3 and in at least one of these spaces, near the back of the cabinet, is fitted an actuator 4. This is essentially a flat bar made out of two sheet metal strips, one being formed with a central longitudinal V channel to accommodate a vertical shaft 5 about which the bar pivots. It co-operates at each drawer level with a plunger assembly contained in a housing 6 secured to the inside of the panel 2.

There are two spring-loaded plungers 7 and 8 at different levels with stems 9 and 10 which project horizontally through the panel 2 to co-operate with the actuator on opposite sides of the shaft 5. Thus one or other of the plungers 7 and 8 projects from the housing 6 into the drawer space, depending on the actuator position.

The actuator shaft 5 has at one or both ends a radial arm 11 with a toothed segment 12 centred on the shaft axis. A matching arm 13 journaled about a parallel axis nearby has a toothed segment 14 which meshes with the segment 12. The free ends of the arms 11 and 13 are coupled by a coil spring 15 under tension. In the position shown in Figure 1, the arms form a shallow V concave towards the outside of the cabinet and the actuator 4 is tilted so that the rear plunger 7 is retracted and the forward plunger 8 projects.

As will be described below, drawer action can depress the forward plunger 8. Its stem 10 therefore presses the actuator 4 to rotate it clockwise as seen in Figure 1. The arms 11 and 13 swing into alignment, the meshing segments 12 and 14 causing the arm 13 to follow the arm 11, stretching the spring 15. As they go past this point, the spring asserts itself and snaps the actuator 4 into a reverse tilt, causing the plunger 7 to project and the plunger 8 to be retracted.

Reverse drawer action, working through the plunger 7, will correspondingly switch the actuator tilt back to that shown in Figure 1.

Referring now to Figures 2 and 3, the inner panel 2 has a vertical array of evenly spaced horizontal slots 16 opposite the actuator 4. A plate 17 has a hooked tongue 18 at its upper end which can be worked through any one of these slots to suspend the plate flat against the inside of the panel 2. This provides a support for a fixed rail of a drawer slide mechanism 19; it may be conventional and will not be described in detail.

The housing 6 is secured to the inner panel 2 immediately below the drawer slide mechanism 19. It is

constructed in two parts for insertion of the plungers 7 and 8 and their springs 20 and held together by a nut and bolt 21. On its back face (Figure 4), which is offered up to the panel 2, it has lugs 22 which locate in an adjacent pair of slots 16. It is secured in place by screws 23 through the housing which bite into the upper and lower edges of those slots. The stems 9 and 10 of the plungers 7 and 8 pass through the ends of respective slots 16.

Each drawer is carried by the movable portion of the slide mechanism 19, including, at the rear end of each drawer, a bracket 24 to which is fixed a cam-detent block 25 which co-operates with the plungers 7 and 8. It is of shallow isosceles triangular form in plan view, as best seen in Figure 5, the apex pointing towards the panel 2. When the drawer is fully closed, this apex is just to the rear of the plunger 7. The rear sloping side 26 of the block 25 is uniform and can act as a cam on the plunger 7. The front side, however, is divided horizontally. The upper half 27 slopes in mirror fashion to the rear slope and can co-operate with the upper, forward plunger 8. The lower half is cut away, there being a step 28 from the apex perpendicular to the base of the block. This step is therefore a forward facing vertical surface whose path, as the drawer moves, is in line with the rear, lower plunger 7.

When all the drawers are closed, the position of Figure 1 obtains. The actuator bar 1 is tilted so that all the plungers 7 are retracted, while all the plungers 8 are forced against their spring bias to project. Should any one drawer then be opened, the sloping surface 27 of the block 25 of that drawer will wedge the associated plunger 8 towards its retracted position, thereby tilting the bar 4 until it snaps over, forcing all the plungers 7 to project. But the plunger 7 associated with the opening drawer will no longer be in front of the step 28 and will project freely behind the sloping face 26. However, all the other plungers 7 will project in front of their steps 28 and lock the other drawers.

When the open drawer is returned to the closed position, the rear sloping face 26 of its block 25 hits the associated plunger 7 and forces that to retract. The reverse action happens, swinging the bar 4 back to the Figure 1 position. Then that drawer or any other selected drawer can be reopened.

The plunger housing 6 could be attached to the fixed rail of the slider mechanism 19 instead of to the panel 2. This would have an advantage in that it would automatically be correctly positioned in relation to the cam-detent block 27 mounted on the bracket 24. Also instead of that block 27, which will generally be of plastics material and fastened to the bracket 24, that bracket or even the drawer, both of which will usually be of metal, could be locally deformed to provide integral cams and a step.

Instead of plungers 8 or their mechanical equiv-

alents pivoted elements are another possibility, there could be electrical switches, such as microswitches or reed switches, operated by the drawers as they are opened and closed, and any of these switches when closed could energise a solenoid which would rotate the actuator and cause all the plungers 7 to project in unison. Each drawer returning to a closed position would be arranged to de-energise the solenoid and the plunger position would be reversed as in the mechanical arrangement.

It will be understood that the inner panel 2 may be dispensed with and the fixed rails secured to a frame.

For wide drawers it may be advisable to provide similar interlock devices on both sides; for cabinets designed to take the width of A4 files, for example, just one interlock device will generally suffice.

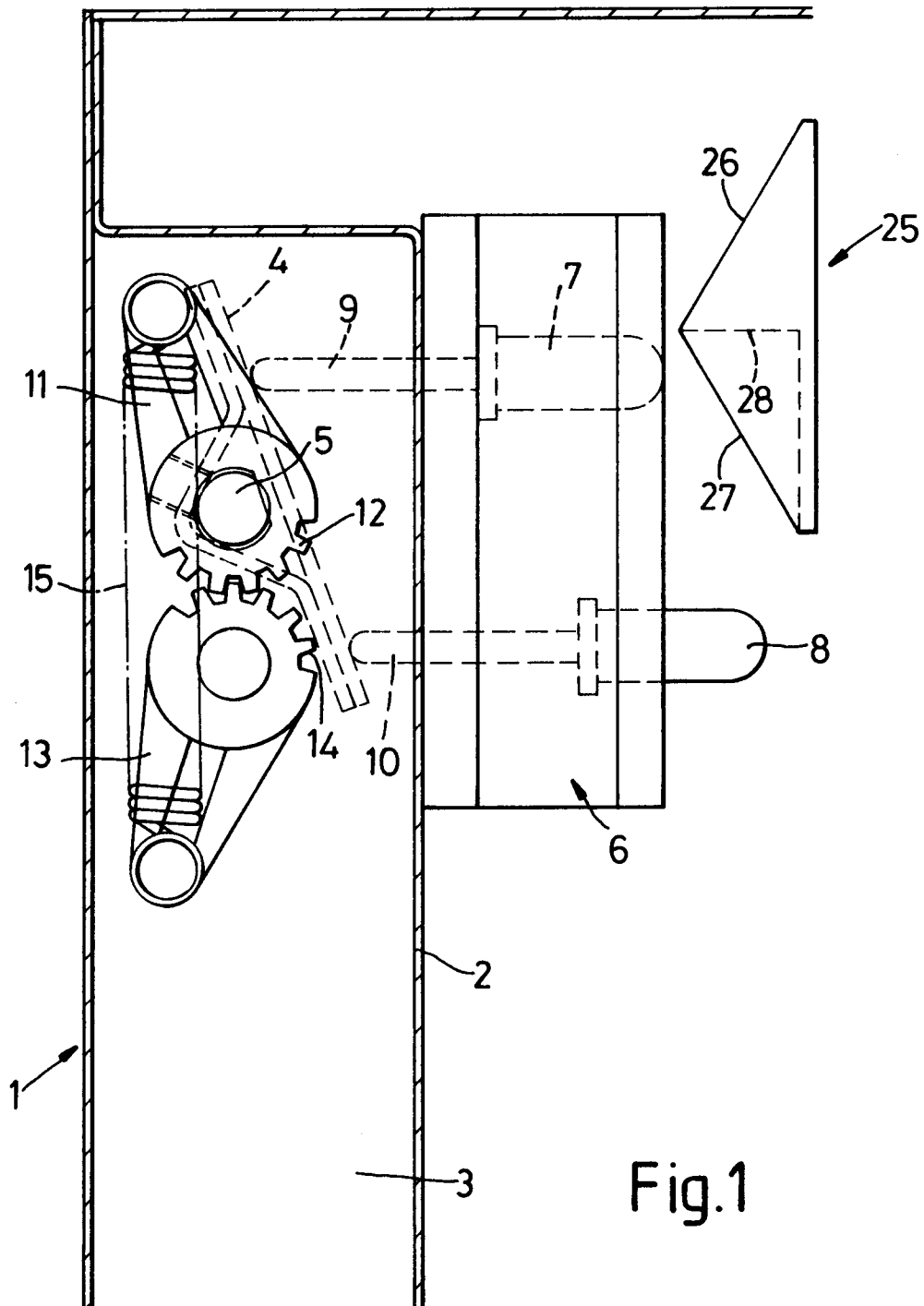
All the drawers may be locked by a key operated device (not shown) which can hold the actuator in the locking position.

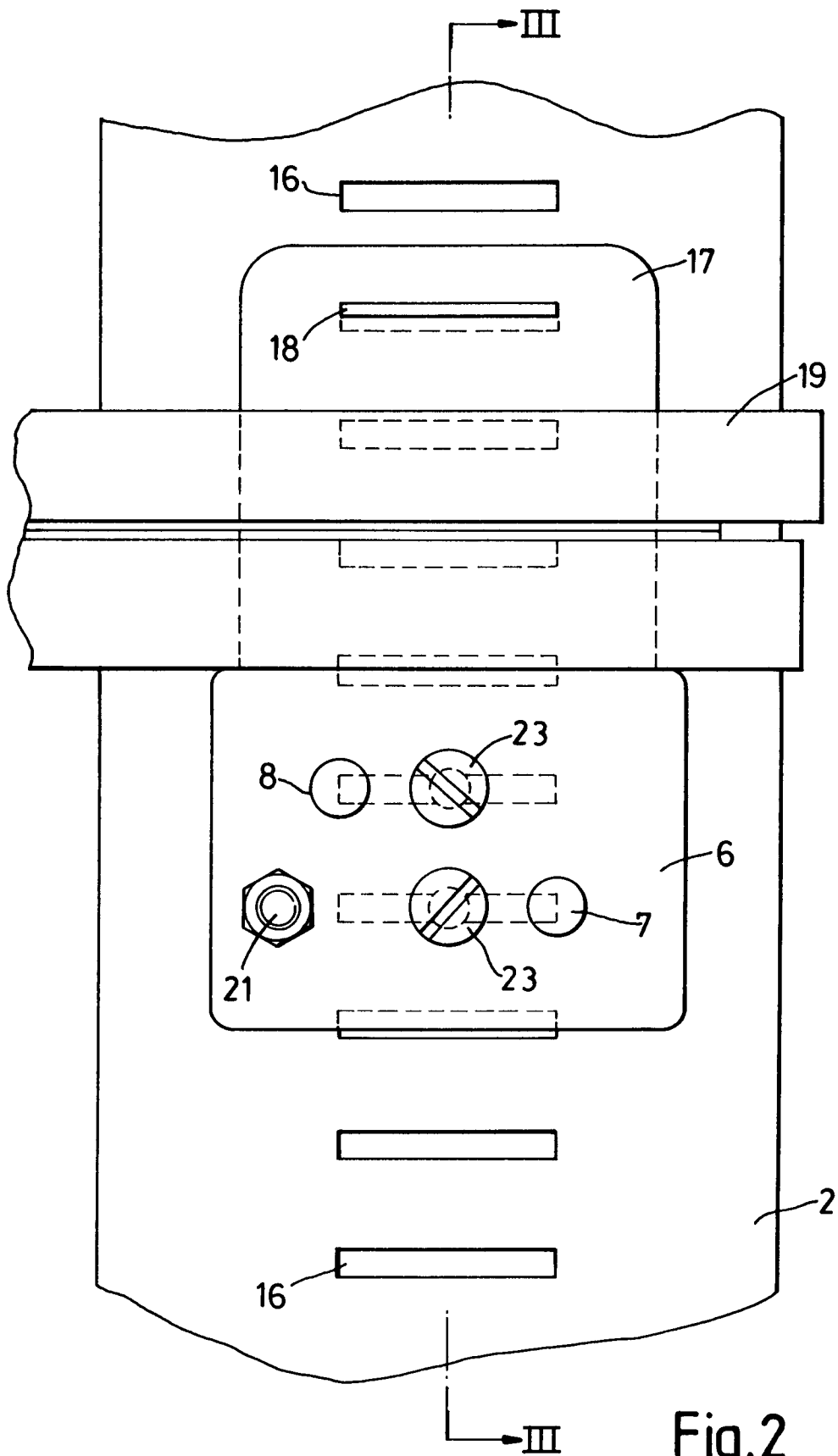
Claims

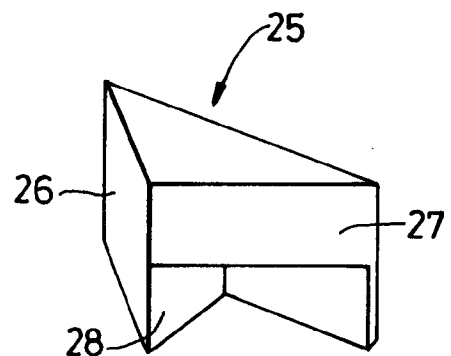
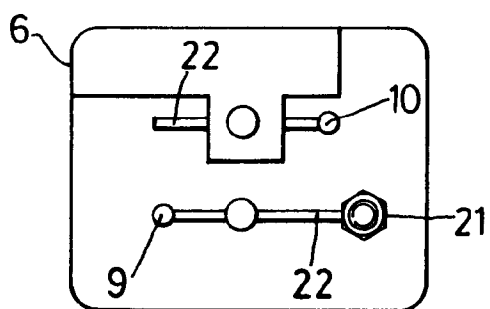
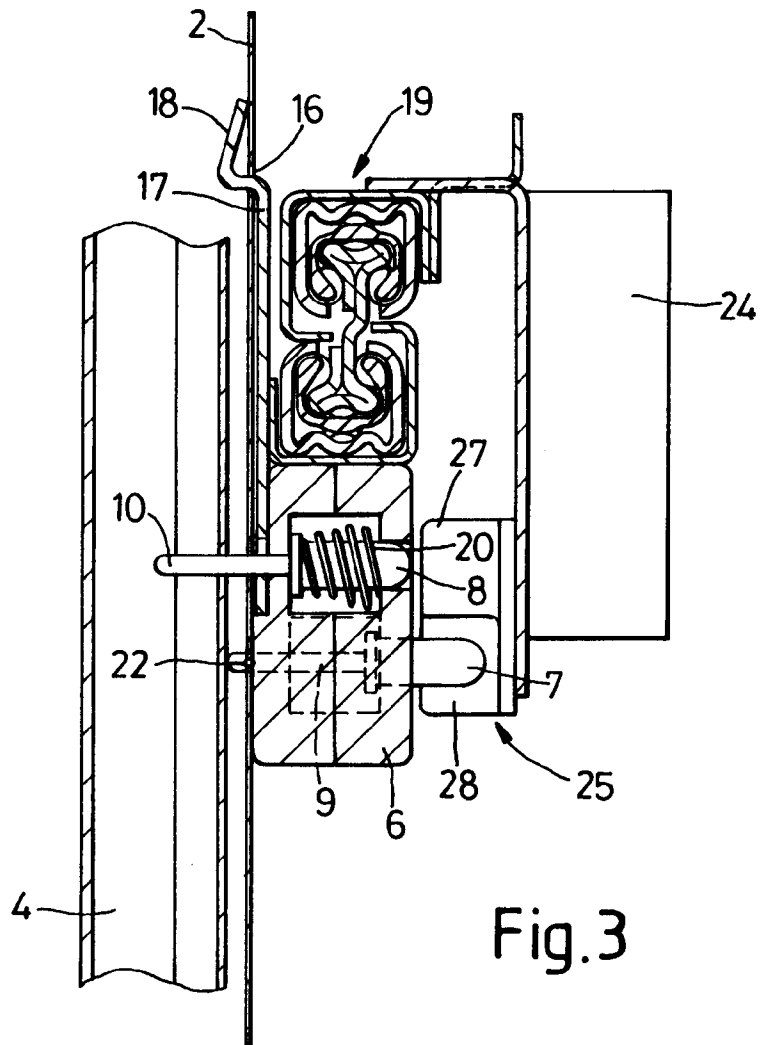
1. A drawer interlock system enabling the opening of any drawer of a plurality of drawers in a cabinet while retaining the other drawers locked, the drawers being supported on rail mechanisms spaced from the outer side walls of the cabinet, the system comprising, for each drawer, a detent fast with the drawer, a cabinet mounted stop laterally movable towards and away from the detent for respective engaging and disengaging positions, and tripping means for actuating the stop as the drawer approaches and leaves its closed position, the tripping means of all the drawers co-operating with a common actuator for the stops wholly within the space between one outer side wall and the adjacent rail mechanism and being arranged to move all the stops to detent engaging positions when any one drawer is moved from its closed position, the detent of that one drawer then escaping engagement by its stop but the other closed drawers being locked, and also being arranged to move all the stops to detent disengaging positions when said any one drawer is returned to its closed position.
2. A system as claimed in Claim 1, wherein said common actuator is an elongate member spanning the drawers to co-operate with all the stops and tiltable by the tripping means about a longitudinal axis between a locking mode in which the stops project into detent engaging positions and an unlocking mode in which the stops are retracted.
3. A system as claimed in Claim 2, wherein the ac-

tuator has associated spring means giving it snap action between said modes.

4. A system as claimed in Claim 2 or 3, wherein the tripping means for each drawer includes a drawer-mounted cam for co-operating with the associated stop as the drawer is closed, the stop being forced to retract thereby and thus tilting the actuator to said unlocking mode.
5. A system as claimed in Claim 2, 3 or 4, wherein the tripping means for each drawer includes a cabinet mounted element co-operating with the actuator to project towards the drawer in the unlocking mode and retract in the locking mode, and a drawer mounted cam which co-operates with said element to force it to retract as the drawer is opened and thereby tilt the actuator to its locking mode.
6. A system as claimed in Claim 5, wherein the stops and tripping elements are spring loaded plungers biased towards the retracted positions to be engaged by the actuator.
7. A system as claimed in Claim 6, wherein there is a common housing for the pair of plungers for each drawer.
8. A system as claimed in Claim 6 or 7, wherein the plungers for each drawer are at different levels.
9. A system as claimed in Claim 4 and any one of Claims 5 to 8, wherein each detent is formed by a step in a member secured to or forming part of the drawer, this member also being formed with the cams of the tripping means.
10. A system as claimed in Claim 1, 2 or 3, wherein said actuator is electrically operated, and the tripping means include switch means operable by the drawers as they open and close to energise and de-energise the electrical circuit for the actuator.









European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 92 30 9178

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-A-2 553 424 (ZELENSKA STAHLBAU OHG) * the whole document *	1-5	E05B65/46
A	DE-A-2 939 575 (HUWIL-WERKE MOBELSCHLOSS-UND BESCHLAGFABRIKEN) * page 6, line 1 - line 19 * * page 7, line 14 - page 8, line 17; figures 1-4 *	1,4	
A	FR-A-2 560 022 (TIRO-CLAS S.A.) * claims; figures *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E05B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 18 DECEMBER 1992	Examiner GIMENEZ BURGOS R.
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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