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(54) **A drawer interlock system**

Auszugssperre für Schubladenschrank

Dispositif pour empêcher l'ouverture simultanée de tiroirs

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Description

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.

DE-A-2553424 describes an interlock system of this kind. Each drawer has a toothed tongue at the rear which co-operates with a vertical member of V-section, rotatable within limits and with a snap action about a vertical axis. When one drawer is pulled out, its tongue pulls the vertical member round by one flange for the other flange to engage in a locking manner between the teeth of the other drawer tongues. When the drawer is closed again, the vertical member is pushed back by the tongue of that drawer acting on said other flange.

Its main disadvantages are that the tongues and the vertical member at the rear of the drawers mean a lot of wasted space there, and the vertical member allows considerable play for the drawers that remain closed.

It is the aim of this invention to avoid that waste of space and to reduce or even eliminate the scope for closed drawers to shift.

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, and this can conveniently provide a space in which the interlock device can be fitted.

However, it is not possible just to put the vertical member of DE-A-2553424 in that space to co-operate directly with toothed tongues or the like on the sides of the drawers. The rails would interfere, and they take precedence.

It is therefore a further aim of this invention to provide a side-mounted 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 side rail supported drawers in a cabinet while retaining the other drawers locked, the system comprising, for each drawer, a detent fast with the drawer, a cabinet mounted stop engageable with and disengageable from the detent and tripping means for actuating the stop as the drawer approaches and leaves its closed position, the tripping means of all the drawers being arranged to move all the stops through a common actuator 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 through the common actuator to detent disengaging positions when said any one drawer is returned to its closed position, characterised in that the common actuator is disposed wholly within a space between a set of supporting rail mechanisms at one side of the cabinet and that side, and in that the actuator moves the stops linearly and transverse of that side into and out of the path of the detents.

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 journalled 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 4 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 25 mounted on the bracket 24. Also instead of that block 25, which will generally be of plastics material and fastened to the bracket 24, that bracket or even the draw-

er, 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 equivalents 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 side rail supported drawers in a cabinet (1) while retaining the other drawers locked, the system comprising, for each drawer, a detent (28) fast with the drawer, a cabinet mounted stop (7) engageable with and disengageable from the detent (28) and tripping means (8, 26, 27) for actuating the stop (7) as the drawer approaches and leaves its closed position, the tripping means (8, 26, 27) of all the drawers being arranged to move all the stops (7) through a common actuator (4) to detent engaging positions when any one drawer is moved from its closed position, the detent (28) of that one drawer then escaping engagement by its stop (7) but the other closed drawers being locked, and also being arranged to move all the stops (7) through the common actuator (4) to detent disengaging positions when said any one drawer is returned to its closed position, characterised in that the common actuator (4) is disposed wholly within a space (3) between a set of supporting rail mechanisms (19) at one side of the cabinet and that side, and in that the actuator (4) moves the stops (7) linearly and transverse to that side into and out of the path of the detents.

2. A system as claimed in Claim 1, characterised in that said common actuator (4) is an elongate member spanning the drawers to co-operate with all the stops (7) and tiltable by the tripping means (8, 26, 27) about a longitudinal axis between a locking mode in which the stops (7) project into detent engaging positions and an unlocking mode in which the stops (7) are retracted.

3. A system as claimed in Claim 2, characterised in that the actuator (4) has associated spring means (15) giving it snap action between said modes.

4. A system as claimed in Claim 2 or 3, characterised in that the tripping means (8, 26, 27) for each drawer includes a drawer-mounted cam (25) for co-operating with the associated stop (7) as the drawer is closed, the stop (7) being forced to retract thereby and thus tilting the actuator (4) to said unlocking mode.

5. A system as claimed in Claim 2, 3 or 4, characterised in that the tripping means (8, 26, 27) for each drawer includes a cabinet mounted element (8) co-operating with the actuator (4) to project towards the drawer in the unlocking mode and retract in the locking mode, and a drawer mounted cam (27) which co-operates with said element to force it to retract as the drawer is opened and thereby tilt the actuator (4) to its locking mode.

6. A system as claimed in Claim 5, characterised in that the stops (7) and tripping elements (8) are spring loaded plungers biased towards the retracted positions to be engaged by the actuator (4).

7. A system as claimed in Claim 6, characterised in that there is a common housing (6) for the pair of plungers for each drawer.

8. A system as claimed in Claim 6 or 7, characterised in that the plungers (7, 8) for each drawer are at different levels.

9. A system as claimed in Claim 4 and any one of Claims 5 to 8, characterised in that each detent (28) is formed by a step in a member (25) secured to or forming part of the drawer, this member also being formed with the cams (26, 27) of the tripping means.

10. A system as claimed in Claim 1, 2 or 3, characterised in that said actuator (4) 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.

Patentansprüche

1. Schubladen-Blockiersystem, das das Öffnen einer beliebigen Schublade aus einer Anzahl von durch Seitenschienen getragenen Schubladen in einem Schrank (1), während die anderen Schubladen verriegelt gehalten werden, ermöglicht, wobei das

System für jede Schublade eine fest an der Schublade sitzende Sperrklinke (28), einen am Schrank montierten Anschlag (7), der in und außer Angriff an der Sperrklinke (28) bringbar ist, und eine Auslöseeinrichtung (8, 26, 27) zum Betätigen des Anschlags (7), wenn die Schublade sich ihrer geschlossenen Stellung annähert oder diese verläßt, umfaßt, und wobei die Auslöseeinrichtungen (8, 26, 27) aller Schubladen für eine Bewegung aller Anschläge (7) durch ein gemeinsames Betätigungsglied (4) in die an der Klinke angreifenden Stellungen dann, wenn eine beliebige der Schubladen aus ihrer geschlossenen Stellung bewegt wird, ausgebildet sind, die Sperrklinke (28) dieser einen Schublade dann dem Angriff durch ihren Anschlag (7) entgeht, jedoch die anderen geschlossenen Schubladen blockiert sind, und die Auslöseeinrichtungen außerdem zur Bewegung aller Anschläge (7) durch das gemeinsame Betätigungsglied (4) in Positionen außer Angriff an der Klinke dann, wenn diese eine Schublade in ihre geschlossene Stellung zurückkehrt, ausgebildet sind, dadurch gekennzeichnet, daß das gemeinsame Betätigungsglied (4) vollständig innerhalb eines Raums (3) zwischen einer Gruppe von tragenden Schienenmechanismen (19) auf einer Seite des Schranks und dieser Seite angeordnet ist und die Anschläge (7) linear und quer zu dieser Seite in den Weg und aus dem Weg der Sperrklinken bewegt.

2. System nach Anspruch 1, dadurch gekennzeichnet, daß das gemeinsame Betätigungsglied (4) ein langgestrecktes Element ist, das an den Schubladen entlang verläuft, um mit allen Anschlägen (7) zusammenzuwirken, und das durch die Auslöseeinrichtungen (8, 26, 27) um eine Längsachse zwischen einem blockierenden Modus, in dem die Anschläge (7) in an den Klinken angreifende Stellungen vorstehen, und einem nicht-blockierenden Modus, in dem die Anschläge (7) zurückgezogen sind, verschwenkbar sind.

3. System nach Anspruch 2, dadurch gekennzeichnet, daß dem Betätigungsglied (4) eine Federeinrichtung (15) zugeordnet ist, die ihm eine Schnappfunktion zwischen diesen Modi verleiht.

4. System nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß die Auslöseeinrichtung (8, 26, 27) für jede Schublade einen an der Schublade montierten Nocken (25) zum Zusammenwirken mit dem zugeordneten Anschlag (7), wenn die Schublade geschlossen wird, umfaßt, wobei dieser Anschlag (7) hierdurch zwangsweise zurückbewegt wird und dadurch das Betätigungsglied (4) in den nicht-blokkierenden Modus verschwenkt wird.

5. System nach Anspruchs 2, 3 oder 4, dadurch gekennzeichnet, daß die Auslöseeinrichtung (8, 26, 27) für jede Schublade ein am Schrank montiertes Element (8) umfaßt, das mit dem Betätigungsglied (4) zum Vorspringen in Richtung zur Schublade im nicht-blockierenden Modus und zum Zurückbewegen in den blockiernden Modus zusammenwirkt, und einen an der Schublade montierten Nocken (27) umfaßt, der mit diesem Element zu dessen zwangsweisem Zurückbewegen, wenn die Schublade geöffnet wird, und hierdurch Verschwenken des Betätigungsglieds (4) in seinen blockierenden Modus zusammenwirkt.

6. System nach Anspruch 5, dadurch gekennzeichnet, daß die Anschläge (7) und die auslösenden Elemente (8) federbelastete Stößel sind, die in ihre zurückbewegten Stellungen für den Angriff am Betätigungsglied (4) vorbelastet sind.

7. System nach Anspruch 6, dadurch gekennzeichnet, daß für die beiden Stößel für jede Schublade ein gemeinsames Gehäuse (6) vorhanden ist.

8. System nach Anspruch 6 oder 7, dadurch gekennzeichnet, daß sich die Stößel (7, 8) für jede Schublade auf unterschiedlicher Höhe befinden.

9. System nach Anspruch 4 und einem der Ansprüche 5 bis 8, dadurch gekennzeichnet, daß jede Sperrklinke (28) durch eine Stufe in einem Element (25) gebildet ist, das an der Schublade befestigt ist oder einen Teil der Schublade bildet und das außerdem mit den Nocken (26, 27) der Auslöseeinrichtung versehen ist.

10. System nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß das Betätigungsglied (4) elektrisch betrieben ist und die Auslöseeinrichtung eine Schaltereinrichtung umfaßt, die durch die Schubladen, wenn sie öffnen oder schließen, zum Speisen und Abschalten des elektrischen Stromkreises für das Betätigungsglied betätigbar sind.

Revendications

1. Système de verrouillage de tiroirs, permettant l'ouverture de n'importe quel tiroir parmi une pluralité de tiroirs supportés par des rails latéraux dans une armoire (1) tout en maintenant les autres tiroirs à l'état verrouillé, le système comprenant, pour chaque tiroir, un dispositif d'arrêt (28) solidement attaché avec le tiroir, une butée (7), montée sur l'armoire, pouvant être engagée avec et dégagée d'avec le dispositif d'arrêt (28) et des moyens de déclenchement (8, 26, 27) pour actionner la butée (7) alors que le tiroir approche de et quitte sa position fermée, les moyens de déclenchement (8, 26, 27) de tous les tiroirs étant disposés pour déplacer tou-

tes les butées (7), par l'intermédiaire d'un organe de commande commun (4), dans des positions d'engagement des dispositifs d'arrêt lorsque n'importe quel tiroir est déplacé à partir de sa position fermée, le dispositif d'arrêt (28) de ce tiroir échappant alors à l'engagement par sa butée (7) mais les autres tiroirs fermés étant verrouillés, et étant également disposés pour déplacer toutes les butées (7), par l'intermédiaire de l'organe de commande commun (4), dans des positions de dégagement des organes d'arrêt lorsque ledit tiroir précité est ramené à sa position fermée, caractérisé par le fait que l'organe de commande commun (4) est disposé entièrement à l'intérieur d'un espace (3) entre un ensemble de mécanismes (19) de rails de support au niveau d'un côté de l'armoire et ce côté, et par le fait que l'organe de commande (4) déplace les butées (7) de façon linéaire et transversalement à ce côté dans et hors de la trajectoire des dispositifs d'arrêt.

2. Système selon la revendication 1, caractérisé par le fait que ledit organe de commande commun (4) est un élément allongé franchissant les tiroirs pour coopérer avec toutes les butées (7) et pouvant être basculé par les moyens de déclenchement (8, 26, 27) autour d'un axe longitudinal entre un mode de verrouillage dans lequel les butées (7) se projettent dans des positions d'engagement des dispositifs d'arrêt et un mode de déverrouillage dans lequel les butées (7) sont rétractées.

3. Système selon la revendication 2, caractérisé par le fait que l'organe de commande (4) a un moyen de ressort (15) associé, donnant son action d'encliquetage entre lesdits modes.

4. . Système selon l'une des revendications 2 ou 3, caractérisé par le fait que le moyen de déclenchement (8, 26, 27) pour chaque tiroir comprend une came (25) montée sur le tiroir, pour coopérer avec la butée associée (7) alors que le tiroir est fermé, la butée (7) étant forcée à se rétracter de cette façon et faisant ainsi basculer l'organe d'actionnement (4) dans ledit mode de déverrouillage.

5. Système selon l'une des revendications 2, 3 ou 4, caractérisé par le fait que le moyen de déclenchement (8, 26, 27) pour chaque tiroir comprend un élément (8) monté sur l'armoire, coopérant avec l'organe de commande (4) pour se projeter vers le tiroir dans le mode de déverrouillage et se rétracter dans le mode de verrouillage, et une came (27), montée sur le tiroir, laquelle coopère avec ledit élément pour le forcer à se rétracter alors que le tiroir est ouvert et faire de cette façon basculer l'organe de commande (4) dans son mode de verrouillage.

6. Système selon la revendication 5, caractérisé par le fait que les butées (7) et les éléments de déclenchement (8) sont des pistons chargés par ressort, rappelés vers les positions rétractées pour être engagés par l'organe de commande (4).

7. Système selon la revendication 6, caractérisé par le fait qu'il y a un boîtier commun (6) pour la paire de pistons pour chaque tiroir.

8. Système selon l'une des revendications 6 ou 7, caractérisé par le fait que les pistons (7, 8) pour chaque tiroir sont à différents niveaux.

9. Système selon la revendication 4 et l'une quelconque des revendications 5 à 8, caractérisé par le fait que chaque dispositif d'arrêt (28) est formé par un gradin dans un élément (25) fixé à ou faisant partie du tiroir, cet élément étant également formé avec les cames (26, 27) du moyen de déclenchement.

10. Système selon l'une des revendications 1, 2 ou 3, caractérisé par le fait que ledit organe de commande (4) est actionné électriquement, et les moyens de déclenchement comprennent des moyens de commutation pouvant être actionnés par les tiroirs alors qu'ils s'ouvrent et se ferment pour activer et désactiver le circuit électrique pour l'organe de commande.

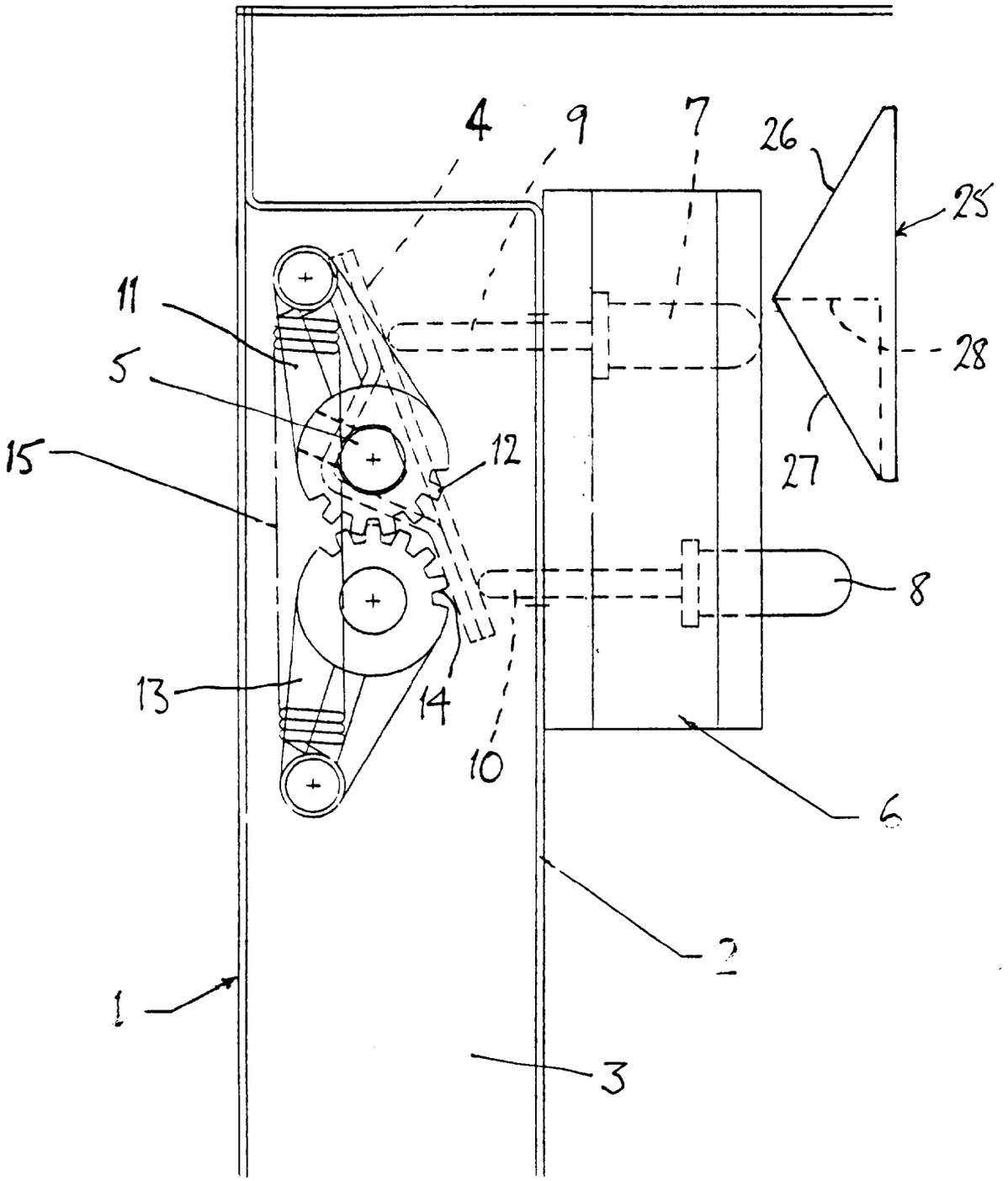


FIG. 1

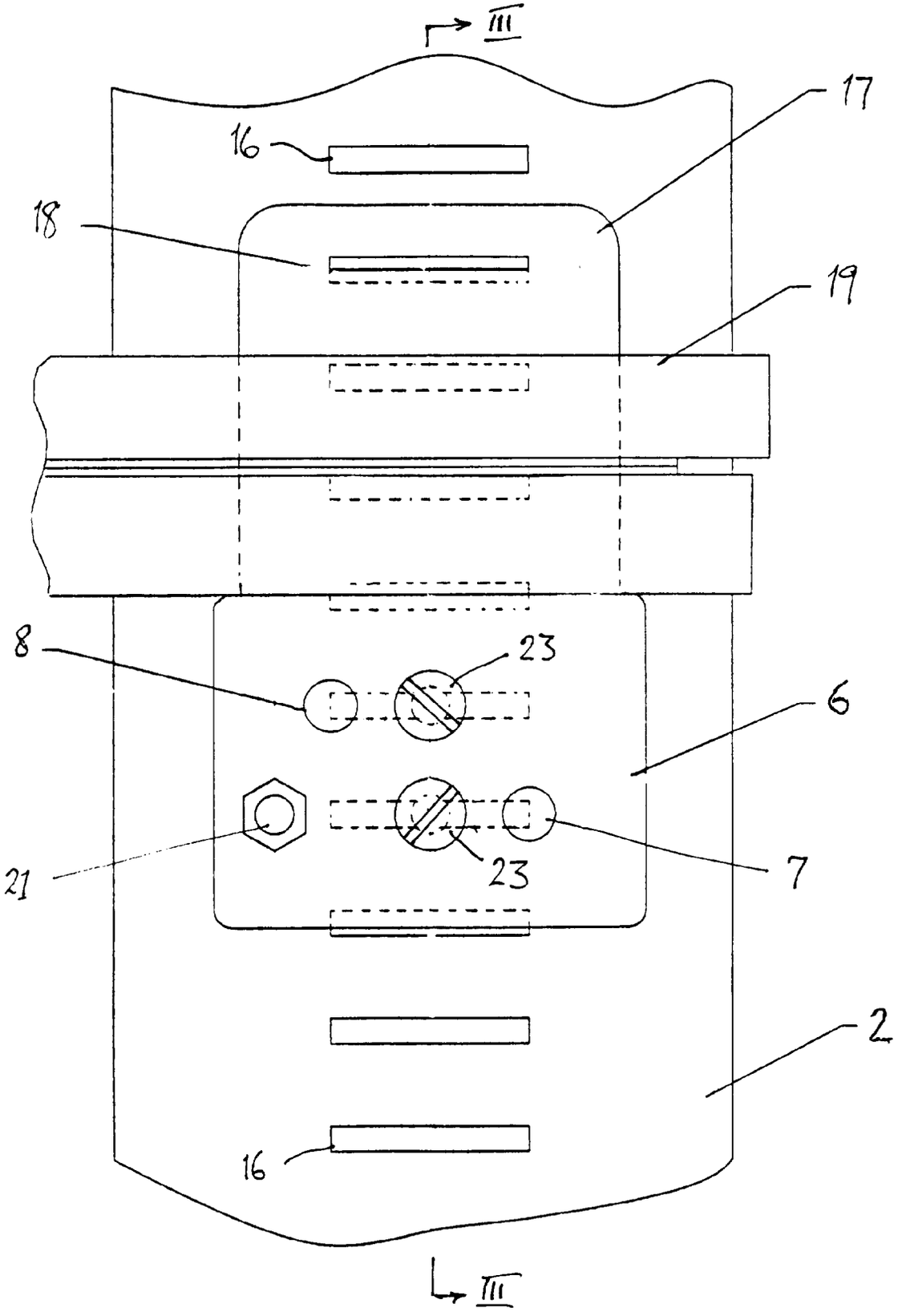


FIG. 2

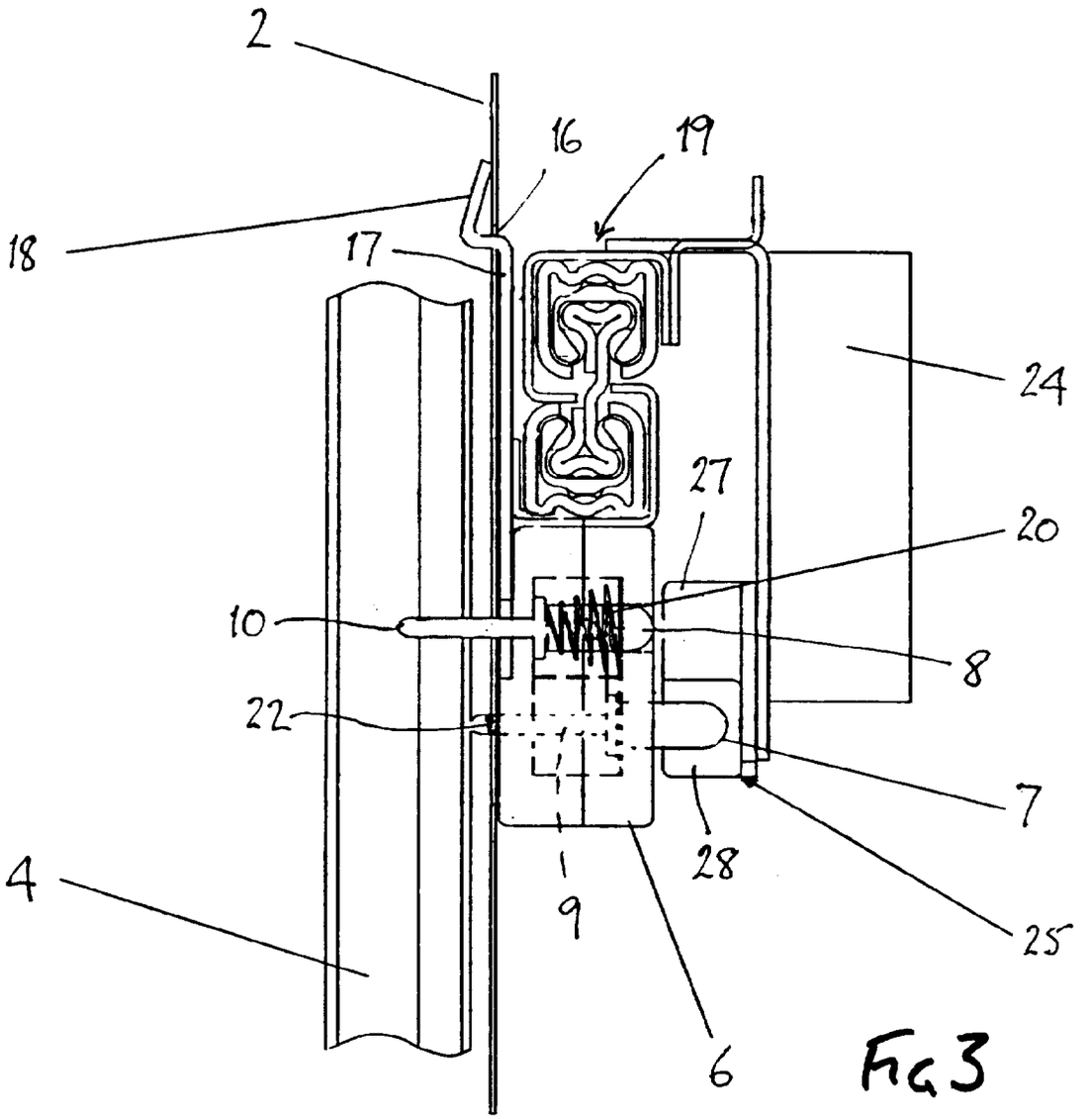


Fig 3

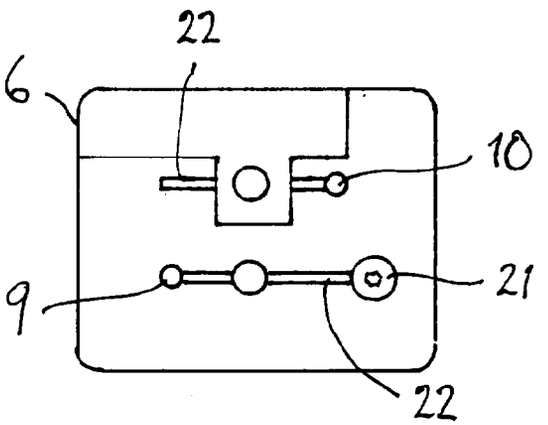


Fig. 4

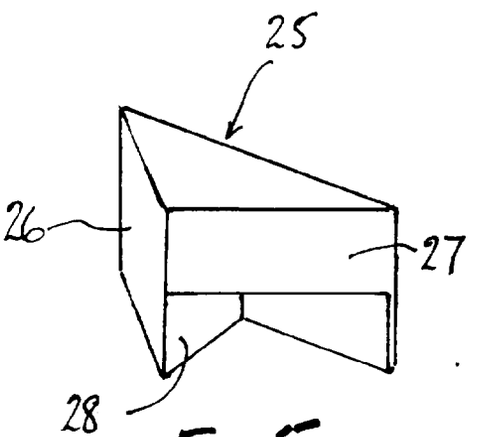


Fig. 5