United States Patent [19]

Mortashed

[11] **3,870,387**

[45] **Mar. 11, 1975**

[54] **FILE DRAWER INTERLOCK MECHANISM**

[75] Inventor: **Merle H. Mortashed,** Union City, Calif.

[73] Assignee: **Harbor Universal, Inc.,** San Leandro, Calif.

[22] Filed: **Mar. 27, 1974**

[21] Appl. No.: **455,164**

[52] **U.S. Cl.** **312/218,** 312/219

[51] **Int. Cl.** **E05b 65/46**

[58] **Field of Search** 312/215–222, 312/276, 317

[56] **References Cited**

UNITED STATES PATENTS

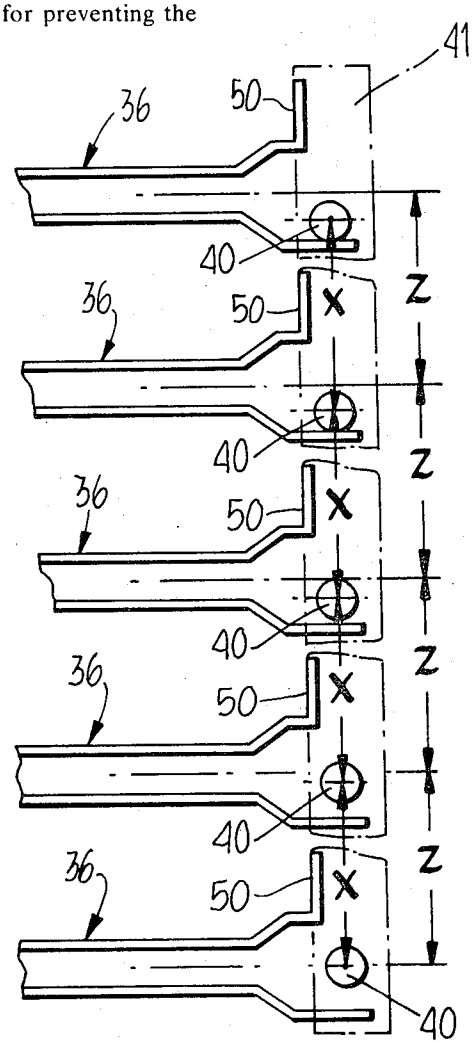
2,240,067	4/1941	Bolesky et al.	312/221
3,323,849	6/1967	Stark	312/221
3,404,929	10/1968	Wright et al.	312/218

Primary Examiner—Paul R. Gilliam
Assistant Examiner—Kenneth J. Dorner
Attorney, Agent, or Firm—Townsend & Townsend; Warren P. Kujawa

[57] **ABSTRACT**

A file drawer interlock mechanism for preventing the opening of more than one of a plurality of drawers, trays or shelves, slideably mounted in a file cabinet. Each slideable unit is provided with an interlock channel on a side wall thereof, the channels being mutually spaced by a first predetermined interval when the units are mounted in the cabinet. An interlock bar slideably disposed within the cabinet in a generally vertical direction is provided with a plurality of interlock members mutually spaced at second intervals different from the separation distance of the interlock channels. With all units closed, each interlock member is positioned in a forward portion of the associated interlock channel. When a single unit is opened, the corresponding interlock member is forcibly positioned in the interlock channel, thereby changing the position of the remaining interlock members. Since the remaining interlock members are mis-aligned from their corresponding interlock channels, a second unit cannot be opened. With all units closed, the lower-most unit interlock channel and interlock member are normally aligned so that accidental tipping of the cabinet causes the lower-most unit to open under the force of gravity to minimize the danger of cabinet tip-over. A full lock-up mechanism is also provided for preventing any one of the units from being opened.

10 Claims, 22 Drawing Figures



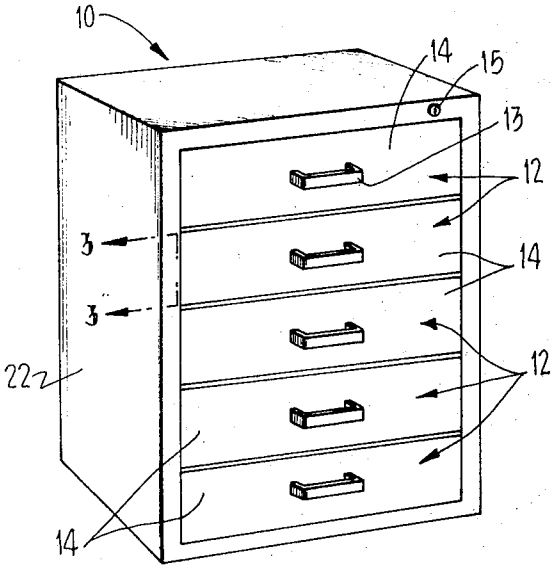


Fig_1

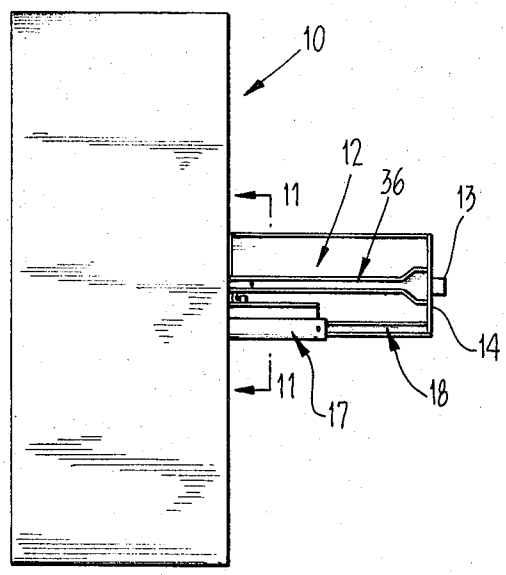


Fig_2

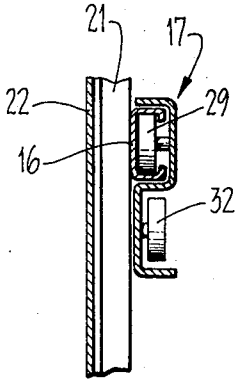


Fig_5

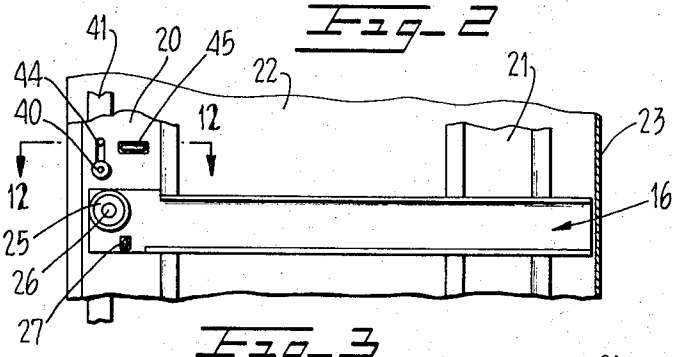


Fig_3

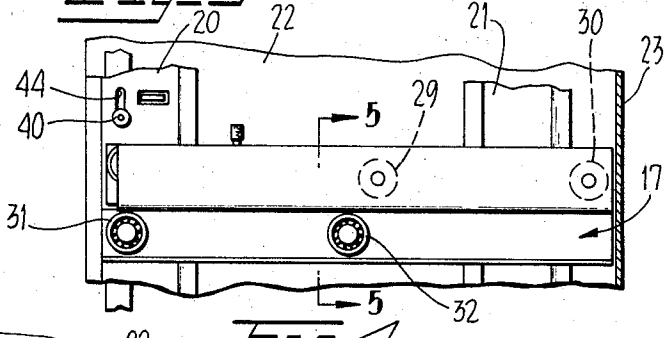


Fig_4

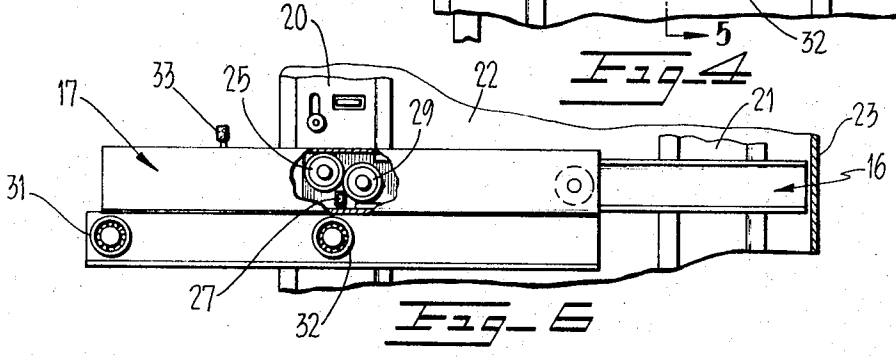


Fig_6

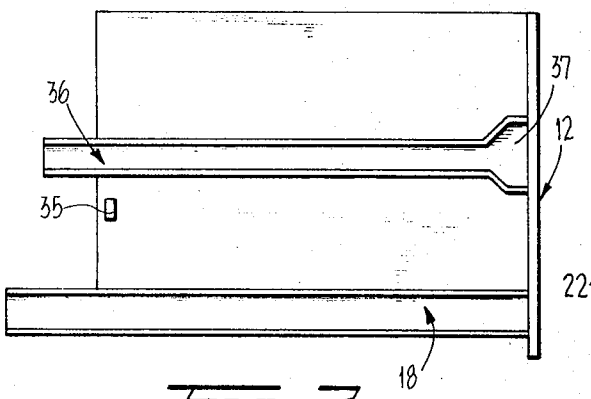


Fig_7

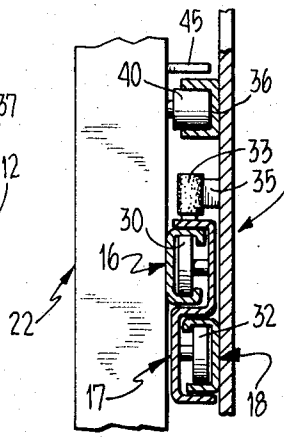


Fig_11

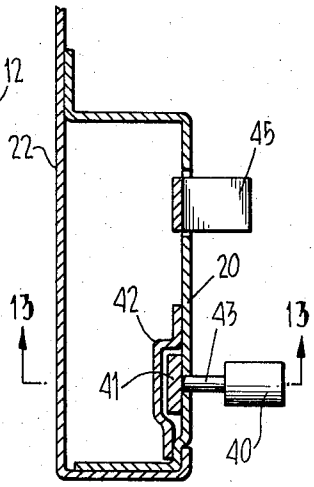


Fig_12

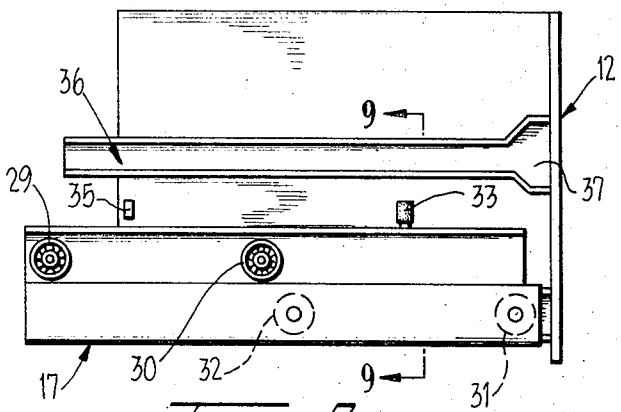


Fig_8

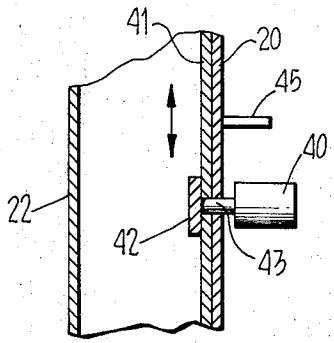


Fig_13

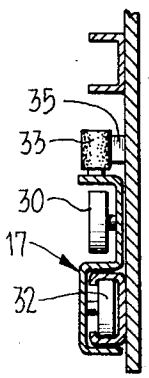


Fig_9

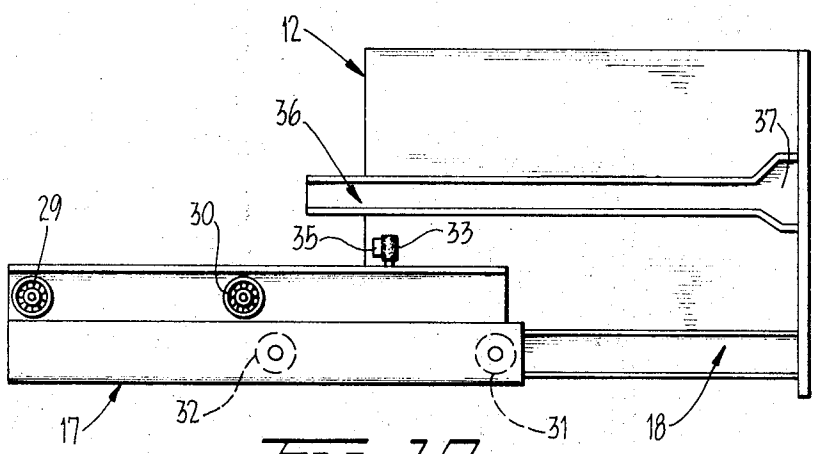


Fig_10

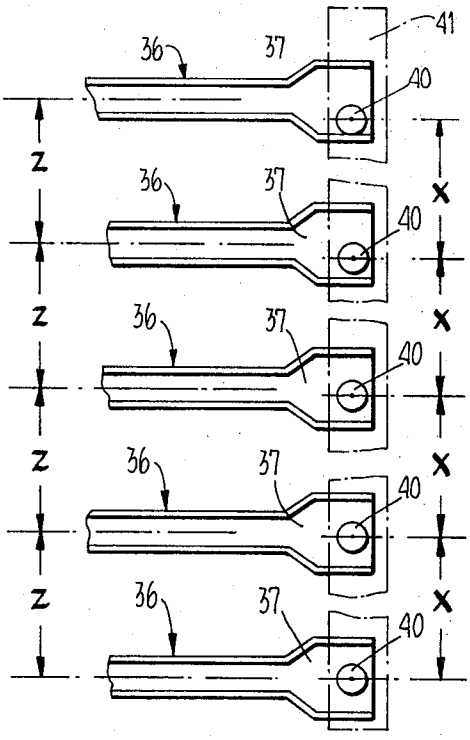


Fig_14

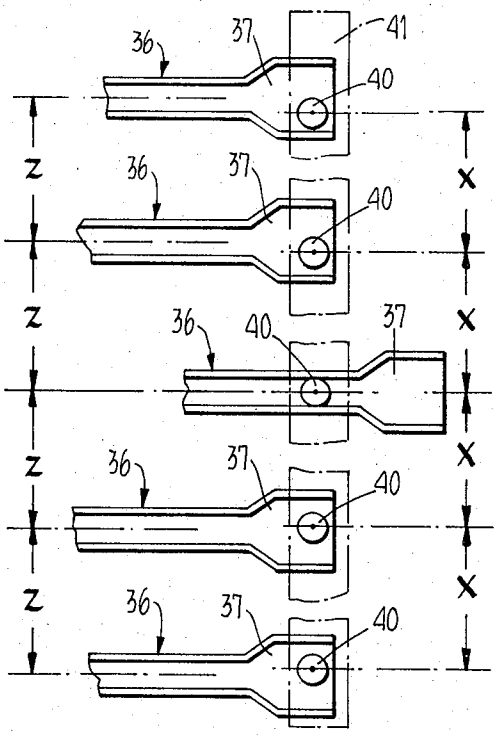


Fig_15

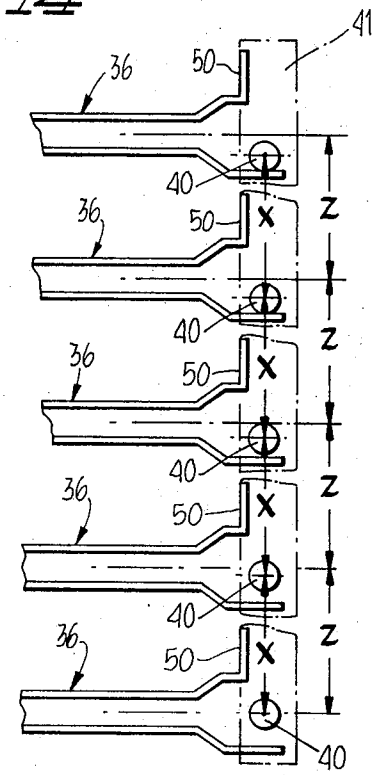


Fig_16

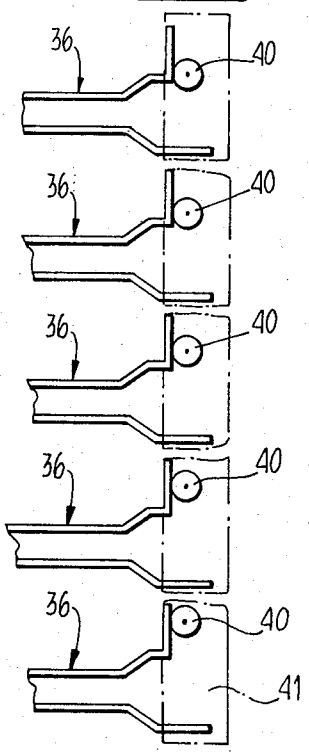


Fig_17

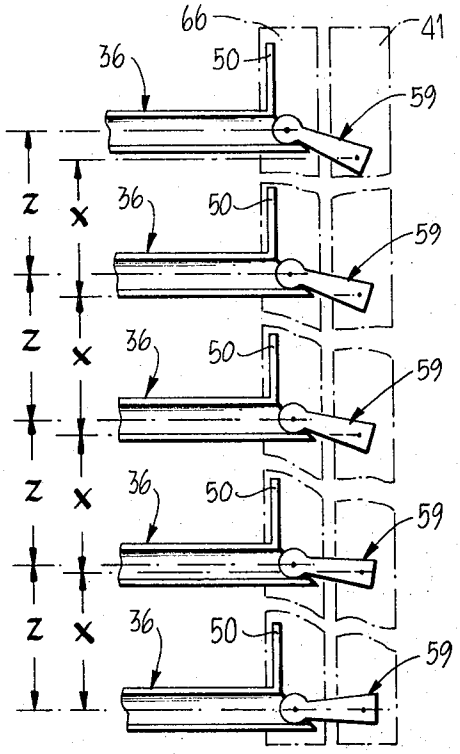


Fig_18

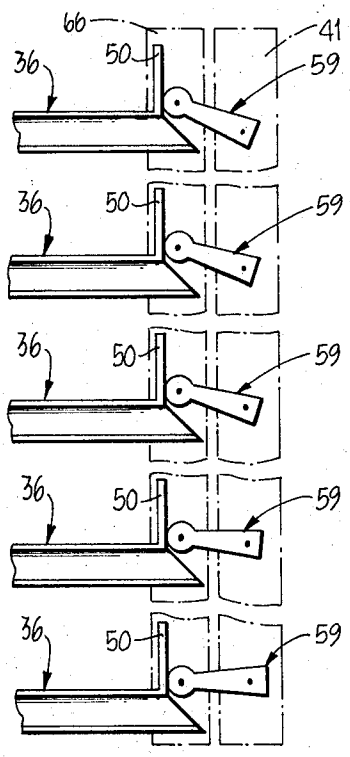


Fig_19

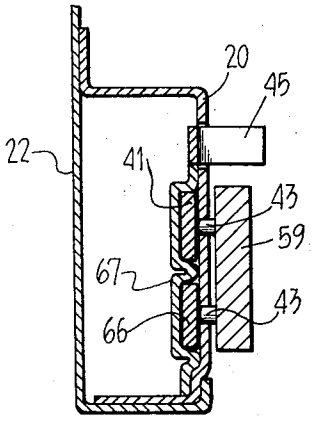


Fig_21

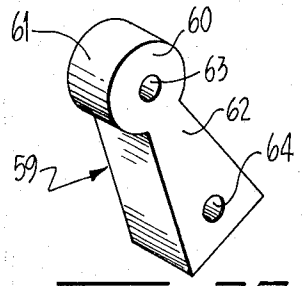


Fig_20

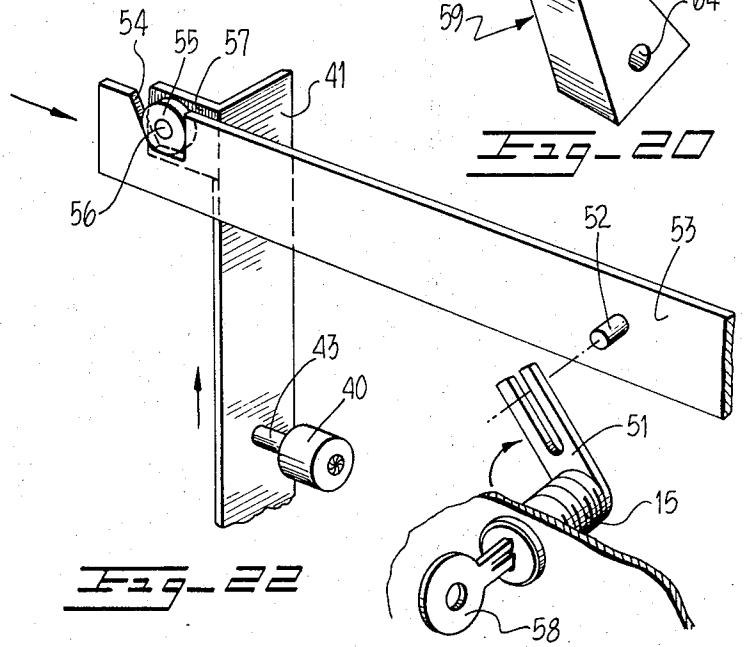


Fig_22

FILE DRAWER INTERLOCK MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to interlock devices commonly found on file cabinets to control the opening of more than one drawer, tray or slide.

Interlock mechanisms are known which control the opening of file drawers, trays or slides, hereinafter termed "units", in a filing cabinet or the like. Some such devices permit the opening of only one unit; others permit the opening of selective combinations of more than one unit. Typically, the interlock mechanism is mounted in the rear of the cabinet between the rear wall of the unit and the rear wall of the cabinet. This arrangement requires the provision of additional space sufficient to permit the installation of the interlock device. This space is normally wasted and requires a cabinet having greater depth than would ordinarily be required in the absence of such an interlock mechanism. Thus, in many installations, particularly those in which space is at a minimum, cabinets provided with interlock devices of the above type are generally undesirable and in extreme cases cannot be employed at all.

Unit interlock devices generally fall into one of two categories: a first, in which all units are normally unlatched. In the former type of device, the act of unlatching the unit and opening it to the desired extend activates the interlock mechanism which prevents the opening of a second unit. In the latter type of device, the simple act of opening a single unit activates the interlock device with the same result.

If a cabinet provided with either of the above types of interlock devices is accidentally tipped, the usual result is the complete toppling of the cabinet. In the former device this occurs when the cabinet is tipped beyond a static equilibrium point. In the latter device, this occurs when one or more units slide out of their own accord to change the equilibrium point. Typically, due to the forces involved, the upper-most unit is the one to spontaneously open, which accelerates the toppling process.

SUMMARY OF THE INVENTION

The invention comprises a cabinet interlock mechanism which requires no installation space in the rear portion of the cabinet and which minimizes the danger of cabinet toppling. In its most general aspect, the invention comprises an interlock bar slideably secured to a filing cabinet in a generally vertical position, a plurality of interlock members rotatably secured to the interlock bar at first spaced intervals and a plurality of interlock channels secured to the side walls of the individual units, the unit interlock channels being spaced at different intervals when the units are mounted in the cabinet. In the normal position, with all units closed, the interlock members and interlock channels are selectively mis-aligned. In the preferred embodiment, the lowermost unit interlock channel and corresponding interlock member are normally aligned so that this unit may naturally open if the cabinet is tipped, thereby preventing the opening of any other unit.

In a first specific embodiment of the invention, a single interlock bar is provided and the interlock members each comprise a low friction roller rotatably attached to the bar, the roller having an outer diameter dimensioned to be snugly accommodated in the interlock channel.

In a second embodiment, each interlock channel is provided with an upstanding integral flange portion at the forward end thereof, and means are provided for raising the interlock bar to a position in which each interlock roller engages the corresponding flange to provide full unit lock-up.

In still another embodiment, an interlock bar and a lock-up bar are slideably secured to the cabinet in a generally vertical direction and the interlock members each comprise a tab having a curved head portion rotatably pinned to a lock-up bar and a flared tail portion rotatably pinned to the interlock bar.

In all embodiments, a plurality of vertically-spaced stop tabs each associated to a different interlock channel are secured to the cabinet in overlapping relation with the upper surface of the corresponding interlock channels to limit the upward motion of each unit.

For a fuller understanding of the nature and advantages of the invention, reference should be had to the ensuing detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a file cabinet embodying the invention;

FIG. **2** is a left end view of the cabinet of FIG. **1** showing a drawer fully extended to the open position;

FIG. **3** is a detail view of the inner left end cabinet wall taken along lines **3—3** of FIG. **1** showing a case slide;

FIG. **4** is a view similar to FIG. **3**, illustrating an intermediate slide mounted on a case slide in the fully retracted position;

FIG. **5** is a sectional view taken along lines **5—5** of FIG. **4**;

FIG. **6** is a view similar to FIG. **4** showing the intermediate slide in the fully extended position;

FIG. **7** is a left end view of a file drawer;

FIG. **8** is a view similar to FIG. **7** showing the intermediate slide attached to the drawer slide;

FIG. **9** is a sectional view taken along lines **9—9** of FIG. **8**;

FIG. **10** is a view similar to FIG. **8** showing the drawer in the fully extended position relative to the intermediate slide;

FIG. **11** is a view similar to FIG. **9** with the drawer mounted in the filing cabinet;

FIG. **12** is a sectional view taken along lines **12—12** of FIG. **3**;

FIG. **13** is a sectional view taken along lines **13—13** of FIG. **12**;

FIGS. **14** and **15** are schematic left end views illustrating a first embodiment of the invention;

FIGS. **16** and **17** are schematic end views illustrating a second embodiment of the invention;

FIGS. **18** and **19** are schematic end views illustrating a third embodiment of the invention;

FIG. **20** is a perspective view of the interlock tab used in the embodiment of FIGS. **18** and **19**;

FIG. **21** is a sectional view similar to FIG. **12** illustrating the interlock and drawer lock bars of the embodiment of FIGS. **18** and **19**; and

FIG. **22** is a schematic perspective view of a drawer lock mechanism for providing a full drawer lock-up.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to the drawings, FIG. 1 illustrates in perspective a five-drawer file cabinet 10 having a plurality of drawers 12 slideably arranged therein. Each drawer is mounted in cabinet 10 in the manner described below so that it may be manually opened to the fully extended position shown in FIG. 2. For this purpose a handle 13 is provided on the front panel 14 of each drawer 12.

File cabinet 10 is also provided with a manually operable lock mechanism, described below, having a lock cylinder 15 for enabling all drawers 12 to be locked when not in use.

Each drawer 12 is slideably held in filing cabinet 10 by a conventional combination of a case slide 16, an intermediate slide 17, and a drawer slide 18 arranged on both sides of the associated drawer 12. FIG. 3 illustrates a case slide 16 mounted in operative association with the left side of a drawer 12. As seen in this FIG., case slide 16 is secured in a substantially horizontal attitude to a pair of support members 20, 21 which are attached fore and aft to the inner surface of left end wall 22, with the aft end of case slide 16 adjacent rear wall 23 of cabinet 10 and the fore end of case slide 16 adjacent the front of cabinet 10. As best shown in FIG. 5, case slide 16 has a C-shaped cross section for a substantial portion of its length and a flat fore end provided with a guide wheel 25 rotatably mounted on a pin 26 for a purpose described below. A stop tab 27 is secured to the fore end of case slide 16 slightly forward of the termination of the C-shaped channel for a purpose described below.

With reference to FIGS. 4–6, an intermediate slide 17 is provided for each case slide 16 for support thereby. Each intermediate slide 17 has an S-shaped cross section providing a pair of guide channels, in each of which are mounted a pair of support wheels 29–32. As best shown in FIG. 5, upper support wheels 29, 30 are dimensioned to be received in the C-shaped channel of case slide 16 so that intermediate slide 17 may be slideably supported thereby. Thus, intermediate slide 17 may be manipulated between the two extreme positions illustrated in FIG. 4 (fully closed) and FIG. 6 (fully open). As shown in the latter FIG. stop tab 27 limits the forward motion of intermediate slide 17 to prevent inadvertant removal thereof from case slide 16. As also shown in this FIG. support wheel 25 provides rolling support for intermediate slide 17. Intermediate slide 17 is further provided with a stop arm 33 secured to the upper surface thereof for a purpose described below.

With reference to FIGS. 7–11, each intermediate slide 17 is associated to a drawer slide 18 secured to the lower portion of the side wall of a drawer 12 in a substantially parallel attitude to the bottom surface thereof. When mounted in operative relation, lower guide wheels 31, 32 of intermediate slide 17 are received in the C-shaped channel of drawer slide 18 in the manner shown in FIG. 9 so that a drawer 12 may be slideably supported thereby. Drawer 12 may thus be maneuvered from the closed position shown in FIG. 8 to the fully extended position shown in FIG. 10 in which a stop tab 35 secured to the side wall of drawer 12 and extending outwardly therefrom engages with stop arm 33. It is understood that the slide arrangement provided for the right-hand side of drawer 12 is substantially identical to that described above for the left-hand side of drawer 12.

As will now be apparent, each drawer 12 is slideably received in cabinet 10 by means of a pair of sets of slides 16–18 and may be manually opened and closed at will. In addition, each drawer 12 is provided with at least one interlock channel 36 best illustrated in FIGS. 7–9. Each interlock channel 36 has a generally C-shaped cross section extending along the major portion thereof and a forwardly located flared portion 37. Each interlock channel 36 is secured to a side wall of drawer 12 in a substantially parallel attitude to the drawer slide 18.

Each interlock channel 36 is mounted for cooperative relation with a different one of a plurality of rollers 40 rotatably secured to a vertically disposed interlock bar 41 which is slideably received in the space between the inner surface of cabinet wall 22 and support member 20. As best shown in FIG. 12, interlock bar 41 is slideably received between support member 20 and a plurality of vertically spaced retaining members 42, only one of which is illustrated, each secured to the enclosed face of support 20. Each interlock roller 40 is rotatably mounted on a pin 43 which extends through a slot 44 in support member 20 and is secured to interlock bar 41 (see FIG. 3).

Each interlock roller 40 has an outer diameter which is slightly smaller than the width of an interlock channel 36, so that the roller can be snugly received therein. Preferably, rollers 40 are fabricated from Nylon, Delrin, Teflon or any other suitable high impact, low friction material.

A plurality of inwardly extending upper guide stop flanges 45, only one of which is shown in FIGS. 3 and 11–13, are secured to support member 20 slightly above respective interlock channels 36 in order to provide a stop for limiting upward motion of each drawer 12. The cooperative relation among slides 16–18, the associated guide wheels and the various elements is shown in FIG. 11. As seen in this FIG., when a drawer 12 is opened the associated interlock roller 40 is snugly received in the associated interlock channel 36 while the stop flange 45 is positioned over the upper surface of the associated interlock channel 36 with a slight clearance therebetween.

FIGS. 14 and 15 illustrate the principle of the invention. When mounted in cabinet 10, each drawer interlock channel 36 is spaced in the vertical direction from the adjacent drawer interlock channel 36 by a predetermined distance Z. This spacing is provided by the placement of the drawer interlock channel 36 on the drawer side wall, and the placement of slides 16–18. The individual interlock rollers 40, on the other hand, are mutually spaced on the interlock bar 41 by a distance X which is different from the dimension Z. In the preferred embodiment shown, $X<Z$. It is understood that the vertical scale in FIG. 14 is greatly compressed for purposes of illustration.

As illustrated in FIG. 14, when all drawers 12 are in the closed position, the individual interlock rollers 40 are all located in the forward portion 37 of the associated interlock channels 36. When one of the drawers 12 is opened as shown in FIG. 15, the associated interlock roller 40 is forced into the associated interlock channel 36, thereby repositioning interlock bar 41 and the remaining rollers 40. Since the dimension of roller

40 closely approximates the inner diameter of interlock channel 36, whenever any drawer 12 is opened a sufficient distance to enable the associated roller 40 to be received in the narrow portion of channel 36, further motion of interlock bar 41 in the vertical direction is prevented. The mutual spacing of interlock rollers 40 (dimension X) relative to the mutual spacing of interlock channels 36 (dimension Z) is chosen so that only one interlock roller 40 can be received in an interlock channel 36 at any given time. Thus, once a single drawer 12 is pulled forward to such an extent that the associated roller 40 is received in the narrow portion of channel 36, a second drawer cannot be opened due to the interference between the remaining interlock rollers 40 and the walls of forward portions 37 of interlock channels 36.

FIGS. 16 and 17 illustrate another embodiment of the invention in which the interlock bar 41 and rollers 40 provide full drawer lock-up in addition to single drawer interlock. As shown in these FIGS., each interlock channel 36 is provided with an alternately configured forward portion having an upstanding flange member 50. Operation of this embodiment in the drawer interlock mode is similar to that described above with reference to FIGS. 14, 15. In addition, however, when interlock bar 41 is raised to the position illustrated in phantom in FIG. 17, the individual interlock rollers 40 abut the forward edge of associated flange members 50 in such a manner as to prevent any drawer 12 from being opened.

FIG. 22 illustrates a locking mechanism suitable for raising interlock bar 41 to the full drawer lock-up position. Lock cylinder 15 is provided with a slotted arm 51 adapted to receive a pin 52 secured to a lock arm 53. Lock arm 53 is slideably supported by any convenient means in cabinet 10. The left end of lock arm 53 is provided with a ramped notch 54 for receiving a guide wheel 55 which is rotatably secured by means of a pin to a flange 57 integral with interlock bar 41.

When a key 58 is inserted into lock cylinder 15 and rotated in the clockwise direction, arm 51 forces lock arm 53 to the right by virtue of the interference fit with pin 52. As lock arm 53 moves to the right, guide wheel 55 rides up ramp 54, thereby raising interlock bar 41 to the position illustrated in FIG. 17. The cabinet may be unlocked by reversing this procedure. If desired, the ramp may be formed on the inboard side of notch 54, to provide a counter-clockwise key lock operation.

FIGS. 18–21 illustrate still another embodiment of the invention which provides both single drawer interlock and full drawer lock-up. In this embodiment, interlock rollers 41 are replaced by interlock tabs 59. As best illustrated in FIG. 20, each interlock tab 59 has a head portion 60 with a substantially cylindrical peripheral wall surface 61 and a flared tail portion 62. A first bore 63 having an axis centered at substantially the center of the radius of curvature of surface 61 is provided for enabling interlock tab 59 to be rotatably attached to a lock-up bar 66 by means of a pin 43. A second bore 64 adjacent to the free end of tail portion 62 is provided for enabling interlock tab 59 to be pivotally attached to interlock bar 41. Interlock tabs 59 may be constructed of any suitable high impact, low friction material.

With reference to FIG. 21, interlock bar 41 and lock-up bar 66 are slideably retained in the volume provided between cabinet end wall 22 and support member 20 by means of a plurality of retaining straps 67 vertically disposed at spaced intervals along the inner surface of support member 20 and secured thereto by any suitable means, e.g. welding. Each interlock tab 59 is pivotally secured to bars 41, 66 by means of a pair of pins 43. In addition, in the embodiment of FIGS. 18–21 a pair of vertically disposed slots, rather than a single slot 45 of the type illustrated in FIG. 3, are provided for accommodating each pair of pins 43. In this embodiment, interlock bar 41 functions in a manner similar to that described above with reference to FIGS. 14, 15, while lock-up bar 66 provides full drawer lock-up when translated to the position illustrated in FIG. 19 by the mechanism illustrated in FIG. 22 described above.

File drawer cabinets constructed in accordance with the teachings of the invention offer a number of advantages not found in the prior art. For example, since the interlock and full drawer lock-up mechanisms are housed in the forward portion of the cabinet, a cabinet having a shallower depth can be designed without sacrificing drawer depth. Further, since the lower-most interlocking roller 40 or interlocking tab 59 in the preferred embodiments is normally aligned with the corresponding lower-most drawer interlock channel, if the cabinet is accidentally tipped or shaken, the lower-most drawer will be the only drawer having a tendency to slide open. As will be appreciated by those skilled in the art, if the lower-most drawer slides open this tends to counteract further tipping of the cabinet. This feature enables the construction of file cabinets which are highly position stable.

While the above provides a complete disclosure of the preferred embodiment of the invention, various modifications, alternate constructions and equivalents may be employed without departing from the true spirit and scope of the invention. For example, while the invention has been illustrated as embodied in a file cabinet having all drawers, the principles of the invention may be readily applied to cabinets having a mix of drawers and trays or shelves. Accordingly, the above description and illustrations should not be construed as limiting the scope of the invention which is defined by the appended claims.

What is claimed is:

1. In a cabinet having a plurality of slideable units mounting at first spaced intervals, an interlock device for preventing the opening of more than one unit, said interlock device comprising:
   - an interlock bar slideably secured to said cabinet in a generally vertical position;
   - a plurality of interlock members rotatably attached to said bar at second spaced intervals different from said first spaced intervals said first and second spaced intervals extending in a direction substantially normal to the sliding direction of said units and
   - a corresponding plurality of interlock channels secured to different ones of said units at said first spaced intervals in selective misalignment with said interlock members, said interlock channels having camming portions arranged in cooperative relationship with said interlock members so that the opening of a single unit forceably aligns the corresponding interlock member and channel and causes mis-alignment of the remaining interlock members and channels.

2. The combination of claim 1 wherein said interlock members each comprise a roller rotatably attached to said interlock bar.

3. The device of claim 1 further including means for forcibly mis-aligning said plurality of interlock members relative to said interlock channels to prevent the opening of any one of said units.

4. The combination of claim 3 wherein said misaligning means includes a plurality of abutment flanges positioned at the forward end of said interlock channels, and means for translating said interlock members to an abutting position relative to said abutment flanges.

5. The combination of claim 4 wherein said translating means includes said interlock bar.

6. The combination of claim 4 wherein said translating means includes a second bar slideably secured to said cabinet in a generally vertical position and wherein said interlock means each comprise a tab member having a curved head portion rotatably attached to said second bar and flared tail portion rotatably attached to said interlock bar.

7. The combination of claim 1 wherein said interlock bar is retained in a forward corner portion of said cabinet.

8. The combination of claim 1 wherein the interlock channel secured to a first one of said units is normally aligned with the corresponding interlock member when all said units are closed to provide preferential opening of said first one of said units.

9. The combination of claim 8 wherein said first one of said units is the lower-most unit.

10. The combination of claim 1 further including a plurality of stop tabs secured to said cabinet for limiting upward motion of said interlock channels.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,870,387

DATED : March 11, 1975

INVENTOR(S) : Merle Mortashed

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, lines 9 and 10 correct the spelling of "described." In column 6, line 45 delete "mounting" and insert "mounted". Column 6, line 52 after "intervals" insert a comma. In column 6, line 54 after "units" insert ";".

Column 8, line 1 after and insert "a".

Signed and Sealed this

fourth Day of *November 1975*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks