United States Patent [19]

Vogt

[11] **3,716,284**

[45] **Feb. 13, 1973**

[54] **VERTICALLY-ADJUSTABLE DRAWER SUSPENSION**

[76] Inventor: **James B. Vogt,** 7811 Consveration Drive, Ada, Mich. 49801

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[21] Appl. No.: **144,090**

[52] **U.S. Cl.** **312/339,** 312/335, 312/350, 312/351, 308/3.6

[51] **Int. Cl.** **A47b 88/10**

[58] **Field of Search**.....312/350, 335, 338, 339, 351, 312/340; 308/3.6; 211/133, 134, 151

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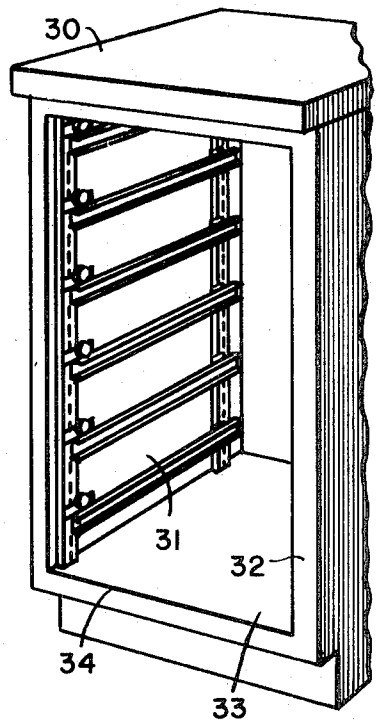
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Primary Examiner—James T. McCall
Attorney—Glenn B. Morse

[57] **ABSTRACT**

A track suspension for drawers and trays, the components being positioned vertically by apertured mounting strips installed at the four vertical corners of a cabinet space, together with brackets engageable at selected apertures in these strips. The rear brackets are engageable and disengageable in a direction other than tangential with respect to the front mounting strips, so that engagement of the front brackets locks the entire assembly in position.

7 Claims, 20 Drawing Figures



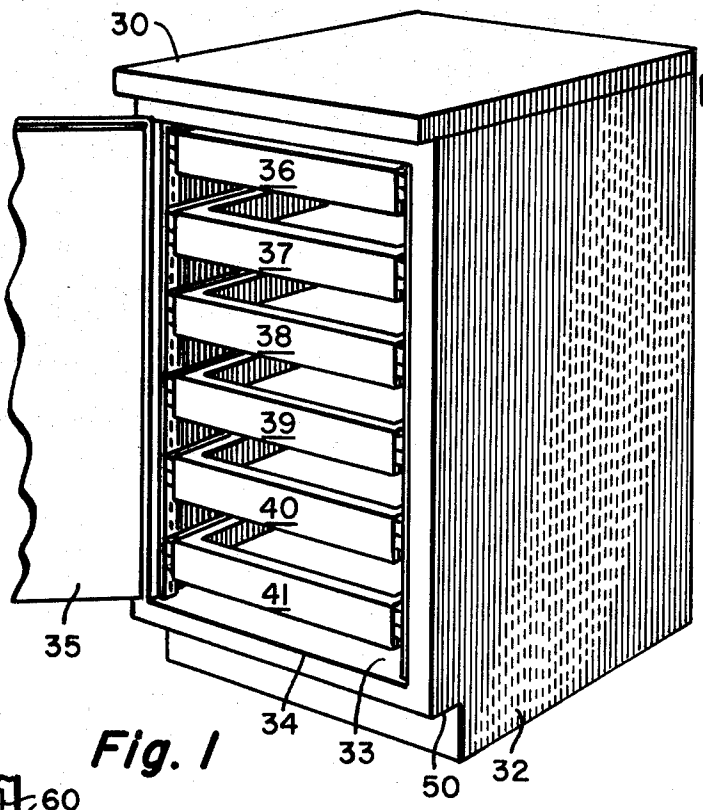


Fig. 1

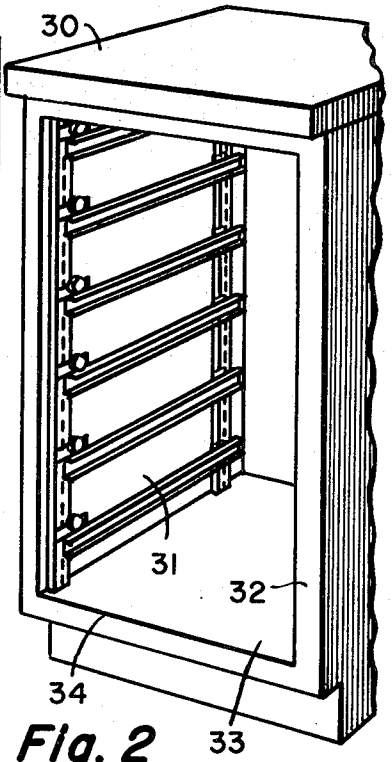


Fig. 2

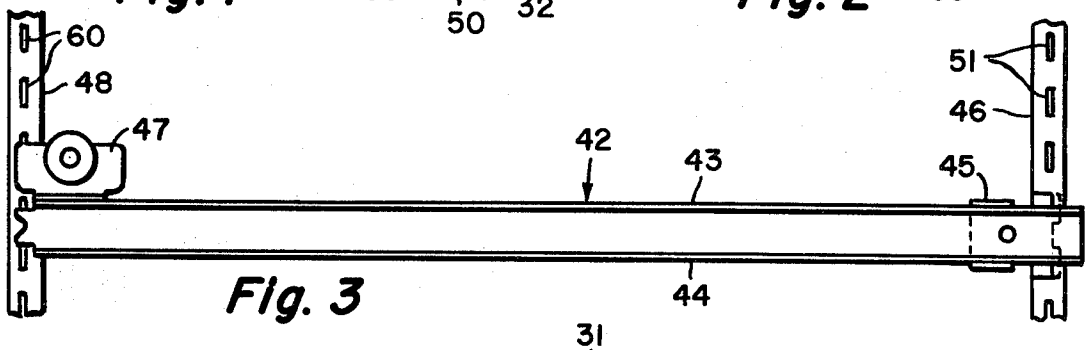


Fig. 3

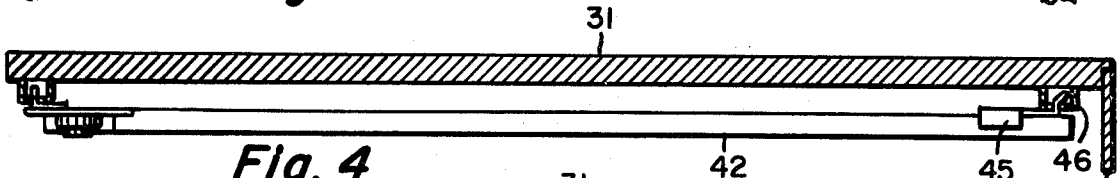
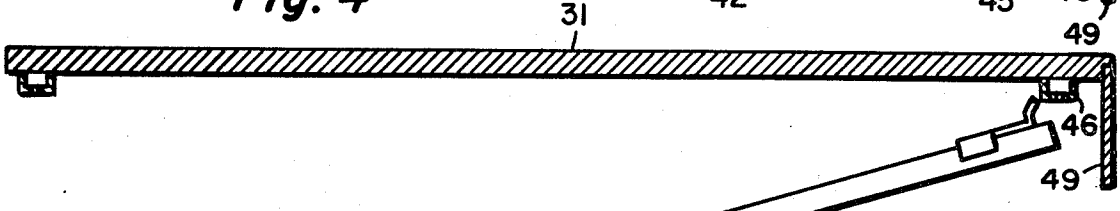


Fig. 4



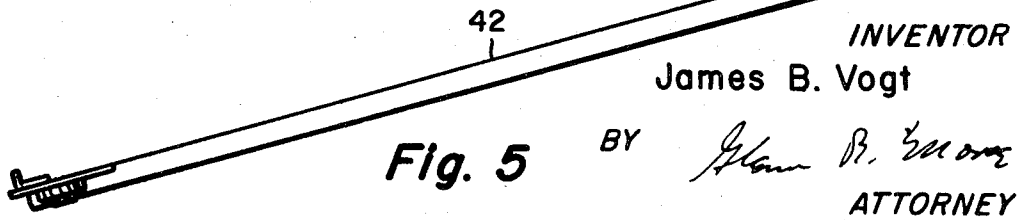


Fig. 5

INVENTOR
James B. Vogt

BY

ATTORNEY

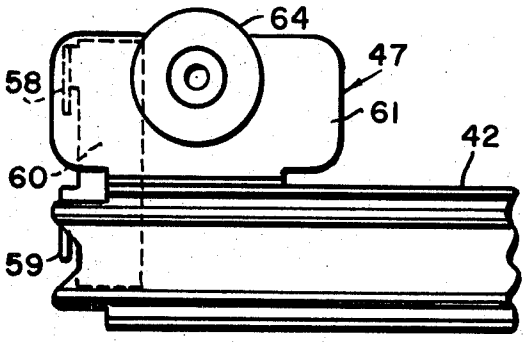


Fig. 6

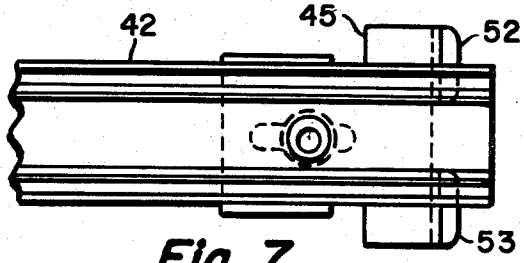


Fig. 7

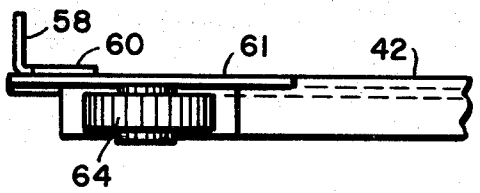


Fig. 8

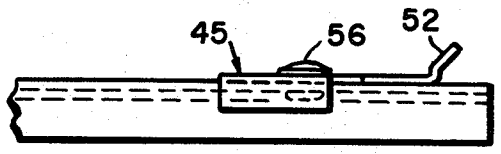


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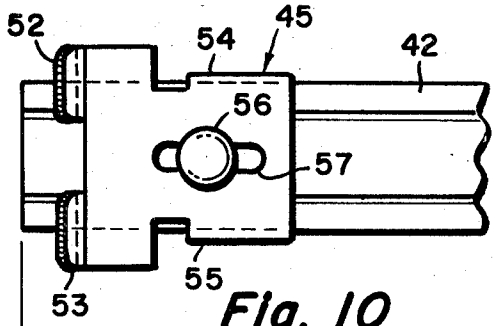


Fig. 10

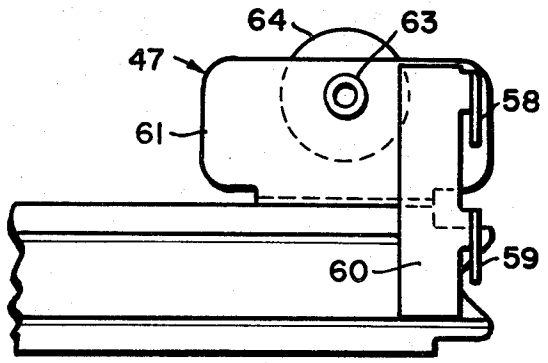


Fig. 11

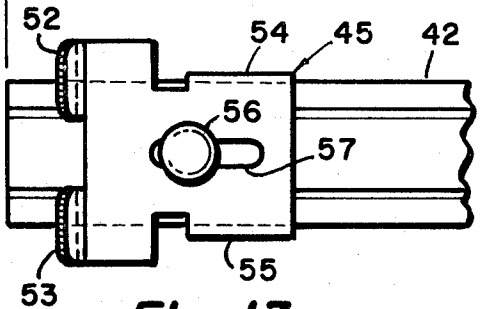


Fig. 13

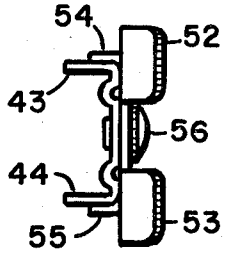


Fig. 14

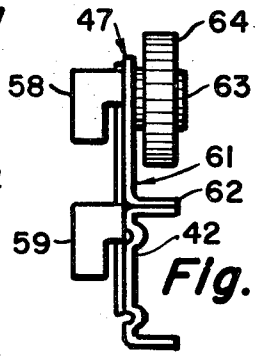


Fig. 12

INVENTOR
James B. Vogt
BY
ATTORNEY

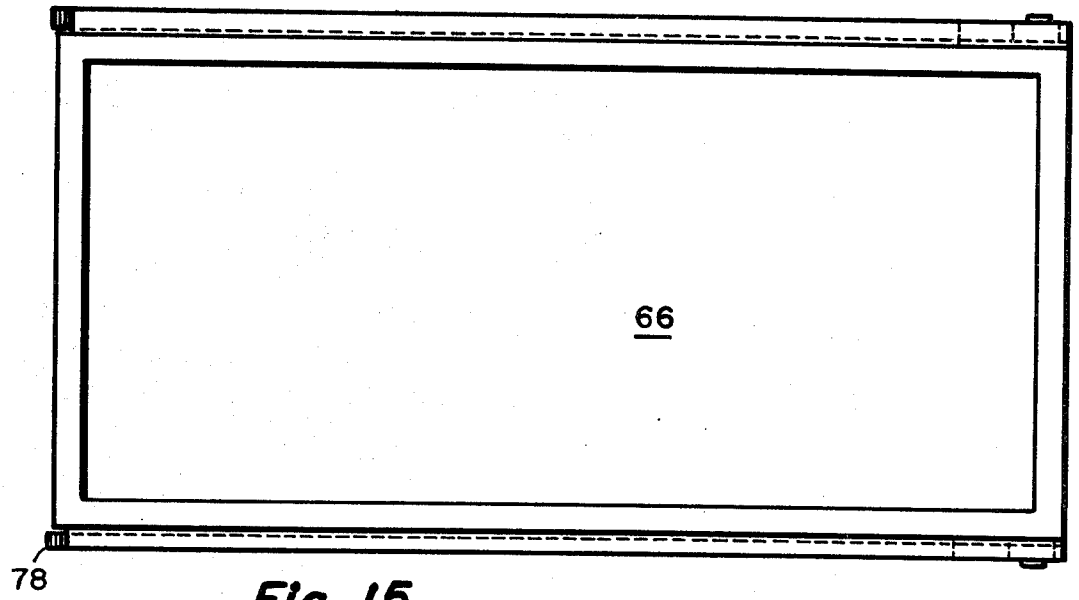


Fig. 15

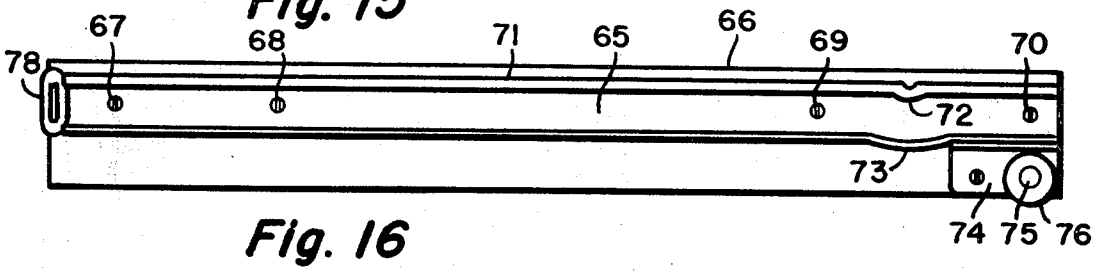


Fig. 16

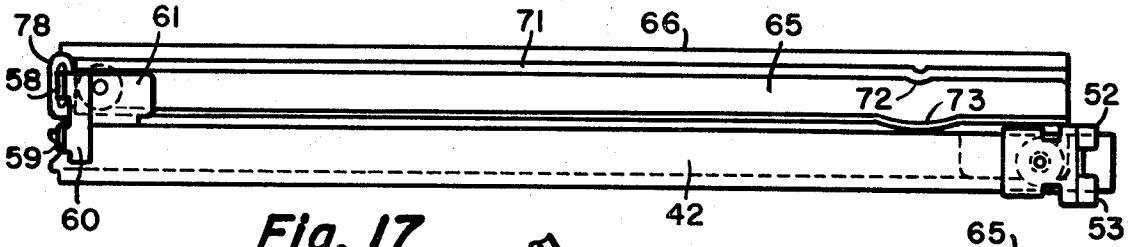


Fig. 17



Fig. 18

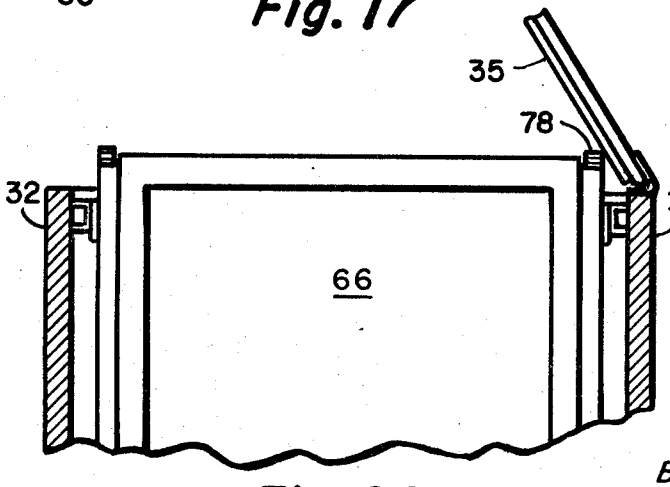


Fig. 20

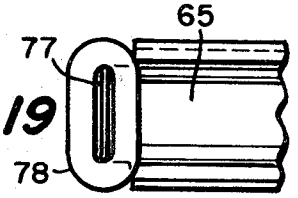


Fig. 19

INVENTOR
James B. Vogt
BY Glenn B. Gubbs
ATTORNEY

VERTICALLY-ADJUSTABLE DRAWER SUSPENSION

BACKGROUND OF THE INVENTION

Present trends in design of drawer cabinets are in the direction of replacement of the conventional drawers by drawers or movable trays that can be placed at selected levels according to convenience. This arrangement, of course, eliminates the usual cabinet structure with built-in frontal drawer openings in favor of a hinged or slideable door across the front of a cabinet space within which a vertical array of adjustable drawers is mounted. This design trend is notably present in such structures as kitchen cabinets, where cost is a very significant factor to be considered.

Vertical adjustability of shelves is a standard feature obtainable in book shelving by the use of apertured mounting strips installed vertically at the four corners of the shelves. Standard brackets are available with hooked tongues capable of slight downward movement after engagement with the apertures to lock the brackets against lateral withdrawal. It should also be noted that the design of drawer suspensions based upon telescoping rails provided with interengaged rollers is also a wellestablished art. It is the purpose of this invention to combine the feature of vertical adjustability with the track-type drawer suspension, using a structure that can be installed in low-to-moderate cost cabinets with a minimum of difficulty. The primary problem exists at the rear of the cabinet space, where the engagement of conventional vertically-adjustable shelving brackets would require the services of a contortionist. The features of the present invention make possible an installation feature that can be performed entirely from the front of the cabinet structure, through the usual opening through which the drawers extend and retract.

SUMMARY OF THE INVENTION

The present invention utilizes standard shelving mounting strips, preferably of the type which are generally "U"-shaped in cross-sectional configuration, with regularly-spaced elongated apertures along the central face of the channel. This channel configuration provides a space within the mounting strip for receiving the end of a tongue associated with the brackets that support the drawer-suspension tracks or rails. In the usual arrangement, screw holes are provided in the mounting strips in addition to the apertures, so that the installation of the strips in the cabinet structure can be accomplished merely through the application of standard wood screws.

The rear supporting brackets are preferably assembled to the drawer-suspension track rails, so that the rail may be used as a tool in the engagement of the rear bracket with the mounting strip. The placement of the mounting strip, and the angular configuration of the bracket tongue, are selected to provide a direction of engagement with the mounting strip which is other than tangential with respect to the mounting strip on the same side of the drawer adjacent the frontal opening. This is another way of saying that the rear bracket is not free to swing out of engagement with the rear mounting strip, utilizing the front mounting engagement as a pivot on a vertical axis. To provide a degree of depth of adjustability it is preferable that either the front or the rear bracket be given at least a limited slideable engagement with respect to the rail, so that the engagement of the rear bracket can be followed by sliding displacement of the rail with respect to the bracket to a degree exactly appropriate for the engagement of the front bracket tongues, which have a hooked configuration similar to standard shelf supports. Where this slideable adjustability is provided, the direction of engagement and disengagement of the rear bracket tongues with the rear mounting strips should also be other than radial with respect to the front mounting strip, so that the freedom of sliding movement of the bracket along the rail cannot result in a slip-out of the rear tongues in a direction toward the front mounting strip after installation has been completed.

It is preferable that the angular position of the rear bracket tongues be such that they are engageable with the installed rear mounting strip only when the bracket is in a position established by shifting the front of the rail toward the center plane of the cabinet space from its finally installed position. This angular displacement is also preferably established in a degree such that the return of the rail to the front-rear position after engagement of the rear bracket tongues will establish a wedging or clamping action of the tongues within the mounting strip apertures which, though small in intensity, will effectively remove any looseness or clattering sound as the drawer is extended and retracted. It should also be noted that the rear bracket tongues should substantially fully occupy the apertures in the rear mounting strip vertically, so that the shifting of the center of gravity of the drawer as the drawer is extended will not move the rear bracket tongues vertically to cause a tipping action of the drawer, and create a feeling of looseness associated with low-quality structure.

Since this type of drawer installation can easily do away with the conventional front drawer flange that functions as a stop to the inward movement of the drawer, a stop system built into the drawer suspension is incorporated in a structure embodying the preferred form of the present invention. A very inexpensive arrangement for providing this feature involves the use of a flange turned up from the material of the otherwise conventional drawer suspension rail, in a position for interengagement with one of the roller guides at the front of the installation. The flange is preferably surrounded by a resilient member that requires some degree of distortion to slip it into engagement with the flange.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a typical kitchen cabinet structure, showing a group of vertically-adjustable drawer trays in the retracted position, with the door covering the frontal opening of the cabinet swung open.

FIG. 2 is a perspective view of the kitchen cabinet shown in FIG. 1, with the drawer trays removed to expose the normally fixed suspension rails or tracks.

FIG. 3 is a side view on an enlarged scale over that of FIGS. 1 and 2, showing one of the normally fixed suspension rails in engagement with the front and rear mounting strips.

FIG. 4 is a sectional view of the left wall of the cabinet, as shown in FIG. 1, showing the installation of the structure illustrated in FIG. 3.

FIG. 5 is a view showing an intermediate position in the installation of the normally fixed rail, with the rail swung laterally so that the front end is displaced toward the center of the cabinet space.

FIG. 6 is a fragmentary view on an enlarged scale over that of FIG. 3, showing the front section of the normally fixed rail assembly.

FIG. 7 is a view similar to FIG. 6, but showing the rear section of the normally fixed rail, and the bracket associated with it.

FIG. 8 is a top view in projection with FIG. 6.

FIG. 9 is a top view in projection with FIG. 7.

FIG. 10 is a view of the outside of the rear portion of the normally fixed rail, including the adjustable rear bracket.

FIG. 11 is a view of the outside of the front section of the normally fixed rail, showing the front bracket.

FIG. 12 is a front end view, with respect to FIG. 11.

FIG. 13 is similar to FIG. 10, but shows a different relative position of the rear bracket and the fixed rail, to illustrate the adjustability.

FIG. 14 is a rear end view with respect to FIGS. 10 and 13.

FIG. 15 is a top view of a drawer tray, with the tray secured to the movable suspension rails, the left side of the view corresponding to the front of the cabinet.

FIG. 16 is a side elevation of the drawer tray shown on FIG. 15, and its associated movable support rail.

FIG. 17 illustrates the complete suspension assembly at the side of the drawer tray, disengaged from the cabinet mounting strips.

FIG. 18 is a top view of the stop abutment associated with the outer end of the movabie support rail.

FIG. 19 is a side elevation with respect to FIG. 18.

FIG. 20 is a section in plan at the frontal portion of the cabinet, showing the functioning of the abutments of FIGS. 18 and 19 as a protective device for a resilient engagement with a cabinet door with a drawer extended somewhat from the fully-retracted position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The cabinet structure shown on FIGS. 1 and 2 has a top 30, sides 31 and 32, and a bottom 33. These panel-type components define a front opening 34 normally covered by a door 35 hinged to the cabinet structure at the front of the side 31. A vertical array of drawer trays 36-41 is mounted within the cabinet on four apertured mounting strips, each positioned at a point adjacent the four vertical corners of the space within the cabinet. Each of the drawer trays has a suspension system separately engageable with these mounting strips, so that the vertical position of the drawer trays can be selected according to convenience, and subsequently altered when it becomes desirable to do so.

The components of the suspension mechanism at the opposite sides of each of the drawers is the same, except for a right-left relationship. Referring to FIGS. 3 and 4, the normally fixed rail 42 is channel-shaped in configuration, having the upper and lower flanges 43 and 44, respectively, facing inwardly toward the center plane of the space within the cabinet covered by the door 35. The rear bracket 45 supports that portion of the normally fixed rail 42 through engagement with the apertured mounting strip 46, which is normally secured to the cabinet structure by conventional wood screws. The front bracket assembly 47 similarly engages the front mounting strip 48 installed at the side of the front opening of the cabinet structure. In the particular cabinet structure illustrated in the drawings, an optional rear panel 49 is used to define the rear of the cabinet space, but some conventional cabinet structures will utilize an existing wall for this purpose. The lower front portion of the cabinet is frequently off-set as shown at 50 for broom clearance, but this arrangement has no relationship with the present invention.

The rear mounting strip 46 is "U"-shaped in configuration, commonly referred to as a "channel." The central portion of this channel has regularly-spaced apertures as shown at 51 in FIG. 3. The rear bracket 45 is provided with the tongues 52 and 53 which are spaced to engage an adjacent pair of the apertures 51, and dimensioned to slip easily into these apertures, but substantially fill them vertically. Load is transferred from the fixed rail 42 over to the supporting strips through the tongues 52 and 53, as a result of the embracement of the rail 42 by the flanges 54 and 55 of the bracket 45. The flanges are preferably held in engagement with the bracket by the rivet 56, which traverses the slot 57 in the bracket to provide a degree of limited freedom of movement of the bracket with respect to the rail to provide a telescoping adjustability.

The tongues 52 and 53 are preferably inclined with respect to the rail 42, as shown in FIGS. 4 and 5. This angular relationship is selected to render the tongues 52 and 53 engageable with the apertures 51 with the bracket in an angular position corresponding to that shown in FIG. 5. The engagement of the tongues 52 and 53 can be established by placing the rail in this angular position, followed by an appropriate movement in a front-rear direction such that the tongues 52 and 53 engage the apertures 51. Following this engagement, the angular swinging of the rail 42 in a clockwise direction, as shown in FIG. 5, will result in establishing a position in which the tongues 52 and 53 cannot be withdrawn from the apertures. The incline is also preferably selected such that the swinging of the rail 42 from the FIG. 5 to the FIG. 4 position will establish a degree of wedging, or clamping, action with respect to the rear mounting strip 46.

After the engagement of the tongues 52 and 53 have been completed, and the rail 42 swung toward the FIG. 4 position, the offset, or hook-shaped, tongues 58 and 59 of the front bracket structure are engaged with the front mounting strip 48. The tongues 58 and 59 have a vertical dimension such that they will just be admitted to the apertures 60, which are preferably of the same size and shape as that of the apertures 51 (so that the mounting strips are interchangeable), with the width dimension (as viewed in FIG. 12) established such that the tongues can enter into the mounting strips far enough to permit a downward movement to hook the tongues into position and prevent lateral disengagement. The final downward movement to the limit permitted by the offset of the tongues 58 and 59 is established such that the fixed rail is in approximately horizontal position. When the unit is installed to this

point, it is completely locked against any lateral displacement in any direction.

The front bracket structure preferably includes not only the portion **60** containing the tongues **58** and **59**, but also the roller mount **61**. This portion of the bracket structure has a flange **62** preferably spot-welded to the flange **43** of the rail **42**, and the portion **60** of this bracket structure is preferably spot-welded both to the rail **42** and to the roller-supporting portion **61**. A stub shaft **63** is secured to the portion **61** of the bracket, and carries the roller **64**.

A moveable rail **65** is normally secured to the drawer indicated at **66** by screws indicated at **67–70**. This rail is also channel-shaped in configuration, and dimensioned to receive the roller **64**. The moving rail on one side of the drawer structure is preferably provided with a retaining flange as shown at **71** which retains the associated roller **64**. This arrangement is standard construction, and forms no part of the present invention. The discontinuity in the upper flange of the rail **65**, indicated at **72**, is also conventional, and is provided as a stop limiting the outward movement of the drawer. Removal of the drawer is accomplished by an upward tilt of the outer portion of the drawer, so that the associated roller **64** can move over the abutment **72**, as a result of the clearance offset **73** in the lower flange of the rail **65**. This arrangement is also conventional. A standard bracket **74** is preferably spot-welded to the lower flange of the rail **65**, and supports the stub shaft **75** carrying the roller **76**, which is normally carried between the flanges **43** and **44** of the fixed rails **42**.

The retracting movement of the door is limited by the presence of an abutment assembly, which includes the front flange **77** on the rail **65**, with the flange **77** being surrounded by the resilient rubber-like bumper **78**. This structure is positioned to intersect the roller **64** on closure of a drawer. It has the additional effect shown in FIG. **20**, as the door **35** can close against this cushion member, if a drawer is inadvertently left partially extended. The member **78** is preferably a short section of initially round tubular material necessarily distorted to slip over the flange **77**. This arrangement can be improved in its effect by permitting the rear side of the member **78** to bow out to the rear, and this increase its cushioning ability.

I claim:

1. In combination with a cabinet structure, a vertically adjustable suspension system for drawers and trays including apertured mounting strips formed to define a space within said mounting strip at least on installation thereof, and secured in vertical positions adjacent the front and rear of a cabinet structure on opposite sides of space extending to the rear of a front opening in said structure, said system also including opposite and normally fixed side rails each provided with front and rear brackets engageable respectively with the apertured strips on one side of said front opening, and a moveable supporting rail adjacent each of said normally fixed rails, said fixed rails each having guide means at the outer portion thereof normally interengaged with the adjacent moveable rail, and said moveable rail having guide means at the inner portion thereof normally interengaged with the adjacent fixed rail, wherein the improvement comprises:

tongue means on the said rear brackets, said tongue means having a relationship with respect to said rear mounting strips selected to render said tongue means engageable and disengageable with apertures in said rear mounting strips in a selected substantially horizontal direction other than tangential with respect to the axis of said front mounting strips, and

tongue means on the said brackets adjacent the front of said fixed rails, said latter tongue means having an offset configuration selected to render said latter tongue means engageable with apertures in said front mounting strips and moveable downwardly after engagement to cause said offset configuration to lock said brackets against lateral withdrawal from said mounting strips, the engagement of said latter tongue means (with said brackets assembled to said normally fixed rails) preventing disengagement of said tongue means on said rear brackets, said rear mounting strips having side-opening apertures, and said rear bracket tongue means being engagable therewith exclusively in a first position angularly displaced about a vertical axis from the second position corresponding to the installed position of the fixed rail associated therewith determined by the engagement of said tongue means adjacent the front of said fixed rail.

2. A system as defined in claim **1**, wherein said first position corresponds to rotation of said rear brackets from said first position toward the center plane of said space extending to the rear from said front opening, and about the axis of said rear mounting strips, respectively.

3. A system as defined in claim **2**, wherein said rear bracket tongue means is inclined with respect to the fixed rail associated therewith to a degree to establish a wedging action as said rear bracket tongue means is inserted in said mounting strip aperture, and said normally fixed rail is placed in operating position, said rear bracket being angularly fixed with respect to said normally fixed rail associated therewith.

4. A system as defined in claim **1**, wherein at least one of said brackets are slideably mounted on said normally fixed rail.

5. A system as defined in claim **4**, wherein said selected direction is, additionally, other than radial with respect to the axis of said front mounting strips.

6. In combination with a cabinet structure, a vertically adjustable suspension system for drawers and trays including apertured mounting strips formed to define a space within said mounting strip at least on installation thereof, and secured in vertical positions adjacent the front and rear of a cabinet structure on opposite sides of a space extending to the rear of a front opening in said structure, said system also including opposite and normally fixed side rails each provided with front and rear brackets engageable respectively with the apertured strips on one side of said front opening, and a moveable supporting rail adjacent each of said normally fixed rails, said fixed rails each having guide means at the outer portion thereof normally interengaged with the adjacent moveable rail, and said moveable rail having guide means at the inner portion thereof normally interengaged with the adjacent fixed rail, wherein the improvement comprises: abutment

means on said moveable supporting rails adjacent the front extremity thereof and engageable with the said guide means of the adjacent fixed rail to determine the retracted position of said moveable rails.

7. A system as defined in claim 5, wherein said abutment includes a vertical lateral flange on said moveable supporting rails, and also includes a resilient tubular cushioning member surrounding said flange, and normally having the vertically central portion thereof spaced from said flange.

* * * * *