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3,544,186

STORAGE CABINET HAVING A READILY SLIDABLE AND REMOVABLE
TILTING-RESISTANT DRAWER ASSEMBLY

Filed April 22, 1968

3 Sheets-Sheet 1

Fig. 1

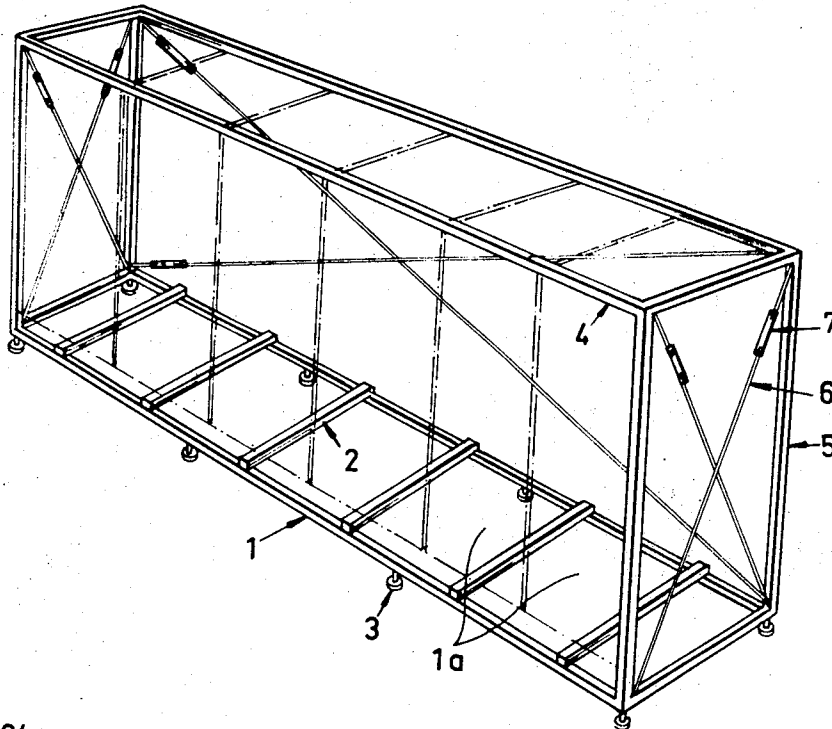
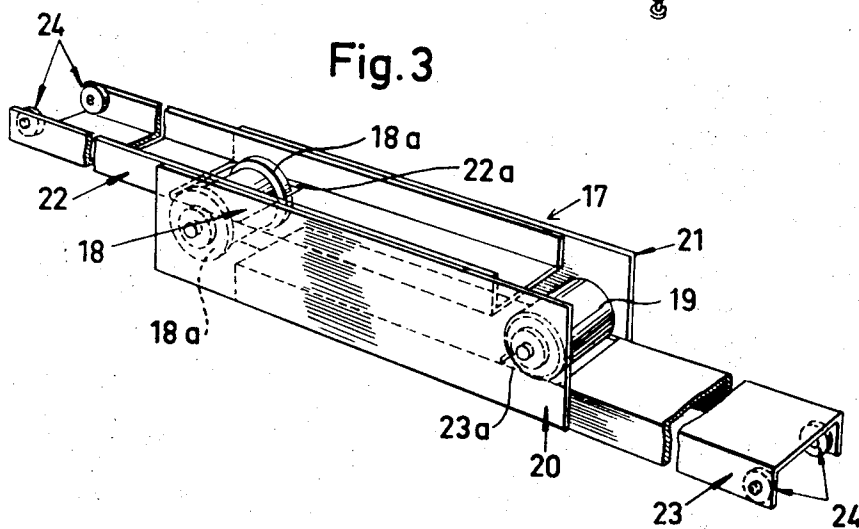


Fig. 3



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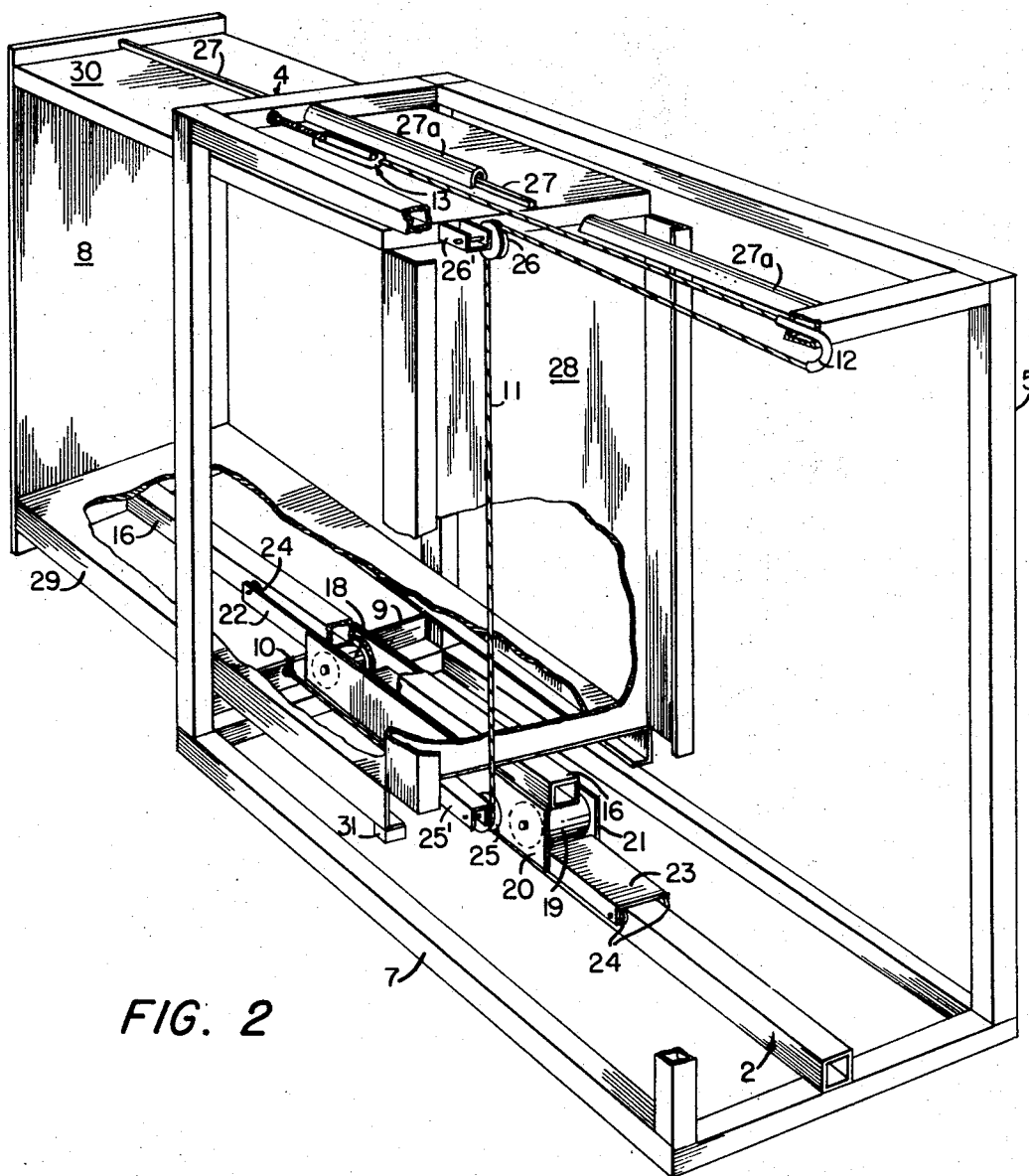
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Fig. 4

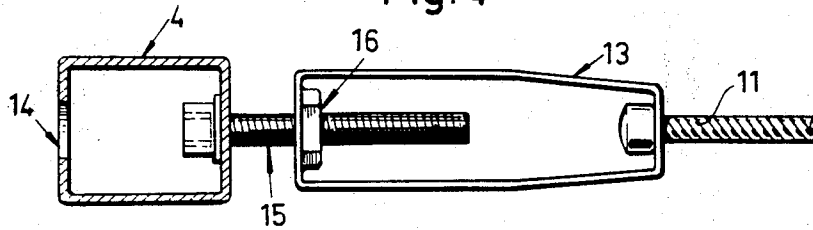


Fig. 5

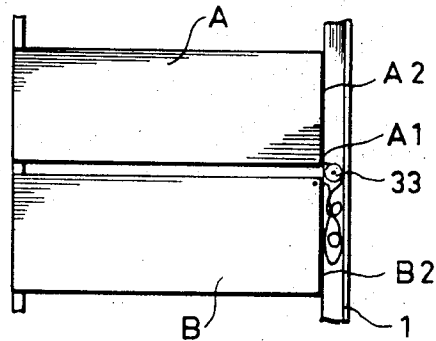
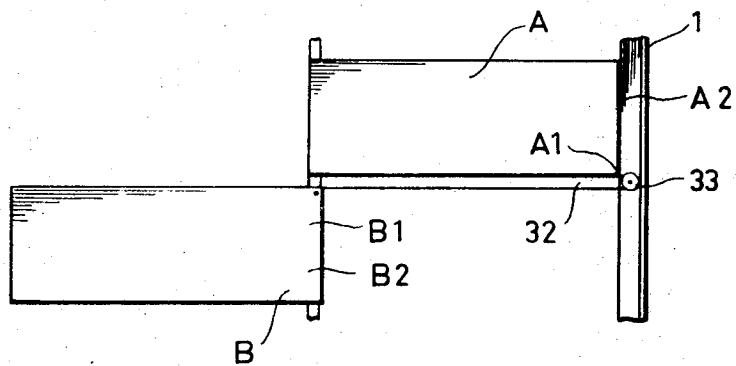


Fig. 6



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STORAGE CABINET HAVING A READILY SLIDABLE AND REMOVABLE TILTING-RESISTANT DRAWER ASSEMBLY

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14 Claims

ABSTRACT OF THE DISCLOSURE

A storage cabinet is provided having a readily slidable and removable tilting-resistant drawer assembly, the drawer sliding on a track, and riding along a relatively taut cable fixed at each end to the frame to inhibit tilting of the drawer when it is pulled out of the cabinet.

This invention relates to a storage cabinet having a readily slidable and removable tilting-resistant drawer assembly, and more particularly to a storage cabinet comprising a frame with at least one slidable drawer therein, a sliding track assembly for the drawer, and an anti-tilting cable assembly for the drawer.

Cabinets having sliding drawers such as filing cabinets are customarily provided with tracks at each side of the cabinet, in which each drawer slides on rollers. If the drawer is not very deep, nor too heavy, such an arrangement is eminently satisfactory. If, however, a rather high drawer is provided, for instance, the full height of a filing cabinet of conventional size, or of a large cupboard of the order of five to six feet high, it is not practical to mount the drawer in this way. A full drawer of such dimensions can be very heavy, indeed, and in addition, the great depth or height of the drawer makes it easy for the drawer to jam in the track. While a plurality of sliding tracks at several levels can be arranged along the sides of the drawer for better support, it becomes extremely critical to arrange these in exactly parallel positions, and such a construction is not readily adapted for mass production.

Recently, a different type of suspension for filing drawers has been provided. Two rollers are placed at the rear of both sides of the drawer, and arranged to run on a cable, the rear end of which is attached to the cabinet at the rear top of the drawer, and the front end of which is attached to the cabinet at the front bottom of the drawer. Since the rollers ride on the cable, the cable serves as the suspension for the drawer. This type of suspension is not practical for large heavy drawers, either, because of the strain imposed on the cable, particularly when the drawer is in a fully withdrawn position. Moreover, in order to support the weight of the drawer, reinforcement of the cabinet at the points of attachment of the cable is necessary, in order to prevent buckling.

In Swedish Pat. No. 207,665, published Sept. 27, 1966, a support mechanism is provided in which the drawer rides on a roller which extends crosswise of the base of the drawer, and has ribbed edges which match a ribbed track on the cabinet frame, on which it runs. A cable attached to the cabinet encircles the roller and the drawer and is attached at one end to the bottom front of the cabinet frame, and at its other end to the top of the cabinet frame. As the drawer is withdrawn, the roller moves with the drawer along the track, and the cable is moved with the drawer, running on a pulley attached at the top of the drawer as it does so, so as to prevent the drawer from tipping forward. This arrangement is suitable for preventing tilting of the drawer, and for support-

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ing a large-size heavy drawer, but it is not adaptable to ready removal of the drawer from the cabinet, which is sometimes required. It is frequently useful to be able to remove the drawer from the cabinet, and roll it to another position, for delivery of the material stored in the drawer, as, for instance, in hospitals, warehouses, stores and offices and the like. Such removal also gives access to the interior of the cabinet, for cleaning and servicing.

In accordance with the invention, a storage cabinet is provided having a readily slidable and removable tilting-resistant drawer assembly, comprising, in combination, a storage cabinet frame; at least one drawer mounted slidably therein; a sliding track assembly for the drawer, including rail and track guide means, of which one of the rail and track is attached to the drawer, and another is attached to the cabinet frame, and rollers interposed between rail and track for sliding movement of the drawer relative to the frame; and an anti-tilting assembly for the drawer including a line normally held in a relatively taut position, and fixed at each end to opposite sides of the frame, extending generally in a direction from one end of the frame to the other end of the frame, along the top or bottom thereof and/or along the sides, depending on the position of the drawer, and at least one pulley attached to the drawer at an inner end of the drawer, and arranged to ride on the line as the drawer is slid on the track in or out of the cabinet. The pulley is so positioned on the drawer as to inhibit tilting of the drawer as it is pulled out of the cabinet, due to the restraining action of the line on the pulley, and the pulley is also readily slipped off the line, to release the drawer and permit its removal from the cabinet.

In a preferred embodiment, the drawer is provided with two pulleys, one at the back top and one at the back bottom of the drawer, and the sliding track assembly comprises a first rail attached to the drawer bottom, a first track in which the rail runs, a second rail attached to the bottom of the cabinet frame, and a second track in which the rail runs, rollers interposed between the first and second tracks and the first and second rails, and a track frame supporting each track in a spaced position and movable with the track relative to the two rails. The anti-tilting assembly also includes preferably a tensioning means to adjust the tautness of the line.

The drawings illustrate preferred embodiments of the invention:

FIG. 1 is a perspective view of a cabinet frame in accordance with the invention, the drawer being shown in dashed lines;

FIG. 2 is a perspective view of a sliding drawer in accordance with the invention, partly in section, together with associated parts of the cabinet frame;

FIG. 3 is a perspective view, on an enlarged scale, of the sliding track assembly shown in FIG. 2;

FIG. 4 is an enlarged side view, partly in section, showing the tensioning means for adjusting the tautness of the line in the assembly of FIG. 2;

FIG. 5 is a side view of another storage cabinet in accordance with the invention, having a plurality of drawers, in which the drawers are connected so as to prevent more than one drawer from being pulled out at a time, and showing the two drawers in a closed position;

FIG. 6 is another view of the embodiment of FIG. 5, showing one of the drawers in a withdrawn position.

The storage cabinet frame shown in FIG. 1 comprises a bottom frame support 1, which is of a square beam construction of heavy gauge metal, such as steel, and is provided with a plurality of drawer guide rails 2 made of heavy gauge metal, such as steel, and fitted crosswise in the frame and attached securely, such as by welding, to the frame support 1. There is one guide rail 2 for each sliding drawer to be fitted crosswise, longitudinally

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of the cabinet. A plurality of height-adjusting screws 3 are provided at the bottom of the frame beam 1, so that the frame can be made level on an uneven floor or other base. The adjusting screws are positioned along the frame so as to distribute the weight of the frame evenly on the floor or other support, to a plurality of locations.

Four square beam uprights 5 of sturdy metal, such as steel, are provided at each corner of the base frame 1, and these support a metal square beam top frame 4. The uprights 5 are braced by crosslines 6, which are suitably steel multistrand cables, provided with rigging screws 7 or other tensioning means, for adjusting and taking up the forces acting on the frame, and preventing sagging. If desired, metal cross brace supports can be provided, instead of the cables 6. While the frame members 1, 4, 5 are preferably in the form of square beams, for greater strength, they can also be in the form of L-shape strips.

At the front of the bottom frame 1, between each rail 2, is a plurality of upstanding L-shaped supporting section bars or beams 9, best seen in FIG. 2. These serve as a support for one end of the sturdy multistrand steel anti-tilting cable 11, and for this purpose are provided with an attachment eye-lug 10, to which is firmly secured the looped end of cable 11. In place of a cable, rope, wire, chain, or other flexible line connection can be used. The line must have a tensile or breaking strength sufficient to support the weight of the drawer in a tilted position, when filled. There is one cable 11 for each drawer.

At the upper rear end of the frame, on the beam 4, is provided a U-shaped tubular conduit 12, through which the cable 11 passes to the tensioning device 13. The tensioning device in turn is fixed to the forward upper frame beam 4. Thus, the cable 11 runs all around the bottom rear and top of the drawer, and describes a U-path around the frame from the front lower end to the front upper end.

The tensioning device 13 as is best seen in FIG. 4 is in the form of a stirrup. The cable 11 terminates in a T that is fixed on the inside of one end of the stirrup 13. The other end of stirrup 13 is provided with an aperture through which is passed a cap screw 15, on the inside stirrup end of which is threaded a nut 16. The cap end of the screw 15 is inserted in a hole in the upper frame beam 4, and the cap holds the screw in position in the frame. Access to the cap end of the screw is provided through the hole 14, and the screw can be turned by means of a screw driver or like tool inserted in the hole 14. It will be evident that if the stirrup 13 is drawn towards the frame by adjustment of the screw on the bolt 16, the cable 11 can be made taut, while if the screw is turned in the opposite direction, the cable 11 can be made slack.

At the center rear of the drawer, both at the top and at the bottom, are positioned a pair of pulleys 25 and 26. The cable 11 passes over the outside of the pulley 25, and over the inside of the pulley 26, immediately adjacent the conduit 12, so that the path of the cable is in an S-shape over the pulleys. This serves two purposes: it restrains the drawer against an upward tilt at the rear, and it also facilitates withdrawing the cable 11 from the groove of the pulley, when the drawer is tilted downwardly at the rear.

The drawer shown in FIG. 2 comprises a bottom 29, a top 30, a front wall 8, and a back wall 28. The front wall, which is on the outside of the cabinet, can be of decorative wood, or of a metal construction. The remaining drawer parts can be of wood or metal, as desired. Plastics can also be used. A U-beam 26' attached to the top 30 serves as the support for the pulley 26. The U-beam 25' fixed to the bottom 29 serves as the support for the pulley 25. Extending between the back and front walls of the drawer there

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can be provided a plurality of racks, shelves, or bins, mounted horizontally, one above the other. These shelves are not shown on the drawing, because to show them would obscure the representation of the essential mechanism. The shelves, bins or racks are suitably arranged so as to be accessible from both sides of the drawer, when the drawer is pulled out from the cabinet, but they can be closed on one side, if desired. If needed, bracing supports can be arranged on one side or the other side of the drawer. If desired one or both of said sides can also be covered, with curtains, doors, or the like, so as to protect the material stored in the drawers.

At the top side of the top 30 of the drawer, arranged longitudinally of the drawer, and crosswise of the frame, is an upstanding flange 27, which runs in a matching U-guide 27a attached to the frame. This serves as a guide for the top of the drawer. To the underside of the bottom 29 of the drawer is attached a guide rail 16, which is a part of the rail and track assembly. At its rear lower edge, the bottom of the drawer is provided with a stop 31, which is positioned so as to engage the crossbar 9 when the drawer is pulled out, and thus prevent the drawer from leaving the frame completely. However, if the drawer is lifted slightly at the back, the stop 31 will clear the bar 9, and thereby permit the drawer to be withdrawn entirely from the cabinet. At the same time, the cable 11 can be slipped out from the groove of pulley 26, and when the drawer is put horizontal again, the cable will then slip out of pulley 25. The drawer is then free, and can be withdrawn entirely from the cabinet.

The sliding track assembly and support 17 for the drawer is best seen in FIG. 3, while the attachment of the various parts with respect to the drawer and the cabinet is best shown in FIG. 2. The assembly is not attached either to the drawer or to the cabinet frame, and is free to move with respect to both. The assembly comprises an upper U-shaped track 22, which encircles the upper rail 16 on three sides, and is provided at the front end with two bushings 24, along which the rail 16 runs. A lower track 23, also in a U-shape, encloses the lower rail 2 on three sides. At the rear end of the track 23 are provided two bushings 24 which slide along and guide the track on the rail 2. Intermediate these are two additional rollers 18 and 19, which are mounted between plates 20 and 21. These plates connect and support the two tracks 22 and 23. The roller 18 has a central recessed portion or groove, and is positioned beyond the end of the lower track 23 approximately in the center of the assembly and extends through an opening 22a in the upper track 22, whence it can contact rails 16 and 2. The flanges 18a of the roller 18 serve as a guide for rails 16 and 2. The second roller 19 is spaced behind the roller 18 in the frame, at a distance approximately equal to one-quarter of the length of the drawer, and fits in the opening 23a of the lower track 23, so that it also contacts rails 16 and 2. The result is that the entire assembly 17 runs via track 23 on rollers 18 and 19, on rail 2 and the drawer runs via rail 16 in track 22 on rollers 18 and 19. There is no need to provide flanges on the roller 19 because the other guides maintain the assembly in position on the rail 2. In fact, the absence of flanges avoids binding of the assembly on the rail 2.

When track 23 of the assembly 17 is placed on the rail 2, and the drawer is fitted within track 22 on the rail 16, the drawer rests on the flanged roller 18 positioned in the center of the assembly, while the rear roller 19 prevents the drawer from tipping backwards, should the drawer be back-heavy. The assembly 17 supports the entire weight of the drawer, while at the same time making the drawer slidable in and out of the cabinet, guiding it laterally during the sliding thereof, and also preventing the drawer from tipping backwards. Of course, if the drawer is not back-heavy, then the roller 19 can be omitted.

Removal of the drawer from the cabinet is easily ac-

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complished, by moving the drawer out as far as possible from the cabinet, and then tilting the back of the drawer upwardly so that the stop 31 slips over the beam 9. Then, while the cabinet is tipped down at the rear, the cable 11 is slipped off the pulley 26. All of this can be done from outside the cabinet. After the cable has been released, the drawer can be restored to a horizontal position and fully withdrawn from the cabinet.

The drawer can be fitted into the cabinet from the outside just as easily. The drawer is placed in front of the frame, and the cable 11 is placed behind and over the roller 26, after which the lower track 23 of the sliding track assembly 17 is mounted on the rail 2 of the frame, so far forward that the assembly can be engaged from the front. The drawer is then lifted up and the sliding track assembly 17 drawn forward so that the roller 18 comes into contact with the beam 9, after which the rear lower edge of the drawer is inserted in the frame so that the stop 31 is positioned behind the beam 9. In this position, the tensioned cable 11 automatically passes under and in front of the pulley 25, and the rear portion of the drawer rail 16 is caused to rest on the roller 18. The drawer can now be rolled easily all the way back into the frame. The cable 11 is held taut, with the forward portion of the pulley 26 pressing against the cable 11, and also the rear portion of the pulley 25 pressing against the cable. When the drawer is moved out from the cabinet, the pulleys 25, 26 travel along the cable 11, which is still held taut. Thus, in every position of the drawer within the cabinet, the rear portion of the cable 11 is taut between the connections with the attachment points 10 and 13, and the taut cable restrains the drawer from tipping up at the rear, which of course prevents it from tipping downward at the front.

It will be evident that the particular line or course followed by the cable within the cabinet is in no way critical, and can be varied as desired. All that is necessary is that the cable pass over a pulley attached to the drawer, and that the cable be taut, and fixed to a rear portion of the frame, so that any forces tending to tip the rear of the drawer upward as it is withdrawn are restrained by the cable.

In accordance with the invention, means is also provided to prevent the cabinet frame itself from tipping over. If this is to be accomplished, the center of gravity of the frame must be kept behind the front line of the frame, which, in effect means that at least half the drawers or half the weight of the drawers must be kept behind this line at all times. To achieve this, the invention provides means for controlling the number of drawers that can be withdrawn from the cabinet at any given time. The principle is illustrated in the case of a cabinet having two drawers, A and B, as shown in FIGS. 5 and 6. These drawers are capable of being withdrawn from the frame 1. A line 32 is fastened to the drawers A and B at the rear lower edge A1 and the rear upper edge B1, respectively, of the drawers. These rear edges lie adjacent to one another when the drawers are in the position shown in FIG. 5. The line 32 passes over a pulley 33. When one drawer, for example, drawer B, as shown in FIG. 6, is pulled out, the line 32 is put under tension, and restrains the second drawer A within the frame, so that it cannot be withdrawn. The attachment points of the line 32 are easily reached from outside the cabinet, beneath the withdrawn drawer, and can be unhooked from the point of attachment, when it is desired to remove the drawer from the frame. In this way, it is possible to provide a plurality of drawers, and the frame can be freely erected at any desired site, without the necessity of anchoring it to the floor or wall.

The storage cabinets of the invention are particularly adapted for use in locations where the storage area is to run from ceiling to floor, to provide a horizontally-extending array of vertically-disposed drawers, each of which extends from ceiling to floor. Withdrawal of a

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single vertical drawer gives access to a plurality of storage shelves, racks or bins. It is also possible to simply remove the drawers from the cabinet, and run them on wheels or rollers (affixed to the bottom thereof for this purpose) to any desired location, for delivery of the stored material. Such a system is particularly advantageous in hospitals, warehouses, retail stores, and the like. The normal appearance of the storage area is very neat, and quite uncluttered since only one drawer front is provided for each vertically-disposed drawer. If the fronts of the drawers are made of decorative wood, the array gives the effect of a panelled wall. The fronts can also be arranged in a coordinated and decorative pattern or design, in any desired material, for unique storage wall effects.

The interiors of the storage cabinets can be provided with ventilating means, such as fans, and vents, for circulating air or gases through the cabinets. In this way, the cabinets can be heated, or cooled. If attached to suitable refrigeration means, the cabinets can be used as refrigerators, or as freezers.

Having regard to the foregoing disclosure, the following is claimed as the inventive and patentable embodiments thereof:

1. A storage cabinet having a readily slidable and removable tilt-resistant drawer assembly, comprising, in combination, a storage cabinet frame; at least one drawer slidably mounted therein; a sliding track assembly for the drawer, including rail and track guide means, of which one rail or track is attached to the drawer, and one is attached to the cabinet frame, and rollers interposed between rail and track for easy sliding movement of the drawer relative to the frame; and an antitilting assembly for the drawer, including a relatively taut line fixed at each end to the frame at opposite sides thereof, and at least one pulley attached to the drawer at the inner end of the drawer and arranged to ride on the line as the drawer is slid on the track in or out of the cabinet, the pulley being so positioned on the drawer as to prevent tilting of the drawer as it is pulled out of the cabinet, due to restraining action of the line on the pulley, and being readily slipped off the line, to release the drawer and permit its removal from the cabinet.

2. A storage cabinet according to claim 1, wherein two pulleys are attached to the drawer, positioned at upper and lower rear portions respectively of the drawer.

3. A storage cabinet according to claim 1 wherein the pulley is so positioned that it is accessible from outside the cabinet, when the drawer is pulled out, so as to permit detachment of the line from the pulley from the outside.

4. A storage cabinet according to claim 1 wherein the line and pulley are arranged to prevent the drawer from tipping downward when the drawer is pulled out from the cabinet.

5. A storage cabinet according to claim 1 wherein the line is so attached to the frame as to extend generally in a line centrally of the cabinet from an upper end of the frame to the diagonally opposed lower end, and along the top or bottom thereof.

6. A storage cabinet according to claim 5 wherein the line is attached to the lower front central portion of the cabinet frame, and runs thence to an upper central rear portion of the cabinet frame, describing an S-course about a pulley attached to the drawer.

7. A storage cabinet according to claim 5 in which the ends of the cable are attached at the front bottom and front top central portions of the cabinet frame.

8. A storage cabinet according to claim 1 wherein the rail and track guide means is long enough to prevent the drawer from tipping backwards when the drawer is pushed all the way in the cabinet.

9. A storage cabinet according to claim 1 having a plurality of such drawers.

10. A storage cabinet according to claim 9, wherein the

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drawers are interconnected in pairs by a line attached to the rear portion thereof and extending over a pulley attached to the cabinet frame, the line having a length which is approximately equal to the length of travel of one drawer to prevent withdrawal of more than half the drawers at a time from the cabinet.

11. A storage cabinet according to claim 10 wherein the line is a cable.

12. A storage cabinet according to claim 1 wherein the sliding track assembly comprises a first rail attached to the bottom of the drawer, a first track in which the rail runs, a second rail attached to the bottom of the cabinet frame, and a second track in which that rail runs, a track frame supporting each track in a spaced position, and movable with the tracks relative to the rails, and rollers interposed between the first and second tracks and the first and second rails.

13. A storage cabinet according to claim 1 including tensioning means to adjust the tautness of the line.

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14. A storage cabinet according to claim 1 in which the line is a metal cable.

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