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SELF-CLOSING DRAWER SLIDE

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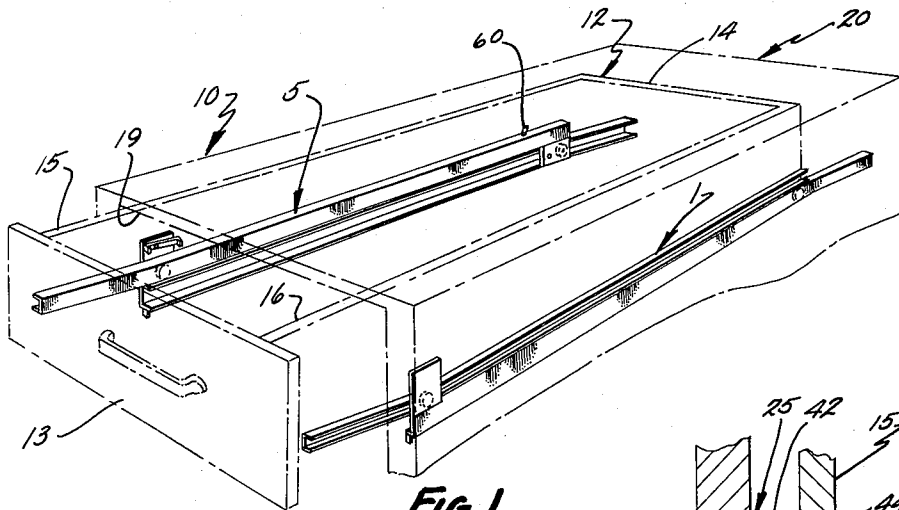


FIG. 1.

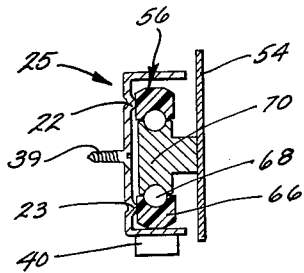


FIG. 5.

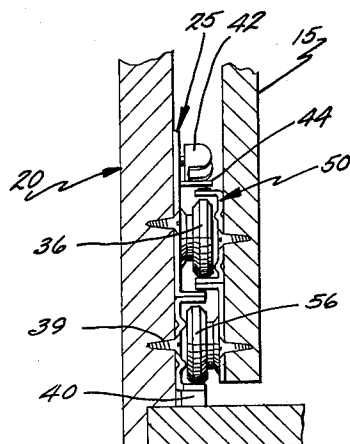


FIG. 4.

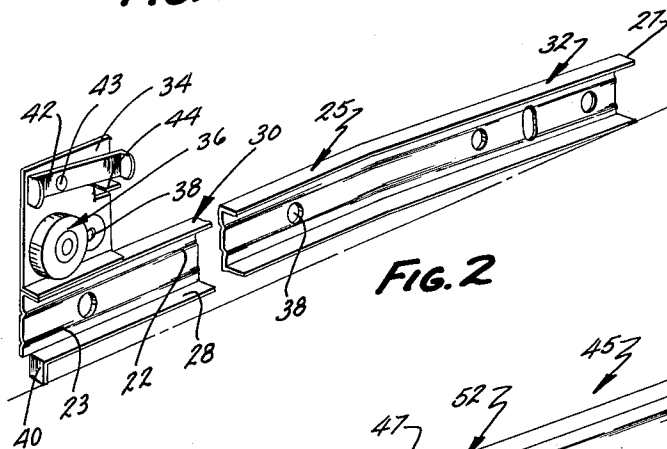


FIG. 2

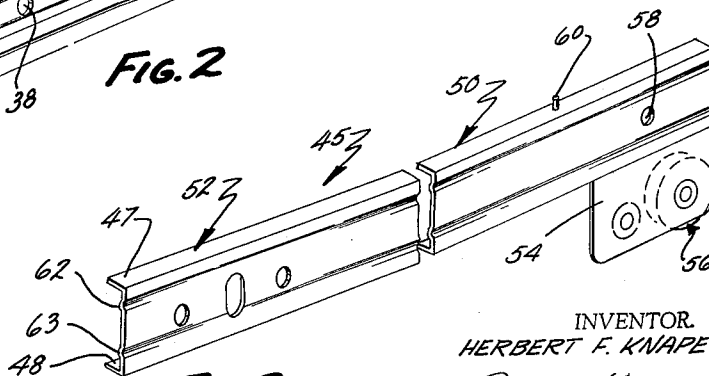


FIG. 3

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SELF-CLOSING DRAWER SLIDE

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6 Claims. (Cl. 312-333)

This invention relates to drawer slide mechanisms and more particularly to slide mechanisms for use in self-closing drawers.

Cabinets having drawers which close or tend to close themselves, and which also hold themselves in a closed position are by the present time well-known. Such cabinets generally utilize a sliding type of drawer mount mechanism which embodies over all or a portion of its operating length various structural expedients which produce a slight angle of declination. In devices of this type the weight of the drawer is carried by the sliding mount mechanism down this angle of declination, thus allowing the forces of gravity to draw the drawer into its closed position.

While the self-closing feature of these devices was itself successful, the actual manufacture of cabinets embodying this feature has always been hindered and retarded by the difficulty of properly indexing the sliding mount structure so that the desired angle of declination is obtained while the portions of each structure which are intended to be horizontal are truly so mounted. This placement of each of the mounts is absolutely essential, since if the horizontal portions are not accurately mounted, the drawer will in one case always roll open when unattended and at the same time be difficult to close; while in another case the drawer will always roll closed from any open position and be difficult to open. Again, if the mounting structures on opposite sides of a drawer are not mounted in the same horizontal plane the drawer will cock and operate poorly, and if such a pair of mounting structures are mounted in different planes altogether (i.e., mounted on angles which are not the same) the drawer will jam and be inoperative over at least a portion of its opening movement. Often the current mounting process involves the laborious and time-consuming task of making separate measurements for each individual mount structure as the same is installed in a given cabinet.

In accordance with the present invention, I provide a simple, inexpensive, but unique refinement, whereby drawer slides of the type indicated may be quickly and precisely indexed and mounted. I have reduced the chance of inadvertent error and consequent improper mounting to an absolute nullity, while speeding manufacture very considerably and producing corresponding reductions in costs.

I have provided further desirable advantages in this inventive drawer slide through the provision of mating track means for each side of a drawer, which rollably engage with each other by means of a unique roller assembly having a lubricous bearing surface which overlaps the interior of the bearing in such a manner as to preclude any metal-to-metal contact whatsoever. Also, I provide rail projections along the inner surface of my track means, against which ride the overlapping edges of the lubricous bearing surface, thus preventing the screws which retain the track means in their mounted position from ever making contact with the lubricous bearing surface, while simultaneously adding structural rigidity to the track means.

Further, I provide the desirable safety feature of a unique drawer stop latch means by which a drawer may unimpededly be inserted into the drawer opening, but which will automatically prevent the inadvertent total

withdrawal of the drawer which has led to accidental injury in the past by requiring a simple but deliberate manual operation before the drawer may be totally removed.

These objects and advantages of the present invention, as well as others, will become even more apparent upon reading the following specification, in conjunction with the accompanying drawings, wherein:

FIG. 1 is a perspective view showing the drawer slide structure of this invention in relation to a conventional drawer and a cabinet drawer opening, shown in phantom;

FIG. 2 is a perspective view of the fixed, or cabinet-mounted track means;

FIG. 3 is a perspective view of the movable, or drawer-mounted track means;

FIG. 4 is an enlarged elevational view, partially in cut-away, showing the two track means of the drawer slide structure mounted upon the drawer and the cabinet drawer opening of FIG. 1; and

FIG. 5 is an enlarged and detailed elevational view, partially in section, showing the unique roller and track wall configuration and the operating relationship of the same.

Basically, this invention relates to a self-closing drawer slide structure which is automatically indexed for mounting due to its very structure. The structure involved includes generally channel-shaped track means which attach to each side of a cabinet drawer opening (i.e., the fixed track means), and similarly shaped track means which attach to each side of a drawer (i.e., the movable track means). Each such track means has affixed to it a roller, such that on each side of the drawer the roller carried by one of the track means interfits with and runs upon the channel flanges of the other track means. A portion of each of the fixed track means at its end nearest the rear of the cabinet is formed downwardly from the main horizontal portion of the track, thus presenting an inclined surface having a small angle of declination. Similarly, each movable track means has a portion of the same length nearest the front of the drawer formed upwardly to present a surface inclined upwardly at the same angle.

The inclined surface on each such track means is encountered by the roller carried by the mating track means on each side of the drawer, over the final portion of their relative motion during the process of drawer closure. Thus, the final movement of the roller is "down hill," and the drawer is automatically drawn into the closed position by the force of gravity acting upon its weight.

Each of the fixed track means has, at its end which is to be positioned nearest the front of the cabinet, a portion of its lower flange sheared and formed into a unique, integral downwardly depending tab, which cooperates with the rest of the track to form a ready index means for use in quickly and accurately positioning the track preparatory to mounting it.

Further, each of the track means has a pair of transverse rail projections running the length of the track which project slightly inward and against which bears the side of the outer bearing surfaces of the rollers, which are uniquely formed so as to overlap and thereby protect the inner portions of the roller, the rail projections preventing injurious contact by mounting screws and the like with the bearing surface of the roller while serving also to additionally strengthen the rails.

Further still, unique drawer stop latch means are provided on each track means, which prevent accidental total withdrawal of the drawer by requiring a deliberate and intentional release before allowing the drawer to be fully extracted from the cabinet.

Referring now in more detail to the drawings, in FIG. 1 is shown the self-closing drawer slide assembly in a

typical environment, all designated generally as 10. The assembly 10 includes two slide units 1 and 5 respectively, a drawer 12 within the drawer opening 19 of a conventional cabinet member 20, the drawer having a front 13, rear 14, opposed sides 15 and 16, and a bottom 17. The slide units 1 and 5 which are positioned on opposite sides of the cabinet drawer opening are substantially mirror images of each other, and therefore only the structure 5 will be described in detail.

The slide unit 5 comprises a first fixed track means 25 (FIG. 2) and a second movable track means 45 (FIG. 3), each being preferably channel-shaped in cross section, as shown, having the generally parallel flanges 27, 28 (FIG. 2) and 47, 48 (FIG. 3), between which lie the inwardly-directed transverse rail projections 22 and 23 (FIG. 2) and 62 and 63 (FIG. 3), which preferably are formed by pressing grooved depressions into the outside surface of the track means, thus causing the formation on the inside surface of the ridge-like rail projections noted.

The fixed track means 25 has a substantially straight portion 30 which is mounted on a truly horizontal axis, and a portion 32 which is crimped or bent at a slight downward angle from the horizontal axis of the portion 30, thereby forming a downwardly inclined surface. The track means 25 carries an upstanding bracket 34, upon which is mounted a roller 36, which is preferably a ball bearing or like member, a drawer stop latch 42, a stop latch pivot 43, and a latch-positioning element 44.

A novel indexing tab 40 is located near the front of the track 25, and comprises generally a downwardly depending tab or projection which in the preferred embodiment shown may be sheared and formed from the lower flange 28. This indexing tab may, of course, assume any desired configuration, and may be positioned at any desired place along the underside of the flange 28. What is important in this regard is that the length of the tab 40 be such that it exactly compensate for the height given the horizontal main portion 30 of the track means 25 by the downwardly-declining portion 32 of this member. That is, when the lowermost tip of the portion 32 is placed upon the rearmost area of a horizontal surface (as illustrated by the plane shown in FIG. 2) within the cabinet drawer opening, and when then the indexing tab is lowered so as to make contact with another area of this same horizontal surface forward of the one mentioned previously, the portion 30 of the track means will automatically and necessarily occupy a horizontal plane, and may, as is subsequently described, easily be mounted in this plane by any worker, regardless of skill or aptness, without the need of using calipers, rule, level, scribe, or any other indexing or measuring tool or instrument.

Fixed tracks 25 are mounted on each of the two opposite sides of the cabinet drawer opening 19 as by the mounting screws 39, and each such track means is accordingly provided with a plurality of screw-receiving mounting apertures 38.

A movable track means 45 (FIG. 3) is mounted to each of the opposing sides (such as 15, FIG. 1) of the drawer 12, adjacent to and aligned with the fixed track means 25 just described. The movable track means 45 is of a construction comparable to the track means 25, and has a bracket means 54 which depends downwardly from the track and upon which is mounted a roller 56, the same being preferably a ball bearing of the same nature as the roller 36 of the track 25.

The unique preferred structure of these rollers is shown in detail in FIG. 5, where it may be seen that the sides of the outer bearing surface 66, which is preferably made of a strong, resilient, lubricous material such as nylon or the like, in their preferred form extend beyond and curve over the balls 68 and cone 70. This configuration prevents any protrusion which might appear on the inner surface of the mating track means, including the heads of the mounting screws 39, from snagging the

roller as it traverses the length of the track, while insuring smooth and silent operation by the absence of any metal-to metal contact between roller and track. The smoothness of operation of my inventive drawer slide is further enhanced by the presence of the transverse rail projections 22 and 23, against which bear the overlapping sides of the bearing surface 66. It will thus be seen that the relative movement of the two track means is completely cushioned by means of a resilient bearing surface having this configuration.

The track means 45 has an essentially linear portion 50 which when mounted lies in a level, substantially horizontal plane. The portion 52 of track means 45, which lies nearest the front of the drawer, is bent or crimped so as to form a surface inclined upwardly at a small angle from the horizontal plane occupied by the portion 50. Each of the movable track means 45 carries a small upstanding projection 60, which engages the forward end of the stop latch 42 (FIG. 2) when the drawer is withdrawn a predetermined amount, in a manner more fully explained hereinafter. Conventional attaching means such as the screws 39 (FIGS. 4 and 5) are used to securely mount both track means 25 and 45, by means of a desired number of screw-receiving mounting apertures 38 and 58 respectively, which are provided in the material forming the web of the channel-shaped tracks.

OPERATION

As best seen in FIGS. 1 and 4, a drawer 12 of a size receivable within a drawer opening 19 of a conventional cabinet 20 is mounted therein by means of two drawer slide units 1 and 5, one such unit being positioned at each side of the drawer. Each of the drawer slide units comprises two track members, one being mounted upon the side of the drawer, while the other is mounted to the side of the cabinet, within the drawer opening. The movable or drawer-mounted track means 45 (see FIG. 3) is mounted with its portion 50 in a level horizontal position, as by means of conventional screws or the like, which pass through the apertures 58 in the web of the channel-shaped track, and thereby secure the track to the side of the drawer.

The fixed or cabinet-mounted track 25 (see FIG. 2) is placed in the proper mounting position by first placing the lower corner of the inclined surface portion 32 into the lower rear corner of the drawer opening within the cabinet. With the outer or flat portion of the track means held firmly against the side of the drawer opening, the track means 25 is simply lowered until the indexing tab 40 rests against the bottom surface of the drawer opening adjacent the front of the cabinet. The indexing tab 40 is preferably substantially perpendicular to the portion 30 of the track means, and of a length equal to the height of the inclined surface 32 where it joins the portion 30. Thus, when in the position just described, the main portion 30 will occupy a true horizontal position. It is thus apparent that the indexing of the track means 25 for proper placement of attaching means such as the screws 39 through the apertures 38 into the side of the cabinet may be readily accomplished with one hand, leaving the other free for marking the exact position of the apertures 38 on the inside of the cabinet, drilling mounting holes, or actually fastening the screws or other attaching means to the cabinet.

When a movable track means such as 45 (FIG. 3) has been attached to each side of the drawer, and fixed track means such as 25 (FIG. 2) have been attached within the cabinet drawer opening in alignment with the movable track means, the drawer is ready for insertion into the drawer opening. The movable track means affixed to each side of the drawer are positioned such that their attached roller (such as 56) will be aligned with and will run between the two flanges of the fixed track means, while the roller carried by the fixed track means is similarly aligned with and will run between the two flanges of the movable track means, as best illustrated by FIG.

4. The rollers are thus inserted into their respective track means, and the drawer rollably received within the drawer opening.

Since the pivot 43 upon which the stop latch 42 is mounted is positioned above the level of the latch-positioning element 44 (FIG. 2), as the drawer is inserted and the projection 60 of the movable track 45 (FIG. 3) engages the stop latch 42, the latch is caused to be turned counterclockwise about the pivot 43 and so merely rises above the positioning element 44 until the projection 60 has passed beyond the latch. Should the drawer now be withdrawn, the projection 60 would engage the latch 42 from the right, tending to cause the latch to be turned clockwise, and forcing it against the positioning element 44. At this point the latch can move no more, and the drawer is consequently prevented from being further opened. In the event it is desired to completely withdraw the drawer, all that need be done is to manually depress the outward end of latch 42, thereby raising the inward end and allowing the projection 60 to pass unimpeded beneath the latch.

When from an open position the drawer is closed, the roller 56 will travel from left to right between the flanges 27 and 28 of the fixed track means 25 (see FIG. 2). Thus, as the drawer nears its closed position and the roller 56 consequently nears the rightward extremity of the track, the roller 56 will encounter the inclined portion 32, and the roller 36 will encounter the inclined portion 52 (FIG. 3). At this juncture, the motion of the rollers within their respective tracks begins to be downward upon an inclined plane, and therefore the mere weight of the drawer will effect the final closure of the drawer, and also will serve to keep the drawer closed until manually reopened. Thus, the drawer has automatically closed itself.

It should be pointed out that due to the true horizontal positioning of the track portions 30 and 50 made possible by the unique self-indexing means herein disclosed, when the drawer is in a position where the rollers have not yet encountered the inclined portions of the track means, the drawer will tend to neither open nor close itself, but will remain wherever it is placed, requiring a deliberate, finite increment of force to begin closure or to effect further opening.

From the above description it should be apparent that the unique self-indexing slide structure for self-closing drawers disclosed herein is simply and effectively constructed from a minimum number of component parts and with minimum expenditure of labor, which construction results in an economically designed competitive article of commerce. The manufacture of completed desks, cabinets, and similar articles having drawers which are self-closing and which hold themselves in the closed position has been very appreciably simplified by the present novel self-closing drawer slide mechanism which incorporates its own means for positioning and securing the track means in the proper mounting relationship, thereby making possible the realization of attendant economies which may be passed on to the final purchaser.

While a preferred embodiment of this invention has been described throughout, it should be understood that modifications and alterations may occur to those knowledgeable in the art upon reading this specification, and that such of these modifications and variations as incorporate the principles of this invention are to be considered as included in the below-appended claims, unless these claims by their language specifically state otherwise.

Accordingly, I claim:

1. A slide assembly for self-closing drawers, comprising: fixed track means adapted to be attached to the sides of a cabinet drawer opening having horizontal surface means in one plane; said fixed track means having downwardly sloping rear extremities; movable track means adapted to be attached to the sides of a drawer receivable within said drawer opening and having upwardly

sloping front extremities; means associated with said track means permitting the sliding interaction of one with another whereby said drawer may be withdrawn from said cabinet opening, said means co-acting with said sloping portions of said track means so as to allow the force of gravity to automatically draw the drawer into its fully closed position; indexing means projecting generally downwardly from the front end of said fixed track means to make contact with said surface means within said cabinet opening, and said fixed track rear extremities engaging said surface means, thereby positioning said track means in the correct mounting attitude relative to true horizontal without requiring the making of measurements or the use of other indexing equipment.

2. A slide assembly for self-closing drawers comprising: fixed track means having upper and lower flanges and adapted to be attached to the sides of a cabinet drawer opening having horizontally disposed surface means in one plane; movable track means having upper and lower flanges and adapted to be attached to the sides of a drawer receivable within said drawer opening; first rollers carried by said fixed track means and disposed so as to interfit with and ride between said movable track means flanges; second rollers carried by said movable track means and disposed so as to interfit with and ride between said fixed track means flanges, such disposition of said track means and rollers establishing a sliding interaction of one track means with the other whereby said drawer may be retracted from said opening; said fixed track means having their rearward extremities displaced at a slight downward angle from horizontal, and said movable track means having their forward extremities displaced at a slight upward angle from horizontal, thereby forming inclined surfaces upon which said first and second rollers may roll under the force of gravity thereby automatically effecting closure of said drawer; indexing means comprising a projection carried by said fixed track means and depending downwardly from the front end thereof to make contact with said horizontally disposed surface means within said cabinet opening, and said rear extremities also contacting said surface means, whereby the track means may be easily placed in the correct mounting position relative to true horizontal without the necessity of using other indexing equipment or of making any measurement.

3. The track means of claim 2, wherein said projection comprising said indexing means is an integral tab sheared from the lower flange of said fixed track means.

4. A slide assembly for self-closing drawer comprising: fixed track means having upper and lower flanges and adapted to be attached to the sides of a cabinet drawer opening having horizontally disposed surface means in one plane; movable track means having upper and lower flanges and adapted to be attached to the sides of a drawer receivable within said drawer opening; first rollers carried by said fixed track means and disposed so as to interfit with and ride between said movable track means flanges; second rollers carried by said movable track means and disposed so as to interfit with and ride between said fixed track means flanges, such disposition of said track means and rollers establishing a sliding interaction of one track means with the other whereby said drawer may be retracted from said opening; said fixed track means having their rearward extremities displaced at a slight downward angle from horizontal, and said movable track means having their forward extremities displaced at a slight upward angle from horizontal, thereby forming inclined surfaces upon which said first and second rollers may roll under the force of gravity thereby automatically effecting closure of said drawer; stop means mounted on each of the mating track means and including a stop latch mounted on one track means and a latch-engaging projection mounted on the other track means, said latch and said projection adapted to co-act so as to allow a drawer to be fully inserted

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within a cabinet drawer opening but to prevent said drawer from inadvertently being fully withdrawn from the opening; indexing means comprising a projection carried by said fixed track means and depending downwardly from the front end thereof to make contact with said horizontally disposed surface within said cabinet opening, and said rear extremities also contacting said surface means, whereby the track means may be easily placed in the correct mounting position relative to true horizontal without the necessity of using other indexing equipment or of making any measurement.

5. A slide assembly for self-closing drawers comprising: fixed track means having upper and lower flanges and adapted to be attached to the sides of a cabinet drawer opening having horizontally disposed surface means in one plane; at least one transverse rail projection formed on said fixed track means between said upper and lower flanges; movable track means having upper and lower flanges and adapted to be attached to the sides of a drawer receivably within said drawer opening; at least one transverse rail projection formed on said movable track means between said upper and lower flanges; first rollers carried by said fixed track means and disposed so as to interfit with and ride between said movable track means flanges while bearing against said movable track means rail projections; second rollers carried by said movable track means and disposed so as to interfit with and ride between said fixed track means flanges while bearing against said fixed track means rail projections; such disposition of said track means and rollers establishing a sliding interaction of one track means with the other whereby said drawer may be retracted from said opening; said fixed track means having their rearward extremities displaced at a slight downward angle from horizontal, and said movable track means having their forward extremities displaced at a slight upward angle from horizontal, thereby forming inclined surfaces upon which said first and second rollers may roll under the force of gravity thereby automatically effecting closure of said drawer; indexing means comprising a projection carried by said fixed track means and depending downwardly from the front end thereof to make contact with said horizontally disposed surface within said cabinet opening whereby the track means may be easily placed in the correct mounting position relative to true horizontal without the necessity of using other indexing equipment or of making any measurement.

6. A slide assembly for self-closing drawers comprising: fixed track means having upper and lower flanges and adapted to be attached to the sides of a cabinet

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drawer opening having horizontally disposed surface means in one plane; at least one transverse rail projection formed on said fixed track means between said upper and lower flanges; movable track means having upper and lower flanges and adapted to be attached to the sides of a drawer receivably within said drawer opening; at least one transverse rail projection formed on said movable track means between said upper and lower flanges; first rollers carried by said fixed track means and disposed so as to interfit with and ride between said movable track means flanges while bearing against said movable track means rail projections; second rollers carried by said movable track means and disposed so as to interfit with and ride between said fixed track means flanges while bearing against said fixed track means rail projections; such disposition of said track means and rollers establishing a sliding interaction of one track means with the other whereby said drawer may be retracted from said opening; said fixed track means having their rearward extremities displaced at a slight downward angle from horizontal, and said movable track means having their forward extremities displaced at a slight upward angle from horizontal, thereby forming inclined surfaces upon which said first and second rollers may roll under the force or gravity thereby automatically effecting closure of said drawer; stop means mounted on each of the mating track means and including a stop latch mounted on one track means and a latch-engaging projection mounted on the other track means, said latch and said projection adapted to co-act so as to allow a drawer to be fully inserted within a cabinet drawer opening but to prevent said drawer from inadvertently being fully withdrawn from the opening; indexing means comprising a projection carried by said fixed track means and depending downwardly from the front end thereof to make contact with said horizontally disposed surface within said cabinet opening whereby the track means may be easily placed in the correct mounting position relative to true horizontal without the necessity of using other indexing equipment or of making any measurement.

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