March 12, 1935. S. BRANTINGSON 1,994,424

ANTIFRICTION APPARATUS

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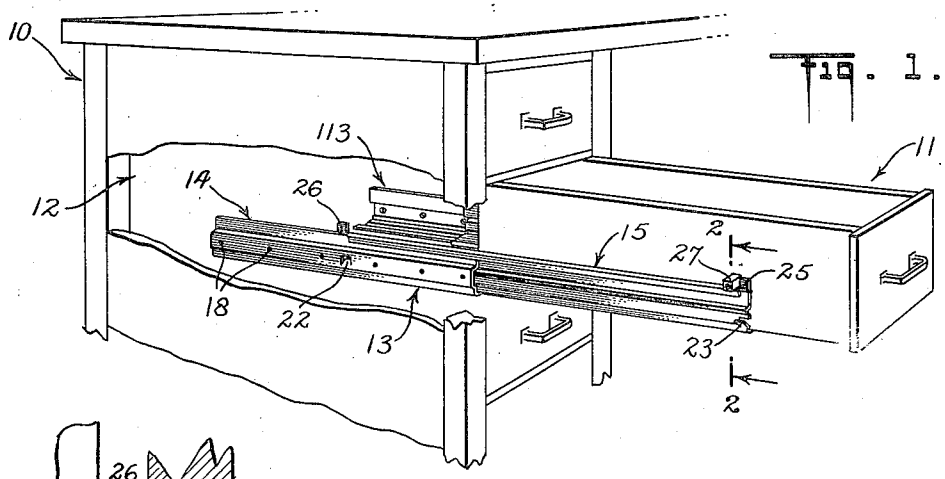


Fig. 1.

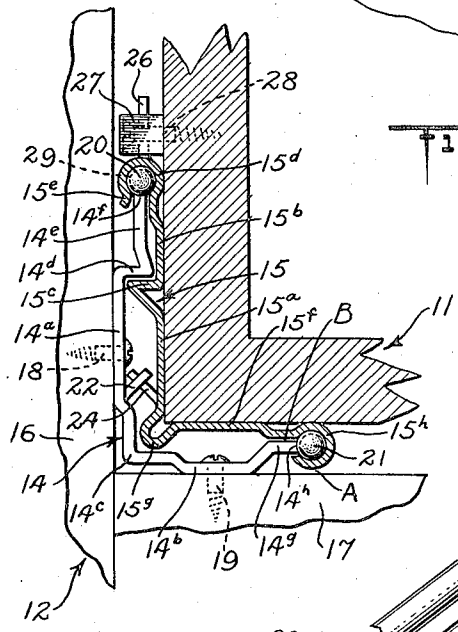


Fig. 2.

Fig. 3.

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ANTIFRICTION APPARATUS

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23 Claims. (Cl. 45—77)

This invention relates to anti-friction apparatus for a drawer or the like.

One of the objects of this invention is to provide anti-friction apparatus for a drawer or the like which may be economically manufactured with a minimum amount of labor. Another object is to provide apparatus of the above character which will be practical, simple and thoroughly durable. Another object is to provide apparatus of the above character which will act in a reenforcing capacity for the frame of a drawer or the like. Another object is to provide apparatus of the above character which, while supporting a drawer within its frame and allowing easy access thereto, prevents wear and tear of the individual parts. Another object is to provide apparatus of the above character which will support a drawer more firmly when it is in an extended or open position. Another object is to provide apparatus of the above character which may be easily installed in a standard construction without making any material changes thereto. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which is shown one of the various possible embodiments of my invention,

Figure 1 is a fragmentary perspective view of a desk or the like, certain of the parts thereof being broken away and having my anti-friction apparatus installed therein;

Figure 2 is a vertical sectional view taken along the line 2—2 of Figure 1, and

Figure 3 is a fragmentary perspective view of one of the units of my anti-friction apparatus ready for installation.

Similar reference characters refer to similar parts throughout the several views of the drawing.

As conducive to a clearer understanding of certain features of this invention it might here be pointed out that considerable difficulty has been experienced in constructing a drawer frame and drawer so proportioned to each other that the drawer is free to slide without being undesirably loose in the frame. Drawers of common construction are often built to fit snugly within the frame to present a neat appearance and, when so constructed, are often subject to jamming while opening. Some of the various sliding arrangements which have been associated with drawers in the past in an attempt to overcome some of the above-mentioned difficulties have been characterized by inferiority and complexity of construction, making for difficult installation and large expenditures without material improvement in result. One of the objects of this invention is to provide anti-friction apparatus for a drawer or the like which will overcome the above-mentioned difficulties as well as many others.

Referring now to the drawing in detail, there is shown in Figure 1 a desk or the like generally indicated at 10 having a drawer generally indicated at 11 slidably disposed within a frame generally indicated at 12. Drawer 11 is slidably supported within frame 12 by way of my anti-friction unit generally indicated at 13 and a unit 113 substantially similar in construction and positioned on the opposite side of the drawer, as viewed in Figure 1.

As is best shown in Figures 1 and 2, unit 13 includes two relatively slidable members generally indicated at 14 and 15, respectively, and which for convenience I shall term respectively the track member and the slide member or slide. Both are preferably made of sheet metal, track member 14 being preferably made of a somewhat heavier gage or thickness than the slide member 15 and, as will be later hereinafter made clear, both members are constructed so that they may be readily and inexpensively rolled or otherwise fabricated commercially. The two members will be seen in general to be of angular or right-angled cross-section, slide member 15 nesting within the angle of the track member 14.

Considering first now the detailed construction of the track member 14 and now referring to Figures 2 and 3, track member is shaped to provide a side portion 14^a and a bottom portion 14^b, these portions extending at right angles to each other and presenting substantial areas of contact with the inner face of the side portion 16 and the upper face of the bottom portion 17 of the frame 12, track member 14 thus nesting in the right angle between these frame members. Suitable screws 18—19 may be employed to secure the track member 14 to the frame, frame and track member mutually reinforcing each other.

The apex at which the portions 14^a and 14^b meet is preferably shaped or bent as is indicated in Figure 2 at 14^c, thus carrying the external angle inwardly and away from the extreme corner between the frame parts 15—16, thus avoiding the need of a close interfitting of the track member and frame at the extreme apexes thereof. Furthermore, in thus shaping the track

member as at 14^c, the track member is given additional longitudinally extending bends or angles and is thereby greatly strengthened and its rigidity increased.

Adjacent the upper part of the side portion 14^a, the sheet metal thereof is rolled or bent inwardly and toward the right as at 14^d, whence it is continued upwardly as at 14^e, the latter extending in substantial parallelism with the side portion 14^a. Thus, the portion 14^e is offset and is thereby spaced from the side wall part 16 of the frame, the portion 14^d, moreover, forming an overhanging ledge, a particular purpose of which will be pointed out hereinafter. In thus providing this ledge and offset, the sheet metal of the track member 14 is again given several bends or angles and thus again is thereby greatly strengthened and its rigidity increased. The upper edge 14^f, like the overhanging ledge 14^d, extends horizontally and is parallel to the bottom portion 14^b; it serves as is pointed out hereinafter, as a trackway or raceway for coaction with the slide member 15.

The right-hand end portion of the bottom portion 14^b is rolled or bent so as to be vertically offset from the bottom part 17 of the frame, as at 14^g, the resultant bend or bends also increasing rigidity and strength while the right-hand edge 14^h of the offset part 14^g provides a trackway or raceway for coaction with the slide 15.

Considering now the general and preferred configuration of the slide member 15 and again referring to Figures 2 and 3, slide 15 is shaped to provide vertically extending portions 15^a and 15^b, preferably extending in the same plane, joined by an angular portion 15^c that projects to the left and that is so positioned that, when the slide 15 is assembled with respect to the track member 14, the ledge-like portion 15^c comes underneath the overhanging horizontal part 14^d, with preferably a small clearance therebetween. The projecting rib 15^c preferably extends throughout the length of the slide 15 and the various bends that are made greatly strengthen and increase the rigidity of the slide member 15.

Upwardly from the vertical portion 15^b, the sheet metal of the slide 15 is rolled or otherwise suitably formed into a loop-like or hook-shaped portion 15^d whose inner surface is preferably cylindrical and has a circumferential extent preferably greater than 180°. Within this portion 15^d are inserted suitable balls 20 (Figure 3), the balls being held against dropping out of the portion 15^d, which thus forms a raceway therefor, because the portion 15^d encompasses the balls by more than 180°. Egress of the balls 20 from the portion 15^d is prevented in a manner described hereinafter.

The shaping of the portion 15^d (see Figure 2), as above described, will be seen to expose portions of the balls so that when the slide 15 is assembled to the track member 14, the uppermost edge 14^f of the track member is engaged by the balls 20. As is better shown in Figure 2, the raceway portion 15^d of the slide is extended downwardly to form a lip 15^e that is of sufficient length to overhang the offset portion 14^e of the track member, being accommodated in the space between the side frame part 16 and the portion 14^e that is provided by reason of the offset of the latter.

The slide 15 has a horizontal portion 15^f joined to the vertical portion 15^a by a looped portion 15^g, the latter lending additional strength and rigidity and also obviating a sharp angle so that when the drawer 11 is related to the slide 15, the need for a close interfitting of the apices thereof is avoided.

The right-hand end portion of the horizontal portion 15^f of the slide is rolled or shaped as at 15^h to provide a cylindrical or tube-like raceway for balls 21 (Figure 3) substantially similar to the raceway portion 15^d at the uppermost part of the slide 15. Here again the balls 21 are encompassed by the portion 15^h preferably by more than 180° and are thus precluded from egress through the space through which the raceway edge 14^h is presented for contact with the balls 21.

The slide member 15 is preferably of a length equivalent to that of the drawer 11 itself; the track member 14, however, need be and hence preferably is only two-thirds as long as the drawer 11 and hence two-thirds as long as the slide member 15; when the track member 14 is secured to the frame 12 of the disk or other structure (see Figure 1) the forward end of the track member 14 is positioned to terminate adjacent the forward end or part of the frame 12. To limit relative sliding movement between the slide 15 and the track member 14, I provide at a midpoint in the length of the track member 14 a stop 22 (Figures 2 and 3) and this stop I preferably form by cutting and bending or punching and bending a lip or lug out of the vertical portion $14a$ of the track member 14, the lug being bent inwardly at a suitable angle into the space (see Figure 2) between the portions 14^a and 15^a of the track and slide members respectively. This stop member 22 is at the midpoint in the length of the track member 14.

At the respective ends of the slide member 15 and in the vertical portion 15^a thereof I provide stops 23 and 24 (Figure 3) similarly formed, being in the form of lugs or lips cut and bent out of the plane of the portion 15^a and bent into the space between the portions 14^a and 15^a (Figure 2), stop 22 being in the path of movement of stops 23 and 24 depending upon which direction the slide 15 is moved.

With the stops thus formed, both the track member 14 and the slide member 15 are reversible in that they may be related to the left-hand side of the drawer 11, as is shown in full lines in Figure 1, or they may be related to the right-hand side or edge of the drawer 11 and related portion of the frame. Thus, in production, I avoid the many difficulties and disadvantages attendant upon the use of such constructions as need specifically a left-hand and a right-hand member to make up a pair for any given drawer and I am enabled to achieve uniformity and identity of construction throughout, in these respects, utilizing of course two sets of track and slide for each drawer.

Having secured the track member 14 in place on the frame 12 (Figure 1), the slide 15 may next be assembled to the track 14. The manner of assembly of these parts can be better understood by reference to Figure 2; first the slide 15, held so that the vertical portion 15^a—15^b thereof makes a suitable angle with the vertical, is moved downwardly to bring the longitudinally extending link 15^e into the space between the offset portion 14^e and the wall part 16 of the frame 12, thus bringing the track or raceway portion 14f into the space between the portions 15^b and 15^e and thus bringing the balls 20 to rest upon the trackway 14^f.

Next the slide member 15 is swung in clockwise direction with the axis of the tube-like raceway 15^d as a pivot, bringing the rib 15^c underneath the ledge 14^d and thus also bringing the balls 21 in the raceway 15^h into engagement with the raceway or track 14^h, the parts coming to rest in the positions shown in Figure 2. This assembly will also be seen to bring the stop 23 or the stop 24 into appropriate functional relation to the stop 22 on the track member 14 in that stop 22 is thus in the path of movement of stop 23 or stop 24 as the slide member 15 is moved lengthwise of the track 14.

With a pair of track and slide members thus related the two slide members 15 of the pair are ready for the reception of the drawer 11, the drawer 11 being set onto and thus carried by the two track members 15, as will be clear from the relation of the drawer 11 to the slide 15 as is better shown in Figure 2.

Preferably the drawer 11 simply rests within the two facing slide members 15, and is permitted to be slid therealong when desired and for a purpose more clearly described hereinafter; in such case, the slide member 15 is provided with a stop and so also is the drawer 11 for coaction with such a stop. For uniformity of manufacture and to permit the slide to function either as a right-hand slide or a left-hand slide, I preferably provide two stop members on the slide and in Figure 3 these stop members are indicated at 25 and 26, being upstanding and positioned at the respective ends of the slide member 15 itself. Conveniently and preferably the stops 25—26 are formed by bending upwardly, so as to project upwardly from the tube-like raceway 15^d end portions of the lip 15^e, as is clearly shown in Figure 3, the stops being thus integral with the slide member 15. At the front end of the side of the drawer 11 (see Figure 1) I secure a stop member 27, so that about one-third of the drawer length is between the front end of the drawer and the stop member 27, the latter being in the form of a block of any suitable material, such as wood, fiber, or even metal, and being secured to the side of the drawer 11 in any suitable way, as, for example, by a screw 28 (Figure 2). The stop 27, moreover, is positioned at such a point that when the drawer 11 is nested within its pair of slide members 15 the stop member 27 extends above the raceway portion 15^d of the slide 15 (see Figures 1 and 2) with a suitable clearance therebetween and is thus also positioned in line with the stops 26 and 25 on the slide member 15. A similar stop, like stop 27, is, of course, also provided at the other or the right-hand side of the drawer 11 for coaction with a stop or stops like the stops 25 and 26 on the right-hand slide member.

Before considering other features of action, it is noted that I have above mentioned the fact that I insert balls 20 and 21 in the tube-like raceways 15^d and 15^h of the slide member 15 (see Figures 2 and 3). I have found it satisfactory and convenient to arrange the balls as is better shown in Figure 3 from which it will be seen that I insert into the respective raceways a series of four, five, or six (by way of example) balls, then a spacer 29, illustratively of a length equivalent to the series of balls just mentioned, the spacers being in the form of metal cylinders of a diameter large enough not to pass through the slot-like opening in the raceway and preferably somewhat smaller than the diameter of the balls themselves. Such series of balls I alternate with such spacers, and thus I achieve economy in the use of balls as well as insure a desired distribution of the balls throughout the raceways. However, I do not completely fill the raceways with balls or with balls and spacers, and the balls or balls and spacers, thus placed end to end in the raceways are of a length less than the length of the slide member 15 itself, for a purpose presently to be described.

To prevent egress of balls or of balls and spacers from the otherwise open ends of the raceways, I insert into the ends of the raceways a cylindrical plug 30, there being four in number (see Figure 3) two for each raceway. This plug may be secured in place in any suitable manner, preferably as by spot welding, as at 31, to the sheet metal of the raceway portion of the slide 15 itself.

Considering now other features of action, let it first be assumed that the drawer 11 (Figure 1) is closed. The front ends of the track members 14 substantially coincide with the front ends of their respective slide members 15 and also substantially with the front end of the drawer 11. If it is desired to open the drawer 11, it is pulled out by means of the usual handle, whereupon slides 15 move as a unit with the drawer 11, the balls 20 rolling along both the fixed track portion 14^f (Figure 2) and the raceway 15^d of the slide member 15, the balls 20 partaking of a movement of translation relative to the raceway 15^d itself, this relative motion being permitted because of the preferred arrangement wherein the raceway 15^d is not completely filled with balls.

The opening movement of drawer 11 with the slides 15 continues until the rear stops 24 (Figures 2 and 3) on the slides 15 strike the fixed stops 22 of the track members 14. Stops 22 being positioned at the midpoint of the track members 14 and the latter being two-thirds as long as the drawer and two-thirds as long as the slide members 15, the slide members 15 as well as the drawer 11, find themselves withdrawn or projected forwardly by a distance of substantially two-thirds the length of the drawer itself.

In most cases met with in practice, such a withdrawing or opening movement of the drawer, equivalent substantially to two-thirds of the length of the drawer itself, will suffice for obtaining access to the contents of the drawer. However, if it is desired to completely withdraw the drawer, continued pulling outwardly of the drawer 11 causes the latter to slide along the now stationary slides 15 and if the opening movement of the drawer 11 is halted at a point where the drawer itself is completely withdrawn, the drawer will still be firmly and reliably supported by two-thirds of the length of the slides 15.

Upon closing the drawer 11, as by pushing it inwardly or to the left as viewed in Figure 1, drawer 11 and slides 15, because of the lesser friction existing between the slides and the track members than exists between the drawer 11 and the slides, move inwardly as a unit until the slides 15, at their rear or left-hand ends as viewed in Figure 1 strike the rear or innermost ends of the frame 12, thus halting the movement of the slides 15; thereupon the drawer 11, at this point projecting one-third of its length, may be completely pushed into closed position by sliding it relative to the now stationary slides 15, the drawer being halted by stops 27 engaging stops 26.

During the action and operation of the apparatus, a number of unique and advantageous actions and coactions take place. For example, the weight or load of the drawer 11 is transmitted by

the slides 15 directly to the track portion 14^f of the track members 14, through the raceway 15^d and the balls 20; the offsetting, as by the bend 14^d (Figure 2), of the raceway or track portion 14^f brings the latter so close to the vertical plane of the portions 15^a and 15^b, through which the drawer load is transmitted, that a dependable and reliable relative sliding action between slide and track members is achieved, without binding of the parts.

As the slide members 15 are projected out of the track members 14, for example, as shown in Figure 1, the slide members 15 are in part caused to function as cantilevers but the various bends or angles therein, all as above described, lend to the track members a very advantageous rigidity and strength so that this cantilever action may be dependably achieved in practice without overstressing, bending or straining and binding of parts; moreover, due to the overlapping or interfitting of the portions 14^d and 15^c (see Figure 2), a relative tilting in a vertical plane of the slide or slides 15 relative to the track or track members 14 cannot take place and thus a nice interengagement of the balls 20 with their respective races is maintained, even though, when the slides 15 are withdrawn and subjected to cantilever action, the load carried by the slides tends to tilt the inward ends of the slides upwardly and the outermost ends thereof downwardly. Also the features whereby these overlapping parts extend throughout the lengths of their respective members assures the dependable achievement of this action irrespective of the extent of overlapping between a slide and a track member.

Insofar as such features of action and construction as have just been described above are concerned, I may even eliminate the sliding bearing arrangement provided at the lower right-hand portions of the slide and track member as viewed in Figure 2, and in such case the loop-like portion 15^g of the slide 15 may be depended upon to take up any side or lateral thrusts, the latter causing the portion 15^g to engage the vertical portion of the angular part 14^c of the track member 14. However, as already above indicated, I prefer to employ the uniquely correlated sliding bearing arrangement provided by the raceways 14^h and 15^h with the rollers 21 therebetween; the latter insure nicety of action of the entire arrangement, particularly in that any side or lateral thrusts, such as might be caused because the pulling or pushing force exerted on the drawer 11 is not exerted truly in line with the intended path of movement of the drawer 11, are to be prevented from causing such a frictional sliding contact between the slide 15 and the track member 14, as would have the effect of materially increasing the effort necessary to move the drawer. With the preferred construction as shown in Figuse 2, therefore, the drawer 11 may be easily and freely moved irrespective of whether or not the operator exerts the pulling or pushing thrust in line with the axis of the drawer 11 or at a substantial angle thereto.

Referring again to Figure 2, I proportion the parts so that the clearance between the raceway portion 15^h and the bottom portion 17 of the frame, indicated at A, is greater than the clearance between the portion 14^g and the horizontal portion 15^f of the slide 15, this clearance being indicated at B. Thus, should any circumstance of load arise that would overstress the horizontal portion 15^f of the slide, the difference in clearances just noted insures that the bottom or horizontal portion of the track 14 is contacted by the horizontal portion of the slide 15 and thus takes the load, rather than having the load transmitted by the portion 15^h to the frame part 17.

Thus, great dependability and ease of action are insured. Furthermore, the apparatus may be readily installed. For example, the tracks 14 may be put in place independently of the slides 15 and the latter then interengaged with the tracks, in the manner hereinabove described; this is a great advantage in installation, particularly in giving ready and free access for the installer to secure the track 14 to the frame, as by the screws 18—19 or the like. Moreover, the interchangeability of the parts makes it possible to avoid having to put up with the inconvenience of distinguishing between right-hand and left-hand members or parts and this is also an advantage not merely in installing but also in replacement or repair of the parts.

Thus, it will be seen that there has been provided in this invention a structure in which the various objects hereinabove noted, together with many thoroughly practical advantages are successfully achieved. Moreover, the parts are of sheet metal and may be inexpensively and rapidly fabricated as by rolling, punching, stamping, or the like, and still maintain great strength and rigidity. It will thus be seen that the apparatus provided is well adapted to meet the varying conditions of hard practical use.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In apparatus of the character described, in combination, a drawer frame, a pair of track members mounted upon the opposite sides of the base of said frame, said track members being substantially right angular in cross-section, the upper edge of said track members being offset from the side of said frame and the inner edge of said track members being spaced from the base of said frame, a pair of slides mounted on said track members, said slides being substantially right angular in cross-section, the top edge of said slides overlapping the top edge of said track members and the inner edge of said slides overlapping the inner edge of said track members, a plurality of balls disposed along both edges of said track members and retained in said position by said overlapping edges of said slides, spacing means disposed between groups of said balls, the ends of the edge portions of said slides being crimped over to retain said balls and said spacing means in said position, stopping means on said track members and said slides to limit the relative movement therebetween, and a drawer supported within said frame on said slides and capable of relative movement with respect to said slides.

2. In apparatus of the character described, in combination, a drawer frame, a pair of track members mounted upon the opposite sides of the base of said frame, said track members being substantially right angular in cross-section, the upper edge of said track members being offset from the side of said frame and the inner edge of said track members being spaced from the base of said frame, a pair of slides mounted on said track members, said slides being substan-

tially right angular in cross-section, the top edge of said slides overlapping the top edge of said track members and the inner edge of said slides overlapping the inner edge of said track members, a plurality of balls disposed along both edges of said track members and retained in said position by said overlapping edges of said slides, spacing means disposed between groups of said balls, stopping means on said track members and said slides to limit the relative movement therebetween, and a drawer supported within said frame on said slides and capable of relative movement with respect to said slides.

3. In apparatus of the character described, in combination, a drawer frame, a pair of track members mounted upon the opposite sides of the base of said frame, said track members being substantially right angular in cross-section, the upper edge of said track members being offset from the side of said frame and the inner edge of said track members being spaced from the base of said frame, a pair of slides mounted on said track members, said slides being substantially right angular in cross-section, the top edge of said slides overlapping the top edge of said track members and the inner edge of said slides overlapping the inner edge of said track members, a plurality of balls disposed along both edges of said track members and retained in said position by said overlapping edges of said slides, spacing means disposed between groups of said balls, stopping means on said track members and said slides to limit the relative movement therebetween, and a drawer supported within said frame on said slides and capable of relative movement with respect to said slides, said slides being supported out of engagement with said track members by said balls.

4. In an anti-friction device for drawers or the like, in combination, a track member substantially L-shaped in cross-section, and a sliding member substantially L-shaped in cross-section and mounted upon said track member so that the sides of said members are substantially parallel, said sliding member having its top edge overlapping the top edge of said track member to support it free from the base portion of said track member.

5. In an anti-friction device for drawers or the like, in combination, a track member substantially L-shaped in cross-section, a sliding member substantially L-shaped in cross-section and mounted upon said track member so that the sides of said members are substantially parallel, said sliding member having its top edge overlapping the top edge of said track member to support it free from the base portion of said track member, portions of said substantially parallel sides being spaced from each other, and stop means on said track member and said sliding member accommodated in the space between said spaced portions to limit the relative movement thereof.

6. In an anti-friction device for drawers or the like, in combination, a track member substantially L-shaped in cross-section, a slide member substantially L-shaped in cross-section mounted on said track member so that the sides of said members are substantially parallel, and a plurality of rolling members mounted on the top edge of said track member, the top edge portion of said slide member overlapping said rolling members to retain them in position, said rolling members supporting said slide member free from the base portion of said track member.

7. In apparatus of the character described, in combination, a drawer frame, tracks members L-shaped in cross-section mounted upon the opposite sides of said frame, sliding members substantially L-shaped in cross-section having lip portions overhanging the upper edge of said track members, said track members supporting said sliding members free from the base of said frame so that the sides of said members are substantially parallel, and a drawer supported upon said sliding members.

8. In apparatus of the character described, in combination, a drawer frame, a pair of L-shaped track members portions of which are in engagement with the sides of said frame, means for securing said track members in said position substantially adjacent the base of said frame, the upper edge of each of said track members being spaced from the side of said frame, a pair of sliding members substantially L-shaped in cross-section and having their upper edge portions overlapping the respective upper edges of said track members, said sliding members being supported by said track members free from the base of said frame, and a drawer supported by said sliding members.

9. In apparatus of the character described, in combination, a drawer frame, a pair of L-shaped track members portions of which are in engagement with the sides of said frame, means for securing said track members in said position substantially adjacent the base of said frame, the upper edge of each of said track members being spaced from the side of said frame, a pair of sliding members substantially L-shaped in cross-section and having their upper edge portions overlapping the respective upper edges of said track members each to form a longitudinal enclosure, a plurality of rolling members disposed within said enclosures and supported respectively upon the top edges of said track members, said rolling members supporting said sliding members above the base of said frame, and a drawer supported by said sliding members.

10. In apparatus of the character described, in combination, a drawer frame, a pair of track members portions of which are in engagement with the sides of said frame, means for securing said track members in said position substantially adjacent the base of said frame, the upper edge of each said track members being spaced from the side of said frame, a pair of sliding members substantially right angular in cross-section and having their upper edge portions overlapping the respective upper edges of said track members each to form a longitudinal enclosure, a plurality of rolling members disposed within said enclosures and supported respectively upon the top edges of said track members, said rolling members supporting said sliding members above the base of said frame, the ends of said sliding members having means closing the ends of said enclosures to retain said rolling members within their respective enclosures, and a drawer supported by said sliding members.

11. In apparatus of the character described, in combination, a drawer frame, a pair of track members portions of which are in engagement with the sides of said frame, means for securing said track members in said position substantially adjacent the base of said frame, the upper edge of each of said track members being spaced from the side of said frame, a pair of sliding members substantially right angular in cross-section and having their upper edge portions overlapping the

respective upper edges of said track members each to form a longitudinal enclosure, a plurality of rolling members disposed within said enclosures and supported respectively upon the top edges of said track members, said rolling members supporting said sliding members above the base of said frame, a drawer supported by said sliding members, and stopping means on said sliding members and said track members for limiting the relative movement therebetween, said drawer adapted to slide on said sliding members upon the operation of said stopping means.

12. In apparatus of the character described, in combination, a drawer frame, a pair of track members portions of which are in engagement with the sides of said frame, means for securing said track members in said position substantially adjacent the base of said frame, the upper edge of each of said track members being spaced from the side of said frame, a pair of sliding members substantially right angular in cross-section and having their upper edge portions overlapping the respective upper edges of said track members each to form a longitudinal enclosure, a plurality of rolling members disposed within said enclosures and supported respectively upon the top edges of said track members, said rolling members supporting said sliding members above the base of said frame, a drawer supported by said sliding members, stopping means on said sliding members and said track members for limiting the relative movement therebetween, said drawer adapted to slide on said sliding members upon the operation of said stopping means, and stopping means associated with said sliding members and said drawer for limiting the relative movement between said drawer and said sliding members.

13. In apparatus of the character described, in combination, a drawer frame, a pair of track members each resting upon one side of said frame and the base thereof, means for securing said track members in said position, the edge portions of said track members being spaced from the sides and bottom of said frame respectively, a pair of sliding members having edge portions respectively overhanging the top edges of said track members, a plurality of rolling members disposed between said edge portions and the top edge portions of said track members to support said sliding members free from the base portions of said track members, said sliding members having their inner edges overlapping the respective inner edges of said track members, and a drawer supported upon said sliding members.

14. In apparatus of the character described, in combination, a drawer frame, a pair of track members each resting upon one side of said frame and the base thereof, means for securing said track members in said position, the edge portions of said track members being spaced from the sides and bottom of said frame respectively, a pair of sliding members having edge portions respectively overhanging the top edges of said track members, a plurality of rolling members disposed between said edge portions and the top edge portions of said track members to support said sliding members free from the base portions of said track members, said sliding members having their inner edges overlapping the respective inner edges of said track members, a plurality of rolling members disposed between said inner edge portions of said sliding members and the inner edge of said track members, and a drawer supported on said sliding members.

15. In apparatus of the character described, in combination, a drawer frame, a pair of track members each resting upon one side of said frame and the base thereof, means for securing said track members in said position, the edge portions of said track members being spaced from the sides and bottom of said frame respectively, a pair of sliding members having edge portions overhanging the top edges of said track members, a plurality of rolling members disposed between said edge portions and the top edge portions of said track members to support said sliding members free from the base portions of said track members, said sliding members having their inner edges overlapping the inner edges of said track members, a stop on said track members, a stop on said sliding members, said stops coacting to limit the outward movement of said sliding members, and a drawer supported upon said sliding members.

16. In apparatus of the character described, in combination, a drawer frame, a pair of track members each resting upon one side of said frame and the base thereof, means for securing said track members in said position, the edge portions of said track members being spaced from the sides and bottom of said frame respectively, a pair of sliding members having edge portions overhanging the top edges of said track members, a plurality of rolling members disposed between said edge portions and the top edge portions of said track members to support said sliding members free from the base portions of said track members, said sliding members having their inner edges overlapping the inner edges of said track members, a stop on said track members, a stop on said sliding members, said stops coacting to limit the outward movement of said sliding members, a drawer supported upon said sliding members, a stop on said drawer, and a second stop on one of said sliding members in the path of said last-mentioned stop and adapted to limit the relative movement between said sliding members and said drawer.

17. In apparatus of the character described, in combination, a drawer frame, a pair of track members portions of which are in engagement with the opposite sides of said frame substantially near the base thereof, the top portions of said track members being bent inwardly and upwardly so that the edges thereof are spaced from the sides of said frame and so that portions of said track members are substantially parallel to the base of said frame, a pair of sliding members having a substantially right angular cross-section, the upper edges of which overlap the upper edges of said track members to support said track members free from said base portions of said sliding members extending outwardly underneath said last-mentioned portions of said track members, and a drawer supported upon said sliding members.

18. In apparatus of the character described, in combination, a drawer frame, a pair of track members mounted upon the sides of said frame substantially near the base thereof, the upper portions of said track members extending inwardly from said sides and thence upwardly to form a surface substantially at right angles to said sides and facing said base, a pair of sliding members having their upper edge portions overhanging the upper edges of said track members, said sliding members having substantially right angular cross-sections and having formed therein an outwardly extending ridge fitting under said right angle portions of said track members,

said sliding members being supported free from the base of said frame, and a drawer supported upon said sliding members.

19. In apparatus of the character described, in combination, a drawer frame, a pair of track members mounted upon the sides of said frame substantially near the base thereof, the upper portions of said track members extending inwardly from said sides and thence upwardly to form a surface substantially at right angles to said sides and facing said base, a pair of sliding members having their upper edge portions overhanging the upper edges of said track members, said sliding members having substantially right angular cross-sections and having formed therein an outwardly extending ridge fitting under said right angle portions of said track members, said sliding members being supported free from the base of said frame, stopping means for limiting the relative movement between said sliding members and said track members, and a drawer supported upon said sliding members.

20. In apparatus of the character described, in combination, a drawer frame, a pair of track members mounted upon the sides of said frame substantially near the base thereof, the upper portions of said track members extending inwardly from said sides and thence upwardly to form a surface substantially at right angles to said sides and facing said base, a pair of sliding members having their upper edge portions overhanging the upper edges of said track members, said sliding members having substantially right angular cross-sections and having formed therein an outwardly extending ridge fitting under said right angle portions of said track members, a plurality of rolling members disposed between said edge portions of said sliding members and the upper edge of said track members, means for retaining said rolling members in said position, said rolling members supporting said sliding members above the base of said frame, and a drawer supported upon said sliding members.

21. In apparatus of the character described, in combination, a drawer frame, a pair of track members mounted upon the sides of said frame substantially near the base thereof, the upper portions of said track members extending inwardly from said sides and thence upwardly to form a surface substantially at right angles to said sides and facing said base, a pair of sliding members having their upper edge portions overhanging the upper edges of said track members, said sliding members having substantially right angular cross-sections and having formed therein an outwardly extending ridge fitting under said right angle portions of said track members, a plurality of rolling members disposed between said upper edges of said track members and said edge portions of said sliding members, spacer members disposed between groups of said rolling members, said rolling members adapted to support said sliding members above the base of said frame, and a drawer supported upon said sliding members.

22. In apparatus of the character described, in combination, an L-shaped track member, an L-shaped sliding member mounted upon said track member so that the sides of said members are substantially parallel, said track member being made of sheet metal and being bent along its length to provide a longitudinally extending downwardly facing ledge, rolling members disposed between said sliding member and said track member to hold said sliding member in suspended relation with respect to said track member, and means on said sliding member engaging underneath said downwardly facing ledge for preventing movement in an upward direction of said sliding member relative to said track member, thereby preventing disruption of said suspended relation between said two members.

23. In apparatus of the character described, in combination, L-shaped track members, L-shaped sliding members mounted respectively upon said track members so that the respective sides of said members are substantially parallel, said track members being made of sheet metal and being bent along their respective lengths to provide longitudinally extending downwardly facing ledges, said sliding members being bent along their respective lengths to provide longitudinally extending upwardly facing ledges, rolling members disposed between said sliding member and said track member to hold said sliding member in suspended relation with respect to said track member, said ledges holding said sliding members and said track members in substantially parallel relation when said sliding member is moved along said track member and means occupying the space underneath said ledges adapted to limit the relative sliding movement between said sliding member and said track member.

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