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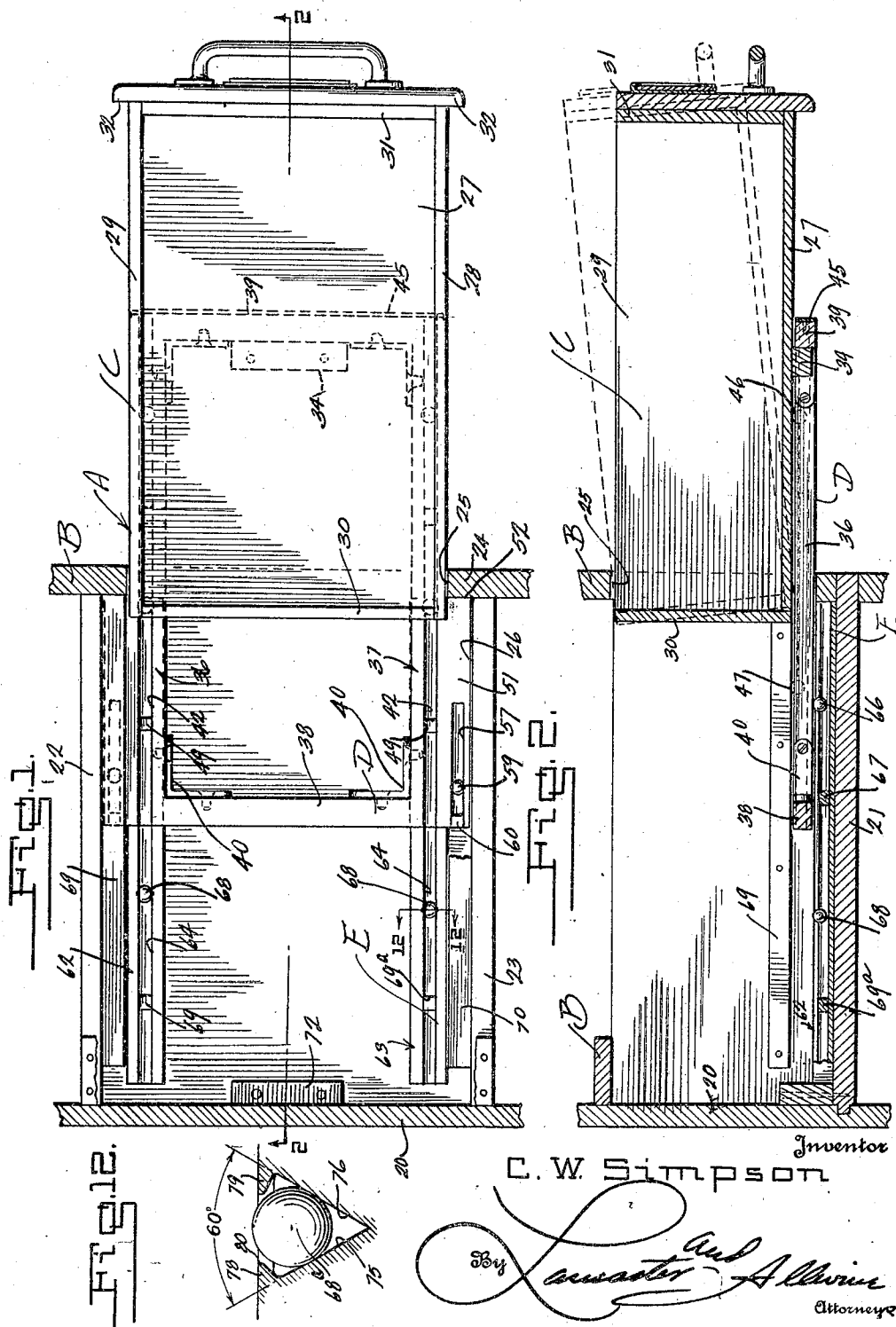
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ANTIFRICTION BEARING SUPPORT FOR DRAWERS

Filed May 27, 1926

3 Sheets-Sheet 1



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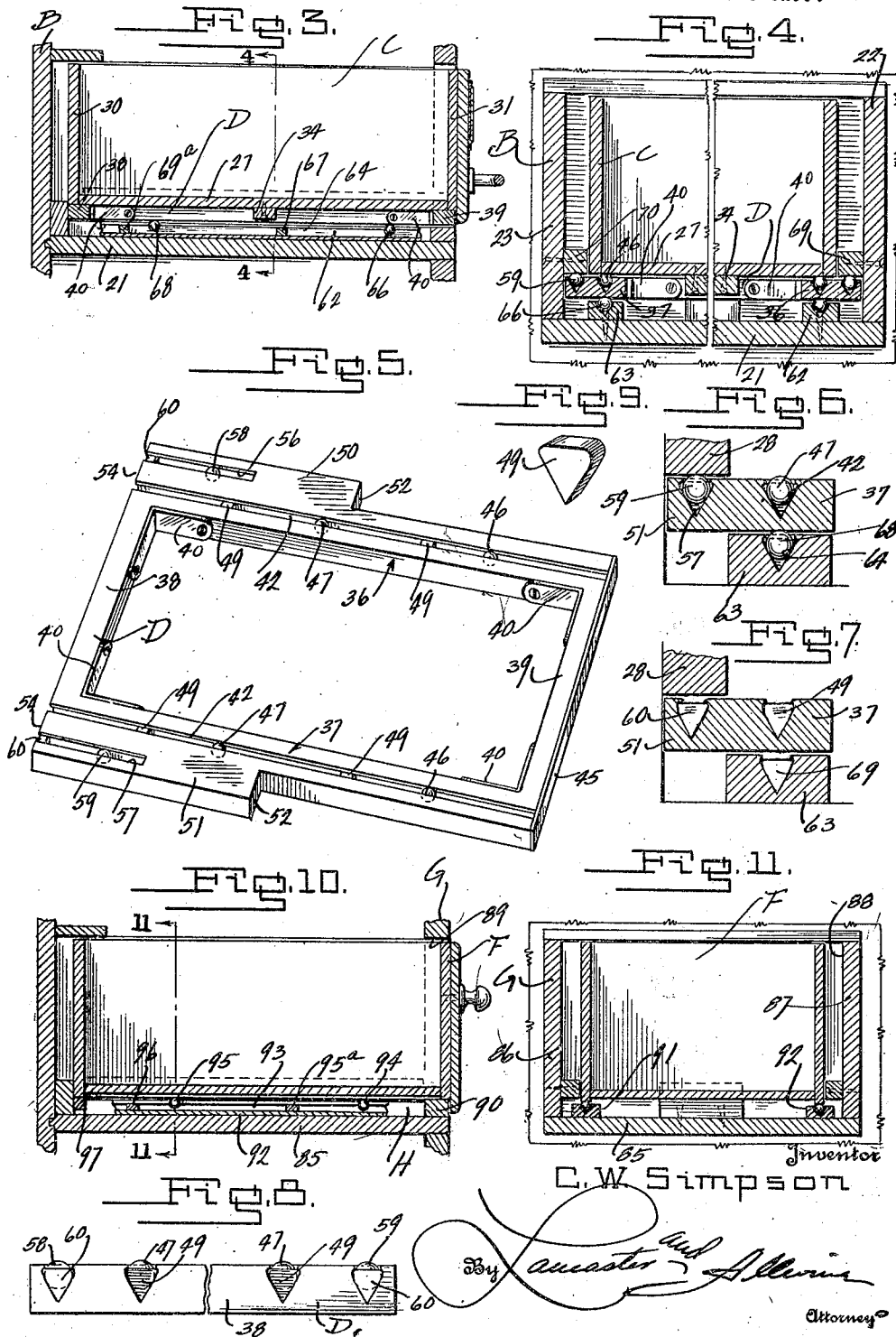
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3 Sheets-Sheet 2



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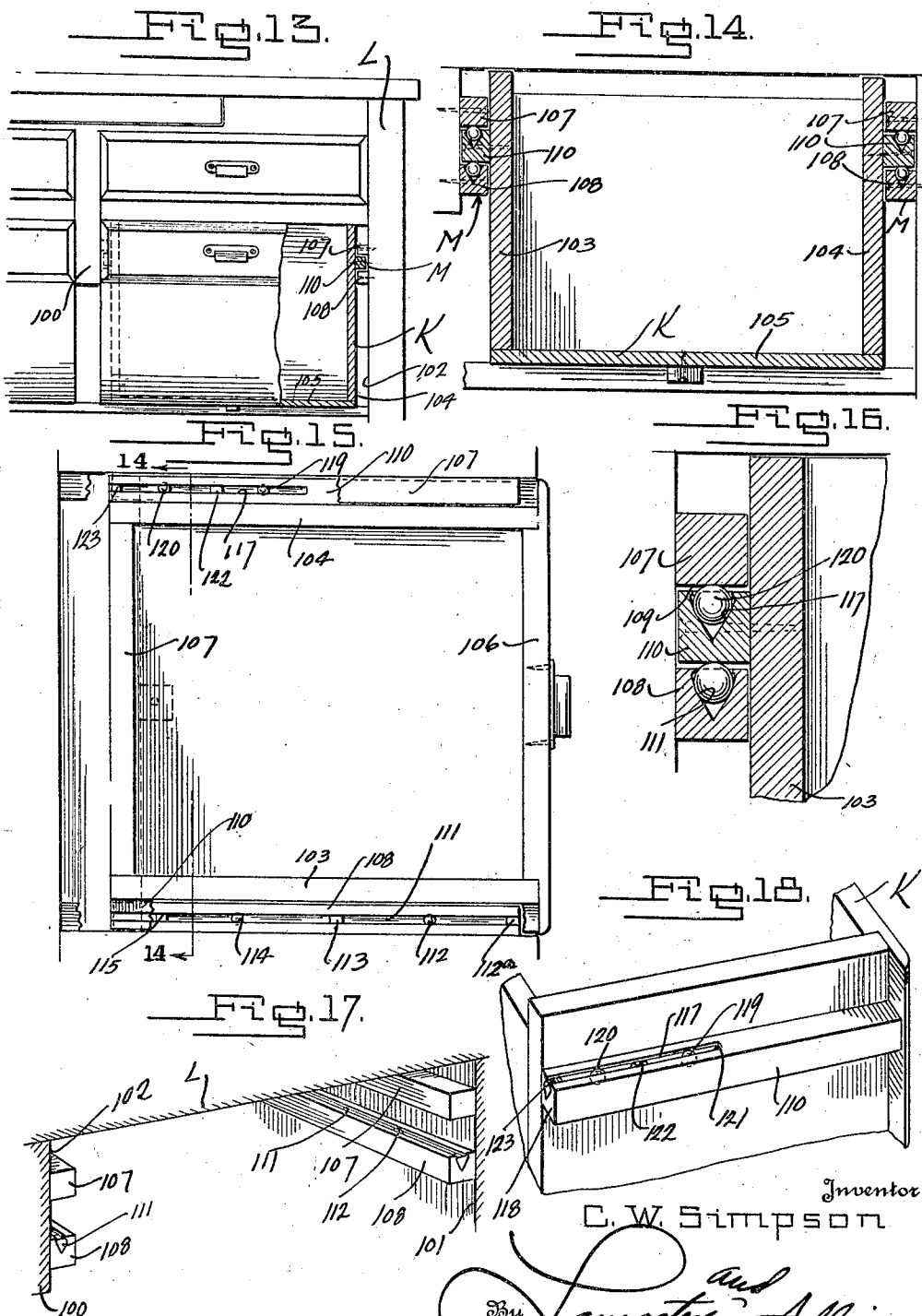
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ANTIFRICTION BEARING SUPPORT FOR DRAWERS

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3 Sheets-Sheet 3



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ANTIFRICTION BEARING SUPPORT FOR DRAWERS.

Application filed May 27, 1926. Serial No. 112,118.

This invention relates to improvements in means for efficiently supporting drawers and the like.

The primary object of this invention is the provision of an improved anti-friction supporting and bearing construction for sliding drawers, by means of which a practically noiseless and facile operation of the drawer may be accomplished.

A further object of this invention is the provision of an improved anti-friction supporting means for sliding drawers, which will enable a full width drawer to be slidably disposed in an opening of a predetermined size, without constructing slide supports on the drawers.

A further object of this invention is the provision of an improved anti-friction bearing and supporting construction for drawers, using bearing members which are mounted in a novel manner to facilitate the expeditious sliding of the drawer with a minimum of frictional contact between the bearing and its support and the bearing and the drawer.

A further object of this invention is the provision of an improved anti-friction bearing construction for cabinet drawers and the like, including an extensible supporting tray upon which the drawer rests at its bottom, so that a full size drawer may be utilized for an opening of a predetermined width, without obstructing the sides of the drawer with supporting flanges and the like, as is conventionally the case with extension tray drawers.

Other objects and advantages of this invention will be apparent during the course of the following detailed description.

In the accompanying drawings, forming a part of this specification, and wherein similar reference characters designate corresponding parts throughout the several views,

Figure 1 is a plan view of an improved type of cabinet drawer, utilizing the improved anti-friction supporting construction, showing the drawer open with respect to a cabinet.

Figure 2 is a longitudinal sectional view taken thru the drawer arrangement illustrated in Figure 1, substantially on the line 2—2 thereof.

Figure 3 is a reduced longitudinal sectional view taken through the cabinet drawer illustrated in Figure 1, showing the closed relation of the same with respect to the cabinet casing and runway for the drawer.

Figure 4 is a transverse sectional view

taken substantially on the line 4—4 of Figure 3.

Figure 5 is a perspective of a novel type of extension supporting member for the cabinet type of drawer illustrated in Figure 1.

Figures 6 and 7 are enlarged transverse sectional views taken through the supporting anti-friction flanges and trackway drawer and casing constructions, for the type of drawer illustrated in Figures 1 to 3 inclusive.

Figure 8 is a rear elevation of the tray extension illustrated in Figure 5.

Figure 9 is a perspective view of a novel type of ball bearing stop member used in connection with the guideways for the ball bearings, to limit the amplitude of movement of the ball bearings.

Figure 10 is a longitudinal sectional view taken through a modified type of common drawer construction, utilizing the improved anti-friction means of this invention, the drawer being substantially the same as the drawer illustrated in Figure 1, less the supporting extension tray or device as illustrated in Figure 5.

Figure 11 is a sectional view taken substantially on the line 11—11 of Figure 10.

Figure 12 is a cross section through a novel ball bearing race construction of this invention.

Figure 13 is a fragmentary front elevation of a type of kitchen cabinet or library table drawer, in connection with which the novel anti-friction bearing construction is used.

Figure 14 is a transverse sectional view taken through the type of drawer and anti-friction means therefor, as illustrated in Figure 13, taken substantially on the line 14—14 of Figure 15.

Figure 15 is a fragmentary plan view of the type of drawer illustrated in Figures 13 and 14 showing the same closed in the relation to the novel anti-friction supporting means therefor.

Figure 16 is an enlarged fragmentary sectional view of the supporting anti-friction construction for the drawer illustrated in Figure 14.

Figure 17 is a perspective view of the entrance opening and supporting flange and anti-friction means formed therewith for receiving the type of drawer illustrated in Figure 13.

Figure 18 is a fragmentary perspective view showing the drawer construction and

anti-friction means therefor adapted to cooperate with the casing and anti-friction construction illustrated in Figure 17.

In the drawings, wherein for the purpose of illustration is shown only a preferred embodiment of this invention, the letter A may generally designate a file cabinet comprising a casing construction B having an opening therein adapted to receive one or more of the drawers C which are supported in anti-friction manner by an extension anti-friction tray or device D which slidably cooperates for extension in the opening of the drawer, upon a novel anti-friction trackway construction E.

For the modified form of invention illustrated in Figures 10 and 11, the drawer F thereof is slidably housed within a casing G, upon anti-friction means H.

In the type of drawer construction illustrated in Figures 13 to 18 inclusive, the drawer K is slidably housed within a casing or cabinet L upon anti-friction bearing means M at each side thereof.

Referring to the form of invention A, the casing B which houses the same is of any approved formation. In so far as its reception of the drawer C is concerned, the same may comprise a rear wall 20; bottom wall 21; side walls 22 and 23; and front wall 24 provided with an opening 25 wherein the drawer C is slidably positioned for disposition within the compartment 26 between the side walls 22 and 23 as is readily obvious.

The drawer C may be of substantially conventional type, including a bottom 27; upstanding side walls 28 and 29; a rear wall 30; and a front wall construction 31 which may be provided with the laterally extending flanges 32 adapted to engage against the front surface of the front wall 24 when the drawer C is closed. A notable feature of the invention is that the distance from the outer side of the wall 28 to the outer side of the side wall 29 of the drawer C is substantially equivalent to the width of the opening 25 which receives the drawer C, inasmuch as no side supporting flanges or extensions are provided on the side walls 28 and 29 of the drawer C, to extend forwardly of the cabinet when the drawer is open, as is the case with many types of slidable supporting extension types of cabinet drawers. The bottom 27 of the drawer C intermediate and substantially midway between the rear and front walls 30 and 31 is provided with a depending stop projection 34 adapted to cooperate in connection with the extension device D, as will be subsequently described and as is illustrated in Figures 1 and 2 of the drawings.

Referring to the extension device or tray D, as illustrated in the perspective view of Figure 5, and elsewhere, the same comprises the elongated parallel spaced side rails 36 and 37, connected at their ends by means of

right angled transverse cross pieces 38 and 39, at the rear and front thereof respectively, to provide a substantially rectangular shaped frame. In order to brace the connection of the rails with the cross pieces suitable angle connecting pieces 40 may be used at the corners of the frame, as illustrated in Figure 5 of the drawings. Each of the side rails 36 and 37 inwardly of the top surface thereof is provided with a groove 42, preferably extending from end to end of said rails 36 and 37, and in cross section being preferably V-shaped. Across the front edge of the front cross piece 39 is disposed a roller bearing stop and wear strip 45, which may be of metal, and which obstructs the forward ends of the grooves 42, to retain the front roller bearings 46 therein. Rear roller bearings 47 are provided in each of the grooves 42 rearwardly of the ball bearings 46; suitable triangular shaped stops 49, as illustrated in detail in Figure 9, being positioned, as is illustrated in Figure 5, in each of the grooves 42 adjacent the rear ends of the grooves to limit the rear amplitude of rear ball bearings 47, and also in the grooves 42 substantially midway of the lengths of the grooves 42 between the ball retaining strip 45 and the rear retaining blocks 49. In this manner each of the grooves 42 is divided into a front track or groove portion wherein the front ball bearing 46 is disposed for limited operation between the retaining strip 45 and the adjacent rear retaining block 49, and into a rear track or portion wherein the ball bearing 47 may be retained for sliding movement between the retaining blocks 49 in each of said grooves 42, as can clearly be seen from Figure 5 of the drawings.

At the outer sides of each of the side rails 36 and 37, and extending for less than one-half the length of said rails, at the rear ends thereof, outwardly extending supporting flange portions 50 and 51 are provided for the rails 36 and 37 respectively, the front edges providing shoulders 52 adapted to abut against the inner surface of the front wall 24 of the cabinet casing B, when the tray or device D is extended to its maximum extent outwardly of the opening 25. These flanges 50 and 51, inwardly of the top surfaces thereof, and from the rear ends or edges 54, for substantially one-half the length thereof, are provided with grooves 56 and 57 respectively, which are V-shaped in cross section similar to the groove 42, and wherein ball bearings 58 and 59 are respectively disposed, limited in their path of travel by abutment against the front ends of the grooves, and at their rear ends being limited by abutment against stop blocks 60 which may be triangular similar to the stop blocks 49 illustrated in Figure 9.

Referring to the stationary track and anti-friction means E for the extension device D and the drawer construction C, as is illus-

trated in the drawings, the same comprises longitudinally extending stationary tracks 62 and 63 secured upon the top surface of the bottom wall 21 of the casing B, preferably in a laterally spaced relation from the side walls 22 and 23. These tracks 62 and 63, as illustrated in the drawings, are provided with grooves 64 extending longitudinally thereof, which are V-shaped in cross section, as the grooves above mentioned, and which are adapted to support roller bearings for travel therealong. Each groove 64 is provided with a front ball bearing 66 limited forwardly by abutment against the front wall 24 of the cabinet casing, and intermediate the ends of the groove 64 being limited by means of a substantially triangular shaped stop block 67 similar in construction to the stop block 49 illustrated in Figure 9. These grooves 64 furthermore each include a rear ball bearing 68, limited in its front forward movement by means of the stop block 67, and in its rear movement by means of the stop block 69^a placed in the groove 64 at the rear end of the rail 62 or 63.

When the slide extension device or tray D is applied in the casing compartment 26, the rails 36 and 37 thereof are disposed immediately over the tracks 62 and 63 respectively, and the lower smooth surfaces of the rails 36 and 37 respectively ride upon the ball bearings 66 and 68 of the grooves 64 of the rails beneath.

Retaining flanges and stationary tracks 69 and 70 are securely affixed to the opposite side walls 22 and 23 of the casing B, upwardly of the tracks 62 and 63, the same in width being relatively narrow, and providing downwardly facing surfaces beneath which the laterally extending retaining flanges 50 and 51 of the sliding tray D are disposed, so that the ball bearings 58 and 59, which ride in the grooves 56 and 57 of the extensions 50 and 51, may engage in rolling contact against the lower surfaces of said retaining flanges 69 and 70, as is illustrated in the drawings.

Referring to the assemblage of the invention A, the stationary tracks 62 and 63 are of course secured on the bottom wall 21 of the casing as above mentioned, in the proper relation above mentioned, and the tray D is then placed in position in anti-friction supported relation upon the ball bearings 66 and 68 which operate in the grooves 64. The retaining flanges and trackways 69 and 70 are preferably then applied, in such manner as to permit of the horizontal sliding of the tray or extension device D, thus preventing the same from tipping in a vertical plane; the spacing of the retaining flanges 69 and 70 being so made with respect to the trackways 62 and 63 as to prevent such tipping of the tray or extension device D as is readily apparent, so that the extension D may be with facility slid forwardly and rearwardly in the

guide channels between the tracks 62 and 63 and the retaining flanges 69 and 70. The forward limit of movement of the extension device D is controlled by abutment of the shoulder 52 against the front wall 24 of the drawer casing B. The rear limit of movement of the extension device D may be determined by abutment against the stop block 72 which may be affixed in the rear end of the drawer compartment to the casing B. It is to be noted that the stationary tracks 69 and 70 are not wide enough to overhang the grooves 42 within which the ball bearings 46 and 47 operate, and this is to permit the drawer C to slide upon such ball bearings 46 and 47 upon insertion into the cabinet compartment 26. As is illustrated in Figure 2 of the drawings the block 34 is normally operable in the opening defined by the extension tray or frame D, and engages against the front cross piece 39 to limit the outward amplitude of movement of the drawer C, so that the rear end of the drawer, when open, is positioned in the opening 25, of the front wall 24, and is prevented from entire removal forwardly of the wall 24 until the drawer is tipped upwardly to remove the block 34 from the extension tray D, as illustrated by the dotted lines in Figure 2 of the drawings. The block 34 also rests between the angles when the drawer is open to prevent lateral drawer movement.

It is readily apparent that due to the entire anti-friction support of the drawer C being placed below the bottom wall thereof, the same is unobstructed by lateral pieces connected to the side walls of the drawer C, and therefore the drawer in width can be equivalent to the width of the opening 25, and this is important in connection with the fire resisting qualities of the cabinet, which may be either of wood or metal. The improved anti-friction supporting construction above described for the drawer C is practically noiseless in operation, due to the well balanced arrangement thereof, and the novel arrangement and support of the ball bearings.

As a generic feature of this invention, in connection with all of the forms, and in connection with every groove of the anti-friction means which receives a ball bearing, the side walls 75 and 76 of each groove are disposed at an upward divergence of 60°, more or less, but in any event less than 90°, in order to permit a proper support of the balls therein, as illustrated for the ball 68^a in Figure 12 of the drawings. It is the object of supporting the ball bearings in such a 60° side edge groove to permit of relatively short anti-friction travel of the ball bearing in the groove, in contra-distinction to the distance of travel of the drawer during its anti-friction travel upon the ball bearing. For a 90° groove the ball bearing will travel a much greater distance in proportion to the distance of travel

of the drawer, than does the ball when supported in a 60° sided groove for the same distance of travel of the drawer, due to the fact that in the 60° sided groove the ball bearing is supported closer to the horizontal axis thereof. In practice with the substantially 60° sided groove, the drawer travels about three times as fast as the ball travels, over a rectilinear path, and it has been found that due to the provision of such a groove the anti-friction means keeps the drawer balanced on the ball for easier operation than would otherwise be the case.

In order to prevent the accidental detachment of the ball bearings from their respective grooves, it is preferred to provide overhanging retaining flanges 78 and 79, for each groove of the anti-friction means of all forms of the invention herein shown and described; these overhanging flanges preferably being triangular in cross section, and either integral, or separate strips attached as illustrated in Figure 12 to overhang the upper enlarged end of the groove, to provide a longitudinal opening 80 which faces upwardly from the groove, less in width than the diameter of the ball bearing 68^a, and upwardly through which, and above the top surface of the strip in which the groove is formed, the ball bearing projects for receiving the lower surface of an upper sliding part thereon.

Referring to the form of invention illustrated in Figures 10 and 11 of the drawings, the drawer thereof is substantially the same as a conventional file drawer, and the casing G to which the same is supported includes a bottom wall or a partition wall 85 having the upstanding side walls 86 and 87 defining a compartment 88 adapted to receive the drawer F, thru an opening 89 in the front wall 90 of the said cabinet G.

The bottom wall 85 of the cabinet construction is provided with the longitudinally extending tracks 91 and 92, along the adjacent walls 86 and 87, which inwardly of their upper surfaces are provided with grooves 93 exactly the same in construction as the groove illustrated in Figure 12, and above described, and each groove 93 supports therein the front ball bearing 94 and the rear ball bearing 95, limited in their longitudinal movement along the groove by means of stops identically the same as the stop constructions above defined for the tracks 62 and 63 of the invention A. That is, the front ball bearing 94 of the track 91 or 92 moves between the front wall 90 of the casing G and a rear stop block 95^a which may be triangular, as illustrated for the stop block in Figure 9 of the drawings. The path of travel of the rear ball bearing 95 is limited by the stop block 95^a at its forward length of travel and at its rear length of travel is limited by a similar stop block 96 located in the groove 93. If desired a stop block 97 may be provided on the drawer below the

bottom wall thereof to abut against the front wall 90 of the casing G to limit the outward movement of the drawer F.

Referring to the form of invention utilizing the drawer K, the casing L thereof may be of any approved nature, and for the purposes of the invention the same has side walls 100 and 101, between which a compartment 102 is provided wherein the drawer K is slidably mounted. The drawer K includes the side walls 103 and 104, connected by a bottom wall 105, and front and rear walls 106 and 107^a respectively, and it is adapted to slide into the compartment 102 between the side walls 100 and 101.

The means M for supporting the drawers in anti-friction relation from the side walls 100 and 101 comprises spaced upper and lower elongated tracks 107 and 108 at the inner side of each side wall 100 and 101, secured thereto in any approved manner, to provide a space 109 therebetween, within which may be slidably received the track flange 110 which is attached to the side wall of the drawer. It is of course understood that each side wall 103 and 104 of the drawer is provided with such a track strip 110, which operates in the channel between the upper and lower tracks 107 and 108 secured to the adjacent side wall of the casing.

Inwardly of the top surface of the lower track 108 of the side walls of the casing, it is preferred to provide a groove 111, which in cross section is exactly the same as the groove illustrated in cross section in Figure 12, although the angle of the sides may vary from 60°, but not above 90°. Inwardly of the groove 111 of each track 108, a forward ball bearing 112 is disposed, which is limited to a path of travel slightly less than one-half the length of the track 108, being forwardly restrained by means of a stop block 112^a in the front end of the groove 111, and at its rear path of travel being limited by a stop block 113. Also in each groove 111 a rear ball bearing 114 is provided which is limited to a length of travel along the groove 111, to about the same distance as the travel of the ball bearing 112. The ball bearing 114 is limited in its front end travel by means of the stop block 113; and a similar stop block 115 is provided in the rear end of the groove 111 to limit the rear movement of the ball bearing 114.

When the drawer K is slipped into place, the bottom surfaces of the side flanges or tracks 110 thereon engages the top projecting portions of the ball bearings 112 and 114, for supporting the drawer in an anti-friction manner from the tracks 108. It is of course understood that the grooves are provided with the retaining flanges 78 and 79 as illustrated in Figure 12, to retain the ball bearings in place.

At the rear end of each of the flanges or

tracks 110, inwardly of the top surface thereof, a groove 117 is provided, which extends from the rear end 118 of the said flange 110, for substantially one-half the length of the flange 110; the groove 117 in cross section being identical with the cross section of the groove illustrated in Figure 12, and being adapted to support front and rear ball bearings 119 and 120 therein, which are respectively limited in their path of travel by front intermediate and rear abutments 121, 122, and 123, to limit the movement of the ball bearings 119 and 120 to substantially the same distance of travel at the front and rear ends of the groove 117 of each flange 110.

It is readily apparent that when the tracks 110 are slipped into the channels between the upper and lower tracks 107 and 108 of the casing L, the upper projecting portions of the ball bearings 119 and 120 will engage the under surfaces of the tracks 107, to support the drawer K in a sliding relation on its casing L, to counter-act the tipping effect when the same is extended, and permits the easy sliding thereof, without binding.

From the foregoing description of this invention it is apparent that a novel type of anti-friction ball bearing support for drawers has been provided, which is susceptible of universal adaptation to various types of drawers, and which may be used in connection with wooden, composition, or metal cabinet or table construction.

Various changes in the shape, size, and arrangement of parts may be made to the forms of invention herein shown and described, without departing from the spirit of these inventions or the scope of the claims.

I claim:

1. In a drawer construction of the class described the combination of a casing having a compartment therein and including a bottom wall and spaced side walls and a front wall with an opening therein to said compartment, tracks stationary on the bottom wall of the casing, retaining flanges connected at the inner sides of the side walls in spaced relation above the tracks, a sliding tray operating on the stationary tracks of the bottom wall for extension into the compartment or extension therefrom through the opening of the front wall of the casing, said sliding tray having lateral extensions at opposite sides thereof below the side wall flanges to prevent the tipping of the tray from a horizontal position, said extensions at the sides of the sliding tray being disposed at the rear end of the sliding tray to limit the forward extended movement of the tray from the casing by abutment against the front wall, and a drawer slidable on the tray.

2. In a drawer construction of the class described, the combination of a casing having a compartment therein and including a bottom wall and spaced side walls and a front

wall with an opening therein to said compartment, tracks stationary on the bottom wall of the casing, retaining flanges connected at the inner sides of the side walls in spaced relation above the tracks, a sliding tray operating on the stationary tracks of the bottom wall for extension into the compartment or extension therefrom thru the opening of the front wall of the casing, said sliding tray having lateral extensions at opposite sides thereof below the side wall flanges of the casing to prevent the tipping of the tray from a horizontal position, said extensions at the sides of the sliding tray being disposed at the rear end of the sliding tray to limit the forward extended movement of the tray from the front wall opening by abutment against the front wall, a drawer slidable on the tray, and means for limiting the forward sliding movement of the drawer with respect to the tray.

3. In a drawer construction of the class described the combination of a casing having a compartment therein and including a bottom wall and spaced side walls and a front wall with an opening therein to said compartment, tracks stationary on the bottom wall of the casing, retaining flanges connected at the inner sides of the side walls in spaced relation above the tracks, a sliding tray operating on the stationary tracks of the bottom wall for extension into the compartment or extension therefrom through the opening of the front wall of the casing, said sliding tray having lateral extensions at opposite sides thereof projecting into the space below the side wall flanges to prevent the tipping of the tray from a horizontal position, said extensions at the sides of the sliding tray being disposed at the rear end of the sliding tray to limit the forward extended movement of the tray from the front wall opening by abutment against the front wall, a drawer slidable on the extension tray, and ball bearings between the stationary tracks and the bottom wall of the drawer and the extension tray for slidably supporting the tray for easy movement.

4. In a drawer construction of the class described the combination of a casing having a compartment therein and including a bottom wall and spaced side walls and a front wall with an opening therein to said compartment, tracks stationary on the bottom wall of the casing, retaining flanges connected at the inner sides of the side walls in spaced relation above the tracks, a sliding tray operating on the stationary tracks of the bottom wall for extension into the compartment or extension therefrom thru the opening of the front wall of the casing, said sliding tray having lateral extensions at opposite sides thereof projecting into the space between the bottom wall tracks of the casing and the side wall flanges to prevent the tip-

ping of the sliding tray from a horizontal position, said extensions at the sides of the sliding tray being disposed at the rear end of the sliding tray to limit the forward extended movement of the tray from the casing by abutment against the front wall, a drawer slidable on the extension tray, ball bearings between the tracks and tray, and the bottom wall of the casing and the extension tray for slidably supporting the tray for easy movement, and anti-friction means supported at the lateral extension of said tray for engaging the under surface of the flanges supported by the side walls of the casing.

5. In a drawer construction of the class described the combination of a casing having a compartment therein and including a bottom wall and spaced side walls and a front wall with an opening therein to said compartment, tracks stationary on the bottom wall of the casing, retaining flanges connected at the inner sides of the side walls in spaced relation above the tracks, a sliding tray operating on the stationary tracks of the bottom wall for extension into the compartment or extension therefrom thru the opening of the front wall of the casing, said extension tray having lateral extensions at opposite sides thereof projecting into the space between the bottom wall tracks of the casing and the side wall flanges to prevent the tipping of the tray from a horizontal position, said extensions at the sides of the sliding tray being disposed at the rear end of the sliding tray to limit the forward extended movement of the tray from the casing by

abutment against the front wall, a drawer slidable on the extension tray, ball bearings between the track surfaces and the bottom wall of the casing and the extension tray for slidably supporting the tray for easy movement, anti-friction means supported at the lateral extensions of said tray for engaging the under surface of the flanges supported by the side walls of the casing, and anti-friction means supported on the upper surface of and at opposite sides of the extension tray upon which the drawer slides.

6. As an article of manufacture an extension drawer supporting tray comprising side rails, cross rails connecting the side rails in substantially parallel relation, said side rails inwardly of the top surfaces thereof having longitudinal grooves, ball bearings in said grooves, said side rails at the rear ends thereof having lateral projecting flanges with forwardly facing shoulders intermediate the ends of said rails.

7. As an article of manufacture an extension drawer supporting tray comprising side rails, cross rails connecting the side rails in substantially parallel relation, said side rails inwardly of the top surfaces thereof having longitudinal grooves, ball bearings in said grooves, said side rails at the rear ends thereof having lateral projecting flanges with forwardly facing shoulders intermediate the ends of said rails, said flanges having grooves in the upper surfaces thereof, and ball bearings in said grooves movable therealong.

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