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E. C. BULLOCK ET AL

2,095,487

EXTENSION DRAWER SLIDE

Filed July 16, 1934

3 Sheets-Sheet 1

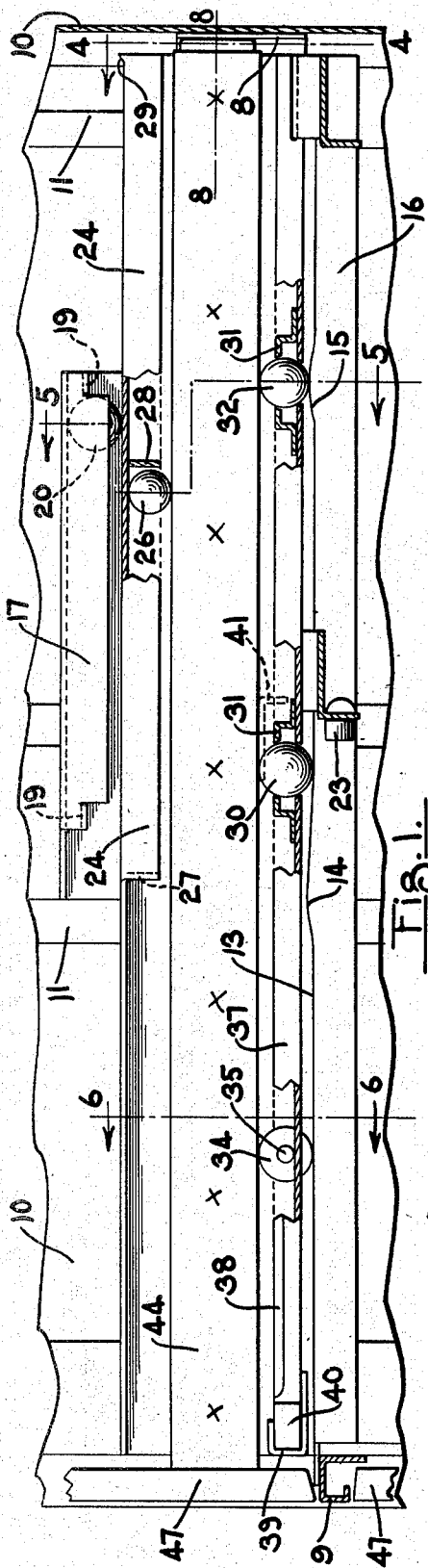


Fig. 1.

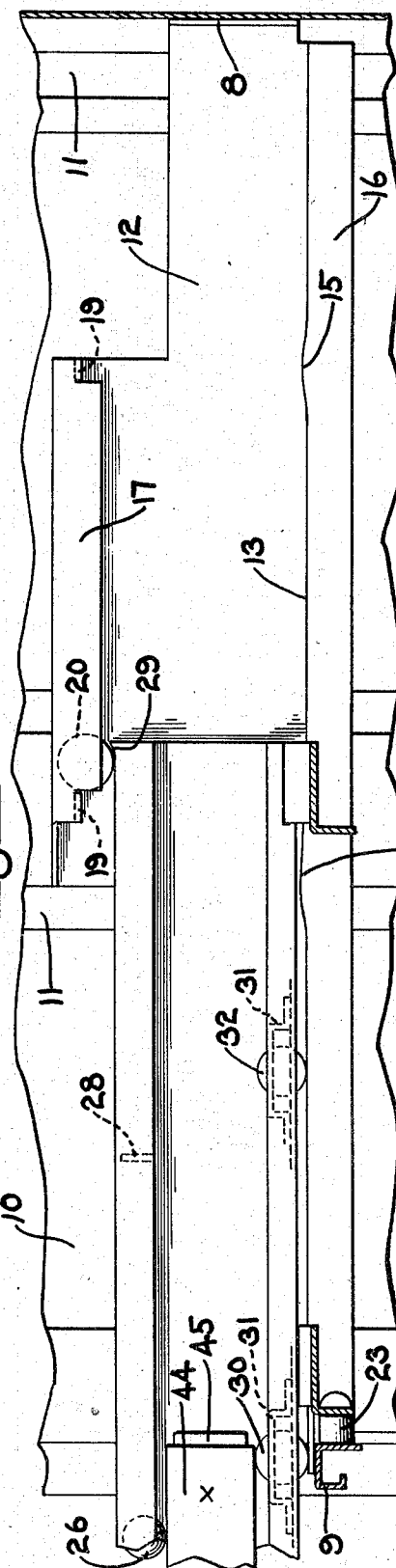


Fig. 2.

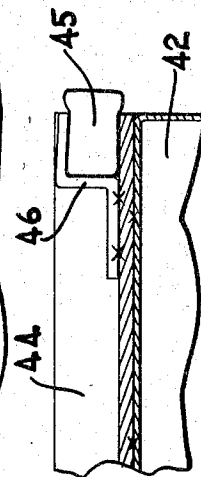


Fig. 3.

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3 Sheets-Sheet 3

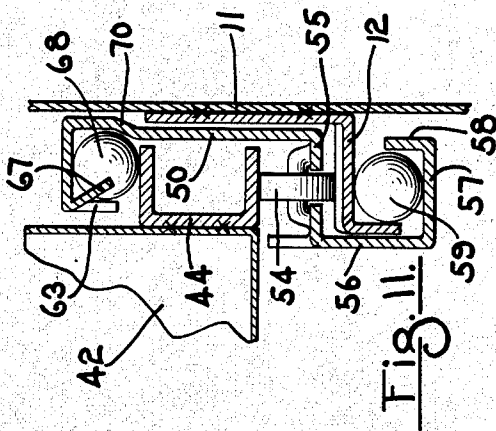


Fig. 11.

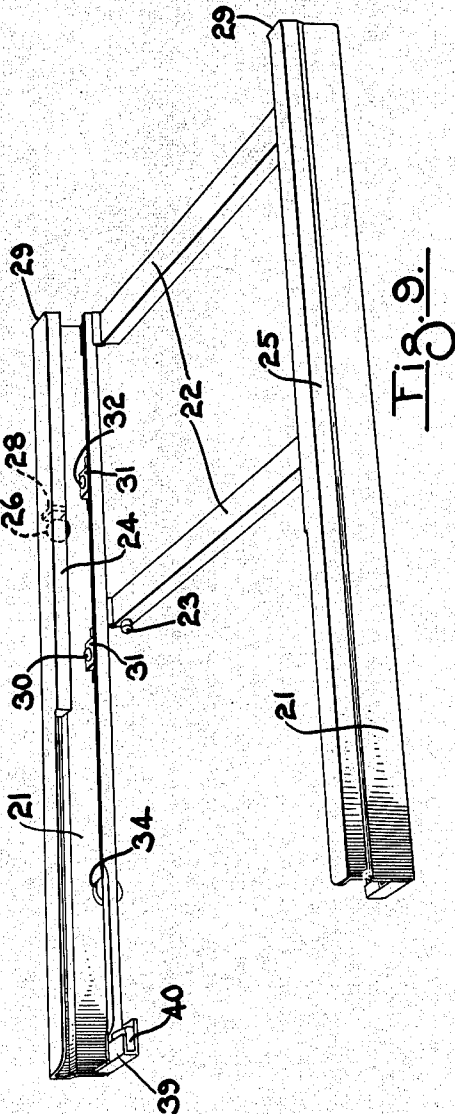


Fig. 9.

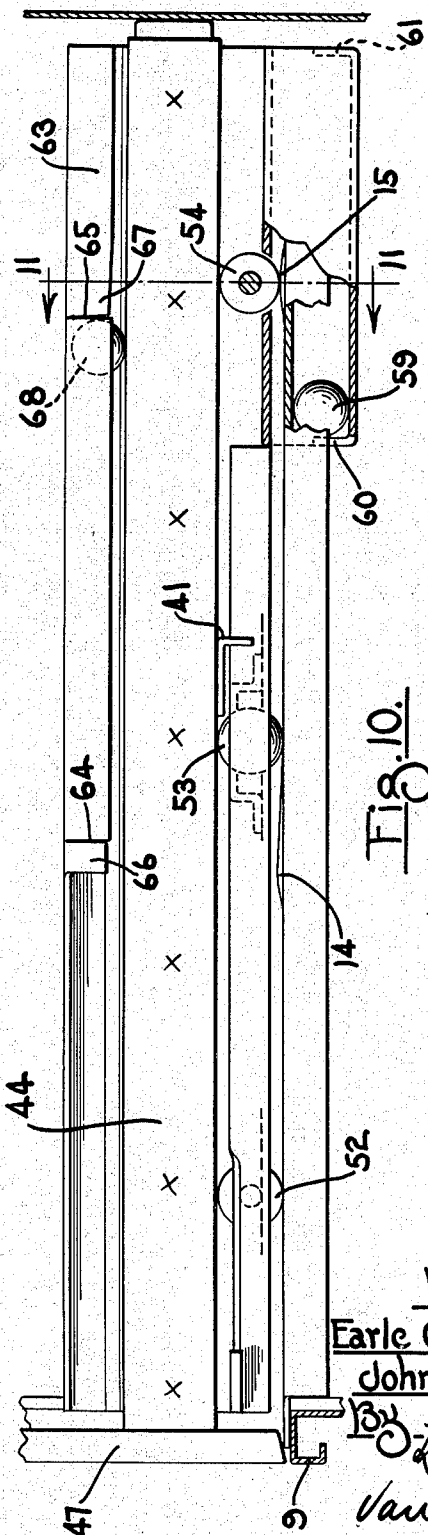


Fig. 10.

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UNITED STATES PATENT OFFICE

2,095,487

EXTENSION DRAWER SLIDE

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6 Claims. (Cl. 45-77)

Our invention relates to filing cabinets or the like having projectible drawer and drawer suspension mechanisms. More particularly the invention relates to mechanism wherein a drawer and its cantilever suspension are progressively and simultaneously projected from the filing cabinet.

This invention is along the same general lines as those set forth in the patent of John Pipe, issued November 20, 1934, No. 1,981,246.

One of the primary improvements of this invention resides in the substitution of spherical supporting means, namely, balls, in place of rollers. This makes for an easier running construction and also provides an automatic adjustment between the cantilever suspension and the drawer and also between the cantilever suspension and the cabinet. In other words, for example, the tracks may be slightly out of alignment and yet the cantilever extension will function perfectly inasmuch as the anti-friction spherical supporting means therefor permits a universalability of adjustment. Also, it is to be noted that the bars connecting the side channels of this cantilever extension are somewhat flexible or yieldable and therefore permit some distortion whereby the parts smoothly engage to permit ease of operation and smooth running thereof.

Another advantage is the provision of anti-friction means between the inner ends of the drawer slides and the stationary tracks in order to prevent the rear of the drawer, when heavily loaded, from tilting and gravitating downwardly and thereby causing the front upper edge of the drawer to contact against the top edge of the opening into the filing cabinet as the drawer is moved to its fully closed position.

Other advantages will become apparent as the description proceeds.

In the drawings:

Fig. 1 is a view showing the several members in fully retracted position, this view showing the drawer removed and being taken from within the opening normally occupied thereby. Certain parts are shown in section in order to clarify the disclosure.

Fig. 2 is a view similar to Fig. 1, showing a fragmentary portion of the several members when located in their fully extended positions.

Fig. 3 is a completing view for the showing of Fig. 2.

Fig. 4 is a view taken along the line 4-4 of Fig. 1.

Fig. 5 is a cross sectional view taken along the line 5-5 of Fig. 1.

Fig. 6 is a sectional view taken along the line 6-6 of Fig. 1.

Fig. 7 is a fragmentary underplan view of Fig. 6 showing the construction of the outer end of the cantilever extension.

Fig. 8 is a view taken along the line 8-8 of Fig. 1.

Fig. 9 is a perspective view of the automatically aligning cantilever extension.

Fig. 10 is a side view, similar to the disclosure of Fig. 1, showing a modified form of our invention.

Fig. 11 is a sectional view taken along the line 11-11 of Fig. 10.

Like numerals refer to like parts throughout the several views.

In the drawings, numeral 10 indicates the walls of a filing cabinet which has vertically located reinforcing strips 11. Numeral 12 indicates the track members. As the construction on both sides of the sliding drawer mechanism is identical only one side thereof will be described in detail.

Each track member is welded onto several of the vertical reinforcing members 11. See Fig. 4. The track member is of the shape shown in Figs. 1 and 2, having a track 13 with raised portions 14 and 15, and a stiffening flange 16, see Figs. 2 and 4, depending therefrom. The track member 12 is of substantially channel shape in its central portion, see Fig. 5. A depending flange 17 is integrally formed with the upper flange of the track along its central portion and is formed with stops 19. The web of the track member, opposite to the flange, is bodily offset as indicated at 18 and thus a ball race is formed. A ball 20 is located therein. The offset formation, see Fig. 5, and the stops 19, see Fig. 2, prevent removal of the ball. During normal operation of the drawer the ball rides between the upper flange of the channel shaped track member and the top side of the cantilever extension, now to be described.

The track members 12, one of which has been described in detail, receive the cantilever extension. This cantilever extension consists of channel members 21 connected by slightly yieldable members 22, the front member 22 having rubber bumper means 23 thereon. A cross member 9, see Figs. 1, 2 and 3, extends between each of the several drawers at the front of the cabinet and the bumper means 23 contact thereagainst

whereby outward movement of the extension is limited.

Each of the side members 21 has a depending portion 24 and the web opposite this portion is stamped outwardly as indicated at 25 in order to receive a ball 26 therein. Stop plates 27 and 28 are fastened in this depending portion 24 to limit the path of movement of the ball. The upper flange is raised at its inner end to form a stop 29 which contacts the ball 20, if necessary, when the drawer is extended, and assures correct positioning thereof. The lower flange of the side member 21 has a ball 30 about centrally mounted therein by means of the socket member 31 whereby it may have a slight vertical movement. A second ball 32 is similarly mounted near the rear of the same member by means of another socket member and likewise has a limited amount of vertical movement. Also, chambers are formed around both of the balls 30 and 32. The ball 32 is of slightly less diameter than the ball 30, say $\frac{1}{8}$ "', for reasons which will later appear. A roller 34, having axial extensions 35 at either side thereof, see Fig. 7 particularly, extends through a slot 36 in the lower flange and an upwardly extending portion 37 is crimped over as indicated at 38 in order to retain this roller member in position. Small plates 39 are welded at each side of the underside of the front end of these members 21, and each receives a rubber bumper block 40 as clearly shown in Fig. 9. These rubber blocks 40 abut stops 41 which are rigidly attached to the drawer. See Fig. 3.

Only a fragmentary part of the drawer 42 is shown. Numeral 44 indicates the drawer slides, one of these slides being attached to each side of the drawer. These slides 44 are received between the several anti-friction means illustrated in Fig. 9. Rubber blocks 45 are attached to the inner ends of the drawer slides by means of the clips 46, see Fig. 8, and these abut against extensions 8 when the drawer is moved to its inner position. These extensions are integral with the track members 12, see Figs. 1 and 2. Numeral 47 indicates the front of the drawer.

Referring to Figs. 10 and 11, these figures illustrating a modified form of our invention, numeral 12 illustrates the track member and 50 indicates the modified form of the extension slide, one of these extension slides being utilized at each side of the drawer. These slides are independently movable. The front part of the slide has a construction similar to that of the side member 21, shown in Fig. 9, having a roller 52 and a centrally located spherical ball 53 but the rear of the slide is provided with a roller 54 revolvably mounted on the horizontally extending flange 55 as shown in Fig. 11. The diameter of the roller is slightly less than that of the ball. This flange continues downwardly as indicated at 56, extends inwardly at 57 and terminates in a vertical portion 58. A ball 59 is received between the vertical portion 58 and the vertical portion 56 and stop means 60 and 61 limit the travel of this ball.

The operation

Referring to Figs. 10 and 11, the track member 12 has its flange 16 extending alongside of the ball 59 and thus the extension slide is prevented from undesired lateral movement.

Each extension slide has a depending portion 63 from the outer edge of its upper flange and is slitted at 64 and 65 whereby portions 66 and 67 thereof may be pushed inwardly to provide stops

for the ball 68. The web of each extension slide is, of course, offset as indicated at 70 to prevent disassembly of the ball 68 from its ball race.

When the drawer is in its retracted position, the center of gravity therein may be either at the front of the drawer or at the rear of the drawer.

Referring now to Figs. 1-9, inclusive, if the center of gravity is at the front of the drawer, the drawer slides will bear upon the centrally located balls 30 and tend to tilt downwardly about these balls as a fulcrum. Rearwardly of this fulcrum the drawer slides bear against the balls 26 at their upper sides and the cantilever extension will bear upwardly against the balls 20 and, if the drawer is pulled outwardly, the drawer slides will roll upon the rollers 34.

If the center of gravity of the drawer is near its inner end, the drawer will cause the drawer slides to tip downwardly at the rear of the balls 30 but the balls 32, see Fig. 1, will prevent this movement when the drawer is at or near its inner or retracted position. That is, the drawer cannot tilt so that the front 47 thereof can contact with the cross member 9. In other words, as the drawer glides to its inner position, the balls 32 roll up the inclines 15 and thus positively cause the front end of the drawer to assume its aligned position between the members 9. It is to be noted that this alining movement occurs only during the inner fractional part of the movement of the drawer and thus the operation of the balls 30 upon their inclined portions 14 of the track member 13 is not hindered or obstructed in any manner.

The balls 30 ride up their respective inclines 14 as the drawer is pulled to open position and slightly raise the drawer and thus upon reversal of this movement gravity will aid therein to cause a smooth and a full closing of the drawer as will be understood by those skilled in this art.

The operation of the modified form of invention, shown in Figs. 10 and 11, is substantially the same as that of the preferred form. The drawer slides 44 move with the drawer and roll upon the balls 53 and thus cause an extending of the extension slides at half speed with respect to the speed of movement of the drawer itself.

When the drawer is almost fully closed, the rollers 54 ride upon the raised portions 15 and thus the front 47 of the drawer is properly located with respect to the cross member 9. When the drawer is pulled open, the rollers 54 roll down upon the level portion of the track 13 and provide clearance whereby the drawer slides 44 may properly tilt due to the balls 53 running upon the raised portions 14. During the extension of the drawer the drawer slides 44 roll upon the front rollers 52 and this gradually moves forwardly between the drawer slides 44 and the extension slides similar to the movement of the rollers in the preferred form.

We claim:

1. In a device of the class described, a filing cabinet having spaced apart horizontally positioned tracks in substantially the same horizontal plane, an automatic alining cantilever extension comprising vertically positioned channel members, means for holding the channel members one over each track, each lower flange of each channel member being cut away at a point intermediate its ends to form a hole therein, a ball located in each of the holes, means to mount each ball in its respective hole whereby it has a limited vertical movement, anti-friction means

located above the said lower flange of each of the channel members near the front ends, a drawer mounted between the channel members, members fastened at each side of the drawer, said members extending into said channel members and resting upon the said anti-friction means and the said balls, an additional ball located between the upper side of each of the members which are fastened to the sides of the drawer and the lower side of the upper flange of each channel member, anti-friction means above the rear portions of each of the said channel members, stationary horizontal tracks for the last mentioned anti-friction means to prevent upward movement of the said channel members and balls located between the rear portions of the members attached to the drawer and said tracks, said balls being of a smaller diameter than the first mentioned balls, and each of said tracks having raised portions immediately below the smaller balls when the several parts are in their retracted positions.

2. In an extension slide, a case having guide tracks on the sides thereof, a horizontally sliding extension member comprising a vertical web extended at the top into an inverted channel for retaining a rolling element therein, the bottom of the web being bent into a horizontal flange, one or more holes being formed in the horizontal flange, a plate with a hole therein being secured above the hole in said flange and spaced away therefrom, a ball being inserted in the holes of the flange and retained by said plate, the said holes being of a size and shape to permit limited vertical displacement of the ball to project above the plate and below the flange, said plate being shaped to form an enclosure around the ball.

3. In an extension slide, a case having guide tracks on the sides thereof, a horizontally slidable extension member comprising a vertical web which is extended at the top into an inverted channel for retaining a roller element therein, and the bottom of the web being bent into a lateral flange and again bent vertically upward to form an upright channel adjacent to the web, two holes suitably spaced apart being formed in said lateral flange, straps to fit inside of the upright channel, said straps having their central portion offset upwardly from the lateral flange, a hole in each of the straps, said straps being secured to the lateral flange with the hole therein directly over one of the holes in the flange, a ball being placed into the holes in the lateral flange and the offset strap, the balls projecting above the straps and below the lateral flange, but being limited in movement, and an enclosed pocket being formed by the side walls of the upright channel and the offset central portion of the straps.

4. In a device of the class described, a filing cabinet having spaced apart horizontally positioned tracks in substantially the same horizontal plane, an automatic alining cantilever extension comprising vertically positioned channel members, means for holding the channel members one over each track, each lower flange of each channel member being cut away at a point intermediate its ends to form a hole therein, a ball located in each of the holes, means to mount each ball in its respective hole whereby it has a limited vertical movement, anti-friction means lo-

cated above the said lower flange of each of the channel members near the front ends, a drawer mounted between the channel members, members fastened at each side of the drawer, said members extending into said channel members and resting upon the said anti-friction means and the said balls, an additional ball located between the upper side of each of the members which are fastened to the sides of the drawer, and the lower side of the upper flange of each channel member, anti-friction means above the rear portions of each of the said channel members, stationary horizontal tracks for the last mentioned anti-friction means to prevent upward movement of the said channel members, and balls located between the rear portions of the members attached to the drawer and said tracks, said balls being of a smaller diameter than the first mentioned balls, and each of said tracks having raised portions immediately below the smaller balls when the several parts are in their retracted positions.

5. A cabinet having means forming a drawer casing, a drawer in said casing, means for shiftably supporting the drawer in the casing, said drawer supporting means comprising a pair of tracks located on the casing in spaced parallel relationship to each other, a cantilever extension including two channels, members extending between the said channel members to hold them vertically positioned above the tracks with the said channels facing inwardly toward one another, anti-friction means located intermediately of each of the channels in the bottom flange thereof, means for mounting the anti-friction means for a limited vertical movement, a second anti-friction means similarly mounted at the front end of each of the said channels, said drawer having means attached thereto at either side thereof adapted to be received upon the said anti-friction means, a third anti-friction means positioned in the lower flanges of each of the said channels near their rear portions, means for mounting the said third anti-friction means whereby they have limited vertical movement, said tracks having a raised portion underneath the third anti-friction means for the purpose described.

6. In an extension drawer slide for a case, flanged channels secured to the sides of the case, flanged drawer slides secured to the sides of the drawer, a pair of flanged extension channels slidable within the case slides and over the drawer slides, a bearing ball mounted about midway in each of the bottom flanges of the extension channels, a second bearing ball of lesser diameter mounted rearwardly of the first ball, said balls riding between the respective lower flanges of the case channels and the slides whereby a cantilever support is effected around the middle pair of bearing balls and a tilting action imparted to the extension slide when in extended position, and a raised portion in the rear bottom flange of the case channels to form a support for the second pair of bearing balls and terminate the cantilever support around the first pair of bearing balls when the extension slide is in closed position.

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