United States Patent [19]

Hagen et al.

[11] **3,904,254**

[45] **Sept. 9, 1975**

[54] **MEANS FOR POSITIONING BALL RETAINER FOR TELESCOPING BALL BEARING SLIDE MECHANISMS IN RELATIONSHIP TO OPEN OR CLOSED POSITION OF SAME**

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[22] Filed: **June 14, 1973**

[21] Appl. No.: **370,040**

[52] **U.S. Cl.** **308/3.8;** 312/348

[51] **Int. Cl.** **F16c 17/00**

[58] **Field of Search** 308/3.8; 312/348, 344, 312/341, 343, 337, 334, 339

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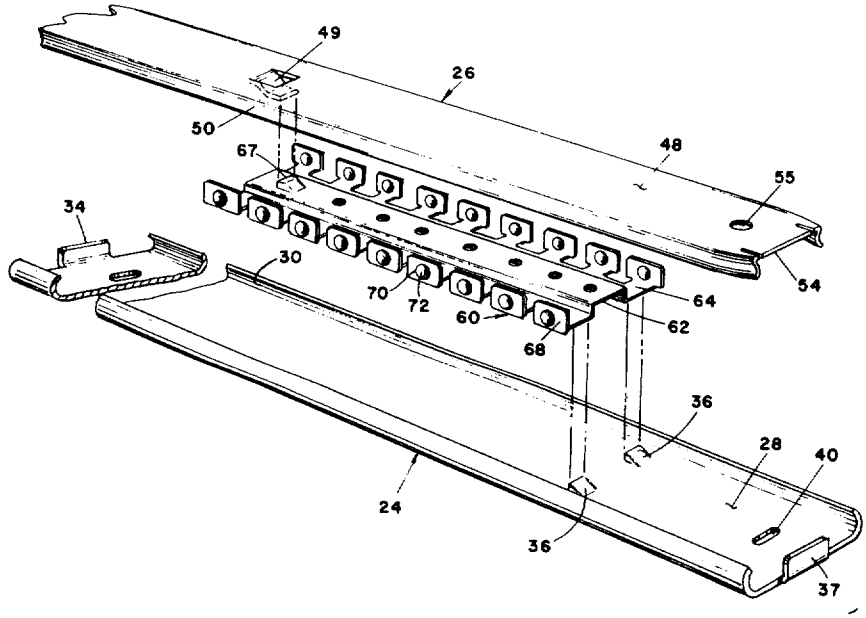
Primary Examiner—Charles J. Myhre
Assistant Examiner—R. H. Lazarus
Attorney, Agent, or Firm—J. Carroll Baisch

[57] **ABSTRACT**

A telescoping ball bearing slide mechanism having inner and outer slide members with a ball bearing retainer positioned there between. The moving slide member has a lanced-down tab. The ball retainer also has a lanced-up counter-tab. The tab of the slide moving member is aligned with the tab of the ball retainer, and if the ball retainer has moved out of its normal operative position, the tab of the slide moving member engages the tab of the ball retainer, and the ball retainer is pushed to its normal position by fully closing the drawer which the slide mechanism supports.

7 Claims, 16 Drawing Figures



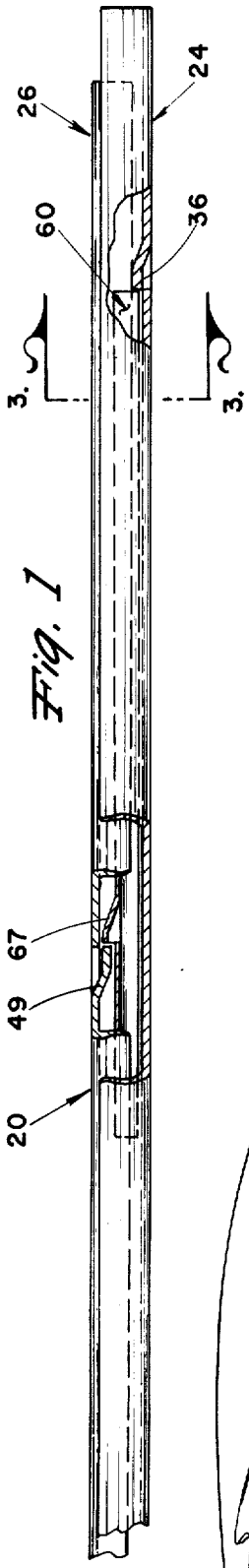


Fig. 1

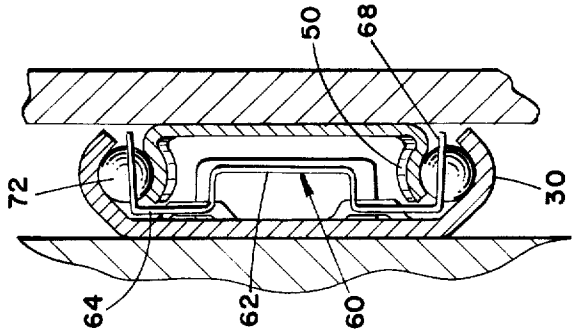


Fig. 3

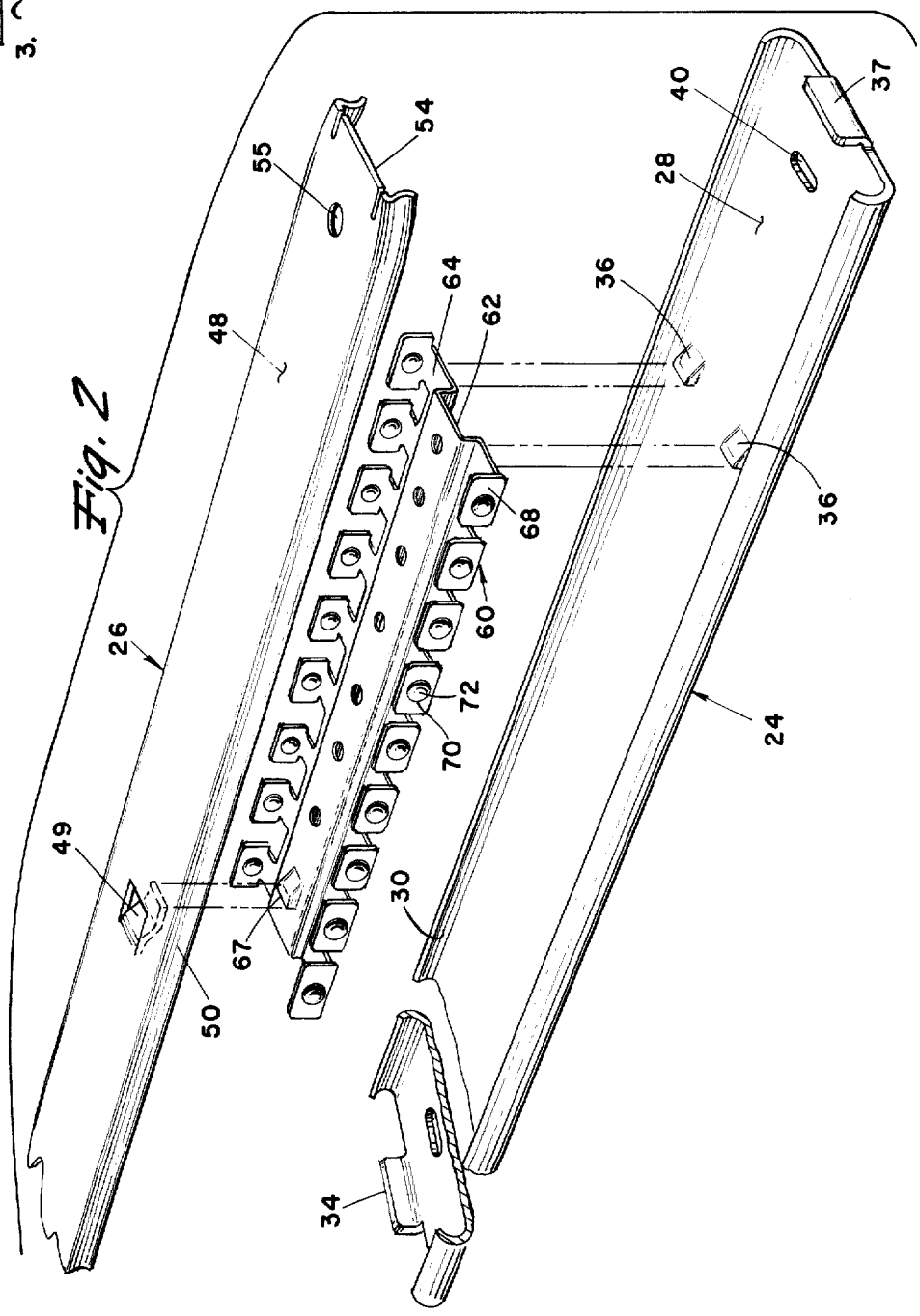


Fig. 2

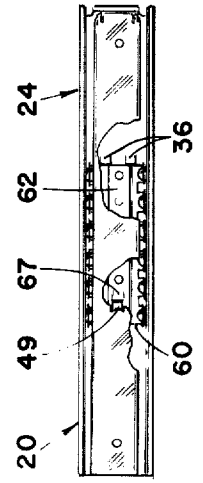


Fig. 9

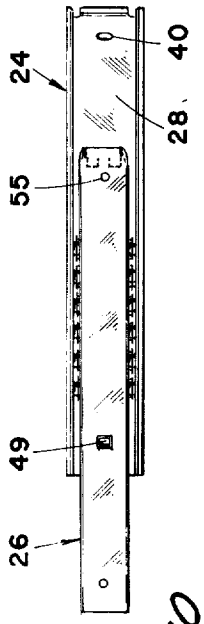


Fig. 10

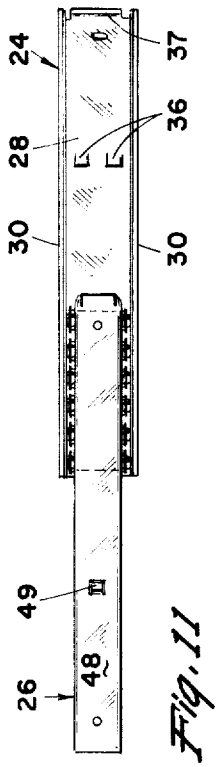


Fig. 11

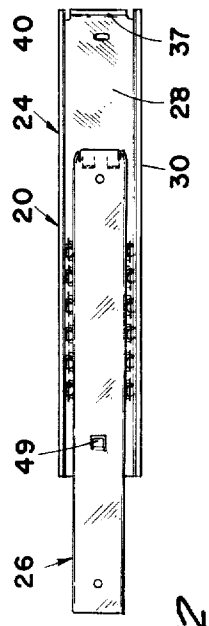


Fig. 12

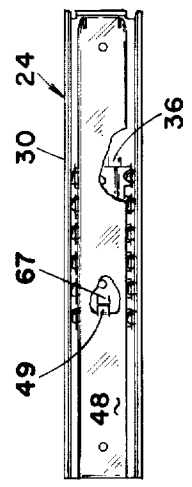


Fig. 13

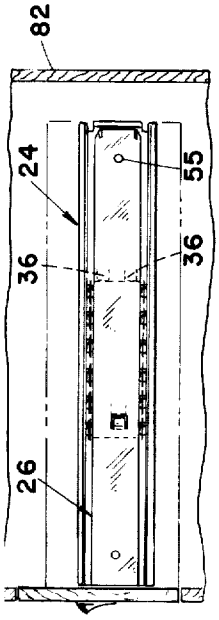


Fig. 4

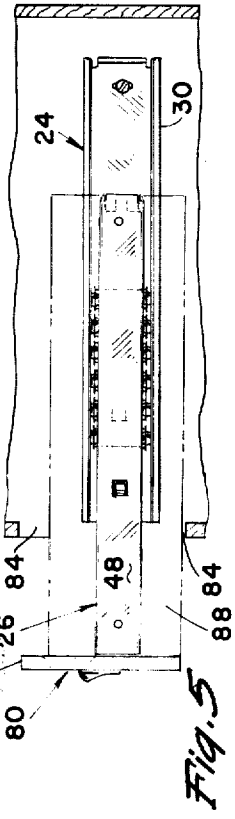


Fig. 5

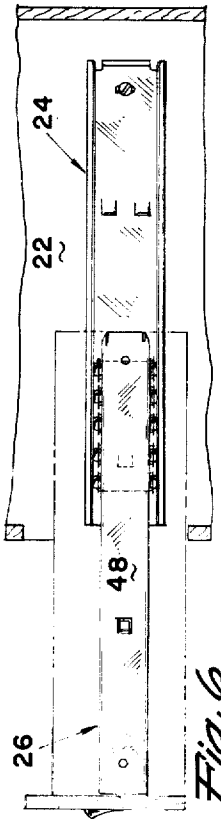


Fig. 6

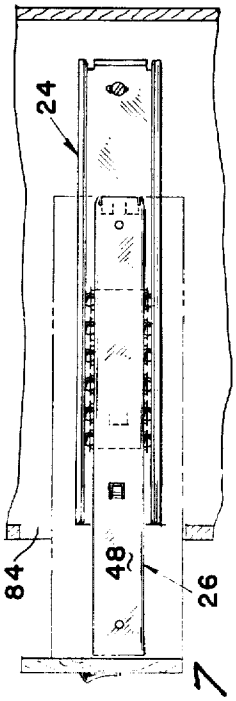


Fig. 7

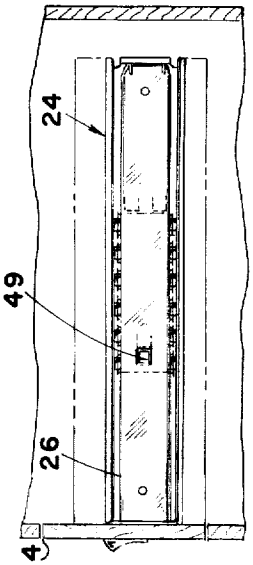


Fig. 8

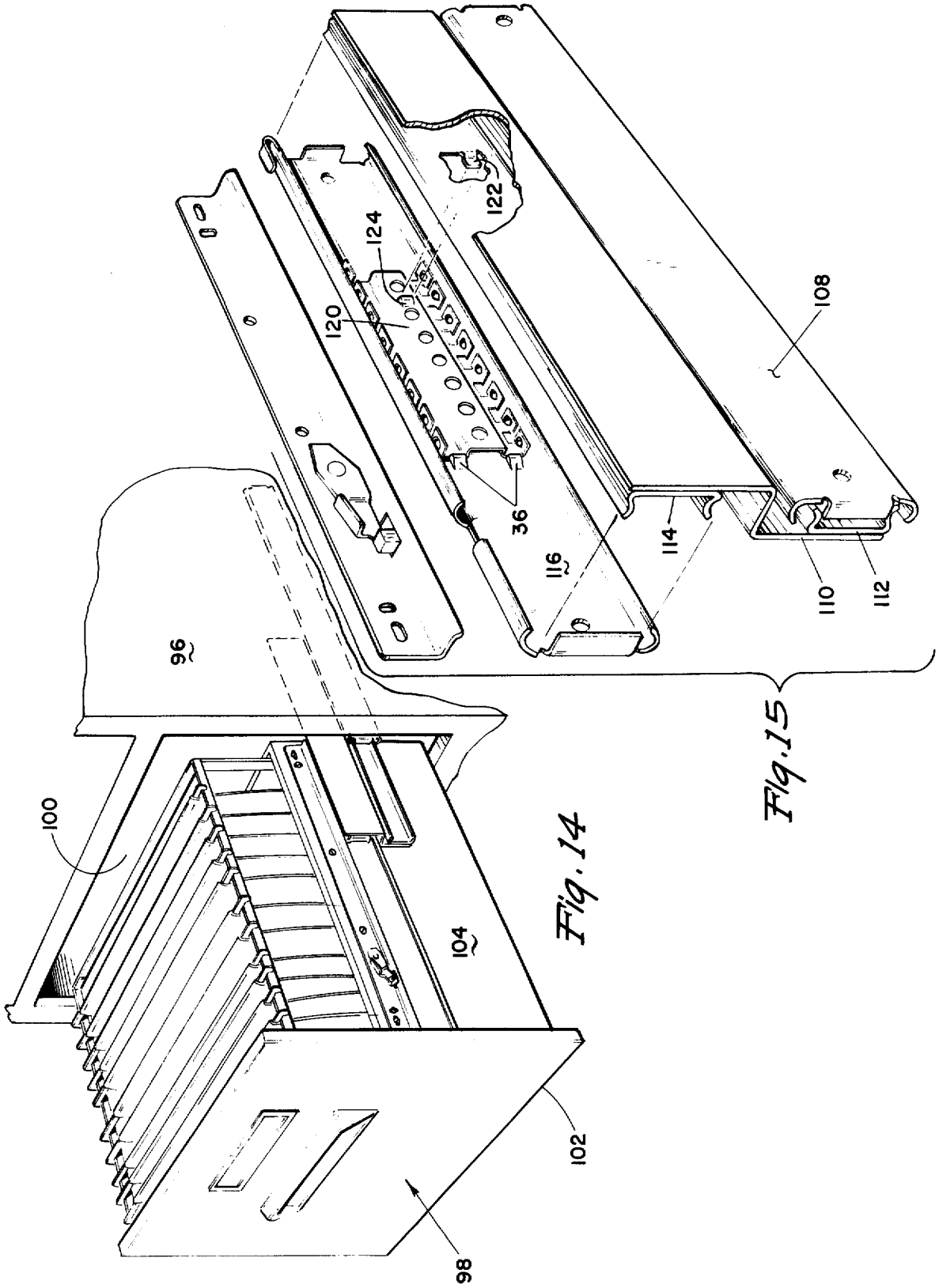


Fig. 14

Fig. 15

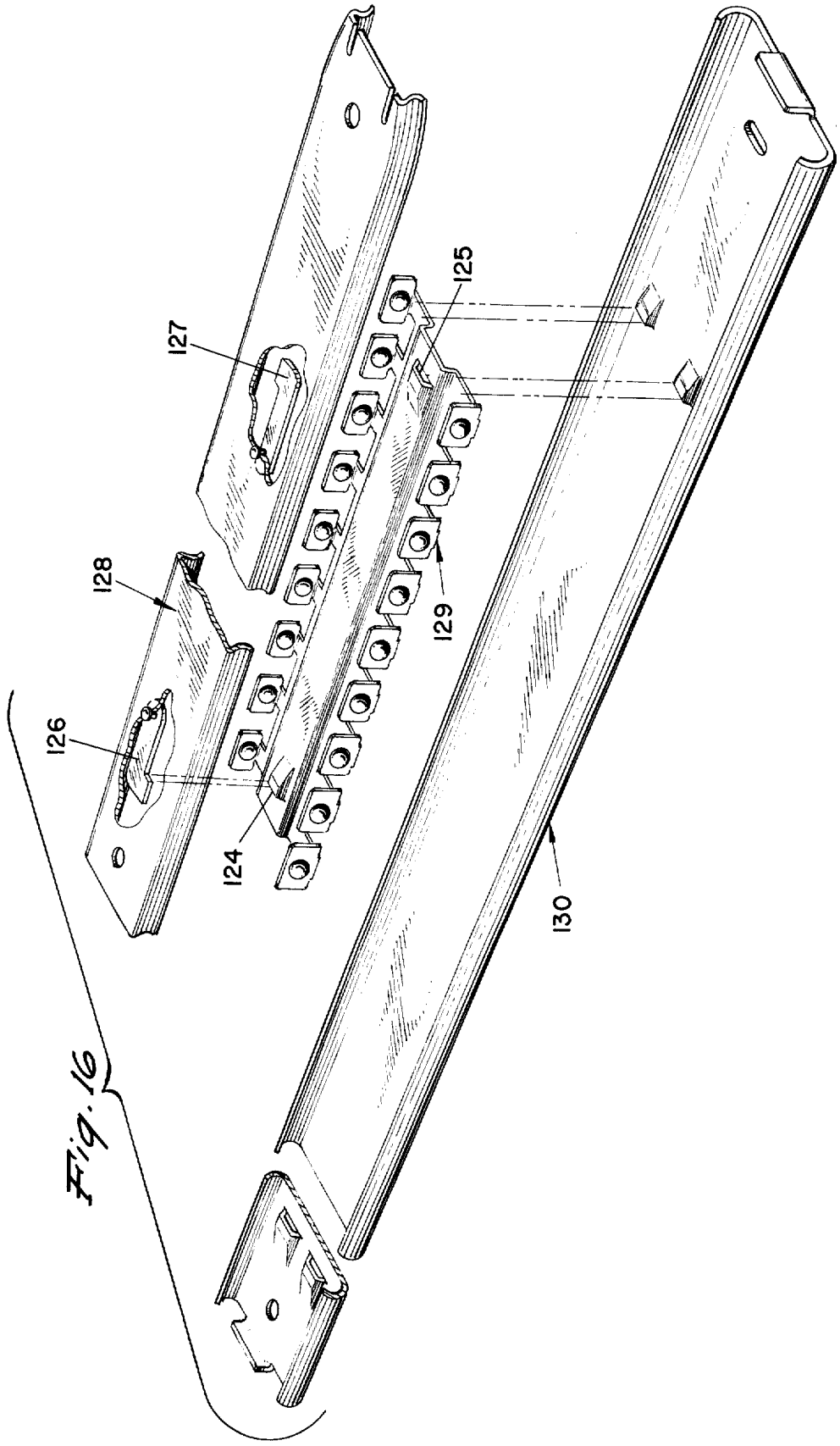


Fig. 16

MEANS FOR POSITIONING BALL RETAINER FOR TELESCOPING BALL BEARING SLIDE MECHANISMS IN RELATIONSHIP TO OPEN OR CLOSED POSITION OF SAME

CROSS-REFERENCE TO RELATED APPLICATION

APPLICANT: MAGNUS F. HAGEN AND FRED A. JORDAN
TITLE: PRECISION TELESCOPING BALL BEARING DRAWER SLIDE SUSPENSION FOR WOOD AND METAL FURNITURE
U.S. Pat. No. **3,778,120**
FILED: Feb. **15, 1972**

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to telescoping slide mechanisms and relates more particularly to improvements in telescoping ball bearing mechanisms such as improved movement under cycling of the slide to less than full extension.

2. Description of the Prior Art

Prior to the present invention, it has not been possible to effect an exact recycling position of the ball retainer in relationship to a closed or telescoped position of the slide mechanism.

The problem or difficulty encountered with such prior slide mechanisms results when a drawer mounted on telescoping ball bearing slide mechanisms is pulled forward toward operator, but not to the fully extended position where the recycling of the ball retainer would take place by virtue of slide member outstops hitting the retainer. When a drawer is repeatedly cycled at less than full extension, the ball retainer will creep due to the skidding of the balls into an uncontrolled location. Due to creep, the ball retainer will skid out of the normal position and result in less than full design extension or travel of the slide mechanism. The ball retainer will then effect a stop of the drawer short of its fully open position, and the drawer can only be pulled to the full forward position by dragging or skidding of the moving drawer member through the balls.

Consider a file drawer mounted on ball bearing telescoping slides which is being utilized frequently by file clerks. It is well known that file clerks do not pull out this drawer every time to its fully extended position, so that the full out stops of the slide will properly engage.

The Jordan U.S. Pat. No. **3,205,025** refers to such stops and the proper cycling of the ball retainers in relationship to the fully open slide position. In this patent, there are outer member tongues which are necessary to limit the ball retainer travel to the rear of the slide so that the proper sequencing of the ball retainer in normal use of the slide is assured.

In other words, should you have removed a drawer with attached slide member, when reinserting the slide member into the other slide section by means of engaging the balls, the ball retainer will be stopped by the tongues of the "outer member," and the inner section will then pass by friction through the ball bearings, since they are unable to rotate due to the retainer having been stopped. Once the slide is in the closed position, or what is called the "**0**" position, the ball retainer is properly cycled. The important point to understand is that this cycle position is only achieved after the drawer has been disconnected and reinserted again.

In case the drawer and attached slide inner member is not removed by pulling the inner sections out completely from the ball bearings, it has been found that various ball bearing slides, not only that of U.S. Pat. No. **3,205,025** but all slides based on this principle, have a considerable problem, namely; skidding of the balls. This is a problem that cannot be overcome in ball bearing slides unless there is synchronization or recycling of the ball retainer and ball bearings with the inner member movement.

Due to this ball skidding, the normal full extension of the slide becomes less, because of the foreshortened travel of the ball retainer. Due to the frictional stop effected by balls which cannot rotate freely, which occurs when the ball retainer engages the slide outer member stop in the extended position, the drawer then stops before the intended full-extension position is reached for full accessibility, unless the operator is familiar with the slide mechanism and pulls hard on the drawer and attached inner member in order to skid the inner member through the stationary balls. Only by overcoming this frictional stop can the operator "drag" the inner member to the maximum extended position with the ball retainer stopped by the slide outer member stop, thereby achieving full drawer extension and full accessibility. When drawers are full of papers, the frictional resistance under such conditions makes it extremely difficult to pull the drawer to its fully extended position, especially for a woman file clerk. There is also the danger of inadvertantly removing the drawer

However, since the file clerks are generally not familiar with such workings of the slide, they cannot be expected to exert such strong drawer pull in order to pull the drawer to its fully extended position.

SUMMARY OF THE INVENTION

The above problem is solved by the present invention. To begin with, it is always certain that a file drawer has a "normal" position which is the closed or "shut" position within the file cabinet or desk pedestal, etc. With this assumption that the normal drawer position is always a closed or shut drawer position, we now provide special ball retainer tab and moving member tab which assure a recycling sequence when the drawer is in the closed (normal) position.

Restating the matter, the slide is so constructed that when the members are in the closed position, the recycling closed position tabs are in exactly such position that the ball retainer is forced to move to its zero or closed position.

OBJECTS AND ADVANTAGES OF THE INVENTION

It is an object of the present invention to provide a slide mechanism that will always recycle when the drawer mechanism is in the telescoped or closed position. Consequently, the recycling will be effected when a drawer, carried by such slide mechanisms, is in the closed position.

Another object of the invention is to provide a slide mechanism of this character wherein the ball retainer is always positioned properly with respect to the movable slide member.

Still another object of the invention is to provide a slide mechanism of this character wherein creeping or skidding of the ball retainer is controlled within set limits.

A further object of the invention is to provide a slide mechanism that will allow a drawer to be easily pulled to the fully opened position.

A still further object of the invention is to provide slide mechanisms of this character that will always recycle when the drawer is closed.

The characteristics and advantages of the invention are further sufficiently referred to in connection with the following detailed description of the accompanying drawings, which represent the embodiment. After considering this example, skilled persons will understand that many variations may be made without departing from the principles disclosed, and we contemplate the employment of any structure, arrangements or modes of operation that are properly within the scope of the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the drawings which are for illustrative purposes only:

FIG. **1** is a side elevational view of a portion of a drawer slide with parts broken away.

FIG. **2** is an exploded perspective view of a portion of the drawer slide;

FIG. **3** is a sectional view taken on line **3**—**3** of FIG. **1**;

FIGS. **4**–**8** are reduced views showing various positions of a drawer carried by slide mechanisms embodying the present invention and showing the respective positions of the slide members;

FIGS. **9**–**13** are somewhat enlarged elevational views of the slide mechanism with portions broken away to show the position of the various parts of the slide mechanism related to the respective views of FIGS. **4**–**8**;

FIG. **14** is a perspective view of a drawer carried by an alternative slide mechanism embodying the present invention; and

FIG. **13** is an exploded perspective view of the slide mechanism of FIG. **12**; and

FIG. **14** is an exploded perspective view of a slide mechanism employing movable inner member tabs.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring more particularly to FIGS. **1**–**3**, there is shown a slide mechanism, indicated generally at **20**, embodying the present invention. It is to be understood, of course, that there are two slide mechanisms for a desk or other drawer, one at each side of the drawer.

Each slide mechanism comprises a pair of slide members, an outer member indicated generally at **24** and an inner slide member indicated generally at **26**. One of the slide members is attached to the side of a drawer and the other is attached or secured to the adjacent side of the desk, there being sufficient clearance for the slide between the side of the drawer and the adjacent side wall or parts of the desk defining the drawer opening. Normally, the small or inner slide member is secured to the side of the drawer while the larger or outer slide member is secured to the adjacent part or wall of the desk defining the drawer opening. Slide members **24** and **26** are generally channel shaped and formed of sheet metal by stamping, these parts being made with great accuracy.

Outer member **24** has a longitudinally extending center wall **28** which may be termed the bottom of the channel. Along each side edge of the bottom **28** there is an outwardly and laterally extending ball race **30** that is concave and convex in cross section with a concave surface facing inwardly so that said surfaces are oppositely arranged relative to each other and are spaced apart laterally relative to the length of the wall **28**.

At each end of the outer member **24** there is a flange **34** & **37** that is turned laterally at an angle substantially normal to the plane of the bottom wall **28** and in a perpendicular direction to the ball races **30**. However, the flange **34** extends but part way across the channel so as to leave clearance space at each side for the ball races of the inner slide member when the device is assembled as described hereinafter.

At its other end, and at a location intermediate to the ends of member **24** there are two tongues **36** cut from the bottom wall, said tongues being apart one-third of the distance from the ball races **30** of the member **24** relative to the length of said member **24**. The sides of each tongue are cut parallel to each other in laterally spaced relationship and one end of said tongue is free and formed by a cut connecting the adjacent sides of the tongue. At one end the tongue is integral with the metal of the bottom wall **28** while the other end is free and said tongue is bent inwardly into the channel so that said free end is positioned inwardly of the inner surface of wall **28** and provides stop means of a ball retainer **60**. Wall **28** is also provided with various openings **40** for reception of screws, not shown, whereby said member **24** is secured at a support such as the part of the desk defining the side walls of the drawer opening or the like.

Inner slide member **26** also has a bottom wall, indicated at **48**, along the longitudinally extending sides or side edges of which are laterally turned ball races **50** which are oppositely arranged and arcuate in cross-section with the concave surfaces arranged oppositely respective adjacent ball races **30** of the outer slide member, said races **50** being spaced from said adjacent races **30**.

Both ends of the inner slide member **26** are open. End **54** of slide member **26** is designed to engage flange **37** when the slide members **24** and **26** are fully telescoped together to thereby limit telescopng movement thereof. Thus, the members **24** and **26** have longitudinal movement relative to each other and may be extended and telescoped. Wall **48** of the inner member **26** also has openings **55** therein for screws not shown whereby said member **26** is attached to the side wall of a desk or file drawer. The bottom wall **48** of the inner slide member has a recycle tab **49** that is lanced down or inwardly.

Slide members **24** and **26** are arranged so that their open sides face each other and disposed between said members, in the space between the parallel walls **28** and **48** is a ball retainer, indicated generally at **60**.

Ball retainer **60** is also channel shaped and has a bottom wall comprising a shallow, reverse channel portion **62** which extends longitudinally of the retainer and from the outer edges of which there are longitudinally extending wall portions **64** in a plane parallel to the bottom of said channel portion **62**. From the outer edges of the wall portions **64** extend a series of ball retaining arms **68**, integral with said wall portions **64** and spaced apart longitudinally of the ball retainer **60**. The arms **68** at one side of the ball retainer end are parallel to those at the opposite side thereof, said arms being at

right angles to the bottom portions **64.** The arms **68** are provided with respective aligned openings **70** for reception of ball bearings **72,** FIG. **3,** said openings **70** being of smaller diameter than the balls **72.** The bottom **72** of the ball retainer has a lanced out counter tab **67** that extends outwardly of said bottom and toward the movable or inner slide member **48.** The free inturned end of the counter tab **67** and the free end of the recycle tab **49** are designed so that these ends may engage when the slide mechanism is telescoped.

Ball retainer **60** is inserted into the outer member **24** before the tongue **36** and flange **34** are bent inwardly. Tongue **36** and flange **34** prevent said retainer **60** from coming out of the outer member at either end of said member **24,** the tongue **36** preventing said retainer from coming out one end while flange **34** prevents said retainer from coming out the opposite end of said member. Thus, the ball retainer has longitudinal movement between said tongue **36** and the flange **34.**

When the ball retainer is operably disposed in the outer member the balls **72** are operably positioned in the races **30** and **50,** as best shown in FIG. **3.** The sides **68** of the ball retainer may exert a slight pressure or tension on the balls against the races to minimize or eliminate retainer vibration and possible noise.

To telescopically assemble the outer and inner members, the ball retainer **60** is moved toward the tongue **36** until the adjacent end engages said tongue. The inner member is then inserted into the outer member to a position whereat the races **50** of said inner member contact the first balls at the end of the ball retainer **60** opposite the tongue **36.** At this point there is frictional resistance but the inner race is forced telescopically inwardly until the inner member slide end **54** engages the flange **37** of the outer member and telescopic movement is stopped. When the outer and inner member **24** and **26** are thus telescopically positioned, they may be moved longitudinally apart relative to each other, supported by the balls **72** with a minimum of friction. As said members are moved apart the ball retainer travels toward the flange **34** of the outer member and when the adjacent end of the retainer is stopped and this in turn stops said movement of the inner member due to the frictional resistance of the balls on the races **50** of the inner member. However, by exertion of a sufficient pull to overcome said frictional resistance said inner member may be separated. Replacement of the inner member in the outer member is effected as described previously.

The drawer **80** includes a front member **86** and sides **88.** The outer slide member is attached to the adjacent wall, not shown, by screws or the like, while the inner slide member is attached by screws or other suitable means to the side **88** of the drawer. The drawer opening is indicated as **84.** The back of the cabinet/enclosure is **82.**

In FIGS. **4** and **8,** the drawer is shown in the closed position with the inner slide member and the ball retainer in the normal position. In FIGS. **5** and **6,** the drawer is shown in different partly open positions. As is well known, file clerks frequently do not pull the drawer out to its fully extended position so that the inner stops of the slide mechanism will not properly engage. In the slide mechanism, disclosed in U.S. Pat. No. **3,205,025,** there is described stops for the proper cycling of the ball retainers in relationship to the fully open slide position. In this slide mechanism, it is necessary to withdraw the drawer with the attached inner slide members to get the proper effect. When reinserting the inner slide members into the outer slide members by means of engaging the balls within the ball retainer, the ball retainer will be stopped by the ball retainer tongues **36** of what is called the outer member **24** and the inner member **26,** will in such case, then pass through the ball bearings once they have stopped rotating due to the retainer being stopped by tongue **36.** It is important to understand that this final position of ball retainer **60** is only achieved once the drawer has been disconnected and reinserted again.

In case the drawer is not withdrawn thereby withdrawing the inner slide members from the ball bearings by pulling them out completely from said bearings, it has been found that various ball bearing slides have a considerable problem, in that the balls will skid and the travel of the inner member and of the ball retainer will be shortened. Due to the frictional stop effected by the ball retainer location which prevents ball rotation and which comes into effect as soon as the ball retainer engages the slide outer member stops in the extended position, the drawer cannot be fully extended for full accessibility unless the operator is familiar with the slide mechanism and pulls hard on the drawer in order to overcome this frictional stop. Only by overcoming this frictional stop, will the operator then drag the inner member and the drawer to its normal intended out position.

Overcoming such a frictional drag requires the exertion of very considerable force and in case of drawers being heavily loaded, it is difficult for the operator to pull the drawer to its full extension or its full accessible position. This considerable force may result in accidentally pulling the drawer completely free of the desk or file with resultant damage or injury.

Such a skidding of the balls occurs when a drawer is frequently only pulled to the partly open position. Such actuation of the drawer is shown in FIGS. **5** and **6** and results in skidding or slipping of the balls in relation to the travel of the inner members. This problem has been solved by the present invention. It is to be understood that the normal position for a file drawer is the closed or shut position within the file drawer cabinet, desk or the like and this position may be considered to be the zero position.

Special ball retainer tabs are incorporated in the moving or inner slide member and the ball retainer such that the ball retainers are recycled to their zero or normal position when the drawer is closed. In other words, the present invention effects recycling of the mechanism in the closed position and this will be effected every time the drawer is closed. Thus, by recycling the ball retainer at the closed position, said retainer is in the original normal or zero position to allow full extension of the drawer so that the drawer will no longer be stopped by an out of cycle or skidded ball retainer, and said drawer can always be pulled to its outward limit of normal movement.

Referring to FIGS. **9** to **13** inclusive, the slide outer member is shown with the inner slide member and the ball retainer variously positioned according to the respective positions of the drawer in FIGS. **4–8** inclusive.

It is to be noted that when the slide mechanism is telescoped, the recycle tab **49** of the inner slide member, will engage the counter tab **67** of the ball retainer should the ball retainer be out of cycle and in a too far

forward position. The free end of the recycle tab **49** then engages the free end of the counter tab **67** of the ball retainer, and moves the ball retainer to the normal or zero position shown in FIGS. **8** and **13.** It is to be understood that the ball retainer in FIGS. **4** and **9** is in its normal **0** position. The ball retainer is in the same position in FIGS. **8** and **13** but in these figures, it has been recycled to its normal or **0** position.

In installing the slides, the inner slide members are attached to the respective sides of the drawer. When the drawer is in its fully extended position, the stops limiting outward movement of the ball retainers are engaged. Closing the drawer to its fully closed position, causes the recycle tab **49** to engage the counter tab **67** of the ball retainer. When the drawer is fully closed, the ball retainer has been moved to its normal or zero position. Opening of the drawer causes the recycle tab **49** to move away from the ball retainer tab **67,** and the drawer may be fully opened without any frictional resistance, as the ball retainer was recycled in the closed position. It will be obvious that each time the drawer is fully closed, the ball retainer will be positively reset to its normal or **0** position. Thus, recycling will be effected at either the fully extended or the fully telescoped (closed) positions of the slide.

Referring to FIG. **14,** there is shown a cabinet indicated generally having a drawer indicated generally at **98,** operably mounted within a drawer opening **100.** The drawer **98** includes a front panel **102** and side walls **104.** The drawer is mounted in the drawer opening by means of what are termed "three member slides," indicated generally in FIG. **15** attached to the respective side walls **96** and drawer side **104.** Each three member slide has an outer slide member **108** and an intermediate member, indicated generally at **110.** Intermediate member **110** is in the general shape of a Z and there is an inner slide member **112** secured to the lower arm of the intermediate member. Inner slide member **112** is considered a part of the intermediate member **110.** There is a ball retainer, not shown, operably disposed between the outer member **108** and the inner member **112.** These parts are arranged in the usual manner.

The upper arm of the intermediate member has what is normally termed an inner slide member **114** attached thereto at the side opposite the slide member **112** and considered part of the intermediate member. A second outer slide member **116** is provided for the inner slide member **114** and there is a ball retainer **120** operably disposed there between.

Slide member **114** has a lanced recycling tab **122** for operable engagement with the counter tab **124** of the ball retainer. There is also a similar arrangement of recycle tab **122** and counter tab **124** for the inner slide member **112** and the outer slide member **108.**

As shown in FIG. **15,** the parts of the mechanism are in the closed or telescoped position with the inner end of the ball retainer in engagement with the tongues **36,** recycle tab **122** being in engagement with the counter tab **124** of the ball retainer, the ball retainer having been moved to this position by the recycle tab when the mechanism has been fully telescoped. While the recycle tabs of the inner members and counter tabs of the ball retainers are shown as within the mechanism, it is to be understood that there could be other arrangements to provide actuation of the ball retainers to the normal or zero position by the moving slide members. In other words, the invention broadly resides in means for actuating or moving the ball retainer to its **0** or normal position by the movable slide member.

Obviously, the recycle tab disengages from the counter tab of the ball retainer when the slide is extended. The recycle tab picks up or engages the counter tab as the moving or movable slide member approaches or reaches its fully telescoped or closed normal position.

The invention and its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit or scope thereof or sacrificing its material advantages. The arrangement hereinbefore described being merely by way of example, and we do not wish to be restricted to the specific form shown or uses mentioned except as defined in the accompanying claims.

FIG. **16** shows a further refinement of a ball retainer recycling method. The methanism shown is of the same general construction as referred to previously, i.e.: there is a moving inner member channel **128** contained by balls in a ball retainer **129** located in an outer member **130** channel. The moving member is capable of moving in two directions, forward and aft.

With such a slide arrangement a fixed inner member recycle tab which mates with a ball retainer counter tab would result in a mechanism which would move only in the forward direction. Aft motion would be prevented by said tab. By making the inner member tab **126** movable it is possible for said tab to clear or bypass the ball retainer when aft travel is desired. Means for moving the tab could be manual, electrical, or mechanical, the important point being that the inner member tab can be moved for aft travel. For forward travel the inner member tab is moved to the normal engaging position such that recycling of the ball retainer occurs in the closed position as described previously.

In FIG. **16** we have also shown a movable inner member tab **127** at the opposite end of the slide mechanism. This tab mates with counter stop tab **125** on the ball retainer. The purpose of these tabs is to recycle the ball retainer when the drawer has been moved aft and closed. These tabs function in the exact same manner as those used for the forward motion.

The invention and its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope thereof or sacrificing its material advantages. The arrangement hereinbefore described being merely by way of example, and we do not wish to be restricted to the specific form shown or uses mentioned except as defined in the accompanying claims.

I claim:

1. Means for recycling of ball retainers to effectively eliminate harmful ball creepage for telescoping ball bearing slide mechanisms, comprising:

an outer slide member of generally channel shape and having a longitudinally extending bottom wall and oppositely arranged ball races along the side edges of the bottom wall, said ball races being concave in cross-section and facing each other;

an inner channel shaped slide member having a bottom longitudinally extending between wall and oppositely facing ball races along the side edges

thereof, said ball races being concave in cross-section and facing outwardly, the inner slide member operably disposed within the other slide member;

a ball retainer having a longitudinally extending bottom wall, and side parts having openings for balls in longitudinally spaced relationship, said ball retainer being disposed between the outer and inner slide members and having a normal **0** position when the slide members are telescoped;

balls in said openings, said balls being operably disposed in the ball races and retained therein by said ball retainer;

a stop for the outer slide member adjacent one end thereof; a stop for the inner slide member adjacent one end for engagement with the stop of the outer slide member to limit telescoping movement of the slide members;

ball retainer stop means for the outer slide member adjacent the first mentioned stop thereof for limiting movement of the ball retainer to a normal **0** position when the slide mechanism is telescoped;

a fixed recycle tab for the inner slide member; and

a fixed counter tab for the ball retainer engagable by the recycle tab of the slide inner member for positively moving the ball retainer to the normal zero position when the slide members are telescoped.

2. The invention defined by claim **1**, including an alternate movable recycle tab at each end of the inner slide member for positively moving the ball retainer to the normal zero position when the inner slide member has been moved forward and then telescoped;

the movable inner member tab engaging the ball retainer tab for positively moving the ball retainer to the normal zero position when the slide inner member has been moved aft and then telescoped.

3. The invention defined by claim **1** wherein the recycle tab is at the inner side of the bottom wall of the inner slide member and the counter tab is on the central portion of the ball retainer.

4. The invention defined by claim **3**, wherein the recycle tab is lanced from the bottom wall of the inner slide member, and the counter tab is lanced from the central portion of the ball retainer and in alignment with the recycle tab.

5. The invention defined by claim **3**, wherein the recycle tab moves away from the counter tab when the inner slide member is extended.

6. Means for recycling ball bearing retainers for telescoping ball bearing slide mechanisms, comprising:

an outer slide member having longitudinally extending ball bearing races a flange stop member at each end, and atleast one tongue member positioned between said flanges stop members;

an inner slide member within the outer slide member and having longitudinally extending ball bearing races operably aligned with the ball bearing races of the outer slide member;

a ball bearing retainer disposed between the inner and outer slide members, said ball bearing retainer having side parts with openings therein for ball bearings;

ball bearings operably disposed between algined ball bearing races of said outer and inner slide members and operably received in openings of said side parts of the outer and inner slide members, said side parts retaining the ball bearings in operable position within said races;

one of the slide members being movable between an extended position and a normal predetermined telescoped position relative to the other slide member;

the ball retainer moving in the same direction as the movable slide member but a lesser distance, said ball retainer having a normal predetermined starting position when the slide members are telescoped with the movable slide member at its predetermined normal position relative to the other slide member, movement of the movable slide member from its normal position causing the ball retainer to operably move from its predetermined normal position;

and means on the inner member engagable with a part of the ball retainer for positively moving the ball retainer to the normal zero position when the slide inner member has been moved aft and then telescoped said means on the inner member comprising a tab; and a counter tab on the ball retainer, the tab of the inner member being engageable with the ball retainer for positively moving the ball retainer to the normal zero position when the inner member has been moved forward and then telescoped.

7. Means for recycling ball bearing retainers for telescoping ball bearing slide mechanisms, comprising:

an outer slide member having longitudinally extending ball bearing races, a flange stop member at each end, and atleast one tongue member positioned between said flange stop member;

an inner slide member within the outer slide member and having longitudinally extending ball bearing races operably aligned with the ball bearing races of the outer slide member;

a ball bearing retainer disposed between the inner and outer slide members, said ball bearing retainer having side parts with openings therein for ball bearings;

ball bearings operably disposed between aligned ball bearing races of said outer and inner slide members and operably received in openings of said side parts of the outer and inner slide members, said side parts retaining the ball bearings in operable position within said races;

one of the slide members being movable between an extended position and a normal predetermined telescoped position relative to the other slide member;

the ball retainer moving in the same direction as the movable slide member but a lesser distance, said ball retainer having a normal predetermined starting position when the slide members are telescoped with the movable slide member at its predetermined normal position relative to the other slide member, movement of the movable slide member from its normal position causing the ball retainer to operably move from its predetermined normal position;

a counter tab carried by the ball retainer; and

a tab carried by the movable slide member for engaging the tab of the ball retainer and for positively recycling said ball retainer to its normal position upon telescoping of the movable slide member to its normal predetermined telescoped position.

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