

[54] **DRAWER EXTENSIBLE SLIDE CHASSIS**
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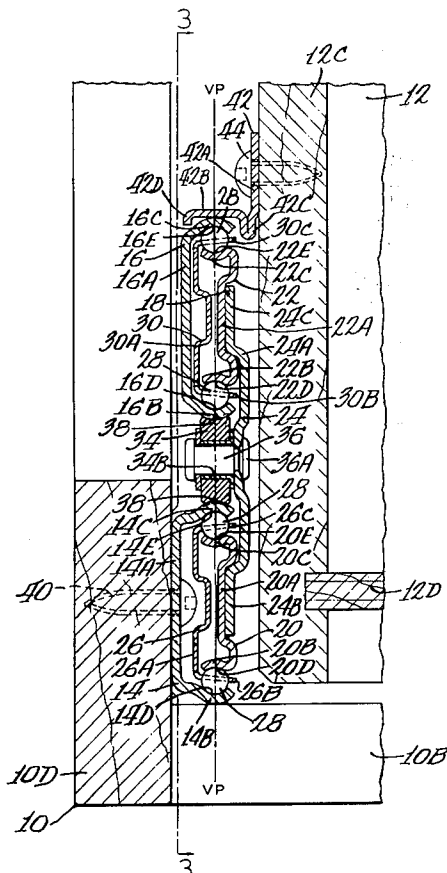
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Assistant Examiner—R. H. Lazarus
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[57] **ABSTRACT**
A drawer extensible slide chassis, of which opposite hand units are adapted for attachment in mirror image to the interior of a desk pedestal or a filing cabinet, and to the sides of a drawer. The chassis comprises: a case attachment rail of channel profile, a drawer attachment rail of channel profile, and a unitary extension slide having first and second slide rails of channel profile extending along and affixed to one side of a generally bar shaped connecting member. The first rail of the extension slide is partially telescoped into the case attachment rail and is slidably correlated therewith on ball bearings. The drawer attachment rail is partially telescoped over the extension slide second rail and is slidably correlated therewith on ball bearings. The case and drawer attachment rails are both disposed in greater part along one side of a median vertical plane extending longitudinally between the attachment rails and the unitary extension slide rails, and intersecting the channel profiles of said rails.

4 Claims, 7 Drawing Figures



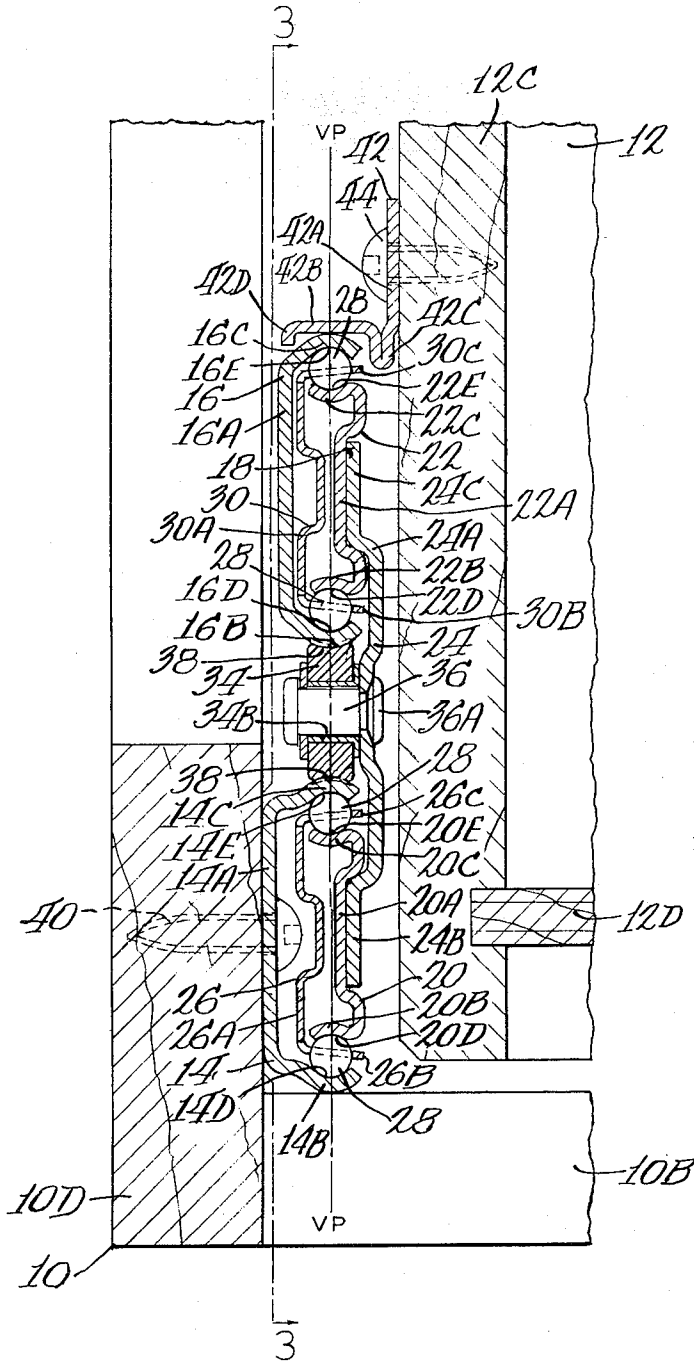


FIG.1.

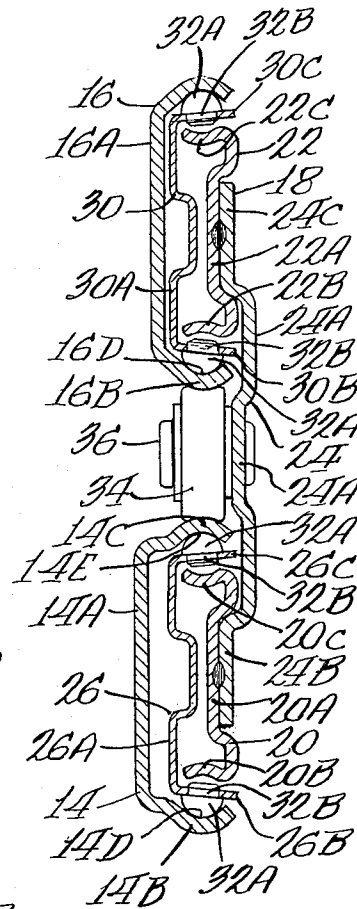
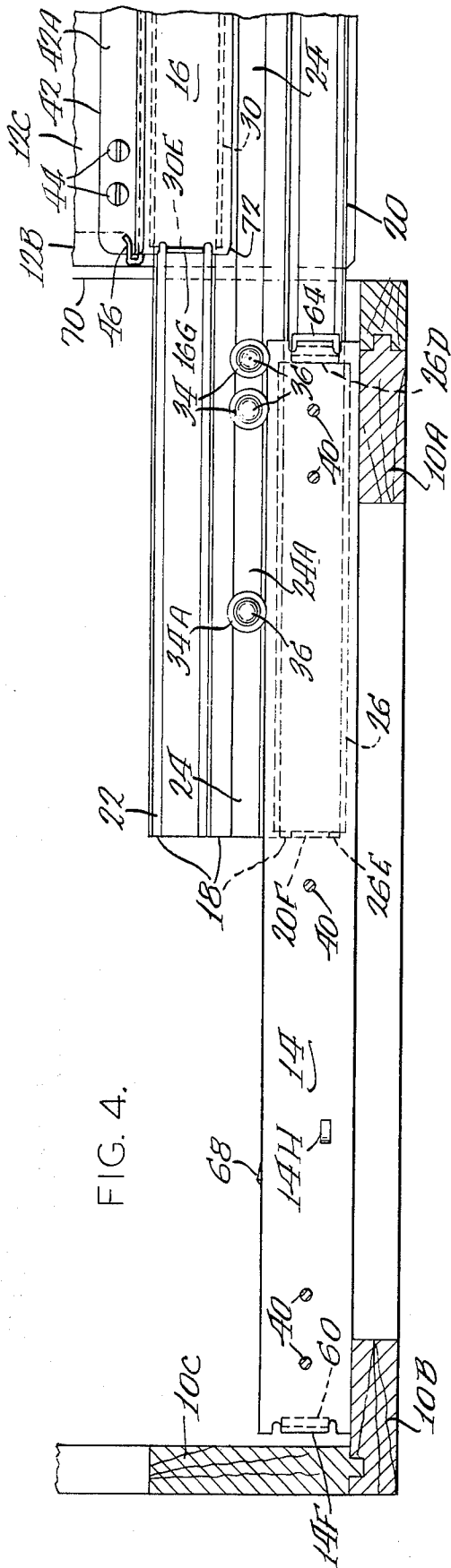


FIG. 2.



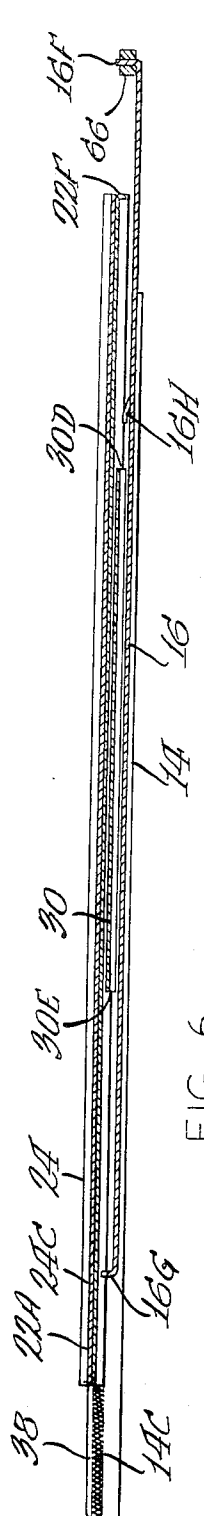


FIG. 6.

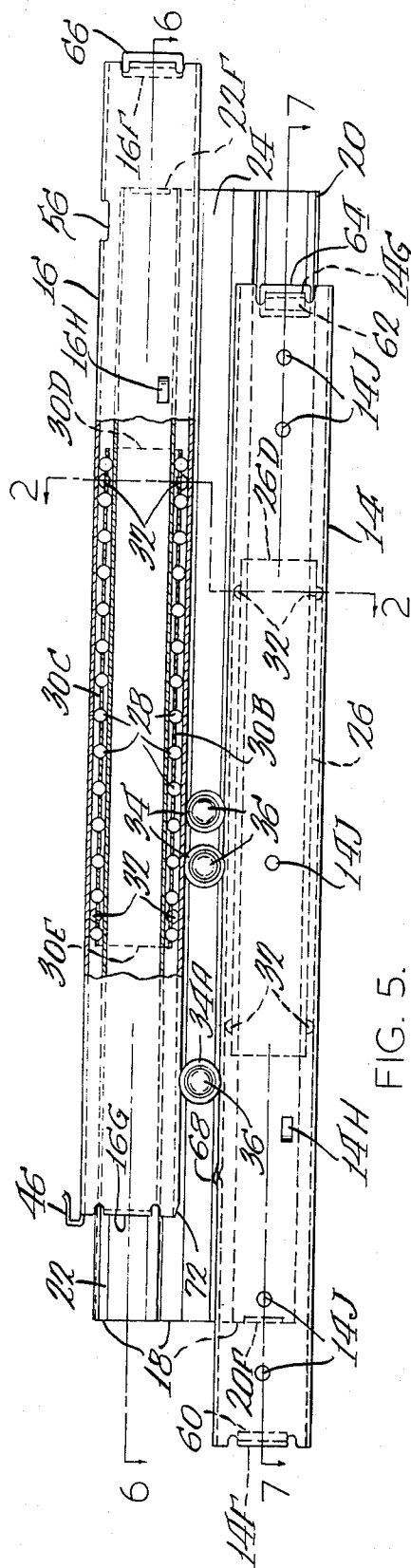


FIG. 5.

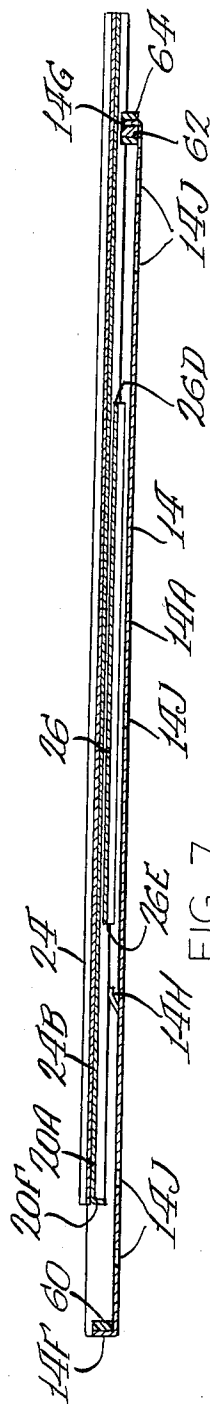


FIG. 7.

DRAWER EXTENSIBLE SLIDE CHASSIS

BACKGROUND OF THE INVENTION

This invention relates specifically to a drawer extensible slide chassis suitable for slidably supporting a file drawer of a desk or filing cabinet.

The subject invention was developed following engineering assessment and analysis of prior art United States Pats., including: Crossey, No. 1,045,523; Yawman, No. 1,109,812; Jones, No. 1,705,571; Gussack, No. 2,320,276; Vignos, No. 2,671,699; Bullock, No. 2,762,660; Bullock, No. 794,690; Bullock, No. 3,131,982; Jordan, No. 3,205,025; Fall, No. 3,488,097; Pipe, No. 3,449,033; Fall, No. 3,679,275.

Design and manufacturing detail of drawer slides now commercially available in the United States is to a substantial measure encompassed within the teachings of the aforesaid patents.

Attempts to meet the need of a free sliding, silent, durable and maintenance free drawer extensible slide chassis of heavy load carrying capacity, suitable for application to a desk or a filing cabinet of conventional design, are to be found in the art. Generally, the mechanisms are either inadequate or deficient, or are too complex and expensive to satisfy all requirements of the office furniture industry, and leave much to be desired.

SUMMARY OF THE INVENTION

This invention constitutes a drawer extensible slide chassis, of which opposite hand units are adapted for attachment in mirror image to the interior of a desk pedestal or a filing cabinet, and to the sides of a drawer. This slide chassis was designed to slidably support a heavily loaded drawer in such manner that it may be slidably withdrawn in its entirety from its case enclosure, and returned to closed position, with minimal expenditure of manual effort.

In one preferred embodiment, the drawer extensible slide chassis comprises: a case rail of channel profile adapted for attachment to the interior of a desk or cabinet structure; a drawer rail of channel profile adapted for attachment to a side of a drawer; and a unitary extension slide assembly having first and second rails each of channel profile, extending in parallelism along one side of and affixed to a bar shaped connecting member. The first rail of the extension slide assembly is slidably correlated with the case rail, and the drawer rail is slidably correlated with the extension slide assembly second rail. Accordingly, the first and second rails of the unitary extension slide assembly extend along one side of a median longitudinal vertical plane, and the case and drawer rails extend along the opposite side of the said plane, in confronting relationship with the said slide rails. This rail arrangement accommodates disposition of a plurality of propulsion rollers at one side of and carried by the unitary extension slide bar shaped connecting member, between the slide rails, and in peripheral tractional contact with opposed flanges of the case attachment rail and the drawer attachment rail.

Salient design aspects of the invention reside in:

a. The formation of the unitary extension slide assembly which embodies first and second slide rails of channel profile extending in spaced parallel relationship along one side of and affixed to a generally bar shaped connecting member.

b. The slidable correlation with the aforesaid extension slide assembly first and second slide rails, of a case attachment rail and a drawer attachment rail, both disposed at one side of and in confronting relationship with the aforesaid slide rails.

c. The combination with the extension slide assembly defined in foregoing paragraph a, of a plurality of propulsion rollers located at one side of and carried by the bar shaped connecting member.

d. The correlation between an attachment rail and a telescoped slide rail, of a ball bearing retainer which is slidably supported in close proximity to and separated from rail ball bearing raceway flanges by anti-friction plastic means carried by the retainer.

OBJECTS OF THE INVENTION

An object of the invention is to provide a drawer extensible slide chassis having uncommonly heavy load carrying capacity, in relation to its cross section external proportions, and the total weight of the steel forming its components.

Supplementing the foregoing objective, a further object of the invention is to provide a slide chassis having a high order of resistance to deflection in both vertical and horizontal planes.

Another object of the invention is to provide a drawer extensible slide chassis embodying a unitary extension slide assembly having two slide rails affixed to a connecting member, to which a plurality of propulsion rollers are attached; and wherein the said rollers are not nested in clearance slots or apertures in the unitary slide structure, so that the rigidity thereof is not diminished by roller clearance openings.

A further object of the invention is to provide uncommonly simple, positive acting and durable propulsion roller means for progressively propelling the chassis unitary extension slide assembly, so that the slide assemblies of a pair of chassis units slidably attached to a drawer travel in unison, and drawer weight forces are uniformly distributed.

A further novel aspect of the invention resides in the design of a ball bearing steel retainer and its correlation in part between and in close proximity to ball bearing raceway flanges of two telescoped steel rails, whereby the retainer is separated from the rail raceway flanges by anti-friction plastic means carried by the retainer, so that scrubbing of the retainer against the rail raceway flanges is prevented.

An additional object of the invention is to provide a drawer extensible slide chassis which is well suited to modern production methods, and wherein extremely close component tolerances are not essential for smooth silent sliding movement of telescoped components, uncommonly heavy load carrying capacity, and durability.

The invention is further characterized by its simplicity of design and suitability for economical component manufacture and rapid assembly with minimum expenditure of labour.

To the accomplishment of these and related objects as shall become apparent as the description proceeds, the invention resides in the formation, arrangement and combination of parts as shall be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereinto appended.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a magnified vertical transverse section through part of a desk case structure, the related side of a drawer, and the intermediate extensible slide chassis, the view being taken on the plane indicated by the arrow line 1 — 1 of FIG. 3;

FIG. 2 is a magnified vertical transverse section of the extensible slide chassis, the view being taken on the offset arrow line 2 — 2 of FIG. 5;

FIG. 3 is a partial sectional elevation showing one side of a drawer in closed position in relation to part of a desk case structure, the view being in reduced scale relative to the scale of FIGS. 1 and 2, and taken on the arrow line 3 — 3 of FIG. 1;

FIG. 4 is a view generally similar to FIG. 3, wherein part of the drawer is shown in open and fully extended position,

FIG. 5 is a side and part sectional view of the extensible slide chassis shown in FIG. 3 with parts broken away, separate from the desk case structure and drawer, the said chassis being in partially extended position;

FIG. 6 is a horizontal sectional view of the extension slide chassis, taken on the plane designated by the arrow line 6 — 6 of FIG. 5, and;

FIG. 7 is a further horizontal sectional view, taken on the plane indicated by the arrow line 7 — 7 of FIG. 5.

FIGS. 3 to 7 inclusive are drawn to a common scale, proportionately about one third of the scale of FIGS. 1 and 2.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENT

The drawings illustrate application of the extensible slide chassis to the pedestal or case structure of an office type desk generally designated by the numeral 10 and to a file drawer designated in its entirety by the numeral 12. In such an application, a pair of opposite hand chassis are affixed in mirror image to the inside of the desk case structure, and the extension slides of the chassis are preferably detachably attached to the respective exterior sides of a drawer. The desk case structure includes wood frame components 10A, 10B, 10C and 10D. The drawer which is also formed of wood, includes a front 12A, back 12B, two sides 12C one only of which is shown, and a bottom 12D. This type of desk construction is common in the office furniture industry. Wood desks are not usually constructed with the precision of steel furniture. This disclosure is based upon application and use of the extensible slide chassis in and to a wood desk structure, to illustrate and define certain of its versatile and flexible characteristics, which contribute to durability and virtual elimination of mechanical maintenance. Such disclosure is not intended to be limitative as to use application or adaptability.

Referring in particular to FIG. 1, the chassis comprises a case attachment rail 14, a drawer attachment rail 16, and a unitary extension slide generally designated by the numeral 18, which embodies first and second slide rails 20 and 22 affixed to a connecting member 24. The slide first rail 20 is slidably correlated with the case attachment rail 14, and the drawer attachment rail 16 is slidably correlated with slide second rail 22. The case rail 14 and the drawer rail 16 are both disposed adjacent to one side of the unitary extension slide, in spaced relationship to its first and second rails.

In other words, the case and drawer attachment rails are both disposed in greater part along one side of a vertical plane indicated by the vertical line VP of FIG. 1, which plane extends longitudinally between and intersects portions of the said attachment rails and the extension slide rails.

Case attachment rail 14 is generally of channel profile and embodies a vertical web 14A and laterally extending ball bearing raceway flanges 14B and 14C, which respectively define internal ball bearing raceways 14D and 14E. Drawer attachment rail 16, also of channel profile but narrower than rail 14, embodies a vertical web 16A and laterally extending ball bearing raceway flanges 16B and 16C, which form internal ball bearing raceways 16D and 16E. Slide rail 20, generally of channel formation, comprises a channel profile offset web 20A and two ball bearing flanges 20B and 20C, which respectively define external ball bearing raceways 20D and 20E. Slide rail 22, similar in cross section to slide rail 20, comprises a channel profile offset web 22A and ball bearing raceway flanges 22B and 22C, which form external ball bearing raceways 22D and 22E. The ball bearing raceways of each said rail have ball bearing arcuate surfaces, the radial centers of which are on the vertical plane line VP in FIG. 1. All the said rails may be press or roll formed in precision sheet or strip cold rolled steel.

Slide rails 20 and 22 extend in vertical spaced relationship along one side of and are attached to the generally bar shaped connecting member 24, which may be of corresponding length. Member 24 may be press or roll formed in precision sheet or strip cold rolled steel and comprises a vertically central web 24A and extending flanges 24B and 24C which are laterally offset with respect to one side of the web 24A. Flange 24B extends laterally into the channel profile of slide rail 20 and is spot welded to the offset web 20A thereof. Flange 24C extends laterally into the channel profile of slide rail 22 and is spot welded to the offset web 24A thereof. The points of spot welding may be substantially vertically central of the said webs and flanges and at about 2 inch longitudinal intervals, which provides a rigid unitary extension slide.

A ball bearing retainer 26 is positioned between the case rail 14 and the telescoped slide rail 20, and comprises a web 26A and two laterally extending flanges 26B and 26C. Flange 26B is disposed between case rail flange 14B and slide rail flange 20B, and flange 26C is disposed between case rail flange 14C and slide rail flange 20C. The said flanges of the retainer 26 retain a plurality of ball bearings 28 in spaced relationship longitudinally of and between raceways 14D and 20D, and 14E and 20E. A ball bearing retainer 30 is positioned between the drawer rail 16 and the telescoped slide rail 22, and comprises a web 30A and two laterally extending flanges 30B and 30C. Flange 30B is disposed between drawer rail flange 16B and slide rail flange 22B, and flange 30C is disposed between drawer rail flange 16C and slide rail flange 22C. The said flanges of the retainer 30 retain a plurality of ball bearings 28 in spaced relationship longitudinally of and between raceways 16D and 22D, and 16E and 22E.

The ball bearings 28 of the retainer 26 slidably support the slide rail 20 relative to the case rail 14. Ball bearings 28 of the retainer 30 slidably support the drawer rail 16 relative to the slide rail 22. The aforesaid flanges of the respective retainers are perforated to

provide from 0.003 inch to 0.007 inch ball bearing clearance, wherefore the ball bearings are retained in limited horizontal floating relationship between related raceways. A longitudinal section of ball bearing retainer 30 is shown in FIG. 5, with the ball bearings 28 in rollable relationship to the raceways of the drawer rail 16 and the slide rail 22. In practice, it has been determined that 0.187 inch diameter ball bearings at 0.500 inch center spacing provide adequate load carrying capacity, where the ball bearing retainer is of suitable length in proportion to the length of the slide chassis, as exemplified in FIG. 5.

It is preferable to have minimum clearance of 0.015 inch between all surfaces of the retainers 26 and 30, and related rail surfaces. In that the ball bearings 28 are not restricted by said retainers against floating movement in the vertical plane indicated by the line VP in FIG. 1, each said retainer is substantially centralized between adjacent rail flanges by anti-friction rigid plastic means carried by the retainer and separating same from the said rail flanges. This aspect of the invention is best shown in FIGS. 2 and 5. In the latter view, a slide member generally designated by the numeral 32 is located near each end of each flange of the retainers 26 and 30. As is best shown in FIG. 2, each said slide member comprises a semi-spherical body 32A of substantially the diameter of a ball bearing 28, and an integral pin 32B, which extends through a close fitting hole in each said retainer flange. The half round body 32A of each said slide member is slidably related to a ball bearing raceway, and a slide clearance of up to 0.010 inch may be provided. Accordingly, each ball bearing retainer 26 and 30 is slidably supported on the slide members 32 in limited floating relationship to related rails 14 and 20, and 16 and 22, respectively.

The cross sectional shape and general formation of the extension slide 18, comprising the connecting member 24 and the two slide rails 20 and 22 arranged in parallelism along one side of and affixed to the connecting member 24, is an important aspect of this invention. Such arrangement of parts accommodates simple, effective and durable means for progressively propelling the extension slide, which means include a plurality of propulsion rollers 34 and 34A carried by and at one side of the connecting member 24, in tractional contact with opposed flanges of the case rail 14 and the drawer rail 16. These rollers are not nested in slots or apertures in an extension slide as is common in the art. Accordingly, the rigidity of the extension slide of this invention is not diminished by a plurality of propulsion roller clearance openings.

Referring again to FIGS. 3 and 5, two propulsion rollers 34 are located slightly rearward of the longitudinal center of the case rail 14. A third and similar propulsion roller 34A which also serves as a drawer retention roller, is located in rearward spaced relationship to the said rollers 34, as is shown in FIGS. 3 and 5. Each said roller may be in the form of a resilient and deformable tire, tightly surrounding or affixed to a bushing 34B. The roller tire may be moulded in elastomeric plastic or rubber in the 60 to 70 durometer range, and which is tough, durable and wear resisting. Each said roller is rotatably mounted on an axle stud 36 which extends from one side of and is riveted to the connecting member web 24A at 36A, as is exemplified in FIG. 1. Each roller 34 and roller 34A is substantially centralized on the vertical plane line VP as is shown in FIG. 1, and is

interposed between the outside face of the flange 14C of the case rail 14, and the outside face of the flange 16B of the drawer rail 16. The outside face of each said flange is knurled longitudinally in ribbon formation, indicated at 38 in FIGS. 1 and 6, to augment tractional contact of the said rollers with the rail flanges 14C and 16B. The outside diameter of each said roller should be sufficiently greater than the space between the opposed rail flanges 14C and 16B, to cause slight compression and deformation of the roller tires and so minimize tractional slippage.

The case attachment rail 14 may be attached to the member 10D of the desk case structure 10 by a plurality of wood screws 40 which extend through holes 14J in the web 14A of the said rail. The drawer attachment rail 16 is preferably attached to the side 12C of the drawer 12 by detachable means, so that the said drawer may be removed with facility from the chassis extension slide, for cleaning or other purposes. One suitable type or form of attachment means may comprise an elongated attachment bar 42, the upright portion 42A of which is affixed by a plurality of wood screws 44 to the side 12C of the drawer. The horizontal portion 42B of the bar 42 overlies and extends along the top flange 16C of the rail 16, which is centralized by the dependent ribs 42C and 42D extending lengthwise of the said bar. An upstanding hook 46 extends from the top flange 16C at the back end of the rail 16, and the back end 42E of bar portion 42B fits into and is retained by the said hook. A dependant hook 48 is affixed to the front end 42F of bar portion 42B, and extends forward of and fits under the front end 16F of the flange 16C of the rail 16. A pawl 50 is pivoted on a stud 52 affixed to and extending from the upright portion 42A of the attachment bar 42. The dependant end 50A of the pawl 50 extends downwardly through a clearance slot 54 in the bar portion 42B, and into an underlying notch 56 in the top rail 16C of the rail 16. The end 50A of the pawl 50, the clearance slot 54, and the notch 56 are substantially centralized on the vertical plane line VP of FIG. 1.

As is shown in FIG. 3, the drawer attachment bar 42 is interconnected to the drawer attachment rail 16 of the slide chassis by means of the hooks 46 and 48, and the pawl 50. The drawer 12 and its attached bar 42 may be lifted from the rail 16 of the slide chassis, upon tilting the pawl 50 upwardly by hand so that its dependant end 50A clears the notch 56 in the drawer attachment rail 16, and upon withdrawing the drawer and its attached bar 42, so that the back end 42E of the latter clears the hook 46 of the rail 16, and the hook 48 of the bar 42 clears the front end 16F of the rail 16. The slide chassis to drawer attachment means illustrated and described, although innovative in part, is not broadly novel.

It is common knowledge in the art to provide means for limiting and controlling relative sliding movement of telescoped slide rails and ball bearing retainers. The pertinent description which follows and related drawing detail is therefore concise; is provided solely for purposes of general explanation; and is not to be construed as limitative.

Referring now to FIGS. 3 and 7, a lug 14F extends laterally from the back end of the web 14A of the case attachment rail 14, and supports an attached resilient stop pad 60. A lug 20F extends normal to the web 20A at the back end of the slide rail 20, and abuts the said

pad 60 when the drawer 12 is closed. A lug 14G extends laterally from the front end of the web 14A of the case attachment rail 14, and supports a resilient pad 62 retained in place by a rectangular and tubular shaped impact stop member 64, which overlies the pad 62 and the lug 14G. The impact stop member 64 is preferably moulded of rigid and durable plastic such as nylon. It serves as a stop abutment for the forward end 26D of the ball bearing retainer 26, when the drawer 12 is fully extended as is shown in FIG. 4. In such position, the lug 20F of the slide rail 20 abuts the end 26E of the ball bearing retainer 26. A lug 16F extends laterally from the web 16A at the front end of the drawer attachment rail 16 and supports a rectangular and tubular shaped resilient pad 66. This pad abuts the lug 22F extending laterally from the web 22A at the front of the slide rail 22, when the drawer 12 is closed, as is shown in FIG. 3. A lug 16G extends laterally from the web 16A at the back end of the drawer attachment rail 16. This lug abuts the end 30E of the ball bearing retainer 30, the end 30D of which abuts the lug 22F at the front end of the slide rail 22, when the drawer 12 is fully extended. A stop boss 14H is lanced inwardly from the web 14A of the case attachment rail 14, and the end 26E of the ball bearing retainer 26 abuts the said boss when the drawer 12 is closed. A stop boss 16H is lanced inwardly from the web 16A of the drawer attachment rail 16, and abuts the end 30D of the ball bearing retainer 30 when the drawer 12 is closed.

The roller 34A is located in the position shown in FIG. 3, so that the said roller overlies and is in part rearward of the boss 68, which is lanced upwardly from the top flange 14C of the case attachment rail. The boss 68 is located adjacent the rearward end 26F of the ball bearing retainer 26 in the position thereof in FIG. 3, so that the die formation of the said boss does not mar or impair the ball bearing raceway 14E. As the drawer is pushed inwardly to its closed position, the roller 34A is slightly deformed and rides over the boss 68 to the extent that the axis of the said roller is rearward of, yet in close proximity to the said boss. In this position the roller 34A serves as a brake means and retains the said drawer in closed position. Slight manual drawer opening force will cause the roller 34A to ride forwardly over the boss 68 and so release the drawer for extended withdrawal.

DESCRIPTION OF OPERATION

Visualize the drawer 12 being supported on a pair of slide chassis, one at each side thereof in mirror image. As the drawer 12 is manually drawn forward from the desk enclosure structure 10, the drawer attachment rail 16 of each slide chassis causes the rollers 34 and 34A to rotate and roll along each case attachment rail 14, and each chassis extension slide 18 with its slide rails 20 and 22 is propelled forwardly at approximately one half the speed of travel of the said drawer, and the ball bearing retainers 26 and 30 of each chassis travel forwardly at about one half the speed of travel of each extension slide 18. The back 12B of the drawer may be extended to a position forward and clear of the front of the desk structure, which is designated by the vertical line 70 in FIGS. 3 and 4. In such extended position, the rollers 34 and 34A remain in tractional contact with each rail 14, and the back end of each rail 16 is adjacent to the said rollers. The end 26D of the retainer 26 of each extension slide 18 is in contact with the related

impact stop member 64, having been drawn into such position by the lug 20F of the slide rail 20. The end 30D of the retainer 30 of each said extension slide is in contact with the lug 22F of the slide rail 22, having been drawn into such position by the lug 16G of the rail 16. As the drawer 12 is drawn forward from the desk, the rollers 34 are tractionally rotated by the rail 16 of each chassis, and the extension slides 18 of the two chassis which support the said drawer slide forward substantially in synchronism.

As the drawer 12 is closed into the desk structure, from the extended drawer position illustrated in FIG. 4, the bevelled end 72 of the rail 16 of each extension slide 18 rides over the related rollers 34, and tractionally contacts same. Continued inward closing movement of the drawer 12 causes the extension slides of the two chassis which support the said drawer to slide backwardly substantially in synchronism, at approximately one half of the rate of travel of the drawer, and the respective ball bearing retainers 26 and 30 slide backwardly at about one half the speed of travel of the said extension slides. In the drawer closed position shown in FIG. 3, the roller 34A is in part over and rearward of the boss 68 on rail 14, and retains the drawer against free outward sliding movement under slight force of gravity, such as may occur if the desk is not level. When the drawer is returned to closed position, the lug 16H of each rail 16 of the pair of chassis which support the drawer, contacts the end 30D of the retainer 30 and moves the latter to the position shown in FIG. 3, and rearward movement of the retainer 26 is restrained by the lug 14H of the rail 14.

SUMMARY OF CHASSIS DESIGN CHARACTERISTICS

It is conventional in the office furniture industry to provide drawers wherein the horizontal depth dimensions range from 14 inches to 28 inches, in 1 inches increments. It is desirable to slidably support a drawer in such wise that its back end may be withdrawn clear of the front of the enclosure structure, so that the entire interior of the drawer is extended, for convenient placement or removal of files, papers, or otherwise. Accordingly, such drawer extension is an important design aspect in determining load forces, materials, and component proportions. Other design criteria may involve the slide clearance space between the side of a drawer and confronting surfaces of a drawer enclosure structure such as a desk pedestal; the precision of manufacture of such related furniture components; and the slide chassis attachment means.

The cost of tooling and tool maintenance, and the cost of production are also important aspects, wherein the total weight of the steel input including waste is a dominant factor. In this slide chassis, suitable for supporting a 28 inch depth file drawer, compactly filled with paper files, and fully extendible from the desk as above defined, the attachment rails 14 and 16, and the slide rail connecting member 24, may be formed in 0.060 inch cold rolled steel, and the slide rails 20 and 22 may be formed in 0.048 inch cold rolled steel; and wherein the vertical spacing of the axis of 0.187 inch diameter ball bearings 28 between an attachment rail and a slide rail is 1.060 inch. This proportion detail provides an uncommonly rigid chassis structure in both vertical and horizontal planes. The design detail of the extension slide, comprised of the slide rails 20 and 22

attached to one side of the connecting member 24, provides a vertically and horizontally rigid structure, which slides freely when supporting a heavily loaded drawer.

The easy sliding action of this chassis may in part be attributed to the uniform distribution of drawer load forces, resulting from synchronization of sliding movement of the extension slides, of the two chassis which support a drawer. Heretofore, such synchronization of extension slides has been achieved in slide mechanisms wherein the drawer attachment rail and the extension slide was supported on several disc shaped rollers, the peripheral frictional contact of which induced positive extension slide movement. Where ball bearings slidably support a rail slide chassis, friction is so minimized that a lack of lubrication or dust accumulation in the ball bearing raceways may cause drag of one of the pair of extension slides. The drawer cantilever load forces are accordingly imbalanced, and free and easy drawer sliding motion is impaired. Attempts have been made to overcome this problem by use of an oversized ball bearing or a single drive roller in the extension slide, but such has proven to be inadequate and unsatisfactory.

An important design aspect of this invention resides in the rigid formation of the extension slide 18, wherein a plurality of propulsion rollers 34 are rotatably mounted at one side of the connecting member 24 on the axle studs 36 protruding therefrom. Any number of propulsion rollers may be used, depending upon the overall length of the chassis, since roller clearance openings in the extension slide are not necessary. The propulsion rollers 34 are retained in slight compression or deformation between the knurled flange surfaces 38 of the rails 14 and 16, to ensure positive peripheral tractional contact and propulsion of the extension slide 18. Accordingly, the extension slides of a pair of chassis which carry a drawer move substantially in synchronism, and drawer load cantilever forces are virtually balanced.

If there is a slight warp in the member 10D of the frame structure of a desk, an applied case attachment rail 14 may be somewhat bowed or twisted. It is therefore desirable to provide at least 0.015 inch slide clearance between all surfaces of the ball bearing retainer 26 and adjacent surfaces of the rails 14 and 20. It is also desirable to float the ball bearings 28 in the said retainer to accommodate such deformation of the case attachment rail 14, and so avoid binding of the said ball bearings in the said retainer.

In that the ball bearing retainers 26 and 30 are slidably supported by the rigid plastic slide members 32, and the ball bearings 28 are free to centralize between opposed ball bearing raceways, it is feasible to provide a tolerance variation of up to 0.005 inch between the root spacing of the raceways of telescoped rails. Such a tolerance range permits roll die formation of all of the rails of the chassis structure, which method of manufacture is desirable from the viewpoints of tooling costs and parts production economy.

The disposition of the two slide rails 20 and 22 along one side of and attached to the connecting member 24, in the cross sectional profile hereinbefore described, and as is shown in detail in FIGS. 1 and 2, provides an extraordinarily rigid extension slide structure, having regard for the gauge thickness of the components thereof. This correlation of parts also provides for facility and rapidity of automated assembly, with minimum expenditure of unit labour time.

I claim:

1. A drawer extensible slide chassis comprising:
 - a case attachment rail;
 - a drawer attachment rail;
 - an extension slide including first and second rails disposed in substantially parallel spaced relationship along one side of and affixed to a generally bar shaped connecting member;
 - each of said rails being channel shaped in cross section including a web and two laterally extending ball bearing raceway flanges;
 - the first rail of the extension slide being partially telescoped into the case attachment rail and slidably correlated therewith on ball bearings supported by the said rail ball bearing raceway flanges,
 - the drawer attachment rail being partially telescoped over the second rail of the extension slide and slidably correlated therewith on ball bearings supported by the said respective rail ball bearing raceway flanges;
 - a resilient and deformable propulsion roller carried by the extension slide connecting member, disposed between opposed flanges of the extension slide first and second rails, and located between and tractionally contacting opposed flanges of the case attachment rail and the drawer attachment rail;
 - a pair of ball bearing retainers for guiding said ball bearings;
 - and plastic slide members engaged between said ball bearing retainers and a raceway flange of each of said rails.
2. A drawer extensible slide chassis comprising:
 - a case attachment rail;
 - a drawer attachment rail;
 - and an extension slide including a generally planar connecting member and first and second rails disposed in substantially parallel vertically spaced relationship and extending outwardly from the same side of said planar member;
 - each of said rails being channel shaped in cross section including a web and two laterally extending ball bearing raceway flanges;
 - the first rail of the extension slide being partially telescoped into the case attachment rail, a first set of ball bearings supported between the said rail ball bearing raceway flanges and the case attachment rail,
 - the drawer attachment rail being partially telescoped over the second rail of the extension slide, a second set of ball bearings supported between the said respective rail ball bearing raceway flanges and the drawer attachment rail,
 - and a resilient and deformable propulsion roller carried by the extension slide connecting member, disposed between opposed flanges of the extension slide first and second rails, and located between and tractionally contacting opposed flanges of the case attachment rail and the drawer attachment rail, said ball bearings defining a vertical plane with said propulsion roller in said plane, and said case attachment rail and drawer attachment rail being positioned to one side of the vertical plane and said planar connecting member being at the other side of the vertical plane.
3. A drawer extensible slide chassis as defined in claim 2, wherein a plurality of said propulsion rollers

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are carried by the unitary extension slide, and are positioned between the case attachment rail and the drawer attachment rail in peripheral contact therewith, a raised boss in said flange of the case attachment rail near an end thereof, and one of said propulsion rollers being positioned to engage said boss and yieldably hold the slide chassis in a retracted position.

4. A drawer extensible slide chassis as defined in

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claim 2 wherein said first and second set of ball bearings each have a ball bearing retainer for guiding of the ball bearings, and a plurality of plastic slide members carried on each of the retainers and engaged between said ball bearing retainers and a raceway flange of each of said rails.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,901,564 Dated August 26, 1975

Inventor(s) Henry P. Armstrong

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Assignee should read -- Jacmorr Manufacturing Company
Limited, Toronto, Ontario, Canada --.

Signed and Sealed this
twenty-seventh Day of January 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks