United States Patent [19]

Fall

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[54] **SLIDE STRUCTURE**

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[73] Assignee: **Herbert S. Fall,** Indianapolis, Ind.

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[52] **U.S. Cl.** **308/3.8,** 312/340

[51] **Int. Cl.** **F16c 29/04**

[58] **Field of Search** 308/3.8; 312/334, 340, 341

[56] **References Cited**

UNITED STATES PATENTS

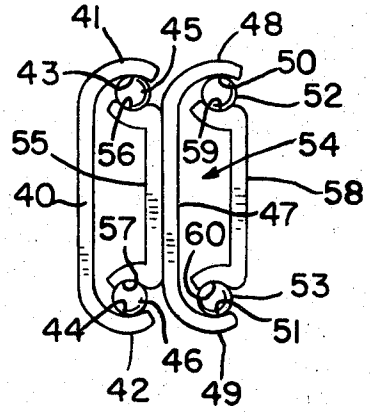
3,488,097	1/1970	Fall	308/3.8
2,606,090	8/1952	Straubel	312/348
3,389,949	6/1968	Studinski	312/341

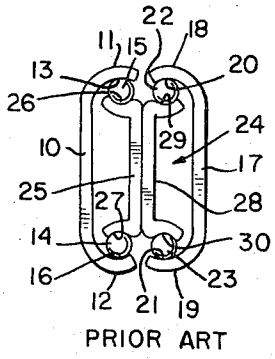
Primary Examiner—Milton Kaufman
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[57] **ABSTRACT**

A slide structure comprising two channel members and two bar members, each bar member being telescopically longitudinally slidably received within a separate channel member, two of said members, of which at least one is a channel member being fixedly secured together to constitute an intermediate element, and the other two members being arranged respectively on opposite sides of the intermediate element and being longitudinally movable relative to the intermediate element and relative to each other.

6 Claims, 6 Drawing Figures





PRIOR ART

Fig. 1

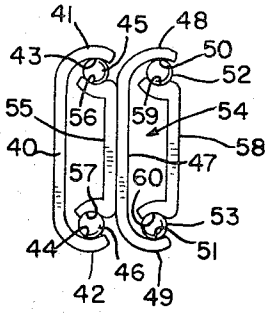


Fig. 2

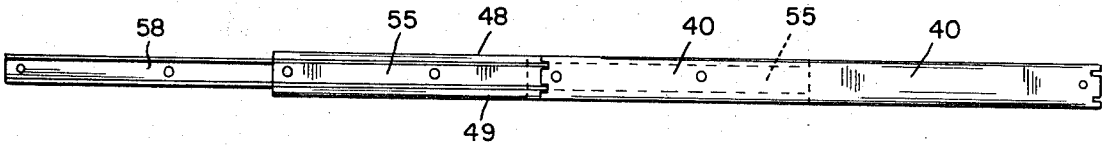


Fig. 3

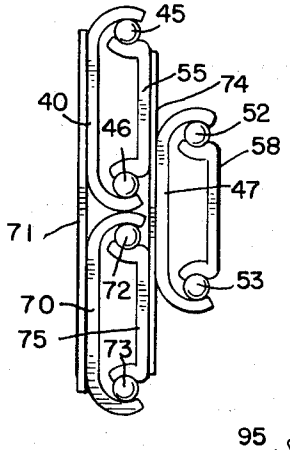


Fig. 4

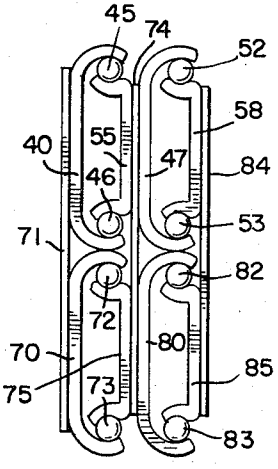


Fig. 5

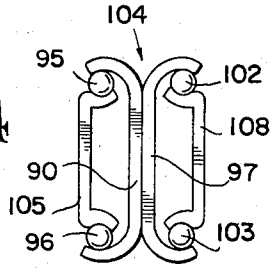


Fig. 6

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SLIDE STRUCTURE

The present invention relates to a slide structure and particularly to an improvement upon one well-known form of structure used primarily to support a drawer from a cabinet or frame for sliding movement in either direction between a rest position within the frame and opposite extended positions outside the frame.

It is obvious that, when the drawer is in either of its fully extended positions, a maximum vertical bending moment is impressed upon the slide structures through which the drawer is suspended. In previously known slide structures of the character here under consideration, the point of primary application of that bending moment has always been a point of minimum strength within the slide structure to sustain that moment. It is a primary object of the present invention, then, so to modify the known slide structure as to eliminate that weak spot in the structure.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the forms illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific constructions illustrated and described, so long as the scope of the appended claims is not violated.

In the drawings:

FIG. 1 is an end view of a conventional, long-known slide structure of the general character here under consideration;

FIG. 2 is a similar view of a similar slide structure modified in accordance with a preferred form of the present invention;

FIG. 3 is a side elevation of the structure of FIG. 2 in extended condition, viewed from the left of FIG. 2 and drawn to a reduced scale;

FIG. 4 is an enlarged view similar to FIG. 2 and showing a modified form of the invention;

FIG. 5 is a view similar to FIG. 4 and illustrating a further modification; and

FIG. 6 is a view similar to FIG. 2 and illustrating a still further modified form of the invention.

Referring more particularly to FIG. 1, I have shown a well-known and long-used form of drawer slide comprising inner and outer rails and an intermediate element retentively associated with both rails to permit relative longitudinal movement only among the three major elements. The outer rail is a channel member 10 formed with curled, parallel, longitudinally extending lips 11 and 12 defining inwardlyfacing, laterally separated trackways 13 and 14 in each of which is received a series of antifriction elements such as the balls 15 and 16. A second channel member 17 having similar lips 18 and 19 defining trackways 20 and 21 similarly receives series 22 and 23 of antifriction elements. The rails or channel members 10 and 17 are substantially identical but allochirally arranged.

An intermediate element indicated generally by the reference numeral 24 comprises a bar 25 formed to define longitudinal, outwardly opening trackways 26 and 27 receiving the antifriction elements 15 and 16 retentively to secure the channel 10 to the bar 25 for relative longitudinal movement only, and an identical, but allochirally arranged, bar 28 fixedly secured to the bar 25 and providing outwardly opening trackways 29 and 30 receiving the antifriction series 22 and 23 retentively to secure the channel 17 to the bar 28 for relative longitudinal movement only.

When the structure of FIG. 1 is fully extended, the inboard ends of the channels 10 and 17 are somewhat separated so that the region between those channel ends consists solely of the intermediate element 24 which, because of the shape and size of the bars 25 and 28, is less resistant to bending moments than are the channel members 10 and 17.

According to the present invention, the several members of the previously known slide structure are differently arranged relative to each other, whereby improved resistance to vertical bending stresses is found to be conferred upon the assembly. Specifically, such rearrangement of the parts must be such that at least one of the channel members constitutes a part of the intermediate element of the slide structure.

According to FIG. 2, a channel member 40 has its opposite edges curled to provide lips 41 and 42 defining trackways 43 and 44 in which are retentively received series 45 and 46 of antifriction elements. In the embodiments of the invention herein illustrated, such antifriction elements are ball bearings with which may be associated suitable cage structures (not shown) for maintaining the integrity of each series of antifriction elements.

A bar member 55 is telescopically received within the channel member 40 and is formed to provide outwardlyopening trackways 56 and 57 retentively engaging, respectively, the antifriction series 45 and the antifriction series 46.

A second channel member 47 which may be identical with the channel member 40 is fixedly secured to the bar 55 to constitute the intermediate element, indicated generally by the reference numeral 54, of the improved slide structure of the present invention. The channel member 47 is formed at its lateral edges with parallel curled lips 48 and 49 defining inwardly facing trackways 50 and 51 retentively receiving antifriction element series 52 and 53. A second bar member 58, in all respects similar to the bar 55, is formed to provide outwardly-opening trackways 59 and 60 for retentively receiving the antifriction series 52 and 53.

Thus, the intermediate element 54 is retentively secured to the rail 40 for longitudinal movement only relative thereto, and to the rail 58 for longitudinal movement only relative thereto. The assembly of FIG. 2 is extensible generally in the same way as is the structure of FIG. 1; but, in its extended condition, the median region of its length includes a portion of at least one channel section whereby resistance to vertical bending stresses is greatly improved.

In the form of invention illustrated in FIG. 4 greater stability is provided by adding an additional guide-and-slide assembly. Thus, I have shown an assembly consisting of the channel member 40, the bar member 55 and the antifriction series 45 and 46 establishing an operative slide assembly as illustrated in FIG. 2, but I have included a second, similar assembly consisting of a channel member 70, a bar member 75 and two series 72, 73 of antifriction elements retentively connecting the telescoped members for longitudinal relative movement only, paralleling the first named assembly and rigidly fixed thereto by a backplate 71 spanning and

rigidly connected to the two channel sections **40** and **70**. A bridge plate **74** spans and is rigidly connected to the two bars **55** and **75**, and the channel section **47** of the second assembly of FIG. **2** is rigidly fixed to said plate **74**.

Thus, in this form of the invention, the intermediate element comprises the bar **55**, the bar **75**, the plate **74** and the channel section **47**; while the outer rail comprises the plate **71**, the channel sections **40** and **70** and the inner rail comprises the bar **58**.

FIG. **5** illustrates a still further reinforced slide structure including the assembly **40, 45, 46, 55** and the assembly **70, 72, 73, 75** of FIG. **4** with the members **40** and **70** fixedly joined by the backplate **71** and the bar members **55** and **75** joined by the bridge plate **74**. The channel members **47** and **80** are fixedly secured to the bar members **55** and **75** through the bridge piece **74** to constitute the intermediate element of the assembly of FIG. **5** and a bar member **85** connected to the fourth channel member **80** through the antifriction series **82** and **83** is fixedly connected to the bar member **58** by means of a bridge piece **84**. Thus, in this form of the invention, the outer rail consists of the plate **71** and the two channel members **40** and **70**, the inner rail consists of the plate **84** and the bar members **58** and **85**, and the intermediate element comprises the bar members **55** and **75**, the channel members **47** and **80** and the bridge plate **74**.

In FIG. **6**, I have shown still another embodiment of my invention in which the channel members **90** and **97** are fixed to each other back to back to constitute the intermediate element **104**, while the outer rail consists of the bar member **105** retentively secured to the channel member **90** through the antifriction series **95** and **96**, while the inner rail consists of the bar member **108** retentively secured to the channel member **97** through the antifriction series **102** and **103**. When this latter form of the invention is used, it may be desirable to apply a relatively wide bearing plate (not shown) to the outer surface of the bar member **105** or the bar member **108** or both of them.

I claim:

1. A slide structure comprising a first assembly including a first channel member defining parallel, inwardly opening trackways, a first bar member defining parallel, outwardly opening trackways received between and mating respectively with said channel member trackways, and a series of antifriction elements received in each mating pair of trackways and establishing a retentive connection between said members for longitudinal relative movement only, a second assembly including a second channel member defining parallel, inwardly opening trackways, a second bar member defining parallel, outwardly opening trackways received between and mating respectively with the trackways of said second channel member, and a series of antifriction elements received in each mating pair of said last-named trackways and establishing a retentive connection between said second members for longitudinal relative movement only, the channel member of one assembly being fixed relative to the bar member of the other assembly, and the other two members being longitudinally movable relative to each other and to said relatively fixed members.

2. A slide structure comprising a first assembly including a first channel member defining parallel, inwardly opening trackways, a first bar member defining parallel, outwardly opening trackways received between and mating respectively with said channel member trackways, and a series of antifriction elements received in each mating pair of trackways and establishing a retentive connection between said members for longitudinal relative movement only, a second assembly including a second channel member defining parallel, inwardly opening trackways, a second bar member defining parallel, outwardly opening trackways received between and mating respectively with the trackways of said second channel member, and a series of antifriction elements received in each mating pair of said last-named trackways and establishing a retentive connection between said second members for longitudinal relative movement only, one member of each assembly being fixed relative to one member of the other assembly, at least one of said relatively fixed members being a channel member, and the other two members being longitudinally movable relative to each other and to said relatively fixed members in which the channel member of said second assembly is fixed to the channel member of said first assembly in direct, back-to-back relationship.

3. A slide structure comprising a first assembly including a first channel member defining parallel, inwardly opening trackways, a first bar member defining parallel, outwardly opening trackways received between and mating respectively with said channel member trackways, and a series of antifriction elements received in each mating pair of trackways and establishing a retentive connection between said members for longitudinal relative movement only, a second assembly including a second channel member defining parallel, inwardly opening trackways, a second bar member defining parallel, outwardly opening trackways received between and mating respectively with the trackways of said second channel member, and a series of antifriction elements received in each mating pair of last-named trackways and establishing a retentive connection between said second members for longitudinal relative movement only, one member of each assembly being fixed relative to one member of the other assembly, at least one of said relatively fixed members being a channel member, and the other two members being longitudinally movable relative to each other and to said relatively fixed members, a third assembly comprising a third channel member defining parallel, inwardly opening trackways arranged in the plane which is common to the trackways of the channel member of said first assembly, a third bar member defining parallel outwardly opening trackways received between and mating respectively with the trackways of said third channel member, and a series of antifriction elements received in each mating pair of the trackways of said third assembly, means rigidly connecting said third channel member with said first channel member, and means rigidly connecting said third bar member with said first bar member and with said second channel member.

4. A slide structure comprising a first assembly including a first channel member defining parallel, inwardly opening trackways, a first bar member defining

parallel, outwardly opening trackways received between and mating respectively with said channel member trackways, and a series of antifriction elements received in each mating pair of trackways and establishing a retentive connection between said members for longitudinal relative movement only, a second assembly including a second channel member defining parallel, inwardly opening trackways, a second bar member defining parallel, outwardly opening trackways received between and mating respectively with the trackways of said second channel member, and a series of antifriction elements received in each mating pair of said last-named trackways and establishing a retentive connection between said second members for longitudinal relative movement only, one member of each assembly being fixed relative to one member of the other assembly, at least one of said relatively fixed members being a channel member, and the other two members being longitudinally movable relative to each other and to said relatively fixed members, a third assembly comprising a third channel member defining parallel, inwardly opening trackways arranged in the plane which is common to the trackways of the channel member of said first assembly, a third bar member defining parallel, outwardly opening trackways received between and mating respectively with the trackways of said third channel member, and a series of antifriction elements received in each mating pair of the trackways of said third assembly, a fourth assembly comprising a fourth channel member defining parallel, inwardly opening trackways arranged in the plane which is common to the trackways of the channel member of the second assembly, a fourth bar member defining parallel, outwardly opening trackways received between and mating respectively with the trackways of said fourth channel member, and a series of antifriction elements received in each mating pair of the trackways of said fourth assembly, means rigidly connecting said third channel member with said first channel member, means rigidly connecting said fourth bar member with said second bar member, and means rigidly connecting said first bar member to said second channel member, to said third bar member and to said fourth channel member.

5. A slide structure comprising a first channel member, a first slide member longitudinally telescopically slidably received in said channel member, a second channel member and a second slide member longitudinally telescopically slidably received in said second channel member, said first slide member and said second channel member being fixedly secured together and the other two of said members being longitudinally movable relative to each other and to said members which are fixedly secured together.

6. A drawer slide comprising an outer member adapted to be secured to a frame, an inner member adapted to be secured to a drawer, and an intermediate element longitudinally telescopically joined with both of said members, each telescopic joinder including a male part and a female part and said intermediate element embodying the male part of one such joinder and the female part of the other such joinder.

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