Dec. 4, 1934. R. I. EUSTIS ET AL 1,982,908

TRACK FOR SLIDING SASHES

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Fig. 1.

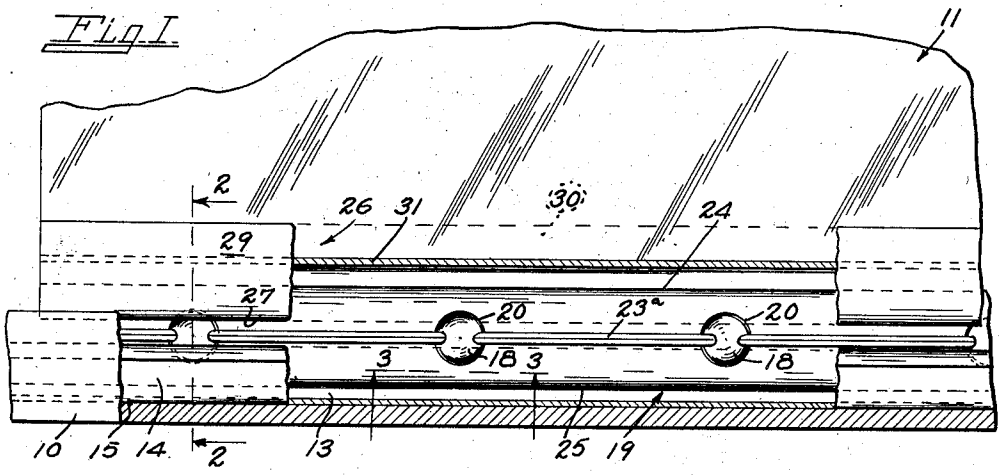
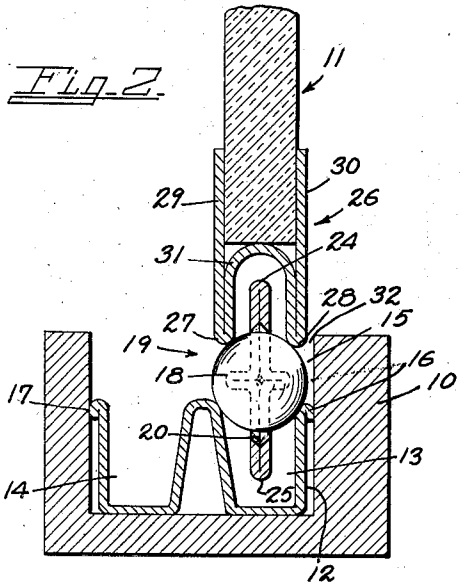


Fig. 2.



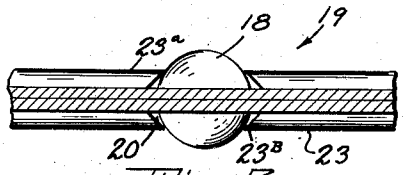


Fig. 3.

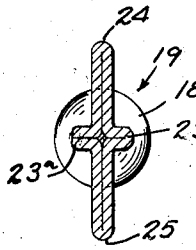


Fig. 4.

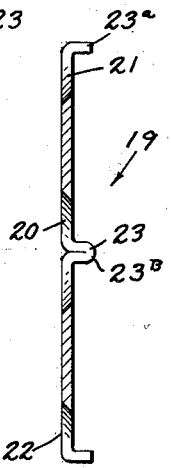


Fig. 6.

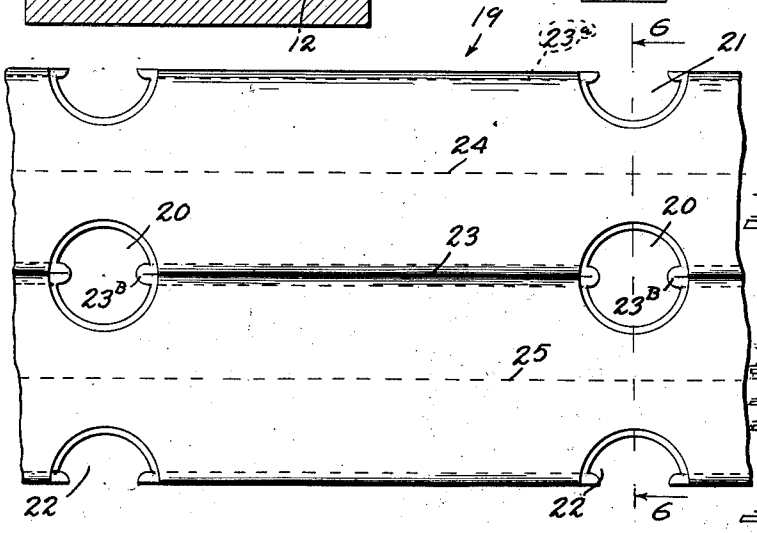


Fig. 5.

Inventor.
R. S. Balger
R. I. Eustis.
By Hazard and Miller
Attorneys.

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1,982,908

TRACK FOR SLIDING SASHES

Robert I. Eustis and Fred S. Beiger, Los Angeles, Calif., assignors to Eustis Specialty Company, Inc., Los Angeles, Calif., a corporation of California

Application February 3, 1932, Serial No. 590,692

11 Claims. (Cl. 308—6)

This invention relates to improvements in tracks for sliding sash or devices for movably supporting sash for longitudinal horizontal movements. It may be considered as an improvement over the disclosures made in our respective prior United States Letters Patent No. 1,685,535 and No. 1,814,503, issued September 25, 1928, and July 14, 1931, respectively.

An object of the present invention is to provide an improved track or support for sliding sash and similar closures having a bottom channeled member designed to support balls which in turn support the sash, which channeled member is so constructed as to cause the groove formed in the supporting structure to receive the channeled member to be cut of proper width so as to provide the necessary clearance. In installing structures of this character in cabinets and the like, it is customary to form a groove in the supporting structure to receive the bottom channeled member. The bottom channeled member is positioned in the bottom of the groove so that the top of the channeled member is disposed below the top of the groove. The shoe which is applied to the sash ordinarily extends into the groove a short distance and is supported upon the balls. In prior constructions, such as that disclosed in our prior patents, the bottom channeled member has perfectly straight sides. We find that those very familiar with installing structures of this character cut the groove in the supporting structure with sufficient clearance so that when the sash is installed there is no danger of the shoe which projects into the groove engaging the sides of the groove and binding. Frequently, however, these devices are installed by persons not so familiar with their installation, who in an endeavor to produce a neat and workmanlike structure cut the groove in the supporting structure with just sufficient width to receive the channeled member. When the groove is so cut, the side of the groove is disposed so near the shoe that if the groove is not cut perfectly true, or the sash is slightly warped, or settling of the structure takes place, the result is that the shoe on the sash engages the side of the groove and binds.

An object of the present invention is to provide a novel channeled member which is so designed that regardless of who installs the structure they will necessarily be forced to cut the groove wide enough to prevent binding or rubbing of the shoe on the side of the groove in the event that the groove is not perfectly straight, or the sash is warped, or any other contingency occurs.

Another object of the invention is to provide a novel cage structure for the balls which roll on the edges between the channeled member and the shoe. In prior Patent No. 1,814,503 above mentioned is disclosed a tubular cage formed of sheet metal having spaced side walls and having the meeting edges at the bottom of the cage. The intention is in installing the cage with the balls that the meeting edges or seam in the cage be positioned downwardly to expose a smooth rounded neat upper edge, which becomes exposed when the sash is moved into open position. It sometimes occurs, however, that those installing the structure and unfamiliar with its installation, reverse the position of the cage so that the seam or the meeting edges are disposed uppermost, giving an unsightly appearance. Furthermore in the structure disclosed in said prior patent, the design has been to stiffen the cage so that it will not bend when long lengths of the cage are handled. The stiffening is accomplished mainly by the integral top and while the meeting bottom edges of the cage will stiffen the cage somewhat, most of the stiffening action is accomplished by the top only.

An object of the present invention is to provide a novel cage construction having its meeting edges or seam disposed at the side. By this arrangement regardless of which edge of the cage is positioned uppermost, it will present a smooth rounded neat appearance. Furthermore there are two edges of the cage at the top and bottom which are integral and which serve to stiffen the cage, thus making it materially stiffer than the structure disclosed in said prior patent. The improved construction of cage also facilitates manufacture and the insertion of the balls.

Another object of the invention is to provide a novel cage for the balls formed of a single piece of sheet metal bent to provide two sides of the cage, each of which has apertures which receive the balls, the cage having beads extending longitudinally along the sides with their ends partially projecting over the apertures forming ears which retain the balls in the apertures. In devices of this character it is highly desirable to have considerable clearance between the balls and the sides of the apertures. If the installation is not perfectly true and the sash is very heavy, the cage may be slightly bent under the weight. Also sometimes the rails afforded by the channeled member are not perfectly straight. Unless there is considerable clearance between the balls and the sides of the apertures, the balls will bind in the cage, creating considerable friction. The improved construction enables a great

deal of clearance to be present. At the same time, the balls will be maintained in position by the cage, the result being that there is no danger of the balls binding and the construction operates always with a minimum amount of friction.

A further object of the invention is to provide a novel shoe formed of a single piece of sheet metal so formed as to provide two channels arranged back to back. The upper channel is designed to receive the bottom of the sash while the lower channel presents smooth rounded edges of neat appearance which engage the balls.

Still a further object of the invention is to provide a novel bottom channel member so formed as to support a plurality of sashes side by side occupying a minimum amount of space and presenting a neat and attractive appearance when exposed by the opening of the sash. While the channeled member supports the sashes very close together, it is so formed as to prevent them from contacting one upon the other.

With the foregoing and other objects in view, which will be made manifest in the following detailed description, and specifically pointed out in the appended claims, reference is had to the accompanying drawing for an illustrative embodiment of the invention, wherein:

Fig. 1 is a partial view in side elevation, parts being broken away and shown in vertical section, illustrating the improved track or support for sliding sash.

Fig. 2 is a vertical section taken substantially upon the line 2—2 upon Figure 1.

Fig. 3 is a horizontal section taken substantially upon the line 3—3 upon Figure 1.

Fig. 4 is a vertical section through the cage taken at a point between two adjacent balls.

Fig. 5 is a fragmentary view illustrating the manner in which the sheet metal is cut and folded to form the improved cage for the balls.

Fig. 6 is a vertical section taken substantially upon the line 6—6 upon Figure 4.

Referring to the accompanying drawing, wherein similar reference characters designate similar parts throughout, 10 designates a suitable supporting structure designed to support the sash 11 which may be a pane of plate glass which is to be moved longitudinally in its plane. The track or support for the sash comprises a bottom channeled member generally designated at 12, this channeled member being illustrated as being of approximately a W cross section forming two channels 13 and 14 arranged side by side. This construction having the W cross section is designed to support two sashes 11 side by side but it will be readily appreciated that features of the invention are not restricted thereto. If desired the bottom channeled member may be in the nature of a single channel or more than two channels. The supporting structure is grooved as indicated at 15 to receive the channel and the groove is made somewhat deeper than the depth of the channeled member 12. The upper edges of the vertical outer sides of the channeled member are reversely bent upon themselves as indicated at 16 and 17 so that at the upper outer edges of the channeled member there is a double thickness of metal, the function of which will be hereinafter described in detail. On the upper edges of each channel 13 and 14 there are disposed balls 18. These balls are held in spaced relation by a cage 19. The cage 19 is formed of a single piece of sheet metal which has apertures 20 formed at regular intervals along its longitudinal center line. At the side edges of the strip of sheet metal there are formed semicircular openings 21 and 22 arranged in transverse alignment with the central apertures 20. The strip is then folded, usually by machine, upon two longitudinal fold lines 24 and 25 with the result that the portion of the sheet metal between the fold lines 24 and 25 forms one complete side of the cage. The sheet metal between fold line 24 and its adjacent edge forms one-half of an adjacent side of the cage disposed in spaced relation to the complete side, as shown in Figure 4. Likewise the portion between the fold line 25 and its adjacent edge forms a complementary half. The semicircular openings 21 and 22 cooperate to form apertures in the side produced by the complementary halves for the reception of the balls 18. As the folding takes place, the balls are dropped into the apertures 20 and the halves are folded down over the balls so that when the folding is completed the balls are automatically retained in the cage between the spaced sides of the tubular cage thus formed. The cage thus produced presents smooth continuous top and bottom edges so that regardless of which edge is uppermost it presents a neat and attractive appearance. Furthermore the integral top and bottom edges, each carrying one of the complementary half sides, causes the tubular cage to be quite stiff and resist bending when long lengths of the cage are handled.

At the center of the strip there is formed a longitudinal crimp 23 which projects laterally from one side of the strip. The side edges of the strip are flanged as at 23*a*. The apertures 20 and the semicircular openings 21 are countersunk and may be formed with a countersinking punch, the countersink being formed from the opposite side of the strip from the side carrying the flanges and crimp 23. In this manner when the strip is folded on the fold lines 24 and 25 the flanges 23*a* cooperate to form a bead, as shown in Figure 4, opposite the bead formed by crimp 23. The ends of the bead on both sides project partially over the apertures, as indicated in Figure 5, thus forming ears at 23*b* which retain the balls in their respective apertures. The apertures are so formed as to be somewhat larger than the balls, affording plenty of clearance, and this clearance may be more pronounced vertically than horizontally, as indicated in prior Patent No. 1,814,503. The presence of the beads stiffens the cage considerably and so locates the ears 23*b* as to retain the balls in the apertures yet allow plenty of clearance. As clearly shown in Figure 4, these beads project outwardly distances from the center line of the cage less than the radii of the balls.

The portion of the cage below the balls extends downwardly into the channeled member 12 and is disposed above its bottom. The portion of the cage above the balls projects upwardly into the bottom of the shoe generally designated at 26. The improved shoe is formed of a single piece of sheet metal reversely bent upon itself along two lines to produce reverse bends 27 and 28, above which bends there are the parallel sides 29 and 30. The intervening connecting portion which is of inverted U shaped form, designated at 31, has its top disposed at about the middle of the sides 29 and 30 with the result that the sides 39 and 30 above the inverted U shaped portion 31 forms a channel to receive the bottom of the sash or pane 11. The lower portions of the sides cooperate with the inverted U shaped connecting portion in forming an inverted channel present-

ing rounded edges which ride on the balls 18. As clearly disclosed on the drawing, the shoe extends into the groove 15 a short distance so that when the sash is closed the shoe very nearly meets the sides of the groove and the top surface of the supporting structure 10 and presents a neat and attractive appearance.

The purpose of the reversely bent portions at 16 and 17 will now be described. Heretofore it has been customary to construct the channeled member with vertical sides 14 which are of single thickness. Those unfamiliar with this installation have ordinarily cut the groove 15 with just enough width to receive the channeled member. When the groove is cut only this wide, the outer side of the shoe is positioned so close to the side of the groove that if for any reason the parts are not in perfect alignment the shoe engages and rubs against the side of the groove. This cutting of the groove 15 with just enough width to receive the channeled member is usually done with the intention of making as neat and workmanlike job as possible, overlooking the disadvantage that there is a possibility of rubbing or binding due to the lack of clearance. Those more familiar with the installation of the structure have usually cut the groove slightly wider than the channeled member to provide for the clearance. By having the reversely bent portions at 16 and 17 all persons installing the structure are forced to cut the groove 15 sufficiently wide to take care of the additional thicknesses of metal at 16 and 17. In this manner the desire to produce a neat and workmanlike installation may be accomplished and satisfied. At the same time sufficient clearance, indicated at 32, is present so that even though the groove may not be perfectly straight along its length, or the shoe may be warped, or the sash warped, there is no danger of rubbing or binding. Consequently the sash is free to roll at all times.

From the above described construction it will be appreciated that a novel track or support for sliding sash is provided which is of very simple construction having quite a number of advantages. The shape of the channeled member is such that two sashes may be mounted very close together on the same neat structure. The channeled member will always be installed in such a manner as to provide the necessary clearance, the cage will always be installed in such a manner as to present a neat and attractive upper edge, which is the edge exposed, and is also of considerably greater stiffness. The shoe is made of a single piece of metal and accomplishes all of the advantages present in a structure wherein the shoe is made of two channels secured back to back. In addition it is of considerable stiffness and strength and presents a neat and attractive appearance.

While the sash mentioned herein is referred to as a sliding sash, the sash does not actually slide but moves or rolls on the balls. However, as sash having this longitudinal horizontal movement are customarily referred to in the art as being sliding sash, this term has been used herein merely to designate the general character of the sash and the movement which it is designed to have.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

We claim:

1. In a track for sliding sash and the like, an elongated cage, balls disposed in the cage and projecting from opposite sides thereof, said cage being formed of a single piece of metal providing one complete side and two half sides integral therewith and connected thereto by reverse bends so that the top and bottom edges of the cage are smooth and continuous.

2. In a track for sliding sash and the like, a cage comprising a single piece of metal providing one complete side and complementary portions of another side, there being apertures in said side and complementary portions of apertures formed in the meeting edges of the complementary portions arranged in alignment with said apertures, and balls disposed in the apertures in the two sides thus formed and projecting beyond the sides.

3. In a track for sliding sash, a plurality of balls, and a straight cage for the balls for maintaining them in aligned spaced relation, said cage having apertures therein to partially receive the balls with the balls projecting laterally from both sides of the cage, there being outwardly projecting crimps forming beads extending lengthwise of the cage between the apertures on the outer sides of both sides of the cage, the ends of the beads projecting partially over the apertures providing ears for retaining the balls in the apertures.

4. In a track for sliding sash, a plurality of balls, and a straight cage for the balls for maintaining them in aligned spaced relation, said cage having apertures therein to partially receive the balls with the balls projecting laterally from both sides of the cage, the sides of the cage having longitudinal outwardly projecting crimps between the apertures providing beads the ends of which project partially over the apertures forming ears for retaining the balls in the apertures.

5. In a track for sliding sash, a plurality of balls, and a cage for the balls formed of a strip of sheet metal providing two sides of the cage, said strip having a longitudinal crimp forming an external bead between the apertures, the ends of the bead projecting partially over the apertures providing ears for retaining the balls in the apertures.

6. In a track for sliding sash, a plurality of balls, and a cage for the balls formed of a strip of sheet metal providing two sides of the cage, said strip having a longitudinal center crimp forming an external bead on one side of the cage and flanged edges adapted to cooperate when the strip is folded to form an external bead on the other side of the cage, there being countersunk apertures formed through the sides of the cage and through the beads, which apertures taper from the inside of the cage outwardly so that the ends of the beads partially project over the apertures forming ears for retaining the balls in the apertures.

7. In a track for sliding sash, a plurality of balls, and a cage for the balls formed of a strip of sheet metal providing two sides of the cage, said strip having a longitudinal center crimp forming an external bead on one side of the cage and flanged edges adapted to cooperate when the strip is folded to form an external bead on the other side of the cage, there being countersunk apertures formed through the sides of the cage and through the beads, which apertures taper from the inside of the cage outwardly so that the ends of the beads partially project over the apertures forming ears for retaining the balls in the apertures, the distances to which the beads project outwardly from the center line

of the cage being less than the radii of the balls.

8. A track for sliding sash comprising two opposed channels between the edges of which balls are disposed, and a cage for the balls disposed within the channels, said cage having two opposed sides, there being outwardly projecting crimps forming beads formed on the outer sides of said sides, there being apertures in the sides for the balls, said beads projecting outwardly over the apertures to retain the balls in the apertures and serving to stiffen the cage intermediate the apertures.

9. A track for sliding sash comprising two opposed channels between the edges of which balls are disposed, and a cage for the balls disposed within the channels, said cage being formed of a single piece of sheet metal bent to provide one entire side and two opposed half sides connected to the entire side by reverse bends, there being aligned apertures in the entire side and half sides for the balls, the entire side having a longitudinal crimp extending outwardly therefrom at about its center, the edges of the half sides being bent outwardly together forming flanges.

10. A track for sliding sash comprising two opposed channels between the edges of which balls are disposed, and a cage for the balls disposed within the channels, said cage being formed of a single piece of sheet metal bent to provide one entire side and two opposed half sides connected to the entire side by reverse bends, there being aligned apertures in the entire side and half sides for the balls, the entire side having a longitudinal crimp extending outwardly therefrom at about its center, the edges of the half sides being bent outwardly together forming flanges, the crimp and flanges being extended partially over the apertures to retain the balls therein.

11. A track for sliding sash comprising two opposed channel members, balls disposed between the edges of the channel members enabling the upper channel member to roll with respect to the lower channel member, a cage for the balls, said cage being formed of a single piece of sheet metal providing one complete side and two half sides integral therewith and connected thereto by reverse bends so that the top and bottom edges of the cage are smooth and continuous, the balls being disposed within the cage and partially projecting from opposite sides thereof, the top of the cage projecting upwardly into the upper channel, and the bottom of the cage projecting downwardly into the lower channel.

ROBERT I. EUSTIS.
FRED S. BEIGER.