This invention relates generally to window construction, and more particularly it pertains to window and screen structures of the vertical reciprocating type where the sashes are removable and replaceable.

This invention is an improvement on the devices outlined in U.S. Patent No. 2,731,287, and in an abandoned application filed by the applicant in the United States Patent Office, Serial No. 361,140, dated June 12, 1953; this application is a continuation-in-part of United States Patent application Serial No. 376,621, now abandoned, filed August 26, 1953, for "Bearling and Tightener for Window Sash."

The conventional types of metal window frames and window and screen sashes now known to the art, have certain limitations in their design which render them more or less objectionable. In certain designs the window frame channels are lined with steel or metal inserts to prevent excessive scoring or galling in the window frame through the movements of the sash therein.

It is an object of this invention to eliminate this costly operation of applying the steel or metal inserts in the window frame to prevent excessive scoring or galling caused by the movement of the sash in the window frame.

It is conventional, as taught by the patent issued to Emil Broggelwirth, No. 479,324, to provide a friction pad to the outer surface of a spring by using a metal channel 14 (only the lower channel 14 is shown) and side channels 16 (only one of which is shown) for receiving a pane of glass 12. Window sash 10 is positioned in a window frame consisting of a base 20 and side frames 21 (only one of which is shown). Each side frame 21 has at least one channel 22, which is parallel sides 23 of one of the grooves 60 of the channel for receiving the lower window sash 10 being shown in Figs. 1 and 6. The channel 22, however, can be formed with three grooves for receiving the upper window sash, the lower window sash 10, and a screen.

The spring tensioning, bearing and tighten device 24, comprising this invention is shown mounted on a latch 18 which is disclosed in detail in U.S. Patent No. 2,672,362. Two of these latches 18 (with the spring tensioning, bearing and tighten device 24) are provided for each window sash 10 and they are mounted in the vertical channel 16 at the top and bottom thereof, as shown in Fig. 1 only the bottom latch is shown. The devices 24 are received in one of the grooves 60, shown in Fig. 6, provided in the channel 22.

Referring now to Figs. 2 to 4 of the drawing, the spring tensioning, bearing and tighten device 24 is shown in greater detail. This device 24 consists of a self-lubricating bearing block 40 which is attached to a leaf type spring 26. This bearing block is of substantially uniform width throughout its length. The spring 26 is bent at its ends 32 and 34 so that these ends can be inserted in slots 62 and 64 provided in the edge of the channel member 16.
The bearing block 40, as best seen in Fig. 5, is provided with notches 42 and 44 at both of its ends.

This bearing block 40 is of greater width than the leaf spring 26 and it is centrally positioned on the spring and is secured thereto by metal clips 46 which fit into the slots 42 and 44. The ends of the clips 46 are bent below the spring 26 to secure the bearing block 40 thereto, as best seen in Figs. 3 and 4. The clips 46, as applied in this application, are not preformed fasteners, but are applied in a coiled wire form using a special machine. Clips 46, of this type, are more economical than preformed rivets, in production use. Small lugs 36, formed integrally with the spring 26, are utilized to hold the bearing block in an operative position, that is, prevent it from sliding lengthwise along the spring.

An arm or flange 30 with a circular end 28 having an opening therein and formed integral with the leaf spring 26 is used for securing the center of the spring of the latch mechanism 18 when positioning the window sash 10 in the window frame. It is to be noted, as best seen in Figs. 3 and 4, that when the device 24 in conjunction with the latch 18 is utilized for holding the window sash 10 in the window frame, the bearing block 40 takes the same general shape as the arcuate spring 26, as best seen in Fig. 3.

When the window sash 10 is to be removed from the window frame, the device 24 with the latch 18 is in the position shown in Fig. 4. The bearing block 40 follows the contour of the spring 26.

This means that, due to the mounting of the bearing block 40 to the spring 26 by clips 46, the ends of the bearing block can slide. The overall result is that the bearing block 40 can be flexed any number of times without stress or fatigue failure. The result is that the spring will fail after limited use if it were adapted for use with a removable sash.

It is to be further noted that by making the bearing block 40 of greater width than the spring 26, three bearing surfaces are provided, namely the upper surface of the bearing block as shown in Figs. 1 and 3 together with the two sides or edges thereof for engagement with the parallel sides 23 of the channel groove 60, as shown in Fig. 6. Thus, by providing a bearing block 40 with three bearing surfaces or points of contact, scoring and galling of the metal frame 22 is eliminated.

Both polyethylene and nylon are suitable for use as the bearing element 40 for the reason that they have somewhat similar properties. Both are synthetic resins. Polyethylene is a thermoplastic resin produced by polymerizing ethylene under high pressure and elevated temperature. Nylon is the generic term for a series of polyamide resins made by the polymerization of a hexamethylene diamine salt of adipic acid.

Both types of substances are moldable. The stiffness of polyethylene is greater, however, and places it between the common rigid and non-rigid plastics which makes it highly suitable for the present purpose. Buffers of polyethylene offer a low coefficient of friction and possess unusually long service life.

In actual operation, sash 10 is inserted into the window frame with the latches 18 in an unlocked position as shown in Fig. 4. The latches 18 are then latched, as shown in Figs. 1 and 3. The window sash 10 can then be moved upwardly and downwardly in the groove 60 in the window frame without galling or scoring the frame, as previously mentioned.

While one form of the invention is shown in the drawings and described in the specification, it is not desired to limit this application for patent to this particular form as it is appreciated that other forms of bearings could be made that would use different clamping means to suit the construction encountered and use the same principles and come within the scope of the appended claims.

What is claimed is:

1. A flexible tensioning, bearing device for use between a window frame and a relatively thin removable storm sash therefor, comprising, a leaf type spring of substantially elongated, arcuate shape and of uniform width throughout its intermediate length, said spring being of substantially the same width as said storm sash, a separate self-lubricating bearing mounted on the upper curved surface of said spring, said bearing consisting of a moldable synthetic resin having a low coefficient of friction, said bearing being of greater width than the intermediate length of said arcuate spring so that the edges of said bearing as well as the upper surface thereof provide three points of contact with the surfaces that said bearing comes into engagement with between said frame and storm sash, said bearing having a pair of oppositely opposed, spaced notches at each end thereof and extending inwardly from its side edges, said spring having a pair of spaced portions extending outwardly from one side edge and in the same curved plane thereof, and a clip element positioned in each pair of oppositely opposed spaced notches of said bearing and extending past the edges of said spring and engaging the under surface thereof for securing said bearing to said spring, said bearing being prevented from slipping lengthwise along said spring by said clips being positioned between said extended portions of said spring.

2. An arrangement as recited in claim 1, wherein said spring is provided with means at the opposite ends thereof for securing said spring to the side edges of said storm sash.

3. A flexible tensioning, bearing device for use between a window frame and a relatively thin removable storm sash therefor, comprising, a leaf type spring of substantially elongated, arcuate shape and of uniform width throughout its intermediate length, said spring being of substantially the same width as said storm sash, a separate self-lubricating bearing mounted on the upper curved surface of said spring, said bearing consisting of a moldable synthetic resin having a low coefficient of friction, said bearing having at least one side extending outwardly from edge of said arcuate spring so that the edge of the outwardly extending portion of said bearing as well as the upper surface thereof provide at least two surfaces of contact with the surfaces that said bearing comes into engagement with between said frame and storm sash, said bearing having a pair of oppositely opposed, spaced notches at each end thereof and extending inwardly from its side edges, said spring having a pair of spaced portions extending outwardly from one side edge and in the same curved plane thereof, and means positioned in each pair of oppositely opposed spaced notches of said bearing and extending past the edges of said spring and engaging the under surface thereof for securing said bearing to said spring, with said bearing being prevented from slipping lengthwise along said spring by said means being positioned between said extended portions of said spring.

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