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DRAWINGS ATTACHED

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(54) SEALING STRIP FOR SLIDING DOORS AND WINDOWS

(71) I, KUNIO ISAMATSU, a subject of Japan, of 11-4, 5-Chome, Sekimae, Musashino, Tokyo-To, Japan, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a device for sealing the gaps between the periphery of a sliding door or window and its frame. The invention also concerns a sliding door or window arrangement which includes such sealing devices.

The use of weather strips made of materials such as rubber and synthetic resin sponge materials as means for sealing the peripheries of sliding doors and windows has heretofore been practised. These weather strips, however, produce considerable frictional resistance to the sliding movements of the doors or window sashes. For this reason, for sliding doors or window sashes which move in a straight line when opening or closing, it is necessary to devise some means for separating the door or sash and the weather strips when the door or sash is being moved and to cause the weather strips and the door or sash to be pressed together only when the door or sash is fully closed. Furthermore, strips made of materials such as rubber tend to harden and lose their resilience in cold weather.

It is an object of the present invention to provide a sealing device for sliding doors and window sashes which is not accompanied by the above described difficulties encountered with known sealing means.

According to one aspect of the present invention, there is provided a resilient sealing strip for sealing the gaps between the periphery of a sliding door or window and its frame, comprising a base portion adapted to be secured to a flat surface on one of two parts of the door or window and its frame that are slidable relative to one another, and a projecting tongue adapted to press against the other of said two parts, the base portion

comprising two strips of substantially rectangular cross-section lying parallel to one another in the same plane, and a bridge portion connecting together said two strips rising out of the plane of said two strips so as to leave under the bridge portion a gap adjacent said flat surface when the strip is secured thereto, said projecting strip portion extending from the bridge portion away from said gap, the exposed surfaces of the sealing strip being covered with a pile.

According to another aspect of the invention, there is provided a sliding door or window arrangement in which a door or a window sash is slidably supported and guided in opening and closing movements by beads fixed to and projecting from a frame structure, the arrangement including a pair of mutually-facing and spaced-apart grooves along all peripheral edge parts of said door or sash, each of said grooves accommodating one of said sealing strips fitted thereto at its base part, said tongues of the strips in each pair of grooves being pressed in a resiliently deformed state against opposite flanks of a corresponding one of said beads interposed therebetween.

Embodiments of a sealing strip in accordance with the invention, as well as a sliding window arrangement including such strips, will now be described, by way of example only, with reference to the accompanying drawing, in which:—

Figure 1 is an elevation, in cross-section and with a central portion cut away, of a window frame and horizontally sliding window sashes provided with an example of the sealing strip of the invention;

Figure 2 is a fragmentary plan view, in section, showing one end part of the window frame and one of the sashes shown in Figure 1; and

Figures 3 and 4 are cross-sectional views showing examples of sealing strips of the invention.

Referring to Figures 1 and 2, the window frame 1 shown therein has two lintel beads 2 and two sill track beads 3 along which

[Price 25p]

horizontally sliding sashes 4 and 5 slide to open and close the window opening. Each of the upper and lower edge parts of each sash is provided with mutually-facing, horizontal grooves 6 and 7 disposed on opposite sides of, and spaced apart from, a corresponding bead 2 (or 3).

Each of the jambs or upright side members of the window frame 1 is provided with a vertical side bead 8, as shown in Figure 2, which is interposed, in spaced apart relationship, between mutually-facing, vertical grooves 9 and 10 provided in the edge part of the corresponding upright member of the corresponding sash.

The grooves 6, 7, 9, and 10 all extend the full lengths of their respective sash members, and each of these grooves accommodates the base of a sealing strip according to the invention (shown in diagrammatic form only) examples of which are illustrated in Figures 3 and 4. Each of these sealing strips is made of a resilient material, for example a rubber or rubber-like material, and has a mounting base portion *a* and a tongue *b* projecting perpendicularly, or in curved form, from the base portion *a*. The surface of each sealing strip other than its part for resting flush against the sash is provided with electrically implanted short hairs *c* which form a pile. Examples of materials suitable for these hairs *c* are fibres of silk, cotton, sheep's wool, and certain synthetic fibres. The base portion *a* of each weather strip is fitted as illustrated in Figures 1 and 2 into the groove (6, 7, 9, or 10) of the sash 4 (or 5).

Referring now to Figures 3 and 4, the base portion *a* of each of the embodiments shown consists of two parallel strips of rectangular cross-section, joined together by a bridge portion. The bridge portion consists of two further strips of rectangular cross-section, arranged in an inverted V-shaped configuration. In each case, the bridge portion leaves a gap thereunder in the base *a* which is secured in a groove of the door or window sash. The tongue *b* extends in each case from the bridge portion away from the gap, and in Figure 3 is of curved cross-section, whereas in Figure 4 it is a straight strip with an enlarged bulbous edge.

Each of the above described sealing strips can be so formed that it can be installed on the sash merely by inserting and fitting its mounting base portion *a* into the corresponding groove. The tongues *b* of the sealing strips in each pair of mutually-facing grooves (6 and 7 or 9 and 10) are then in positions to deform resiliently and press against opposite flanks of their respective bead (2, 3, or 8) thereby to press firmly on the bead from both sides.

Thus, when the sashes are fully closed, the sealing strip of the invention is highly

effective in sealing the peripheral joint between the sashes and the window frame against passage through said joint of elements such as draught, water, dust, noise or heat. Another feature of the sealing strip of the invention is that the implanted hairs on the surfaces of the weather strips reduce the frictional resistance to opening and closing movements of the sashes and, moreover, compensate for hardening or freezing of the weather strips, and thereby prevent sticking or unreliable sealing of the weather strips in severely cold weather.

While the invention has been described above with respect to a horizontally sliding window, the application of the sealing strip of the invention is not limited to windows, the sealing strip being applicable with equal effectiveness to horizontally sliding doors and french doors or french windows. Furthermore, the sealing strip of the invention can be effectively applied also to vertically sliding windows such as double-hung windows.

WHAT I CLAIM IS:—

1. A resilient sealing strip for sealing the gaps between the periphery of a sliding door or window and its frame, comprising a base portion adapted to be secured to a flat surface on one of two parts of the door or window and its frame that are slidable relative to one another, and a projecting tongue adapted to press against the other of said two parts, the base portion comprising two strips of substantially rectangular cross-section lying parallel to one another in the same plane, and a bridge portion connecting together said two strips and rising out of the plane of said two strips so as to leave under the bridge portion a gap adjacent said flat surface when the strip is secured thereto, said tongue extending from the bridge portion away from said gap, the exposed surfaces of the sealing strip being covered with a pile.

2. A sealing strip according to claim 1, wherein said tongue is of curved cross-section.

3. A sealing strip according to claim 1 or claim 2 wherein exposed surfaces of the strip are covered with an electrically implanted pile.

4. A sliding door or window arrangement in which a door or a window sash is slidably supported and guided in opening and closing movements by beads fixed to and projecting from a frame structure, the arrangement including a pair of mutually-facing and spaced-apart grooves along all peripheral edge parts of said door or sash, each of said grooves accommodating a sealing strip according to any one of claims 1 to 3 fitted therein at its base part, said

horizontally sliding sashes 4 and 5 slide to open and close the window opening. Each of the upper and lower edge parts of each sash is provided with mutually-facing, horizontal grooves 6 and 7 disposed on opposite sides of, and spaced apart from, a corresponding bead 2 (or 3).

Each of the jambs or upright side members of the window frame 1 is provided with a vertical side bead 8, as shown in Figure 2, which is interposed, in spaced apart relationship, between mutually-facing, vertical grooves 9 and 10 provided in the edge part of the corresponding upright member of the corresponding sash.

The grooves 6, 7, 9, and 10 all extend the full lengths of their respective sash members, and each of these grooves accommodates the base of a sealing strip according to the invention (shown in diagrammatic form only) examples of which are illustrated in Figures 3 and 4. Each of these sealing strips is made of a resilient material, for example a rubber or rubber-like material, and has a mounting base portion *a* and a tongue *b* projecting perpendicularly, or in curved form, from the base portion *a*. The surface of each sealing strip other than its part for resting flush against the sash is provided with electrically implanted short hairs *c* which form a pile. Examples of materials suitable for these hairs *c* are fibres of silk, cotton, sheep's wool, and certain synthetic fibres. The base portion *a* of each weather strip is fitted as illustrated in Figures 1 and 2 into the groove (6, 7, 9, or 10) of the sash 4 (or 5).

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Each of the above described sealing strips can be so formed that it can be installed on the sash merely by inserting and fitting its mounting base portion *a* into the corresponding groove. The tongues *b* of the sealing strips in each pair of mutually-facing grooves (6 and 7 or 9 and 10) are then in positions to deform resiliently and press against opposite flanks of their respective bead (2, 3, or 8) thereby to press firmly on the bead from both sides.

Thus, when the sashes are fully closed, the sealing strip of the invention is highly

effective in sealing the peripheral joint between the sashes and the window frame against passage through said joint of elements such as draught, water, dust, noise or heat. Another feature of the sealing strip of the invention is that the implanted hairs on the surfaces of the weather strips reduce the frictional resistance to opening and closing movements of the sashes and, moreover, compensate for hardening or freezing of the weather strips, and thereby prevent sticking or unreliable sealing of the weather strips in severely cold weather.

While the invention has been described above with respect to a horizontally sliding window, the application of the sealing strip of the invention is not limited to windows, the sealing strip being applicable with equal effectiveness to horizontally sliding doors and french doors or french windows. Furthermore, the sealing strip of the invention can be effectively applied also to vertically sliding windows such as double-hung windows.

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2. A sealing strip according to claim 1, wherein said tongue is of curved cross-section.

3. A sealing strip according to claim 1 or claim 2 wherein exposed surfaces of the strip are covered with an electrically implanted pile.

4. A sliding door or window arrangement in which a door or a window sash is slidably supported and guided in opening and closing movements by beads fixed to and projecting from a frame structure, the arrangement including a pair of mutually-facing and spaced-apart grooves along all peripheral edge parts of said door or sash, each of said grooves accommodating a sealing strip according to any one of claims 1 to 3 fitted therein at its base part, said



tongues of the strips in each pair of grooves being pressed in a resiliently deformed state against opposite flanks of a corresponding one of said beads interposed therebetween.

- 5 5. A sealing strip for sealing the periphery of a sliding door or window sash substantially as herein described with reference

to and as illustrated by Figures 3 or 4 of the accompanying drawing.

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