June 9, 1959 G. D. PETERSON 2,889,587

DEVICE FOR ADJUSTING WINDOW TO OUT-OF-SQUARE FRAME WITH INSULATING STRIP

Filed Feb. 20, 1958

fig. 1

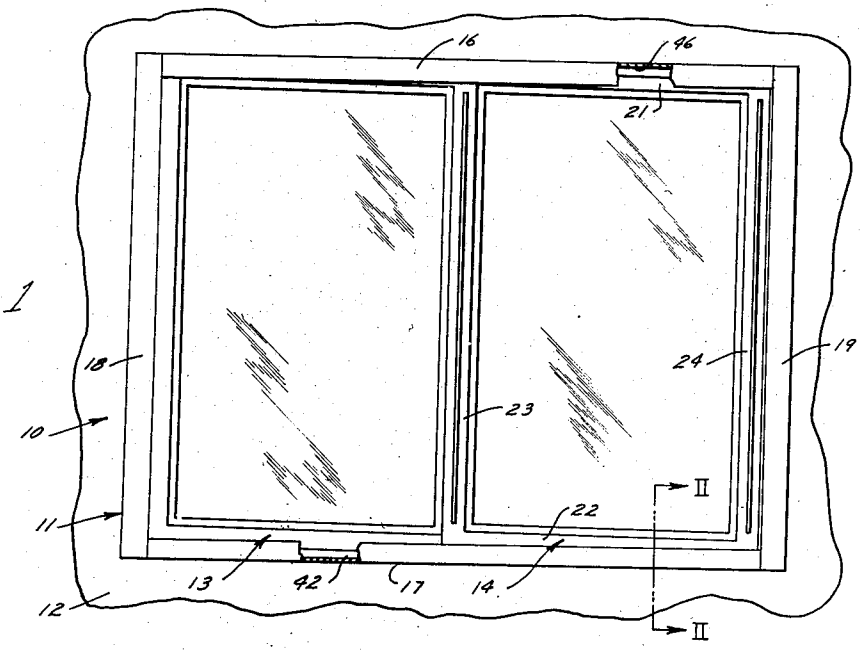
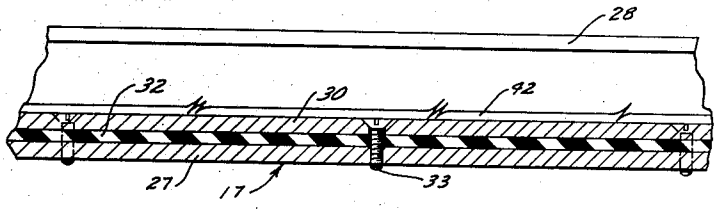


fig. 3



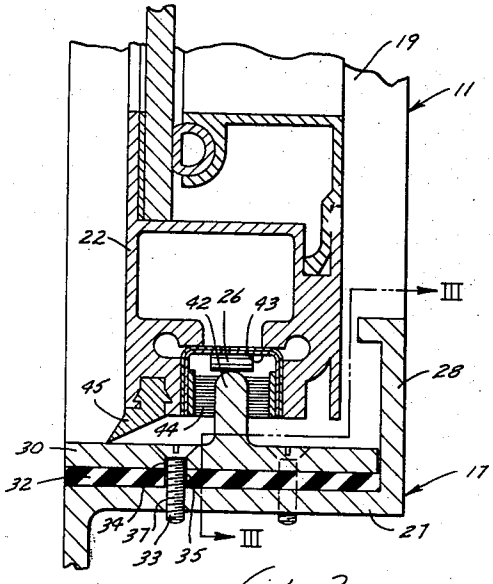


fig. 2

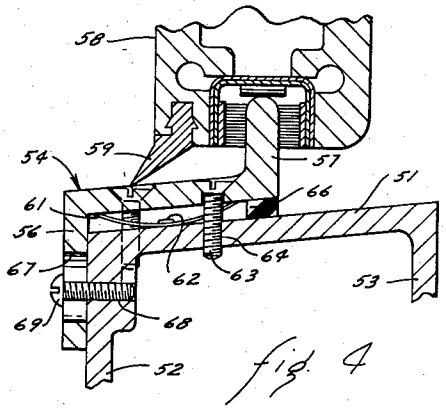


fig. 4

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United States Patent Office 2,889,587 Patented June 9, 1959

2,889,587

DEVICE FOR ADJUSTING WINDOW TO OUT-OF-SQUARE FRAME WITH INSULATING STRIP

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Application February 20, 1958, Serial No. 716,359

7 Claims. (Cl. 20—52)

This invention relates in general to window construction including a horizontally sliding sash and, more particularly, to support structure for such sash by which the sash can be adjusted to fit and completely close an out-of-square frame with which said sash is used.

One type of window construction, which is widely used in high-grade residential and institutional buildings, has a horizontally sliding sash and a support structure underneath said sash for supporting and guiding same in its horizontal movement. Such window constructions normally comprise a completed and self-supporting frame structure within which the sash is mounted. The structure by which the sash is supported for horizontal movement is normally a horizontally positioned rail on the lower horizontal frame member together with rollers on the under side of the sash arranged for engaging the rail.

It sometimes happens in the manufacturing and/or shipment of these windows from the factory to the job site that the frame will be moved slightly from its normal and desired rectangular condition into a somewhat out-of-square shape which defines a non-rectangular parallelogram. While this out-of-square condition can readily be corrected by the builder when the window frame is installed into a building, such correction frequently is not made. This may be because the condition is not noticed or it may be because of carelessness. In other cases, it sometimes happens that the out-of-square condition develops during the installation step by reason of irregularities, including the forming of an out-of-square window opening, in the masonry or other structure within which the window frame fits. Regardless of the reason, however, it is apparent that once the window frame is installed in an out-of-square condition, particularly in a masonry building, correction of such condition becomes virtually impossible.

Since the sash will not assume a corresponding out-of-square condition, the sash will fail to fit snugly against the vertical end members of the frame. This results in an unsightly appearance and possibly a leaking window, neither of which has been capable of correction within economic limits. Even though the cause for this condition is beyond the control of the window manufacturer, where it has originated in the installation step, the manufacturer is usually charged with responsibility for the unsightly appearance of the window. Inasmuch as the unsightly appearance results from the failure of the window frame and sash to match, it is desirable for the window manufacturer to incorporate into his window means by which the sash can be adjusted to the frame to compensate for the out-of-square condition of the frame and can close in a manner which will not reveal the irregularity.

This problem has been previously recognized and prior attempts have been made to overcome it, as shown in Patent No. 2,668,318. However, the previous structure for this purpose is relatively expensive and somewhat awkward to use. Therefore, it has not fully met the requirements of the condition under consideration and further improvement has been needed by the industry.

Other mechanisms suggested for this purpose involve notching the track or otherwise moving the sash with respect to the adjacent surface of the window sill. Some of these structures are inexpensive and effective, but they have the disadvantage of necessitating movement of the sash, in consequence of its adjustment, with respect to the upper surface of the sill. Thus, where a notch is used at the end of the track to effect the sash adjustment, a permanently mounted sealing strip must be sufficiently flexible to enable it to close under conditions involving different spacings between the sash and the sill. This requires either an extremely flexible sealing strip or it incurs the risk of failure to seal effectively in one position or another. Attempts to meet this condition have involved the use of an adjustable sealing strip which not only creates an added cost, but also requires a further step in the installation and adjustment of the window.

Accordingly, a major object of the invention is to provide a horizontally sliding window construction having a sash support structure by which the sliding sash may be adjusted to effect a snug fitting of the sash stile against the side element of the frame, when the sash is in the closed position, in order to compensate for a slight out-of-square condition in the frame.

A further object of the invention is to provide a window construction as aforesaid, wherein the sliding sash remains at a substantially constant distance from, and at a constant attitude with respect to, the track along which it moves and, therefore, said sliding sash remains at a substantially constant distance from the adjacent upper surface of the frame sill upon which the track is mounted, whereby a simple weather sealing strip can be effectively mounted on the sash to close the space between the sash and the sill.

A further object of the invention is to provide window construction, as aforesaid, in which the necessary adjustment of the sash with the frame can be readily made after the installation of a window into a building and, when once made, will remain permanently in adjusted position.

A further object of the invention is to provide window construction, as aforesaid, wherein said adjustment will not materially change the operating characteristics of the window and wherein such changes as do occur will not be noticeable.

A further object of the invention is to provide window construction, as aforesaid, which will permit the required adjustment of the sash with respect to the frame but which will render unnecessary any corresponding adjustment in the sealing means between the sash and the sill.

A further object of the invention is the provision of window construction, as aforesaid, wherein the sill of the window frame includes an adjustable, sash-supporting plate which is used not only to adjust the attitude and vertical position of the sliding sash, but also to minimize the transfer of sound vibrations between the sash and the frame.

A further object of the invention is to provide window construction, as aforesaid, which will simultaneously operate to dampen the sound which often occurs as the sliding sash is moved horizontally along the track.

A further object of the invention has been to provide window construction, as aforesaid, wherein the sash-adjusting feature can be provided at a minimum of expense, without weakening or otherwise damaging the window structure, and without materially affecting the appearance of the window.

A further object of the invention is the provision of a sash-adjusting structure, as aforesaid, which can be furnished as standard equipment with all such windows, which is embodied in the frame sill structure and can,

therefore, be adapted to a variety of different specific window constructions presently available, and which is very easy to adjust without special tools and by any person capable of installing a window frame.

Other objects and purposes of the invention will be apparent to persons acquainted with constructions of this general type upon reading the following specification and inspecting the accompanying drawings, in which:

Figure 1 is a side elevational view of a window construction embodying the invention and as viewed from the interior of a building in which it is installed.

Figure 2 is a sectional view taken along the line II—II of Figure 1.

Figure 3 is a sectional view taken along the line III—III of Figure 2.

Figure 4 is a sectional view similar to that shown in Figure 2 and illustrating a modified structure.

For convenience in description, the terms "upper," "lower" and derivatives thereof will have reference to the window construction in its usual position of operation, as shown in Figure 1. The terms "interior," "exterior" and derivatives thereof will have reference to the inside and outside surfaces of the wall structure in which the window is installed. The terms "inner," "outer" and derivatives thereof will refer to the geometric center of said window construction.

General description

In order to meet the objects of the invention, including those set forth above, there has been provided a window construction including a sash-supporting frame and a horizontally movable sash. The lower horizontal element of said frame supports a removable sill plate having an integral, sash-supporting track. Resilient means, such as a relatively thick piece of elastomeric material is then interposed between the sill plate and the lower horizontal frame element, and these parts are then connected by a plurality of screws arranged along their respective lengths. By tightening some of such screws more than others, the sill plate, hence the track, may be tilted in either direction lengthwise thereof and thereby tilt the movable sash until its stiles are in alignment with the corresponding jamb element of the frame, regardless of which way the jamb elements are tilted. The elastomeric material also tends to deaden the sound created when the window moves along said track.

Detailed construction

The window construction **10** (Figure 1), which has been selected to illustrate the invention, is comprised of a substantially rectangular frame **11** which is supported within and upon a wall structure **12** fabricated from conventional material, such as masonry or wood. A fixed sash **13** and a horizontally movable sash **14** are disposed within said frame **11**, which has a header **16**, a sill **17** and a pair of upright jamb elements **18** and **19**.

The movable sash **14** has an upper rail **21**, a lower rail **22** and a pair of stiles **23** and **24**. Said movable sash **14** has a pair of rollers, such as that indicated at **26** in Figure 2, which are supported upon the lower edge of the sash near its opposite ends in a manner substantially as set forth in the copending application entitled "Device for Adjusting Window to Out-of-Square Frame," Ser. No. 716,813, filed concurrently herewith.

As shown in Figures 2 and 3, the sill **17** has an elongated, substantially horizontal portion **27** disposed substantially directly below the movable sash **14** and projecting beyond both sides of said lower sash rail **22**. Said sill **17** also includes an upstanding flange **28** affixed to the interior edge of the horizontal sill portion **27**. An elongated, substantially flat sill plate **30** which is preferably approximately as wide as the horizontal sill portion **27**, is disposed directly above and lengthwise of the sill portion **27**.

In this particular embodiment, an elongated strip **32** (Figures 2 and 3) of elastomeric material, such as sponge rubber, is disposed between the sill plate **30** and sill portion **27** and preferably extends between the corresponding exterior, interior, and end edges thereof. Said elastomeric material **32** is preferably selected so that the normal weight of the sash **14** will not materially compress said material. However, said material can be compressed by any suitable means, such as the adjustment screws **33**, which slidably extend through appropriate openings **34** and **35** in the sill plate **30** and elastomeric strip **32**, respectively, for threaded reception into the threaded openings **37** in the sill portion **27**. The adjustment screws **33** prevent upward movement of the sill plate **30** away from its desired position with respect to the sill portion **27**. The elasticity of the resilient strip **32** permits some downward movement of the sill plate **30** to absorb vibrations and shocks. It will be observed that the adjustment screws **33** are alternately disposed upon opposite sides of the track **42** in order to effect a uniformly controllable compression of the elastomeric strip **32** during the adjustment of the sill plate **30** with respect to the sill **17**.

The sill plate **30** (Figure 2) has an integral, upstanding track **42** which is spaced from both the interior and exterior edges of the sill plate and is engaged along its upper edge by the rollers **26** mounted upon the movable sash **14** for the purpose of supporting same. The lower rail **22** of the movable sash **14** has in its lower edge a channel-shaped recess **43** extending lengthwise thereof for reception of the track **42**. Sealing means, such as the pile **44**, is mounted upon the side walls of the channel recess **43** for sealing and sliding engagement with the adjacent side walls of the track **42**. The pile **44** also serves to prevent accidental lateral movement of the movable sash **14** and derailment of the rollers **26** from the track **42**.

A sealing element **45**, which is preferably resilient and flexible, is secured to and extends along the lower edge of the lower rail **22** on the exterior side of the track **42**. Said element **45** projects downwardly for sealing engagement with the upper surface of the horizontal sill portion **27**.

Operation

The frame **11** and sashes **13** and **14** of the window construction **10** are normally assembled at the factory and shipped in the assembled form to the location of their use. The frame **11**, often without sashes in place, is then installed in the wall structure **12** of the building in which the window construction is to be provided. Although the frame has not been previously damaged and great care is exercised in such installation, it is extremely difficult to prevent some distortion of the frame during its installation, especially where large window constructions are involved. Furthermore, even though the frame **11** is perfectly square when it is installed, the wall structure may expand or contract adjacent to the window frame in an ununiform manner after such installation, thereby shifting the frame out of its square condition.

The fixed sash **13** can be installed in an out-of-square frame, by using any one of several well known procedures, so that its misalignment is not particularly noticeable. Since this sash is not removable, there is no problem of sealing. With the window construction **10** of this invention, proper alignment of the movable sash **14** is also relatively simple.

The movable sash **14** is first mounted upon the track **42** of the sill plate **30** and moved therealong into the closing position adjacent to the rightward jamb element **19** as appearing in Figure 1. If the stile **24** is not exactly parallel with the jamb element **19**, the sill plate **30** is adjusted with respect to the sill portion **27**, until said jamb element **19** and stile **24** are parallel. More specifically, the movable sash **14** is moved leftwardly away from its closing position and the adjustment screws **33** are tight-

ened or loosened as the case may be to effect the desired slope in the sill plate **30** hence the track **42**. The movable sash **14** is then moved rightwardly into the closing position and a visual check is made to see if the stile **24** is parallel with the jamb element **19**. Further adjustments can be made in the above described manner until the proper parallel relationship exists between the jamb element **19** and the stile **24**. It will be seen that where the jamb element **19** leans rightwardly ("rightwardly" being taken as appearing in Figure 1) it is necessary to lower the rightward end of the sill plate **30** by tightening the adjustment screws **33** adjacent to the rightward end thereof. Under such circumstances, the screws are tightened in progressively increasing amounts toward the rightward end in order to provide a uniform slope of the sill plate **30**. Under some circumstances, it may be necessary to loosen the adjustment screws **33** adjacent to the leftward end of the sill plate **30** in order to provide the proper vertical adjustment of the sash **14** while maintaining the proper slope of the track **42**.

As shown in Figure 1, there is sufficient clearance between the upper edge of the upper sash rail **21** and the opposing surface **46** on the header **16** to permit the vertical adjustment of the sill plate **30** with respect to the sill **17** without jamming the movable sash **14** within the frame **11**.

Regardless of the amount of raising, lowering or slope of the sill plate **30** with respect to the sill portion **27**, the movable sash **14** will always remain at substantially the same distance from the upper surface of said sill plate **30** throughout the length thereof, regardless of its position along the track **42**. Accordingly, the sealing element **45** along the lower exterior edge of the lower rail **22** will at all times engage said sill plate **30** in a uniform manner which is gentle enough to avoid unnecessary friction and wearing, but firm enough to provide an effective weather seal between the movable sash **14** and the sill plate **30**. In other words, the adjustment of the sill plate **30** for the purpose of effecting alignment of the sash **14** with respect to the jamb element **19**, if properly effected by the adjustment screws **33**, will not have any effect upon the sealing capability of the sealing strip **45**. Furthermore, since the sill plate **30** constitutes the upper surface of the sill **17** when viewed from the exterior side, the lower sash rail **22** will also appear to be aligned with said sill on its external side.

Alternate structure

As shown in Figure 4, the sill portion **51** has downwardly extending exterior and interior flanges **52** and **53**, respectively. The sill plate **54** has a downwardly extending flange **56** which, in this particular embodiment, is disposed adjacent to the exterior flange **52** of the sill portion **51**. The sill plate **54** has an integral upstanding track **57** along its interior edge which, like the track **42** shown in Figure 2, is utilized to support a movable sash **58**, having along its lower exterior edge a downwardly projecting sealing strip **59** which is engageable with the sill plate **54**.

In this alternate embodiment, the sill plate **54** is supported upon a plurality of leaf springs **61** which are secured to the sill portion **51** by means such as the rivets **62** and which urge the sill plate **54** upwardly away from sill portion **51**. The sill plate **54** is positioned with respect to the sill portion **51** by means of the adjustment screws **63** which are slidably received through openings in the sill plate **54** and are threadedly received into the threaded openings **64** in said sill portion **51**. The adjustment screws **63** are preferably staggered along the sill plate **54** in order to effect substantially uniform adjustment thereof with respect to the sill portion **51**. A resiliently compressible sealing strip **66** is disposed between the sill plate **54**, near the interior edge thereof, and the opposing surface of the sill portion **51**.

The holding flange **56** may have a plurality of vertical slots **67** therethrough which are aligned with threaded openings **68** in the exterior flange **52** for the threaded reception of holding screws **69** which slidably extend through the vertical slots **67**. The holding screws **69** assist the screws **63** and springs **61** to hold the sill plate **54** in the desired position, which has been obtained by appropriate adjustment of the screws **63**.

As in the case of the elastomeric strip **32** of Figure 2, the leaf springs **61** provide a resilient means for urging the sill plate **54** away from the sill portion **51**, against the contrary limitation imposed by the screws **63**, while permitting adjustment therebetween. Said leaf springs may also provide a resilient support for the sill plate **54**, hence for the movable sash **58** supported thereon by means of the track **57**, particularly where no holding screws **69** are used. Accordingly, downwardly directed shocks imparted to the movable sash **58** are absorbed and cushioned by the springs **61**. Furthermore, vibrations initiated in the wall structure **12**, or some other media connected to the wall structure **12**, will be dampened somewhat by the leaf springs **61** before they reach the movable sash **58**.

As in the case of the sealing element **45** for the window structure **10** (Figure 2), the sealing element **59** will be in continuous uniform sealing engagement with sill plate **54** at all times without unnecessary drag and regardless of the adjustments effected between the sill plate **54** and the sill portion **51** by means of the adjustment screws **63** and holding screws **69**.

During the adjustment of the movable sash **58**, the holding screws **69** are loosened, the adjustment screws **63** are properly positioned and the holding screws **69** are then tightened. The sealing strip **66**, which may be fabricated from an elastomeric material, such as sponge rubber, is provided primarily for the purpose of preventing foreign materials from entering between the sill plate **54** and the sill portion **51**.

Although particular preferred embodiments of the invention have been disclosed in detail hereinabove for illustrative purposes, it will be understood that variations or modifications of such disclosure, which lie within the scope of the appended claims, are fully contemplated.

I claim:

1. In a window construction including a substantially rectangular frame having a sill, a header and a pair of jamb elements, a fixed sash and a horizontally movable sash disposed within said frame, structure arranged for supporting said movable sash upon said sill and adjusting said movable sash with respect to the one jamb element adjacent to said movable sash when it is in the closing position, comprising: a sill plate extending along the upper surface of said sill beneath said movable sash and between said jamb elements; resiliently compressible means disposed between said sill and said sill plate and resisting movement of said sill and sill plate toward each other; an upstanding track extending lengthwise of and fixed with respect to said sill plate; a track engaging means on the lower edge of said movable sash for supporting said movable sash, said compressible means being at least partially uncompressed by the weight of said movable sash; adjustable means connecting said sill plate to said sill for selectively compressing said compressible means and thereby adjusting the position of said sill plate with respect to said sill, whereby said movable sash is aligned with said one jamb element, said compressible means being completely compressed only by said adjustable means.

2. The structure of claim 1 wherein said compressible means is a strip of elastomeric material and said connecting means includes a plurality of screws slidably extending through said sill plate and said elastomeric material and threadedly engaged with said sill, said screws being disposed at uniform intervals lengthwise of said sill plate.

3. The structure of claim 1 wherein the connection between said sill and said sill plate is weather tight, and

said lower edge of said movable sash remains at all times substantially within a horizontal plane fixed with respect to said sill plate.

4. The structure of claim 1 wherein a resiliently flexible sealing element is mounted upon, extends along and projects downwardly from said lower edge of said movable sash near the exterior surface thereof, said element being at all times in sealing engagement throughout its length with said upper surface of said sill plate.

5. The structure of claim 1 wherein said sill plate has an integral, downwardly projecting flange extending along its exterior edge and bridging the space between said sill plate and said sill; wherein said resilient means includes a plurality of spaced springs; and wherein said adjustable means includes a plurality of screws extending through said sill plate and said flange for threaded engagement with said sill.

6. In a window construction including a substantially rectangular frame having a sill, a header and a pair of jamb elements, a fixed sash and a horizontally movable sash disposed within said frame, structure arranged for supporting said movable sash upon said sill and adjusting said movable sash with respect to the one jamb element adjacent to said movable sash when it is in the closing position, comprising: a sill plate extending along the upper surface of said sill beneath said movable sash and between said jamb elements; resiliently compressible means disposed between said sill and said sill plate and resisting relative movement of said sill and sill plate toward each other; a track extending lengthwise of and fixed with respect to the upper surface of said sill plate; track engaging means on the lower edge of said movable sash for supporting said movable sash for movement along said sill plate; means defining a plurality of openings through said sill plate, said openings being arranged in two spaced rows substantially parallel with said track; a plurality of screws slidably received through said openings and threadedly engaged with said sill for selectively moving said sill plate toward said sill and thereby compressing said compressible means, whereby the position of said sill plate is adjusted with respect to said sill and the movable sash is aligned with said one jamb element, said compressible means being completely compressed only when said screws are completely tightened with respect to said sill.

7. The structure of claim 6 wherein said two rows of openings in said sill plate are disposed upon opposite sides of said track.

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