Sept. 1, 1964 L. E. PETERS 3,146,501

SIDE CAMMING BALANCE SPRING LOCK

Filed Sept. 24, 1962 2 Sheets-Sheet 1

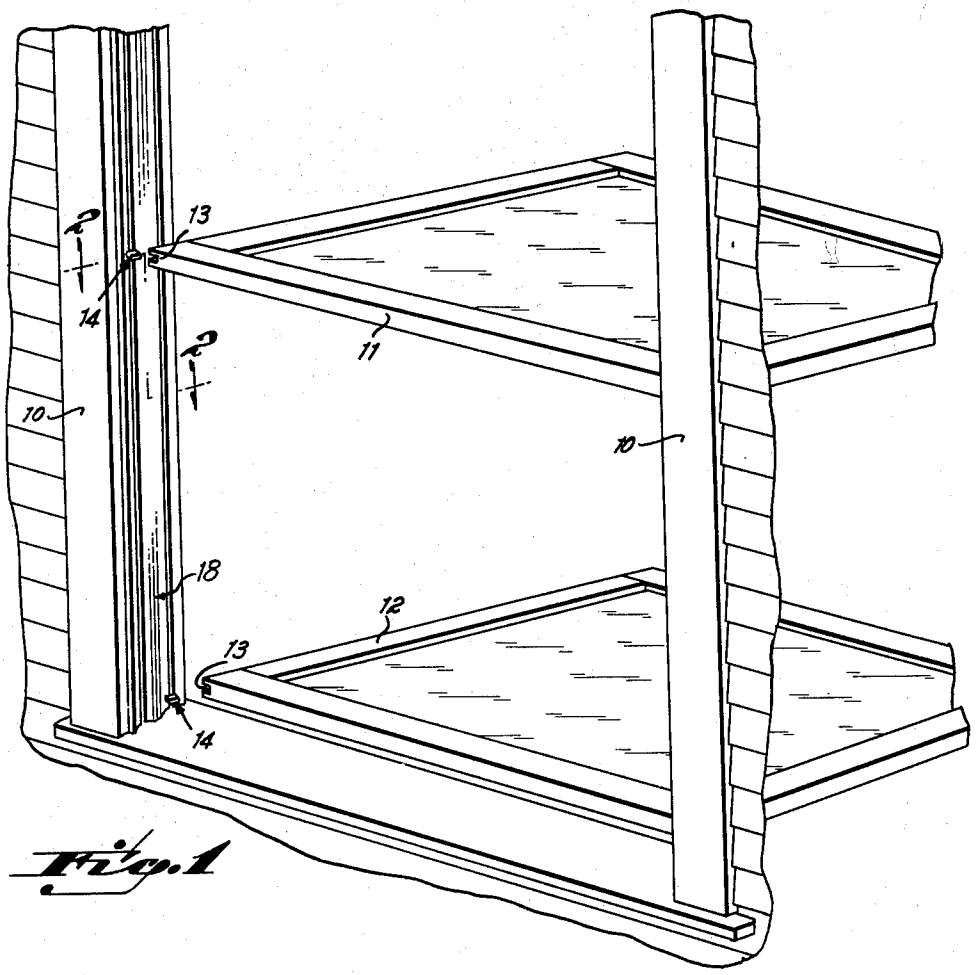

Fig. 1

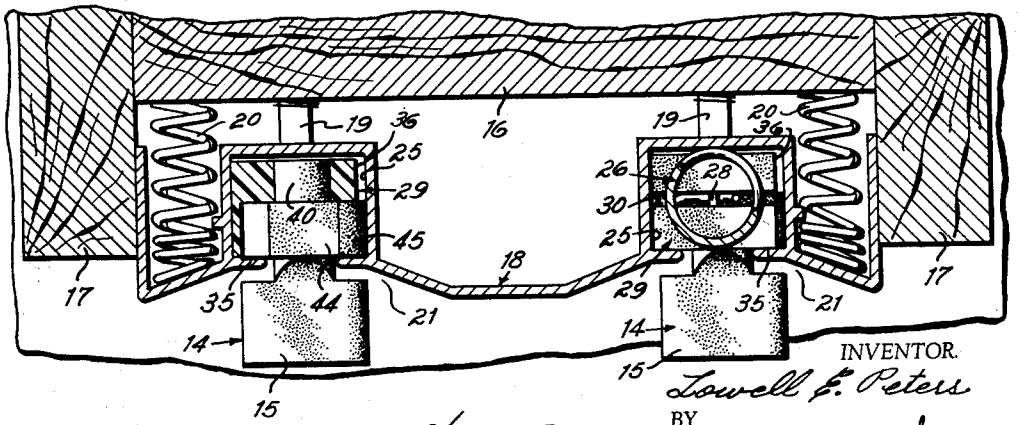

Fig. 2

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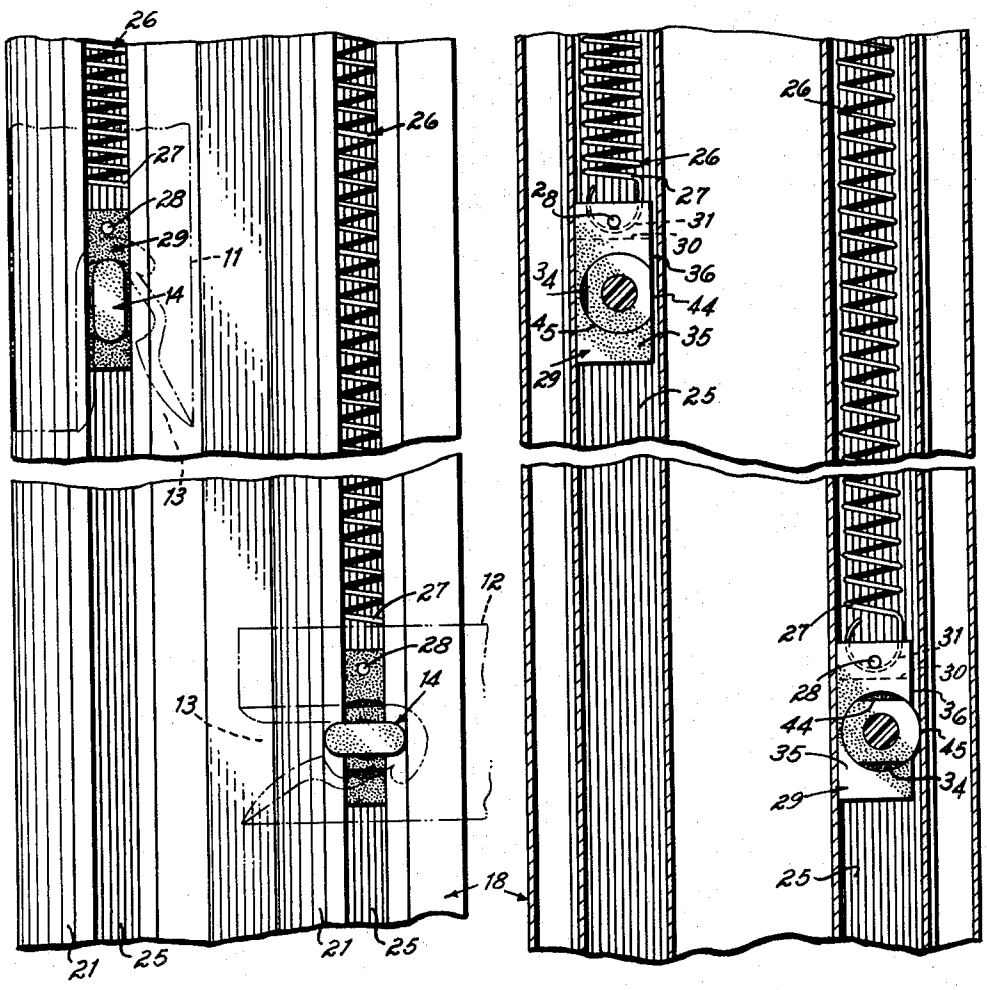

Fig. 3

Fig. 4

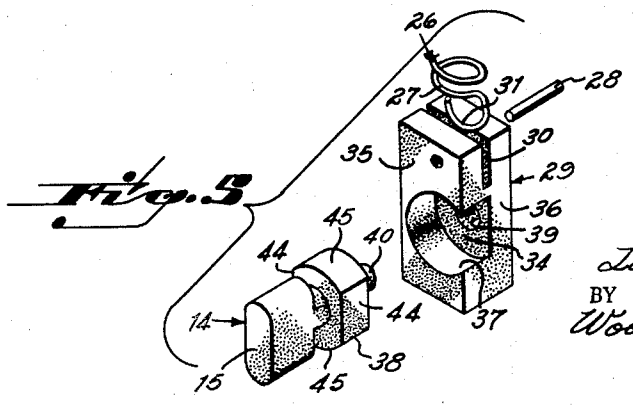

Fig. 5

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SIDE CAMMING BALANCE SPRING LOCK

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4 Claims. (Cl. 20—42)

This invention relates to a sliding sash type window of the type described in my co-pending applications Serial Nos. 115,717, filed June 8, 1961, and now Patent No. 3,055,063, patented September 25, 1962, and 113,216, filed May 29, 1961, and now Patent No. 3,055,062 patented September 25, 1962, in which the sash may be tilted or pivoted between vertical and horizontal positions and may be removed from the window frame entirely.

Basically, the pivoted or tilt out sash type window is not a new concept, but rather it has its origin at least as early as the nineteenth century. There has been a recent emphasis on such windows and many attempts have been made to provide commercially satisfactory designs. The increased emphasis on this type of sash window has been caused by the need for and the desirability of reducing the time and expense of maintaining clean windows.

The type of window to which the invention is directed is one in which upper and lower sliding sash are normally confined in their vertical planes but are adapted to be released from such plane and rotated through an angle of approximately 90° to a horizontal position. In such a horizontal position the glazing on each sash normally facing the outside of the building may be conveniently washed without requiring a person to be on the outside of the building. Additionally, when both sash are in a horizontal position, almost the complete window frame area is open to permit the circulation of air during warm weather.

When the feature of complete removability of the sash is added to the structure, the structure is even more advantageous, at least from the standpoint of the convenience with which broken glazing can be replaced.

It has been an objective of the invention to provide a sliding sash type window in which the sash can be pivoted and removed, the window structure being of such an economical design that its cost will not be substantially greater than a sliding sash type window not having the tilting and removability features.

A sash type window to which the invention is applied has double sash slidably mounted in side jamb weather stripping which is resiliently biased toward the sash stiles for good weather protection. Balance springs are connected between the window frame and sash to facilitate the raising of the sash. Through a minimum redesign of such elements and through the addition of one other element in the connection of the balance spring to the sash, the objectives of the invention can be attained. In this way, economy and simplicity are provided, for the complexity of the window has not been increased. Additionally, reliability of the window has been preserved by maintaining the simplicity of construction.

An important aspect of the invention resides in the structure by which the balance spring is connected to the sash. The connection comprises a block which is snugly slidable in a channel in the weather stripping, the block being recessed to receive a pin which is connected to the sash. The balance spring is connected to the block and normally urges the sash in an uppermost position. It can be appreciated that when the sash is tilted through an angle of 90°, the full weight of the window is not applied to the balance spring so that there is a tendency to pull the bottom of the sash upwardly. Also, if the sash is removed, the balance springs will snap upwardly because they are resisted only by the weight of the slidable blocks.

In accordance with the present invention, the pin which is disposed in the block recess has a locking or camming

base mounted in the slot recess and a projecting flat portion which is engageable with the slot in the lower corner of the window sash. The pin is mounted off the longitudinal center line of the block and has a locking portion projecting from the base, the locking portion normally lying within the confines of the block. However, when the pin is rotated through approximately 90°, the projecting portion is swung outwardly from the side surface of the block and moves into tight engagement with the wall forming a part of the side jamb weather stripping channel in which the block slides. When the projecting portion is swung into engagement with the channel wall, the opposite side surface of the block is forced with the same pressure into engagement with the opposite channel wall, thereby frictionally locking the block in the channel against the upward urging of the balance spring.

It should be understood that the pin could be positioned in the center of the block and have projecting portions on either side so that, upon rotation of the block, the projecting portions of the pin engage the walls of the channel, whereby only the pin forms a locking engagement with the channel walls. While such centered pin structure will perform satisfactorily, I prefer to employ the embodiment wherein the pin cams the block against the wall of the channel, so as to utilize the total surface of one side of the block to provide the frictional lock.

The several features and objectives of the invention will become more readily apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of a window frame and sash employing my invention,

FIG. 2 is a cross-sectional view taken along lines 2—2 of FIG. 1,

FIG. 3 is a fragmentary side elevational view of the side jamb weather stripping containing locks of my invention,

FIG. 4 is a view similar to FIG. 3 but partly in sections to show the operating characteristics of the invention, and

FIG. 5 is a disassembled perspective view of the lock of my invention.

As shown in FIG. 1, the window with which the invention is employed has a frame **10** within which an upper sash **11** and a lower sash **12** are slidably and pivotally mounted. The lower corners of each sash are slotted as at **13** to receive pins **14** having flat heads **15** and forming a part of the balance spring lock. The slot **13** may be configurated as described in my co-pending application Serial No. 171,955, filed February 8, 1962, to facilitate the introduction and removal of the flat head of the pin **14** with respect to the slot. In any event, the slot **13** and pin **14** cooperation must be such as to permit the pin to be inserted and removed therefrom and, further, when the pin is inserted, to block the pin against rotation with respect to the sash. Thus, as the sash is pivoted through 90°, the sash in turn rotates the pin **14** through 90°.

The sides of the window frame are formed by a side jamb **16** which is bracketed by jamb liners **17**. Side jamb weather stripping **18** is mounted between the jamb liners by screws **19** which permit the side jamb weather stripping to be moved toward and away from the side jamb **16**. Helical compression springs **20** resiliently bias the side jamb weather stripping away from the side jamb and into snug engagement with the side stiles of each sash.

The side jamb weather stripping **18** has a pair of spaced parallel longitudinal concavities **21** which receive the side stiles of each sash. The side stiles have a convex configuration in transverse section by which they seat firmly in the concavities **21**. It should be understood of course that the side jamb weather stripping may be convexly configurated instead of employing the concavities **21** in

which event the side stiles would be concavely formed in order to provide the retaining cooperation.

Because of the resilient mounting of the side jamb weather stripping, when either sash is pulled inwardly by applying pressure to the top rail thereof, the side stiles force the weather stripping toward the side jambs and thereby permit the pivoting movement of the sash.

In order to facilitate the raising and lowering of the sash, it is common practice to connect the sash to a counter balancing mechanism. To this end the side jamb weather stripping is formed with longitudinal channels 25 within which balance springs 26 (FIGS. 3 and 4) on each side of the sash are mounted, the balance springs being secured at their upper ends to the screws 19 which mount the weather stripping to the side jambs. Each spring has a lower end 27 which is connected by means of a pin 28 to a block 29 which is slidable in the channel 25. The upper end portion of the block 29 has a slot 30 which receives a loop 31 on the lower end 27 of each spring, the pin 28 passing through the loop.

Each block has a recess 34 which is open at the front surface 35, that is the surface facing the sash. The recess is also open at the side surface 36 of the block.

The recess 34 has a cylindrical wall 37 which rotatably and slidably receives a locking base portion 38 of the pin 14. A hole 39 in the wall of the block at the bottom of the recess receives a stud 40 at the end of the pin 14 to stabilize the positioning of the pin 14 within the recess.

The base 38 of the pin has two planar surfaces 44 and two cylindrical surfaces 45. When the pin is vertically oriented, that is by having its flat head 15 extending in a vertical direction, the planar surfaces 44 will be vertical with one of them being flush with the side wall 36 of block 29. When the pin is rotated through 90°, one of the cylindrical surfaces 45 projects beyond the plane of the side wall 36 and moves into engagement with the wall of the channel 25. The condition of the lock with respect to the channel 25 is shown in FIGS. 3 and 4. In each of these figures, the lock on the left side has its pin vertically oriented to permit sliding movement and the lock on the right side has its pin horizontally oriented to lock the balance spring in an extended position. When in a locking position, the transverse dimensions of the lock at a line through the center of the pin is substantially greater than the width of the channel in which the lock is positioned, so that when the pin 14 is in its horizontal attitude a considerable pressure is exerted between the lock and the walls of the channel. More particularly, there is a line pressure at the line of engagement of cylindrical surface 45 with the channel wall and an area of pressure over the complete opposite side of the block 29 as it engages the opposite side wall of the channel. It is possible to apply such a considerable force comparatively easily because of the mechanical advantage obtained due to the height of the sash. In other words, the height of the sash represents a lever arm by which force applied to the sash headrail is applied to the pin 14.

In operation, the sash are normally in a vretical position. In the vertical position, the slot 13 in the lower corners of each sash causes the pin 14 to assume a vertical position. When in the vertical position the balance springs 26 apply an upwardly directed force to the blocks 29 and consequently to the sash, thus overcoming the effects of gravity and facilitating the raising and lowering of the windows. If it is desired to open the windows for the purpose of washing them or increasing the ventilation of the building, the lower sash 12 is brought to its lowermost position and pivoted inwardly to a substantially horizontal position and pivoted inwardly to a substantially horizontal position. In so pivoting the sash the slot 13 pivots the pin 14 through 90° bringing it to the position illustrated in the right-hand sides of FIGS. 3 and 4. In this position pressure, as described above, is applied by the lock to the side walls of the channel 25.

That pressure creates a frictional retaining force considerably greater than the force applied by the extended stressed springs. The balance springs therefore remain in the extended position.

The upper sash may then be dropped to its lowermost position and pivoted horizontally.

When in the horizontal position each sash may be removed if desired. When it is time to replace the sash, the pins 14, being held in the lowermost position, are properly oriented and in a proper position to receive the corner slots 13 of the sash. The upper sash may then be positioned on the pins, pivoted to a vertical position and raised. Thereafter the lower sash may also be pivoted to a vertical position.

While there are a number of materials which might be suitable for the lock mechanism, I prefer to use nylon or other similar plastic for both the block 29 and the pin 14 in view of its lubricity which permits it to slide easily in the slot 25 and in view of its compressibility which permits it to be jammed tightly in the slot upon rotation of the pin to a horizontal attitude.

I claim:

1. In a tilt out sash window comprising a frame including side jambs, at least one sash having side stiles, side jamb weather stripping secured to said side jambs, said weather stripping being configurated to receive said sash side stiles in sliding engagement, springs between said side jamb and said weather stripping resiliently biasing said weather stripping toward said side stiles, a longitudinal channel in said weather stripping on each side of said frame and a balance spring in each said channel,

a balance spring lock comprising

a block slidable in each said channel and connected to said balance spring.

said block having a recess in the front surface thereof,

a pin having a base at one end mounted in said recess and having the other end projecting into a lower corner of said sash and fixed against rotation therein,

said pin base having a locking surface normally lying within the confines of said block but being projectable beyond the side of said block into engagement with the wall of said channel upon rotation of said pin through approximately 90°.

2. In a tilt out sash window comprising a frame including side jambs, at least one sash having side stiles, side jamb weather stripping secured to said side jambs, said weather stripping being configurated to receive said sash side stiles in sliding engagement, springs between said side jamb and said weather stripping resiliently biasing said weather stripping toward said side stiles, a longitudinal channel in said weather stripping on each side of said frame and a balance spring in each said channel,

a balance spring lock comprising

a block slidable in each said channel and connected to said balance spring,

said block having a recess in the front surface thereof, said recess opening to the side of said block,

a pin having a base at one end mounted in said recess and having the other end projecting into a lower corner of said sash and fixed against rotation therein,

said pin base being generally cylindrical and having at least one flat surface lying within the confines of said block when said pin is in a first position, said cylindrical portion of said base projecting through said side opening into a pressure engagement with the wall of said channel upon rotation of said pin through approximately 90°.

3. A balance spring lock for use in a vertical channel of a window side jamb comprising

a block slidable in each said channel,

said block having a recess in one surface thereof,

a pin having a base at one end rotatably mounted in said recess and having the other end projecting from said block,

said pin base having a locking surface normally lying

within the confines of said block but being projectable beyond the side of said block into engagement with the wall of said channel upon rotation of said pin through approximately 90°, the other end of said pin being receivable by a sash for rotation upon pivoting of said sash.

4. A balance spring lock for use in a channel of a window side jamb comprising

a block slidable in each said channel,

said block having a hole therein offset from the longitudinal center line of said block,

a pin having a stud at one end mounted in said hole and having the other end projecting from said block,

said pin having a locking base intermediate said stud and said projecting end,

said base having a locking surface normally lying within the confines of said block but being projectable beyond the side of said block into engagement with the wall of said channel upon rotation of said pin through approximately 90°.

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