Dec. 30, 1958 W. FRANK 2,866,635

WINDOW FITTINGS

Filed June 13, 1955 3 Sheets-Sheet 1

Fig. 1

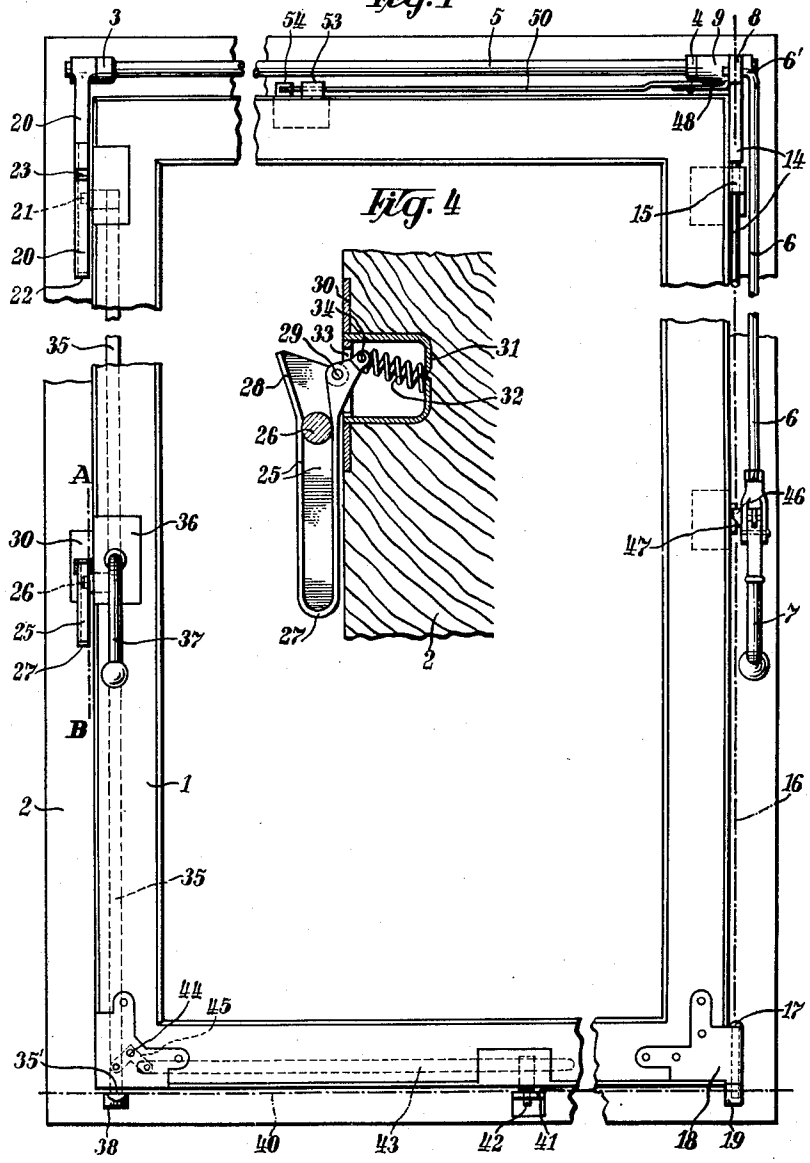


Fig. 4

INVENTOR:
WILHELM FRANK

BY Fritz G. Hohmann
AGENT:

Dec. 30, 1958 W. FRANK 2,866,635

WINDOW FITTINGS

Filed June 13, 1955 3 Sheets-Sheet 2

Fig. 2

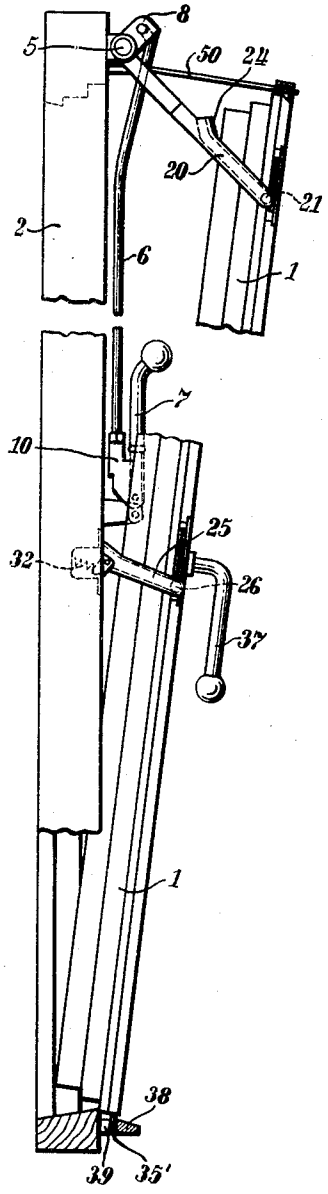
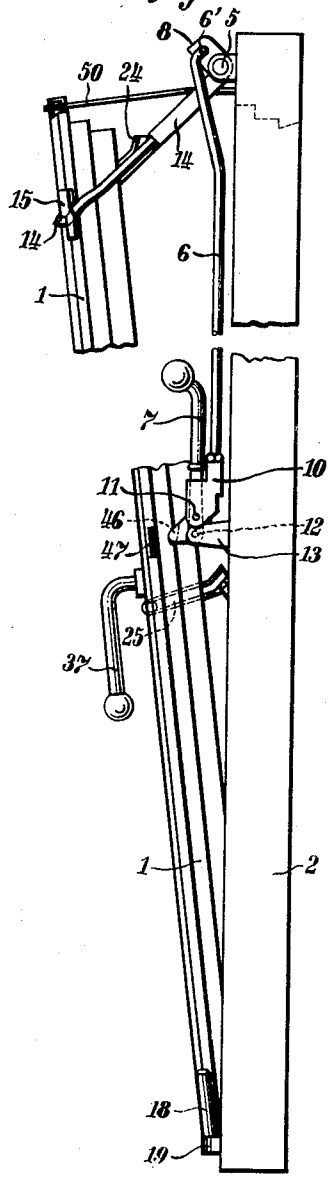


Fig. 3



INVENTOR:
WILHELM FRANK

BY Fritz G. Hockley
AGENT:

Dec. 30, 1958 W. FRANK 2,866,635

WINDOW FITTINGS

Filed June 13, 1955 3 Sheets-Sheet 3

Fig. 8

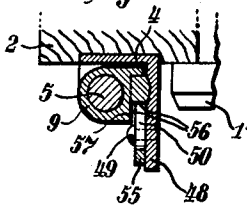


Fig. 5

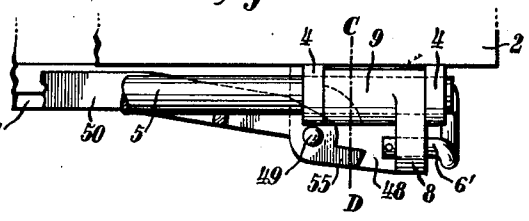


Fig. 6

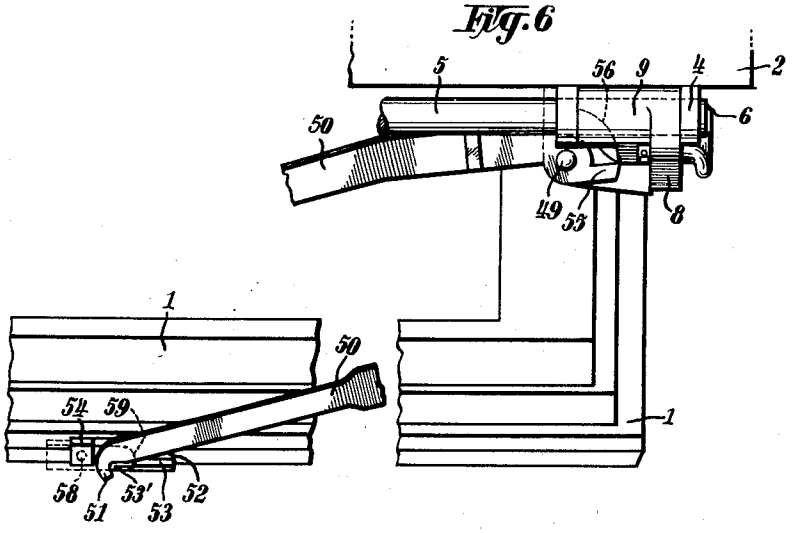
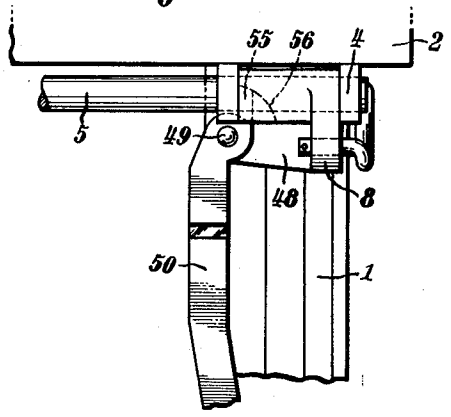


Fig. 7



INVENTOR:
WILHELM FRANK

BY Fritz G. Herbert

AGENT:

United States Patent Office 2,866,635
Patented Dec. 30, 1958

2,866,635

WINDOW FITTINGS

Wilhelm Frank, Stuttgart, Germany

Application June 13, 1955, Serial No. 515,080
Claims priority, application Germany March 28, 1955
14 Claims. (Cl. 268—112)

The invention relates to window fittings which consist of a plurality of parts and which enable the window sash to be optionally turned about a vertical axis or tipped about a bottom horizontal axis into a ventilating position. Such window fittings have been disclosed under the short designation turn-tip fittings. The window sash is then connected to the window frame by a so-called corner joint situated at a bottom corner in such manner that the said joint situated at the point of intersection of the vertical turning axis and the horizontal tipping axis permits the two movements of the window sash. The window sash is further connected to the window frame by a pull-out bar which is pivotally connected to the window frame. The pull-out bar, which lies in the vertical turning axis when the window sash is closed, acts on the window sash in a fitting, a so-called guide sleeve, which is connected at the side to the window sash. On the side of the window sash opposite the corner joint a further detachable connection is provided between the window sash and the window frame and is situated in the horizontal tipping axis. An espagnolette known per se or a window mechanism provided with bolt bars serves for the closing or locking of the window, said parts being disposed on the side of the window sash opposite the vertical turning axis. The last described locking means must always be raised in the turn-tip fittings known heretofore, irrespective of whether the window sash is turned about the vertical turning axis into its completely open position or about the horizontal tipping axis into the ventilating position.

The problem is to construct a turn-tip fitting in such manner that both the turning movement and the tipping movement of the window sash can be effected by operating only one handle in each case, thus in such manner that when the window is tipped the above-described means locking the window sash to the window frame no longer has to be released. A further problem consists in the construction of the turn-tip fitting for relatively very tall and correspondingly heavy window sashes, in which the above-mentioned pull-out bar is so high that it can no longer be reached from the floor by a person in the room.

For the purpose of solving the said problems use is made of the transverse shaft known in fanlight openers and mounted on the window frame, and of a push and pull lever system acting on said transverse shaft and movable by hand. According to the invention the pull-out bar known from the turn-tip fitting and lying in the vertical turning axis of the window sash is rigidly connected to the transverse shaft, which is rigidly connected to a second pull-out bar, which acts in a detachable manner on the window sash on the side opposite the vertical turning axis. Tipping of the window sash about the bottom horizontal turning or tipping axis is effected through the transverse shaft and the two pull-out arms rigidly connected thereto, by operating the push and pull lever system, without any window sash locking means first having to be released. Turning of the window sash about its vertical turning axis is possible as soon as the connection of the window sash to the pull-out bar opposite the vertical turning axis is released, said release being effected by moving a suitable handle.

In the case of very tall window sashes it must be ensured that the window sash fits satisfactorily tightly against the window frame over the entire height. For this purpose according to the invention at least one further pull-out bar rotatably mounted on the window frame is disposed beneath the pull-out bar connected to the transverse shaft, and is connected, likewise in detachable manner, to the window sash. Such further pull-out bars are spring-influenced in order always to ensure the required contact pressure of the window sash against the window frame.

The detachability of the connection of the window sash to the pull-out bars provided and opposite the vertical turning axis is ensured according to the invention by constructing the individual pull-out bar as a guide rail for a pin which is slidable in the window sash in the vertical direction, and for which the guide rail is provided at the top, corresponding to the upper position of the pin, with an entry and outlet opening.

Further details of the invention are clear from the description hereinbelow and the claims.

One exemplified embodiment of the window fittings according to the invention for tall window sashes is illustrated in the drawing.

Figure 1 shows the fittings with the window closed, seen from inside the room. In order to show the individual parts of the fittings sufficiently large, the window frame and the window sash are shown shorter and narrower in Figure 1 by parts broken away.

Figure 2 shows, with reference to Figure 1, a left-hand view of the window with the window sash tipped.

Figure 3 is a corresponding right-hand view.

Figure 4 shows a section on an enlarged scale on the line A—B in Figure 1, in order to show a single component of the entire fitting.

Figure 5 shows from the top the fitting parts shown on the top right in Figure 1, with the window sash closed.

Figures 6 and 7 show the position of the parts of the fitting according to Figure 5, seen from the top when the window sash is tipped and when the window sash is opened about the vertical turning axis.

Figure 8 shows a cross-section on the line C—D in Figure 5.

The bearing blocks 3, 4 for accommodating the rotatable transverse shaft 5 are fastened to the window frame 2 above the window sash 1. The rotation of the transverse shaft 5 is effected by a push and pull lever system which is known in fanlight openers and which consists essentially of the rod 6 and the hand lever 7. The rod 6 engages by its upper end 6', which is bent round, in the arm 8 of a boss 9 fastened on the transverse shaft 5. The lower end 10 of the rod 6 is pivotally connected by a bolt 11 to the hand lever, which is rotatably mounted by means of the bolt 12 on a bearing block 13 fastened to the window frame. The pull-out bar 14 is rigidly connected to said boss 9 and the free end of said bar engages in manner known in turn-tip fittings in a guide sleeve 15, which is rigidly connected at the side to the window sash 1. When the window sash is closed, the pull-out bar 14 lies in the vertical turning axis indicated by the chain-dotted lines 16 in Figure 1. In other words, the vertically situated pull-out bar 14 forms a part of the vertical turning axis about which the window sash 1 can be turned by means of the guide sleeve 15. Another part of the vertical turning axis 16 consists of the vertically situated bolt 17 of the so-called bottom corner joint 18, which is rigidly connected to the bottom corner of the window sash 1. The bolt 17 engages at the bottom in a bearing 19 fastened to the window frame 2. The hole in the bearing 19 is

so constructed that the bolt 17 of the corner joint 18 can participate in the window sash tipping movement described later.

In Figure 1 a further pull-out bar 20 is rigidly connected to the left-hand end of the transverse shaft 5 and serves in the example illustrated as a guide rail for a pin 21, which is disposed to be vertically slidable in the window sash 1. The pull-out bar or the guide rail 20 has in its lower part a U-shaped cross-section, the open side facing the window sash, so that the pin 21 can enter the guide rail. The guide rail 20 is closed at the bottom at 22. Reference 23 denotes an opening in the guide rail and below this opening the guide rail has an inclined surface 24, as is clear from Figures 2 and 3.

For tall window sashes at least one further pull-out bar or guide rail 25 is rotatably mounted below the pull-out bar or guide rail 20 on the window frame 2, a further bolt 26 slidable in the window sash 1 engaging in said further pull-out bar or guide rail 25. The latter, shown on an enlarged scale in Figure 4, has a U-shaped cross-section. The rail 25 open at the top is closed at the bottom at 27 and has at the top an inclined surface 28, which runs at an incline to the window frame 2 exactly like the abovementioned inclined surface 23. The guide rail 25 is pivotally connected by a bolt 29 to a bearing plate 30, which is constructed at the rear to form a spring housing 31 engaging in the window frame 2. A helical pressure spring 32 supported in the housing 31 at the back presses constantly on to a small arm 33, which is constructed on the rail 25 and which is provided, for further support of the spring 32, with a small transverse pin 34.

In the example illustrated, the two pins 21, 26 which project laterally from the window sash are connected by a bar 35 mounted slidably inside the window sash. Said bar 35 is slidable by a so-called window gear 36 by means of the hand lever 37. For example, a toothed pinion fastened on the turning axis of the hand lever 37 engages in a corresponding toothing after the style of a rack 35.

The bar 35 extends downwardly in the window sash 1. The lower bar end 35' engages, when the window sash is closed, in the hole of a block 38 rigidly connected to the window frame 2. The hole 39 in the block 38 is so wide that the bar 35 can participate in the tipping movement of the window sash. The horizontal turning or tipping axis 40 indicated by the chain-dotted line in Figure 1 is formed by said block 38, which constitutes a bearing as it were, and by the abovementioned bearing 19 of the corner joint 18. If, in the case of very tall window sashes, a further pull-out bar or guide rail, not illustrated in the drawing, is provided in accordance with the type of construction illustrated in Figure 4, then the pin cooperating with this guide rail is likewise connected to the bar 35.

It is clear from Figure 1 that a further window closure can be operated by the hand lever 37. This closure, situated on the window sash 1 at the bottom, comprises an angular plate 41, which is fastened to the window frame 2 and which has at the top a slot open on one side for the entry of a pin 42, which is fastened to a slidable bolting rod 43 situated horizontally in the window sash 1. The bolting rod 43 is pivotally connected to the bar 35 for example by an angle lever 45 mounted to be rotatable about the bolt 44.

The hand lever 7 is rigidly connected at the side, as is clear from Figure 1, to a snout 46 which cooperates with a laterally projecting lug 47 fastened in the window sash.

A holder bar 50 is rotatably connected to the window frame 2 or to a horizontally disposed plate 48 of the bearing block 4 fastened to the window frame by a bolt 49. The holder bar lies in the horizontal direction above the window sash, and its free end provided with a hook 51 cooperates with a fitting part 52 fastened to

the window sash 1 at the top. The holder bar 50 is slidable between the bent-up edges 53, 54 of the fitting 52. The left-hand edge 53' of the edge 53 forms a stop for the hook 51 of the holder bar 50. The latter is extended beyond its pivot 49 to form a snout 55, which cooperates in the manner described below with a cut-out or a gap 56 in the abovementioned hub 9. As is clear from the drawing, the pivot 49 lies to the side of the vertical sash turning axis 16 or of the pull-out bar 14.

The entire fitting works in the following manner. If the window sash is to be opened and turned about the vertical axis 16 from the closed position shown in Figure 1, then the hand lever 37 is turned for example through 90° in counter-clockwise direction, whereby the bar 35 and with it the pins 21, 36 move upwardly to such extent that the pin 21 comes to lie in the opening 23 of the pull-out bar 20. The pin 26 assumes a position above the guide rail 25. Since, as a result of the upward movement of the fastening bar 35, its bottom end 35' has emerged from the block 28, the window sash can now be completely opened into the interior of the room about the vertical turning axis. If the window sash is provided with the above-described additional closure 41, 42, then the bolting bar 43 is moved to the left in Figure 1 through the angle lever 45 on the upward movement of the bar 35, so that the pin 42 emerges from the slot of the part 41 of the fitting.

If the window sash is turned back into the closed position, then the pin 21 enters the opening 23 of the pul-out rail 20. If the bar 35 is then moved downward by turning back the hand lever 37, then the pin 21 encounters the inclined surface 24 of the pull-out bar 20. Similarly, the pin 26 encounters the inclined surface 28 of the guide rail 25, thus resulting, on the further downward movement of the pins 21, 26, in the window sash being pressed tightly towards or against the window frame 2. It is ensured by the helical pressure spring 32 acting on the guide rail 25 that the window sash is constantly pressed against the window frame through the medium of the pin 26. On the downward movement of the fastening bar 35, the window sash is locked simultaneously at the points indicated by 38 and 41. Pressing of the window sash against the window frame also occurs on the side of the vertical turning axis 16, the lug 47 engaging behind the snout 46, which is in this case stationary, of the hand lever 7 on the closing movement of the window sash.

Tipping of the window sash about the horizontal axis 40 is immediately possible from the closed position of the window shown in Figure 1, without the fastener hand lever 37 having to be moved. For the purpose of tipping, the hand lever 7 of the push and pull lever system is rocked or turned over upwardly, so that the hand lever 7 assumes the position shown in Figures 2 and 3. Through the rocking of the hand lever the snout 46 connected thereto moves downwardly, so that it becomes free of the lug 47. The transverse shaft 5 and with it the two pull-out bars 14, 20 are moved towards the interior of the room by the push and pull rod 6 moving upwardly. The window sash is then driven by the guide sleeve 15 on the one hand and by the pin 21 on the other, so that it passes into the tipped or ventilating position clear from Figures 2 and 3. If a further pull-out bar or guide rail 25 is provided, then it is rocked out by the pin 26 under the tension of the spring 32, as shown in Figures 2 and 3. Closing of the window sash is effected by rocking back the hand lever 7, the bar 6 being tensionally stressed. The window sash is moved back into its closed position by the inwardly rocking pull-out bars 14, 20. This closing movement is additionally and automatically supported by the force of the spring 32.

In the tipped position the window sash can be held additionally by the holder bar 50. During tipping the holder bar 50 moves about its pivot 49 towards the

interior of the room, the end of the holder bar sliding between the edges **53**, **54** of the fitting **52** until the end position clear from Figure 6 is reached, in which the hook **51** lies against the stop **53'**.

The holder bar **50** further serves on the one hand to prevent faulty operation of the hand lever **7** and on the other hand to render any faulty manipulations which may occur harmless and inoffensive.

It is clear from Figure 7 that when the window sash is opened about the vertical turning axis **16** the snout **55** provided with the holder bar **50** enters the gap **56** of the boss **9**. If the attempt is made to move the hand lever **7** upwardly in this closed position of the window sash, it is impossible because rotation of the transverse shaft and hence of the boss **9** cannot occur, since in this case the surface **57**, limiting the gap **56** at the top, of the boss **9** is supported on the snout **55**.

If the window sash is turned back from its open turning position into the closed position, and if the user forgets to turn the hand lever **37** back into the fastening position, then it is possible, by upward movement of the hand lever **7**, to bring the window sash into the tipped position without the window sash being able to fall. In this position the window sash is securely held fast by the bottom corner joint, by the holder bar **50** and additionally by the pull-out bar **14**. Too far a tipping movement is further prevented in this case by the fact that the snout **55** of the holder bar **50** lies and is supported against the boss **9** beneath the gap **56**, as is clear from Figure 6. From this, as it were abnormal, tipped position of the window sash, the latter can immediately be brought into the normal turning position about the vertical axis **16** by downward movement of the hand lever **7**. The new complete fitting is thus absolutely accident-proof, this being of very great importance particularly in the case of tall and heavy window sashes.

This is also the case if the above described holder bar **50**, **55** and boss **9** locking means is omitted in a simpler construction of the complete fitting. In the simpler construction the holder bar **50** does not have the locking means or snout **55**; the gap **56** in the boss **9** is also absent in this case. The joint bolt **49** arrangement, laterally staggered in relation to the vertical turning axis **16**, for the holder bar **50** is retained. In this simplified construction the mode of operation is as follows. A window sash tipped about the horizontal axis **40** and released from the window frame on the side opposite the vertical turning axis passes, as a result of rocking back the pull-out bar **14** into the vertical turning axis, into the vertical turning position. A window sash turned about the vertical turning axis similarly passes, by operation of the tipping arrangement, i. e. by rocking out the pull-out bar **14**, into the tipped position.

It should finally be mentioned that on the return movement of the window sash from the normal tipped position into the closed position the snout **46** of the hand lever presses on to the lug **47** on the window sash, so that tight contact of the sash against the window frame is ensured at this point too.

It should also be mentioned that the guide rail **25** or its arm **33** can be so constructed that the spring **32** acts below the bearing bolt **29** (Figure 4) in the rocked-out position of the guide rail **25**. In this case the spring **32** assists the operation of the parts of the fitting at the end of the tipping movement of the sash.

The fitting **52** connected to the window sash at the top can be provided with a securing means **59**, which is rotatable about the bolt **58** indicated by broken lines in Figure 6 and which is likewise indicated by broken lines, in the form of a bolt. The latter engages over the end of the holder bar **50** so that undesired unhinging of the holder bar cannot occur.

I claim:

1. A window fitting in combination with the frame and sash of a sash window, said sash being rotatable about a vertical and a horizontal axis, said fitting comprising a rotatable transverse shaft on the upper side of said frame, a push and pull lever system on the vertical side of the frame arranged close and parallel to the vertical turning axis of the sash, said lever system turning said shaft, a first pull-out bar operatively connected with said sash and disposed in the vertical turning axis thereof, said bar being carried by said shaft for rotation therewith and transmitting said rotation into rotation of the sash about its horizontal turning axis, a second pull-out bar carried by said shaft and disposed on the vertical side of the frame opposite the vertical turning axis, means detachably connecting said second bar to the sash, means blocking the rotation of the sash around its vertical axis, and actuating means concurrently moving said connecting and said blocking means into operative and inoperative position, respectively, thereby allowing rotation of the sash either about the vertical or about the horizontal turning axis only.

2. A window fitting according to claim 1, wherein in the case of tall window sashes at least one further pull-out bar is disposed beneath the second pull-out bar which bar is rotatably mounted on the window frame and which acts in detachable manner on the window sash.

3. A window fitting according to claim 1, wherein the pull-out bar or guide rail is subject to the action of a spring force, by which the pull-out bar is pressed against the window frame.

4. A window fitting according to claim 1, comprising a holder bar which is disposed horizontally above the window sash and which is pivotally connected to the window frame and the free end of which is guided in a fitting part of the window sash, wherein the point of connection of the holder bar to the window frame lies to the side of the vertical sash turning axis and above the sash in such manner that a window sash tipped about the horizontal axis and released from the window frame on the side opposite the vertical turning axis passes into its vertical turning position by rocking back the pull-out bar into the vertical turning axis, and a window sash turned about the vertical turning axis passes into the tipped position by rocking out the pull-out bar.

5. A window fitting according to claim 4, comprising means locking the transverse shaft against rotation by the holder bar when the window sash is turned about the vertical axis.

6. A window fitting according to claim 5, wherein said locking means comprise a boss fastened on the transverse shaft of the pull-out bar and said holder bar is provided at its pivoted end with a catch, said boss having a recess receiving said catch when the window sash is turned about its vertical axis.

7. A window fitting according to claim 1, comprising a hand lever operating said push and pull lever system, a catch secured to said hand lever, and a lug mounted on the window sash, said lug being engaged behind said catch on the closing movement of the window sash.

8. A window fitting according to claim 1, wherein the second or further pull-out bar is constructed as guide rail for a pin which is slidable in the window sash in the vertical direction and for which the guide rail is provided at the top to correspond to the upper pin position with an outlet and entry opening.

9. A window fitting according to claim 8, wherein the guide rail has following its opening an inclined surface which in cooperation with the sash pin ensures the pressing of the window sash against the window frame.

10. A window fitting according to claim 8, including at least one additional vertically slidable pin arranged in the window sash below said slidable pin.

11. A window fitting according to claim 10, wherein the pins provided in the window sash are individually movable.

12. A window fitting according to claim 10, wherein

said pins are connected by a bar for joint manual displacement.

13. A window fitting according to claim 12, wherein said bar connecting the pins cooperates with a socket, situated in the bottom horizontal tipping axis, on the window frame.

14. A window fitting according to claim 12, wherein the bar additionally controls a closure means situated on the window sash at the bottom, said closure means

comprising a bolting bar pivotally connected in the corner of the sash to the vertical bar.

References Cited in the file of this patent

FOREIGN PATENTS

150,858	Switzerland	Feb. 1, 1932
549,129	Germany	Apr. 23, 1932
175,959	Switzerland	June 1, 1935
636,989	Germany	Oct. 27, 1936
219,612	Switzerland	June 1, 1942