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RAISING SASH

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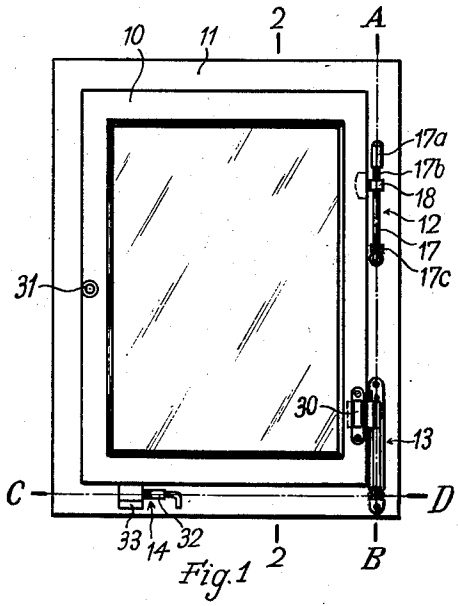


Fig. 1

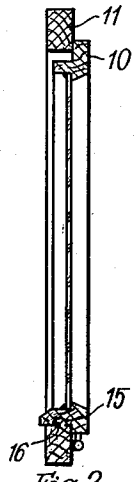


Fig. 2

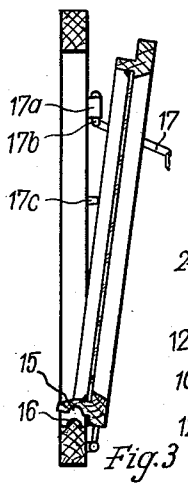


Fig. 3

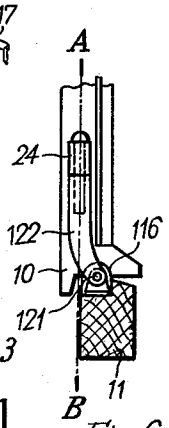


Fig. 6

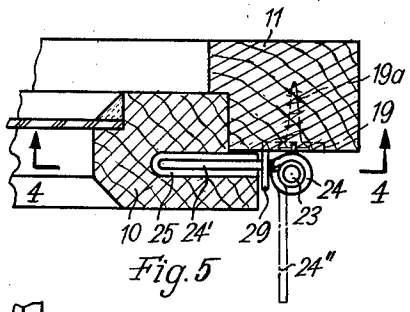


Fig. 5

Fig. 4

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RAISING SASH

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7 Claims. (Cl. 20—53)

This invention relates to a door or window construction in which the sash is arranged so as to be both swingable about a vertical axis and tiltable about a horizontal axis.

One object of the present invention is to provide a door or window construction which is so designed as to seal the sash with weathertight fit so that draft is completely eliminated.

An essential feature of the present invention consists accordingly in a door or window construction wherein the sash, which is selectively swingable about a vertical axis as well as tiltable about a horizontal axis, is in addition provided with a raising device by means of which it can be raised or lowered in vertical direction. According to another feature of the present invention the arrangement is such that the sash can but be swung about the vertical axis in its raised position. The arrangement can also be such that both swinging about a vertical axis and tilting about a horizontal axis is but possible in raised position of the sash.

Another object of the present invention is simplification of the devices provided for raising, swinging and tilting the sash, in that the fittings for raising and the fittings for swinging and tilting are combined into one unit.

A feature of the present invention resides therefore specifically in that a corner fitting for fixing both the vertical swinging axis and the horizontal tilting axis is at the same time combined into one unit with the raising device for raising the sash.

A raisable and tiltable swinging sash constructed in accordance with the present invention is consequently capable of performing three different movements. Experience has proven that such a sash—notwithstanding the three different movements—can be made sufficiently rigid, and that the function of the sash as tiltable swinging sash is not impaired by the necessity of raising, so that it has the advantages of the latter as well as those of a raising sash, i.e. especially a close fit and weathertight closing.

The novel features which are considered characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of two specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is an elevational view of a sash constructed in accordance with the present invention and showing the sash in its lowered position,

Fig. 2 is a sectional view through the sash taken along line 2—2 of Fig. 1,

Fig. 3 is a sectional view similar to that of Fig. 2, but showing the sash in its raised and partly tilted position,

Fig. 4 is an enlarged fragmentary elevational view of one corner of the sash shown in Fig. 1,

Fig. 5 is a sectional view taken along line 5—5 of Fig. 4, and

Fig. 6 is a side elevational view of a modification of the present invention.

Referring now to the drawings it will be seen that the invention illustrated in Fig. 1 includes a sash **10** which is operatively mounted on a window frame **11** by means of fittings **12**, **13** and **14**. The lower cross member of the sash is provided with a groove **15** with which it is in sealing engagement with a molding **16** incorporated in the lower cross member of the fixed window frame when the sash is in its lowered position shown in Figs. 1 and 2. The side fitting **12** comprises a stay rod **17** pivotally connected by a joint **17***a* at **17***b* to the frame **11**, and a bush-like member **18** turnably attached to the sash and slidingly arranged on the stay rod **17** coupled with the sash by a ratchet device **17***c*, or the like. As is specifically shown in Fig. 4 the lower side fitting **13** includes a base plate **19** of relatively great length which is fastened to the fixed window frame by screws **19***a*. A bushing or hollow rod **22** adapted for receiving a hinge pin **23** is hinged on the lower end of the base plate between two bearing eyes **20** by a fulcrum pin **21**. The hinge pin **23** carries on its upper end which is extended beyond the bushing **22** a hinge member **24**, **24'** which is slidably arranged for up-and-down motion between the legs of a U-shaped fitting **25** mortised in the window frame **10**. The flap **24'** of the hinge member **24** has an opening therein which is in engagement with an eccentric **28** turnable about a fulcrum member **27** in the U-shaped fitting **25**. A nose **29** made integrally with the base plate **19** engages the hinge member **24** at the top so that raising the hinge member **24** out of the hinge pin **23**, that is, separating the sash from the window frame, is prevented when the sash is closed. A handle **30** coupled with the fulcrum member **27** by a square pin serves for operating the eccentric **28**, whereas for opening the sash a knob **31** is provided thereon in place of the conventional handle.

The fitting **14** comprises a hinge-like member **32** fastened to the window frame and a hinge-like member **33** secured to the sash. A bolt **34** operatively arranged in the member **32** permits coupling together of the members **32** and **33** when the sash is raised a distance "*h*" (Fig. 4) and the aforesaid members are thus brought into alignment with one another.

As is clearly shown in Fig. 1 the vertical swinging axis A—B of the sash is fixed by both the stay rod **17**, which is a member of the fitting **12** and operatively mounted on the window frame, and the hinge pin **23** of the lower side fitting **13**, and the horizontal tilting axis C—D of the sash is fixed by both the axis of the fulcrum pin **21** and the axis of the hinge member **32**.

Figs. 1 and 2 show the sash **10** in its lowered, closed position. In this position it cannot be swung or tilted because the molding **16** prevents such movement. When it is desired to open the sash, that is to swing it about the vertical axis A—B, or to tilt it about the horizontal axis C—D, the handle **30** is turned and with it the eccentric **28**, and thus the sash **10** carrying the fulcrum member **27** of the eccentric **28** is raised by a distance "*h*." The lower bushing **22** and the upper stop **29** act at the same time as an abutment for the hinge member **24**. Together with the raising of the sash by the distance "*h*," the hinge member **33** is brought into alignment with the hinge member **32** so that the sash can now be coupled by the bolt **34** with the window frame preliminary to tilting about the axis C—D (Fig. 3). The sash is guided in known manner along the stay rod **17** till it abuts with its bushing **18** against the stop provided at the end of the stay rod.

When it is desired to open the sash, that is, to swing

it about the axis A—B, then the bolt **34** is not coupled with the hinge member **33**, whereas the stay rod **17** is arrested on the window frame.

If occasion arises, the sash in its lowered position may also at another point be secured to the window frame against opening, for example, by means of hooks, or guide pins acting in the manner of a bayonet joint, or the like.

Unhinging of the sash is possible by swinging it about its vertical axis A—B into an open position of approximately 90 degrees. In this position the sash together with its fitting **24** can be lifted off its hinges by passing the stop **29**, as in this position the flap-like portion **24'** of the fitting **24** will be in the position **24''**.

No closing gear need be provided in connection with the knob **31**. Also without closing gear the sash is securely locked in the window frame when closed. Thus is attained a sash of relatively simple practical construction which can be produced just as economically as conventional swinging sash. As compared with the latter the sash provided by the present invention has the advantage of greater weathertightness and better closing and permits, in addition, to use it both as swinging and tilting sash.

Under certain circumstances it is also possible to locate the horizontal tilting axis C—D in the apex or centerline of the molding **16** and groove **15** respectively so that the groove moves about the molding when the sash is tilted. For this purpose it is necessary to sink the lower corner fitting correspondingly so that also in this case it will be in alignment with the tilting axis.

Such a modification is shown in Fig. 6. The fulcrum pin **121** of the lower corner fitting accordingly is so arranged that its axis coincides approximately with that of the rounded cross-section of the molding **116** on the fixed window frame **11**. The upper bushing **24**—in relation to which, as in the embodiment according to Figs. 1 through 5, the sash can be raised or lowered—is turnably supported by a bushing **122** on the pin **121** for movement about the tilting axis extending therethrough so that the sash **10** can be tilted about this axis, that is, about the molding **116**, the bushing **122** being inwardly bent at its lower end.

The sash is consequently also in its lowered position capable of tilting, whilst for swinging it about the axis A—B it must, in the first place, be raised so much that its lower edge can be swung over the top of the molding **116**.

The arrangement of the raising device on a hinge joint cooperating with both the vertical swinging axis and the horizontal tilting axis renders it possible that relatively few fittings are needed for operating the sash according to the present invention. As the bearing or base plate for the tiltable hinge joint may be subjected to a relatively large load, it is to the purpose to strengthen it accordingly.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts provided that such changes fall within the scope of the appended claims.

What I claim is:

1. A door or window construction comprising, a frame; a sash; means located between said sash and said frame for fixing both a vertical swinging axis and a horizontal tilting axis for said sash in relation to said frame and adapted for permitting said sash to be selectively swung about said vertical swinging axis or about said horizontal tilting axis, said means comprising a corner hinge joint containing a first member having means attached to said frame and provided with first bearing means in said horizontal tilting axis, a second member having a bushing arranged in said vertical swinging axis and provided at an extension thereof with second bearing means, coaxial with said first bearing means, a third member having a bushing likewise located in said vertical swinging axis, pivot means for connecting said first member with said second member in the axis of their bearing means whereby said second member is turnably supported for movement about said horizontal axis in relation to said first member, and pivot means for connecting said second and third members in the axis of said bushings whereby said third member is turnably supported for movement about said vertical axis in relation to said second member; and means for raising said sash comprising, a member attached to said sash, a member rigidly connected with said second bushing and means for shifting said last two members relative to each other in vertical direction to thereby raise said sash in relation to said frame.

2. A door or window construction comprising, a frame; a sash; means located between said sash and said frame for fixing both a vertical swinging axis and a horizontal tilting axis for said sash in relation to said frame and adapted for permitting said sash to be selectively swung about said vertical swinging axis or about said horizontal tilting axis, said means comprising a corner hinge joint containing a first member having a base plate attached to said frame and provided with an eye in said horizontal tilting axis, a second member having a bushing arranged in said vertical swinging axis and provided at an extension thereof with an eye co-axial with said first eye, a third member having a bushing likewise located in said vertical swinging axis, pivot means for connecting said first member with said second member in the axis of their eyes whereby said second member is turnably supported for movement about said horizontal axis in relation to said first member, pivot means for connecting said second and said third members in the axis of said bushings whereby said third member is turnably supported for movement about said vertical axis in relation to said second member with said third member supported on the upper portion of said second member so as to prevent downward movement thereof in relation to said frame, and stop means on said base plate for preventing an upward movement of said third member in relation to said frame; and means for raising said sash comprising, a member attached to said sash, a member rigidly connected with said second bushing and means for shifting said last two members relative to each other in vertical direction to thereby raise said sash in relation to said frame.

3. A door or window construction comprising a frame; a sash; means located between said sash and said frame for fixing both a vertical swinging axis and a horizontal tilting axis for said sash in relation to said frame and adapted for permitting said sash to be selectively swung about said vertical swinging axis or about said horizontal tilting axis, said means comprising a corner hinge joint containing a first member located on said frame, a second member located on said sash and a third member located between said first and said second members, said third member being turnably supported for movement about said horizontal axis in relation to said first member, said second member being turnably supported for movement about said vertical axis in relation to said third member; means for raising said sash in connection with said corner hinge joint; a mechanism arranged essentially in said vertical swinging axis at a distance from said corner hinge joint and comprising an essentially cylindrical stay rod arranged co-axial to said vertical swinging axis, means for pivotally connecting said stay rod with said frame and for permitting swinging of said stay rod as to said frame about an axis parallel to said horizontal tilting axis, and means for connecting said stay rod with said sash for guiding the latter; and a device located adjacent to said horizontal tilting axis comprising a first hinge member arranged on said frame and having a fulcrum located in said horizontal tilting axis,

a second hinge member arranged on said sash and having a fulcrum parallel to and vertically displaced from said tilting axis, said distance corresponding to the permissable upward movement of said sash effected by said raising means, and means for coupling together said two hinge members when said sash has been raised the said distance to thereby permit tilting of said sash about the joint axis of said two hinge members.

4. In a door or window arrangement, in combination, a rectangular door or window frame having a pair of opposite vertical upright members and a pair of opposite horizontal cross members; a door or window sash adapted to fit into said frame; means for mounting said sash for vertical movement relative to said frame between an upper unlocked and a lower locked position; cooperating pivoting means mounted on said frame and said sash and constructed for pivotal engagement with each other when said sash is in its upper unlocked position for pivotal movement of said sash about a horizontal pivot axis, said pivoting means comprising a first hinge member arranged on said frame having a fulcrum located in said horizontal axis, a second hinge member arranged on said sash and having a fulcrum parallel to and vertically displaced from the fulcrum of said first hinge member when said sash is in lower locked position a distance equal to the distance between said upper and lower positions of the sash, and means for coupling said hinge members to each other when said sash is raised into said upper position; and additional compound pivoting means mounted on said frame and sash and being in pivotal engagement permitting pivotal movement of said sash relative to said frame about a vertical axis and about said horizontal axis when said sash is in its upper unlocked position.

5. In a door or window arrangement, in combination, a rectangular door or window frame having a pair of opposite vertical upright members and a pair of opposite horizontal cross members; a door or window sash adapted to fit into said frame; means for mounting said sash for vertical movement relative to said frame between an upper unlocked and a lower locked position; cooperating pivoting means mounted on said frame and said sash and constructed for pivotal engagement with each other when said sash is in its upper unlocked position for pivotal movement of said sash about a horizontal pivot axis, said pivoting means comprising a first hinge member arranged on said frame having a fulcrum located in said horizontal axis, a second hinge member arranged on said sash and having a fulcrum parallel to and vertically displaced from the fulcrum of said first hinge member when said sash is in lower locked position a distance equal to the distance between said upper and lower positions of the sash, and means for coupling said hinge members to each other when said sash is raised into said upper position; compound hinge mechanism comprising a base hinge member mounted on said frame, a swingable hinge member pivotally connected to said base hinge member for turning about said horizontal axis between a vertical position and an inclined position and means movably interconnecting said swingable hinge member with said sash so that said sash is movable in compound fashion towards and away from the hinge axis as between said locked and unlocked positions as well as turnable about said hinge member when in vertical position providing a vertical turning axis for said sash when said cooperating pivoting means are disengaged from one another and the sash has been unlocked, said sash being turnable about said horizontal axis with said swingable hinge member when said cooperating pivot means are pivotally engaged with one another.

6. In a door or window arrangement, in combination, a rectangular door or window frame having a pair of opposite vertical upright members and a pair of opposite horizontal cross members; a door or window sash adapted to fit into said frame; means for mounting said sash for vertical movement relative to said frame between an upper unlocked and a lower locked position; cooperating pivoting means mounted on said frame and said sash and constructed for pivotal engagement with each other when said sash is in its upper unlocked position for pivotal movement of said sash about a horizontal pivot axis, said pivoting means comprising a first hinge member arranged on said frame having a fulcrum located in said horizontal axis, a second hinge member arranged on said sash and having a fulcrum parallel to and vertically displaced from the fulcrum of said first hinge member when said sash is in lower locked position a distance equal to the distance between said upper and lower positions of the sash, and means for coupling said hinge members to each other when said sash is raised into said upper position; compound hinge mechanism comprising a base hinge member mounted on said frame, a swingable hinge member pivotally connected to said base hinge member for turning about said horizontal axis between a vertical position and an inclined position and means movably interconnecting said swingable hinge member with said sash so that said sash is movable in compound fashion towards and away from the hinge axis as between said locked and unlocked positions as well as turnable about said hinge member when in vertical position providing a vertical turning axis for said sash when said cooperating pivoting means are disengaged from one another and the sash has been unlocked, said sash being turnable about said horizontal axis with said swingable hinge member when said cooperating pivot means are pivotally engaged with one another; and auxiliary mechanism operatively interconnecting said frame and said sash vertically above said compound hinge mechanism and arranged to be adjustable to one condition for providing vertical hinge means coaxial with said vertical turning axis while said cooperative pivot means are disengaged from one another, and to another condition to permit turning movement of the sash about said horizontal axis when said cooperative pivot means are pivotally engaged with one another.

7. In a door or window arrangement, in combination, a rectangular door or window frame having a pair of opposite vertical upright members and a pair of opposite horizontal cross members; a door or window sash adapted to fit into said frame; means for mounting said sash for vertical movement relative to said frame between an upper unlocked and a lower locked position; cooperating pivoting means mounted on said frame and said sash and constructed for pivotal engagement with each other when said sash is in its upper unlocked position for pivotal movement of said sash about a horizontal pivot axis, said pivoting means comprising a first hinge member arranged on said frame having a fulcrum located in said horizontal axis, a second hinge member arranged on said sash and having a fulcrum parallel to and vertically displaced from the fulcrum of said first hinge member when said sash is in lower locked position a distance equal to the distance between said upper and lower positions of the sash, and means for coupling said hinge members to each other when said sash is raised into said upper position; compound hinge mechanism comprising a base hinge member mounted on said frame, a swingable hinge member pivotally connected to said base hinge member for turning about said horizontal axis between a vertical position and an inclined position and means movably interconnecting said swingable hinge member with said sash so that said sash is movable in compound fashion towards and away from the hinge axis as between said locked and unlocked positions as well as turnable about said hinge member when in vertical position providing a vertical turning axis for said sash when said cooperating pivoting means are disengaged from one another and the sash has been unlocked, said sash being

turnable about said horizontal axis with said swingable hinge member when said cooperating pivot means are pivotally engaged with one another; and auxiliary mechanism operatively interconnecting said frame and said sash vertically above said compound hinge mechanism and comprising a substantially cylindrical stay rod pivotally connected to said frame and swingable about an axis parallel to said horizontal axis, a bushing slidable as well as turnable on said rod, and means for swingably mounting said bushing upon said sash so arranged as to provide a vertical hinge for the sash coaxial with said vertical turning axis when said rod is in a vertical position and said cooperative pivot means are disengaged from one another, and to permit turning movement of

the sash about said horizontal axis when said cooperative pivot means are pivotally connected with one another.

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