Claims

1. A vertical sliding window (1) as a closure for an opening in an exterior wall of a building, wherein all superposed, movable window panes (2) of the sliding window (1) are an integral part of a single sliding sash (8), which for opening is lowered vertically downwardly as a whole, and is completely or essentially completely countersunk into a flat chamber (14) within a box (13), **characterized in that** the free lower edge of afilter mat (42a) or a horizontal rod fixed thereto is suspended or suspendable on the upper edge of the sliding sash (8), wherein the filter mat (42a) is suitable for filterings suspended particles such as fine sand, dust, allergens, fine particulate matter, soot, and/or aerosols, and is unwoundable from a shaft (43a) installed above the closed sliding sash (8), and wherein a drive (17) of the sliding sash comprises at least one energy converter for converting supplied auxiliary energy into a mechanical movement, wherein the energy converter is coupled to a control, regulation, and/or monitoring in order to automatically bring about closing or partial or complete opening of the sliding sash (8) according to predefined criteria, for example during deteriorating weather conditions, or as an integral part of a central anti-burglary protection system upon leaving the building or living space in question, or when there is a low oxygen level or increased humidity in the interior in question.

2. The vertical sliding window (1) according to Claim 1, characterized in that two straight longitudinal edges adjoin the free lower edge of the filter mat (42a) and connect the free lower edge of the filter mat (42a) to the shaft (43a), and in each of which a lateral guide and/or seal extends.

3. The vertical sliding window (1) according to Claim 2, characterized in that the lateral guide and/or seal for the filter mat (42a) have/has a U-shaped cross section whose opening faces the filter mat (42a).

4. The vertical sliding window (1) according to Claim 3, characterized in that one or both inner sides of the opening of a lateral guide is/are provided with a rubber



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seal or a brush seal.

5. The vertical sliding window (1) according to Claim 1, characterized in that the free lower edge of an insect screen (42b) or a horizontal rod fixed thereto is suspended or suspendable on the upper edge of the sliding sash (8), wherein the insect screen (42b) is unwoundable from a shaft (43b) installed above the closed sliding sash(8).

6. The vertical sliding window (1) according to one of the preceding claims, characterized in that at least one shaft (43a; 43b), from which the filter mat (42a) and/or the insect screen (42b) is unwoundable, is supported within an upper, horizontal closure element (12), wherein a shaft (43a; 43b) accommodating the filter mat (42a) and/or the insect screen (42b) is preferably pretensioned by a spring element in a rotational direction such that the spring element seeks to wind up the filter mat (42a) and/or the insect screen (42b).

7. The vertical sliding window (1) according to one of the preceding claims, characterized in that the shaft(s) (43a; 43b) is/are displaced perpendicularly with respect to the plane of the window pane.

8. The vertical sliding window (1) according to one of the preceding claims, characterized in that the free end of the filter mat (42a) and/or of the insect screen (42b) detaches from the particular shaft (43a; 43b) in an area facing the window pane.

9. The vertical sliding window (1) according to Claim 5, characterized by a first shaft (43a) for the filter mat (42a) and a second shaft (43b) for the insect screen (42b).

10. The vertical sliding window (1) according to Claim 9, characterized in that the filter mat (42a) is wound onto the first shaft (43a) in an opposite winding direction than the insect screen (42b) is wound onto the second shaft (43b).

11. The vertical sliding window (1) according to Claim 9 or 10, characterized in that

a spring tensioning element for the first shaft (43a) is situated opposite from the spring element for the second shaft (43b) so as to act in a reverse direction of rotation.

12. The vertical sliding window (1) according to one of Claims 6 to 11, characterized in that the insect screen (42b) is situated on the inner side of the filter mat (42b).

13. The vertical sliding window (1) according to Claim 12, characterized in that lateral guides for the insect screen (42b) are situated on the side of the guides for the filter mat (42b) that face the interior.

14. The vertical sliding window (1) according to one of the preceding claims, characterized in that the free lower edge of the filter mat (42a) or a horizontal rod fixed thereto is suspended or suspendable in the area of the outer side or in the area of the inner side of the upper edge of the sliding sash (8).

15. The vertical sliding window (1) according to one of Claims 6 to 14, characterized in that the free lower edge of the insect screen (42b) or a horizontal rod fixed thereto is suspended or suspendable in the area of the inner side of the upper edge of the sliding sash (8).

16. The vertical sliding window (1) according to Claim 6, characterized in that at least one shaft (37), from which a roller shutter (38), a roller blind, or a louver blind is unwoundable, is supported in the area of the upper, horizontal closure element (12).

17. The vertical sliding window (1) according to Claim 16, characterized in that at least one guide groove for the guiding accommodation of each side edge of the roller shutter (38), roller blind, or louver blind is incorporated into each of the two lateral mullions (11) of the window casing (10), wherein the slotted openings of these two guide grooves lie in a shared vertical plane parallel to the plane of the vertical sliding sash (8), and face one another.

18. The vertical sliding window (1) according to Claim 17, characterized in that the



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lateral guide grooves for a roller shutter (38) are situated on the outer side (40) of the countersinkable sliding sash (8), in particular on the other side of the guide for a filter mat (42a), and/or the lateral guide grooves for a roller blind or a louver blind are situated on the inner side (41) of the countersinkable sliding sash (8).

19. The vertical sliding window (1) according to one of the preceding claims, characterized in thata panel (46) made of a transparent material is provided in the upper area of the window opening, preferably on the outer side, to allow gap ventilation that is not impaired by driving rain.

20. The vertical sliding window (1) according to one of the preceding claims, characterized in that the at least one lowerable sliding sash (8) has a movable frame (3) that is connected to the glass pane(s), or is designed without a frame.

21. The vertical sliding window (1) according to one of the preceding claims, characterized in that the housing of the box (13) accommodating the lowered sliding sash (8) is not transparent, so that in any case the completely lowered sliding sash (8) is still visible along its upper edge strip; when the sliding sash (8) is completely lowered, the upper edge strip is preferably either completely lowerable into the box (13), or protrudes upwardly from the box (13) at most by a narrow region, preferably by a height of not more than 30 cm, preferably by a height of not more than 20 cm, in particular by a height of not more than 10 cm.

22. The vertical sliding window (1) according to one of the preceding claims, characterized in that the box (13) accommodating the lowered sliding sash (8) is an integral part of a window casing (10), wherein the movable sliding sash (8) is guided in each position, wherein at least one guide groove or guide rail (9) for the guiding accommodation of each side edge of the lowerable sliding sash (8) is preferably incorporated into the two lateral sections of the window casing (10), and wherein the slotted openings of these two guide grooves or the two guide rails (9) preferably lie in a shared vertical plane parallel to the plane of the vertical sliding sash (8), and face one another.



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23. The vertical sliding window (1) according to one of the preceding claims, characterized in that the box (13) accommodating the lowered sliding sash (8) has a further, flat chamber for accommodating insulation (30), in particular thermal and/or acoustic insulation (30).

24. The vertical sliding window (1) according to one of the preceding claims, characterized in that the drive (17) for raising and/or lowering the lowerable sliding sash (8) is situated in the chamber (14) of the box (13) accommodating the lowered sliding sash (8) or in a further flat chamber or chamber extension (20) of the box (13) that is parallel to this first chamber (14).

25. The vertical sliding window (1) according to Claim 24, characterized in that the drive (17) comprises at least one of the following drive elements:
    a) one or more vertical toothed rack(s) (26) that is/are connected or connectable to the lowerable sliding sash (8); and/or
    b) one or more vertical scissor-like drive(s) (19) that is/are coupled or coupleable to the lowerable sliding sash (8); and/or
    c) one or more vertical threaded spindle(s) that is/are connected or connectable to the lowerable sliding sash (8); and/or
    d) one or more vertical traction element(s) that is/are connected or connectable to the lowerable sliding sash (8).

26. The vertical sliding window (1) according to one of Claims 24 or 25, characterized in that the drive (17) comprises an electric or hydraulic motor or a hydraulic or pneumatic cylinder.



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