

# **MULTI-FUNCTIONAL WINDOW FRAME DEVICE**

## **Field of the Disclosure**

[0001] The present invention relates to a window frame device. In embodiments, the window frame is arranged to be mounted in a wall. The window frame can be configured to provide for various functions or features, for example, a window, a window grille, or a clothes hanging device.

## **Background of the Disclosure**

[0002] A window frame serves as a means to hold window panels and window grilles in place on a window. Other than to hold window panels and window grilles in place, conventional window frames hardly serve any other purpose, except in some cases, a secondary function of being ornamental.

[0003] It is a known practice to dry laundry by hanging wet laundry on hanging rods and then suspending the hanging rods outdoors for the wet laundry to dry under sunlight. For high-rise dwellers, a device used for drying their laundry is a hollow pipe attached to the exterior wall, usually built into the wall by the building developer. A user of such a device would arrange the laundry on a hanging rod, secure the laundry to the hanging rod using clothes pegs, then lean out of a window to insert the hanging rod together with the laundry, into the hollow pipe attached to an exterior wall below the window. Another device used for drying laundry is a clothes hanging device as disclosed in SG patent P-No. 157994. Such a clothes hanging device includes a hollow cylindrical portion to be provided through the width of a wall, such that a user can extend a hanging rod out of his house by inserting the hanging rod into the hollow cylindrical portion from inside of his house. Other known laundry hanging devices include laundry racks attached to an exterior wall under a window, the laundry racks typically including railings or bars arranged parallel to the exterior wall surface.

[0004] Regardless of the choice of laundry hanging devices as described above, to install a laundry hanging device would require making structural changes in the exterior wall, such as cutting holes or drilling in the wall. Such installation processes could be problematic if the

wall intended for installing the laundry hanging device already has features such as built-in hollow pipes, raised edges or decorative features like moldings or paintings. The existing features on the wall may have to be removed in order for the new laundry hanging devices to be installed, or if the existing features cannot be removed, cutting holes or drilling the wall may damage the building façade or render the building façade unsightly. The building authorities may also impose rulings against such installations for the reason of protecting the building façade. In addition, should a home owner decide to change the laundry hanging device installed on his wall, he would need to go through a removal process that is no less cumbersome and may leave unsightly drilling marks or holes in the building wall after removing of the laundry hanging device.

[0005] The present disclosure aims to provide a solution to the abovementioned problems through a multi-functional window frame device.

### **Summary of the Invention**

[0006] According to various embodiments in the present disclosure, there is provided a window frame device, including a window frame, the window frame arranged for mounting in a standing wall, the window frame defining a first surface for facing the inside of a building and a second surface opposing the first surface, the second surface for facing the outside of the building; a window panel held inset the window frame, wherein the window panel is movable between a closed position to at least one open position; at least one bore provided within the window frame; and at least one clothes hanging device including an elongate hollow body inserted into the at least one bore and affixed to the window frame, the elongate hollow body configured to movably receive a rod such that the rod can be inserted at a first end of the elongate hollow body protruding from the first surface of the window frame and extend through a second opposite end of the elongate hollow body protruding from the second surface of the window frame.

[0007] In various embodiments, the at least one bore is provided substantially perpendicular to the first surface of the window frame.

[0008] In various embodiments, the window frame device further includes a plurality of bores provided within the window frame.

[0009] In various embodiments, the window frame device further includes a window grille held inset within the window frame and provided adjacent to the window panel.

[0010] In various embodiments, the window frame device further includes a plurality of clothes hanging devices, each clothes hanging device including an elongate hollow body inserted into one of the plurality of bores and affixed to the window frame.

[0011] In various embodiments, the window frame device further includes a window grille held inset within the window frame and provided adjacent to the window panel.

[0012] In various embodiments, the window frame device further includes a plurality of clothes hanging devices, each clothes hanging device including an elongate hollow body inserted into one of the plurality of bores and affixed to the window frame.

[0013] In various embodiments, each of the plurality of clothes hanging devices includes a linear axis along which the elongate hollow body is formed, wherein the linear axes of the plurality of clothes hanging devices are parallel.

[0014] In various embodiments, a set of the plurality of clothes hanging devices is located below the window panel, when the window frame is mounted in the standing wall.

[0015] In various embodiments, any one of the plurality of clothes hanging devices is coupled to the window frame with an adhesive compound.

[0016] In various embodiments, the window frame device further includes a securing element arranged to couple onto the elongate hollow body of the clothes hanging device to secure the clothes hanging device to the window frame.

[0017] In various embodiments, the securing element is arranged to couple onto the elongate hollow body at the first end with a bolt and nut arrangement.

[0018] In various embodiments, the adhesive compound is applied between an external surface of the elongate hollow body and the walls of the bore in the window frame at the first end of the clothes hanging device.

[0019] In various embodiments, the window frame device further includes a canopy, the canopy extendable perpendicularly from the second surface of the window frame and provided above the window panel when the window frame is mounted in the standing wall.

[0020] In various embodiments, the window frame device further includes a top set of bores and corresponding clothes hanging devices provided in the window frame and above the window panel, configured for supporting the canopy.

[0021] In various embodiments, the canopy includes an elongate sheet coupled at opposing ends of the sheet to a pair of rods, the pair of rods arranged to be movably received by the top set of clothes hanging devices.

[0022] In various embodiments, the top set of clothes hanging devices includes two clothes hanging devices arranged to receive the pair of rods of the canopy.

[0023] In various embodiments, the top set of clothes hanging devices further includes a third clothes hanging device, arranged centrally to the two clothes hanging devices of the top set, the third clothes hanging device arranged to receive a third rod for elevating a central portion of the canopy.

[0024] In various embodiments, the window frame device further includes a plurality of window panels mounted on a first set of tracks in the window frame and a plurality of window grilles mounted on a second set of tracks in the window frame, the first set of tracks and the second set of tracks running parallel and adjacent to each other.

[0025] In various embodiments, the window frame device further includes a clothes hanging rod arranged to be movably received by any one of the plurality of clothes hanging devices, the clothes hanging rod including a first end arranged to be inserted into the elongate hollow body of the clothes hanging device from the first surface of the window frame, and to extend

through the elongate hollow body to protrude from the second surface of the window frame, the clothes hanging rod including a user handling portion at a second end.

[0026] In various embodiments, the clothes hanging device includes a restricting portion at the first end of the clothes hanging device, arranged to abut the user handling portion of the clothes hanging rod and prevent the clothes hanging rod from moving entirely through the clothes hanging device.

[0027] In various embodiments, the window frame device further includes a hanger arranged for coupling onto the clothes hanging rod, the hanger including a central portion, a hook portion extending from a first side of the central portion and a triangular support portion for receiving a clothes item extending from a second opposing side of the central portion.

[0028] In various embodiments, the hook portion is rotatably coupled to the central portion of the hanger.

[0029] In various embodiments, the hook portion includes an elongate member extending from the central portion of the hanger from at one end and forming a substantially elliptical shape with an outward extrusion at the opposing end.

[0030] In various embodiments, the elongate member is a resilient elongate member.

[0031] In various embodiments, the central portion includes an aperture formed through the central portion, the aperture arranged to receive a clothes hanging rod through the aperture.

[0032] In various embodiments, the aperture is dimensioned to fit the clothes hanging rod.

[0033] In various embodiments, the aperture includes a resilient flap coupled to extend inward from the circumference of the aperture for providing a secure fit in receiving the clothes hanging rod.

## **Brief Description of the Drawings**

[0034] In order to aid in the further understanding of the present disclosure, the following embodiments, as illustrated in the accompanying drawings, is described in greater detail below, in which:

[0035] FIG. 1A shows an exterior surface of a window frame device in accordance with an embodiment.

[0036] FIG. 1B shows a cross-sectional side view of the window frame device of FIG. 1A.

[0037] FIG. 2A shows an exterior surface of a window frame device in accordance with another embodiment.

[0038] FIG. 2B shows a side view of the window frame device of FIG. 2A.

[0039] FIG. 3 shows a clothes hanger in accordance with an embodiment.

[0040] FIG. 4 shows an image with a perspective view of an interior surface of the window frame device of FIG. 2A and 2B.

[0041] FIG. 5 shows an image with a perspective view of an exterior surface of the window frame device of FIG. 2A and 2B.

[0042] FIG. 6 shows an image with a perspective view of a clothes hanging device of FIG. 1A.

[0043] FIG. 7 shows an image with a perspective view of the clothes hanging device of FIG. 6.

## Detailed Description

[0044] While embodiments of the invention have been particularly shown and described with reference to specific embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. The scope of the invention is thus indicated by the appended claims and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced. It will be appreciated that common numerals, used in the relevant drawings, refer to components that serve a similar or the same purpose.

[0045] FIG. 1A shows a window frame device 100 according to an embodiment of the present disclosure. As can be seen in FIG. 1A, the window frame device 100 includes a window frame 102, at least one window panel 104, a set of bores 106 and a set of clothes hanging devices 108 held within the window frame 102 through the bores 106. For the benefit of unambiguous description, the surface of the window frame 102 for facing the inside of a building is defined as the first surface or interior surface 110 and the surface of the window frame 102 opposing the first surface and facing the outside of the building is defined as the second surface or exterior surface 112 (FIG. 1B).

[0046] The window frame device 100 can be mounted in an opening 101 in an exterior wall 103. Such an exterior wall can be the exterior wall of a building, providing separation between an interior of a building and an exterior of a building. The window frame 102 can hold at least one window panel 104. The size and shape of the window frame 102 can be substantially similar to the size and shape of the opening 101 in the exterior wall 103. In the embodiment illustrated in FIG. 1A, the window frame 102 is a sliding window frame holding three window panels 104, in which the three window panels 104 are mounted on a set of tracks in the window frame 102. The combined width of the three window panels 104, can be substantially similar to the inner width of the window frame 102, the inner width of the window frame 102 defined as the distance measured between the vertically upright sides of the window frame 102 when mounted in the opening 101 in the exterior wall 103. Besides the embodiment in FIG. 1A, the window frame can also be of any known window frame designs, including but not limited to casement windows, double hung windows and awning windows.

For example, the window frame can be a casement window frame, holding at least one window panel which is attached to the window frame by a set of hinges at an edge of the window panel.

[0047] The window panels 104 generally form a window 105 when they are held inset in the window frame 102 and the window frame 102 is mounted in the opening 101 in the exterior wall 103. The window panels 104 can be configured to open or close the window 105 with corresponding movement between the window panels 104. One or more of the window panels 104 can be moved parallel with respect to the other window panels 104 to an open position, where one or more of the window panels 104 overlap to at least partially open the window 105 and expose a portion of the opening 101. One or more of the window panels 104 can also be moved parallel with respect to the other window panels 104 to a closed position (as shown in FIG. 1A), where the opening 101 is substantially covered by the window panels 104, to close the window. The movement of the window panels 104 can be generally parallel to the second surface 112 of the window frame surface. The window panels 104 can be equipped with a lock to prevent unauthorized opening of the window. In another embodiment where the window frame is a casement window frame, the window panels can be swung outwards or inwards, in a direction perpendicular to the second surface of the window frame surface, to open the window. The window panels can be made of glass or other materials that admit light or air through the window.

[0048] As shown in FIG. 1A, the window frame device 100 includes a set of at least one bore 106 and a corresponding set of clothes hanging devices 108 provided within the window frame 102. In some embodiments, there is provided a plurality of bores 106 and a corresponding plurality of clothes hanging devices 108 located below the window panels 104, when the window frame 102 is mounted in the exterior wall 103. FIG. 1B shows a cross-sectional side view of the window frame device 100. The bore 106 can be relatively cylindrical in shape and extends through the thickness of the window frame 102 and is dimensioned and shaped to fit or receive the clothes hanging device 108, which correspondingly includes a substantially cylindrical body.

[0049] The clothes hanging device 108 can be configured for providing a hanging rod 115 through from inside the building to outside the building, so that a user does not have to lean out of the building through the window 105 to hang laundry. The present inventors have

previously come up with such a clothes hanging device and have obtained a patent covering such a device under Singapore Patent P-No. 157994, entitled “Clothes Hanging Device and Method of Mounting Thereof”, the specifications of which are incorporated in its entirety herein by reference into the present disclosure.

[0050] As shown in FIG. 1B, the clothes hanging device 108 includes an elongate hollow body 114, a first securing element 116 and a second securing element 118. Each of the clothes hanging device 108 includes a linear axis 117 along which the elongate hollow body 114 is formed, wherein the linear axes of the plurality of clothes hanging devices 108 can be parallel. The elongate hollow body 114 can be sized to be slightly smaller than, or the same, but no larger than the bore 106, so that the elongate hollow body 114 can fit within the bore 106. For example, the diameter of a cylindrical portion of the elongate hollow body 114 can be slightly shorter than the diameter of the cylindrical bore 106. The length of the elongate hollow body 114, however, can be sized to be longer than the bore 106 such that the elongate hollow body 114 can be mounted within the window frame 102 through the bore 106, with its first end 120 protruding from the first surface 110 of the window frame surface and its second end 122 opposing the first end 120 and protruding from the second surface 112 of the window frame 102. The elongate hollow body 114 is generally provided horizontally and positioned in a substantially perpendicular orientation with respect to the second surface 112 of the window frame 102. The elongate hollow body 114 can be affixed to the window frame 102 with a first securing element 116 at the first end 120 of the elongate hollow body 114 and a second securing element 118 between the second end 122 and a middle portion of the elongate hollow body 114.

[0051] In the embodiment shown in FIG. 1B, in carrying out an installation of the elongate hollow body 114 of clothes hanging device 108, the first securing element 116 is attached to the first end 120 of the elongate hollow body 114. The first securing element 116 can include screw threads on the internal of the securing element and can be screwed onto corresponding screw threads provided on the first end 120 of the elongate hollow body 114, tightening in the direction towards the second surface 112 of the window frame 102. Once the elongate hollow body 114 is placed in a relatively comfortable position, without fully tightening the first securing element 116, the hollow body 114 is secured at the opposing end of the bore 106 with a second securing element 118. Second securing element 118 is provided opposing to the

first securing element 116, with respect to the window frame 102 and relative to the elongate hollow body 114.

**[0052]** Screwing of the first securing element 116 after it is in contact with the first surface 110 of the window frame 102, and when the second securing element 118 is secured to the hollow body 114 and the window frame 102, further secures the elongate hollow body 114 against the window frame 102, by receiving or drawing the hollow body 114 in a direction along the linear axis 117 from exterior surface 112 to internal surface 110. In this manner, the first securing element 116 is arranged to secure the elongate hollow body 114 to the window frame 102, the first securing element 116 being positioned, when the elongate hollow body 114 is mounted, opposite to the location of the second securing element 118. Other securing means such as adhesive, pins and nails can also be used to secure the first securing element 116 to the window frame 102 and to the elongate hollow body 114, such that the hollow body 114 is tightened and secured when the first securing element 116 screws onto the hollow body 114 and against the first surface 110.

**[0053]** In the embodiment shown in Figures 1B, the first securing element 116 is a flange joint plate. The first securing element 116 can also be any suitable structure such as, but not limited to, a bolt and nut arrangement, a mounting plate, a mounting bracket or housing. The first securing element 116 has dimensions larger than the bore 106. In this manner, the first securing element 116 is able to engage the first surface 110 of the window frame 102, when the clothes hanging device 108 is mounted through the window frame 102. The first securing element 116 can include a restricting portion 124 arranged to abut a user handling portion 126 of the clothes hanging rod 115 and prevent the clothes hanging rod 115 from moving entirely through the clothes hanging device 108.

**[0054]** In the embodiment shown in FIG. 1B, the second securing element 118 is a flange joint plate including a short cylindrical portion 119a and an annular plate 119b. The short cylindrical portion 119a can be arranged to fit securely around the hollow body 114 to provide for a secure fit between the hollow body 114 and the bore 106. The annular plate 119b extends perpendicularly outward from an end of the cylindrical portion 119a opposing the end for insertion into the bore 106. The annular plate 119b of the securing element 118 can be sized larger than the bore 106, so that the annular plate 119b can abut against the exterior second surface 112 of the window frame 102. The second securing element can also be any

suitable structure such as, but not limited to, a plate, a mounting bracket, housing or integral with the elongate hollow body as a single structure. The second securing element 118 can be secured to the second surface 112 of the window frame 102. The second securing element 118 can be secured to the hollow body 114 of the clothes hanging device 108 with adhesive. Further, the securing element 118 can be secured to the window frame 102 at the second surface 112 with adhesive. In other embodiments, pins, screws, nails or welding can be used for securing the securing element 118 to the clothes hanging device 108 and/or the window frame 102.

**[0055]** In another embodiment (not shown), the second securing element 118 is formed on the elongate hollow body 114 exterior surface. The second securing element 118 may include any suitable structure such as, but not limited to, one or more of a group of structures consisting of corrugations, ridges, grooves and bumps. It will be appreciated that the group of structures consisting of corrugations, ridges, grooves and bumps increase the amount of friction between the elongate hollow body 114 exterior surface and the corresponding surface of the bore 106 in contact with the group of structures, thereby securing the elongate hollow body 114 to the window frame 102. The corresponding surface of the bore 106 in contact with the group of structures may also be correspondingly structured to provide an interlocking fit with the group of structures, thereby providing a more secure mounting of the elongate hollow body 114 to the window frame 102.

**[0056]** The mounting of the clothes hanging device 108 onto the window frame 102 can be further secured with an adhesive compound that is applied onto the elongate hollow body 114 exterior surface and the corresponding surface of the bore 106 in contact with the elongate hollow body 114 exterior surface, at the first end or a mid-section of the clothes hanging device.

**[0057]** In another embodiment, a drainage hole (not shown) can extend through a wall in the elongate hollow body 114 between an exterior surface of the elongate hollow body 114 and a corresponding interior surface of the elongate hollow body 114. Such a drainage hole can be provided at a position in between the second end 122 and a middle portion of the elongate hollow body 114, and external to where the elongate hollow body 114 is received in the window frame device 102. The drainage hole allows liquid, when present within the elongate

hollow body 114, to flow out of the elongate hollow body 114 through the drainage hole. The interior surface of the elongate hollow body 114 may be machined such that the interior surface is inclined in a direction towards the drainage hole, to further facilitate liquid flow out of the elongate hollow body 114 through the drainage hole. The drainage hole seeks to prevent rain water from stagnating inside the elongate hollow body 114, thereby reducing the risk of the elongate hollow body 114 becoming a possible mosquito larvae breeding ground.

**[0058]** The clothes hanging device 108, as illustrated in FIG. 1A and 1B, can further include a cap (not shown) adapted to cover either the first end 120 of the elongate hollow body 114 or the second end of the hollow pipe elongate hollow body 114, the cap further including a cap securing element to engage the window frame 102. The cap securing element can include a chain secured at one end to the cap and at the other end, secured to a pin which is fastened to the window frame 102, so that the cap remains attached to the window frame 102 when the cap is not secured to the either end of the elongate hollow body 114. The interior of the cap can also be threaded so that the cap can be screwed onto a threaded portion of the first end 120 or second end 122 of the elongate hollow body 114.

**[0059]** As shown in FIG. 1B, the clothes hanging device 108 can further include a hanging rod 115 which is removably coupled to the elongate hollow body 114. In embodiments, the hanging rod 115 is received by the elongate hollow body 114. The hanging rod 115 includes a rod structure 128 and a user handling portion 126. The hanging rod 115 has a first end 129 at the user handling portion 126 and a second end 130 opposing the first end. The rod structure 128 can be of a fixed length or an adjustable length. The user handling portion 126 is affixed to the rod structure 128 to provide an ergonomic surface for a user to pull or push the hanging rod 115, with respect to the elongate hollow body 114. The user handling portion 126 can be arranged for abutting the restricting portion 124 of the first securing element 116 to prevent the hanging rod 115 from moving entirely through the clothes hanging device 108 from the first surface 110 and out through the second surface 112.

**[0060]** FIG. 6 shows a perspective view of the clothes hanging device 108 seen from the first surface 110 of the window frame 102. The first securing element 116, restricting portion 124, rod structure 128 and the user handling portion 126 of the hanging rod 115 can be clearly seen in FIG. 6.

[0061] Laundry for drying and/or airing can first be slid through, in a sequential manner, along the protruding portion of the second end 122 of the elongate hollow body 114. A second end of the hanging rod 115 is then introduced through the elongate hollow body 114 via the first end 120 of the elongate hollow body 114. As the hanging rod 115 is slid along the elongate hollow body 114, each laundry piece can then be secured (by for example, clothes pegs), to the hanging rod 115 that exits from the second end 122 of the elongate hollow body 114. The laundry pieces can then be spaced along the portion of the hanging rod 115 that extends from the second end 122 of the elongate hollow body 114, to the extent where the hanging rod 115 is fully extended until its handling portion 126 is abutting the restricting portion 124 of the first securing element 116. To retrieve the clothes hanging from the hanging rod 115, the hanging rod 115 is removed from the elongate hollow body 114 by pulling the handling portion of the hanging rod 115 from the first end 120 of the elongate hollow body 114. The clothes can then be removed from the second end of the hanging rod 115 as the hanging rod 115 is pulled in. The hanging rod 115 will be completely removed from the elongate hollow body 114, when the second end of the hanging rod exits the first end 120 of the elongate hollow body 114.

[0062] FIG. 7 shows a perspective view of the clothes hanging device 108 and hanging rod 115, showing both first and second end of the hanging rod 115. In various embodiments, the hanging rod is provided separate from the clothes hanging device, and can be any elongate pole capable of hanging an item from.

[0063] The clothes hanging device 108 can further include a clothes hanger 300 which can be removably coupled to the hanging rod 115. As shown in FIG. 3, an embodiment of the clothes hanger 300 includes a hook portion 330, a central portion 332 and a triangular support portion 334. The hook portion 330 is arranged for removably coupling to the hanging rod 115. The hook portion 330 extends from a first side of the central portion 332 and the triangular support portion 334 for receiving a clothes item extending from a second opposing side of the central portion 332. The hook portion 330 can be rotatable so that the triangular support portion 334 holding the clothes can rotate together with the central portion 332, relative to the hook portion 330. The hook portion 330 can be a resilient elongate member 336 extending from the central portion 332, forming a substantially elliptical shape with an outward extrusion 338 at the opposing end. The substantially elliptical shape formed by the elongate member 336 can

have a width slightly smaller than the hanging rod 115 cross-section, so as to provide a tight grip on the hanging rod 115. The outward extrusion 338 can be adapted to serve as a handle for the user to release the hook portion 330 from the hanging rod 115 by pushing the outward extrusion upwards to temporarily increase the width of the elliptical shape formed by the elongate member 336.

[0064] The clothes hanger 300 can further include an aperture 340 in the central portion 332 for removably coupling onto the hanging rod 115. The hanging rod 115 can be received by the clothes hanger 300 through the aperture 340. The aperture 340 should be no smaller than the cross section of the hanging rod so as to fit the hanging rod 115. The aperture 340 can be relatively similar in dimension and shape to the hanging rod 115 cross-section for a secure fit to the hanging rod 115. In another embodiment, the aperture 340 can also include a resilient flap (not shown) coupled to extend inward from the circumference of the aperture 340 for providing a secure fit in receiving the hanging rod 115. By hanging clothes onto the clothes hanger 300, more clothes can be hung from the hanging rod 115 than if the clothes were to be hung directly onto the hanging rod 115, as can be seen in FIG. 7. In various embodiments, the hanger is provided separate from the clothes hanging device, and can be of any hanger design capable of hanging clothes from a pole.

[0065] FIG. 2A and 2B show a window frame device 200 according to another embodiment of the present disclosure. The window frame device 200 is similar to the window frame device 100 shown in FIG. 1A and 1B, except that it includes a window frame 202 which further includes a set of upper bores 206a (not shown), a corresponding set of upper clothes hanging devices 208a and a canopy 242, in addition to a set of lower bores 206b and a set of lower clothes hanging devices 208b as in the window frame 102 shown in FIG. 1A. The upper bores 206a can be identical to the lower bores 206b. The upper bores 206a can also be identical to the bores 106 from FIG. 1A and FIG. 1B. The upper clothes hanging devices 208a can be identical to the lower clothes hanging devices 208b. The upper clothes hanging devices 208a can also be identical to the clothes hanging devices 108 from FIG. 1A and FIG. 1B.

[0066] In the embodiment shown in FIG. 2A, the window frame 202 includes three upper bores 206a and three upper clothes hanging devices 208a in addition to five lower bores 206b and five lower clothes hanging devices 208b. The upper bores 206a and upper clothes hanging devices 208a are provided within the window frame 202, above window panels 204. The

canopy 242 includes an elongate sheet 244 with its two opposing ends each coupled to a hanging rod 215, the hanging rods 215 removably mounted in the leftmost and rightmost upper clothes hanging devices 208a. The canopy can further include a third hanging rod 215 removably mounted in an upper clothes hanging device 208a located in between the leftmost and rightmost upper clothes hanging devices 208a, to further elevate the canopy 242 in the centre. As shown in FIG. 2B, the canopy 242 can be extendable perpendicularly from the second surface 212 of the window frame to outside of the building.

[0067] The elongate sheet 244 can be coupled to the hanging rods 215 by inserting the hanging rods 215 through pockets provided within the elongate sheet. Other means of attaching the elongate sheet to the hanging rod include but are not limited to adhesive, sewing, Velcro<sup>®</sup>, buttons etc. The elongate sheet 244 can be a waterproof canvas sheet or made of other suitable waterproof materials. With reference to FIG. 2A, the window frame 202 can further include hook rings 217 in between the upper clothes hanging devices 208a and the elongate sheet 244 can further include rings or reinforced holes within (not shown), so that the canopy 242 can be elevated at portions of the elongate sheet that in between the upper clothes hanging devices 208a.

[0068] The canopy 242 suspended above the window panels 204 can protect the laundry hung out to dry using the clothes hanging devices 208b from unwanted substances falling from above the canopy 242, such as dripping of water from the laundry hung by neighbors living above the user or high-rise littering. FIG. 4 shows a perspective view of the window frame device 200 as described above, including a canopy 242 supported by three upper clothes hanging devices 208a, as seen from the interior surface. FIG. 5 shows a perspective view of the same window frame device 200, as seen from the exterior surface.

[0069] The window frame device 200, as illustrated in FIG. 2A further includes a set of window grilles 246, held inset within the window frame 202 and provided adjacent to the window panels 204. The window grille 246 includes bars which serve as a protection barrier, to prevent intruders from entering a building through a window 205 or to prevent people from falling out of the building through the window. In an embodiment as shown in FIG. 2A, the window frame 202 holds three window grilles 246 in addition to three window panels 204 and the window grilles 246 can be sized substantially similar to the window panels 204. As shown

in FIG. 2A, the bars in the lower half of the window grilles 246 can be arranged vertically, so that a user of the clothes hanging device can easily reach out of the building through the window frame device 200 to access the second end of a hanging rod, without having to open the window grilles 246.

[0070] The window grilles 246 can be mounted in the window frame 202, on a further set of tracks running parallel and adjacent to the first set of tracks where the window panels 204 are mounted. One or more of the window grilles 246 can be moved parallel with respect to the other window grilles 246 such that one or more of the window grilles 246 overlap, so as to at least partially open the window 205 or moved parallel with respect to the other window grilles 246 such that the window 205 is substantially covered by the window grilles 246, to form a protective barrier over the window. The movement of the window grilles 246 can be generally parallel to the first surface 210 of the window frame surface. The window grilles 246 can be equipped with a lock to prevent unauthorized opening of the window.

[0071] The arrangement of the bars in the window grilles is not limited to the arrangement as shown in FIG. 2A and can have the bars arranged in different directions such as horizontally-arranged bars, inclined bars or a combination of bars being arranged in different directions. The bars are also not limited to straight bars as in FIG. 2A and could be of various shapes including wavy lines, motifs or very thin metallic cables. In other embodiments where the window frame is a casement window frame, the window grilles can be similarly mounted within the window frame, on a set of tracks running parallel to the second surface of the window frame surface, or attached onto the window frame by a set of hinges mounted on the edges of the window grilles.

[0072] The window frame 202 can be constructed out of reasonably strong and hard materials to withstand momentum resulting from the weight of the laundry and the hanging rod 215. Suitable materials for the window frame 202 include but are not limited to metal alloys such as aluminum alloy or steel.

[0073] While the present disclosure discloses embodiments of the multi-functional window frame being a window frame device incorporated with the clothes hanging device, it should be appreciated that a window frame device incorporating other forms of laundry hanging devices

known to a person having ordinary skill in the art is also within the scope of the present disclosure.

**[0074]** The window frame device in accordance to the present disclosure provides a solution for home owners to install and remove laundry hanging devices easily as no additional installation process, other than installation or removal of a window frame, is required. In addition, by incorporating the laundry hanging devices into the window frame device, the present disclosure solves the problem of damaging a building façade as faced by prior art laundry hanging devices.

**[0075]** While embodiments of the disclosure have been particularly shown and described with reference to specific embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. The scope of the disclosure is thus indicated by the appended claims and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced.

## CLAIMS

What is claimed is:

1. A window frame device, comprising:

a window frame, the window frame arranged for mounting in a standing wall, the window frame defining a first surface for facing the inside of a building and a second surface opposing the first surface, the second surface for facing the outside of the building;

a window panel held inset the window frame, wherein the window panel is movable between a closed position to at least one open position;

at least one bore provided within the window frame; and

at least one clothes hanging device comprising:

an elongate hollow body inserted into the at least one bore and affixed to the window frame, the elongate hollow body configured to movably receive a rod such that the rod can be inserted at a first end of the elongate hollow body protruding from the first surface of the window frame and extend through a second opposite end of the elongate hollow body protruding from the second surface of the window frame.

2. The window frame device of claim 1, wherein the at least one bore is provided substantially perpendicular to the first surface of the window frame.

3. The window frame device of claim 1 or 2, further comprising a plurality of bores provided within the window frame.

4. The window frame device of any one of the preceding claims, further comprising a window grille held inset within the window frame and provided adjacent to the window panel.

5. The window frame device of claim 3, further comprising a plurality of clothes hanging devices, each clothes hanging device comprising an elongate hollow body inserted into one of the plurality of bores and affixed to the window frame.

6. The window frame device of claim 4, wherein each of the plurality of clothes hanging devices comprises a linear axis along which the elongate hollow body is formed, wherein the linear axes of the plurality of clothes hanging devices are parallel.

7. The window frame device of any one of the preceding claims, wherein a set of the plurality of clothes hanging devices is located below the window panel, when the window frame is mounted in the standing wall.
8. The window frame device of any one of the preceding claims, wherein any one of the plurality of clothes hanging devices is coupled to the window frame with an adhesive compound.
9. The window frame device of claim 7, further comprising a securing element arranged to couple onto the elongate hollow body of the clothes hanging device to secure the clothes hanging device to the window frame.
10. The window frame device of claim 8, wherein the securing element is arranged to couple onto the elongate hollow body at the first end with a bolt and nut arrangement.
11. The window frame device of any one of claims 7 to 9, wherein the adhesive compound is applied between an external surface of the elongate hollow body and the walls of the bore in the window frame at the first end of the clothes hanging device.
12. The window frame device of any one of the preceding claims, further comprising a canopy, the canopy extendable perpendicularly from the second surface of the window frame and provided above the window panel when the window frame is mounted in the standing wall.
13. The window frame device of claim 11, further comprising a top set of bores and corresponding clothes hanging devices provided in the window frame and above the window panel, configured for supporting the canopy.
14. The window frame of claim 12, wherein the canopy comprises an elongate sheet coupled at opposing ends of the sheet to a pair of rods, the pair of rods arranged to be movably received by the top set of clothes hanging devices.

15. The window frame device of claim 13, wherein the top set of clothes hanging devices comprises two clothes hanging devices arranged to receive the pair of rods of the canopy.

16. The window frame device of claim 11, wherein the top set of clothes hanging devices further comprises a third clothes hanging device, arranged centrally to the two clothes hanging devices of the top set, the third clothes hanging device arranged to receive a third rod for elevating a central portion of the canopy.

17. The window frame device of any one of the preceding claims, further comprising a plurality of window panels mounted on a first set of tracks in the window frame and a plurality of window grilles mounted on a second set of tracks in the window frame, the first set of tracks and the second set of tracks running parallel and adjacent to each other.

18. The window frame device of any one of the preceding claims, further comprising a clothes hanging rod arranged to be movably received by any one of the plurality of clothes hanging devices, the clothes hanging rod comprising a first end arranged to be inserted into the elongate hollow body of the clothes hanging device from the first surface of the window frame, and to extend through the elongate hollow body to protrude from the second surface of the window frame, the clothes hanging rod comprising a user handling portion at a second end.

19. The window frame device of claim 17, wherein the clothes hanging device comprises a restricting portion at the first end of the clothes hanging device, arranged to abut the user handling portion of the clothes hanging rod and prevent the clothes hanging rod from moving entirely through the clothes hanging device.

20. The window frame device of claim 17, further comprising a hanger arranged for coupling onto the clothes hanging rod, the hanger comprising a central portion, a hook portion extending from a first side of the central portion and a triangular support portion for receiving a clothes item extending from a second opposing side of the central portion.

21. The window frame device of claim 19, wherein the hook portion is rotatably coupled to the central portion of the hanger.

22. The window frame device of claim 19, wherein the hook portion comprises an elongate member extending from the central portion of the hanger from at one end and forming a substantially elliptical shape with an outward extrusion at the opposing end.

23. The window frame device of claim 21, wherein the elongate member is a resilient elongate member.

24. The window frame device of claim 19, wherein the central portion comprises an aperture formed through the central portion, the aperture arranged to receive a clothes hanging rod through the aperture.

25. The window frame device of claim 23, wherein the aperture is dimensioned to fit the clothes hanging rod.

26. The window frame device of claim 23, wherein the aperture comprises a resilient flap coupled to extend inward from the circumference of the aperture for providing a secure fit in receiving the clothes hanging rod.