Dec. 12, 1961 R. J. TURK 3,012,605

WINDOW

Filed Dec. 22, 1958 2 Sheets-Sheet 1

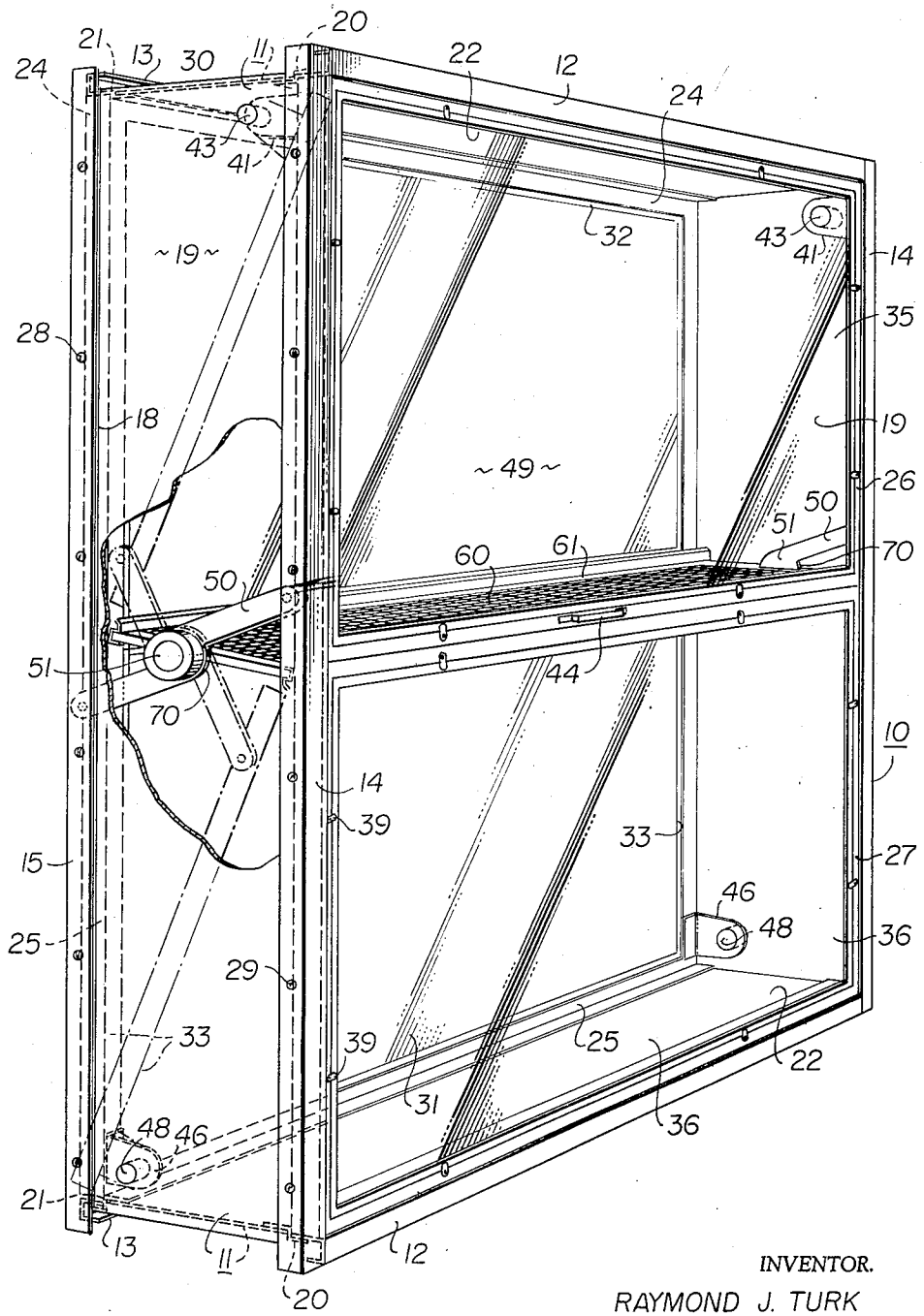


FIG. 1

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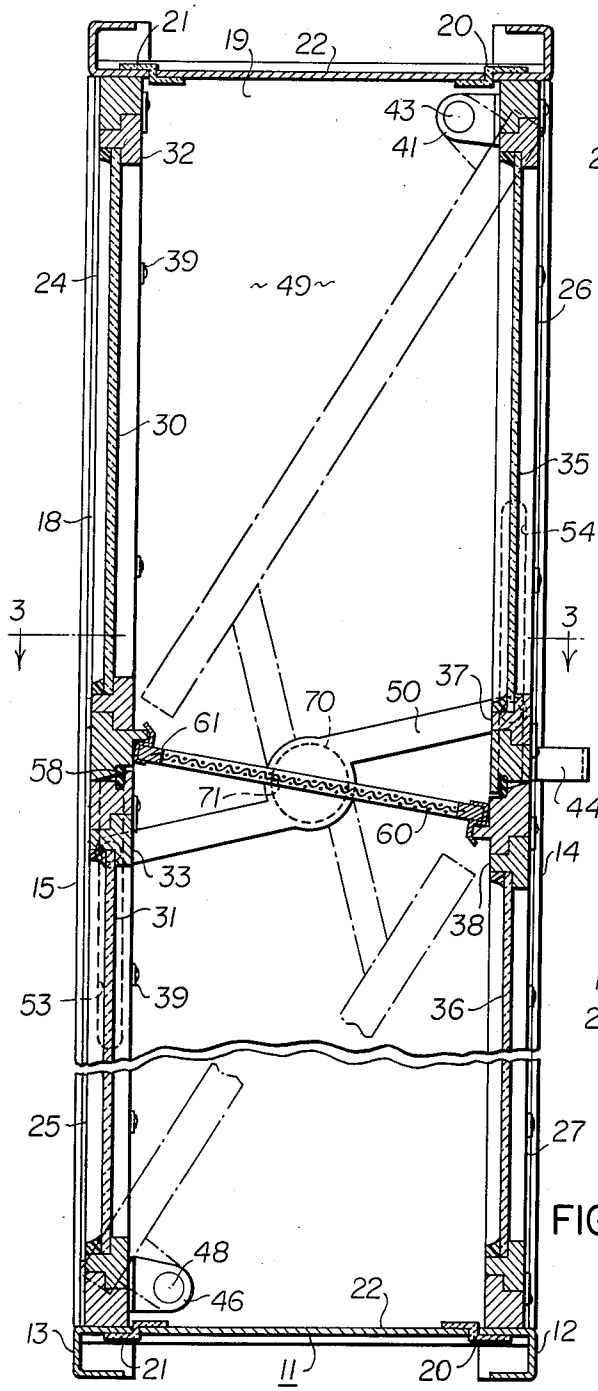


FIG. 2

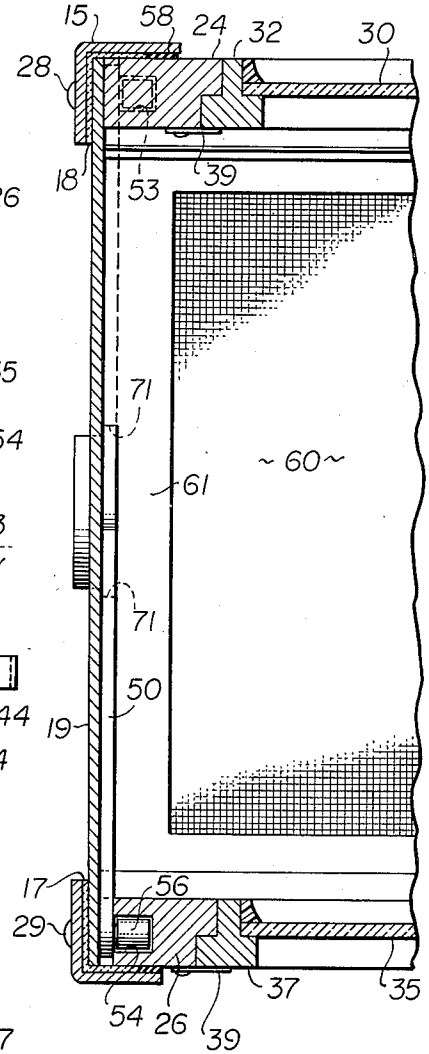


FIG. 3

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WINDOW

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This invention pertains to windows and more particularly to double pane windows.

It is the object of this invention to provide a novel and improved window assembly in a completely integrated unit which at the option of the user creates an insulating space of dead air mitigating the transmission of both cold and heat through the glazed areas of the window by radiation and/or conduction.

Accordingly, one of the principal objects of the invention is to provide a novel and improved double paned insulating window unit which is simple and inexpensive, and which requires no special and delicate manufacturing and assembly techniques.

A further object of the invention is to provide a novel and improved double pane window assembly in which an inner sash and an outer sash are pivotally carried by a window frame to permit opening of the window for ventilation.

An additional object of the invention is to provide a novel and improved double pane window assembly made in accordance with the foregoing objects of the invention which will capitalize upon updrafts along the sides of the building to provide forced ventilation to a room. To achieve this object the inner and outer windows are each pivotally hinged to permit each such pivotal sash to be pivoted into the jamb space between the inner and outer sashes to open the window.

A related object of the invention is to provide a novel and improved connection bar which connects the openable inner and outer window sashes so that movement of one of the openable windows to a selected position will cause simultaneous and corresponding movement of the other window.

A related and more specialized object of the invention is to provide such connection bar in the form of a pivot bar pivotally carried by the frame and slidably connected to the movable sashes so that movement of one sash causes corresponding movement of the other.

A still further object of the invention is to provide a novel and improved double pane window assembly made in accordance with the foregoing features in which a filter screen is disposed transversely across the space between the inner and outer windows at the center mullion to filter pollen, dirt, and other air impurities out of air entering through the window when open.

A related object of the invention is to provide a novel and improved double pane window having such a filter screen wherein the filter screen is positioned substantially horizontally so that it does not in any way obstruct the visibility through the window.

Another and related object of the invention is to provide a novel and improved double pane window assembly which has inner and outer spaced window sashes carried by a frame, which sashes are removably carried in the frame to permit facile cleaning of the windows from the interior of the building.

Yet another object of the invention is to provide a novel and improved double pane window assembly made in accordance with the foregoing objects which may be inserted as a unit in either a new building or as a replacement window in an older building being remodeled or reconditioned.

Another related object of the invention is to provide a novel and improved double pane window assembly in a completely integrated unit, having inside and outside

sash-carrying frames of metal construction which are joined by means of head, sill and jamb panels of variable and optional depth to fit any desired dimension.

Still another object of the invention is to provide a metal framed double pane window in which the head, sill and jamb panels can be made of a wide variety of materials and colors to provide panels which blend with and enhance the decoration of the structure.

Another object of the invention is to arrange the sashes of a completely integrated window unit by new and novel design in such a manner that when the window is in an open position it will facilitate the inflow of outside air into the structure but at the same time afford protection against the entry of rain and snow.

Another object of the invention is to arrange the sashes of a completely integrated window unit by new and novel design in such a manner that even in an open position security is provided against mischevious or unlawful entry or exit, and which resists ingress or egress by humans or animals, and which also resists the transmission of objects through the window.

An additional object of the invention is to provide a novel and improved double pane window made in accordance with all of the foregoing objectives which can be fabricated quickly and easily to any dimension desired from one group of parts which are suitable for most all sizes.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a perspective view with parts broken away and removed of the novel and improved window assembly;

FIGURE 2 is a foreshortened sectional view of the device on an enlarged scale with respect to FIGURE 1 as seen from a vertical plane of cross-section; and,

FIGURE 3 is a sectional view as seen from the plane indicated by the line 3—3 of FIGURE 2.

Referring to the drawings, a frame member is shown generally at **10**. A frame **10** includes a central plate or jamb member **11**, which extends around the window to form substantially the visible peripheral limit of an installed window. The frame **10** also includes inner and outer horizontal anchor members **12, 13**, which may be imbedded in the building masonry, or the like, to fix the frame in position. Inner and outer vertical tie members **14, 15** are connected to the horizontal anchors. The vertical tie members carry vertical jamb connecting strips **17, 18** which in turn support vertical segments **19**, of the jamb member **11**, FIGURE 3.

Inner and outer horizontal insulating and connecting strips **20, 21** are provided in the embodiment shown. The horizontal connecting strips form an insulating tie between the anchor members **12, 13** and horizontal sections **22** of the jamb member **11**. The connecting strips **17, 18** and **20, 21** provide one of the advantages of the invention. The connecting strips are formed of an insulating material such as plastic. This construction permits the frame members to be made of metal such as aluminum without convection of heat to or from the interior of the building which is normally a disadvantage of metal casement windows. Thus, the strips **17, 18, 20, 21** permit the formation of a metal window frame which does not dissipate interior heat through convection transmission of it. Conversely, in the summer months there is no convection which will warm the interior of the building. Alternately, if an insulating jamb member **11** is used the strips may be eliminated and the jamb member itself will provide insulation against convection.

Upper and lower outer window sashes, frames **24, 25**

are carried in an outer sash receiving portion of the frame 10. Upper and lower inner window sashes frames 26, 27 are carried in an inner sash receiving portion of the frame. In the disclosed arrangement, the outer upper sash frame 24 is fixed in position as by screws 28 which connect the upper sash frame 24 to the outer vertical tie members 14. The lower inner sash frame 21 is fixed in a similar fashion to the frame 10 as by screws 29 which removably fix it to the inner vertical ties 14.

The outer sash frames 24, 25 removably carry framed window panes 30, 31 respectively. The outer window panes 30, 31 are carried in suitable pane frames 32, 33 which are preferably aluminum. The outer window panes 30, 31 are disposed in a common vertical plane. The inner sash frames 26, 27 have panes of glass 35, 36 respectively. The glass panes 35, 36 are, like the panes 30, 31, carried in pane frames 37, 38 which are preferably aluminum. The panes 35, 36, are also disposed in a common vertical plane which is parallel to and spaced from the plane of the panes 30, 31.

The window panes are all readily removable from the frames to facilitate cleaning. In the disclosed embodiment this is accomplished by providing clamps 34 to lock the pane frames 32, 33, 37, 38 to the respective sash frames. In the disclosed arrangement, the pane frames and panes are identical to simplify construction procedures and to simplify and facilitate repair and washing. It will be seen that repair and washing can be accomplished from the interior of the building without care and regard as to which pane goes in what location.

A pair of upper sash support brackets 41 are fixed to an upper part of the frame of the inner upper sash frame 26. The sash brackets 41 are apertured to receive removable pivot pins 43. The sash frame 26 is movable outwardly to an open position, shown in phantom in FIGURE 1, by pivoting about the pins 43. Opening and closing movement of the sash 26 is facilitated by a handle 44 which is fixed to the frame of the sash.

A pair of outer support brackets 46, which are preferably identical to the support brackets 41, are fixed to a lower part of the lower outer sash frame 25. The brackets 46 are apertured to receive removable pivot pin 48, only one of which is shown. The removable pivot pins 48 are identical to the removable pivot pins 43. The pivot pins may be threaded into the vertical jamb panes 19 or otherwise suitably and preferably removably connected.

As will be seen by examination of the drawing, the lower outer sash frame 25 is pivotal to an open position, shown in phantom in FIGURE 1, which is inward from the closed position shown in FIGURE 1. Both the inner upper sash 26 and the outer lower sash 25 are movable into a cavity 49 to an open position. The cavity 49 is an air space defined by the entire assembly. The space 49 is a dead air space when the sashes are in a closed position.

First and second pivot bars 50 are provided. The pivot bars 50 are pivotally mounted on pivot pins 51. The pivot pins 51 are carried by the vertical portions 19 of the jamb panel 11 at substantially the midpoint, both horizontally and vertically speaking. A guide groove 53 is provided in each end of the lower outer sash frame 25. A corresponding guide groove 54 is provided in the frame of the upper inner sash frame 26. First and second bearing slide pins 56 are carried by the ends of the pivot bar 50. One of the slide pins 56 is disposed in each of the guide grooves 53, 54. At least the portions of the guide pins 56 which are disposed in the grooves 53, 54 are formed of a suitable bearing material such as nylon.

The coaction of the pivot bar 50 and the connected window sashes provide several of the advantages of this invention. When the upper inner sash frame 26 is pivoted outwardly to its open position, the guide 56 disposed in the groove 54 slides along the groove causing the bar 50 to pivot about the pin 51. This movement of the bar 50 causes the other of the pins 56 to shift the lower outer sash frame 25 by coaction with the groove 53. When the upper sash 22 is pulled in a reverse direction from the open position to the closed position, a reverse action occurs and the lower outer sash simultaneously closes. Thus, with a simple push or pull movement, the inner and outer sashes are simultaneously opened or closed, as the case may be.

When the sash frames 25, 26 are positioned in their open position, shown in phantom in FIGURE 1, another of the advantages of the invention is obtained. Forced draft ventilation is automatically provided. An up-draft is almost always present along the sides of any commercial building. One of the explanations for this up-draft is that at substantially all times the walls of the building will be warmer than the ambient air. This tends to heat the air coming in contact with the building walls and cause it to rise. Wind striking the building also tends to rise upwardly to go over the building. Since the lower outer window and the upper inner window both are shifted into the cavity 49 when opened, a structure is provided which takes advantage of the natural up-drafts. The upwardly moving air moves through the opened lower outer window upwardly through the cavity and out the inner upper window to force air into the room.

This automatic forced air ventilation does not have a disadvantage which may at first appear to be present. A first blush examination would indicate that since it is bringing warmed air into the building, it might cause the interior of the building to be too warm in summer days. However, since the window is designed primarily for air-conditioned buildings, it will be seen that when such forced air is too warm, the window will be closed to take advantage of the air-conditioning. Further, even when used in buildings which are not air conditioned, the window causes air movement to prevent humidity build-up. High humidity is the true cause of discomfort when temperatures are high.

New or reconditioned buildings in the north-eastern quarter of the United States, for example, are almost invariably air-conditioned. Windows are sealed to provide economical air conditioning operation. This air-conditioning, however, is only required for about twenty days a year. The rest of the time it is desirable to have a window which can be opened to avoid the claustrophobia effects of modern sealed buildings and to admit fresh air. Further, a building operating economy is obtained because it is not necessary to operate the air-conditioning system throughout the year to maintain fresh air in the offices. Since the windows are sealed when closed, the present window provides the advantages of sealed construction for economical air-conditioning operations. This window combines the advantages of sealed windows with the advantages of openable windows to eliminate the costly expense of forced air ventilation through air-conditioning systems when outdoor temperatures are comfortable whether it is desired to keep the interior of the building warm or cool.

Modern commercial buildings suffer tremendous losses to both heating and air-conditioning because of single thickness large panes of glass. Further, areas adjacent windows of commercial buildings are cold in winter and warm in summer because of convection. These disadvantages have all been accepted in the past because of the high cost of prior known double pane window construction and because prior known windows did not eliminate all of the disadvantages which have been eliminated by this construction.

To provide a sealed window when the movable windows are closed yieldable weather strip gaskets 58 are interposed where appropriate between the sash frames and between the sash frames and the remainder of the frames. As an example, upper edges of the lower window sash frames and the lower edges of the upper window sash frames are stepped to accommodate the gaskets 58 and compress them therebetween.

Another of the advantages of the window is provided

in the removable construction. Manipulation of the clamps **39** permits removal of the window pane frames **32, 33, 37, 38**. Thus, all of the windows may be cleaned from the interior of the building. No complicated external mechanisms are needed to raise and lower window washers along the outer walls of a building and the dangers inherent in external window washing are eliminated. The prior known alternate to window washers has been to build in automatic window washing systems utilizing modern detergents. Such systems are expensive to install, operate and maintain. The removable feature of the present window eliminates the need for such systems.

A filter screen **60** having a frame **61** is also provided. The screen **60** is positioned such that it extends transversely and essentially horizontally across the cavity **49**. The filter screen frame **61** is in abutment with the vertical portions **19** of the jamb panel **11**, the upper outer fixed sash frame **24** and the lower inner fixed frame **27**. Since the screen **60** is positioned substantially horizontally and not across the line of vision of a person looking through the window, it can be made of an extremely fine mesh so that it is both an ordinary insect screen and a pollen and dirt inhibiting filter, as well.

The frame **61** has inner and outer support members **63, 64** which rest in an inner bracket **65** and an outer bracket **66**. The brackets **65, 66** may be provided on the fixed sash frames **24, 27** respectively. The frame **61** is preferably notched at each end to receive a cylindrical central portion **70** of the pivot bar **50**. The notches are designated by the numeral **71**. The notches **71** are shaped to snugly embrace the pivot bar center **70** at all positions of the windows to prevent the entrance of dirt or insects.

Examinations of the novel and disclosed window will reveal other advantages. The construction is such that the window can be open during a rain storm without fear of water getting into building. Additionally, the construction is such that it is burglar proof. While the sashes and screen are all removable, unless the windows are broken, a burglar cannot enter even when the windows are open. The removable pivot pins **43, 48** and the clamps **39** are so positioned that they cannot be reached from the exterior of the building, whether the window is open or closed and whether the screen is present or removed.

While the invention has been described with a great deal of clarity and detail, it is believed that it comprises a double pane framed window having an insulating air cavity therein and having a plurality of sash portions which are movable for cleaning. The invention is also believed to comprise a double pane window in which inner and outer movable windows are provided which, at the option of the user, may be opened or closed by movement of the inner movable window sash frame which causes simultaneous and corresponding movement of a connected and movable outer sash frame.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. An improved window for an air conditioned building or the like comprising, a frame having inner and outer spaced window receiving portions, inner and outer upper window sashes, inner and outer lower window sashes, the inner sashes being carried in the inner frame portion, the outer sashes being carried in the outer frame portion, the frame and the sashes together defining a space for retaining a volume of insulating air, the outer upper sash and the inner lower sash being secured to said frame, the inner upper sash and the outer lower sash being pivotally carried by the frame, a pivot bar pivotally carried by the frame and connected to both said inner upper sash and said outer lower sash, and filter screen means disposed transversely across said space and extending from one side of the frame to the other, said screen means extending transversely from the outer upper sash to the lower inner sash to filter air admitted by the outer lower sash and passed to the inner upper sash.

2. An improved window for an air conditioned building or the like comprising, a window frame having inner and outer spaced window receiving portions, inner and outer upper window sashes, inner and outer lower window sashes, the inner sashes being positioned in a common plane and carried in the inner frame portion, the outer sashes being positioned in a common plane and carried in the outer frame portion, the outer upper sash and the inner lower sash being secured to said frame, the inner uper sash having an upper part pivotally connected to the frame to pivotally support the inner upper sash, the outer lower sash having a lower part pivotally connected to the frame to pivotally support the outer lower sash, a pivot bar pivotally carried by the frame and connected to both said inner upper sash and said outer lower sash, whereby movement of the inner upper window will cause movement of the outer lower window and vice versa.

3. An improved window for an air conditioned building or the like comprising, a window frame having inner and outer spaced window receiving portions, inner and outer upper window sashes, inner and outer lower window sashes, the inner sashes being positioned in a common plane and carried in the inner frame portion, the outer sashes being positioned in a common plane and carried in the outer frame portion, the outer upper sash and the inner lower sash being secured to said frame, said sashes and said frame together defining an insulating cavity therebetween, the inner upper sash having an upper part pivotally connected to the frame to pivotally support the inner upper sash, the outer lower sash having a lower part pivotally connected to the frame to pivotally support the outer lower sash, a pivot bar pivotally carried by the frame and pivotally connected to both said inner upper sash and said outer lower sash, said pivotal inner upper sash and said pivotal lower outer sash each having a closed position and an open position, each of said pivotal sashes being at least partially disposed within said cavity when in said open position, whereby to provide a device in which movement of one of the pivotal sashes will cause movement of the connected pivot bar and the other pivotal sash.

4. An improved window for an air conditioned building or the like comprising, a frame having inner and outer spaced window receiving portions, inner and outer upper window sashes, inner and outer lower window sashes, the inner sashes being carried in the inner frame portion, the outer sashes being carried in the outer frame portion, the outer upper sash and the inner lower sash being removably secured to said frame, the inner upper sash and the outer lower sash being pivotally carried by the frame, a pivot bar pivotally carried by the frame and slidably connected to both said inner upper sash and said outer lower sash, and gasket means disposed about each of said pivoted sashes to provide inner and outer fluid tight windows when the upper outer sash and the lower inner sash are fixed in position and when the lower outer sash and the upper inner sash are closed.

5. An improved window for an air conditioned building or the like comprising, a window frame having inner and outer spaced window receiving portions, inner and outer upper window sashes, inner and outer lower window sashes, the inner sashes being positioned in a common plane and carried in the inner frame portion, the outer sashes being positioned in a common plane and carried in the outer frame portion, the sashes and said frame together defining an insulating cavity therebetween,

the outer upper sash and the inner lower sash each being secured to said frame, the inner upper sash and the outer lower sash each having an upper part pivotally connected to the frame to pivotally support the sash, a pivot bar pivotally carried by the frame and slidably connected to both said inner upper sash and said outer lower sash, said pivotal inner upper sash and said pivotal lower outer sash each having a closed position and an open position, each of said pivotal sashes being disposed at least partially within said cavity when in said open position, whereby to provide a device in which movement of one of the pivotal sashes will cause movement of the connected pivot bar and the other pivotal sash, and gasket means disposed about each of said pivoted sashes to provide inner and outer fluid tight windows when the removable sashes are fixed in position and the pivotal sashes are closed, and a framed filter screen transversely disposed across the space between the windows, said screen frame being in abutment with the sides of said window frame and with said removable sash.

6. An improved window comprising, a frame having first and second spaced window receiving portions, first and second upper window sashes, first and second lower window sashes, the first window sashes being carried in the first frame portion and the second window sashes being carried in the second frame portion said first window sashes lying in a first plane, said second window sashes lying in a second plane spaced from the first to define a space therebetween, the first upper sash and the second

lower sash being secured to the frame, the first lower sash being pivotally carried by the frame and being pivotal from a closed position toward said second lower sash into the space therebetween, the second upper sash being pivotally connected to the frame and being pivotal from a closed position toward said second upper sash into the space therebetween, said first lower and second upper sash being between said planes when in the open position, and means operably connecting the first lower sash and the second upper sash together such that pivotal movement of one of the pivotal sashes will cause simultaneous pivotal movement of the other of the pivotal sashes.

7. The device of claim 6 wherein a screen is positioned transversely of the frame and across the space between the window receiving portions, and wherein the screen is disposed substantially along a plane defined by the bottom of the upper window sashes and the top of the lower window sashes.

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