May 1, 1934. J. B. MEYER ET AL 1,956,649

WINDOW

Filed May 9, 1931

Fig. 1.

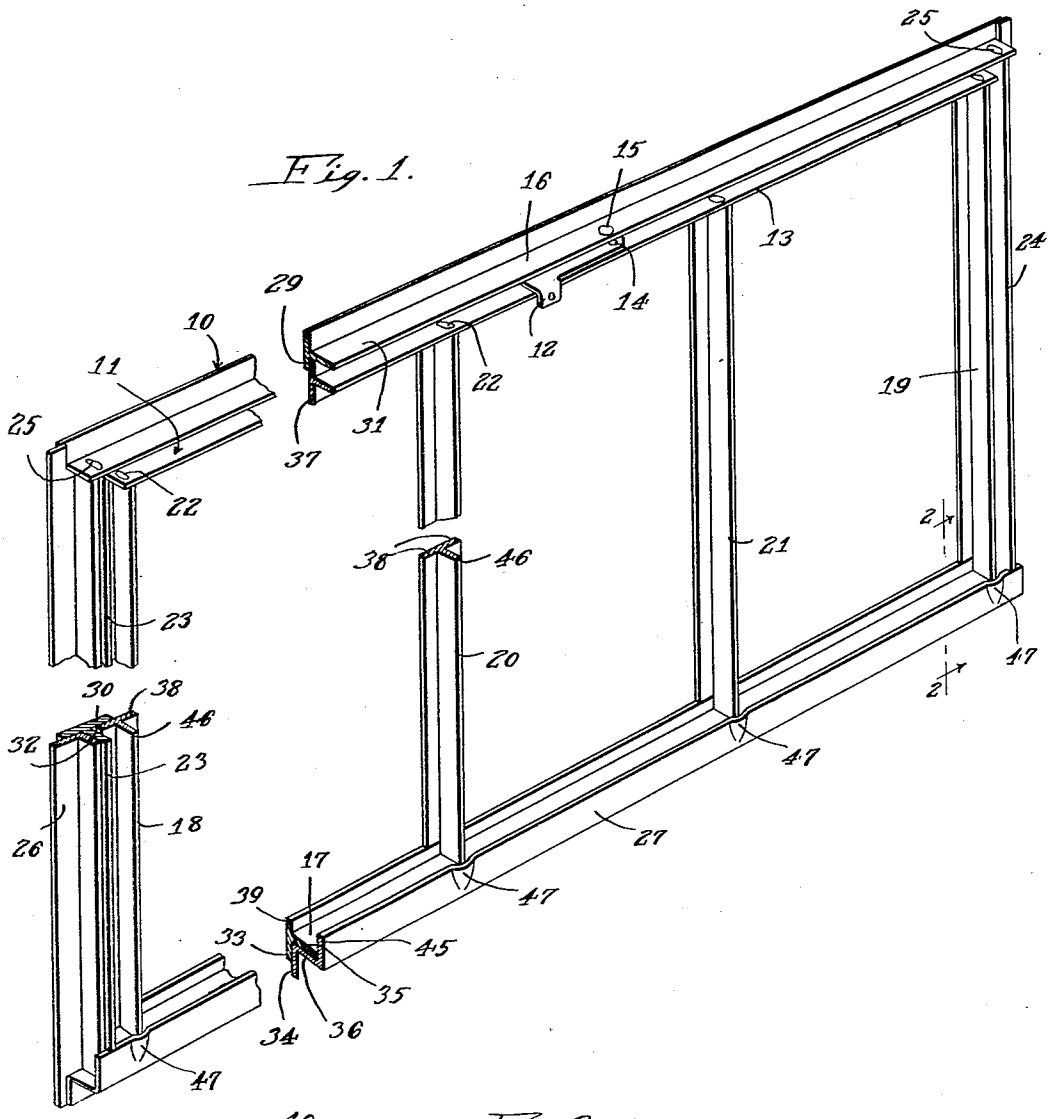


Fig. 2.

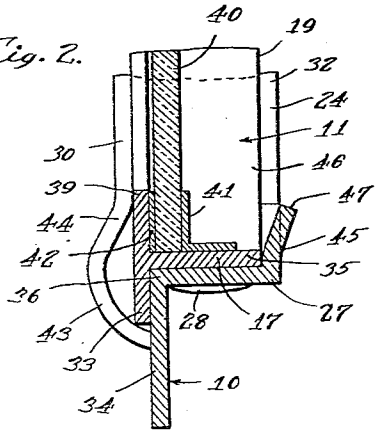
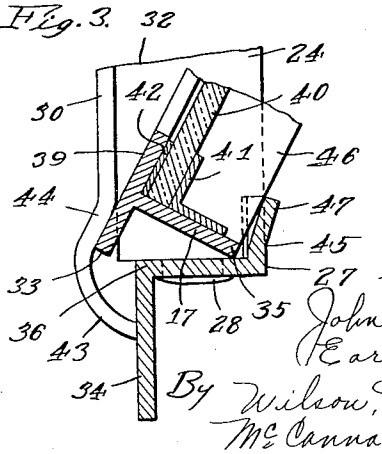


Fig. 3.



Inventors:
John B. Meyer
Earl J. Groff
By Wilson, Dowell, McCanna + Lehm Attys

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WINDOW

John B. Meyer and Earl J. Groff, Dubuque, Iowa, assignors to The Adams Company, Dubuque, Iowa, a corporation of Iowa

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23 Claims. (Cl. 189—69)

This invention relates to windows generally, but is more particularly concerned with steel windows of the type commonly used in basements and other places where it is desired to have the sash tiltable inwardly for ventilation, and where it is also desirable to have the sash removable from the frame for convenience in cleaning, and for other purposes.

The steel windows that are now available usually have the sash permanently connected in some way to the frame, so that the sash cannot be removed bodily to leave the full opening in the frame clear, which is frequently desired. Most of them have provision whereby the sash is arranged to be raised and suitably supported in a position at the top of the frame. Such constructions are rather complicated and expensive and obviously do not make it particularly handy to handle the sash in cleaning the same, and the sash is more or less in the way when it is desired to use the full opening of the frame, and there is, furthermore, considerable danger of glass being broken, either by the window dropping accidentally or by having something thrust against it. It is, therefore, the principal object of our invention to provide a steel window, in which the bottom of the frame and the bottom rail of the sash are constructed to form a detachable hinge, adapted to permit the tilting of the sash to a ventilating position in which the sash is supported by the frame solely at its bottom rail. This obviates the necessity for any supporting brackets, and, since the bottom rail of the sash is detachably mounted in the bottom of the frame, the sash may be removed bodily for ease in cleaning and for the other purposes indicated.

The invention is illustrated in the accompanying drawing, in which—

Figure 1 is a perspective view of our improved window looking at the inside thereof and showing portions thereof broken away better to disclose the construction;

Fig. 2 is a vertical sectional detail on the line 2—2 of Figure 1, and

Fig. 3 is a view similar to Fig. 2 illustrating the sash in tilted position.

The same reference numerals are applied to corresponding parts in these views.

The window illustrated comprises a frame 10 and sash 11 which, as indicated above, is tiltable inwardly to ventilating position when the latch 12 is opened. The latter is of a well known type pivotally mounted on the top rail 13 of the sash, as appears at 14, and having an upwardly projecting lug thereon arranged to be brought behind a pin 15 projecting downwardly from the top 16 of the frame. The window is of steel construction throughout. Thus the sash 11 has its horizontal top and bottom rails 13 and 17 formed from T-iron stock, and its vertical end rails 18 and 19 of similar stock, as well as its intermediate vertical rails 20 and 21. All of the vertical rails are secured to the top and bottom rails suitably by having portions thereof extended through slots in the top and bottom rails and upset, as indicated at 22, although any other method of fastening, such as welding, could be used at these points. The frame 10 has its horizontal top rail 16 formed from a piece of T-iron, and the vertical end rails 23 and 24 are likewise formed by pieces of T-iron fastened at their upper ends to the top rail 16 by upsetting, indicated at 25. Angle irons 26 are welded or otherwise suitably secured to the outer sides of the end rails 23 and 24 and are used to anchor the frame to the wall. The bottom of the frame is formed by a Z-iron 27 of the same length as the top rail 16, and the lower ends of the end rails 23 and 24 are fastened thereto similarly as their upper ends are fastened to the top rail, as appears at 28 in Fig. 3. In the case of the frame 10, just as in the case of the sash 11, any other method of fastening, such as welding, could be used at the points 25 and 28.

The sash 11 fits in the frame 10 behind the downwardly directed flange 29 of the top rail 16 and behind the inwardly directed flanges 30 of the end rails 23 and 24, and, of course, fits within the opening defined by the rearwardly directed flange 31 of the top rail 16 and the rearwardly directed flanges 32 of the end rails 23 and 24. The sash has the downwardly directed flange 33 of its bottom rail 17 arranged to fit against the front of the downwardly directed flange 34 of the bottom rail 27 of the frame, while its rearwardly directed flange 35 rests on the sill 36 provided by the horizontal portion of the said bottom rail 27. The abutment of the sash against the inside of the flanges 29 and 30, coupled up with the abutment of the downwardly directed flange 33 of the sash against the front of the bottom rail 27 adjacent the sill 36, makes the window weather-tight. The construction of the sash of T-iron affords flanges at 37—39, against which to rest the panes of glass or pieces of screen set in the sash. Thus we have shown glass at 40 in Figs. 2 and 3 held in place in the sash suitably by clips 41. Strips of felt or other suitable cushioning material are preferably provided to cushion the glass, as indicated at 42, and, of

course, that seals the joints to make the window weather-tight.

This brings us now to the detachable hinge construction afforded by the interfitting bottom portions of the sash and frame with which our invention is more particularly concerned. The lower ends of the end rails 23 and 24 of the frame have their inwardly directed flanges 30 bent forwardly away from the rearwardly directed flange 32 in the form of an arc, as shown at 43 in Figs. 2 and 3, so as to afford clearance in back of said flange for the downwardly directed flange 33 of the bottom rail 17 of the sash in the tilting movement of the sash to the position shown in Fig. 3, and so as also to provide a stop shoulder 44 against which said downwardly directed flange 33 is arranged to come into abutment when the sash reaches the position shown in Fig. 3. The tilting movement of the sash is permitted by forming recesses in the upwardly directed flange 45 of the bottom rail 27 of the frame directly behind each of the rails 13—21 of the sash in alignment with the rearwardly directed flanges 46 of said rails. Slots of a predetermined length could be provided on the flange 45 measured downwardly from the upper edge of said flange, or grooves could be cut in the front face of said flange to the depth required, but we prefer to dent said flange to form the necessary recesses, as indicated at 47, just enough to allow a predetermined tilting movement of the sash before the flanges 46 come to rest in the dents 47, as shown in Fig. 3.

In operation the sash 11 is arranged to fulcrum about the rear edge of the flange 35 of its bottom rail 17 and rests at that point in the tilted position, with the flange 33 engaging the shoulders 44 and the flanges 46 fitting in the dents 47 in the flange 45. These two locii of support at 44 and 47 to either side of the fulcrum point are enough to insure rigid support of the sash in its tilted position, and there is no need for any supporting arms or brackets, chains, or the like. Furthermore, when the sash is tilted, it will be seen by reference to Fig. 3, that one cannot remove the sash from the frame from the outside because the rear edge of the flange 35 comes into abutment with the front of the flange 45 between the dents 47. This, of course, it a very important feature because one can leave the sash in ventilating position without danger of the sash being removed from the outside. The sash, is however, removable from the inside, as should be evident from inspection of Fig. 3, by simply tilting the same forwardly enough to bring the flanges 46 out of the dents 47 and enough to enable the flange 35 to clear the front of the flange 45 as the sash is lifted out and removed from the frame. It is necessary to swing the sash forwardly so far that one could not keep hold of the top rail of the sash from the outside. In other words, the top rail of the sash can just clear the top rail of the frame as the sash is lifted out. The fact that the sash is bodily removable clearly facilitates cleaning and the full opening of the frame is rendered available when the occasion arises, as it frequently does in the case of a basement window, and there is no danger whatever of glass breakage because the sash can be placed where it is safe. In other windows where the sash had to be raised and fastened in such position it was not entirely out of the way and there was always danger of something coming in contact with the glass. When the sash is closed it is, of course, obvious from the foregoing description, that it is weather-tight and will not rattle.

We claim:

1. In a window, the combination of a frame having opposite end rails formed by pieces of T-iron suitably secured together with the cross portions of the T-iron pieces forming the front of the frame, the inwardly directed flanges of the end rails forming shoulders for engagement by a sash, a bottom rail for said frame fastened to the lower ends of the end rails and constituting a sill, a sash fitting in said frame to close the opening defined thereby, said sash having engagement with the aforesaid flanges, the bottom rail of the sash being formed by a piece of T-iron disposed so that the cross portion of the T-iron forms the front thereof, the downwardly directed flange of said T-iron being arranged to fit against the front of the sill, and the rearwardly directed flange thereof being arranged to engage the top of the sill, the lower ends of the inwardly directed flanges of the end rails of the frame being formed to provide stop shoulders for engagement by the ends of the downwardly directed flange of the bottom rail of the sash when the sash is tilted inwardly, whereby to support the sash in tilted position solely by its bottom rail, the construction just defined permitting detaching the lower portion of the sash from the lower portion of the frame for the removal of the sash bodily, and means for holding the sash in closed position in said frame.

2. In a window, the combination of a frame having the end rails formed by members providing inwardly directed flanges for abutment by a sash, a substantially Z-shaped bottom rail for the frame disposed with the cross portions of the Z rail extending substantially vertically so as to define a downwardly directed front flange, an intermediate horizontal sill, and an upwardly directed rear flange, a sash fitting in the frame to close the opening defined thereby the same being arranged for abutment with the aforesaid inwardly directed flanges, the bottom rail of said sash being formed with a downwardly directed front flange arranged to fit in front of the downwardly directed flange of the bottom rail of the frame when the sash is resting on the sill in its closed position, the lower ends of the inwardly directed flanges of the end rails of the frame being formed to provide stop shoulders for engagement by the ends of the downwardly directed flange of the bottom rail of the sash when the sash is tilted inwardly, and the upwardly directed rear flange of the bottom rail of the frame being arranged to be engaged by the back of the sash when the same is tilted inwardly, whereby to support the sash in tilted position solely by its lower portion in the lower portion of the frame, the construction just defined permitting detaching the lower portion of the sash from the lower portion of the frame for the removal of the sash bodily from the frame, and means for holding the sash in closed position in the frame.

3. A window as set forth in claim 2 wherein the upwardly directed rear flange of the bottom rail of the frame is formed to provide recesses for engagement therein of the vertical rails of the sash when the sash is tilted inwardly.

4. A window as set forth in claim 2 wherein the bottom rail of the sash is formed by a piece of T-iron whereby to provide the downwardly directed front flange for engaging the front of the downwardly directed flange of the bottom rail of the frame and also arranged to engage

the stop shoulders formed at the lower ends of the inwardly directed flanges of the end rails of the frame, and a rearwardly directed flange arranged to rest on top of the sill provided by the bottom rail of the frame, and an upwardly directed front flange providing a shoulder between it and the rearwardly directed flange for the mounting of glass or screen in the sash.

5. A window as set forth in claim 2 wherein the upwardly directed rear flange of the bottom rail of the frame is dented rearwardly in the same planes with the vertical rails of the sash whereby to provide recesses in the front of said flange for reception of said rails when the sash is tilted inwardly.

6. A window comprising in combination a frame having end rails formed to provide inwardly directed flanges for engagement by a sash, a bottom rail for the frame providing a horizontal sill, and a sash fitting in said frame to close the opening defined thereby, the same having the bottom and end rails formed of members of angular cross-section providing rearwardly directed flanges, the bottom and end rails also providing downwardly and outwardly projecting flanges, respectively, the outwardly directed flanges of the end rails being arranged for engagement behind the aforesaid inwardly directed flanges of the frame, the downwardly directed flange of the bottom rail of the sash being arranged for engagement in front of the sill when the rearwardly directed flange of the bottom rail rests on the sill in the closed position of the sash, said sash being arranged to be tilted inwardly and being arranged to have its bottom rail detached from the bottom rail of the frame, and means for holding the sash in closed position in the frame, the lower ends of the inwardly directed flanges of the end rails of the frame being formed to provide stop shoulders for engagement by the ends of the downwardly directed flange of the bottom rail of the sash when the sash is tilted inwardly, whereby to support the sash in tilted position solely by its bottom rail, and still permit detaching of the lower portion of the sash from the lower portion of the frame.

7. A window comprising in combination a frame having end rails formed to provide inwardly directed flanges for engagement by a sash, a bottom rail for the frame providing a horizontal sill, and a sash fitting in said frame to close the opening defined thereby, the same having the bottom and end rails formed of members of angular cross-section providing rearwardly directed flanges, the bottom and end rails also providing downwardly and outwardly projecting flanges, respectively, the outwardly directed flanges of the end rails being arranged for engagement behind the aforesaid inwardly directed flanges of the frame, the downwardly directed flange of the bottom rail of the sash being arranged for engagement in front of the sill when the rearwardly directed flange of the bottom rail rests on the sill in the closed position of the sash, said sash being arranged to be tilted inwardly and being arranged to have its bottom rail detached from the bottom rail of the frame, and means for holding the sash in closed position in the frame, the lower ends of the inwardly directed flanges of the end rails of the frame being formed to provide stop shoulders for engagement by the ends of the downwardly directed flange of the bottom rail of the sash when the sash is tilted inwardly, whereby to support the sash in tilted position solely by its bottom rail, and still permit detaching of the lower portion of the sash from the lower portion of the frame, and the bottom rail of the frame including an upwardly directed rear flange at the back of the sill arranged for abutment with the back of the end rails of the sash when the sash is tilted inwardly, whereby to provide further support for the sash in tilted position.

8. A window comprising in combination a frame having end rails formed to provide inwardly directed flanges for engagement by a sash, a bottom rail for the frame providing a horizontal sill, and a sash fitting in said frame to close the opening defined thereby, the same having the bottom and end rails formed of members of angular cross-section providing rearwardly directed flanges, the bottom and end rails also providing downwardly and outwardly projecting flanges, respectively, the outwardly directed flanges of the end rails being arranged for engagement behind the aforesaid inwardly directed flanges of the frame, the downwardly directed flange of the bottom rail of the sash being arranged for engagement in front of the sill when the rearwardly directed flange of the bottom rail rests on the sill in the closed position of the sash, said sash being arranged to be tilted inwardly and being arranged to have its bottom rail detached from the bottom rail of the frame, and means for holding the sash in closed position in the frame, the lower ends of the inwardly directed flanges of the end rails of the frame being formed to provide stop shoulders for engagement by the ends of the downwardly directed flange of the bottom rail of the sash when the sash is tilted inwardly, whereby to support the sash in tilted position solely by its bottom rail, and still permit detaching of the lower portion of the sash from the lower portion of the frame, and the bottom rail of the frame including an upwardly directed rear flange at the back of the sill arranged for abutment with the back of the end rails of the sash when the sash is tilted inwardly, whereby to provide further support for the sash in tilted position, the said upwardly directed rear flange being formed to provide recesses therein for reception of the end rails of the sash in the tilted position of the latter.

9. A window comprising in combination a frame having end rails formed to provide inwardly directed flanges for engagement by a sash, a bottom rail for the frame providing a horizontal sill, and a sash fitting in said frame to close the opening defined thereby, the same having the bottom and end rails formed of members of angular cross-section providing rearwardly directed flanges, the bottom and end rails also providing downwardly and outwardly projecting flanges, respectively, the outwardly directed flanges of the end rails being arranged for engagement behind the aforesaid inwardly directed flanges of the frame, the downwardly directed flange of the bottom rail of the sash being arranged for engagement in front of the sill when the rearwardly directed flange of the bottom rail rests on the sill in the closed position of the sash, said sash being arranged to be tilted inwardly and being arranged to have its bottom rail detached from the bottom rail of the frame, and means for holding the sash in closed position in the frame, the lower ends of the inwardly directed flanges of the end rails of the frame being formed to provide stop shoulders for engagement by the ends of the downwardly directed flange of the bottom rail of the sash when the sash is tilted inwardly, whereby to support the sash in tilted position solely by its bottom rail,

and still permit detaching of the lower portion of the sash from the lower portion of the frame, and the bottom rail of the frame including an upwardly directed rear flange at the back of the sill arranged for abutment with the back of the end rails of the sash when the sash is titled inwardly, whereby to provide further support for the sash in tilted position, the upwardly directed rear flange being dented rearwardly in the same planes with the end rails of the sash, whereby to provide recesses in the front of said flange for reception of the end rails in the tilted position of the sash.

10. In a window, the combination of a frame, a sash fitting in said frame to close the opening defined thereby, the lower portion of the frame and the lower portion of the sash being constructed with relation to one another to permit tilting of the sash inwardly relative to the frame to a ventilating position, the said lower portions of the frame and sash being furthermore so constructed with relation to one another whereby the sash is supported in tilted ventilating position solely by its lower portion in the lower portion of the frame, the said construction preventing detachability of the lower portion of the sash from the lower portion of the frame when the sash is in tilted ventilating position but permitting such detachability when the sash is near to closed position, and means for securing the sash in closed position in the frame.

11. In a window, the combination of a frame having end rails formed by members providing inwardly directed flanges, for abutment by a sash, a substantially Z-shaped bottom rail for the frame disposed with the cross portions of the Z rail extending substantially vertically so as to define a downwardly directed front flange, an intermediate horizontal sill, and an upwardly directed rear flange, a sash fitting in the frame to close the opening defined thereby, the same being arranged for abutment with the aforesaid inwardly directed flanges, the bottom rail of said sash being formed with a rearwardly directed flange to rest on the sill and a downwardly directed front flange arranged to fit in front of the downwardly directed flange of the bottom rail of the frame, the said sash being tiltable about the rear edge of the rearwardly directed flange of the bottom rail thereof, the lower ends of the inwardly directed flanges of the end rails of the frame being formed to provide stop shoulders for engagement by the ends of the downwardly directed flange of the bottom rail of the sash when the sash is tilted inwardly, and the upwardly directed rear flange of the bottom rail of the frame being arranged to be engaged by the back of the sash when the same is tilted inwardly, whereby to support the sash in tilted position solely by its lower portion in the lower portion of the frame, the said upwardly directed rear flange being formed to provide recesses for engagement therein of portions of the sash when the sash is tilted inwardly, and the portions of said upwardly directed rear flange between said recesses being arranged by engagement by the rear edge of the rearwardly directed flange of the bottom rail of the sash to serve to prevent removal of the sash from the frame when the sash is tilted inwardly a predetermined amount, the said sash having its lower portion detachable from the lower portion of the frame when the sash is tilted inwardly a lesser amount, and means for holding the sash in closed position in the frame.

12. A window comprising, in combination a frame having opposed end rails formed by members providing inwardly directed flanges arranged to be engaged by a sash, a bottom rail for the frame formed by a member of angular cross-section providing a horizontal sill and an upwardly directed rear flange at the back of the sill, a sash fitting in said frame to close the opening defined thereby, the same having the bottom and end rails formed by pieces of T-iron suitably secured together with the cross-portions of the T's forming the front of the sash, the outwardly directed flanges of said end rails being arranged for engagement behind the inwardly directed flanges of the frame, the downwardly directed flange of the bottom rail of the sash being arranged to fit the front of the sill when the rearwardly directed flange of said bottom rail rests on the sill in the closed position of the sash, the remaining flanges of the bottom and end rails of the sash defining shoulders for the mounting of glass or screen in said sash, said sash being arranged to be tilted on the sill using the rear edge of the rearwardly directed flange of the bottom rail of the sash as a fulcrum, the upwardly directed rear flange at the back of the sill being provided with recesses therein to accommodate the rear edges of the end rails of the sash to support the sash in tilted position, but the front of said upwardly directed flange constituting a shoulder for abutment by the rear edge of the rearwardly directed flange of the bottom rail of the sash to prevent removal of the lower portion of the sash from the lower portion of the frame when the sash is tilted inwardly a predetermined amount, the lower portion of the sash being detachable from the lower portion of the frame when the sash is tilted inwardly a lesser amount, and means holding the sash in closed position in the frame.

13. In a window construction, an open frame, a sash fitting in said frame, the lower portion of the sash and the lower portion of the frame being constructed with relation to one another to permit tilting of the sash inwardly relative to the frame to a ventilating position, the said portions being so constructed to prevent detachability of the lower portion of the sash from the lower portion of the frame when the sash is in tilted ventilating position but permitting such detachability when the sash is near to closed position, and means for holding the sash in closed position in the frame.

14. In a window construction, an open frame, a sash fitting in said frame and mounted therein to permit tilting of the sash inwardly relative to the frame to a ventilating position, the sash having a detachable mounting in the frame to permit bodily removal thereof from the frame, means cooperating with the sash in tilted ventilating position to prevent removal of the sash from the frame, said means permitting removal of the sash only when the same is near to closed position, and means for securing the sash in closed position in the frame.

15. In a window construction, an open frame, a sash fitting in said frame and mounted so as to permit tilting of the sash inwardly relative to the frame to a ventilating position, means for supporting the sash in ventilating position, the lower portion of the sash being detachable from the lower portion of the frame, and means cooperating with the sash in its tilted ventilating position to prevent detaching the lower portion of the sash from the lower portion of the frame,

said means being so constructed to permit detaching the lower portion of the sash from the lower portion of the frame when the same is near to closed position, and means for securing the sash in closed position in the frame.

16. In a window construction, an open frame, a sash fitting in said frame, means providing a detachable pivotal mounting for the bottom of the sash in the bottom of the frame, means adjacent the bottom of the sash for limiting the pivotal movement of the sash whereby to support the same in a tilted ventilating position solely by its lower portion, the first and second means being constructed to permit detaching the lower portion of the sash from the lower portion of the frame only when the sash is tilted nearer to closed position than to ventilating position, whereby to permit bodily removal of the sash from the frame, and means for securing the sash in closed position in the frame.

17. In a window construction, an open frame, a sash fitting in said frame, means providing a detachable pivotal mounting for the bottom of the sash in the bottom of the frame, means adjacent the bottom of the sash for limiting the pivotal movement of the sash whereby to support the same in a tilted position solely by its lower portion, said last mentioned means being constructed so as to prevent detaching the lower portion of the sash from the frame except when the sash is slightly tilted and is near to closed position, and means for securing the sash in closed position in the frame.

18. In a window construction, an open frame, a sash fitting in said frame, means providing a detachable pivotal mounting for the bottom of the sash in the bottom of the frame, means in front of the sash and adjacent the bottom thereof serving to limit inward tilting of the sash whereby to support the sash solely by its lower portion in tilted position, as for ventilation, means behind the sash adjacent the bottom thereof for preventing raising of the sash out of the frame, said means being so constructed to permit raising the sash out of the frame when the sash is slightly tilted and is near to closed position, and means for securing the sash in closed position in the frame.

19. In a window construction, an open frame, a sash fitting in said frame and tiltable inwardly, means for supporting the sash in tilted position, the bottom of the sash being detachable from the bottom of the frame, means behind the sash adjacent the bottom thereof serving to prevent detaching of the bottom of the sash from the frame when the sash is in tilted position, said means being so constructed to permit detaching the bottom of the sash from the frame when the sash is slightly tilted and is near to closed position, and means for securing the sash in closed position in the frame.

20. In a window construction, an open frame, a sash fitting loosely in said frame, said sash constituting a separate unit devoid of any connection with the frame, so that the sash is bodily removable from the frame, means providing a detachable pivotal mounting for the bottom of the sash in the bottom of the frame, means on the frame in front of and behind the sash and adjacent the bottom thereof serving to limit inward tilting of the sash whereby to support the sash solely by its lower portion in tilted position, that portion of the last-mentioned means behind the sash being constructed to prevent detaching the bottom of the sash from the frame except when the sash is slightly tilted near to closed position, and means for securing the sash in closed position in the frame.

21. In a window construction, an open frame, a sash fitting loosely in said frame, said sash constituting a separate unit devoid of any connection with the frame, so that the sash is bodily removable from the frame, means providing a detachable pivotal mounting for the bottom of the sash in the bottom of the frame, whereby to permit tilting of the sash, means on the bottom of the frame to prevent detaching of the sash in all tilted positions except one position in which the sash is nearly closed, and means for securing the sash in closed position in the frame.

22. In a window construction, an open frame, a sash fitting loosely in said frame, said sash constituting a separate unit devoid of any connection with the frame, so that the sash is bodily removable from the frame, means on the bottom of the frame for supporting the sash solely by its lower portion in a tilted position and so as to permit removal of the sash bodily from the frame, said means including portions engaging the sash so as to prevent removal of the sash unless the same is in a position nearly closed, and means for securing the sash in closed position in the frame.

23. In a window, the combination of a frame, a sash fitting in said frame to close the opening defined thereby, the lower portion of the frame and the lower portion of the sash being constructed with relation to one another to permit tilting of the sash inwardly relative to the frame, the said lower portions of the frame and sash being furthermore so constructed with relation to one another whereby the sash is detachably supported solely by its lower portion in the lower portion of the frame in tilted position and may be removed bodily by raising its lower portion out of the lower portion of the frame, means preventing raising of the lower portion of the sash out of the lower portion of the frame except when the sash is tilted inwardly relative to the frame only enough for the upper portion of the sash to clear the back of the upper portion of the frame, and means for securing the sash in closed position in the frame.

JOHN B. MEYER.
EARL J. GROFF.