Feb. 21, 1933. O. CARLSON 1,898,813

SKYLIGHT

Filed July 8, 1930 2 Sheets-Sheet 1

Fig. 1.

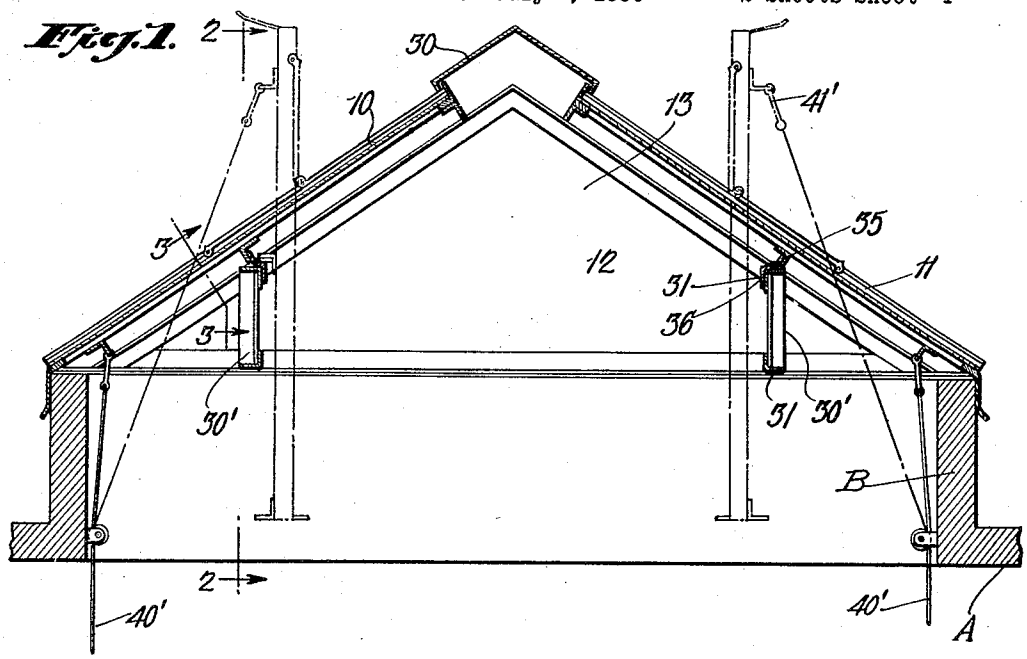


Fig. 2.

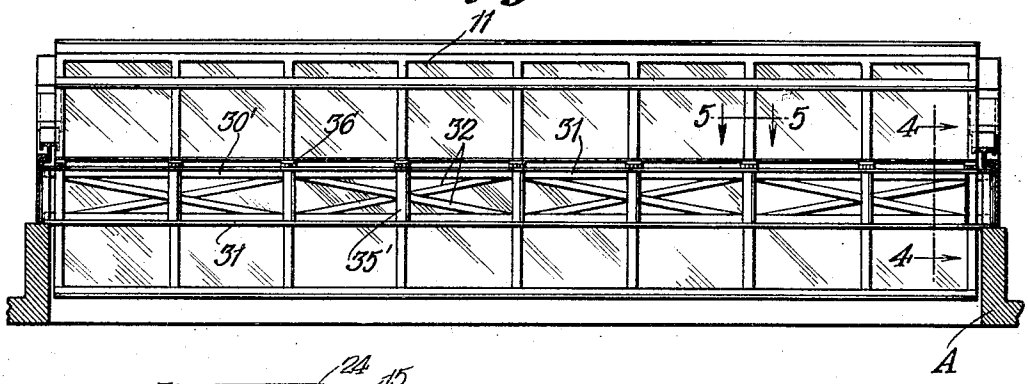
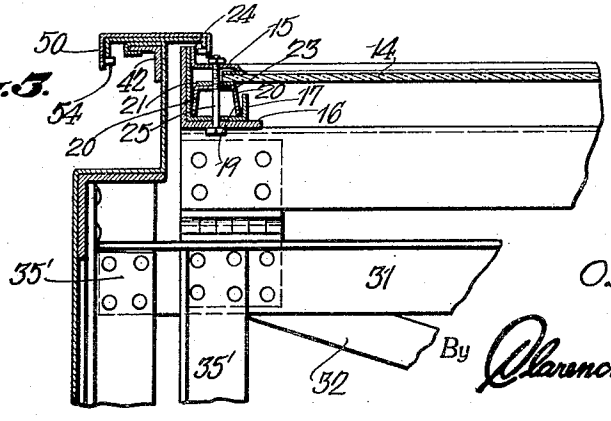


Fig. 3.



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Fig. 4.

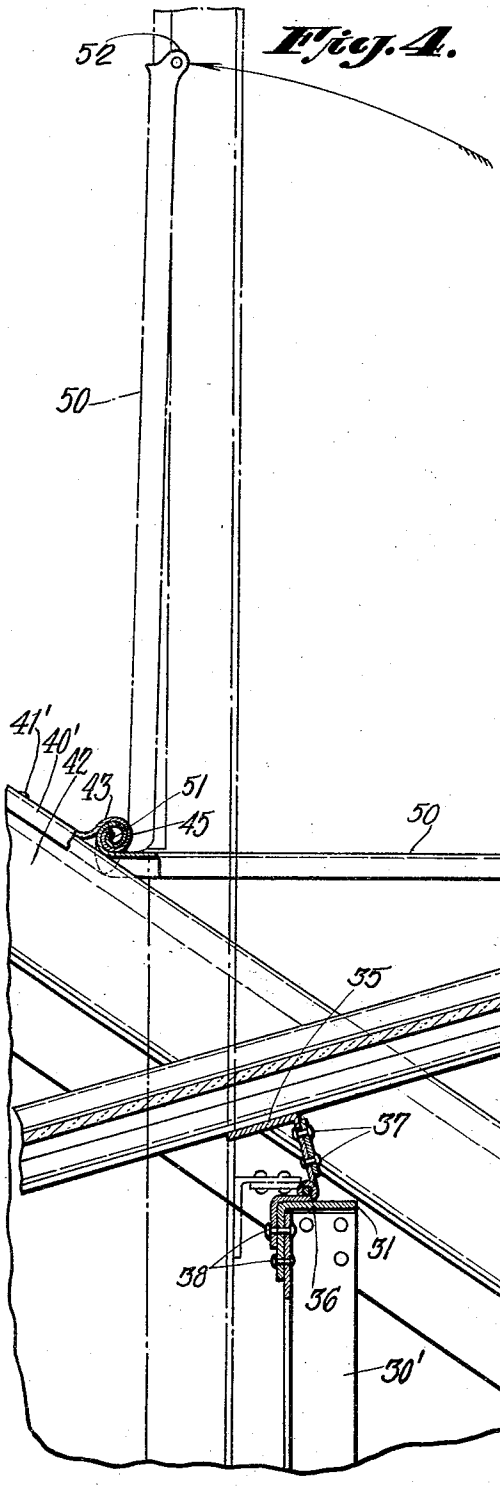
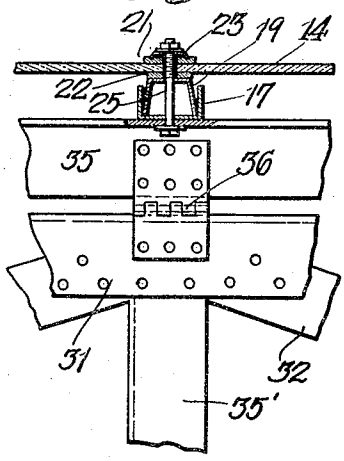


Fig. 5.



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UNITED STATES PATENT OFFICE

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SKYLIGHT

Application filed July 8, 1930. Serial No. 466,554.

This invention relates to skylights and ventilators, and more particularly it pertains to such devices particularly adapted for use over the stages of theatres, auditoriums and the like.

Stage ventilation presents problems quite different from other types of ventilation. For example, in warehouses and similar buildings, when doors windows skylights or the like are opened for ventilation or other purposes, they are held in their open position by thermal devices such as fusible links so that in case of fire, they will automatically move to closed position with a view to the elimination of all drafts and thereby retard the fire's progress. In stage ventilation, the practice is just the opposite to that in warehouses and similar buildings, that is all ventilating devices associated with the stage are held in their closed or partly open position by thermal devices such as fusible links, and they are so constructed as to move to their full open position in case of fire to increase to the maximum, the draft, with a view to confining the fire to the stage section of the building and carrying the smoke and fumes thereof away from the seating space of the building and out through the ventilators, at least for sufficient length of time to permit of the people of the audience safely leaving the building.

An ideal inclined sash type of ventilator for stages is one of the skylight type, in which the several sash move automatically preferably by gravity to position in a vertical plane within the opening, since such a skylight when its sash move to full open position in a vertical plane, affords maximum opening, the only barrier to the draft being the edge of the skylight sash.

This type of skylight, has, however, not to my knowledge been used in this connection and the principal reason for this condition, has been the failure to produce a pivotal support which will effectively support inclined sash of large dimensions and at the same time, will permit the sash to move to a position in a vertical plane to provide a maximum draft opening and which will also effectively exclude the weather when the skylight is closed.

By reason of the foregoing existing disadvantages, stage ventilators and skylights are generally of the cupola type with side windows or swinging sections which occupy a vertical plane when in their closed position. Such structures do not, however, afford the maximum draft for the reason that when mounted to swing about a pivot located intermediate of their ends, a portion of each section swings across the shaft and offers an obstruction to the rising draft, or when mounted to swing about a pivotal point at either the top or bottom of the section to give a maximum space opening, it is necessary for the rising draft to be diverted to a substantially right angular path before it can escape. Furthermore, such structures are not readily operable automatically, and all installations for ventilating purposes with which I am familiar, require ponderous and cumbersome operating mechanisms which are not always reliable in their operation.

It is one of the objects of the present invention, to provide a novel structure in skylights of the inclined sash type, which new structure greatly enhances skylights of this type for general purposes, and which particularly adapts this type of skylight to use over the stages of theatres, auditoriums and the like.

A feature of the invention resides in a novel construction, whereby the inclined sections of an inclined sash type of skylight, ventilator or similar structure may swing, preferably automatically to a position in a substantially true vertical plane within the confines of the skylight shaft or ventilator opening, whereby the sections present only their thickness in the path of the draft, thereby offering the absolute minimum obstruction to a free passage of the draft in a vertical direction.

A further feature of the invention resides in the provision of a novel structure wherein the weather will be effectively excluded from entering the skylight at the points where the inclined sash sections are pivotally mounted, when the skylight or ventilator sections are closed.

Other features of the invention relate to certain novel and improved constructions, arrangements and combinations of parts hereinafter described and particularly pointed out in the claims, the advantages of which will be readily understood and appreciated by those skilled in the art.

The invention will be clearly understood from the accompanying drawings illustrating the invention in its preferred form and the following detailed description of the constructions therein shown.

In the drawings:

Figure 1 is a transverse sectional view of a skylight illustrating the sash in their open position in dotted lines,

Figure 2 is a sectonal view taken at right angles to Figure 1, on the line 2—2 of said figure,

Figure 3 is a detail sectional view taken on the line 3—3 of Figure 1,

Figure 4 is a detail sectional view on an enlarged scale, taken on the line 4—4 of Figure 2, and,

Figure 5 is a detail sectional view taken on the line 5—5 of Figure 2.

In the herein illustrated embodiment of the invention A designates a roof, and B designates a housing or cupola. The cupola, although not shown herein as provided with side windows, may if desired have such windows, and they may be either of the stationary, swinging or slidable type.

The roof of the skight in the embodiment of the invention consists of two inclined sash members 10 and 11 of substantially identical construction, and the description of one will therefore suffice for both. By inclining the sash 10 and 11, triangular spaces 12 are provided at the ends of the cupola B and these spaces are closed by windows 13, which although herein illustrated as stationary, may be of the movable type if desired.

The sash members 10 and 11 preferably consist of suitable panes of glass 14 secured as at 15, see Figure 3, to frame members 16. The frame members 16 are preferably of right angular cross-sectional shape, and carried thereby there is an L-shaped member 17 which supports a sash pane seat 18 preferably in the form of an inverted channel member 19 the side walls of which are inclined as indicated. This construction provides channels 20 which serve to carry off fluids of condensation which form upon the under face of the sash panes. The panes of glass rest upon a gasket or the like 21 mounted on top of the pane seat 18, and another gasket of felt or other suitable material is positioned on top of the glass pane, and is engaged by a retaining clip 23, which as illustrated in Figure 3 has an upstanding flange 24 engaging the vertical leg of the L-shaped member 17. This entire assembly is secured together by a bolt or the like 25 and serves to removably retain the glass sash panes in position.

The construction just described, is that employed at the ends of the sash, and differs slightly from that employed at intermediate sash rails in that, at the intermediate sash rails, instead of employing an L-shaped member 17, the member 17 is in the form of a channel, and the clip 23 does not have the vertical leg 24, but is instead in the form of an inverted chanel, see Figure 5.

It is to be understood however, that the present invention is not limited to any particular sash construction, and that the construction herein shown may be varied, and that sash of other types may be employed.

The top of the cupola or housing B is open except for a small central section extending lengthwise thereof which is closed by the cap 30. This cap 30 may be of any desired construction, so long as it will overlie the upper edge of each sash member, when the sash are in their closed position.

In their open position, the sash are adapted to swing to a vertical plane within the open upper portion of the cupola, as indicated in dotted lines in Figure 1, and the sash members are so mounted that their swinging movement to this position is automatic when the sash members are released, they being held against such movement by means to be hereinafter described.

Extending longitudinally of the cupola B, there are trusses or beams 30, there being one adjacent each of two opposite side edges of the cupola, as more clearly illustrated in Figure 1. These trusses or beams 30 may be of any desired form, but I prefer to fabricate them in the manner shown of two longitudinally extending side rails 31 preferably of L-shaped cross-section, connected by a plurality of crossed diagonally extending braces 32, and transversely extending braces 32′, suitably fastened together to provide a rigid structure of sufficient strength for the purpose intended.

The trusses or beams 30′ are suitably supported within the cupola or housing B, as at 35′ in Figure 3, and form the sole means of support for pivotally mounting the sash members as will be now described.

Referring to Figure 4, it will be noted that each sash member has a longitudinally extending beam member 35 preferably L-shaped in cross-section, and that these beams are secured to their respective sash member at a point below the longitudinal center line thereof, or nearer the lower edge thereof. Hinges 36 are secured as at 37 to these beams 35, and as at 38 to the trusses or beams 30, and in the preferred form of the invention, these hinges form the sole support of the sash members upon said beams 30.

By mounting the sash as above described, that is by positioning the beams 35 to which

the hinges 36 are secured, at a point below the longitudinal center of the sash members, the upper portion of each sash member being larger than the portion below the pivotal point thereof, tends to overbalance the sash, thus producing an inherent tendency in the upper portions of the sash members to swing downwardly under the influence of gravity and thereby move the sash members to their open position.

Any suitable means may be employed to maintain the sash members in their closed position and in the present embodiment of the invention ropes, cables or the like 40 are employed. These ropes or the like are preferably connected to the sash members by a fusible device such as a link 41, and the ropes or cables may also have a number of such devices throughout their length at suitable intervals and at desired locations between their ends.

From the foregoing, it will be apparent that the sash members may be held in a fully closed or partially open position by said ropes or cables, and that when in any position but their full open position, they will immediately move to their full open position upon release of any one of the fusible links.

As will be apparent, the sash members are mounted wholly within the open upper end of the cupola or housing B, and I will now describe the construction by which the weather is excluded from the joints between the ends of the sash members, and the adjacent walls of the cupola or housing B.

The end walls of the cupola or housing B each have a cap plate which is preferably in the form of an inverted channel 40′ and they may be secured to their respective end wall by bolts, rivets or the like 41′ see Figure 4, which pass through the upper flange of a beam 42 mounted upon the upper edges of said end walls.

As more clearly illustrated in Figure 4, the cap plates 40′ terminate at their lower end at a point short of their respective pivotal point of the sash, and are formed with a housing 43 having a rolled wall 45, the purpose of which will be hereinafter described.

Each of the L-shaped members 16 which form the end sash frames are provided with a cap plate 46 preferably in the form of an inverted channel member, which is secured to its respective channel member in a similar manner to the cap plates 40′ as for example by bolts or the like 47. The upper end of each of these cap plates terminates short of its respective pivotal point of the sash as illustrated at 48 in Figure 4.

From the foregoing description, it will be apparent that as the sash are moved from their open position to their closed position, the upper portion of the upper side flanges of the end members 16 of the sash members move to position beneath their respective cap plates 40′, and that the cap plates 46 carried by the lower portions of these sash frame members move to position over the lower portions of their respective beams 42, and this construction also permits of free swinging of the sash about their pivotal points, in the manner heretofore described, and at the same time provides a weather tight joint between the ends of the sash members and their respective end walls of the cupola or housing B beneath the cap plates 40′ and 46.

The construction as thus far described, leaves a break between the inner ends of the cap members 40′ and 46, as illustrated in Figure 4, and the means which is provided to render this portion of the joint between the sash frames and their respective stationary sash support weather proof, will now be described.

Pivotally mounted in each of the housings 43, there is a cap plate 50, which consists of a relatively short length of channel member arranged in inverted position. The cap plate 50 has a rolled extension 51 which engages around the rolled wall 45 of its respective housing 43, and this construction provides means for pivotally mounting each cap plate 50 upon the lower end of its respective cap plates 40′. The opposite or free end 51 of the cap plates 50 slides upon the top of its respective cap plate 46 and may be formed with ears such as 52 or similar depending portions, and accidental raising of the free ends of the cap members 50 may be prevented by means of pins or the like 54 carried by the ears 52 and engaging beneath the side flanges of the cap plates 46. The free end of these cap plates 50 is preferably formed with an upturned lip 55 to act as a water shed for the joint between the end of the cap plates 50 and their respective cap plates 46.

From the foregoing it will be apparent that the present invention provides a skylight construction of the pivoted inclined sash type which when in its closed position, will be entirely weather-proof and which will at the same time move automatically to open position and in so doing, will provide a free and unobstructed passage through the skylight.

It will also be apparent that the sash of the skylight may, by reason of the holding means 40, be maintained partially open for ventilating purposes, from which partially open position they are free to move automatically to their full open position.

While the invention is herein illustrated in a preferred form, it is to be understood that it is not to be limited to the form or construction illustrated, and that it may be practiced in various forms, and is adaptable to any type of inclined sash skylight or ventilator.

Having thus described the invention, what

is claimed as new and is desired to secure by U. S. Letters Patent, is:

1. A skylight construction comprising a stationary sash support, a sash pivotally mounted in said support, and means for excluding weather from the joint between the sash support and the sash, said means comprising a member pivotally connected to the sash support, and having sliding engagement with the sash frame.

2. A skylight construction comprising a skylight shaft, and means for excluding weather from the joint between the shaft and the skylight, said means comprising a flanged member pivotally mounted on the wall of the shaft at a point removed from the pivotal point of the sash, and having sliding engagement with the sash at a point removed from the pivotal point of the sash.

3. A skylight construction comprising a skylight shaft, a sash pivotally mounted in said shaft, and means for excluding the weather from the joint between the shaft and the skylight, said means comprising a flanged member pivotally mounted on the wall of the shaft at a point removed from the pivotal point of the sash, and having sliding engagement with the sash at a point removed from the pivotal point of the sash, on the opposite side of the pivotal point of the sash.

4. A skylight construction comprising a stationary sash support, a sash pivotally mounted in said support, and means for excluding weather from the pivotal mounting of the sash, said means comprising a member pivotally connected to the sash support, and having sliding engagement with the sash frame, said member having side flanges embracing the sides of the sash, and the sides of the sash support.

5. A skylight construction comprising a sash support including spaced channel members positioned on edge, a cap for each of said channel members positioned on edge, in back to back relation to the channel members of the sash support, a cap for each of the channel members of the sash, means for pivotally mounting the sash in said sash support, and means for excluding the weather from the end pivots of said sash, said means including an inverted channel member pivotally secured to the sash support adjacent each pivot, each of said inverted channel members having sliding engagement with its respective sash side frame.

6. A skylight construction including spaced channel members supported on edge, a cap for each of said channel members, a sash including side frames formed of channel members positioned on edge, and arranged in back to back relation to the spaced channel members, a cap for each of the channel members of the sash, each of said caps being wider than the member to which it is attached, to overlie the other member when the sash is in closed position, means for pivotally mounting the sash, and means for excluding the weather from the pivotal points of the sash.

7. A skylight construction comprising a sash support, including spaced channel members supported on edge, a cap for each of said channel members, a sash including side frames formed of side members positioned on edge, and arranged in back to back relation to the channel members of the sash support, a cap for each of the channel members of the sash, each of said caps being wider than the member to which it is attached, to overlie the other member when the sash is in closed position, means for pivotally mounting the sash, and means for excluding the weather from the pivotal points of the sash, said last mentioned means comprising an inverted channel member pivotally connected to one of said caps, and having sliding engagement with the other cap.

8. A skylight construction comprising a sash support including two spaced channel members arranged on edge, a sash including side rails formed of channel members arranged on edge, means for pivotally mounting the sash in the sash support, a cap carried by each of the channel members of the sash support, and terminating short of the pivotal points of the sash, a cap carried by each of the channel members of the sash and terminating short of the pivot points of the sash, a housing on the pivot end of each of the caps carried by the channels of the sash support, and an inverted channel section pivotally mounted in each of said housings, and having a free end overlying the pivot end of the cap carried by its respective side rail of the sash.

9. In a skylight construction, a housing, a plurality of trusses or beams, extending across said housing, and a skylight sash pivotally mounted on each of said trusses, and adapted to close the open side of said housing.

10. In a skylight construction, a housing having an open upper side, a truss or beam extending across said housing, and a skylight sash pivotally mounted on said truss or beam.

11. In a skylight construction, a housing having an open upper side, trusses or beams extending across said housing from end to end, there being one truss or beam adjacent each side edge of the housing and arranged relatively close thereto, and a sash pivotally mounted on each of said trusses or beams.

12. In a skylight construction, a housing having an open upper side, a ridge or cap plate dividing said open upper side into two sections, each having one of its side edges in a horizontal plane below the ridge or cap, a truss or beam adjacent the lower side of each of said sections, and each arranged below

the longitudinal center line of its respective section and a sash pivotally mounted upon each of said trusses or beams, the pivotal points of each sash being off-set with respect to the longitudinal center axis of the sash whereby one side of the sash swings into the housing upon movement of the sash about its pivotal points.

13. In a skylight construction, a housing having an open upper side, a ridge or cap plate dividing said open upper side into two sections, each having one of its side edges in a horizontal plane below the ridge or cap, a truss or beam adjacent the lower side of each of said sections, and each arranged below the longitudinal center line of its respective section, a sash pivotally mounted upon each of said trusses or beams, the pivotal points of each sash being off-set with respect to the longitudinal center axis of the sash whereby one side of the sash swings into the housing upon movement of the sash about its pivotal points, and means for excluding weather from the joints between the sash and the adjacent walls of the housing.

14. In a skylight construction, a housing having an open upper side, a ridge or cap plate dividing said open upper side into two sections, each having one of its side edges in a horizontal plane below the ridge or cap, a truss or beam adjacent the lower side of each of said sections, and each arranged below the longitudinal center line of its respective section, a sash pivotally mounted upon each of said trusses or beams, the pivotal points of each sash being off-set with respect to the longitudinal center axis of the sash whereby one side of the sash swings into the housing upon movement of the sash about its pivotal points, and means carried by the side walls of the housing, and the sash for excluding the weather from the joints between the sash and said housing side walls.

In testimony whereof I affix my signature.

OSCAR CARLSON.