July 22, 1930. L. ABT 1,771,107

VENTILATED SKYLIGHT CONSTRUCTION

Original Filed Sept. 8, 1924 4 Sheets-Sheet 1

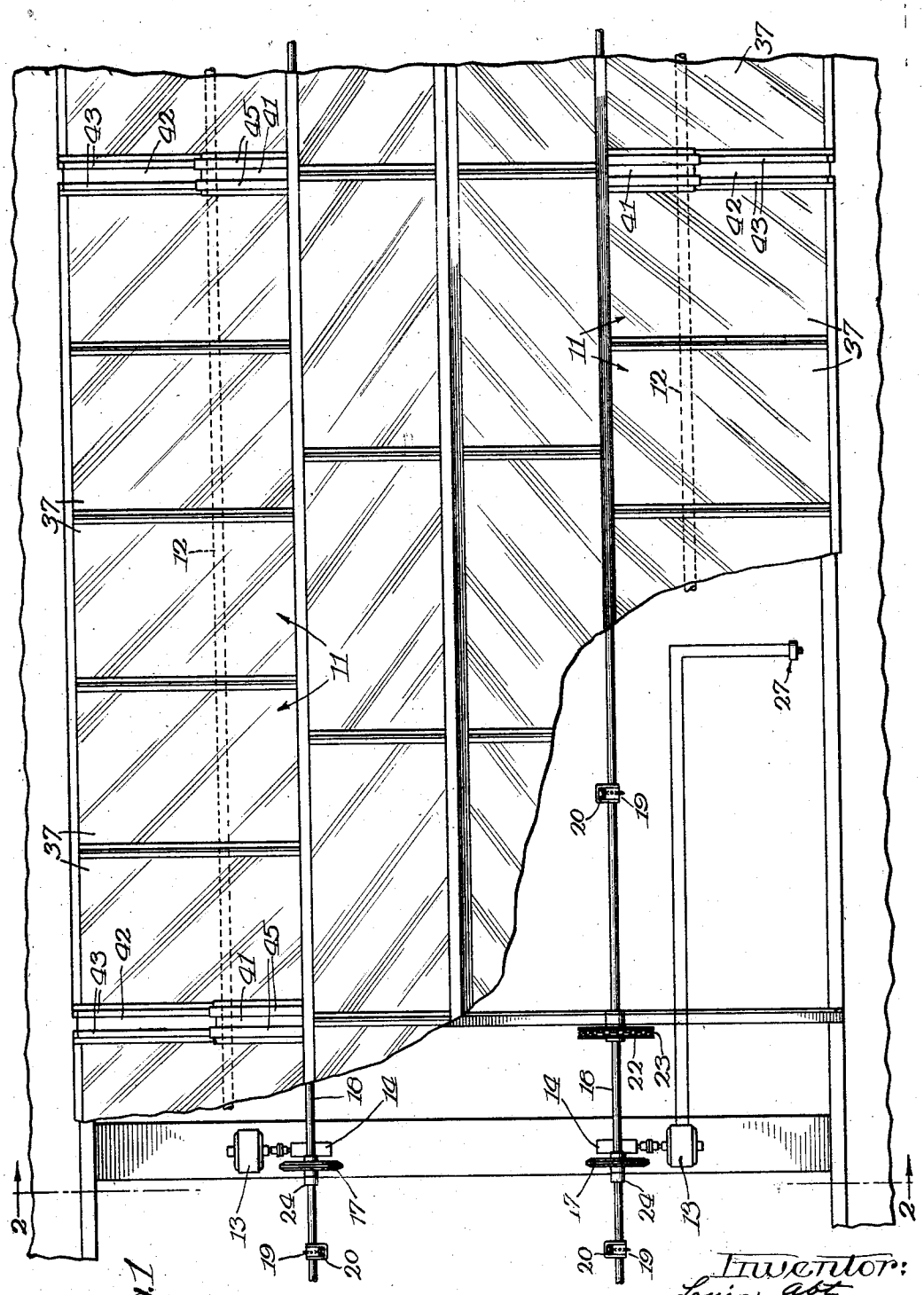

Fig. 1

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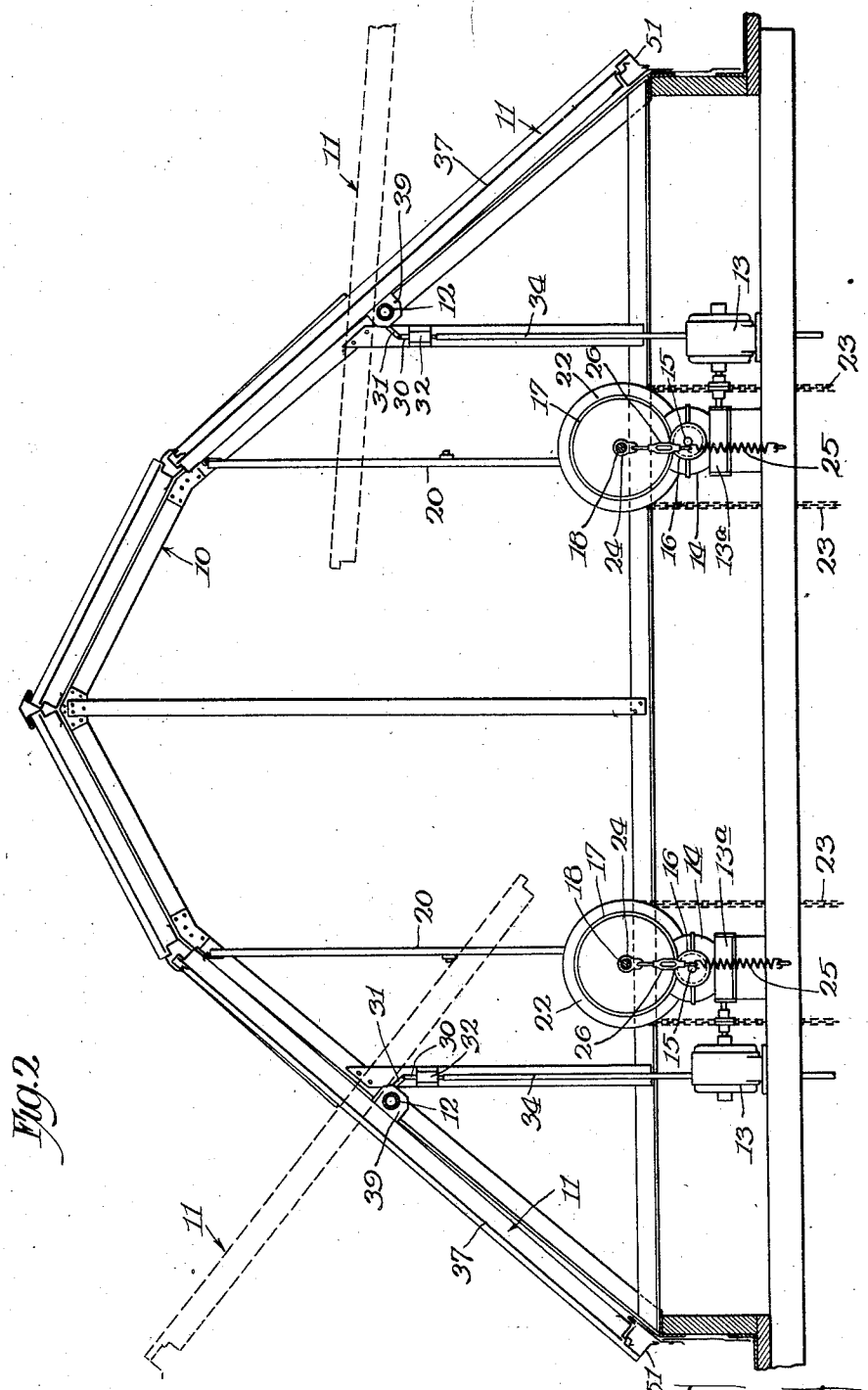

Fig. 2

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VENTILATED SKYLIGHT CONSTRUCTION

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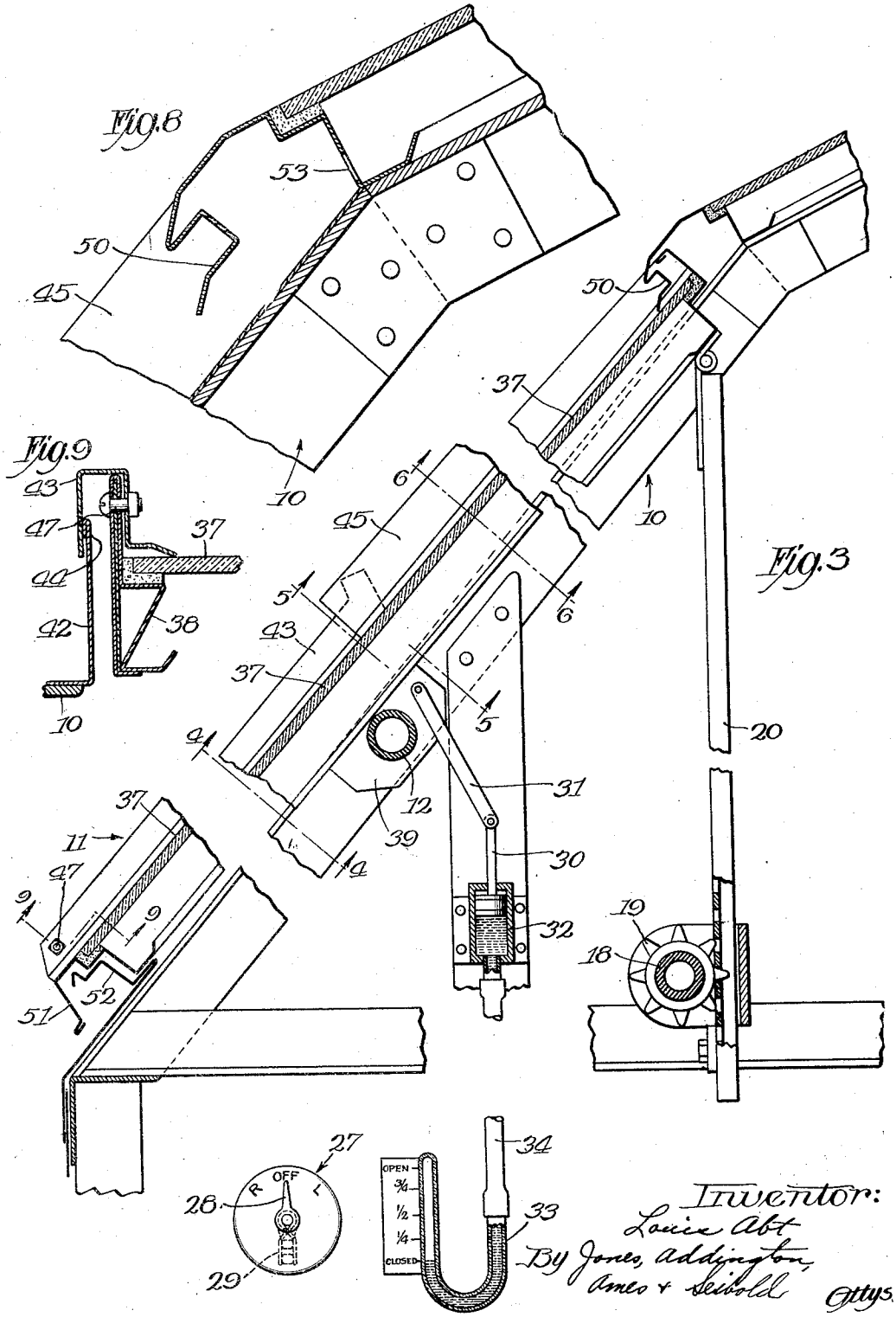

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VENTILATED SKYLIGHT CONSTRUCTION

Original Filed Sept. 8, 1924 4 Sheets-Sheet 4

Fig.4

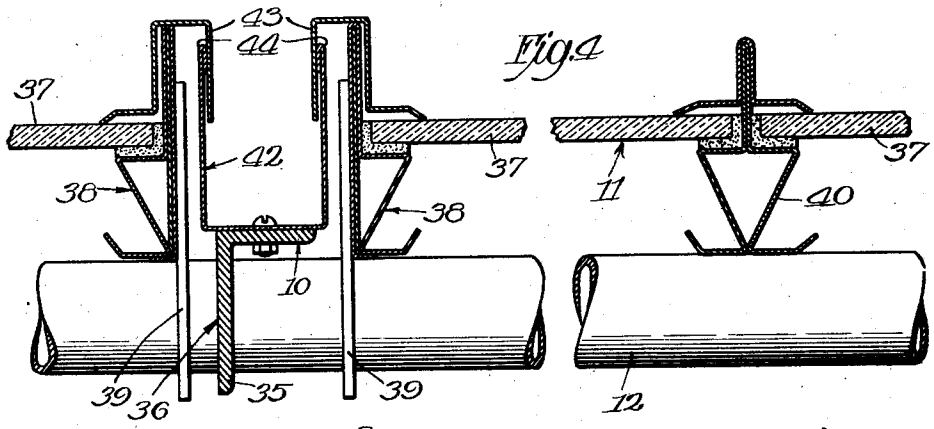


Fig.5

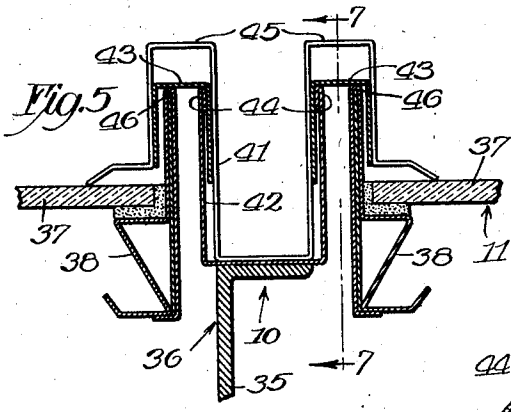


Fig.6

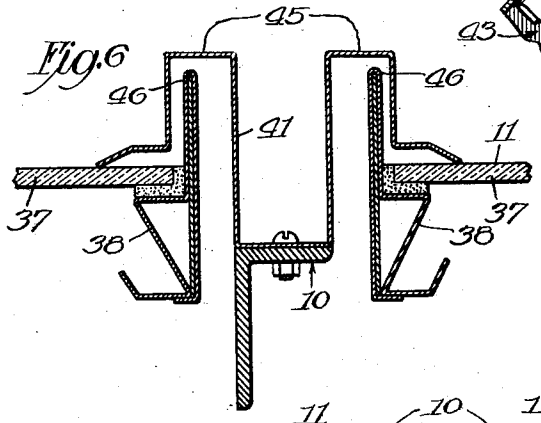


Fig.7

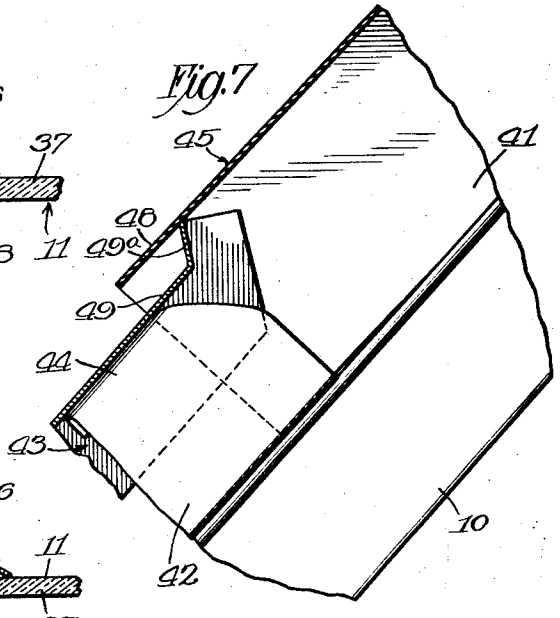
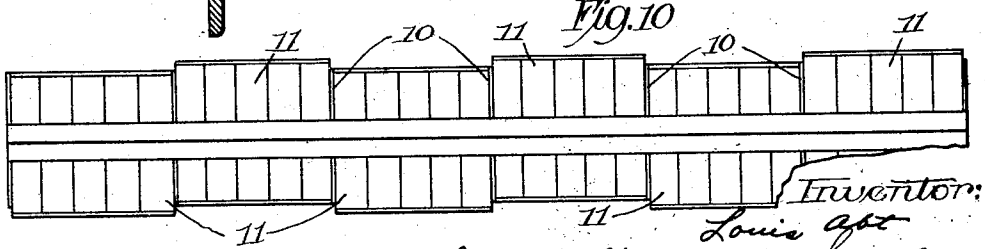


Fig.10



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Patented July 22, 1930

1,771,107

UNITED STATES PATENT OFFICE

LOUIS ABT, OF CHICAGO, ILLINOIS

VENTILATED SKYLIGHT CONSTRUCTION

Continuation of application Serial No. 736,403, filed September 8, 1924. This application filed March 14, 1927, Serial No. 175,020. Renewed January 16, 1930.

My invention relates to roof constructions and more particularly to a ventilated skylight construction.

One of the objects of my invention is to provide an improved ventilated skylight construction by means of which the skylight sections, extending many feet in length, may be operated as a unit with a minimum of power.

A further object of my invention is to provide improved means for excluding weather at the edges of the movable sections.

A further object is to provide improved motor means for controlling the movement of the skylight sections.

A further object is to provide an improved construction which will give full ventilation and light.

A further object is to provide improved means whereby an operator at a distance from the skylight can accurately control the movement thereof.

Further objects will appear from the description and claims.

In the drawings, in which an embodiment of my invention is shown,

Figure 1 is a plan view of a skylight construction embodying my invention;

Fig. 2 is a vertical transverse section on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged vertical transverse section showing part of the transmission and the indicator switch.

Fig. 4 is a section on the line 4—4 of Fig. 3, showing the long fulcrum on which the skylight sections swing.

Fig. 5 is a section on the line 5—5 of Fig. 3;

Fig. 6 is a section on the line 6—6 of Fig 3;

Fig. 7 is an enlarged view showing the weather-tight construction between the lower and upper caps;

Fig. 8 is a vertical transverse section through a portion of one of the trusses;

Fig. 9 is a section on the line 9—9 of Fig. 3; and

Fig. 10 is a somewhat diagrammatic plan view showing a staggered arrangement of the ventilated sections.

Referring to the drawings in detail, the construction shown therein comprises a plurality of truss members 10 between which the pivoted ventilating skylight sections 11 swing, and a pair of fulcrum members 12 secured to the truss members 10 and on which the movable skylight sections 11 are mounted to swing.

Two electric motors 13 are provided for operating the skylight sections, one motor for each side. Suitable transmission is provided between a motor and all of the skylight sections on one side of the central ridge so that all of these sections are moved together when the motor is operated. As the skylight sections are pivoted substantially at the middle, they are practically counter-balanced so that very little effort is required to move them, and a relatively small motor can be used to control a plurality of skylight sections extending many feet in length. In practice, 150 feet of skylight sections have been effectively controlled by a single 1-4 horsepower motor.

The transmission from the motor to the skylight sections comprises a worm 13^a directly connected with the motor shaft, a worm wheel 14 driven from this worm 13^a, a shaft 15 on which this worm wheel 14 is mounted, a driving friction wheel 16 mounted on this shaft 15, a driven friction wheel 17 engaged by the driving friction wheel 16, a long counter-shaft 18 extending the full length of the sections to be operated on which the driven friction wheel 17 is mounted, a plurality of sprockets 19, two for each skylight section, mounted on the long counter-shaft 18, and a plurality of racks 20, two for each skylight section, meshing with the sprockets 19 respectively, and driven thereby.

The racks are pivoted at their upper ends to the upper edges of the swinging skylight sections and are held in engagement at their lower ends with the sprockets by means of retaining guide yokes 21 mounted on the counter-shaft.

If desired, manual means may be provided in addition to the motor means for operating the skylight sections; for example, a chain wheel 22 may be mounted directly on the shaft 18 to be operated by a chain 23 extend-

ing down to a position convenient for the operator.

I have found it desirable to provide means for yieldingly holding the driven friction wheel against the driving friction wheel. For this purpose I provide a bearing loop 24 on the shaft 18 to which a strong coil tension spring 25 is connected by means of a turnbuckle 26 by means of which the tension of the spring may be adjusted.

In order that the skylight movement may be accurately controlled by an operator at a distance from the skylight, suitable motor controlling switch mechanism and indicator mechanism is provided. The switch mechanism comprises a manually operated pole changing switch 27, the controlling lever 28 of which is normally held in neutral position by any suitable means such as a centering spring 29. The motor 13 is of the type in which a reversal of rotation is effected by changing the direction of current. This change in direction of current is effected by means of the pole changing switch 27 referred to. If the operator wants to open the skylights he moves the switch lever to the mark "R" on the dial of the switch which will cause the motor to operate in a direction to open the skylights. If the operator wants to close the skylight he moves the switch lever to the mark "L" on the dial causing the motor to operate in a reverse directon to close the skylight. The neutral centering return spring prevents any danger that the operator will go away and leave the motor running, as this necessitates that the operator hold the switch down if he wants the motor to operate.

The indicator mechanism shown comprises a cylinder and piston construction, the piston rod 30 of which is connected with the movable skylight by means of a connecting rod 31, and the cylinder 32 of which is connected with a bent tube indicator 33 adjacent the switch by means of a flexible fluid conduit 34. Any suitable fluid may be used for transmitting movement from the piston to the indicator. Any suitable liquid may be used in the bent U tube indicator 33.

By means of the U tube 33 and switch 27, the operator can cause the skylight sections to be moved to any desired degree between open and closed, even if the operator is not in a position where he can see the actual movement of the skylight.

The friction drive between the motor and skylight prevents danger of injury to the motor or the skylights in case the operator should hold the switch in "on" position after the skylight sections have moved to an extreme position, as the slip drive between the friction wheels enables the motor to run without injury to itself or to the skylight sections even after the skylight sections have moved to one or the other extreme position. The worm drive between the motor and skylight sections provides a self-locking construction which will hold the skylights in any position in which they may be adjusted, as the pitch of the worm is such that it cannot be driven backward from the worm wheel.

The weather-proof construction adjacent the edges of the swinging skylight sections 11 is shown in detail in Figs. 4 to 9 inclusive. As shown herein, the fulcrum member 12 extends through the vertical flange 35 of the angle iron 36 which forms part of the truss member 10. The glass pane 37 of the skylight section is mounted in a suitable sheet metal frame 38. The pivotal mounting of this frame on the fulcrum member is effected by means of bearing clips 39 secured to the sheet metal frame 38 and having bearing openings through which the fulcrum member 12 extends. The panes of glass are supported at points between the trusses by means of the sheet metal framework 38 in which the panes are set, the division bars 40 of the framework resting on the fulcrum member 12 as shown in Fig. 4.

The weather-proof construction referred to comprises upper and lower valley members 41 and 42 respectively, mounted on the trusses 10, lower cap members 43 mounted on the swinging sections 11 and overlapping the upstanding edges 44 of the lower valley section when the skylight section is closed, and upper cap members 45 formed integral with the upper valley member 41 and overlying upwardly extending flanges 46 on the upper part of the swinging section when the skylight section is in closed position.

The upper end of the lower cap member 43 fits within the lower end of the upper cap member 45 and has movement therein as the skylight section swings. In order that the upper end of the lower cap may not bind in the lower end of the upper cap as the skylight section swings, the lower cap member is so secured to the swinging skylight section as to provide for movement of the upper end of the lower cap member relative to the roof section to permit the upper end of this lower cap member to accommodate itself to the lower end of the upper cap member into which it fits, as the skylight section is rocked. This connection between the lower cap member and the skylight section which permits the above described operation, comprises a pivot bolt 47 (Figs. 3 and 9) which pivotally secures the lower end of the lower cap to the framework of the swinging section. This connecton holds the lower cap member in place but permits the upper end of the cap member to have the necessary freedom of movement.

Referring to Fig. 7 it will be seen that in order to permit the swinging movement of the skylight section, the upper part 48 of the upper cap member 45 must be spaced a substantial distance away from the upper part 49 of

the lower cap member 43 in order to provide clearance for the swinging movement. In order to close up this gap, the upper end of the lower cap member is turned upwardly as indicated at 49a so that it engages the upper part of the upper cap member when the skylight section is closed to effectually exclude weather at this point.

In order to exclude weather at the upper edge of the swinging section a longitudinally extending cap member 50 (Figs. 3 and 8), is provided into which the upstanding flange of the metal frame of the skylight section enters as shown in Figs. 3 and 8. Similarly at the bottom edge of the skylight section a weather-tight construction is provided by means of a cap member 51 on the swinging skylight section which receives an upstanding flange 52 on the sheet metal framework secured to the truss.

As shown in Fig. 8, a drain opening 53 is provided leading from the framework 54 for the upper part of the roof, to the upper valley member 42.

The operation of the skylight has been outlined in connection with the description of the construction. By means of this construction it will be seen that an operator can accurately control the skylight movement even if he is at a distance from the skylight and even where he cannot see the actual movement of the skylight. The indicator 33, which should be located adjacent the switch 27, will show the operator the exact condition of the skylights as to whether they are open or closed or partly open. To move the skylights from closed to open position the operator simply moves the switch lever 28 to the indication point "R" on the dial and holds the switch lever there until the indicator shows that the skylights have been moved, to the desired position. The operator then releases the switch arm which is then immediately restored to neutral position by means of the restoring spring 29. There is no danger that the motor will be left running as the switch moves to neutral position as soon as the operator releases it. Movement in a reverse direction is effected by moving the switch lever to the indication "L" on the dial which changes the pole connections and reverses the current in the motor to cause a reverse rotation thereof.

As indicated above, even if the operator should hold the switch in "on" position after the skylight had been moved to one or the other of its extreme positions, no great harm will be done, because of the provision of the friction drive which will simply slip without harming either the motor or the skylight construction.

In Fig. 10 is shown a cheap form of skylight construction which gives ample ventilation. In this form the skylight sections on the same side of the central ridge are made alternately fixed and movable and the fixed sections on one side of the ridge are opposite the movable sections on the other side of the ridge. By this construction ventilation can be obtained throughout the entire length by opening up the sections on both sides.

This application is a continuation as to common subject-matter of my co-pending application, Serial No. 736,403 filed September 8, 1924.

I claim:

1. A ventilated roof construction comprising an inclined truss member, roof members alongside said truss members having edges adjacent said truss members and rockable so that their upper ends swing downwardly and their lower ends swing upwardly, and means for excluding weather at the junctions of said truss member and said roof members, comprising a valley carried by said truss, inverted channel cap members carried by the lower portion of the roof members and overlying the edges of the lower part of the valley, flanges carried by the upper portions of said roof members, and inverted channel cap members carried by the truss members and overlying said flanges, the upper ends of the lower cap members fitting within the lower ends of the upper cap members, the sides of the lower cap member being engageable with and guided by the sides of the upper cap members, said lower cap members being so mounted on the roof sections as to provide for a slight lateral adjustment of the upper ends thereof relative to the roof sections, to permit the upper ends of the lower cap members to accommodate themselves to the lower ends of the upper cap members into which they fit, as the roof section is rocked.

2. A ventilated roof construction comprising an inclined truss member, roof members alongside said truss members having edges adjacent said truss members and rockable so that their upper ends swing downwardly and their lower ends swing upwardly, and means for excluding weather at the junctions of said truss member and said roof members, comprising a valley carried by said truss, inverted channel cap members carried by the lower portion of the roof members and overlying the edges of the lower part of the valley, flanges carried by the upper portions of said roof members, and inverted channel cap members carried by the truss members and overlying said flanges, the upper ends of the lower cap members fitting within the lower ends of the upper cap members, the sides of the lower cap member being engageable with and guided by the sides of the upper cap members, said lower cap members being so mounted on the roof sections as to provide for a slight lateral adjustment of the upper ends thereof relative to the roof sections, to permit the upper ends of the lower cap members to accommodate themselves to the lower

ends of the upper cap members into which they fit, as the roof section is rocked, the upper ends of the lower cap members being turned up within the lower ends of the upper cap members to exclude weather.

3. A ventilated roof construction comprising two spaced inclined truss members, a skylight frame member lying between said truss members and rockable so that its upper end swings downwardly and its lower end swings upwardly, a plurality of skylight panes supported by said frame member, said frame member having a plurality of division bars between said panes for supporting the edges thereof, and a fulcrum member mounted on said trusses and extending therebetween, said fulcrum member extending underneath and supporting said division bars.

4. A ventilated roof construction comprising an inclined truss member, a ventilation member having an edge adjacent said truss member, and rockable so that its upper end swings downwardly and its lower end swings upwardly, and means for excluding weather at the junction of said truss member and ventilation member, comprising a valley extending along said truss member, a cap member extending along the lower portion of the ventilation member and overlying the edge of said valley and carried by said ventilation member, and a cap member extending along and overlying the edge of the upper portion of the ventilation member and carried by said truss member, the upper cap member and valley member being parts of the same integral sheet metal member, said truss member comprising a flat portion lying underneath and against the bottom portion of said valley member.

5. A ventilated roof construction comprising an inclined truss member, a ventilation member having an edge adjacent said truss member, and rockable so that its upper end swings downwardly and its lower end swings upwardly, and means for excluding weather at the junction of said truss member and ventilation member, comprising a valley extending along said truss member, a cap member extending along the lower portion of the ventilation member and overlying the edge of said valley and carried by said ventilation member, and a cap member extending along and overlying the edge of the upper portion of the ventilation member and carried by said truss member, said valley comprising a lower channel member and an upper channel member, the upper channel member fitting within the lower channel member, the upper cap member and the upper valley member being portions of the same integral sheet metal member.

6. A ventilating skylight construction comprising an inclined stationary section and an inclined tiltable section adjacent thereto, said stationary section comprising an inclined truss member having a flat upper face, and means for effecting a weather-proof joint between said sections comprising an integral member having a flat portion lying against the upper face of said flat truss member and a flange portion extending upwardly from said flat portion, and a weather-excluding hood member secured to and extending along the edge of the tiltable section within which said upwardly extending flange portion is received.

7. A ventilating skylight construction comprising an inclined stationary section and an inclined tiltable section adjacent thereto, said stationary section comprising an inclined truss member having a flat upper face, and means for effecting a weather-proof joint between said sections comprising an integral member having a flat portion lying against the upper face of said flat truss member and a flange portion extending upwardly from said flat portion, and a weather-excluding hood member secured to and extending along the edge of the tiltable section within which said upwardly extending flange portion is received, said hood member having a pivotal connection with said upwardly extending flange portion.

8. A ventilating skylight construction comprising a stationary section and a tiltable section, and means for effecting a weather-proof joint between said sections comprising an upwardly extending flange member mounted on and running along the edge of said stationary section and a sheet metal member mounted on and running along the edge of the tiltable section and having a hood portion for receiving the upwardly extending flange and a laterally extending flange portion for effecting a weather-proof engagement with the upper face of the tiltable skylight section.

9. A ventilating skylight construction comprising an inclined stationary section and a tiltable section adjacent said stationary section, said stationary section comprising an inclined truss member and a sheet metal member mounted on and running along the edge of said stationary section and having a flat portion lying against the flat upper face of the truss member and an upwardly extending flange portion, said movable section having a sheet metal member mounted on and running along the edge of the tiltable section having a hood portion for receiving said upwardly extending flange and a laterally extending flange portion providing a weather-proof engagement with the upper face of the tiltable section.

10. A ventilating skylight construction comprising a stationary section and a tiltable section adjacent the stationary section, said stationary section having a truss member having a flat upper face, and means for effecting a weather-proof joint between the

stationary section and the movable section comprising a sheet metal member mounted on and running along the edge of the stationary section and having a flat flange portion for engaging the flat face of the truss member and having an upwardly extending flange, and a sheet metal hood member mounted on and running along the edge of the movable section and having a channel portion for receiving said vertical flange, said hood member being pivotally mounted adjacent its upper end to said upwardly extending flange.

11. A ventilating skylight construction comprising a stationary section and a tiltable section, and means for effecting a weather-proof engagement between said sections, comprising a sheet metal hood member having a channel portion mounted on and running along the edge of said stationary section and a sheet metal member mounted on and running along the edge of the movable section and having a flange portion underlying the edge of the movable section and an upwardly extending flange extending above the edge of said movable section and into the channel portion of the hood member.

12. A ventilating skylight construction comprising a stationary section and a tiltable section, and means for effecting a weather-proof engagement between said sections, comprising a sheet metal hood member having a channel portion mounted on and running along the edge of said stationary section and a sheet metal member mounted on and running along the edge of the movable section and having a flange portion underlying the edge of the movable section and an upwardly extending flange extending above the edge of said movable section and into the channel portion of the hood member, and a drip channel portion extending downwardly from said underlying flange portion.

13. A ventilating skylight construction comprising a stationary section and a movable section, and means for effecting a weather-proof joint therebetween comprising a sheet metal member mounted on and running along the edge of said stationary section and comprising a channeled hood portion and a flange portion for engagement with the upper face of the tiltable section, and a sheet metal member mounted on and running along the edge of the tiltable section and having an upwardly extending flange extending up into the end of the channel of the hood portion.

14. A ventilating skylight construction comprising a stationary section and a movable section, and means for effecting a weather-proof joint therebetween comprising a sheet metal member mounted on and running along the edge of said stationary section and comprising a channeled hood portion and a flange portion for engagement with the upper face of the tiltable section, and a sheet metal member mounted on and running along the edge of the tiltable section and having an upwardly extending flange extending up into the end of the channel of the hood portion, and a flange portion underlying the edge of the tiltable section.

15. A ventilating skylight construction comprising a stationary section and a movable section, and means for effecting a weather-proof joint therebetween comprising a sheet metal member mounted on and running along the edge of said stationary section and comprising a channeled hood portion and a flange portion for engagement with the upper face of the tiltable section, and a sheet metal member mounted on and running along the edge of the tiltable section and having an upwardly extending flange extending up into the end of the channel of the hood portion, and a flange portion underlying the edge of the tiltable section, and a drip channel portion extending downwardly from said underlying flange.

In witness whereof, I have hereunto subscribed my name.

LOUIS ABT.