Oct. 14, 1941. E. A. SIPP ET AL 2,259,089

LIGHTING AND VENTILATING PANEL

Filed Dec. 30, 1939 2 Sheets-Sheet 1

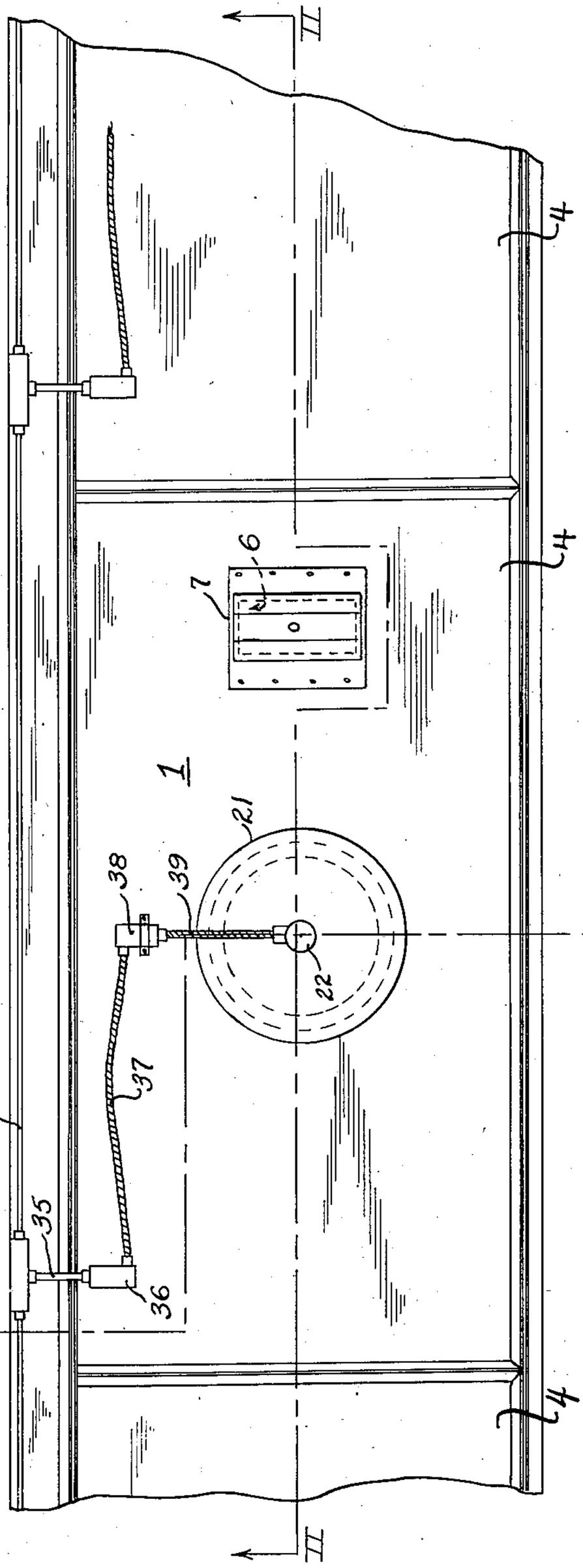

FIG-1

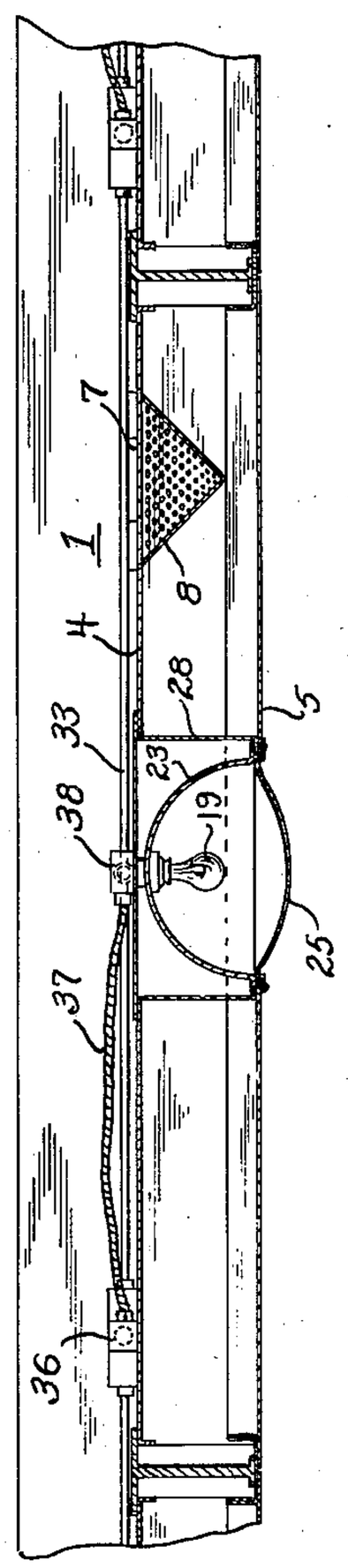

FIG-2

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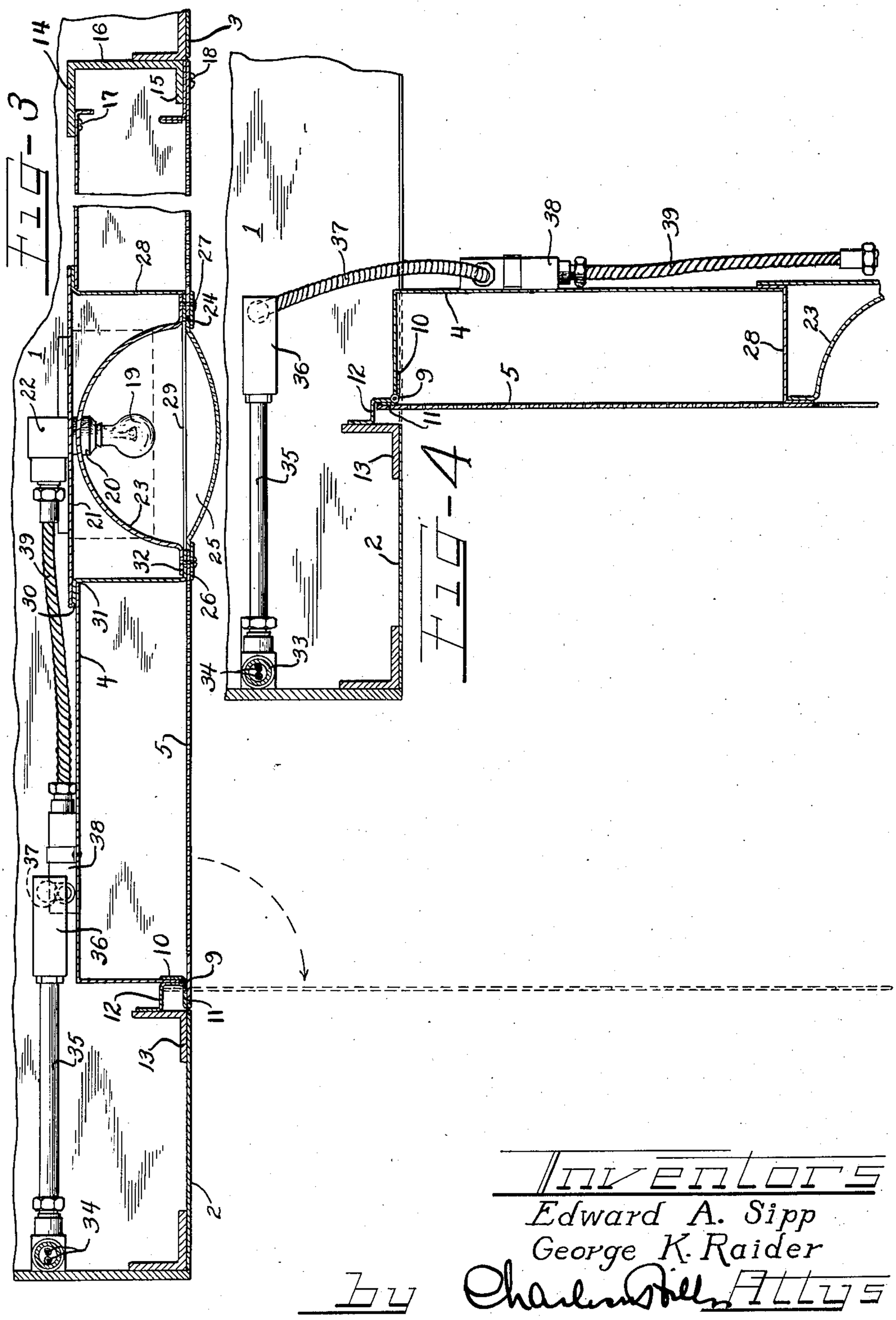

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LIGHTING AND VENTILATING PANEL

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2 Claims. (Cl. 240—7.35)

The present invention relates in general to air distributing panels such as are utilized in connection with ventilating systems, and particularly to that type of air-distributing panel which forms a wall section of an enclosure and is hinged for swinging movements for enabling access to the rear of the panel. More specifically, the present invention is concerned with improvements in the construction of such panels and the embodiment therein of lighting means for the illumination of the enclosure being ventilated.

Air-distributing panels of the hinge type have been widely used in connection with air-distributing systems, and while such constructions are susceptible of general application they have been most widely used for distributing conditioned air into closed vehicles, especially in railway coaches and motor buses.

In such systems, a distributing duct is generally located overhead and a double panel air-distributor forms at least a portion of the ceiling of the enclosure. In the usual arrangement, an inner panel which is not visible from within the closure, is provided with a number of distributed openings which permits the passage of air from the distributing duct into the space between the panels. The other panel forms an exposed facing panel which is provided with a large number of perforations, or is otherwise foraminated for finely distributing the air into the enclosure.

Experience has shown that it is necessary to remove one or both of the air-distributing panels frequently for the purpose of removing accumulations of foreign materials deposited by the ventilating air. This is necessary in view of the inability of filters to remove more than a part only of the dirt entrained with the air taken into the system. In order to provide convenient mountings for these panels for enabling access to the air conducting spaces in the rear of the panels and in the adjacent duct portions, these panels have been as a rule hinged so as to permit swinging movement thereof to open and closed positions.

Because of the difficulties encountered in previously endeavoring to mount a lighting fixture on the air-distributing panels, it has been the practice to provide separate stationary panels, which were usually located between the ventilating panel sections, for the lighting fixtures. Thus the expense of installation for the lighting and ventilating in a car or vehicle was considerably increased due to the fact that special panels had to be provided for the lighting fixtures. The difficulties encountered had to do principally with the problem of finding a suitable connection to the lighting means which would meet the approval of the underwriters and would withstand over a long period of time the frequent swinging movement of the air-distributing panels when they were opened for servicing, and which would not produce sparks in the air conducting chambers which might be apt to ignite the foreign materials deposited therein by the ventilating air. One method proposed for carrying the circuit supply conductors to the swingable panels, which was suggested, was to provide a loop in the conductors. However, such a loop did not meet with approval for the reason that the successive straightening and bending of the conductors would ultimately result in their being broken.

Having in mind the foregoing objections to the arrangement as now utilized, the present invention seeks as its primary object to provide an improved hinged ventilating and illuminating panel, wherein lighting means are carried by the panel structure and circuit connections are made in such a manner as to eliminate the possibility of sparks occurring in the air conditioning spaces or the circuit connections becoming broken as a result of stresses set up in the circuit connections during hinged movements of the panel.

A further object of the present invention is to provide a novel arrangement for making circuit connections to illuminating means carried by hinged panels, wherein the conductors of the connections are so arranged that their deforming forces, during hinged movements of the panels, will be limited mainly to twisting or torsional forces which are distributed over a considerable length of the conductor, rather than to bending forces concentrated in a relatively short loop or length of the conductor.

A still further object of the invention is to provide an improved construction in a ventilating and lighting panel which may form a section or portion of the wall of an enclosure to be ventilated.

Other objects and features of the invention will more readily appear from the following detailed description, taken in connection with the accompanying drawings, which illustrate a single embodiment thereof, and in which:

Figure 1 is a plan view showing a plurality of wall forming panel sections disposed in end-to-end relation to form a side wall of a distributing

duct, the wall forming panel sections being viewed from the duct interior;

Figure 2 is a section taken generally longitudinally of the wall forming sections, and showing the cooperative relationship of the air control and distributing panels of each section, taken substantially on line II—II of Figure 1;

Figure 3 is an enlarged sectional view through the control and distributing panels of one of the wall sections, taken substantially on line III—III of Figure 1, the panels being in closed position; and

Figure 4 is an enlarged fragmentary view similar to Figure 3, except that the control and distributing panels of the section are shown as being swung as a unit to open position.

As shown on the drawings:

For purposes of illustration, the air-ventilating wall forming sections are disclosed in Figures 1 and 2 in end-to-end relation as they might be installed in a railway car to provide either a part or all of the car's ceiling and provide ventilation for the car interior.

When utilized in such an installation, the wall forming sections are arranged to close one side of a distributing duct 1 extending lengthwise of the car just under the roof. Where the car is constructed with a clerestory, the distributing duct may be housed therein. It will also be appreciated that these ventilating wall sections may or may not extend entirely across the top of the car, and in the latter case laterally disposed ceiling panels 2 and 3 may be utilized, these panels in the case of a car forming the half decks.

Each of the air-distributing wall sections provides a unit consisting essentially of a control panel 4 which together with other similar panels forms the floor of the distributing duct, and a perforated distributing panel 5 which is exposed to the interior of the railway car.

As shown in Figure 1, an opening 6 is provided in control panel 4 through which air may flow downwardly from the distributing duct 1 into the space between panels 4 and 5. A suitable valve mechanism, as generally indicated at 7, is provided for adjustably regulating and controlling the rate of flow from the distributing duct through the opening 6. Below the opening 6 there is arranged a diffusing device 8 in the form of a perforated baffle which operates to spread and diffuse the stream of air passing from the distributing duct through opening 6 as it enters the space between panels 4 and 5.

In the arrangement shown, the control panel 4 and distributing panel 5 are supported along one edge for independent and unitary swinging movement by means of a three-wing hinge 9. The control panel is fastened to a wing 10, the distributing panel to a wing 11, and a wing 12 of the hinge is fastened to an angle iron structural member 13. The free edges of the panels 4 and 5, opposite their hinged edges, are arranged to abut in their closed positions against the spaced legs 14 and 15 of a channel structural member 16. These free edges may be removably fastened to the associated legs of the structural member 16 as by suitable screws 17 and 18.

As shown in Figure 3, lighting means are provided, the lighting means being associated with the control panel 4 and distribution panel 5 assembly. Although the lighting means may be constructed in different ways, for purposes of illustration herein, the lighting means are disclosed as comprising an electric lamp 19 removably mounted in the usual manner in a lamp receptacle 20, this receptacle being supported from a plate member 21 and connected with an outlet box 22. The lamp is preferably associated with a dished reflector 23.

The perforated distributing panel is provided with an opening or window 24 having a removable lens 25 positioned therein and removably retained in said opening by means of an annular bezel 26 which may be secured as by suitable screws 27.

The lighting means are contained within a separate compartment which is defined by an annular partition member 28 having its lowermost end inwardly deflected to form a flange 29, the uppermost end of the member 28 being outwardly deflected to form a flange 30.

In the construction herein disclosed, the partition member 28 is inserted through an opening 31 in the control panel 4. The flange 30 underlies the periphery of the plate 21, and the flange 29 abuts the inner surface of the distribution panel 5 adjacent the opening 24 and underlies a peripheral flange 32 of the reflector. The screws 27, if desired, may extend through the bezel, the panel 5, the flange 29 and the flange 32 of the reflector to secure these parts together in assembled relation.

In this construction, it will be noted that the compartment for the lighting means is entirely sealed and separated from the air-distributing duct 1 above the control panel 4, and is also separated from the space between the panels 4 and 5 which is in communication with the air-distributing duct through the opening 6 and the interior of the car through the perforations of the distributing panel 5.

For distributing electric current to the lighting means at each air-distributing unit, there is provided a main conduit 33 which may be carried along in the air-distributing duct 1 adjacent the hinged edges of the control panels and distributing panels, this conduit having circuit conductors 34 therein.

At each air-distributing unit there is provided a rigid branch conduit 35 which extends over the hinged margin of the control panel 4 and is fitted with an outlet box 36 which is connected through a flexible conduit 37 with an outlet box 38 which is mounted on the upper surface of control panel 5 and associated with another flexible conduit 39 connecting with the box 22.

It will be noted that the outlet boxes 36 and 38 are relatively so disposed that the conduit 37 and the circuit conductors therein will extend a considerable distance along the hinge line of the associated control panel 4 and distribution panel 5, when the panels are in closed position. The normal position of the conduit section 37 is clearly shown in Figures 1 and 3 where the control and distributing panels are shown as being closed.

Referring to Figure 4, it will be seen that the conduit section 37 enables the swinging of the control panel and distribution panel as a unit without setting up stresses in the circuit conductors, which would ultimately result in failure of these conductors by being broken.

The outlet box 38 during this hinged movement will describe an arc and instead of subjecting the conduit section 37 and the conductors therein to bending forces, the forces will be limited mainly to twisting forces which have the least damaging effect upon the cable. Since this twisting or torsional force is distributed over a considerable length of conduit and circuit conductors, there

will be no damaging or breaking of the conductors even though the air-distributing unit be opened and closed multitudinous times during long years of service. Also, since sliding contacts have been eliminated, there is no possibility of sparks resulting from the circuit connections in the air-distributing duct, which might ignite the accumulated foreign matter in the air conducting spaces. If desired, the conduit section **37** and the conductors therein may be provided with a slight initial twist, when the air-distributing panels are in closed position, so that when these panels are opened the conduit section **37** and the circuit conductors therein will be untwisted.

From the foregoing description, it will be apparent that the present invention provides an improved ventilating and lighting panel which may form a section or portion of a wall or closure to be ventilated; which embodies lighting means and circuit connections which are made in such a manner as to eliminate the possibility of sparks occurring in the air conditioning spaces or the circuit connections becoming broken as a result of stresses set up in the circuit connections during hinged movements of the panel; and in which the circuit conductors of the connection to the lighting means are so arranged that their deforming forces will be limited mainly to twisting or torsional forces which are distributed over a considerable length of the conductors, rather than to bending forces concentrated in a relatively short loop or length of conductor.

It is, of course, to be understood that although we have described in detail a single embodiment of our invention, the invention is not to be thus limited but only in so far as defined by the scope and spirit of the appended claims.

We claim as our invention:

1. In a wall structure, a movable section comprising a facing panel, a backing panel rearwardly spaced from the facing panel, means hingedly supporting said panels for independent and unitary swinging movements, said panels having openings therein for the passage of a ventilating fluid through the section, and the facing panel having a window, light producing means supported between said panels for illuminating the space on the forward side of the facing panel through said window, an electric circuit conductor connected to the light producing means, said conductor having a portion extending generally along and adjacent to the hinge line of the panels, and means anchoring the ends of said portion, whereby deformation of the conductor during hinged movements of the panels is confined mainly to twisting.

2. In a ventilating and lighting system for a vehicle, air and light distributing apparatus comprising a facing panel, a backing panel rearwardly spaced from the facing panel, said panels having openings therein for the passage of a ventilating fluid supplied to the rear of the backing panel, and the facing panel having a window, light producing means supported between said panels for illuminating a space on the forward side of the facing panel through said window, a housing surrounding the light producing means and having an opening in registration with said window, and hinge means supporting said panels for concerted swinging movement together with the light producing means as a unit or for swinging movement of the facing panel only without the light producing means.

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