

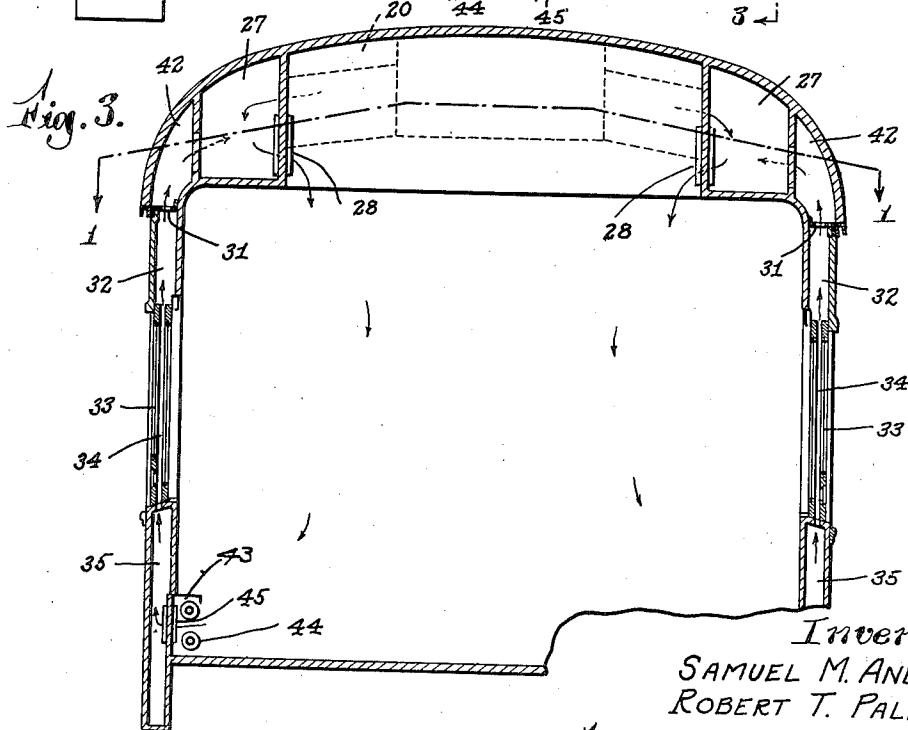
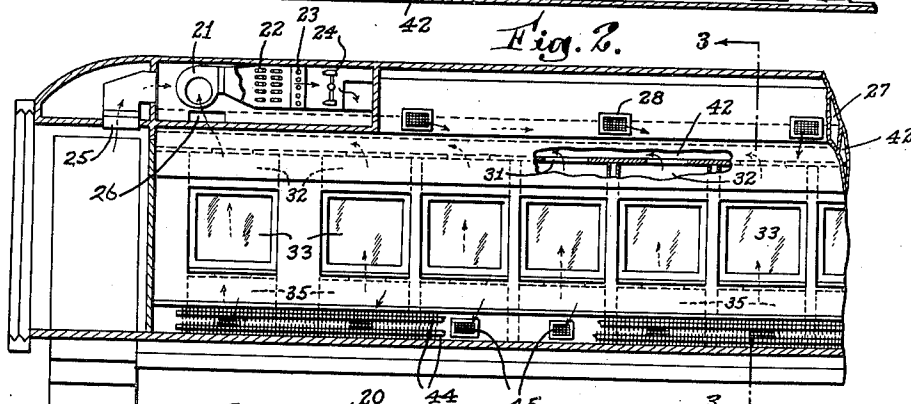
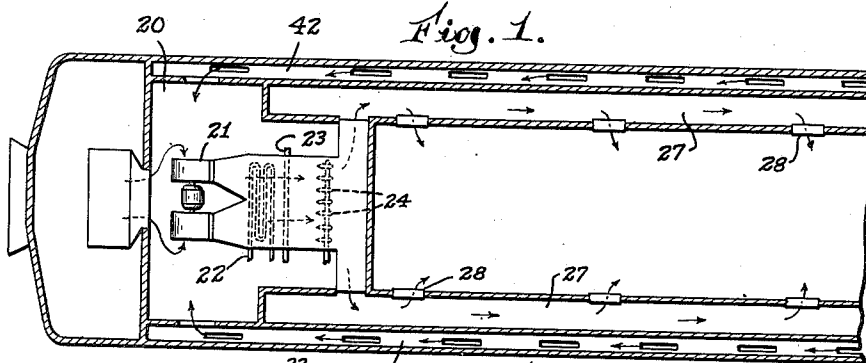
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2,179,873

HEATING AND HUMIDIFYING SYSTEM

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HEATING AND HUMIDIFYING SYSTEM

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2 Claims. (Cl. 237—45)

This invention relates to heating and humidifying systems and relates more particularly to heating and humidifying systems for passenger vehicles such as railroad passenger cars.

This application is a division of our application Serial No. 62,470, filed Feb. 5, 1936.

The benefits of humidifying heated air are well known but there are disadvantages which have in many cases prevented these benefits from being gained. For example, in a space having windows, it is impossible to maintain the desired relative humidity indoors when the outdoor temperature is low without the moisture in the humidified air condensing upon the inner surface of the window panes. This condensation takes place, of course, whenever the window pane is chilled by the outdoor air to a temperature below the dew point of the indoor air. This condensation upon the window panes is very undesirable especially in passenger vehicles such as railroad passenger cars where the passengers are accustomed to gaze at the passing scenery.

Attempts have been made in the past to solve this problem by lowering the indoor relative humidity conformably with the lowering of outdoor temperatures for the purpose of maintaining the dew point of the indoor air at all times below the temperature of the outdoor air. This has proved successful in preventing condensation but in order to accomplish this, it is necessary on cold days to reduce the indoor relative humidity far below that recognized as necessary for comfort. As a result of the fogging up of the window panes even when double sash windows are employed, the railroads for example, do not utilize to any extent humidified air in winter. This results in the absurd situation that the air is properly conditioned in railroad passenger cars in summer, but not in winter, despite the fact that the very dry heated air supplied to railroad passengers is very uncomfortable.

According to this invention, there is provided in combination with a system for supplying properly humidified air to a heated space, means for the heating of the window panes to such a temperature that they cannot be chilled by any outdoor temperature to the dew point of the properly humidified indoor air.

An object of this invention is to prevent the condensation of moisture from properly humidified indoor air upon the surface of a window pane.

Another object of the invention is to maintain the window pane of an enclosure supplied with properly humidified air, at a temperature above the dew point of the humidified air.

Other objects of the invention will be apparent from the following description taken together with the drawing.

The invention will now be described with reference to the drawing of which:

Fig. 1 is a plan view in section along the lines 1—1 of Fig. 3, of a railroad passenger car equipped according to one embodiment of this invention;

Fig. 2 is an elevation view in section of the same car, and

Fig. 3 is a cross-section along the lines 3—3 of Fig. 2.

In the arrangement illustrated by Figs. 1 to 3 inclusive, there is mounted in one end and in the roof zone of a railroad passenger car an air conditioning compartment 20, containing the blowers 21, the cooling coils 22 adapted to be supplied with a refrigerant in summer, the heating coils 23 adapted to be supplied with steam from the engine or other convenient source, and the humidified spray nozzles 24 adapted to be supplied with water from a conveniently located source. Outside air is drawn in by the action of the blowers 21, through the inlet 25, and recirculated air is drawn in through the inlet 26.

The conditioned air comprising heated and humidified air in winter is forced from the output side of the compartment 20 into the overhead longitudinal ducts 27. The ducts 27 are provided with a plurality of spaced outlets 28 through which the conditioned air is supplied into the passenger space.

The suction sides of the blowers 21 are connected to the auxiliary longitudinal ducts 42 which in turn communicate with the spaces between the window panes with air flow upward, and arranged below the windows and opening into the lower spaces 35 are the lower longitudinal ducts 43 within which are mounted the heating elements 44 which may be of the steam or electric type, for example.

The spaced inlets 45 in the ducts 43 communicate with the floor zone of the passenger space and in operation, the recirculated air from the floor zone is drawn in by the action of the blowers 21 over the heating surfaces 44, into the ducts 43 and then passes upward between the parallel window panes 33 into the auxiliary overhead ducts 42 which connect with the compartment 20 at the suction sides of the blowers 21. With this embodiment the air passed between the window panes may be heated to a higher temperature without the supply of overheated air to the passenger space, to heat the window panes to a rel-

actively high temperature regardless of how low the outdoor temperature falls.

In the accompanying drawing, only those details of car construction necessary for an understanding of the invention are shown. The drawing is purely diagrammatic as regards other details. For example, although the modern railroad passenger car has insulated air supply ducts and insulation at various locations, these details have been purposely omitted to avoid the showing of what is believed to be unnecessary detail.

While one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the exact apparatus and arrangement of apparatus described, since many departures may suggest themselves to those skilled in the art without departure from the invention.

What is claimed is:

1. Air conditioning apparatus for a passenger vehicle having a plurality of double sash windows, comprising a central air conditioning unit, air heating and humidifying means in said unit, an air distributing duct overhead the passenger space of said vehicle for supplying air from said unit into said passenger space, an air receiving duct above said passenger space connecting with the air inlet of said unit, means forming a plurality of air passages from the floor zone of said

space, between the panes of said windows and into said air receiving duct, air heaters below said windows for heating the air entering said passages, and means for drawing air over said heaters, through said passages and duct and through said unit and for discharging it into said distributing duct.

2. Air conditioning apparatus for a passenger vehicle having a plurality of double sash windows, comprising a central air conditioning unit, air heating and humidifying means in said unit, an air distributing duct overhead the passenger space of said vehicle for supplying air from said unit into said passenger space, an air receiving duct above said passenger space connecting with the air inlet of said unit, a second air receiving duct in the floor zone of said space, means forming a plurality of air passages from said second air receiving duct, between the panes of said windows and into said first mentioned air receiving duct, air heaters in said second air receiving duct below said windows for heating the air entering said passages, and means for drawing air over said heaters, through said passages and said air receiving ducts and through said unit and for discharging it into said distributing duct.

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