Dec. 3, 1940. E. J. W. RAGSDALE ET AL 2,223,940

VENTILATING SYSTEM

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Fig. 1.

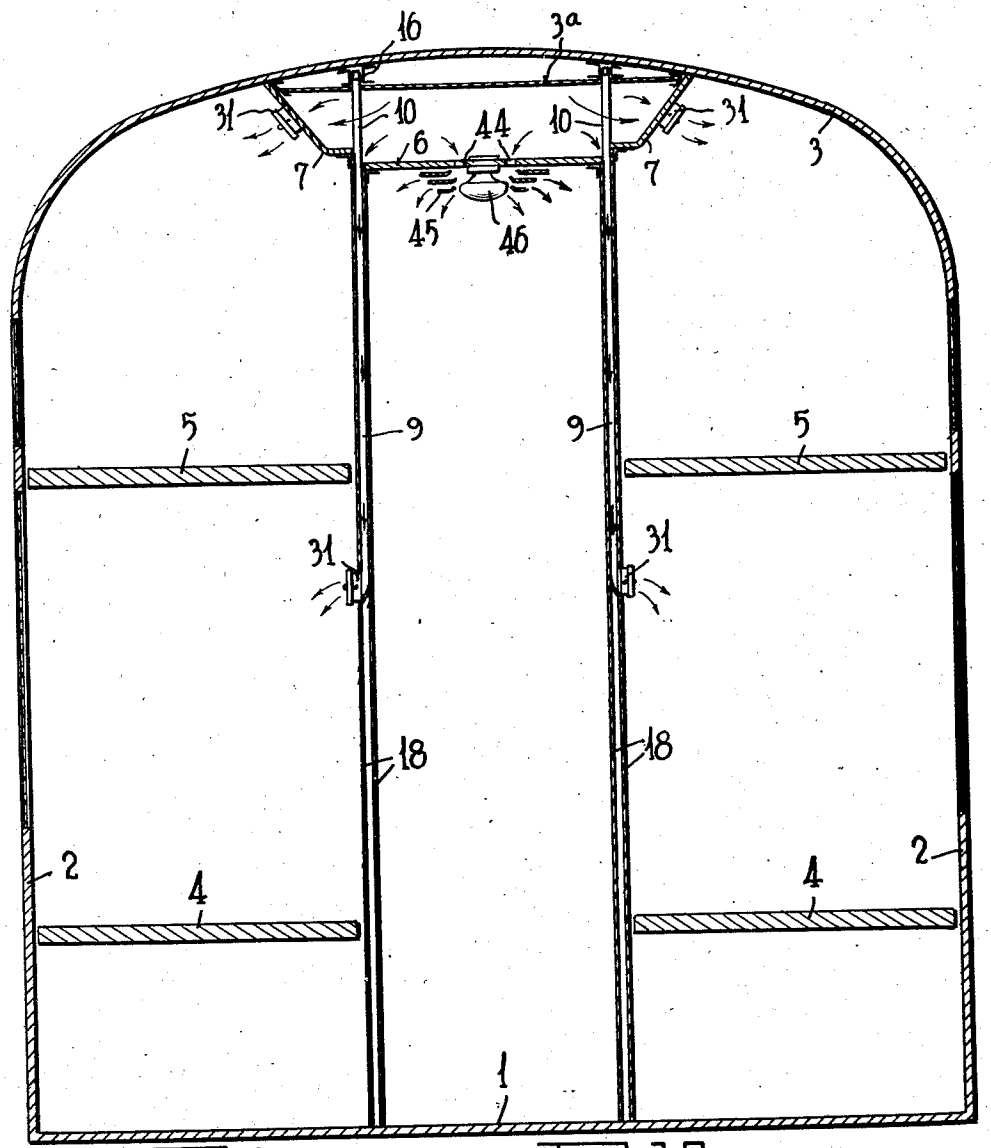


Fig. 12.

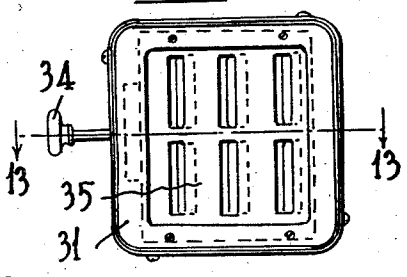
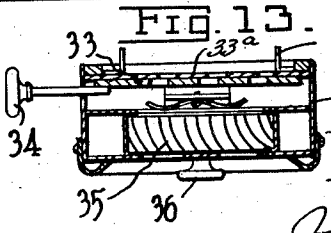


Fig. 13.



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VENTILATING SYSTEM

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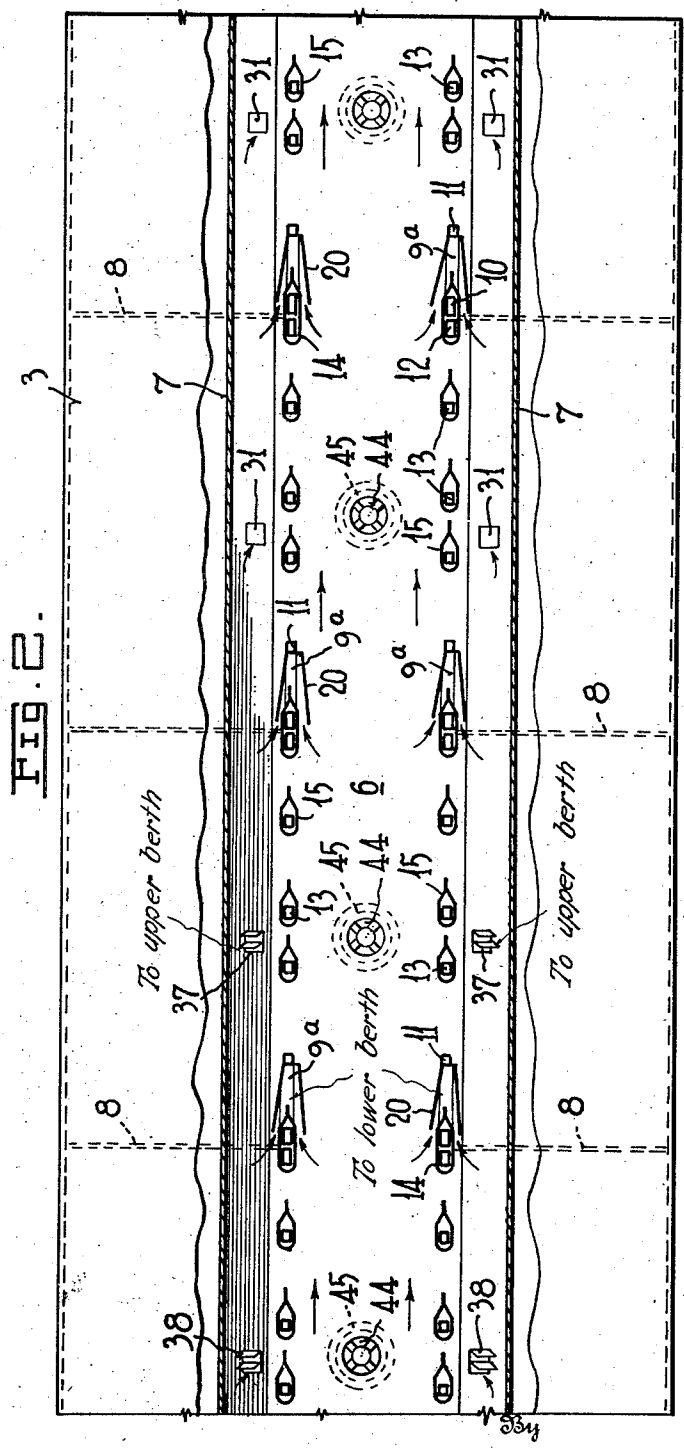

FIG. 2.

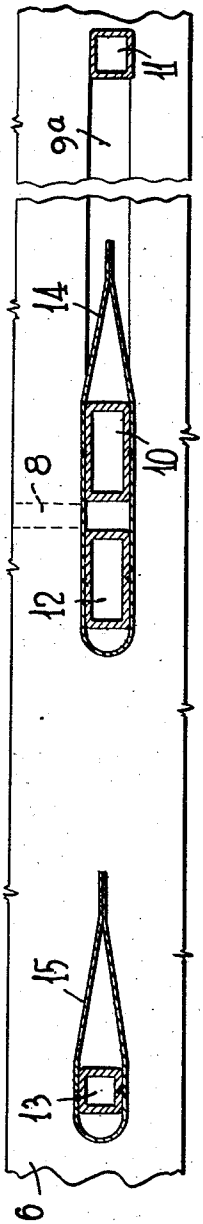

FIG. 3.

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VENTILATING SYSTEM

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Fig. 4.

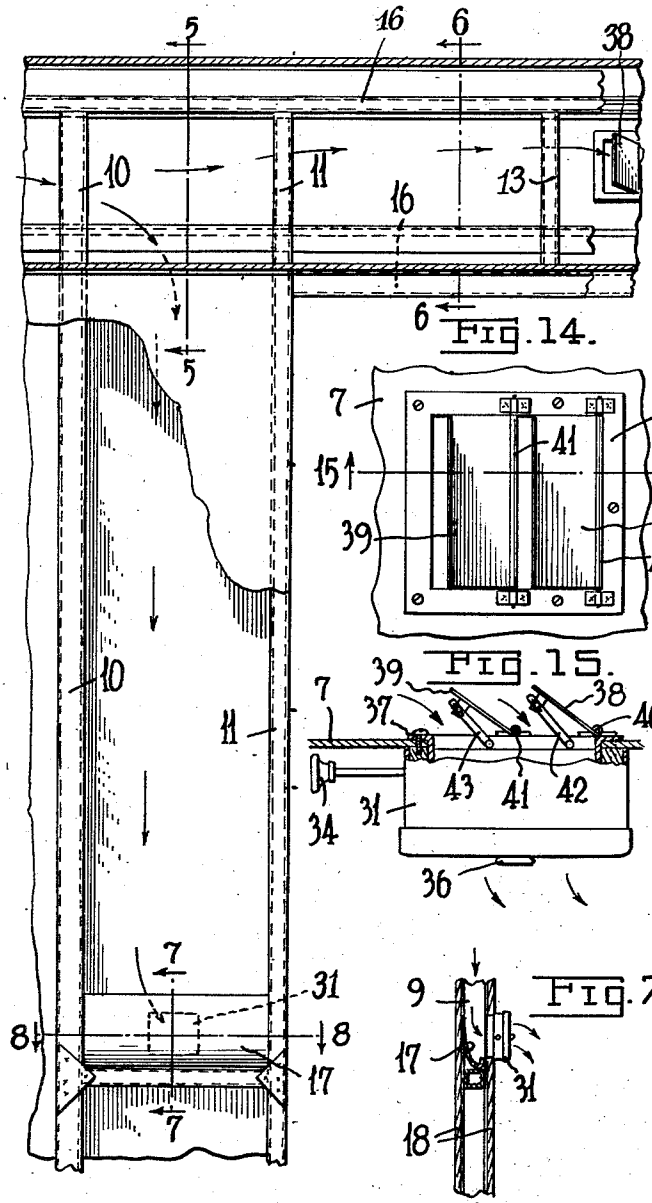


Fig. 5.

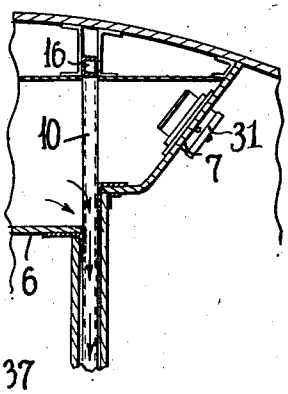


Fig. 14.

Fig. 6.

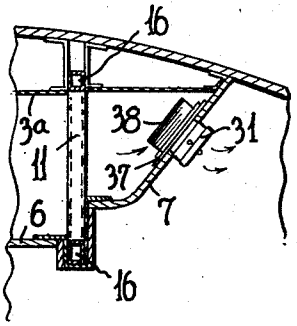
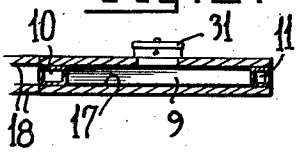


Fig. 15.

Fig. 7.

Fig. 8.



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VENTILATING SYSTEM

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Fig. 9.

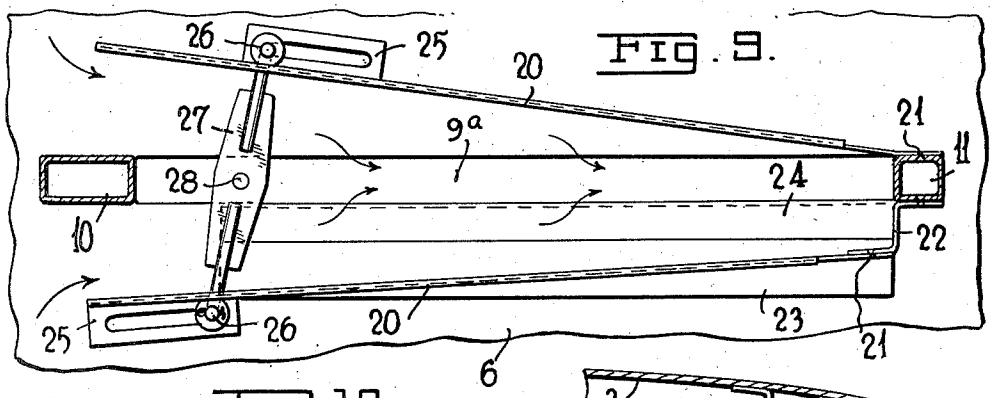
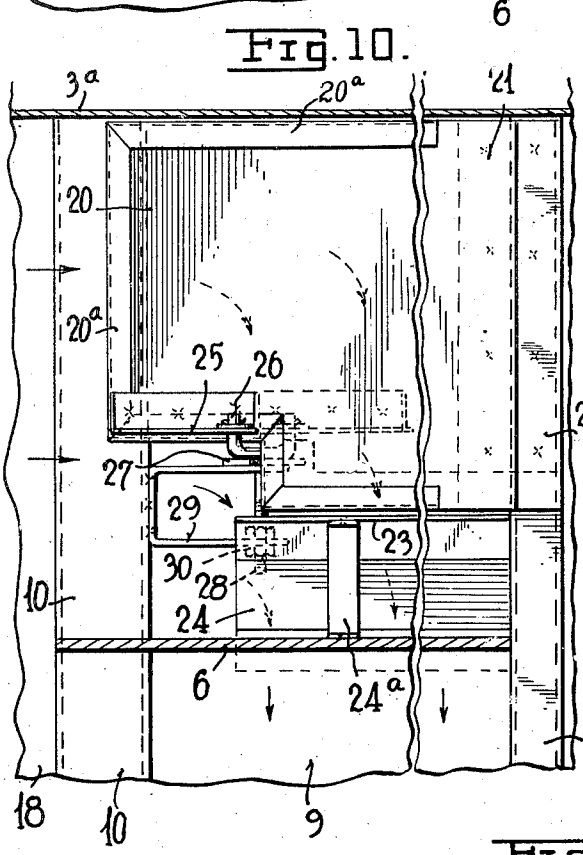


Fig. 10.



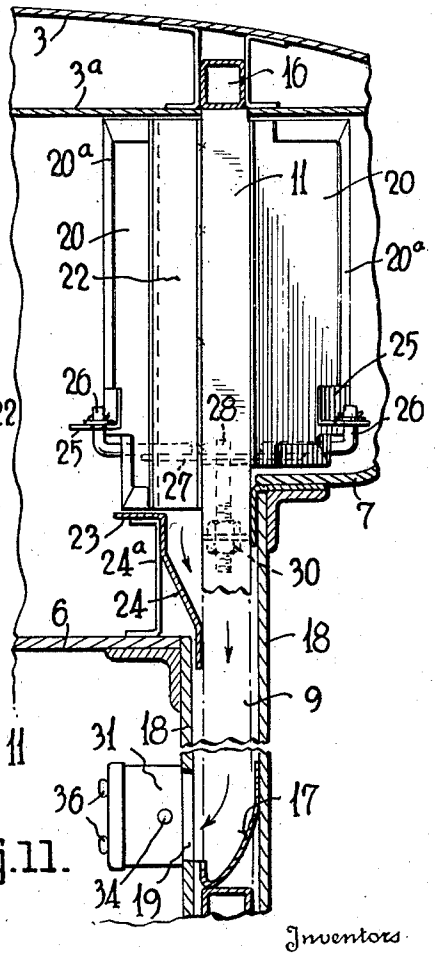


Fig. 11.

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Patented Dec. 3, 1940

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UNITED STATES PATENT OFFICE

2,223,940

VENTILATING SYSTEM

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Application April 10, 1937, Serial No. 136,188

7 Claims. (Cl. 98—5)

This invention relates to sleeping cars and more particularly to ventilating systems for such cars.

As ordinarily constructed, sleeping cars comprise a series of sections or berth spaces along each side, with an aisle between them, each section comprising upper and lower berths. Owing to the necessity of closing the berth spaces when occupied, for the sake of privacy, the suitable ventilation of such berth spaces presents a difficult problem. This is particularly true of the upper berths, which usually are not even provided with windows.

The general object of the invention is to devise improved means for supplying suitably conditioned air, in regulatable quantities, to each of the berth spaces of a sleeping car, regardless of windows or outside conditions.

To this end, the invention contemplates the provision of an air duct extending longitudinally of the car and means by which air from this duct may be delivered into each of the berth spaces.

In order to convey air to the lower berth spaces, we propose to provide conduits extending down from the said duct to each berth space, and also to provide means whereby air flowing through the duct may be deflected into said conduits.

These conduits will preferably be in the form of hollow columns constituting part of the car structure and forming a portion of the side walls of the berth spaces adjacent the aisle.

As to the upper berths, the invention contemplates an air duct of the full width of the aisle, and the provision of means whereby air from this duct may be delivered directly into the upper berth spaces on each side thereof.

Other features and advantages of the invention will hereinafter appear from the following description.

In order that the invention may be readily understood, reference is had to the accompanying drawings, forming part of this specification, and in which:

Fig. 1 is a cross sectional view conventionally illustrating a sleeping car, and showing the application of the invention thereto;

Fig. 2 is a fragmentary sectional diagrammatic plan view of the car shown in Fig. 1, parts being broken away;

Fig. 3 is a fragmentary enlarged sectional plan of some of the parts shown in Fig. 2;

Fig. 4 is a fragmentary elevation of the framework of one of my improved conduits for feeding air to the lower berth spaces, and also illustrating the associated roof framing but certain deflecting plates have been omitted for the sake of clearness;

Fig. 5 is a fragmentary transverse section substantially on line 5—5 of Fig. 4, but also showing part of the adjacent car structure;

Fig. 6 is a similar section taken at a different point, as indicated by the line 6—6 of Fig. 4;

Figs. 7 and 8 are vertical and horizontal sections taken respectively on the lines 7—7 and 8—8 of Fig. 4, but showing the conduit as it appears when completed by the addition of the side panels;

Fig. 9 is a plan view on an enlarged scale of the improving air deflecting means which we employ for directing air from the main duct into the conduits leading to the lower berth spaces, parts being shown in section and other parts omitted for the sake of clearness;

Fig. 10 is a side elevation of the device shown in Fig. 9, parts being broken away and parts shown in section;

Fig. 11 is an end elevation of the apparatus shown in Fig. 10, additional portions of the car structure being included, and parts being shown in section;

Fig. 12 is an inverted plan view of an air control device which we may employ;

Fig. 13 is a section on the line 13—13 of Fig. 12;

Fig. 14 is a face view of air deflecting means which may be employed in connection with the upper berth spaces; and

Fig. 15 is a section substantially on the line 15—15 of Fig. 14.

Referring to the drawings in detail, and more particularly first to Figs. 1, 2 and 3 thereof, Fig. 1 shows conventionally a typical cross section of a sleeping car, having a floor 1, side walls 2, roof 3, lower berths 4, and upper berths 5. The usual curtains enclosing the berth spaces are, of course, employed, but have been omitted from the drawings for the sake of clearness.

In carrying out the present invention, I provide a main air duct extending along the length of the car adjacent the roof, such duct having a horizontal bottom wall or floor 6, forming the top of the aisle, and having its sides closed by diagonally extending partition walls 7.

The transverse partitions between the sections or berth spaces are indicated at 8 in Figs. 2 and 3.

Extending down from the main duct above the aisle to each lower berth space, is an air conduit designated in its entirety by the reference numeral 9, and best shown in Fig. 1. This conduit is in the form of a hollow column built up of spaced posts and cover plates or panels.

As illustrated in Figs. 2, 3, 4 and 8, each conduit or column 9 comprises two posts 10 and 11 spaced apart longitudinally of the car, the space between them being closed by side panels 18. The upper end of each of these columns or conduits opens into the main air duct, as indicated at 9a in Figs. 2, 3 and 9.

By reference to Fig. 2, it will be understood that one of these columns or conduits is disposed near one end of each berth space or section. In addition to the posts 10 and 11 forming each of these columns, there is associated with each berth space another post 12 similar to and closely adjacent the post 10, but on the opposite side of the partition 8 therefrom.

The posts 10 and 11 extend up in to the main air duct and are secured at their upper ends to longitudinally extending framing members 16. In the spaces between the columns 9 are short posts or braces 13 which connect the longitudinal framing members 16, as shown in Fig. 4, and as illustrated diagrammatically in Figs. 2 and 3. It will therefore be understood that these posts 13 and the upper ends of the posts 10 and 11 are set directly in the path of the air flowing through the main duct above the aisle.

In order to reduce to a minimum the air resistance of these posts, and also to prevent turbulence of the air at the entrance 9a to the conduits 9. We preferably enclose the upper portions of the posts 10 and 12 in streamlined shrouds 14, and enclose the posts 13 in streamlined shrouds 15, all as clearly shown in Figs. 2 and 3. These shrouds are omitted in Figure 4 for the sake of clearness.

At a suitable point in the height of the column is a discharge opening 19, arranged to deliver air into the lower berth space, and extending across the column immediately below the opening 19 is a deflector 17, as clearly shown in Figs. 4, 7 and 11.

By reference to Figs. 1, 3, 8 and 9, it will be understood that the columns 9 are relatively thin transversely but relatively wide longitudinally of the car, so that they form in effect part of the side wall of the berth spaces.

In order to catch or deflect the air flowing along the main duct and direct it into the openings 9a at the top of the columns 9, we provide the device shown in detail in Figs. 9, 10 and 11, and illustrated diagrammatically in Fig. 2. This comprises a pair of deflecting plates 20 having throughout the major portion of their length a marginal seam or bead 20a, to give stiffness to the plate, the rear ends of the plates, however, being free from this bead, so as to be flexible. The flexible rear end of one of the plates 20 is secured as by spot welding to the post 11, as indicated at 21, while the rear end of the other of said plates is secured as by welding to the outer flange of a Z-shaped spacing plate 22, the other flange of which is secured as by welding to the opposite face of the post 11. Thus the two plates are spaced apart at their rear ends a distance somewhat greater than the width of the post 11.

The lower edge of one of the plates 20 lies in close proximity to the partition wall 7, while the lower edge of the other plate lies close to a horizontal flange 23 projecting from a funnel plate 24 secured at its lower edge to the post 11 and supported by a suitable bracket 24a.

The deflector plates 20 are preferably made adjustable, and to this end each carries a slotted lug 25, in the slots of which work the upturned ends 26 of arms secured to a cross bar 27 rigid with the upper end of a shaft 28, journalled in a U-shaped bracket 29, welded to the post 10, and having its lower end threaded and provided with a pair of clamping nuts 30.

It will be seen that by turning the cross bar 27 to different angular positions, the forward ends of the plates 20 may be drawn closer together or forced further apart, so as to gather in more or less air as desired, and that the plates may be secured in adjusted position by tightening the nuts 30.

It will be apparent that air flowing along the main duct will be caught in the space between the deflector plates 20 and will be forced by them and the funnel plate 24 down into the open end 9a of the conduit 9, as shown by the arrows in Figs. 9, 10 and 11. (The post 12 and the streamlined shrouds have been omitted from these figures for the sake of clearness.)

In order to regulate and control the air discharged through the openings 19 in the conduits or columns 9, I preferably mount in each such opening a combined throttling and air directing device designated in its entirety by the reference numeral 31 and best shown in Figs. 12 and 13. This device is provided on its rear side with a flange 32 adapted to fit within the opening 19, and adjacent this flange, with a grid structure 33, manipulated by means of a handle 34, by means of which the amount of air admitted may be controlled as desired. In addition, the device 31 contains a rotary element 35 comprising curved vanes, and this may be turned by means of the handle 36 so as to direct the incoming stream of air in any way desired. This controlling device itself is of known construction and forms no part of the present invention.

The partition walls 7 extending along the sides of the main air duct are also provided with a discharge opening at each berth space, and air control devices such as 31 are likewise preferably mounted in these discharge openings. In this way the quantity and direction of air admitted to the upper berth spaces may be regulated as desired.

In addition to the control device 31, it may be desirable in some cases to install adjacent each opening in the partitions 7, and on the inside thereof, air deflectors or "snatchers" for the purpose of deflecting air from the duct into and through the control devices 31. As shown in Figs. 6, 14 and 15, this air deflecting device comprises a frame 37 adapted to fit within the openings in the partition 7 and carrying a pair of pivoted doors or vanes 38 and 39, hinged at 40 and 41 respectively. These doors or vanes may be held at any desired angle by means of adjustable braces 42 and 43, as illustrated diagrammatically in Fig. 15. Air is caught by these vanes or doors and directed into and through the control device 31, as shown by the arrows in Fig. 15.

In addition to the specific provisions for delivering air from the main duct into both the upper and lower berth spaces, as described, I also propose to deliver air from this duct into the aisle at a point between the berth spaces. The method of doing this is illustrated in Figs. 1 and 2, in which suitable openings 44 are provided in the wall 6 at intervals and beneath these openings are arranged circular concentric curved baffles 45, which serve to distribute the air evenly in all directions. A suitable lamp 46 may, if desired, be mounted at the center of the baffles 45, and these may be arranged to serve as reflectors.

It will be understood that air which has been

filtered, cooled or otherwise conditioned, is forced, by means of a fan (not shown) to flow along the main duct longitudinally of the car, above the wall 6. On account of the velocity of this air being greater at the fan end of the car than at the other end, it may be desirable to use the deflecting devices for the upper berths, as shown in Figs. 14 and 15, only for the first two berths adjacent the fan end of the car. This is indicated in Fig. 2. For the other berths, only the control device 31 is usually employed.

Whether these deflectors 38, 39 are used or not, it will be apparent that air passing along the main duct, under pressure, will be discharged both through the control devices 31 into the upper berth spaces and through the conduits 9 and control devices 31 into the lower berth spaces, as well as through the openings 44 into the aisle, and that therefore the entire interior of the car is at all times provided with an ample supply of fresh, suitably conditioned air.

What we claim is:

1. The combination with a sleeping car having sections, of a hollow inside column associated with each section and constituting part of the car structure and located centrally within the car and spaced from the car side walls, an air duct extending longitudinally of the car, and means for delivering air from said duct through said columns into said sections.

2. In a sleeping car having a series of sections at each side, with an aisle between them, a hollow inside column spaced from the car side walls associated with each section at the aisle side thereof and constituting part of the car structure, an air duct extending centrally and longitudinally of the car, and means for delivering air from said duct through each of said columns into the associated section.

3. In a sleeping car having a series of sections at each side, with an aisle between them, a hollow inside column spaced from the car side walls associated with each section at the aisle side thereof and constituting part of the car structure, an air duct extending centrally and longitudinally of the car above the aisle, and means for delivering air from said duct down through each of said columns into the associated section.

4. The combination with a sleeping car having an aisle and a series of lower berth spaces adjacent thereto, of an air duct extending longitudinally of the car adjacent the roof, and a conduit spaced from the side walls of the car extending down from said duct at the aisle side of each of said berth spaces and opening into the same, the upper ends of said conduits communicating with said duct, and said conduits being relatively thin and wide, and themselves constituting a part of the inside wall of said berth spaces.

5. The combination with a sleeping car having a series of lower berth spaces, of an air duct extending longitudinally of the car adjacent the roof, a conduit extending down from said duct to each of said berth spaces, each of said conduits being formed of a pair of posts spaced longitudinally of the car and extending into said duct, and means adjacent said posts and cooperating with one of them for deflecting air from said duct into the space between them constituting the conduit.

The combination with a sleeping car having a series of lower berth spaces, of an air duct extending longitudinally of the car adjacent the roof, a conduit extending down from said duct to each of said berth spaces, each of said conduits being formed of a pair of posts spaced longitudinally of the car and extending into said duct, means adjacent said posts for deflecting air from said duct into the space between them constituting the conduit, and a streamlined shroud enclosing the upper ends of those posts at the side of the conduit from which the air is flowing.

7. The combination with a sleeping car having a series of lower berth spaces, of an air duct extending longitudinally of the car adjacent the roof, a series of posts extending into said duct, and conduits extending down from said duct to said berth spaces, the upper ends of said conduits communicating with said duct adjacent said posts, and said posts within said duct being of streamlined section, whereby air turbulence at the entrance to said conduits is prevented.

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