

March 20, 1934.

W. H. MUSSEY

1,951,521

CAR HEATING ASSEMBLY

Filed March 5, 1930

4 Sheets-Sheet 1

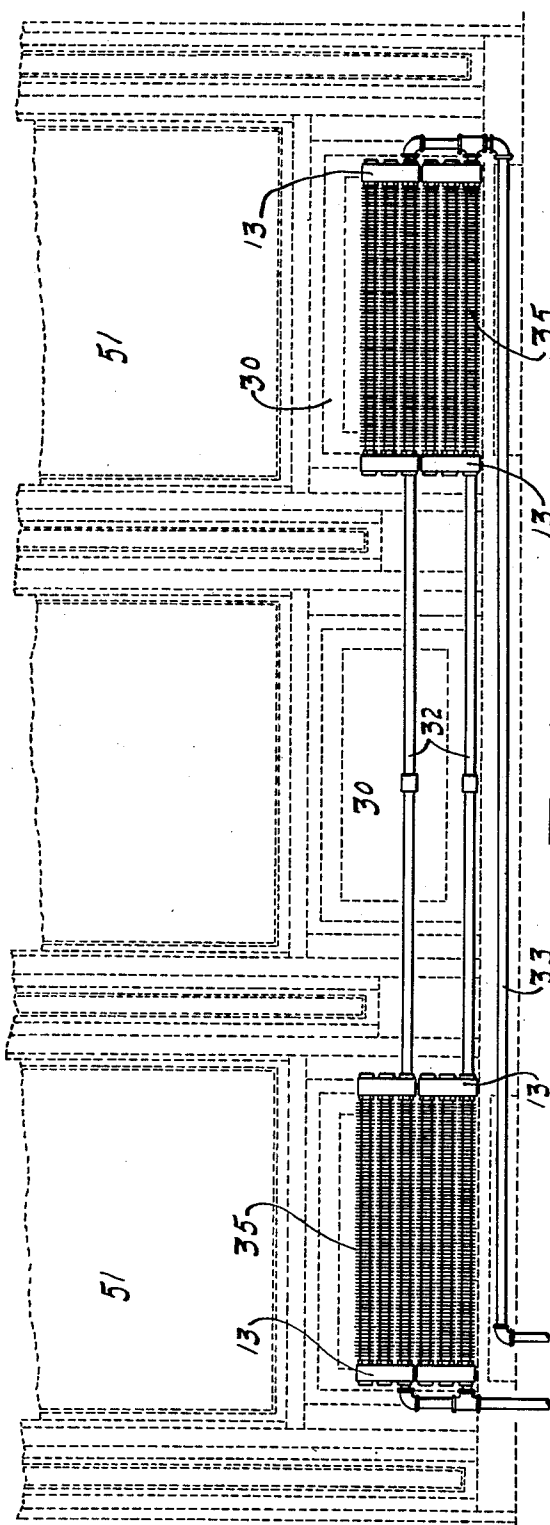


FIG. 1.

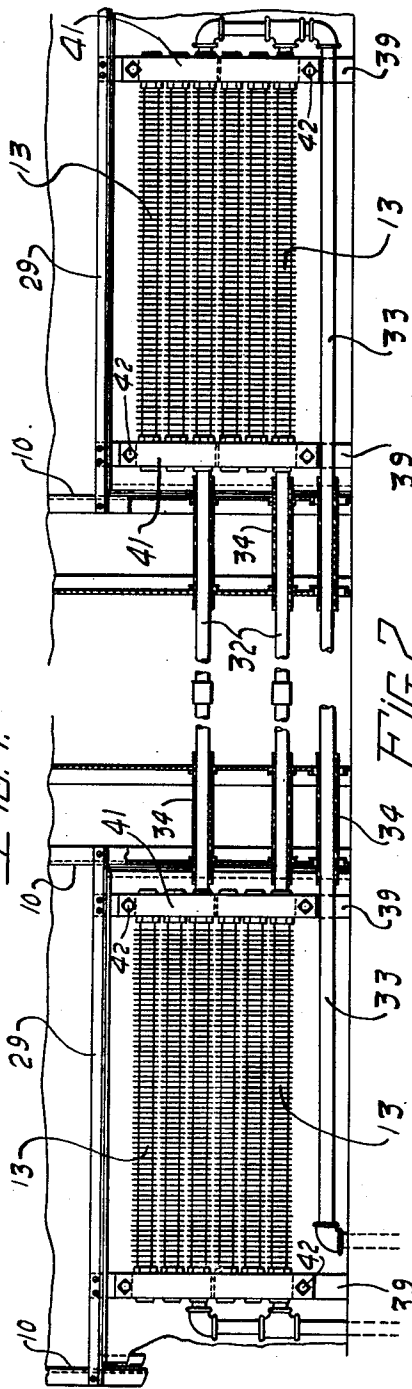


FIG. 2.

INVENTOR:
WILLIAM H. MUSSEY.
by Oscar Hochberg.
his ATTORNEY.

March 20, 1934.

W. H. MUSSEY

1,951,521

CAR HEATING ASSEMBLY

Filed March 5, 1930

4 Sheets-Sheet 2

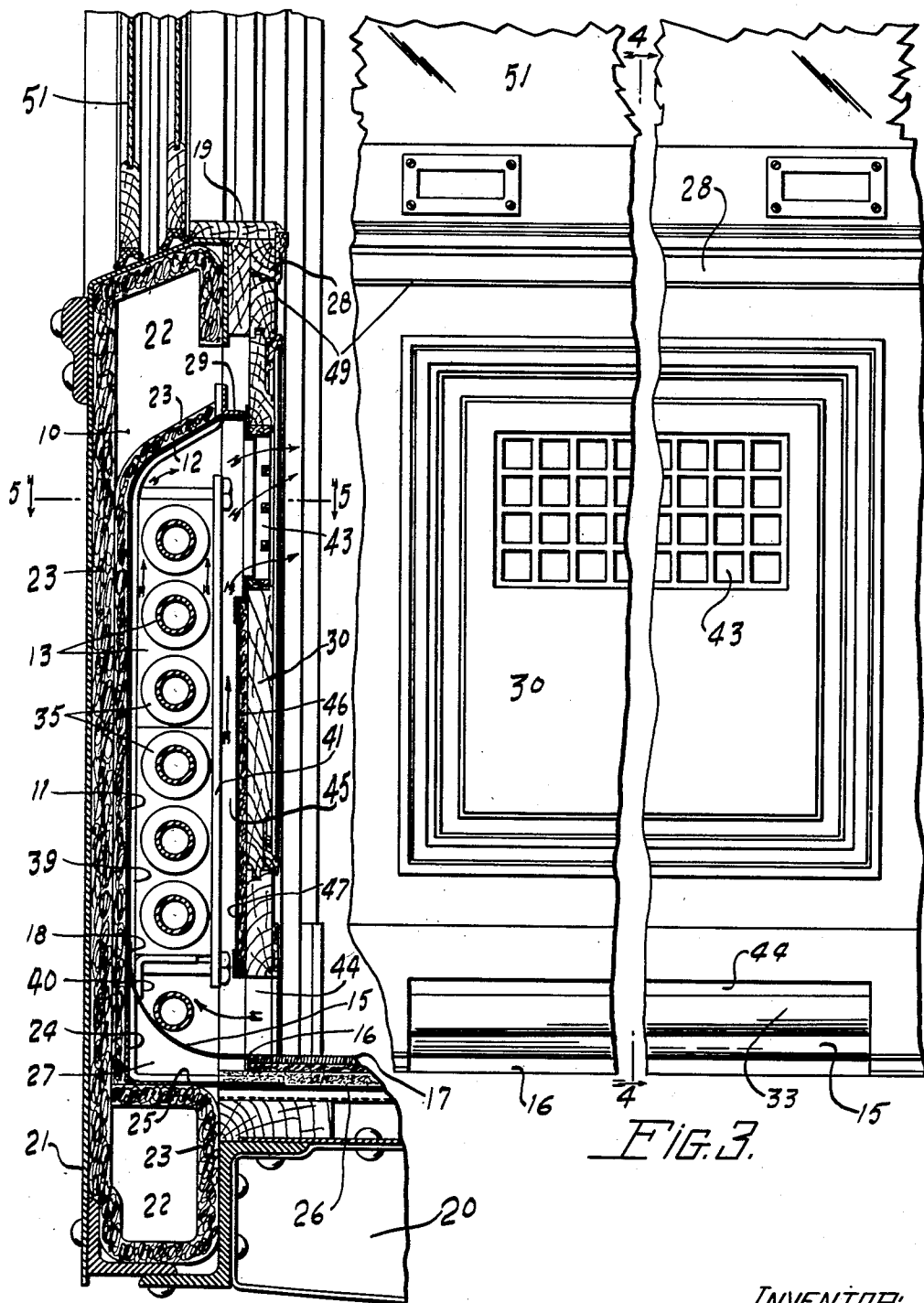


FIG. 4.

FIG. 3.

INVENTOR:
WILLIAM H. MUSSEY.
by Oscar Hochberg.
his ATTORNEY.

March 20, 1934.

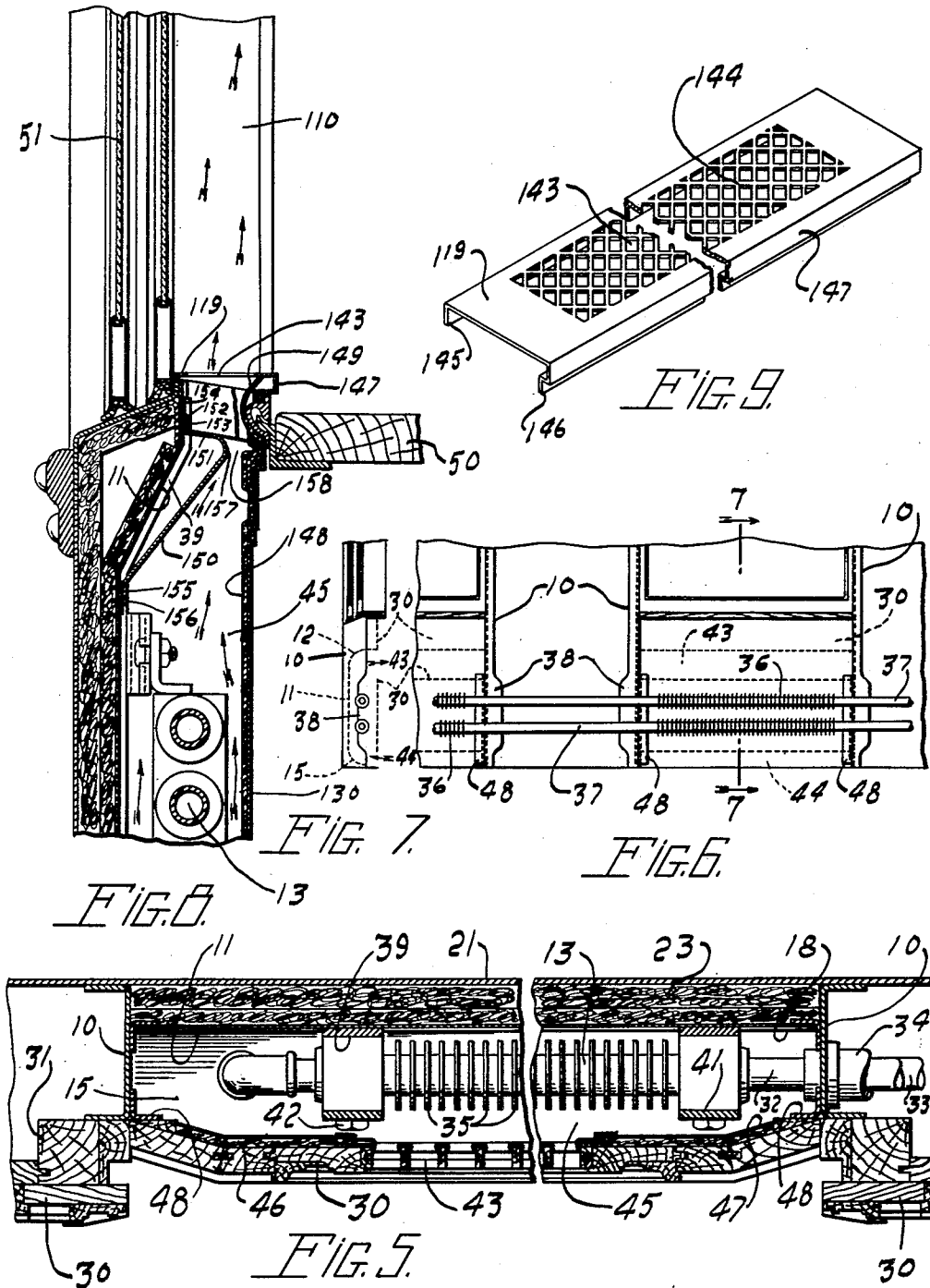
W. H. MUSSEY

1,951,521

CAR HEATING ASSEMBLY

Filed March 5, 1930

4 Sheets-Sheet 3



INVENTOR:
WILLIAM H. MUSSEY,
by Oscar Hochberg,
his ATTORNEY.

March 20, 1934.

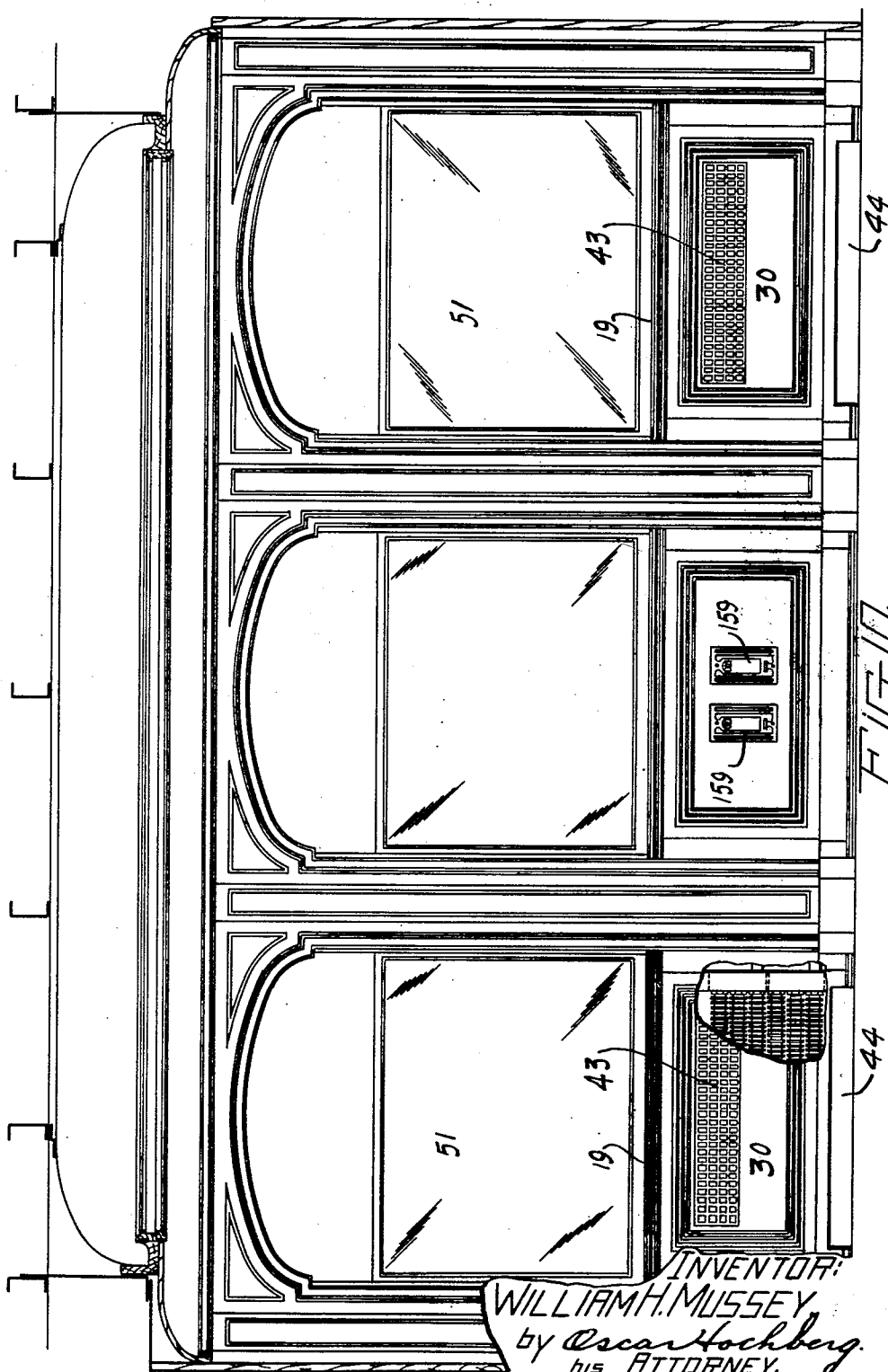
W. H. MUSSEY

1,951,521

CAR HEATING ASSEMBLY

Filed March 5, 1930

4 Sheets-Sheet 4



INVENTOR:
WILLIAM H. MUSSEY
by Oscar Hochberg
his ATTORNEY.

UNITED STATES PATENT OFFICE

1,951,521

CAR HEATING ASSEMBLY

William H. Mussey, Chicago, Ill., assignor, by
mesne assignments, to Pullman Car & Manu-
facturing Corporation, a corporation of Dela-
ware

Application March 5, 1930, Serial No. 433,302

7 Claims. (Cl. 237—45)

The invention relates generally to heating installations in railway cars and other vehicles, and contemplates the placement of radiators behind the wainscoting and between posts of the car framing. The invention further contemplates the provision of means associated with the respective radiators for drawing the relatively cool air to be heated from adjacent the floor within the car and emitting the heated air in localized areas throughout the car interior.

The principal object of the invention is to utilize the heretofore unoccupied space between the supporting posts of the car framing, and between the girder side and inside lining or wainscoting, for the concealment of radiators and associated deflector units, so that the space devoted to the passengers shall be free from the hampering presence of coils and coil housings commonly associated with the systems heretofore employed.

A further object is to so correlate the framing structure and the several radiators and deflector units, that the heating coils and connecting pipes may be removably mounted and made accessible for inspection.

A further and important object is to so dispose the several radiators as to cause the relatively cool air drawn from the car interior to be swept across the full heat radiating field of the respective radiators.

The foregoing and other objects are attained by the construction illustrated in the accompanying drawings, in which

Figure 1 is an elevational view of the heating system in position within the wall of a railway car, the embodiment indicated involving a unit of two banks of radiators;

Figure 2 is a similar view on a larger scale showing the unit mounted upon the supporting posts of the car framing;

Figure 3 is a similar view showing the wainscoting panel covering the radiator pockets in the car wall and formed with air intake and emission openings;

Figure 4 is a vertical sectional view through one of the radiator pockets taken on line 4—4 of Figure 3, showing the side girder of the car, the deflector unit, the radiator in front of it, and the removable wainscoting panel, together with the method of insulating the deflector unit from the girder and window sill;

Figure 5 is a horizontal section through the same taken on line 5—5 of Figure 4, showing the radiator connecting and drain pipes supported in the framing posts, and the radiator clamping means;

Figure 6 is an elevational view showing a modified embodiment of the invention in which the radiator units are formed upon or interposed in the supply and drain pipes of the system at spaced intervals along the pipes;

Figure 7 is a vertical section through same taken on line 7—7 of Figure 6, showing the posts recessed to accommodate the pipes in the plane of the posts;

Figure 8 is a view similar to Figure 4, but showing the system adapted for the delivery of heated air upwardly through registers in the window sills for use in dining cars;

Figure 9 is an isometric view showing the window sill grille; and

Figure 10 is an inside elevational view of a portion of a car interior showing the wall formed with ducts housing the radiators, and indicating the relative positions of intake and exhaust openings beneath certain of the windows with temperature regulating controls for operating selected units of the system.

In the practice of the invention, the space between the posts 10 at the radiator positions is fitted with a deflector plate 11 having its upper wall 12 formed to overhang adjacent radiator 13 and its lower portion designed to extend beneath the radiator as best indicated in Figs. 4 and 7. In the embodiment shown, the lower portion of the deflector is provided with a separately formed curved deflecting face 15, with its exposed outer edge shaped to provide an abutment 16 for the bordering margin of the floor covering 17, the upper edge 18 of the curved plate being attached to the body plate 11 to avoid possible chattering of the plates at that point.

To prevent conduction of the radiated heat to the underframe 20, girder side 21, and window sills 19, the space 22 between said parts and deflector plate 11 is lined with heat insulating material 23 secured in any approved fashion. As indicated in Figure 4, the deflector plate 11 is extended downwardly to a point below the upper edge 18 of the curved face plate 15 of the deflector, to form a wall portion 24, then laterally to provide flange 25 extending beneath the curved deflector face plate 15 and in overlapping relation with the floor 26 of the car, to form with deflector plate 15, a dead air space 27 designed to prevent undue chilling of the air received at the intake hereinafter referred to, and further insulate the car interior from the relatively cold insulation space 22 between the floor and girder wall.

At its upper side the deflector unit is secured to

the framing of the car through the medium of the overhanging wall 12 secured along its marginal edge to adjacent framing strips 29 extending between and secured to the posts 10 and against which the lining or wainscoting 30 may find an abutment. Thus arranged, the deflector prevents the heated air rising from the radiator from entering that portion of space 22 above the deflector part 12 and directs all of the air heated to the car interior through emission openings hereinafter described.

Since the duct space 45 is closed in by the posts 10 and filler pieces 31 the radiated heat is emitted at the respective radiator areas in sufficient volume to maintain desired temperature at selected points in the car.

The radiator units employed are proportioned to the heating requirements, and in Figures 1 to 5, inclusive, are indicated as comprising a plurality of coils 13 connected by feed pipes 32 and drain pipe 33 leading to regulating valves (not shown) beneath the car. As best shown in Figures 2 and 5, these pipes are preferably covered with heat insulating material 34 where the pipes enter openings in posts 10 to prevent conduction of heat to the framing and insure delivery of such heat to contiguous coil areas. The radiating field of the several coils 13 may be increased by the addition of fin plates 35 firmly secured to the coil tubing as indicated in Figures 1, 2, 4, and 5, with their exposed faces disposed vertically to permit passage of the air stream between them.

As shown in Figures 6 and 7, these fins may be employed to provide localized radiators 36 in or upon pipe lines 37 in cases where smaller radiator units will answer the purpose or where space is limited. Radiators thus formed upon or interposed in the pipe lines 37 may be supported directly upon the several posts 10 as shown in Figures 6 and 7, and the posts indented as at 38 to permit the pipe lines to be set within the planes of the posts to provide sufficient clearance between the pipe lines and wainscoting 30 and to avoid piercing the posts. In Figures 2, 4, and 5, the radiator units 13 are supported by means of saddle straps 39 resting upon lower flange 25 of the deflector plate 11 and extending upwardly along the underface of upper wall 12 thereof and through openings in said wall for attachment to horizontal framing strips 29.

To the saddle straps at the bottom of the radiators, brackets 40 are secured by screws or otherwise, and provide substantial support for the radiator coils 13 which are further held in proper operating relation to deflector plate 11 and wainscoting 30, by strap clamps 41 fastened by screw bolts 42 tapped into the saddle straps 39.

With the radiator units, deflectors, and associated framing elements assembled as above described, the installation is completed by the application, in the present embodiment, of wainscoting sections 30 having air emission openings 43 and lower air intake openings 44, with a relatively broad expanse of wainscoting area between them, as best shown in Figures 3, 4, and 10. The respective wainscoting portions intermediate the air emission and intake openings 43 and 44 are of relatively substantial proportions for the purpose of providing with their associated framing and deflector assemblies, a continuous air duct 45 having its terminals at such openings. The radiator unit 13 installed within the duct is designed to induce circulation of the air therein to the end that the air heated by the radiator will

be forced through emission opening 43 as the relatively cool air drawn in at the intake opening 44 displaces the air expelled.

Between companion openings, the wainscoting areas, upon their respective inner faces, are insulated from the heat of adjacent coils 13 by a layer of fibrous material 46 to prevent absorption of heat by the wainscoting, if of metal, and the insulation shielded by a covering 47 of tin or other metal having like heat reflecting characteristics, providing at once a protection for the insulation and the maintenance of a substantial air stream through intake and discharge openings. By utilizing the heat reflecting values of the steel deflector plate 11 and the tin covering 47 on the wainscoting 30, the effective heat zone is extended beyond the radiator proper to the plates 11 and 47 on respectively opposite sides of the radiator unit to insure complete utilization of the heat by all of the air circulating through the duct.

The wainscoting 30 at the radiator positions is removably secured to adjacent posts 10, preferably through the medium of attaching angle pieces 48 secured to the posts as best shown in Figures 5, 6, and 7. As indicated in Figures 3 and 4, the removable portions of the wainscoting rest upon the floor of the car and are held along their upper margins in interlocking relation with fixed portions 28 of the wainscoting beneath the window sills 19 by means of a rabbeted joint 49, so that by outward movement of the lower edge of the panel after removing the fastening means taking angle pieces 48, the panel may be disengaged and removed and the radiator and remaining duct parts exposed. From the disclosure it should be noted that the ducts 45 may terminate in openings in the plane of the wainscoting 30 or at an angle thereto, as desired. In both embodiments indicated, the lower curved portion of the duct 45 is adapted to direct all dirt and other matter finding its way to the duct, towards the intake opening 44 to avoid accumulation thereof and facilitate removal.

In practice, it may be desirable to install the system in dining or other cars in which the wall area immediately beneath the windows 51 is not available for heat emission openings 43 disposed as indicated in Figures 3 and 4, because of the presence of dining tables 50 or other interior equipment at the window positions and below the level of the window sills 19. As best shown in Figure 8, the air circulating ducts 45 are, in such cases, extended upwardly to emission openings 143 in window sills 119 in order that the heated air issuing from the duct will be directed upwardly to the window areas above the window sills without interfering with the comfort of those seated at the tables who might otherwise be discommoded by heat discharged beneath the tables were the wall openings 43 to be used.

The window sill 119 is preferably of metal with emission opening 143 therein covered by grille 144 as shown in Figure 9. As depicted in this figure, the sill is made in one piece and formed with outer and inner securing flanges 145 and 146 adapted for telescoping with associated parts on the framing between posts 110 and held down in any approved fashion. The insulation 148 covering inner face of wainscoting 130 is extended upwardly to provide shield 149 to prevent undue heating of the beaded inner edge 147 of the sill above tables 50.

Beneath the sill opening 143 is a removable fender and deflector plate having an upwardly

and inwardly inclined front face portion 150 terminating in a shelf portion 151 underlying the sill opening 143 and provided along its inner edge with an upstanding attaching flange 152 designed to interlock with offset flange 153 of strip 154 secured to the car framing. The inclined face portion 150 merges at its foot with securing flange 155 held to the car wall by screws 156 or like fastening devices to prevent withdrawal of upper flange 152 from its engagement with holding strip 154.

The fender plate functions to prevent the dropping of dirt and other matter upon the radiator 13 through sill opening 143. For this purpose the fender extends outwardly with its nosing 157 in or beyond the outer plane of the front face of the radiator. As indicated in Figure 8, the fender nosing is spaced from the insulation 148 of the wainscoting to provide an elongated passageway 158 to cause the expanding heated air in the duct 45 to be accelerated through the passageway whereby the air stream issuing from the sill opening 143 will be held in close proximity to the glass area of the windows to provide a curtain of warm air designed to temper and divert relatively cool air chilled by the window pane, and to prevent the steaming or frosting of the glass.

In operation, suitable provision is made to properly regulate the temperature of the car interior by automatic heat control devices 159 operatively connected with suitable regulating valves of the system and not here involved. Assuming the car to be cold and it is desired to turn on the heat, the control devices 159 are manipulated to cause regulating valves of the system to admit the heating agent to the coils 13 behind the wainscoting 30, whereupon the air enveloping the radiators becomes heated and begins to rise and is displaced by colder air admitted through intake openings 44 of the ducts as the heated air is discharged through emission openings 43 as indicated by the arrows, thereby creating a circulation of air of substantial proportions in the several ducts 45 concealed at strategic points in the walls of the car, whereby the heat of the radiators housed in the ducts is taken up by the air sweeping across the radiating field of the coils and conveyed thus indirectly to the car.

By placing the several coils 13 within ducts 45 vertically arranged at predetermined points in the car walls, a more equable and efficient distribution of heat is possible than that obtainable from the direct radiation systems heretofore employed. The arrangement lends itself to the installation of such ducts in walls, partitions, or bulkheads of the car large enough to accommodate a radiator unit. It should be noted that by the confinement of the radiator and duct units to the several window positions, the heating and circulation of the air is localized at predetermined points along the car wall beneath the windows, and the heat confined to the relatively cold window areas by the insulation of the duct areas beneath the windows from adjacent wall areas and between the windows.

What I claim is:—

1. In an indirect system of heating for passenger carrying vehicles, the combination including a car side comprising a plurality of windows and isolated, vertically arranged ducts, disposed at intervals along the car side and in vertical alignment with said windows extending substantially from the floor to respectively adjacent windows in the car side, extended wall areas between said ducts, said ducts terminating at their upper ex-

tremities in air emission openings beneath the windows and at their lower extremities in air intake openings at the floor line, the portions of the respective ducts intermediate said openings being imperforate, and separate radiators in said ducts spanning, respectively, the distance between said extended wall areas and the respective duct openings.

2. In combination with the side wall of a railway car comprising a plurality of spaced apart vertical posts and inner and outer walls carried thereby so as to enclose a plurality of separated wall spaces one between each adjacent pair of posts, a concealed radiating system comprising a plurality of separate radiators, each radiator being mounted in one of the wall spaces, and pipe sections connecting the radiators in series, each pipe section extending through openings provided therefor in the posts.

3. In combination with the side wall of a railway car comprising a plurality of spaced apart vertical posts and inner and outer walls carried thereby so as to enclose a plurality of separated wall spaces one between each adjacent pair of posts, a concealed radiating system comprising a plurality of separate radiators, each radiator comprising a pair of headers and a plurality of connecting pipes, means for anchoring each radiator in one of the wall spaces, a reflecting shield behind each radiator, the inner wall being provided with a lower inlet passage and an upper outlet passage to permit a circulation of air through each wall space in which a radiator is positioned, and pipe sections connecting the radiators in series, each pipe extending through openings provided therefor in the posts.

4. In combination with the side wall of a railway car comprising a plurality of spaced apart vertical posts and inner and outer walls carried thereby so as to enclose a plurality of separated wall spaces, one between each adjacent pair of posts, a concealed radiating system comprising a plurality of separate radiators, means for anchoring each radiator in one of the wall spaces, a reflecting shield behind each radiator, the inner wall being provided with a lower inlet passage and an upper outlet passage to permit a circulation of air through each wall space in which a radiator is positioned, and pipe sections connecting the radiators in series, each pipe section extending through openings provided therefor in the posts.

5. In combination with the side wall of a railway car comprising a plurality of spaced apart vertical posts and inner and outer walls carried thereby so as to enclose a plurality of separated wall spaces, one between each adjacent pair of posts, a concealed radiating system comprising a plurality of radiators each radiator being positioned in one of the wall spaces, the inner wall being provided with an inlet passage below the radiator and an outlet passage above the radiator, a reflecting shield positioned in the wall space, said shield being secured to the inner wall below the inlet passage and above the outlet passage and extending behind the radiator and pipe sections connecting the several radiators in series, each pipe section extending through openings provided therefor in the posts.

6. In combination with the side wall of a railway car comprising a plurality of spaced apart vertical posts and inner and outer walls carried thereby so as to enclose a plurality of separated wall spaces, one between each adjacent pair of posts, a concealed radiating system comprising a

plurality of radiators each radiator being positioned in one of the wall spaces, the inner wall being provided with an inlet passage below the radiator and an outlet passage above the radiator, a reflecting shield positioned in the wall space, said shield being secured to the inner wall below the inlet passage and above the outlet passage and extending behind the radiator, brackets for securing the radiator to the shield, and pipe sections connecting the several radiators in series, each pipe section extending through openings provided therefor in the posts.

7. In combination with the side wall of a railway car comprising a plurality of spaced apart vertical posts and inner and outer walls carried thereby so as to enclose a plurality of separated wall spaces, one between each adjacent pair of posts, a concealed radiating system comprising a plurality of radiators each radiator being positioned in one of the wall spaces, the inner wall being provided with an inlet passage below the radiator and an outlet passage above the radiator, a reflecting shield positioned in the wall space, said shield being secured to the inner wall below the inlet passage and above the outlet passage and extending behind the radiator, pipe sections connecting the several radiators in series, each pipe section extending through openings provided therefor in the posts, and a return pipe extending through the several posts and beneath the several radiators and within the spaces enclosed by the several reflecting shields.

WILLIAM H. MUSSEY.

20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150