June 2, 1970 F. C. PULCRANO 3,515,051

SIDE PLATE STRUCTURE CONDUIT FOR VENTING OF COVERED HOPPER CARS

Filed Dec. 20, 1967 5 Sheets-Sheet 1

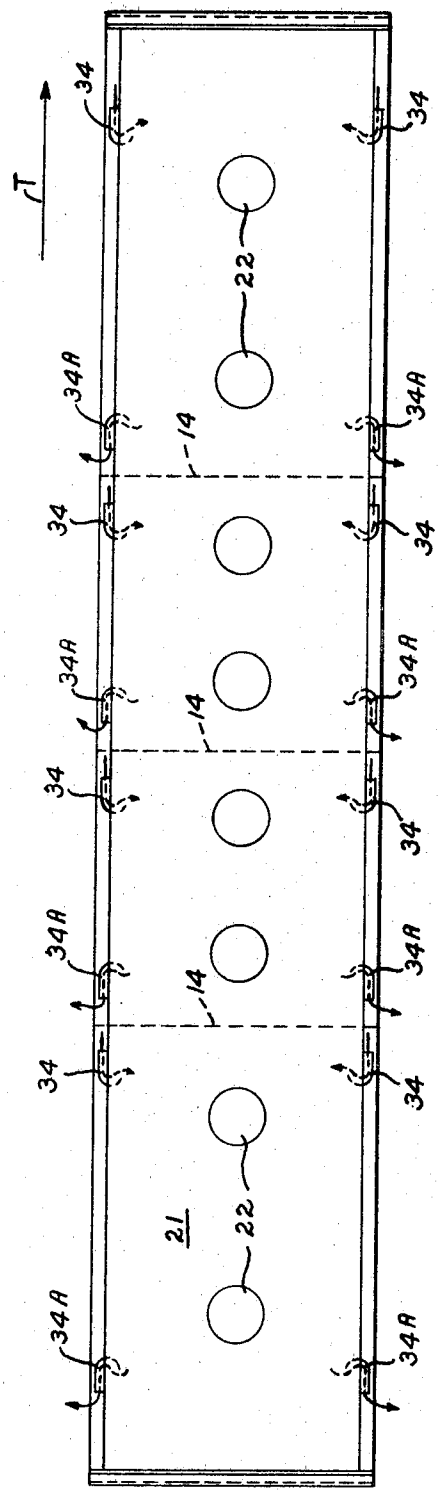


FIG. 2.

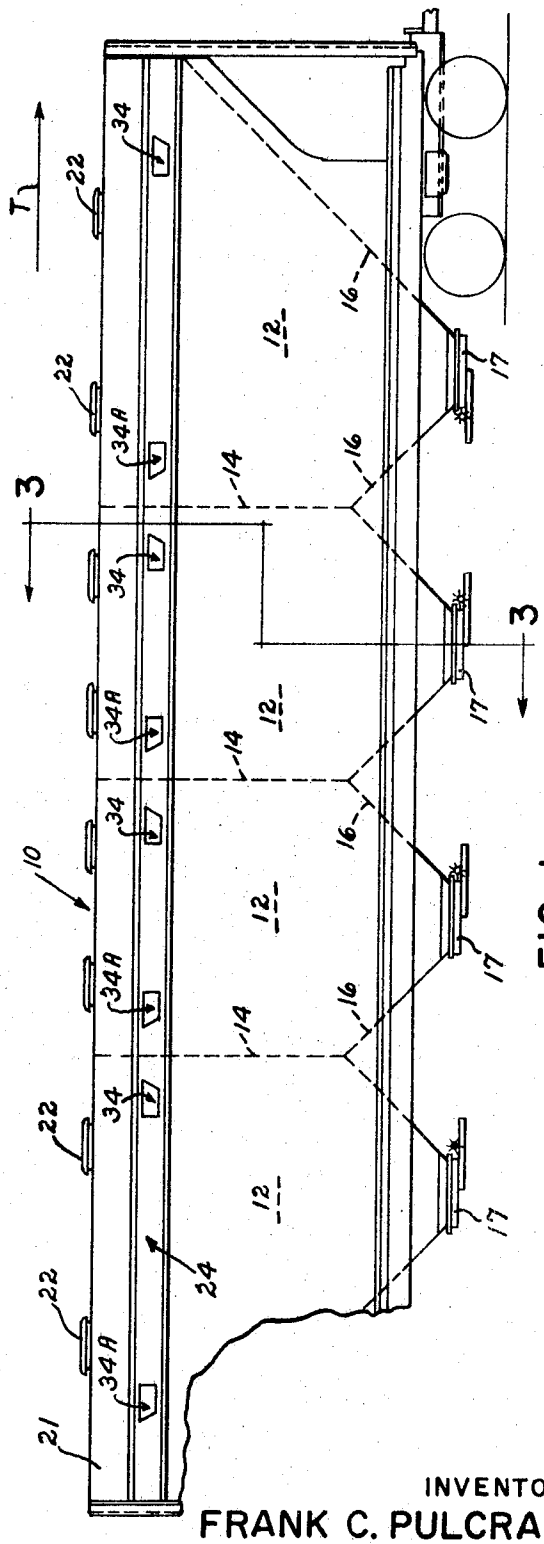


FIG. 1.

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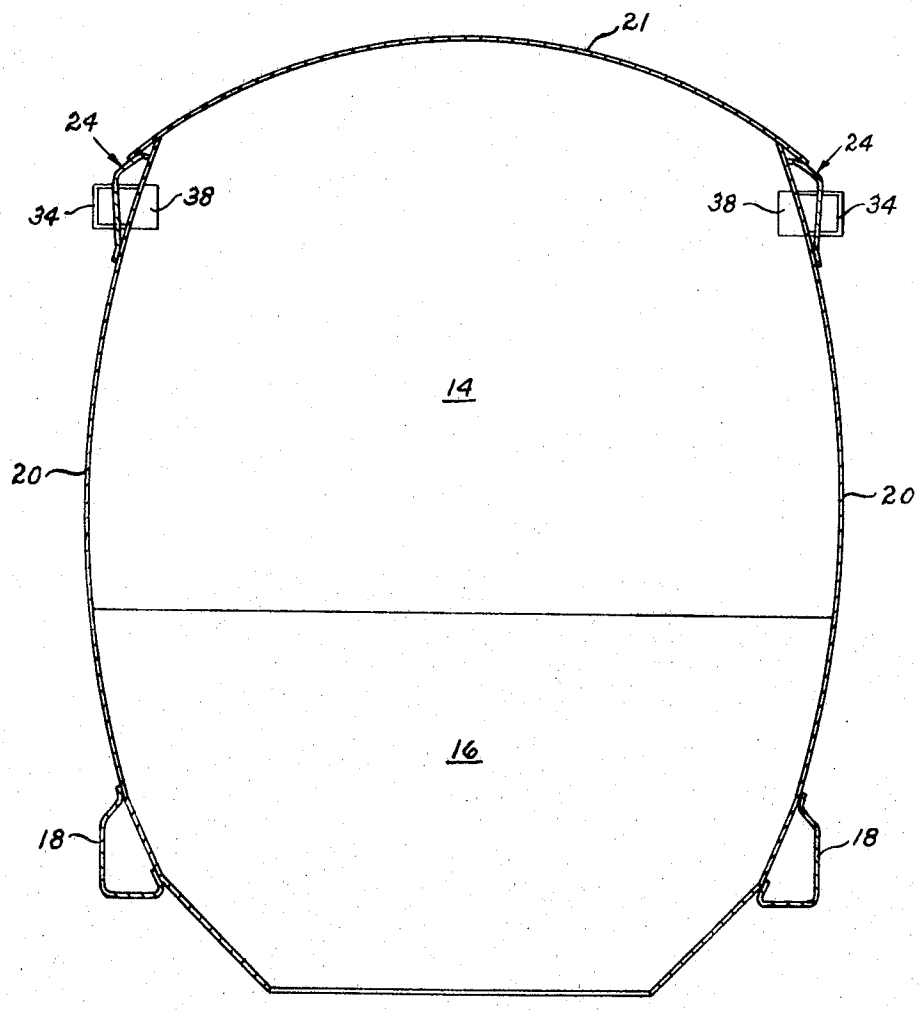


FIG. 3.

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SIDE PLATE STRUCTURE CONDUIT FOR VENTING OF COVERED HOPPER CARS

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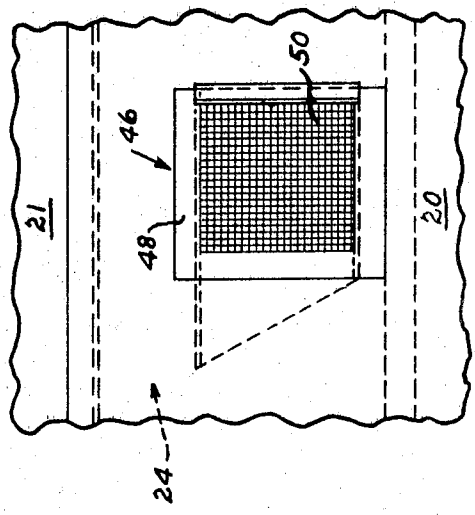


FIG. 5.

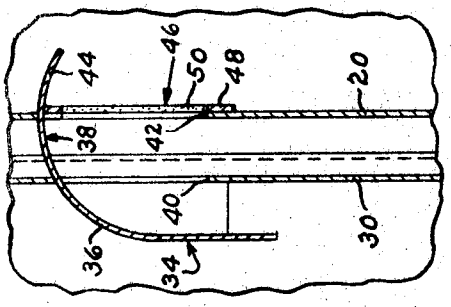


FIG. 7.

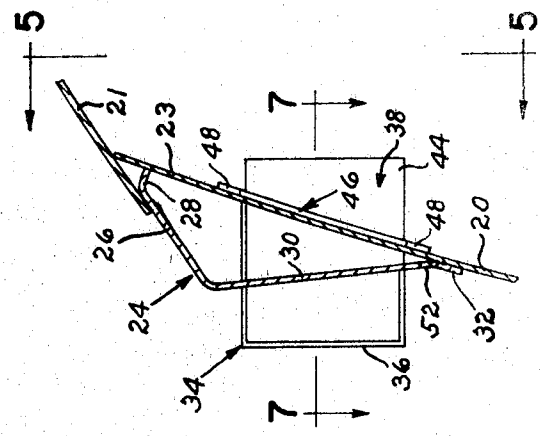


FIG. 4.

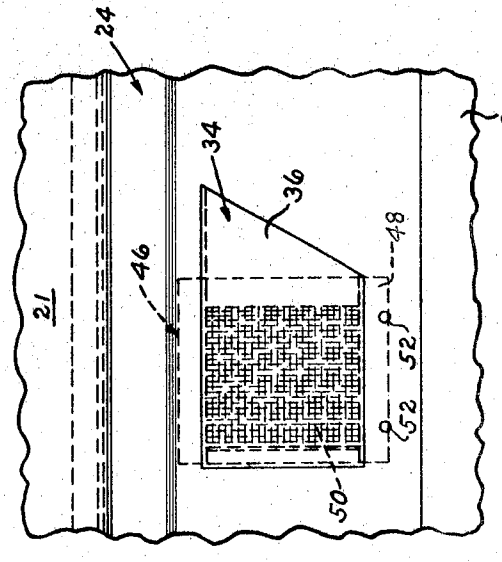


FIG. 6.

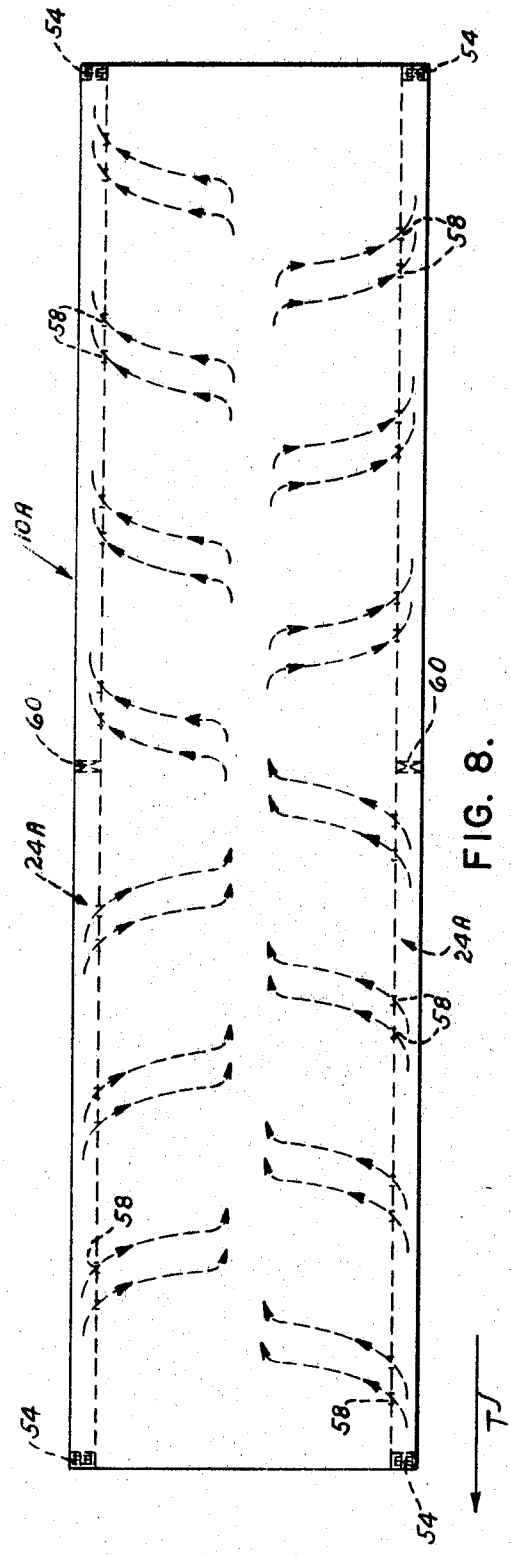


FIG. 8.

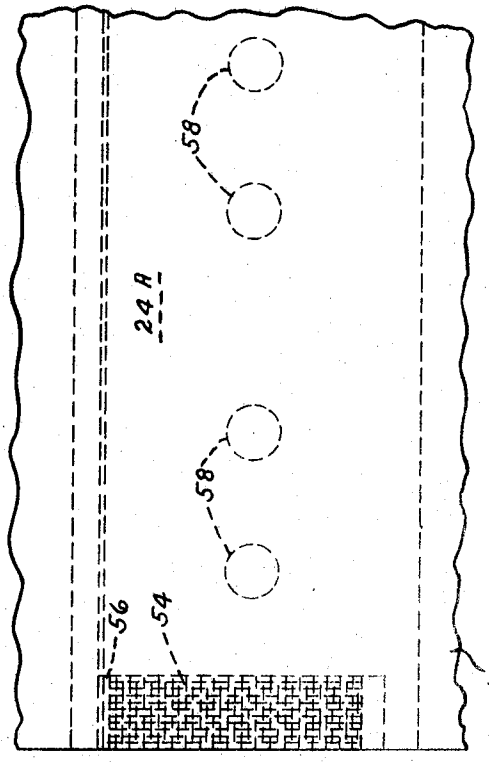


FIG. 9.

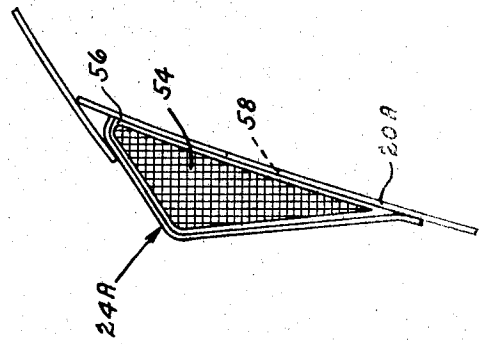


FIG. 10.

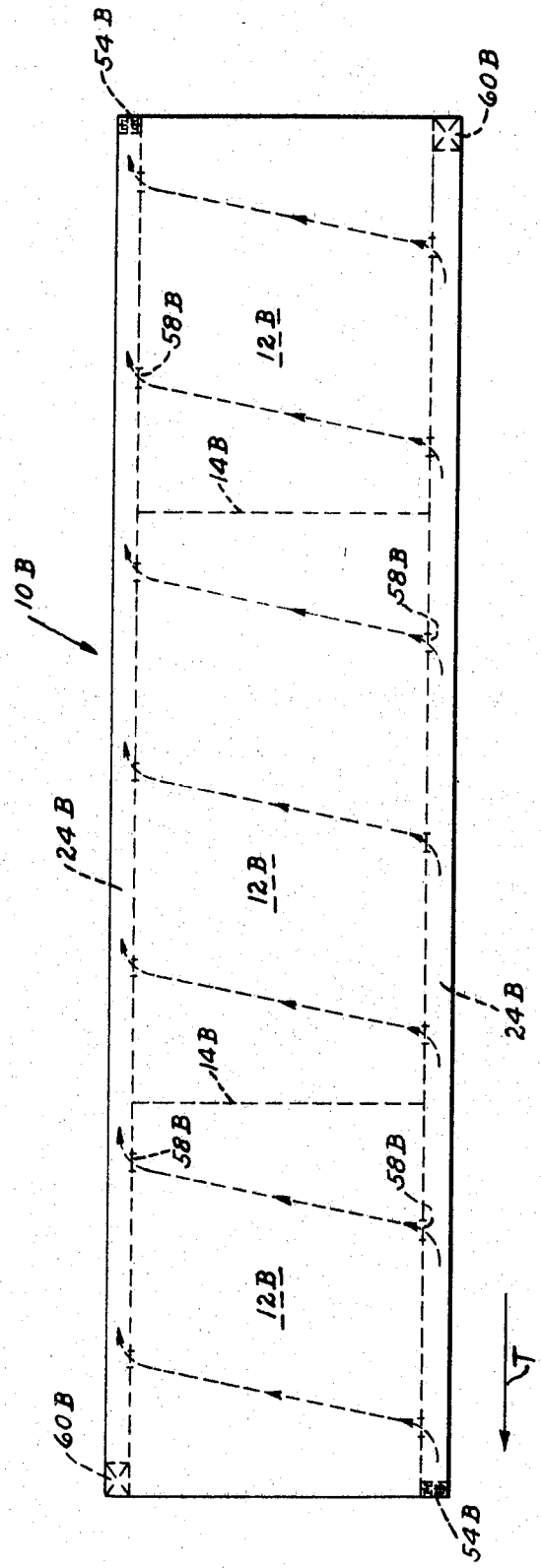


FIG. 11.

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SIDE PLATE STRUCTURE CONDUIT FOR VENTING OF COVERED HOPPER CARS

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Int. Cl. F24f *7/04;* B61d *7/00;* B61f *1/00*

U.S. Cl. 98—6 9 Claims

ABSTRACT OF THE DISCLOSURE

A covered hopper railway car having a hollow side side plate structure forming a conduit extending along the upper portion of each side sheet for the length of the car. One of the side plate structures has an air inlet with respect to the leading end of the railway car and openings in the side plate structure communicate with the interior of the car to supply air thereto. Air is exhausted from the interior of the car through openings in one of the hollow side plate structures communicating with the interior of the car and thence to the atmosphere from an exhaust opening in the hollow side plate structure. Upon a reversal in the direction of travel of the car or a reversal of the trailing and leading ends of the car, the flow of air through the side plate structures is reversed.

Heretofore, railway cars, such as box cars and refrigerator cars, have been vented to the atmosphere to permit ambient air within the car and to exhaust the air from the car. These prior art vents have generally comprised attachments added to the car or modifications made in the car structure.

The present invention utilizes existing structural members of a covered hopper car as both an air inlet to permit ambient air within the car and an air outlet to exhaust air from the interior of the car. The basic design of the structural members is not changed in any manner and only relatively minor modifications of the existing structural members are made for the air inlets and outlets. The side plate structure of the present invention is secured along the upper marginal portion of the side sheet for the length of the car and is of a hollow air-tight construction to provide an air duct extending the length of the car. The hollow side plate structure extends outwardly from the outer face of the side sheet and is a primary load carrying member. Leading end portions of the side plate structure with respect to the direction of travel may be employed as air inlets and trailing end portions of the side plate structures with respect to the direction of travel may be employed as air outlets. If the direction of travel of the car is reversed or if the ends of the car are reversed, the respective air inlets and air outlets are reversed and function respectively as air outlets and air inlets.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the acompanying drawings, in which several of various possible embodiments of the invention are illustrated,

FIG. 1 is a side elevation of one embodiment of a covered hopper railway car having the present invention thereon for aerating the interior of the car;

FIG. 2 is a plan, largely schematic, of the embodiment

shown in FIG. 1 for aerating the interior of the covered hopper car;

FIG. 3 is a cross section taken generally along line 3—3 of FIG. 1 and illustrating the hollow side plate structures adjacent the upper sides of the car;

FIG. 4 is an enlarged fragment of FIG. 3 showing a hollow side plate structure and associated means for admitting and discharging air in the embodiment shown in FIGS. 1–3;

FIG. 5 is a view taken generally along line 5—5 of FIG. 4;

FIG. 6 is a side elevation of the structure shown in FIG. 4;

FIG. 7 is a section taken generally along line 7—7 of FIG. 4;

FIG. 8 is a schematic in plan of an additional modification of means for aerating the interior of a covered hopper car and employing the side plate structures in which air is admitted from the leading ends of the side plate structures and exhausted from the trailing ends of the side plate structures;

FIG. 9 is an enlarged partial side elevation of the modification shown in FIG. 8 and indicating the openings in the side plate structure for admitting or discharging air;

FIG. 10 is an enlarged end elevation section of the filter structure adacjent an end of a side plate structure for filtering the air in the modification of FIGS. 8 and 9; and

FIG. 11 is a schematic in plan of a further embodiment of means for aerating the interior of a covered hopper car in which one hollow side plate structure admits air within the car and the other hollow side plate structure exhausts the air from the interior of the car.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now to the drawings for a better understanding of this invention, and more particularly to the embodiment shown in FIGS. 1–7, a covered hopper railway car is generally indicated **10** and has a plurality of hoppers **12** separated by partitions or bulkheads **14**. Slope sheets **16** lead to bottom discharge openings for the discharge of lading. Slidable gravity gate structures **17** control the discharge of lading from the bottom openings. A side sill **18** extends along each side of car **10** for the length thereof. A side sheet **20** on each side of car **10** is secured along its lower marginal portion to adjacent side sill **18**. Roof **21** is secured along the upper marginal portions **23** of side sheets **20**. Hatch covers **22** on roof **21** permit loading of car **10** with lading.

Reinforcing the upper marginal portion **23** of each side sheet **20** at its juncture with roof **21** is a hollow side plate structure generally indicated **24**. Side plate structure **24** includes an upper leg **26** secured to roof **21** and forming generally a continuation of roof **21** with an inturned lip **28** secured to the adjacent surface of side sheet **20**. A lower leg **30** of side plate structure **24** has a lower marginal portion **32** secured by welding to the adjacent outer surface of side sheet **20**. Side plate structure **24** forms with marginal portion **23** of adjacent side sheet **20** a hollow air-tight structure which may be employed as an air conduit.

In the embodiment illustrated in FIGS. 1–7, the length or section of side plate structure **24** adjacent each hopper **12** has an air inlet chute or scoop generally designated **34** and an air discharge chute generally designated **34A**

with respect to the leading end of railway car **10** facing the direction of travel indicated by arrow T. It is to be understood that upon a reversal in the direction of travel of car **10** or a reversal of the trailing and leading ends of the car **10**, chutes **34A** would be the air inlet chutes and chutes **34** would be the air discharge chutes.

Chutes **34** and **34A** are generally identical but face in opposite directions. Each chute **34**, **34A** includes an outer box-shaped section **36** secured to the outer surface of leg **30** and an arcuate deflector or baffle **38** integrally connected to section **36**. An opening **40** in leg **30** and an opening **42** in side sheet **20** receive arcuate deflector **38** as shown in FIGS. 4 and 7 and permit air flow between the interior of car **10** and atmosphere. Deflector **38** includes a lip **44** extending within car **10** to direct the flow of air within the car when chute **34** is acting as an air inlet, and to direct the air from the interior of the car when chute **34** is acting as an air outlet.

To filter the air passing between the interior of the car and atmosphere, an air permeable filter structure generally indicated **46** is positioned adjacent opening **42**. Filter structure **46** includes a rectangular frame **48** having a filter **50** mounted thereon. Frame **48** is secured, such as by spot welding, to the interior surface of side sheet **20** about opening **42** and the adjacent abutting surface of deflector **38**. Filter **50** may be formed of a suitable filter material, such as a perforated polyethylene sheet material or a fine mesh wire screen having around twenty-five hundred (2500) openings per square inch. Filter **50** minimizes the escape of lading from the interior of the car and minimizes the entrance of any foreign matter within the car from ambient air or atmosphere. Since chute **34** may act as both an air inlet or air outlet dependent on the direction of travel of car **10**, a reversal of air flow through filter **50** aids in cleaning filter **50** and the removal of any adhering foreign matter. To permit moisture or water to drain from side plate structure **24**, drainage openings **52** are provided adjacent the lower end of leg **30** as shown in FIGS. 4 and 6.

As shown in the drawings of the embodiment of FIGS. 1–7, each hopper **12** on each side of car **10** has an air inlet chute **34** and an air outlet chute **34A**. If desired, a single inlet chute for each hopper **12** could be provided on one side plate structure **24** and a single outlet chute for each hopper **12** could be provided on the other side plate structure.

Referring now to another embodiment of this invention shown in FIGS. 8–10, the open ends of side plate structures **24A** act as air inlets and air outlets. A suitable filter **54** is secured across the open ends of each hollow side plate **24A** and comprises a fine mesh wire screen to minimize the entrance of foreign matter. A metallic frame **56** about filter **54** may be suitably secured to the inner surface of side plate structure **24A**. Openings **58** in adjacent side sheet **20A** are spaced along the length of each side plate structure **24A** and permit the flow of air between the interior of the car and the hollow side plate structure **24A**. If desired, a suitable filter could be positioned over openings **58**. To permit one portion of side plate structures **24A** to act as air inlet and the remaining portions to act as air outlets, barriers or partitions **60** are secured within side plate structure **24A** intermediate the length of car **10A** to direct the air inwardly of the car on one side of the barrier. As shown in FIG. 8 with the direction of travel of car **10A** indicated by the arrow T, air is admitted from the leading end of car **10A** and directed within car **10A** through openings **58** on one side of barriers **60**. Air is discharged from the trailing end of car **10A** from side plate structures **24A** on the opposite side of barriers **60**. The embodiment of FIG. 8 is especially adapted for covered hopper railway car **10A** in which air-tight bulkheads are not provided between adjacent hoppers.

In another embodiment shown in FIG. 11, one side plate structure **24B** on car **10B** acts as an air inlet conduit and the other side plate structure **24B** acts as an air discharge conduit. In the event bulkheads **14B** are provided, air is delivered and discharged from each hopper **12B**. A suitable filter **54B** is secured within one end of each side plate structure **24B** and a suitable barrier **60B** is secured within the opposite end of each hollow side plate structure **24B**. It is noted that the leading end of car **10B**, with respect to the direction of travel indicated by arrow T, has only one side plate structure **24B** open to receive air. Thus, the other side plate structure **24B** only acts as an air discharge conduit. In the event of a reversal in the direction of travel of car **10B**, the air flow through the respective side plate structure **24B** would be reversed. Openings **58B** similar to openings **58** in the embodiment of FIGS. 8–10 are provided to permit an air flow between the interior of car **10B** and hollow side plate structures **24B**.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results obtained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A covered hopper railway car comprising, a side sheet along each side of the car, a roof over the car, a side plate structure extending longitudinally of the car for the entire length of the car along the upper marginal portion of each side sheet at the juncture of the roof with the associated side sheet and secured thereto, at least one of said side plate structures forming with the adjacent side sheet an enclosed hollow space providing an air conduit for aerating the interior of said car, air inlet means communicating with said air conduit to permit the entrance of air within the hollow side plate structure, means communicating the hollow side plate structure forming the air conduit with the interior of the car to permit the supply of air thereto, and air outlet means to exhaust air from the interior of the car.

2. A covered hopper railway car as set forth in claim **1** wherein said air inlet means communicating with said side plate structure comprises an open leading end of the side plate structure, and a filter structure is secured within said open outer end to minimize the entrance of foreign matter within the car.

3. A covered hopper car as set forth in claim **1** wherein said air inlet means communicating with said side plate structure comprises a box-shaped chute secured to the outer surface of the side plate structure to direct air within the hollow side plate structure and the interior of the car.

4. A covered hopper railway car as set forth in claim **1** wherein the leading end of one side plate structure constitutes the air inlet means and the trailing edge of the other side plate structure constitutes the air outlet means.

5. A covered hopper railway car as set forth in claim **1** wherein the leading end of one side plate structure constitutes the air inlet means and the trailing end of the same side plate structure constitutes the air outlet means.

6. A covered hopper railway car as set forth in claim **1** wherein the direction of the air flow in the respective side plate structure is reversed upon a reversal of the direction of travel of the railway car.

7. A covered hopper railway car comprising, a side sheet along each side of the car, a side sill extending along the lower marginal portion of each side sheet for the length of the car, a side plate structure extending longitudinally along the upper marginal portion of each side sheet for substantially the length of the car, each side plate structure including an upper portion extending outwardly from the associated side sheet and an integral lower portion extending downwardly from the upper portion and secured to said associated side sheet to form with

the adjacent side sheet a hollow enclosed side plate structure, the leading end of at least one of said side plate structures with respect to the direction of travel of said car being an air inlet to permit air to enter the side plate structure and the trailing end of at least one of said side plate structures being an air outlet to exhaust the air from the interior of the car, and means communicating the interior of the car with said respective trailing and leading ends.

8. A covered hopper railway car as set forth in claim 7 wherein said side plate structure includes drainage openings to permit the drainage of water and the like from the side plate structure.

9. A covered hopper railway car as set forth in claim 7 wherein one side plate structure constitutes an air inlet conduit and the other side plate structure constitutes an air discharge conduit.

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U.S. Cl. X.R.

98—8, 13; 105—247, 248, 360, 409, 418