AIR CIRCULATING MEANS FOR RAILWAY CARS

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This invention relates to an air circulating means for railway cars and more particularly to mountings for air circulating fans above the bulkheads in refrigerator cars.

In railway refrigerator cars, it is common to employ a vertical bulkhead separating the car into ice bunker and lading compartments and which terminate below the car roof for air circulation. In recent years fans have been mounted above the bulkhead to force air to circulate through the car thereby to maintain a more nearly uniform temperature in the car. Such fans have been driven mechanically through power take-off rollers engaging a car wheel, or electrically by individual electric motors on the fans.

In mounting such fans, it is important that they be arranged so that they will not collect frost, ice, salt, or the like which might interfere with their operation. When electric fans are employed, it is important that the wiring connections be protected against moisture, frost, and the like. It is furthermore important in all cases that the fans be so mounted as to be easily accessible for repair or replacement.

It is one of the objects of the present invention to provide an air circulating means for railway cars in which fans are individually mounted for easy service access from the lading compartment of the car.

According to one feature the motor and fans are carried by separate cover members detachably mounted over openings in panel means extending across the car above the bulkhead for easy removal with the cover members for repair or replacement.

Another object is to provide an air circulating means in which wire connections to the fans are so arranged as to provide maximum protection against moisture, frost, and the like, and to provide easy access to the connections for mounting and disconnecting the fans.

According to one feature of the invention, the fans are mounted individually in registry with openings in panel means permanently secured above the bulkhead; and each fan is covered by an individual perforated cover detachably connected to the panel. The wiring connections extend behind the face of the panel means and covers and include terminal blocks covered by separate individual covers for easy access.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings in which:

Figure 1 is a partial section through the upper part of a railway refrigerator car embodying the invention.

Figure 2 is a partial horizontal section on the line 2—2 of Figure 1.

Figure 3 is a partial vertical section on the line 3—3 of Figure 1.

Figure 4 is an elevation of a panel embodying a modified construction.

Figure 5 is an enlarged horizontal section on the line 5—5 of Figure 4.

Figure 6 is an enlarged vertical section on the line 6—6 of Figure 4.

Figure 7 is a perspective view of an individual cover.

Figure 8 is a perspective view of still another panel construction with parts disassembled.

Figure 9 is an enlarged vertical section showing the parts in assembled position.

Figure 10 is a disassembled perspective view of a modified cover construction as used in the embodiment of Figures 11 to 14.

Figure 11 is a partial view similar to Figure 1 of still another panel construction.

Figure 12 is a section on the line 12—12 of Figure 11.

Figure 13 is a section on the line 13—13 of Figure 11; and

Figure 14 is a detailed section on the line 14—14 of Figure 11.

The fan construction as shown in Figures 1 to 3 is illustrated as applied to a conventional railway refrigerator car having a roof 10 and outer side walls 11. The interior of the car is divided by inner side walls 11a spaced from the side walls 11 and a ceiling 16 spaced from the roof 10, the spaces preferably being filled with insulating material, not shown. The car is divided into lading and ice compartments by a vertical bulkhead indicated generally at 12 which is formed by vertically extending spaced beams 13 extending from the floor of the car to the ceiling 16. The beams 13 may be provided with wood filler strips 13b to which the bulkhead covering, the side walls 11a and the panel elements described hereinafter are secured. As shown in Figure 3 the tops of the beams 13 are connected by a channel strip 13c on which the ceiling 16 rests. The rear surface of the beams is covered by a cover plate 14 which is perforated in at least its upper part above the bulkhead to provide for air circulation over the bulkhead. The front surface of the beams is covered by an apron 15 which may conveniently be formed of wooden planks fastened to the beams and which terminates below the interior ceiling of the car as indicated at 16. When the car is in use, air will circulate through the ice compartment over the top of the bulkhead around and over the lading and beneath the floor of the car back to the ice compartment to cool the lading.

The present invention provides air circulating means mounted in the space above the bulkhead to force a circulation of air through the car to insure adequate cooling of the lading. As shown, panel means are provided above the bulkhead which are formed by panels 17 of plywood or the like mounted between and secured to adjacent beams 13 with spaces between certain of the beams left open to receive circulating fans. The panel means is comprised of cover members fitting into the open spaces between the panels 17 and carrying circulating fans to cause circulation of air over the bulkhead. In the embodiment of Figures 1 to 3, the cover means comprises a cover member 18 which may be formed of sheet metal, or the like, to fit between and to be secured to adjacent beams and which is formed with a central opening therein defined by inwardsly turned shrouds 19. The covers 18 may be detachably secured in place by fastenings such as bolts 21 so that they can be removed when desired. As best seen in Figure 3, the cover members are inwardly offset at their upper and lower edges to define one side and the base of an elongated channel 22 extending along the top edge of the panel means adjacent to the ceiling 16 of the car.

The cover members are completed by perforated panels or sheets 23 in the form of open grill work which fit over the openings in the cover members and are secured to the cover members 18 by detachable fastenings such as bolts 20. At their upper edges the panels 23 are im-
perforate and extend to the ceiling of the car to complete the channels 22, as seen in Figure 3. Circulating fans are carried by the cover members, and as shown, each fan comprises an electric motor 24 carrying a series of fan blades 25 which lie within the shrouds 19 to produce a circulation of air over the bulkhead. To mount the fans, mounting brackets 26 are secured to the cover members 18 and engage the motors 24 to hold them securely to the cover members.

Power for operation of the fans is supplied from a generator or other suitable source through a power cable 27 extending upward between the outer and inner walls 11 and 11a at one side of the car and across the car beneath its ceiling 16 behind the panels 17. The cables extend into the channels 22 as indicated in dotted lines in Figure 1 and may be connected to terminal blocks 28 within the channels 22. Leads from the terminal blocks as shown at 29 may extend through the cover members 18 to the motors. It will be seen that access to the termi-

nal blocks for making the necessary wiring connections can easily be obtained by removing the front perforated panels 23 without disturbing any other parts of the assembly. If it is necessary to remove any one of the fans for repair or replacement, the entire cover member can be easily removed, taking with it the fan and motor for convenient repair in a shop or other desired point.

With the fans assembled and energized by current from the source, a positive circulation of air through the lading and ice compartments of the car will be produced so that the lading will be cooled efficiently. The fan assembly can be made up of standard units easily mounted in the car and easily removed and replaced for repair when necessary. It will further be seen that the wiring is enclosed, except for the short leads 29, so that it is protected against frost, ice, salt or the like and is so arranged as to be easily available for making the necessary connections or disconnections.

Figures 4 to 7 illustrate an alternative construction in which the panel is a unitary metal sheet 31 of a size to extend across and fill the space above the bulkhead and which may be permanently attached to the bulkhead. The upper edge of the sheet is offset inward as shown at 32 in Figure 6 to provide a space in which terminal blocks 33 may be mounted and to facilitate connection to the bulkhead. The sheet 31 is formed with spaced openings therein of a size to receive fans and is imperforate between the openings. Cover members are provided to fit into and to be secured over the openings and, as shown, comprise flat sheets 34 having central openings therein which may be punched out to provide a grill as indicated at 35 for flow of air therethrough. The cover members 34 are preferably offset outwardly at their upper edges as indicated at 36, and the upper edges may be cut away centrally of their lengths as shown at 37 in registry with the terminal blocks 33. An annular shroud 38 is secured to each cover member around the perforated central portion thereof and extends inwardly therefrom through the openings in the panel sheet 31. The cover members may be secured to the panel sheet by detachable fastenings such as bolts 39 so that the shrouds will extend into the openings in the panel and the edges of the flat plate 34 will overlie the edges of the openings to be secured thereto.

Each cover member carries a fan assembly comprising an electric motor 41 which is directly secured by bolts 42, or the like, to the central part of the perforated panel 35 and which carries a series of fan blades 43 lying within the shroud 38. The motors 41 are supplied with operating current from a suitable source through a cable 44 which extends behind the solid portions of the panel 31 and upward through the lower flanges of the offset portions 32 to connect to the terminal blocks 33, as shown in dotted lines in Figure 4. In this way, the cable is fully protected throughout its length. The openings 37 in the cover member are closed by short cover plates 45 detachably secured to the upper offset edge 36 of the cover member by bolts 46, or the like. The small covers 45 provide ready access to the terminal blocks 33 without disturbing any other parts of the assembly and engage the motors 41 to hold them securely to the cover members.

To assemble this construction, the panel 31 is first secured more or less permanently to the top of the bulkhead above the apron; and the cover member may then be mounted in the openings in the panel by the bolts 39. With the cover plates 45 in place, access to the terminal blocks 33 can be easily had to complete the necessary wiring connections and the cover plates 45 can then be secured in place to protect the terminal blocks. In the event removal is necessary for repair or replacement, the entire cover member can easily be detached from the panel and removed, taking with it the fan and motor.

Figures 8 and 9 show a modification of the construction of Figures 4 to 7, which comprises a metal panel 47 to extend across and fill the space above the bulkhead apron and which is formed at spaced points in its length with circular openings 48. The panel has integrally formed therewith annular shrouds 49 which surround the openings 48 and extend inward therefrom. At its upper edge the panel 47 may be offset inwardly as indicated at 51 to carry terminal blocks 52 which are connected to the wiring cables in the same manner as illustrated in Figures 4 to 7. Cover members 53 fit over the openings 48 and are detachably secured to the panel 47 by bolts, or the like. Each cover member has a perforated central portion 54 for circulation of air therethrough and which registers with the openings 48 when the cover members are in place. At its upper edge, each cover member is offset, outwardly, as indicated at 55, to define with the offset 51 of the panel a closed channel for the reception of the wiring. The cover members may be cut out at their central portions for access to the terminal blocks 52, and detachable cover plates 56 may be provided to permit access to the terminal blocks without disturbing the cover member assembly. Each cover member carries a fan unit, including a motor 57, directly bolted to the central part of the cover member and carrying fan blades 58 lying within the shrouds 49. Apart from the fact that the shrouds 49 are in this construction integral with the panel 47 rather than with the cover members, the construction of Figures 8 and 9 is substantially similar to that of Figures 4 to 7.

Figures 10 to 14 illustrate a further alternative construction which is similar in many respects to the embodiment of Figures 1 to 3. As shown in Figures 11 to 13, the bulkhead apron 61 terminates below the ceiling of the car, as shown at 62, and the bulkhead beams 63 extend above the apron to the car ceiling. The back of the bulkhead is covered by metal cover plates 64 which are omitted at least at the upper part of the bulkhead above the apron between certain of the beams 63 and are replaced by perforated cover sheets 65 for air circulation. At the front of the bulkhead, solid panels 66 of plywood, or the like, are secured between the top of the apron and the car ceiling between adjacent beams in registry with the solid back sheet 64. The panels 66 are omitted between adjacent beams in registry with the perforated sheets 65 to leave openings for air circulation.

Covering the like, to the central part of the perforated panel 35 and which carries a series of fan blades 43 lying within the shroud 38. The motors 41 are supplied with operating current from a suitable source through a cable 44 which extends behind the solid portions of the panel 31 and upward through the lower flanges of the offset portions 32 to connect to the terminal blocks 33,
back perforated cover sheets 65 as best seen in Figure 12.

Each cover member carries an annular shroud 71 extending inward therefrom around the perforated central portion 68 thereof. In addition, each cover member carries a fan assembly, including a motor 72 secured directly to the center part of the perforated sheet portion 68 and carrying fan blades 73 lying within the shroud 71. To provide space for wiring to the motors, the panels 66 terminate beneath the ceiling 62 of the car, as best seen in Figure 14. Angle strips 74 are secured to the ceiling of the car and project into the space so provided and may carry terminal blocks 75 centrally of the panels 66. The space in front of the terminal blocks is covered by a detachable cover strip 76 secured to the face of the panels 66 and to the ceiling of the car as shown.

To assemble the cover members and fan units, the cover members may be attached to the front of the bulkhead between the panels 66 with the cover strips 76 removed. Wiring leads from the fan motors 72, as shown at 77 in Figure 10, may be led over the panels 66 to the terminal blocks and after the necessary connections are made the cover strips 76 may be secured in place. It will be understood that the cover strips 76 extend only over the panels 66 between the cover members 67 and that the cover members 67 may extend completely to the ceiling of the car, as shown in Figure 13. In this way, the wiring is adequately covered and protected and is yet easily available for making any necessary connections and disconnections. In this assembly also the entire cover members may be removed as units for repair or replacement simply by disconnecting the motor leads 77 from the terminal blocks 75 and removing the entire cover member assemblies.

While several embodiments of the invention have been shown and described in detail, it will be understood that these are for the purpose of illustration only and are not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. In air circulating means for railway cars and the like, a bulkhead extending across the car and terminating beneath the roof of the car and spaced from one end thereof to separate the car into a lading space and a bunker space, means defining a panel extending across the car above and in vertical alignment with the bulkhead and having an opening therethrough and being offset adjacent one edge to define a recess extending longitudinally of the panel, a fan including an electric motor and a series of fan blades projecting from the motor lying in the opening in the panel wiring connections extending in the recess adjacent said one edge of the panel and including a terminal block adjacent to the opening, connections from the terminal block to the motor, a cover plate detachably secured to the face of the panel facing the lading space and having a perforate central portion registering with the opening in the panel and having an edge portion overlying the recess in said edge of the panel and enclosing the wiring connections and terminal block, and means for securing the motor to the cover to mount the fan in the panel.

2. In air circulating means for railway cars and the like, a vertical bulkhead in the car terminating below the ceiling thereof, means forming a panel extending across the car above the bulkhead and in vertical registry therewith and formed with spaced openings therethrough, said panel being offset adjacent one edge to define a recess, separate cover members detachably secured to the panel in registry with the openings respectively, said covers having flat edge portions extending over the offset edge of the panel and cooperating with the recess to define terminal housings, an electric motor and fan unit carried by each cover member to circulate air through the corresponding opening, electric terminal blocks mounted in the recessed part of the panel means, connections from the motors to the terminal blocks respectively, the cover members being cut away in registry with the terminal blocks, and separate covers detachably secured to the first named cover members over the terminal blocks for access thereto without disturbing the first named cover members.

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